



# PART TWO

## explanatory section

### EAST BALDIVÍS LOCAL STRUCTURE PLAN

1. Planning Background Structure Plan Area
2. Site Conditions and Constraints
3. Land Use and Subdivision Requirements

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# EAST BALDIVIS STRUCTURE PLAN – PART TWO EXPLANATORY REPORT

## 1 PLANNING BACKGROUND

### 1.1 Introduction & Purpose

The purpose of East Baldivis Structure Plan is to provide a basis for zoning (including residential density), subdivision and development of Lots 104, 105, 541, 543, 544 and 1000 Baldivis Road, Baldivis, generally for residential purposes.

The information contained in this section provides justification and support for the comprehensive and co-ordinated design response provided for the site.

### 1.2 Background

In February 2012, the WAPC resolved to lift the 'Urban Deferment' zoning exclusively for Australand Holdings Ltd (now Frasers Property) and Bonvest Pty Ltd Co-Venture ('Co-Venture') landholdings (MRS Amendment 1229/27 gazetted 13<sup>th</sup> March 2012 refers.) This was primarily in response to the proponent demonstrating the ability to provide service infrastructure (namely sewer) to the East Baldivis Local Structure Plan ('Structure Plan') area; the key issue impeding development of the broader East Baldivis cell.

Subsequent to the Lifting of Urban Deferment, in June 2012 the City of Rockingham initiated a Town Planning Scheme Amendment (Amendment No. 122) to rezone the Structure Plan area from 'Rural' and 'Special Rural' to 'Development'; this being undertaken in accordance with Section 124 of the Planning and Development Act 2005. The rezoning of the land was gazetted on 26 March 2013.

The Structure Plan was lodged following the exclusive Lifting of Urban Deferment of the Co-Venture landholding. The Structure Plan was subsequently adopted by the City of Rockingham Council in July 2013 and endorsed by the WAPC in February 2014.

An amendment to the Structure Plan, 'Modification 1', was submitted to the City of Rockingham in April 2014. Modification 1 involved a minor reconfiguration to the road network, and subsequently residential cells and POS in the central-western portion of the site. Modification 1 was approved in July 2014.

In response to WAPC Bulletin 112 – *Medium-density single house development standards*, 'Modification 2' to the Structure Plan was proposed and approved in August 2015. The intent of Modification 2 was to embed WAPC Bulletin 112 and the *Medium-Density Single House Development Standards* (R-MD Codes) into the Structure Plan. With the advent of the *Planning and Development (Local Planning Schemes) Regulations 2015* (the Regulations) and the City of Rockingham's Planning Policy 3.3.22, the R-MD Codes have been removed from Part 1 of the Structure Plan report and the Structure Plan map (Plan 1).

Since approval of the Structure Plan, several conditional subdivision approvals have been granted within the Baldivis Parks Estate. In September 2013, a subdivision application was lodged with the WAPC for the entire Baldivis Parks Estate. Conditional approval (WAPC Ref: 148669) for this 866 lot subdivision, including 864 residential lots, 2 residential 'balance' lots (for small lot product) and 2 retained lots was granted by the WAPC in March 2014. Under Condition 1 of subdivision approval (WAPC Ref: 148669), two (2) 'Grouped Housing' lots were excluded from the approved Plan of Subdivision.

Conditional approval (WAPC Ref: 149979) was granted in July 2014 over the previously excluded land for two Grouped Housing Lots under WAPC Ref: 148669.

In August 2014, Conditional approval (WAPC Ref: 149987) was granted for a portion of the Baldivis Parks project area intended to be developed as a display village. Subsequently, in order to facilitate greater diversity of lot product within the southern portion of the Baldivis Parks project area, an additional subdivision application (WAPC Ref: 150244) was lodged and approved in September 2014.

A subdivision application (WAPC Ref: 151508) was approved in May 2015 to facilitate the development of five (5) green-title lots over the northern Grouped Housing Site (Lot 1) of Conditional Subdivision Approval WAPC Ref: 149979. Subsequently, two additional survey-strata subdivisions (WAPC Ref: 438-15 & 439-15) were submitted and approved in July 2015 to facilitate small lot product over green-title lots approved under WAPC Ref: 151508.

## 1.3 Planning Framework

### 1.3.1 Location

The Structure Plan area is located approximately 40 kilometres to the south-west of Perth's Central Business District within the eastern portion of the City of Rockingham, and is situated approximately 9 kilometres south-east of the Rockingham Regional Town Centre. The subject land is generally bounded by Kwinana Freeway to the east, Baldvis Road to the west, and other privately owned allotments to the north and south (**Plan 2** refers).

### 1.3.2 Ownership, Area and Legal Description

At the time of its inception, the Structure Plan comprised seven landholdings totalling approximately 59.07 Ha in area, as detailed in Table 1 below. Since the approval of the Structure Plan in 2013, approximately 303 residential lots have been titled within the Baldvis Parks Estate to date. Certificates of Title for the original seven landholdings are attached as **Appendix 7**.

**Table 1 – Land Ownership**

Lot Number	Owner	Certificate of Title	Area (Ha)
1000	Nicrow Nominees Pty Ltd	2602/283	32.89 Ha
541	Australand Holdings Ltd	2208/270	3.56 Ha*
105	Australand Holdings Ltd	2181/376	6.34 Ha
104	Australand Holdings Ltd	2181/375	2.00 Ha
543	Australand Holdings Ltd	2167/195	6.69 Ha
544	Australand Holdings Ltd	2045/362	6.59 Ha
Unconstructed Road Reserve	State of Western Australia	NA	1.005 Ha
<b>Total</b>			<b>59.07 Ha</b> (including Road Closure)

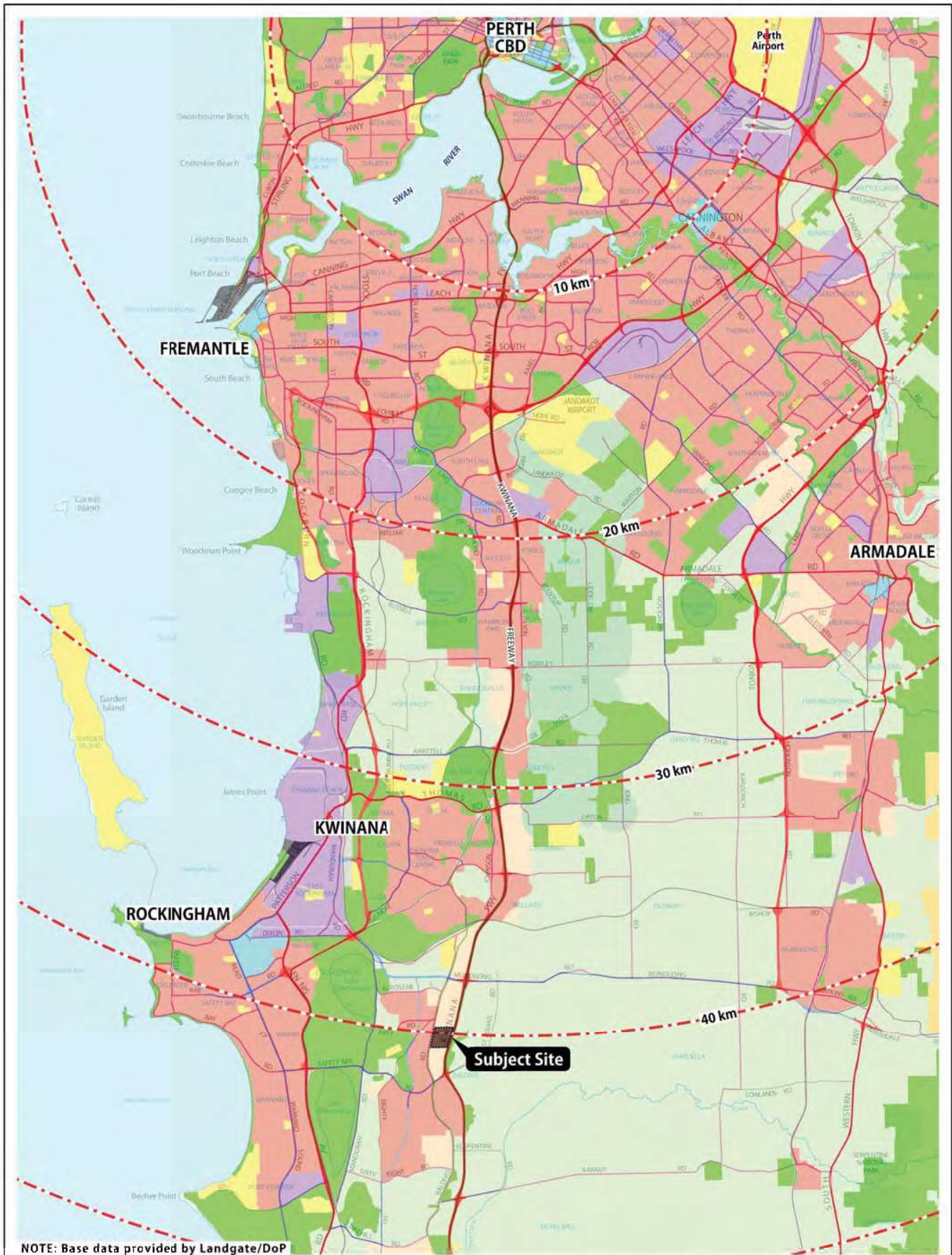
\*NB – Land areas based on DOLI data. A 0.1 Ha discrepancy exists between DOLI and Certificate of Title information.

### 1.3.3 Land Use

The Structure Plan area has previously been used for general farming and grazing, and is generally parkland cleared. Original 'homesteads' and associated outbuildings can be found across the landholding (**Plan 3** refers). Two of these homesteads (Lot 104 and 541) are intended to be retained on site, and have been incorporated into the Structure Plan design. Each site is connected to telephone and power.

The land is generally low lying with a slight central sand ridge running roughly north – south through the centre of the site. The low area between this ridge and Baldvis Road includes an open swale accommodating the Water Corporation's unregistered Main Drain.

The current land use of the Structure Plan can be best described as transitional, with the historic (discontinued) general farming and grazing uses being replaced with residential development over time.





NOTE: Base data provided by Landgate/DoP

## Plan 2 - Location Plan

Various lots Baldvis Road, EAST BALDIVIS

for: Frasers Property



		Scale 1:200 000 @ A4 	
COMPILED: CD+P	DATE: 06/08/2013	DRAWN BY:	REVISION: 09/06/2016
GRID: MGA 50	DRAWING NUMBER: AUSEB-S-014	DATUM:	JOB CODE: AUSEBSP
FILE ID: M:\AUSEB\REPORT DIAGRAMS\AUSEB-S-014			

A 28 Brown St,  
East Perth WA 6004

P (08) 9325 0200

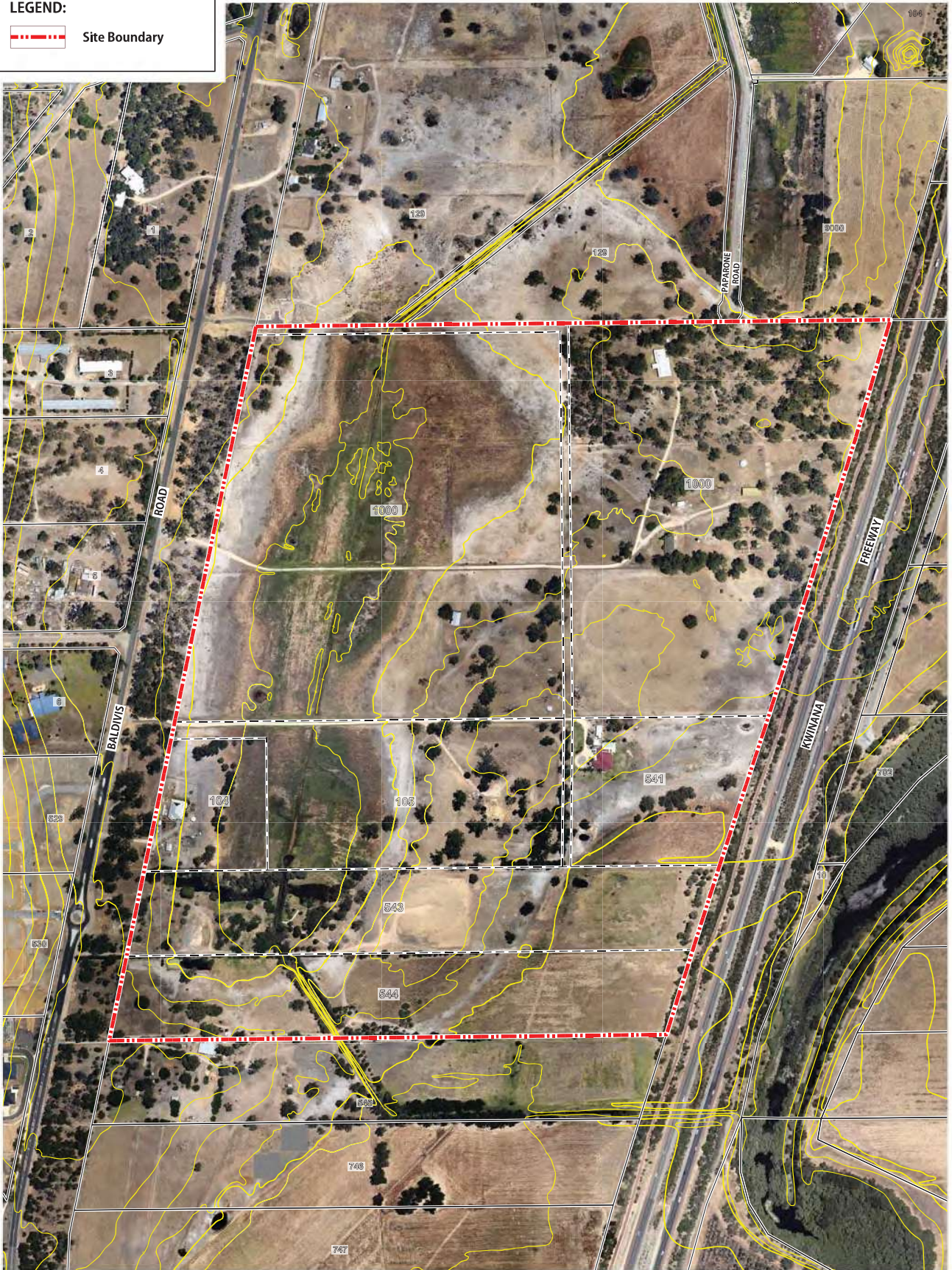
E info@creativdp.com.au

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**LEGEND:**

 Site Boundary





**PLAN 3 - Site Plan and Orthophoto**

Various lots Baldvis Road, EAST BALDIVIS

for: Frasers Property



 NORTH Scale 1: 6000 @ A4 	
COMPILED: CD+P	DRAWN BY: JP
DATE: 13/6/2012	REVISED: 09/06/2016
GRID: MGA 50	DATUM: AHD
DRAWING NUMBER: AUSEB-5-015	JOB CODE: AUSEBSP
FILE ID: M:\AUSEB\REPORT DIAGRAMS\AUSEB-5-015	

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## 2 SITE CONDITIONS & CONSTRAINTS

### 2.1 Zoning & Reservations

#### 2.1.1 Metropolitan Region Scheme

Under the provisions of the Metropolitan Region Scheme the Structure Plan area is currently zoned 'Urban' following the 13<sup>th</sup> March 2012 gazettal of MRS Amendment 1229/27 (**Plan 4** refers).

#### 2.1.2 City of Rockingham Town Planning Scheme No.2

Under the provisions of the City of Rockingham Town Planning Scheme No.2 ('the Scheme'), the Structure Plan area is zoned 'Development'. The Structure Plan area was gazetted 'Development' pursuant to Section 124 of the Planning and Development Act 2005; subsequent to the lifting of the *Urban Deferred* zoning under the MRS in March 2012. Scheme Amendment No. 122 was gazetted on 26 March 2013.

### 2.2 Baldvis (East) District Structure Plan 2012

The East Baldvis DSP was initially lodged with the City of Rockingham in February 2010 under the guidance of Baldvis East Stakeholder Team (BEST); a collaborative landowner forum of mainly professional developers and development consultants. Preliminary assessment and subsequent BEST revisions were undertaken in June 2011 and August 2012. Consent to advertise was granted by Council in February 2013 and the DSP was conditionally approved by Council on 25 February 2014.

The DSP provides a development framework which sets out development principles for the urban development of the DSP area, a broad physical layout of land uses, public transport, road layout, schools, open space, and major infrastructure. The DSP also provides the basis on which more detailed Local Structure Plans can be produced.

The East Baldvis DSP identifies the entire East Baldvis Local Structure Plan area as 'Residential'; thus generally unaffected by external development, namely the final location of the proposed High School site and District Open Space further to the north in the vicinity of Zig Zag Road. The only 'district' level design elements influencing the Structure Plan design relate to the proposed north-south aligned Neighbourhood Connector roads traversing the central portion of the East Baldvis cell, and meandering alignment of the district drainage corridor dissecting Lot 129, the Co-venture landholdings and Lot 545 (**Figure 1** refers).

The DSP includes a major road connection with Baldvis Road, that linking with Amazon Drive which will ultimately connect to Nairn Drive and beyond. The DSP road network however does not preclude additional connection points onto Baldvis Road; this matter to be explored by the more detailed Structure Plan's for each respective landowner/developer.

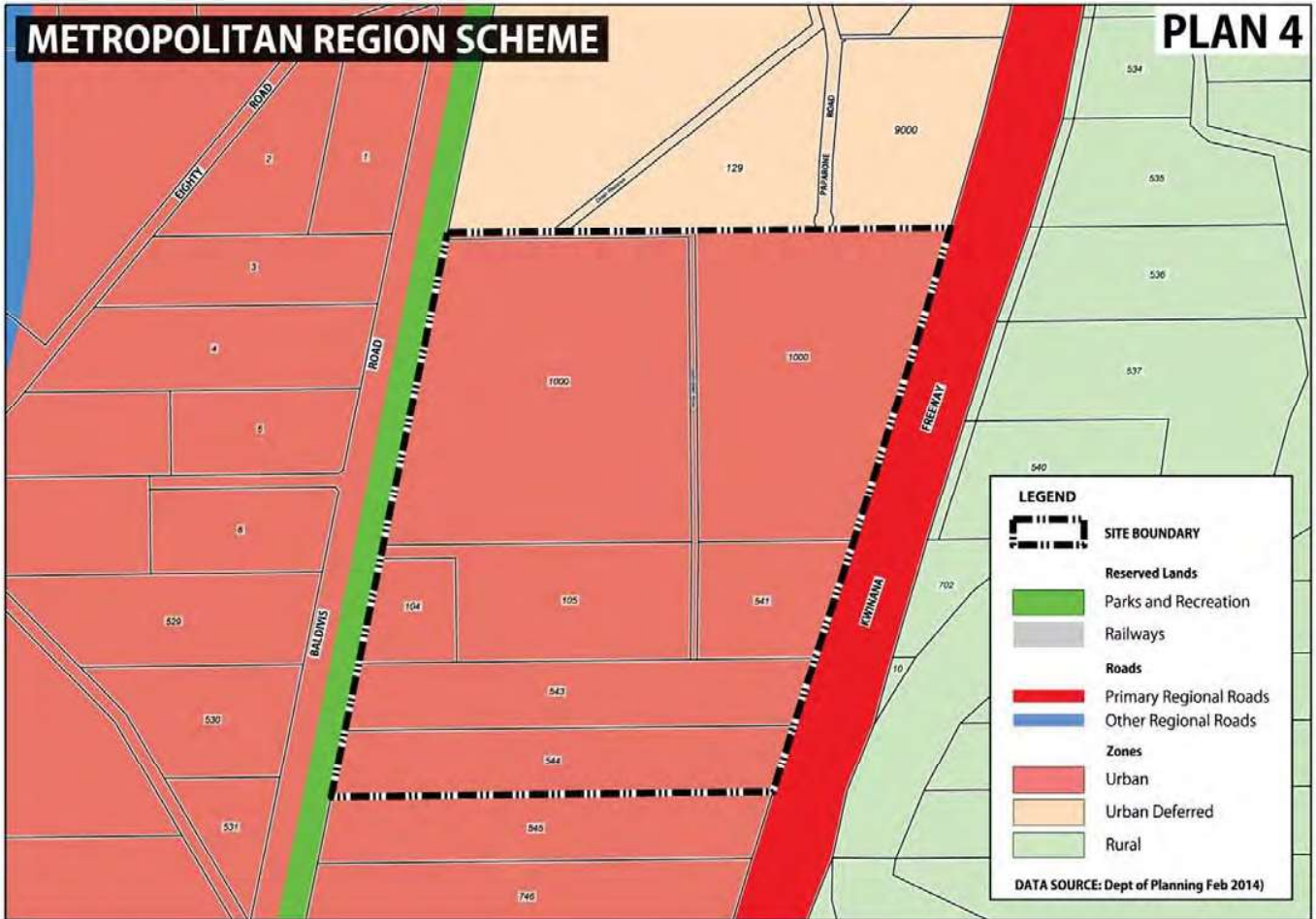
### 2.3 Key State Government Strategies and Policies

#### 2.3.1 Directions 2031– Spatial Planning Framework for Perth and Peel (2009)

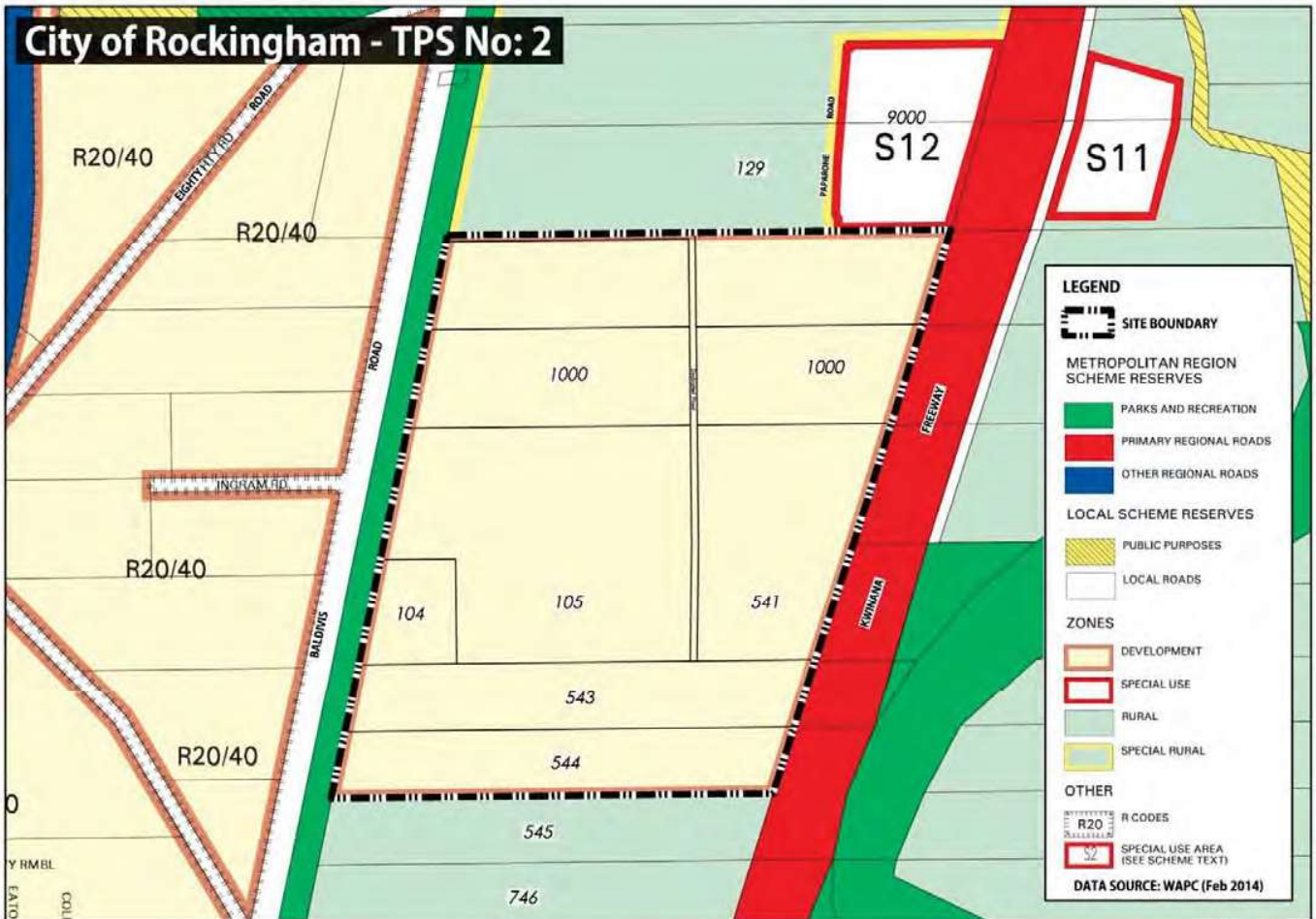
*Directions 2031*, the WAPC's strategic planning framework document for Metropolitan Perth and Peel, is a high level strategic plan that establishes a vision for the future growth of the Perth and Peel region. It provides a framework to guide the detailed planning and delivery of housing, infrastructure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

# METROPOLITAN REGION SCHEME

# PLAN 4



# City of Rockingham - TPS No: 2



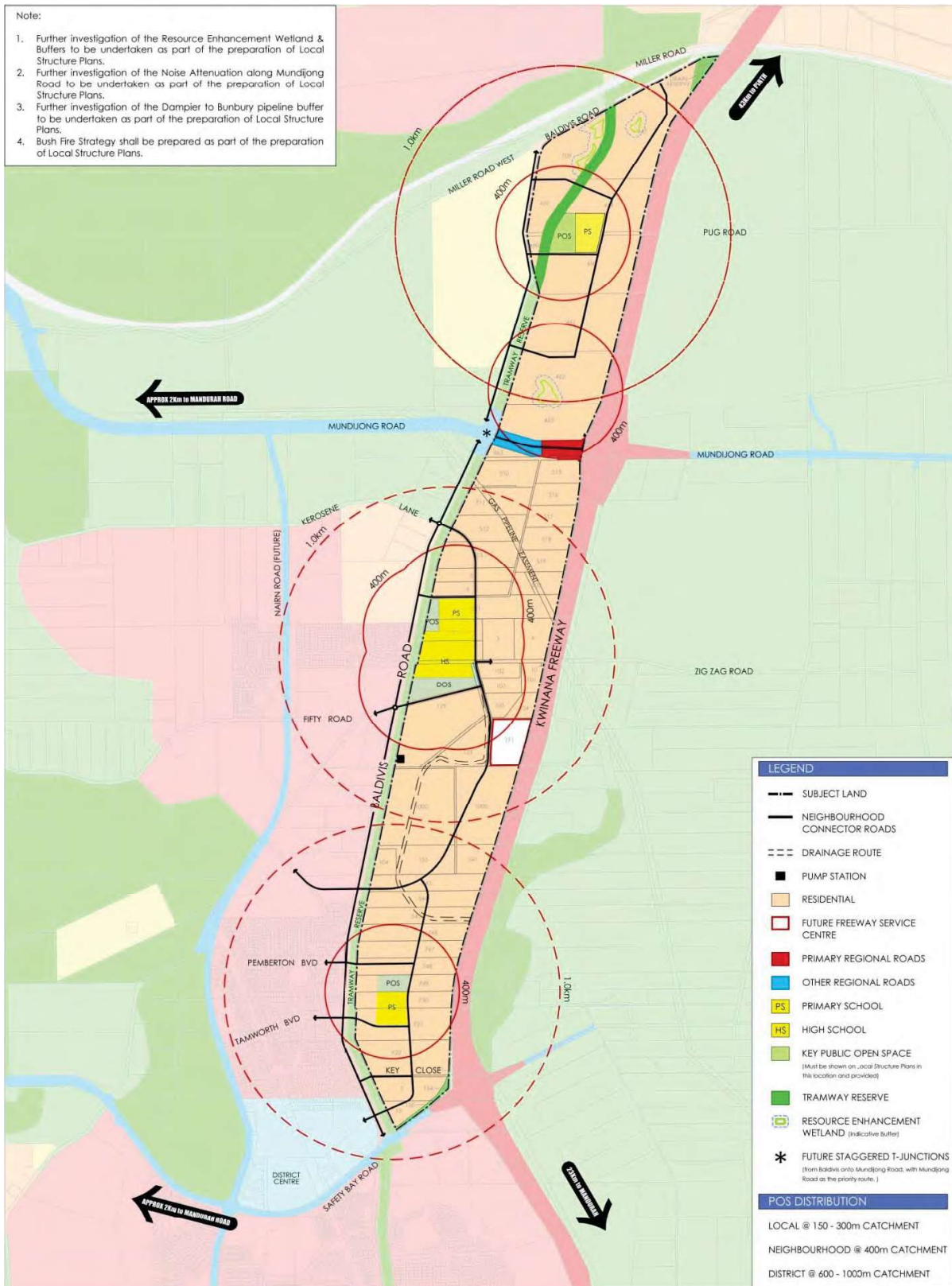


Figure 1 – East Baldvis District Structure Plan (as Conditionally Approved – Feb 2014)

Broadly defined, the Structure Plan is located within the 'South-West Sub-Region', which encompasses the Cockburn, Rockingham and Kwinana Local Governments.

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, and for which the document aims to have 70% of the total workforce employed locally.

### 2.3.2 Draft Outer Metropolitan Perth and Peel, Sub-Regional Strategy

The *Draft Outer Metropolitan Perth and Peel, Sub-Regional Strategy* (OMSRS) provides a framework for the delivering of 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 is identified as an 'Urban Deferred Zoned Undeveloped' site; thus partly outdated based on the recent MRS Amendment to 'Urban' of the Structure Plan area. Referenced as 'BA4' in the South-West sub-region spatial framework map, the total site (south of Mundijong Road) is projected to yield approximately 3,200+ dwellings, based on a 'Connected City' development model of 15 dwellings per gross urban zoned hectare; or 2,100 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 Sub-Regional Strategy 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 broader East Baldivis area has several large physical restrictions (e.g. gas pipeline corridor, drainage) and public infrastructure expectations (e.g. 3 x primary and 1 x secondary school) that would not have been taken into consideration in this strategic document. Consequently, dwelling projections are marginally lower than expected for the broader East Baldivis 'BA4' landholding and the area north of Mundijong Road.

This issue highlights some inconsistencies of dwelling projections in this strategic document; however this issue will be rectified pending the endorsement of the East Baldivis DSP by the City of Rockingham and WAPC. Notwithstanding the above, the Structure Plan area in isolation, given it has very few site restrictions, will provide suitable dwelling yields conforming to *Directions 2031* targets, as detailed later in this document.

### 2.3.3 Statement of Planning Policy 2.1 - Peel Harvey Coastal Plain Catchment

The Peel-Harvey Coastal Plain Catchment Policy ensures that land use changes within the Peel-Harvey estuarine system likely to cause environmental damage to the estuary are brought under planning control and prevented. The objectives of this policy are to:

- Improve the social, economic, ecological, aesthetic, and recreational potential of the Peel-Harvey coastal plain catchment;
- Ensure that changes to land use within the catchment to the Peel-Harvey estuarine system are controlled so as to avoid and minimise environmental damage;
- Balance environmental protection with the economic viability of the primary sector;
- Increase high water-using vegetation cover within the Peel-Harvey coastal plain catchment;
- Reflect the environmental objectives in the draft Environmental Protection Policy (Peel-Harvey Estuarine System) 1992; and
- Prevent land uses likely to result in excessive nutrient export into the drainage system.

The Structure Plan is in accordance with SPP 2.1. There are no development implications for the site as a result of this policy. The Structure Plan incorporates Water Sensitive Urban Design principles and Best Management Practice to prevent excessive nutrient export into the drainage system, will improve social, aesthetic, environmental and recreational potential within the catchment and aims to balance environmental protection with economic viability within the region.

### 2.3.4 Statement of Planning Policy 5.4 - Noise Considerations

This policy aims to promote a system in which sustainable land use and transport are mutually compatible. The objectives of this policy are to:

- protect people from unreasonable levels of transport noise by establishing a standardised set of criteria to be used in the assessment of proposals;

- protect major transport corridors and freight operations from incompatible urban encroachment;
- encourage best-practice design and construction standards for new development proposals and new or redeveloped transport infrastructure proposals;
- facilitate the development and operation of an efficient freight network; and
- facilitate the strategic location of freight handling facilities.

The policy is accompanied by *Implementation Guidelines* which purpose is to assist users with the application and implementation of the policy. The policy and these guidelines apply to proposals for new noise-sensitive developments, new railways or major roads, major redevelopments of existing railways or major roads, and new freight handling facilities. The policy and guidelines do not apply to noise from existing railways or major roads in the vicinity of an existing noise-sensitive land use, or an increase in traffic along an existing railway or major road in the absence of a major redevelopment.

This Policy informs the Structure Plan design, particularly along the Kwinana Freeway boundary to the east.

### 2.3.5 State Planning Policy 3.7 - Planning in Bushfire Prone Areas

The Department of Planning and WAPC have released State Planning Policy 3.7 Planning in Bushfire Prone Areas (December 2015) (SPP 3.7). SPP 3.7 aims to:

- Avoid any increase in the threat of bushfire to people, property and infrastructure. The preservation of life and the management of bushfire impact are paramount
- Reduce vulnerability to bushfire through the identification and consideration of bushfire risks in decision-making at all stage of the planning and development process
- Ensure that higher order strategic planning documents, strategic planning proposals, subdivision and development applications take into account bushfire protection requirements and include specific bushfire protection measures
- Achieve an appropriate balance between bushfire risk management measures, biodiversity conservation values and landscape amenity, with consideration of the potential impacts of climate change.

SPP 3.7 (WAPC 2015) makes provision for further detailed bushfire hazard assessment to be undertaken for areas identified as bushfire prone within the Map of Bush Fire Prone Areas. It also outlines the information that is required to support the various stages of planning and the potential for bushfire conditions to be applied through the subdivision process.

This Policy informs the Structure Plan design, particularly along the Kwinana Freeway boundary to the east, and Baldivis Tramway Reserve boundary to the west.

### 2.3.6 Guidelines for Planning in Bushfire Prone Areas (December 2015)

The Guidelines for Planning in Bushfire Prone Areas (December 2015) ('the Guidelines') have been prepared by the WAPC and DFES, to assist in the interpretation of SPP 3.7 and provide advice on planning, designing or assessing a proposal within a bushfire prone area. The Guidelines are the predominant document to be used by decision-making authorities and referral agencies when considering the appropriateness of strategic planning proposals, subdivisions and development applications.

The Guidelines address important bushfire risk management and planning issues, as well as outlining performance criteria and acceptable solutions to minimize the risk of bushfires in new subdivisions and developments. The Guidelines also address management issues including location, siting and design of the development (and consideration of Bushfire Attack Level (BAL) ratings), vehicular access and water requirements.

Portions of the site have been identified as "Bushfire Prone Areas" under the state-wide Map of Bush Fire Prone Areas released by the Office of Bushfire Risk Management (OBRM) (2016), as shown in Figure 2 of the Bushfire Management Plan (BMP) enclosed at **Appendix 2** of this report. The identification of Bushfire Prone Areas within any portion of the site requires a further assessment of the bushfire hazard implications on development proposed within the site, in accordance with the Guidelines.

Given that the Structure Plan abuts areas of remnant bushland, planning for bushfire protection is imperative and requires a level of 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 the Structure Plan design. The Structure Plan road and cell design has resultantly been influenced by a detailed Bushfire Management Plan (**Appendix 2** refers). The BMP will provide guidance for detailed subdivision design to ensure all fire mitigation strategies, such as appropriate building setbacks, landscaping and interface treatment of the zone between the bushland and residential development is achieved.

### **2.3.7 City of Rockingham Urban Growth Programme (2009)**

The City of Rockingham *Urban Growth Programme* has been prepared by the City to assist in understanding the likely pattern of urban growth to 2031. The *Urban Growth programme* recognises the subject land as being developed for urban purposes, with commencement of development forecast between 2012 and 2016.

### **2.3.8 City of Rockingham Developer Contribution Plan No. 2**

Development Contribution Plan No.2 will assist in the funding of community infrastructure by requiring landowners to pay a contribution when their land is subdivided or developed. The introduction of developer contributions is provided for by *State Planning Policy No.3.6 - Developer Contributions for Infrastructure*.

The requirement for contributions is proposed to be controlled by provisions under the City's Town Planning Scheme No.2, pursuant to Amendment No.114. Adopted for Planning Approval by Council in December 2011, the Amendment was gazetted in March 2013.

### **2.3.9 Baldvis Tramway Reserve Management Plan**

Adopted in 2000, the Baldvis Tramway Reserve Management Plan sought to identify the conservation and recreation opportunities within the Reserve, and to determine the optimum future use and character and ensure the integrity of the Reserve is maintained.

The Reserve abuts the entire western boundary of the Structure Plan area, and pursuant to the Management Plan, there is an expectation that vegetation within the Reserve will be retained, and walking and bridle trails will be developed throughout.

This Management Plan informs the Structure Plan design, in particular the road crossings, landscaping treatments, walking and bridle network and design interface of the proposed development to the Reserve.

### **2.3.10 Relevant Council Policies**

The following check-list of Council Policies and Procedures has informed the Structure Plan design and/or will be considered as part of subdivision staging, Sales Office/Display Village development and ultimate residential built form:

- Policy 3.4.1 Public Open Space
- Policy 3.3.7 Display Home Centres
- Policy 3.3.20 Residential Design Codes
- Policy 3.4.2 Subdivision Fencing
- Policy 7.2 Local Bushland Strategy

## **3 SITE CONDITIONS & ENVIRONMENT**

An environmental assessment report has been prepared by RPS for the Structure Plan area (**Appendix 1** refers). The following section provides a summary of key findings of this report.

### **3.1 Environmental approvals context**

The Environmental Protection Authority (EPA) assessed the MRS Amendment relating to the Structure Plan area under Section 48 of the *Environmental Protection Act 1986* (the Act). The EPA set the level of assessment at 'Scheme Not Assessed – Advice Given'. The EPA advised that the following key environmental factors required further consideration and management as part of the structure planning and subdivision processes:

- Noise;
- Acid sulphate soils;

- Water management;
- Vegetation and flora;
- Potential land use conflict;
- Site contamination; and
- High pressure natural gas pipeline

These environmental factors were addressed in the *Environmental Assessment Report (EAR) – East Baldivis District Structure Plan* prepared by RPS and attached to the East Baldivis District Structure Plan lodged with the City of Rockingham and the Western Australian Planning Commission. The EAR for the East Baldivis DSP outlined that some of the environmental management commitments were to be addressed at the Local Structure Planning stage. These are now addressed by this Structure Plan.

## 3.2 Existing Environment

### 3.2.1 Topography, soils and geology

The Structure Plan area is low lying and subject to seasonal inundation. The site's elevation varies from 4 metres AHD in the western and south-eastern areas to 7 metres AHD in the north western areas.

Geological mapping indicates the soils within the site are derived from the Guildford Formation, having a thin veneer of Bassendean Sands overlaying Guildford Clays. A low lying area in the north eastern part of the site is mapped as containing a veneer of alluvial silts with low clay content.

Previous geotechnical investigations at the site confirm the presence of sandy soils through the western areas of the site to clay to clayey sands through the eastern areas of the site.

### 3.2.2 Vegetation

The vast majority of the Structure Plan area has been cleared due to the historical grazing and agricultural land use pursued in the Baldivis locality. Scattered remnant vegetation (mainly Banksia trees) exists in the north-east portion of the site and some large individual trees (Tuart, Marri and Jarrah) are also scattered throughout the site (Figure 9 of Appendix 1 refers). Site visits by qualified botanists from RPS confirm that the vegetation condition across the site is in a degraded condition and apart from the previously mentioned scattered pockets of trees, the site is almost completely devoid of vegetation, with no apparent understorey.

Nevertheless, vegetation will be protected and retained where practicable and the proposed Public Open Space locations take advantage of limited remnant native vegetation at the site where possible; this providing for good avifauna outcomes as addressed in Section 3.2.3.

The Baldivis Tramway Reserve, situated between Baldivis Road and the Structure Plan area, exhibits areas of native vegetation in good condition, namely Marri trees; this vegetation will be retained. The number of access points through the reserve has been limited to minimise the impact on the vegetation within the Tramway Reserve.

### 3.2.3 Fauna

Given that the majority of the Structure Plan area is cleared of vegetation, any significant fauna habitat on the site has been removed. Opportunistic fauna may utilise the vegetation within the site, however the surrounding uncleared bushland (including the Tramway Reserve) provide much more significant habitat areas. In any case, remaining vegetation and trees (fauna habitat) have been retained within the Structure Plan area where practicable, namely POS areas in the north and north-eastern portion of the site.

#### 3.2.3.1 BLACK COCKATOO

Those fauna species that are protected under the Commonwealth's *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act), and that are potentially impacted by loss of fauna habitat resultant of development of the Structure Plan area, are the two endemic black cockatoo species (Red Tailed and Carnaby's).

The requirements under the EPBC Act were reviewed in early 2013. In this regard the vegetation communities and condition was detailed in the RPS *Flora and Vegetation Report* (**Appendix 1** refers) and supported by a detailed tree survey (by sub-consultants PGC Environment) and subsequent black cockatoo assessment (by sub-consultants Terrestrial Ecosystems). Relevant maps prepared by RPS and Terrestrial Ecosystems are attached under **Appendix 1A**, these plans forming part of the assessment by the Department of Sustainability, Environment, Water, Population and Communities ('DSEWPaC') as part of the EPBC Act referral of the site (addressed below).

PGV Environmental's assessment of the project area identified that most of the site had been historically cleared with native trees remaining in a parkland cleared or isolated trees in a paddock setting. Terrestrial Ecosystem assessment identified the north-east portion, particularly the area to the west of the existing homestead, as a 'very good' Black Cockatoo foraging area. This was based on the key Marri trees present and also the occasional Sheoak and Banksia varieties. The assessment did not identify any native understorey vegetation which could be used by black cockatoos for foraging; with the majority of the understorey consisting of pasture weeds (e.g. African lovegrass).

The Terrestrial Ecosystem broad mapping identified approximately 10ha of Black Cockatoo habitat. However in reviewing the broad mapped areas and removing the cleared areas (i.e. open paddock areas) the total tree canopy covered area specific to black cockatoo foraging was reduced to 5.7ha.

This 5.7ha area is broken into the following vegetation condition categories:

- 2.3 ha 'very good';
- 1.5 ha 'good'; and
- 1.9 ha poor.

The final Structure Plan design has deliberately attempted to capture a greater area of the 'very good' black cockatoo foraging vegetation in the north-east area (Table 2 refers); this now reflected in the final east-west configuration of POS C, and adjustment of POS D boundaries. The table provides the breakdown of the mapped black cockatoo foraging areas, which have been mapped both at the broader boundary scale and the tree canopy scale.

**Table 2 – Foraging Area Comparison**

Vegetation Condition	Total Area		Draft LSP Foraging Condition Boundary Within POS	Draft LSP Foraging Canopy Within POS	Final LSP Foraging Condition Boundary Within POS	Final LSP Foraging Canopy Within POS
All figures in hectares (Ha)						
	Foraging Condition Canopy Area	Foraging Condition Boundary Area				
Very Good	2.3	3.79	0.97 ha (or 25%)	0.57 ha (or 25%)	1.14 ha (or 30%)	0.74 ha (or 32%)
Good	1.5	2.74	0.02 ha	0.00 ha	0.00 ha	0.00 ha
Poor	1.9	3.71	0.84 ha (or 22%)	0.51 ha (or 26%)	0.70 ha (or 19%)	0.42 ha (or 22%)

The black cockatoo foraging habitat in the nominated Public Open Space areas is 1.16 ha; of which further reduces the clearing area, through avoidance, to 4.54 ha (based on tree canopy cover).

The Structure Plan design includes the 'very good' condition black cockatoo foraging habitat retained in public open space at 1.14 ha; this represents 30% of the mapped 'very good' foraging vegetation. Importantly the public open space in the north-east corner focuses on conserving a consolidated area of 'very good' black cockatoo habitat (predominately Marri trees) which is consistent with best practice ecological design measures.

The above outcome was endorsed by the DSEWPac in April 2013 under the EPBC Act referral of the site. In this regard the DSEWPac Delegate formally determined the East Baldivis Local Structure Plan's referral as '*not a controlled action*' (**Appendix 1A** refers).

Also in response, the key area of consolidated vegetation within the Baldivis Tramway reserve will be conserved. Although the Structure Plan area has limited fauna habitat values due to historical clearing, the maintaining of mature trees and Tramway Reserve will assist in preserving avifauna habitat.

### 3.2.4 Surface Hydrology

#### 3.2.4.1 DRAINAGE

The site is situated within the Peel Estuary – Serpentine River Catchment. The Peel Main Drain (PMD) is situated east of the Structure Plan area, which drains stormwater run-off from the catchment into the Serpentine River and ultimately the Peel-Harvey Inlet. The PMD assists in the stabilisation of local groundwater levels and plays an important role in flood management within the area.

### 3.2.4.2 GROUNDWATER

Investigations conducted (Douglas Partners January 2008) for the landholding located just north of the Structure Plan area, still within the East Baldivis DSP area, demonstrated groundwater levels vary between 3.5 metres AHD and 2.3 metres AHD. These investigations were undertaken during a particularly dry period and would constitute minimum groundwater levels.

### 3.2.4.3 WETLANDS

A 'Multiple Use' DEC management category Palusplain runs in a north-south direction and extends out along the majority of the drain alignment on the site. This Palusplain is also present in the south-east corner of the site. These 'Multiple Use' wetlands previously served as flood storage/inundation areas for major storms but do not support significant flora and fauna habitats.

There are no Conservation Category Wetlands (CCW) present within the site. The nearest CCW is located approximately 1 kilometre to the west. It is not anticipated that this CCW will be disturbed by the proposed development because not only is there an existing development between the site and the wetland but also because the CCW is not within the site's stormwater flow path.

### 3.2.4.4 FLOOD PLAIN

The Draft Murray Drainage and Water Management Plan indicated that a portion of the Structure Plan area is within the flood drainage of the PMD during major river flows, with the 100 year ARI flood level estimated to be 5.62 metres AHD. The Department of Water guidance states that development may occur within the flood fringe as long as 0.5 metre freeboard above the 100 year ARI is provided when setting the minimum habitable floor levels, this ensuring flood protection.

## 3.2.5 Groundwater

The Structure Plan is located within the Stakehill Groundwater Area and more specifically the Maramanup and Stakehill Confined sub-areas. The Perth Groundwater Atlas (DoE 2004) indicates that the groundwater levels beneath the site are approximately 2 metres AHD. This equates to groundwater at 4 metres to 7 metres below ground level in the summer months. The on-site monitoring data in conjunction with the DoW and PMD data indicates that the Annual Average Maximum Groundwater Levels (AAMGL) for the site is approximately 4 metres AHD.

Local groundwater flow is generally towards the open drain which traverses the site in a north to south direction. Water is then transported to its respective culverts and ultimately discharged into the PMD.

## 3.2.6 Acid Sulfate Soils

The DEC Acid Sulfate Soil (ASS) risk mapping indicates the entire Structure Plan area as having a 'moderate to low risk' of ASS occurring within 3 metres of the natural of the natural surface.

The south eastern corner of the Structure Plan is located adjacent to Folly Pool (eastern side of the Kwinana Freeway), which is identified as having a high to moderate risk of containing ASS within 3 metres of the natural surface.

A site assessment for ASS has been undertaken in accordance with DEC ASS Guidelines. An ASS management plan was prepared by RPS for the Structure Plan area and subsequently endorsed by the Department of Environment Regulation in 2013.

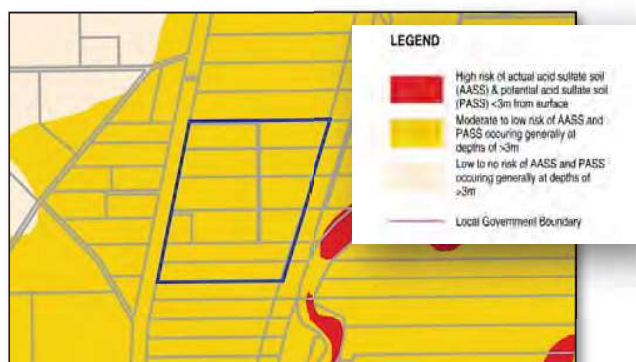


Figure 2 – Acid Sulphate Soils Mapping Source – Department of Planning Website, Download 4 March 2011

## 3.2.7 Contamination

The Structure Plan area has historically been used for agricultural purposes consistent with the Scheme's 'Rural' and 'Special-Rural' zonings.

In 2005 Preliminary Site Investigation (PSI) was undertaken to identify possible areas and sources of potential contamination at the site, assess environmental factors that may affect the transport and fate of potential contaminants, and to assess the presence and natures of potential contamination at the site.

---

The PSI shows the site is largely free from significant contamination and is suitable for residential development.

### 3.3 Heritage

A search of the Department of Indigenous Affairs (DIA) Database showed no registered Aboriginal heritage sites within the Structure Plan area. However, five Aboriginal Sites are located in the vicinity of the Structure Plan. All contractors working on the development will be made aware of their responsibilities under the *Aboriginal Heritage Act 1972* with regard to finding potential archaeological sites. In the event that a potential site is discovered, all work in the area will cease and the DIA will be contacted before proceeding.

### 3.4 Adjacent Conservation Reserves

The Structure Plan is located immediately adjacent to large areas historically set aside for conservation purposes; these areas associated with the Baldivis Road reserve, encompassing the Baldivis Tramway. This area is zoned 'Regional Open Space' under the MRS and 'Parks and Recreation' under the City's Scheme, however recognising such zonings are in fact within the dedicated Baldivis Road reservation.

## 4 CONTEXT ANALYSIS

A Regional Context Plan is included as **Plan 5**, providing illustration of the following section. A localised Context and Constraints Plan is included as **Plan 5a**.

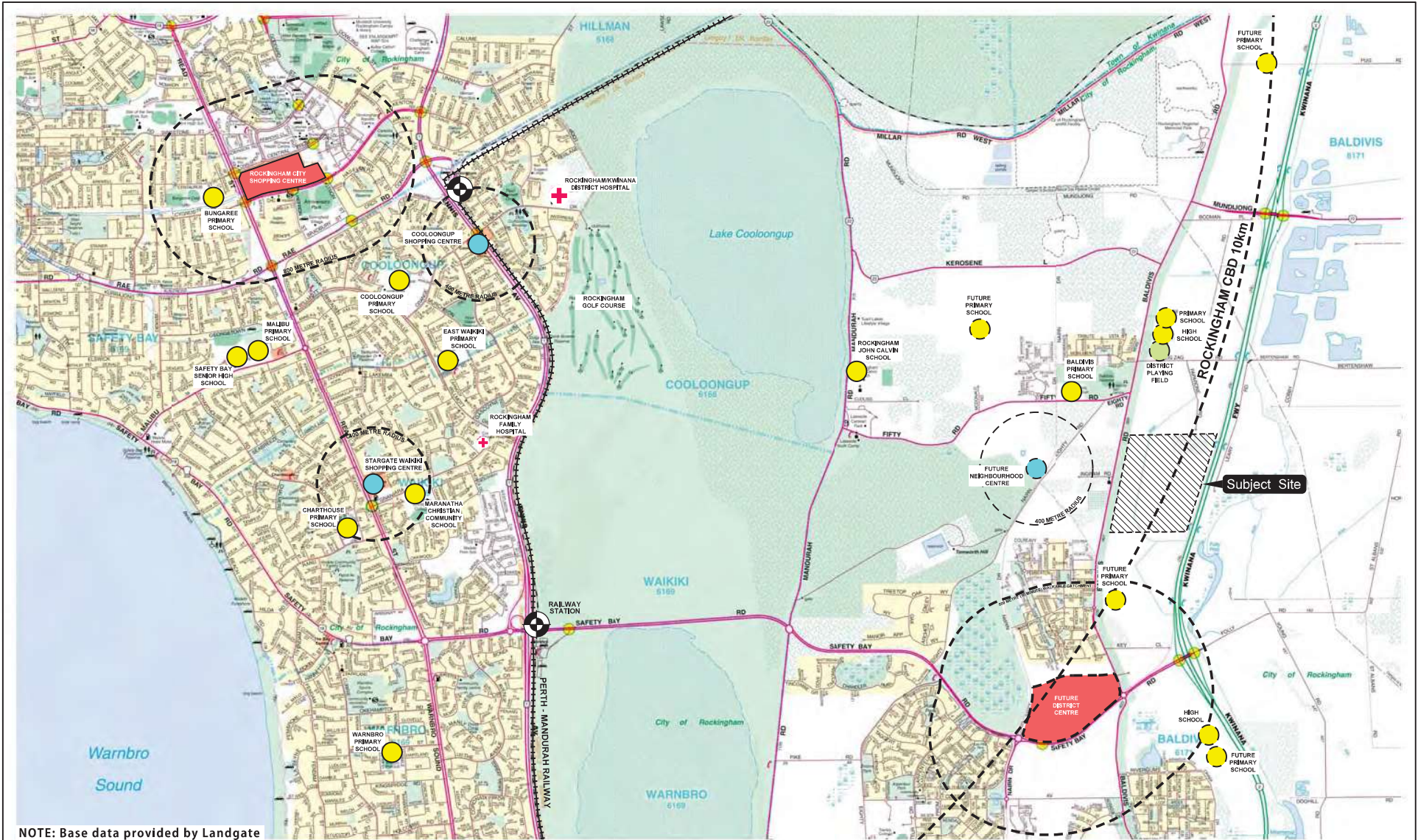
### 4.1 Surrounding Land Uses

The Structure Plan is physically bound on all four sides by:

- Baldivis Road and the Tramway Reserve to the west;
- Kwinana Freeway to the east;
- Greenlea Estate developed by Peet Ltd to the north;
- Freeway Service Centre to the north-east; and
- One 71 Baldivis Estate developed by Mirvac to the south.

The Structure Plan is immediately surrounded in all directions by rural or special-rural type land uses. However, the areas west, north and south of the site will ultimately be developed for residential subdivision, pending the project timeframes of each respective landowner.

Residential estates surrounding the Structure Plan include, but are not limited to; One 71 Baldivis and The Edge to the south; Greenlea Estate to the north; and Baldivis Central, The Spires and Lot 311 Fifty Road Baldivis to the west. All of the aforementioned Estates are subject to approved Structure Plans and are in various stages of development.



NOTE: Base data provided by Landgate

## PLAN 5 - Regional Context Plan

Various lots Baldvis Road, EAST BALDIVIS

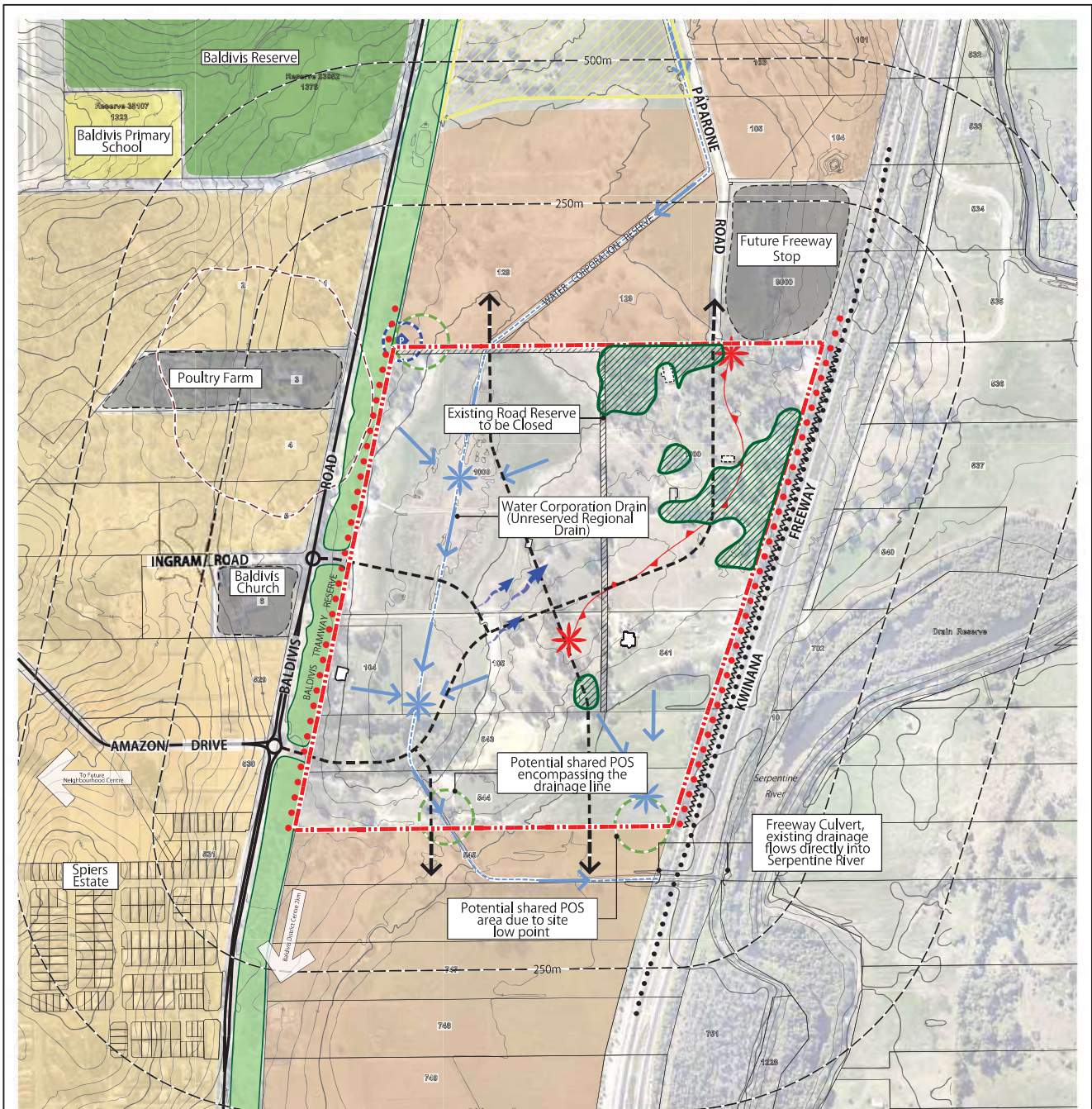
for: Frasers Property



<p>NORTH</p> <p>Not to Scale @ A4</p>	
COMPILED: CD+P	DRAWN BY: JP
DATE: 11/04/2014	REVISED: 06/09/2016
GRID: MGA 50	DATUM: AHD
DRAWING NUMBER: AUSEB-5-016	JOB CODE: AUSEB15P
FILE ID: M:\AUSEB\REPORT DIAGRAMS\AUSEB-5-016	

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**LEGEND:**

- - - - - Subject Site
- Drainage Line
- - - - - Ridgeline
- Future Site Access
- - - - - Proposed Road Network
- Prevailing Winds
- ● ● ● Dual Use Path
- ● ● ● Bush Fire Hazard
- - - - - Potential Shared POS Areas
- - - - - Freeway Noise
- - - - - Poultry Farm Buffer
- - - - - 250m / 500m Radius to Site
- - - - - Urban
- - - - - Urban Deferred
- - - - - School Site and Open Space Precinct
- - - - - Road Closure
- - - - - Baldvis Tramway Vegetation to be Retained
- - - - - Good Quality Remnant Vegetation (retained where practical)
- - - - - Existing Buildings to be Demolished
- - - - - Houses to be Retained
- ★ High Point
- ★ Low Point
- ★ Pump Station with 30m Buffer

**PLAN 5a - Local Context & Constraints**

Lots 104, 105, 541, 543, 544 & 1000 Baldvis Road, BALDIVIS for: Frasers Property



NORTH

Scale 1: 10 000 @ A4

0 100 200 300 400m

COMPILED: CD+P	DRAWN BY: JP
DATE: 11/04/2014	REVISED: 08/06/2016
GRID: MGA 50	DATUM: AHD
DRAWING NUMBER: AUSEB-S-001A	JOB CODE: AUSEBLSP
FILE ID: M:\AUSEB\BASE\REPORT DIAGRAM\AUSEB-S-001A OPCON.dgn	

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## 4.2 Movement Networks

The Structure Plan abuts one existing major road recognised under the provisions of the Metropolitan Region Scheme (MRS); this being the Kwinana Freeway, reserved as a 'Primary Regional Road', and running north-south along the eastern boundary of the Structure Plan area. The recent extension of the Kwinana Freeway in 2009 has reduce regional traffic volumes significantly along Baldivis Road, which forms the western boundary of the Structure Plan area.

Baldivis Road is not classified under the MRS as regionally significant, however it has historically played an important district distributor role. It has a wide road reserve of 80 metres; however a significant portion (50 metres) of this is reserved as the 'Baldivis Tramway' greenbelt recreational spine. Baldivis Road has a current speed limit of 80 kilometres an hour north of Ingram Road, however has been reduced to 70 kilometres an hour south of Ingram Road to correspond with the expansion of residential development in the immediate locality. Baldivis Road north of Ingram Road is constructed as a good standard rural road, with bitumen seal though without any formal drainage. Upgrading of Baldivis Road to a single lane boulevard design has occurred south of Ingram Road, commensurate with urban development to the west side of Baldivis Road. The upgrading of Baldivis Road will continue north of Ingram Road as the development front progresses.

Kulija Road (formerly Mundijong Road) and Safety Bay Road are located equidistant from the Structure Plan area, approximately 3 kilometres north and south of the site respectively. These roads provide the Structure Plan area with direct access to district and regional activity nodes, including Baldivis District Centre, Rockingham Strategic Centre, and Perth CBD.

Access to the Structure Plan area is currently gained from private access roads and Daintree Street, which connect to Baldivis Road. A 1.005ha unconstructed road reserve formerly traversed along the northern boundary of Lot 1000 and extended south through the centre of this lot, separating Lots 105 and 541. In order to enable development for residential purposes, the unconstructed road reserve has since been closed as part of clearances for the first stages of development in early 2015.

Transperth does not currently operate any bus services within close vicinity to the Structure Plan area. The closest bus connection is bus route 568, which terminates in Australand's Baldivis Central Estate immediately to the south-west. This route navigates through residential estates south of Safety Bay Road en route to the Warnbro Station.

Warnbro Station is on the Mandurah-Perth train line is approximately 6.5 kilometres south west of the Structure Plan area. The closest train station is Wellard station, approximately 3.5 kilometres north-west of the Structure Plan.

## 4.3 Kwinana Freeway

Herring Storer Acoustics was commissioned to carry out a road traffic noise assessment for the Structure Plan (**Appendix 5** refers). The traffic noise assessment has been carried out in accordance with the WAPC's Statement of Planning Policy 5.4 *Road and Rail Transportation Noise and Freight Consideration in Land Use Planning*. The purpose of this study was to assess noise received at future residence within the subdivision from vehicles travelling on the surrounding road network, specifically Kwinana Freeway and Baldivis Road.

SPP 5.4 identifies a 'Noise Target' and 'Noise Limit' which sets out acceptable noise levels for residential use. The noise modelling indicates that without any noise amelioration, noise received at the residence located adjacent to the Kwinana Freeway would exceed the 'Noise Limit'.

Future residential properties affected by noise levels above the 'Noise Target' and 'Noise Limit' as identified in the report will require Notifications on the Certificate of Title identifying that noise affects the property. Dwellings located in areas that exceed the 'target' and 'limit' will also have to comply with construction standards (glazing, fencing, fittings) as expanded upon in the acoustic report.

## 4.4 Poultry Farm

A poultry farm (*Baldivis Lavertech Services Poultry Farm*) is located on the western side of the Baldivis Road, adjacent the north-western portion of the Structure Plan area. The buffer distance between poultry farms and sensitive land uses prescribed by the EPA as outlined in Guidance Statement No.3- *Separation Distances between Industrial and Sensitive Land Uses*, is 300 – 1,000 metres depending on the size of the operation.

An Odour Report prepared by The Odour Unit on the odour impacts from this poultry farm, in relation to separate landholdings directly opposite the poultry farm (i.e. Spiers Estate) have provided evidence that a buffer distance of less than 300 metres is appropriate. This buffer is determined on the specifics of the operation of the poultry farm, and vegetation that separates the site, including on the poultry farm site itself and Tramway Reserve. Included as **Appendix 8** in this Structure Plan, the Odour Report identifies that the odour catchment extends only as far east as the Baldivis Tramway Reserve, thus not directly affecting the Structure Plan area.

#### 4.5 Dampier to Bunbury High Pressure Gas Pipeline

The high pressure gas pipeline traverses east-west across East Baldivis however is approximately 900m north of the Structure Plan area. Notwithstanding the above, any future subdivision development of the Structure Plan area will take into consideration the provisions of the WAPC's *Planning Bulletin 87 High Pressure Gas Transmission Pipelines in the Perth Metropolitan Region*, including setback distances from the pipeline corridor, and mitigation measures to manage risks.

#### 4.6 Water Ski Park

Bonney's Water Ski Park is located approximately 1.2 kilometres east of the Kwinana Freeway, accessed north of Mundijong Road. As part of the preparation of the East Baldivis DSP, the City of Rockingham advised the Baldivis East Stakeholder Team that any noise sensitive development (e.g. residential and schools) within 1.7 kilometres of the Water Ski Park, would be subject to noise buffer restrictions.

As the proposed Structure Plan area is over 3.0 kilometres from the Water Ski Park, no noise buffer measures are required to be undertaken in this instance.

#### 4.7 Education

No schools (Primary or Secondary) are proposed within the boundaries of the Structure Plan area. This is consistent with the draft East Baldivis DSP. The closest public schools for future residents include the existing Baldivis Primary School located 700 metres to the north-west, within the North Baldivis District Structure Plan area. Future schools include East Baldivis (South) Primary School, approximately 500 metres to the south; and East Baldivis Primary School (Central), approximately 500 metres to the north.

Two Secondary schools are within proximity to the Structure Plan area. A Secondary School is planned in the vicinity of Zig Zag Road, approximately 400 metres north of the Structure Plan area. This School is estimated 5 – 10 years away from operation however will ultimately service the Structure Plan area.

In the short to medium term, all public Secondary School students within the Structure Plan area may attend the Baldivis High School, located 300 metres south of Safety Bay Road (or 2 kilometres south of the Structure Plan area); situated within the Rivergums Residential Estate. This school has recently been completed and will service the first residents settling in the Structure Plan area.

Nearby Private School education is available within the Rockingham Town Centre and Wellard Town Centre, dependant on religious denominations.

The Rockingham and Mandurah campuses of Murdoch University and Challenger TAFE offer an expanding range of tertiary facilities in proximity to the Structure Plan area. Furthermore, the draft *Keralup District Structure Plan*, encompassing a vast area south-east of the Structure Plan area, has earmarked a university campus in the future Keralup *District Town Centre*.

#### 4.8 Open Space

The Structure Plan immediately abuts a large linear area of bushland protected as 'Parks and Recreation', being the Baldivis Tramway Reserve; therefore providing passive recreational option for future residents. Leda Nature Reserve, Rockingham Lakes Regional Reserve and Lake Coolongup are all within 2 kilometres of the Structure Plan area. The East Baldivis DSP also identifies district playing fields immediately north of the Structure Plan area.

Additionally, the regional road network provides direct connection to Golden Bay foreshore, Rockingham Lakes Regional Park, Paganoni Swap and the Peel Inlet. Future open space areas in Baldivis, and within the Structure Plan area itself, will provide a diverse range of recreational areas for the benefit of future East Baldivis residents.

#### 4.9 Further Abroad

At a district level, employment land uses in close proximity to the Structure Plan area include:

- The expanding Baldivis District Town Centre, located approximately 2 kilometres to the south, at the intersection of Safety Bay and Baldivis Roads;
- The Rockingham Trade Centre, offering bulky goods retailing and light industrial land uses and employment opportunities, located approximately 6 kilometres north west of the Structure Plan; and
- The Rockingham/Kwinana District Hospital located 6 kilometres to the north west of the Structure Plan.

## 5 LOCAL STRUCTURE PLAN

### 5.1 Design Philosophy

The Structure Plan proposes a layout which fosters an efficient and permeable road network and corresponding residential development, with all Estate 'precincts' offering a direct relationship to areas of public open space. The design philosophy has been predicated upon the following objectives:

- provision of road linkages to adjacent landholdings north and south, and west of Baldivis Road, to allow connection and integration with existing and future development of the surrounding land, and connection to District and Regional road networks;
- location and provision of public open spaces to ensure accessibility, diversity in types and usability, tree retention where practical, visual aesthetics and view corridors and the integration of stormwater management within the open spaces;
- provision of a diverse range of lot, and ultimately dwelling, product;
- delivery of a safe and connected pedestrian and cyclist environment through a strategic dual use path and footpath network, including connections to the regional path within the Kwinana Freeway Reserve;
- provision for an excellent urban design outcome with regard to the interface with the Baldivis Tramway Reserve to the immediate west of the subject land; and
- implementation of an innovative drainage solution based on the existing low lying site conditions.

### 5.2 Land Composition

The site will be developed for residential purposes, generally comprising of the following:

**Table 3 – Land Use Budget**

<i>Land Use Budget</i>	<i>(ha)</i>
<b>Site Area</b>	
• Residential Land ~ 35.22 ha	59.07
• Total Green Space (POS) ~ 6.87 ha	
• Roads, PAWs and 'Green Links' ~ 16.97 ha	
<b>Deductions</b>	
Drainage 1:1yr (Uncredited):	0.86
<b>Gross Subdivisible Area</b>	<b>58.21</b>
<b>POS Requirement 10%</b>	<b>5.82</b>
Maximum Restricted Open Space (20%):	1.16
Minimum Unrestricted Open Space (80%):	4.65

*NB: all figures are rounded up and to be reviewed at detailed Subdivision Design phase.*

### 5.3 External Design Influences

#### 5.3.1 Design Abutting Kwinana Freeway

With the Kwinana Freeway Reserve forming the eastern boundary of the Structure Plan, consideration must be given to the Freeway interface in order to alleviate noise and mitigate bushfire issues for future residents.

Herring Storer Acoustics was appointed to prepare an acoustic assessment and a subsequent acoustic technical note for the Structure Plan (**Appendix 5** refers). This assessment being undertaken in accordance with the WAPC's State Planning Policy 5.4 – *Road and Rail Transportation Noise and Freight Consideration in Land Use Planning (SPP 5.4)*.

The assessment recognised that for development adjoining the Kwinana Freeway:

- Noise modelling indicates that for residences located adjacent to the Freeway, compliance with the prescribed 'noise limits' could be achieved with a 3.0m high barrier (a wall, earth bund or combination of both) constructed along the boundary of the road reserve.
- The constructed height of the wall to be further explored pending the final ground levels of the development adjacent.
- Noise received at any first floor would exceed the 'noise limits' and would require compliance with SPP 5.4. In this case 'Quiet House' design elements would need to be explored.
- For residents with back yards abutting the Freeway, to comply with requirements for outdoor areas, these should be designed with either a courtyard down the side of the residence, or a separate outdoor area on the western side of the residence.
- Double storey residences proposed within the area requiring a notification on title, adjacent to the Kwinana Freeway, are required to obtain specialist acoustic advice.

### 5.3.2 Design Abutting Baldivis Tramway Reserve

Similarly to the Kwinana Freeway frontage, the Herring Storer acoustic assessment included modelling along the Baldivis Road frontage.

The assessment recognised that for development adjoining Baldivis Road:

- Noise received at the residences located adjacent Baldivis Road would comply with the 'noise limits' prescribed under SPP 5.4; and
- 'Quiet House' design measures would not be required.

The Structure Plan design limits the number of lots backing directly onto Baldivis Road, with only two lots proposed to share a common boundary with the Tramway Reserve; this by virtue of an existing 'homestead' being retained on Lot 104.

A road interface will generally be provided immediately adjacent to the Baldivis Tramway Reserve, which will also serve as a bushfire management buffer to this Reserve containing remnant bushland. Bushfire management requirements are further addressed later in this document.



*Baldivis Tramway Reserve*

### 5.3.3 Design Abutting Freeway Service Centre

The Freeway Service Centre (FSC) on Lot 9000 Paparone Road was subject of a MRS rezoning 1128/41. It is noted that the rezoning of the site was to facilitate the development of a FSC and contain all associated noise buffers etc within the confines of the lot boundaries. Construction of the FSC has now commenced on site.

It is for noise regulations that the site was made so large, as the FSC itself is only to occupy a very small portion of this site.

It is noted that the EPA Regulations 1997 recommend a buffer of 100 metres to residential development, whilst a buffer of 140 metres was recommended by Herring Storer at the time of the Local Scheme Amendment (Amendment 15).

The intent and practical application of the buffer requirements was for this buffer is to be contained within the FSC lot boundaries. Furthermore, it is not appropriate to sterilise urban land based on a land use that is capable of fulfilling all associated buffer requirements within the boundaries of the lot on which it is contained.

Australand Holdings Ltd lodged a submission to the City of Rockingham during the advertising period of Amendment 15 to the Scheme, detailing concerns of the operation implications of a FSC on land abutting future urban areas.

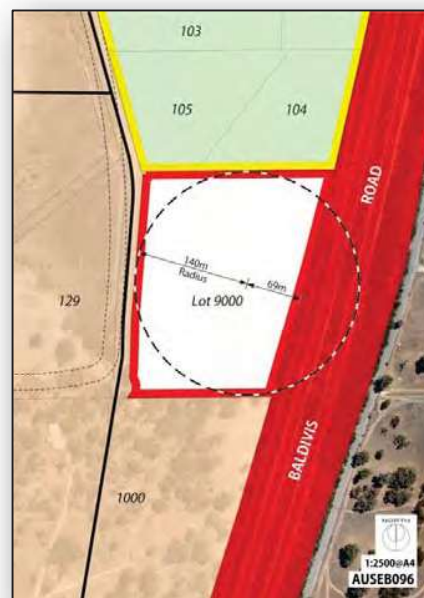


Figure 3 – Freeway Service Centre Setbacks

These concerns included, though were not limited to:

- Light spill;
- Noise;
- Odour/fumes; and
- Safety (arising from storage of vast quantities of highly flammable products).

In response to these concerns, the City of Rockingham sought additional assurances from the applicant that the FSC was to demonstrate that adequate buffers are provided on-site given the future urban intentions for the landholdings abutting the side boundaries.

Given the restrictions placed on size and operation of the facility through provisions of the Scheme, and prohibition of bulk fuel services on site, the FSC should be able to operate adequately on site, including fully containing the associated buffer as intended when the FSC was approved.

**Figure 3** demonstrates that the 140m buffer is contained within the north and south boundaries of the site, whilst enabling the facility to be positioned up to 70m from the western boundary of the freeway whilst still maintaining the 140m buffer within the western boundary of the Structure Plan.

Given it is the understanding and intent of the City of Rockingham that the buffer associated with this land use be contained within the boundary limits of Lot 9000, it is argued that no additional assessment to reduce the buffer is required, and no portion of the subject land is impacted by this buffer.

Notwithstanding the above, a noise barrier wall to 3m high will be constructed along the common boundary with Lot 9000, pursuant to the recommendations of the Herring Storer Acoustic assessment and supplementary acoustic technical note (**Appendix 5** refers).

## 5.4 Residential Densities and Dwelling Forecasts

### 5.4.1 Dwelling Forecasts – Directions 2031

The Structure Plan is encompassed by area 'BA4' of the *Outer Metropolitan Perth and Peel, Sub-Regional Strategy (OMSRS)*; the total site (south of Mundijong Road) is projected to yield approximately 3,200+ dwellings, based on a 'Connected City' development model of 15 dwellings per gross urban zoned hectare; or 2,100 dwellings based on a 'business as usual' scenario of 10 dwellings per gross urban zoned hectare.

The Structure Plan area itself comprises 59.07ha site, thus based on the dwelling projections of *Directions 2031* and accompanying OMSRS, is projected to generate the following dwelling yields:

**Table 4 – Directions 2031 Dwelling Targets:**

Directions 2031 Scenario	Projected Dwellings:
'Connected City' @ 15 dwellings per gross urban zone	886 dwellings
'Business as usual' @ 10 dwellings per gross urban zone	591 dwellings

The Structure Plan proposes in the order of 1,015+ lots, and given no Grouped Housing sites are planned for at present, the total dwelling yield will be generally consistent with this figure. The dwelling yield projections thus exceed the 15 dwellings per gross urban zone targets of *Directions 2031* and will potentially accommodate a population in the order of 2,800+ people, at a rate of 2.8 persons per household.

The proposed forecast across the Structure Plan area is subject to the final design for respective subdivision stages; this based on detailed drainage and environmental constraints, including landowner preference for retention of remnant native vegetation. Preferred lot mix and market demand at the time of land release will also influence final dwelling yields.

### 5.4.2 Dwelling Forecasts – Liveable Neighbourhoods

The majority of the Structure Plan has been assigned a R25 Residential Density Coding; with R30 – R60 development proposed in proximity to Public Open Space areas and the two primary north-south and east-west connector roads.

The R25 – R60 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 ~120m<sup>2</sup>– 600m<sup>2</sup> in area.

Estimate dwellings yields are in the order of:

- Residential R25:~ 650+ dwellings
- Residential R30:~ 95+ dwellings
- Residential R40:~ 170+ dwellings
- Residential R60:~ 100+ dwellings

Based on the *Liveable Neighbourhoods* 'Site Hectare' definition, the overall density for the Structure Plan equates to ~29 dwellings per site hectare; thus well exceeding the 22 dwellings per site hectare target of this document.

## 5.5 Streetscapes and Built Form Environment

The following provides a summary of locational criteria for residential land uses within the Structure Plan area, and offers rationale for the density codings (R-Codings) provided.

### 5.5.1.1 'LOW DENSITY' - RESIDENTIAL R25 (BASE)

- Residential R25 will be the minimum base coding over the Structure Plan area; thus allowing for the provision of traditional single dwelling lots from minimum 300m<sup>2</sup>, averaging minimum 350m<sup>2</sup>.

### 5.5.1.2 'MEDIUM DENSITY' - RESIDENTIAL R30-R60

Generally surrounding, but not limited to:

- areas of high amenity, such as Public Open Space, major public transport routes and/or primary connector roads;

- the ends of residential cells to facilitate the development of wider fronting and shallower depth 'squat' lots to enhance streetscape outcomes; and
- locations that enhance passive surveillance of public spaces.

### 5.5.2 Neighbourhood Character and Precincts

The Structure Plan design also provides for an urban structure which enables four 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 connectivity to key community nodes within and external to the Structure Plan area.

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).

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.

### 5.5.3 Housing Typologies

A diversity and flexibility of housing products will be provided that are appropriate to the variations in lot sizes and proposed densities presented in the Structure Plan.

The housing typologies envisaged will include Single and Double-Storey; Traditional Loaded and Rear Loaded Cottages; Terraces – Attached and Semi-Detached and Multi-Storey dwellings, including potential apartment style dwelling product (i.e. maisonettes). The character of these typologies will differ depending on the nature of the lot and surrounding environment.

Frasers Property is also exploring options for small customised lot product within the R60 density sites nominated on the Structure Plan (Plan 1). Frasers Property itself envisages to build out this lot product to provide diversified house and land packages for future residents; and to establish a distinct (and instant) character and identity particularly for the main entry into the Structure Plan area.

Design provision of these smaller lot sizes would be controlled by comprehensive Local Development Plans that may include detailed floor plans and elevations as part of the assessment process.

### 5.5.4 Solar Orientation

When 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. Design efficiencies pursued as part of 'Modification 3' to the Structure Plan have provided improved solar passive design, increasing the number of lots oriented north by approximately 2%.

### 5.5.5 Parking

On-street visitor parking bays are promoted in a variety of street settings in the project 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.

## 5.6 Local Development Plans

Local Development Plans (LDPs) will be required for residential subdivision lots comprising one or more of the following site attributes:

- a) Lots with rear-loaded vehicle access;
- b) Lots with direct boundary frontage (primary or secondary) to an area of Public Open Space;

- c) Lots identified as being within Bushfire Prone Area pursuant to State Planning Policy 3.7 and the Guidelines for Planning in Bushfire Prone Areas (2015); and/or
- d) Lots with a boundary abutting or frontage towards Kwinana Freeway – noise mitigation.

With reference to (c), affected lots may be identified spatially in Figure 12 of the accompanying Bushfire Management Plan, under **Part Three – Appendix 2**.

With reference to (d), affected lots may be identified spatially in Appendix E of the accompanying Acoustic Assessment and Figures 1, 2 and 3 of the supplementary acoustic technical note under **Part Three – Appendix 5**; this includes a requirement for noise modelling for ground floor and two-storey development as applicable.

LDPs may be prepared as part of a subdivision application or imposed as a condition of subdivision approval, on advice of the City of Rockingham. It is proposed that R25 lots will be subject to a 'generic Estate' front setback and open space variation to the *Acceptable Development* 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 (i.e. setbacks, building envelopes);
- High levels of integration between the POS and the built form to enhance surveillance;
- Appropriate separation of public and private space; and
- Correct orientation and design of homes to address solar orientation principles.

## 5.7 Planning for Bushfire Management

A Bushfire Management Plan (Bushfire Safety Consulting Pty Ltd and Emerge Associates 2017) has been produced for the site to support the Structure Plan (**Appendix 2** refers). Permanent long term bushfire hazard considerations are posed by remnant vegetation within the Tramway Reserve west of the site, and within the Kwinana Freeway reserve and Service Station site to the east and north-east of the site respectively. By undertaking an assessment of the classified vegetation and associated bushfire hazard for the site and surrounding area, the BMP has determined site specific Bushfire Prone Areas, based on AS 3959 *Construction of buildings in bushfire prone areas*.

An indicative BAL assessment has been undertaken as part of the BMP in order to demonstrate that, with the provision of appropriate Asset Protection Zones (APZs), no areas within the Structure Plan are exposed to an unacceptable level of bushfire risk (i.e. greater than BAL-29). A 14.0m APZ has been designated for the western interface of the Structure Plan (Baldivis Tramway Reserve). The 14.0m APZ is achieved by way of road network design and/or building setbacks where required (to be controlled by Local Development Plans); a combination of these design features may be required in some instances.

Along the Kwinana Freeway and northern interface with the Service Station an APZ between 8.0m – 12.0m is designated, as outlined in the BMP. Overall, the BMP demonstrates that the bushfire risk over the site can be appropriately managed through the application of dwelling setbacks and increased constructions standards (as required).

Classified vegetation currently occurs within adjacent landholdings north of the site. This vegetation will be removed as part of separate residential subdivision progressing in this area (associated with the Greenlea Baldivis Estate). This area has therefore been assessed as a long term low threat to the site, as outlined in the BMP, however if fuel remains at the time that staged development is progressed in proximity to the hazard (i.e. within 100m), the associated bushfire risk will be reassessed as part of future detailed BAL assessment(s).

It should be noted that any new dwellings constructed within 100m of classified vegetation will require consideration of the need for increased construction standards to address AS 3959.

The BMP will provide guidance for future detailed BAL Assessment(s) to be prepared to support the staged subdivision of the site, to ensure all fire mitigation strategies (such as appropriate building setbacks (APZs) and designated BAL ratings) respond to the bushfire risk remaining at the time development progresses. Bushfire risk areas will be suitably referenced on any relevant Local Development Plan(s).



*Residential Interface to Bushland area, Baldivis South*

## 5.8 Movement Networks

A Transport Assessment has been prepared by traffic consultants, Transcore to identify projected traffic volumes and suggested road hierarchies within and adjacent to the Structure Plan (**Appendix 4** and **Plan 6** refer). The key findings are summarised in the following section.

Transcore developed a comprehensive EMME model for the 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 development and future traffic projections on the abutting road network, such as Baldivis Road; these being sourced from the Main Roads WA 2031 ROM model. The EMME transport model was development for the year 2031 as it is assumed that the Structure Plan will be fully developed and operational by this time.

It is noted that all traffic volume figures represent total daily vehicular trips.

Based on the Transcore report recommendations, road cross-section concepts have been prepared to establish a general road hierarchy, pedestrian network and preferred streetscape character. The road cross-sections (**Figures 4a – 4c**) support **Plan 6 - Internal Road Hierarchy**.

### 5.8.1 Access

The proposed access system was developed to achieve the following outcomes:

- address Main Roads WA and City of Rockingham preliminary advice and requirements;
- provide a direct and legible link from Structure Plan to Baldivis Road and Baldivis Town Centre;
- provide a continuous link between Papparone Road and Amazon Drive;
- balance the internal traffic flows;
- distribute the impact from traffic to minimise the traffic load onto Baldivis Road;
- ensure alternative access/egress options are available for safety reasons; and
- enable ease of access (and egress) to the proposed community and commercial nodes.

Information previously supplied by the City of Rockingham from Main Roads WA 2031 traffic model indicates future traffic volumes of approximately 10,500 vehicles per day (vpd) on Baldivis Road adjacent to the Structure Plan area.

Access into the Structure Plan area will be provided via seven points, including:

#### 5.8.1.1 ACCESS FROM THE NORTH

Two Neighbourhood Connectors B Roads, have been designed in the western and eastern portions of the site.

- The western road will provide direct connection to the future District Playing Field, the land immediately to the south and imminent extension of Fifty Road, en route to Nairn Drive – a *District Distributor Road*.
- The eastern road will be an extension of the existing Papparone Road and forms part of the preferred north-south connector road prescribed by the East Baldivis District Structure Plan. This road will lead south as an extension of Papparone Road, diverging movement further south and west through the site via a round-a-bout and will provide a direct connection to Amazon Drive and community nodes across the broader Baldivis area; nodes including the future Local Centre (North Baldivis) and District Playing Field, Primary Schools and Secondary School (East Baldivis).

#### 5.8.1.2 ACCESS FROM BALDIVIS ROAD

Access from Baldivis Road will be via two *Neighbourhood Connectors B Roads*, one central and one in the south along the Structure Plan's western boundary.

- The central access will effectively be the estate's main entrance and form the eastern leg of the Baldivis Road, Ingram Road intersection (future roundabout). This road will include entry statements, landscaping verge treatments and built form all to a high standard, to appeal to both residents and visitors alike on arrival. This road will pass the principal Public Open Space in the heart of the Estate and connect to the *Neighbourhood Connector B Road* extending from the existing Papparone Road.

- The southern access will also provide an important link to Baldivis Road and be the eastern leg of the roundabout intersection with the newly constructed Amazon Drive associated with the Spiers Estate. This road will also form the continuous link between Paparone Road and Amazon Drive. Amazon Drive will ultimately provide a direct link to Nairn Drive and development further west.

### 5.8.1.3 ACCESS FROM THE SOUTH

Access to the south will be via two primary north-south connector roads albeit one road is prescribed by the East Baldivis District Structure Plan; this to complement the Structure Plan prepared to the south of the site.

These roads will enable future development to the south to gain Amazon Drive access through the Structure Plan area, as an alternative to Baldivis Road.

## 5.8.2 Road Configuration and Hierarchy

The projected traffic volumes prepared under the EMME strategic model for the internal Structure Plan road network were used to determine the road hierarchy and generic road reservation and cross sections. The general road hierarchy and traffic volumes are represented under **Plan 6**. The internal road hierarchy plan is based on standard Liveable Neighbourhoods cross sections, however reduced verge widths may be permitted adjacent to Public Open Space subject to detailed review by the City and the WAPC at the subdivision phase. The proposed internal road network ensures permeability and efficient traffic distribution throughout the Structure Plan area. The Structure Plan offers a highly permeable road network, with interconnected streets providing opportunity for ease of traffic movements both internally and externally from the site.

### 5.8.2.1 NEIGHBOURHOOD CONNECTOR B ROADS

The abovementioned Neighbourhood Connector B (NCB) roads are projected to carry traffic volumes of less than 3,000 vpd. Accordingly 18 - 20m road reserves are proposed for all NCB roads; with one of four design options to be considered at the subdivision design stage (**Figure 4a** and **4b** refers).

All design options include a pedestrian 'green-link' to one verge, incorporating a combination of dual-use paths, landscaped and vegetated drainage swale and/or on-street parking embayments. The verge widths will vary depending on the number of the above design elements being incorporated. The NCB landscaped verge design will create an Estate identity and will assist pedestrian way finding en route to community nodes (i.e. schools, key Public Open Spaces etc). A standard footpath will be provided on the opposite verge.

### 5.8.2.1 ACCESS STREETS

Generally all local roads will consist of an *Access Street D* design, comprising of 13 - 15m road reserves with 6m wide trafficable carriageway pavement and a maximum 4.5m verge width (**Figure 4b** refers). Where fronting Public Open Space, Baldivis Tramway Reserve or Kwinana Freeway Reserve, Access Street verges may be reduced to 2.5 metres depending on the location, service infrastructure and pedestrian network requirements.

Maximum desirable traffic volumes for this type of road are less than 1,000 vpd. Where traffic volumes exceed 1000 vpd, an Access Street C may be warranted and shall comprise of minimum 16.2m reserve with 7.2m trafficable carriageway and 4.5m verges.

Larger verges may be provided where pedestrian 'green-links' are desired.

### 5.8.2.2 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.

Maximum desirable traffic flow for a laneway is 300 vpd.

**LEGEND:**

**Site Boundary**

**Road Reserve Widths**

Neighbourhood Connector B

20 metre Road Reserve  
18 metre Road Reserve

**Access Street**

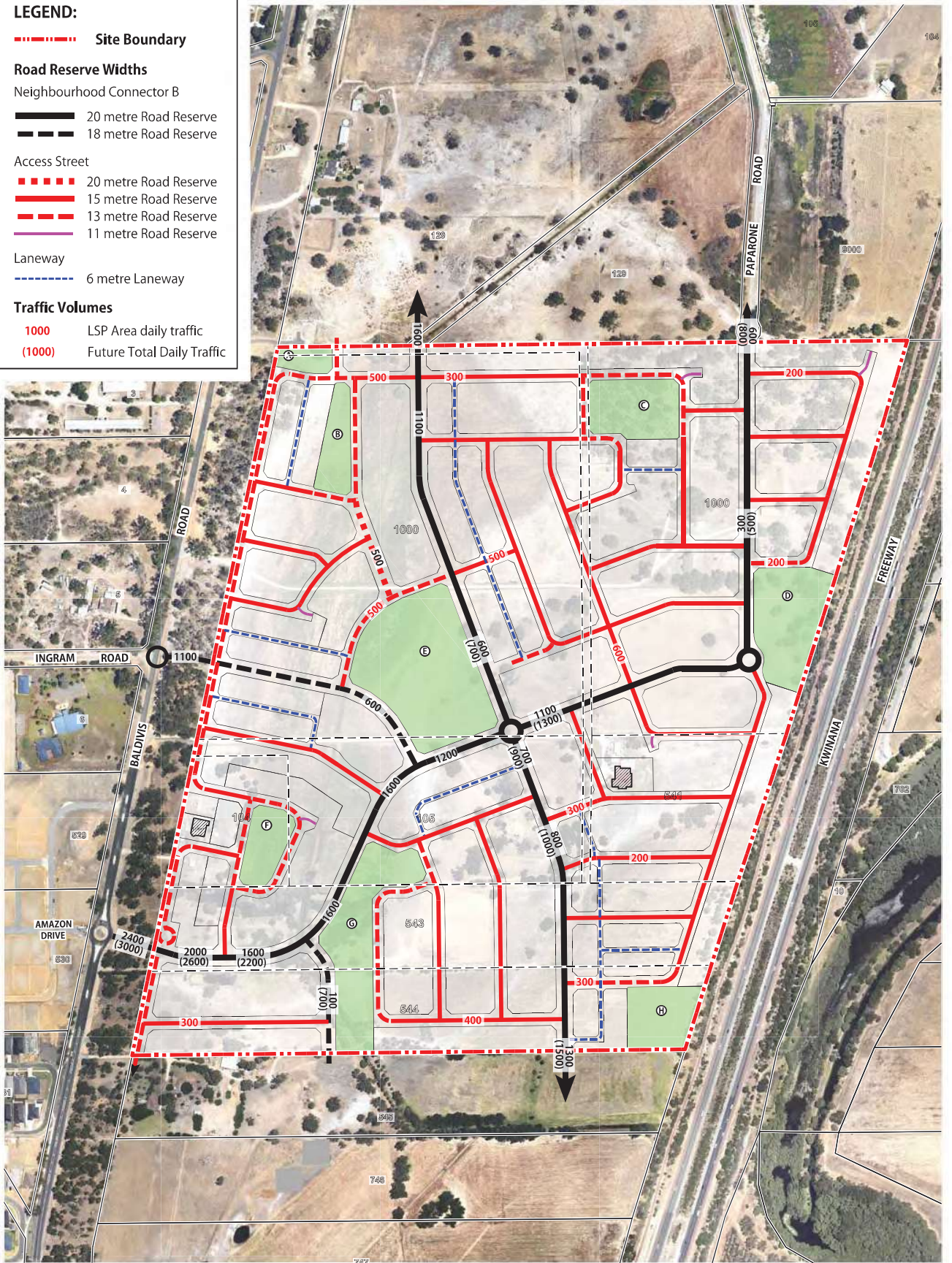
20 metre Road Reserve  
15 metre Road Reserve  
13 metre Road Reserve  
11 metre Road Reserve

**Laneway**

6 metre Laneway

**Traffic Volumes**

1000 LSP Area daily traffic  
(1000) Future Total Daily Traffic



**PLAN 6 - Internal Road Hierarchy**

Lots 104, 105, 541, 543, 545,  
1000 Baldvis Road, BALDIVIS

for: Frasers Property



NORTH		Scale 1: 6000 @ A4	
0 50 100 150 200 metres			
COMPILED: CD+P	DRAWN BY: JP	REVISD: 08/06/2016	
DATE: 01/02/2013	REVISD: 08/06/2016	DATUM: AHD	
GMD: MGA 50	DATUM: AHD	AUSELSP	
DRAWING NUMBER: AUSEB-5-002F	JOB CODE: AUSEB-5-002F	RD HIERARCHY.dgn	
FILE ID: M:\AUSEB\BASE\REPORT DIAGRAMS\AUSEB-5-002F RD HIERARCHY.dgn			

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### 5.8.3 Baldvis Road

Baldvis Road will be an *Integrator B* road pursuant to the *Liveable Neighbourhoods* road hierarchy. The existing upgraded section in the south of the Structure Plan area demonstrates the road cross-section that will be built; this comprising of 5m carriageways with 2m median. Contribution towards the upgrade of Baldvis Road will occur under conditions of subdivision approval.

### 5.8.4 Pedestrian and Cycle Network

**Plan 7** illustrates the proposed pedestrian and cyclist network for the Structure Plan area. 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.

The Structure Plan allows for pathway connections to the regional pathway along the Kwinana Freeway, directly accessed from the internal road network. 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*).

Footpath widths will generally be 2m wide, with Dual Use paths (DUPs) 2.0 – 2.5m wide depending on the location and anticipated pedestrian movements.

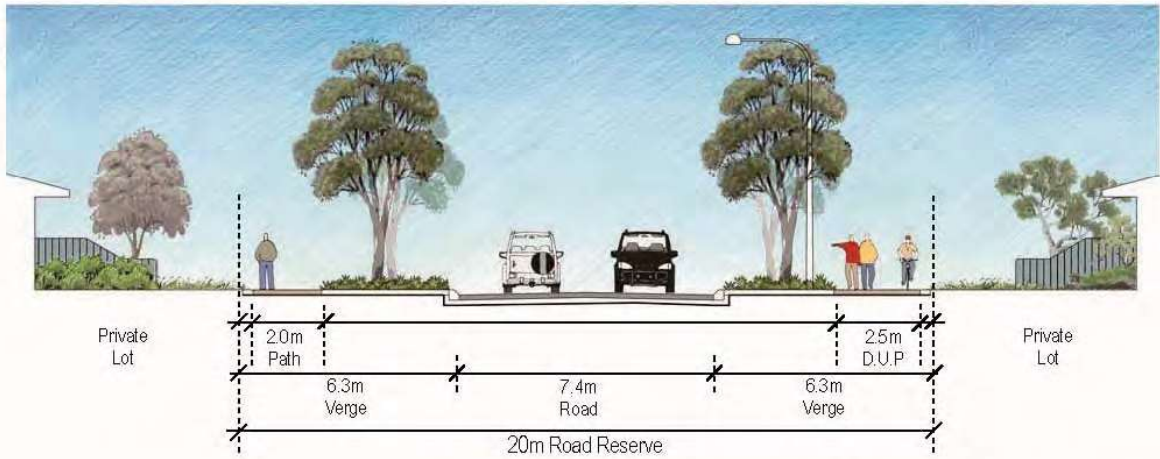
### 5.8.5 Public Transport

Transperth does not currently operate any bus routes within close vicinity to the Structure Plan area. The closest bus connection is bus route 568, which terminates in Australand's Baldvis Central Estate immediately to the south-west. This route navigates through residential estates south of Safety Bay Road en route to the Warnbro Station.

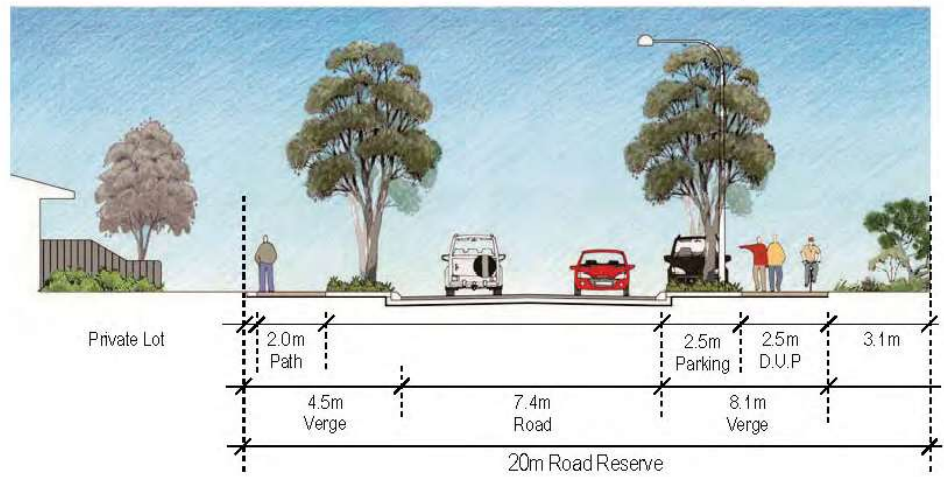
Warnbro Station is on the Mandurah-Perth train line is approximately 6.5 kilometres south west of the Structure Plan area. The closest train station is Wellard station, approximately 3.5 kilometres north-west of the Structure Plan area. There are currently no bus services connecting the Baldvis area to this train station.

A review of services will be undertaken by the Public Transport Authority (PTA) as the expansion of residential development continues in the North and East Baldvis locality. It is anticipated that bus services will initially run along Baldvis Road, servicing the residential catchments either side of this road. Notwithstanding the above, the Structure Plan's primary internal road reserves have been designed to accommodate bus services, should the PTA later resolve to divert buses through this residential area (**Plan 8** refers).

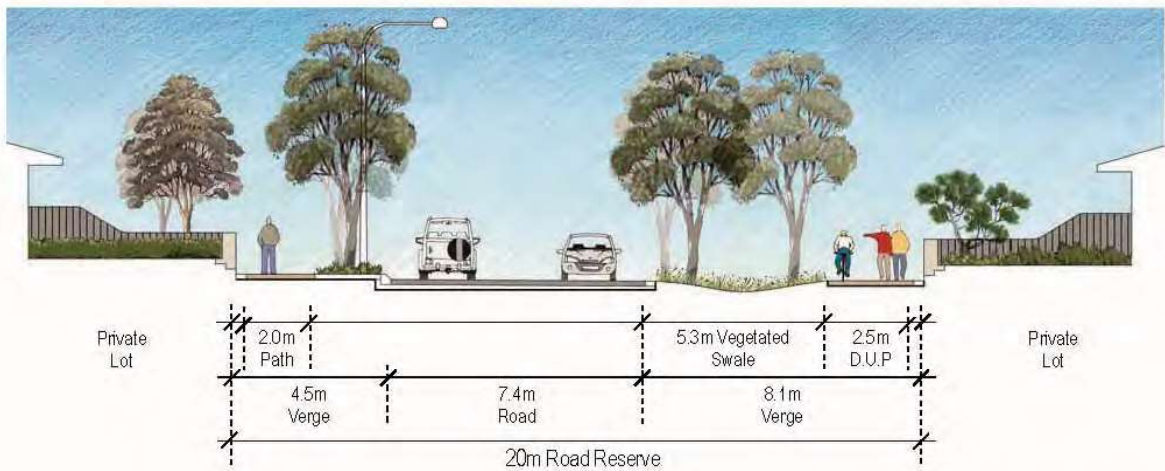
## 20m ROAD RESERVE (OPTION A)



## 20m ROAD RESERVE (OPTION B)

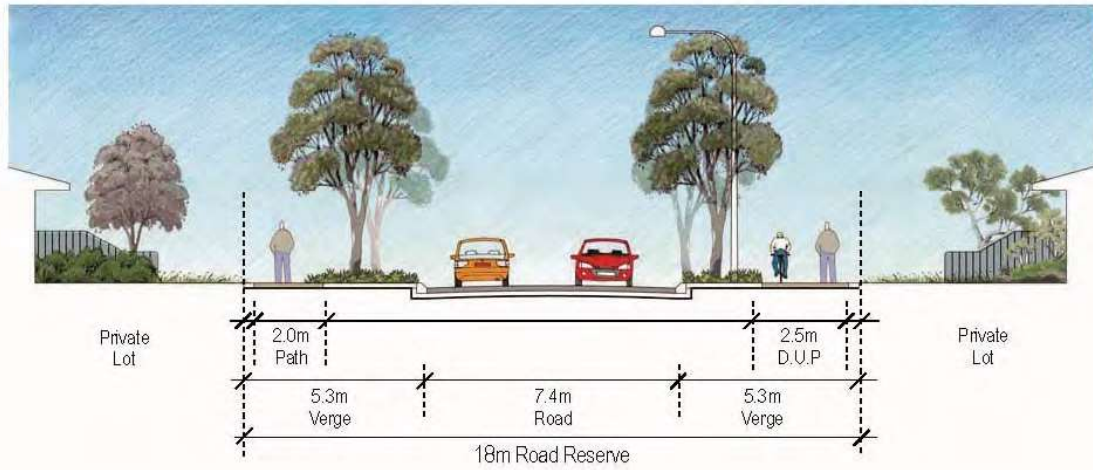


## 20m ROAD RESERVE (OPTION C)

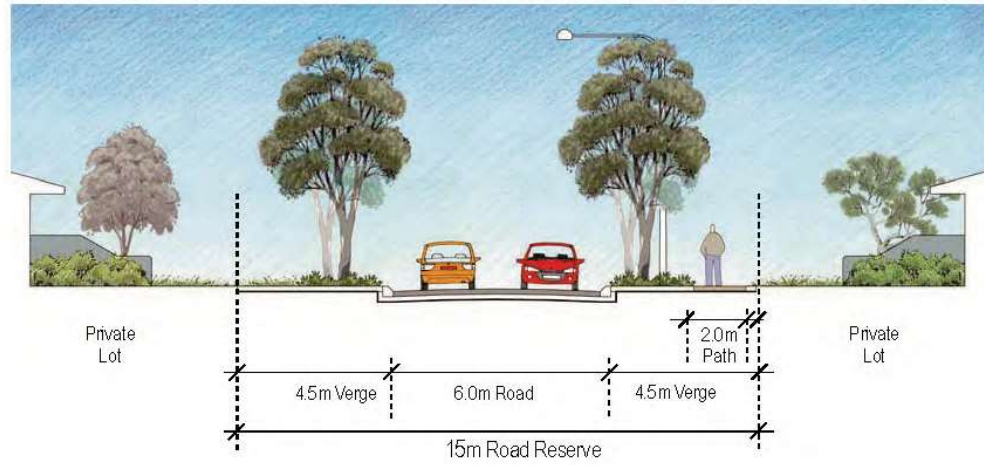


**FIGURE 4a**

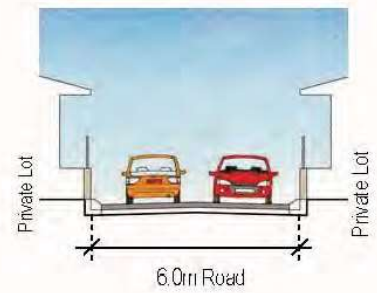
## 18m ROAD RESERVE



## 15m ROAD RESERVE

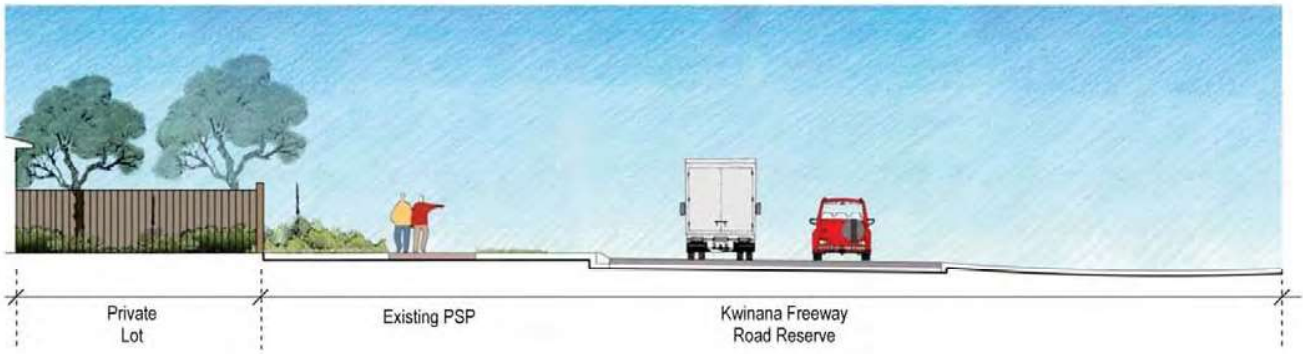


## 6m LANEWAY



**FIGURE 4b**

## FREEWAY INTERFACE (ADJACENT LOT)



## FREEWAY INTERFACE (ADJACENT ROAD)







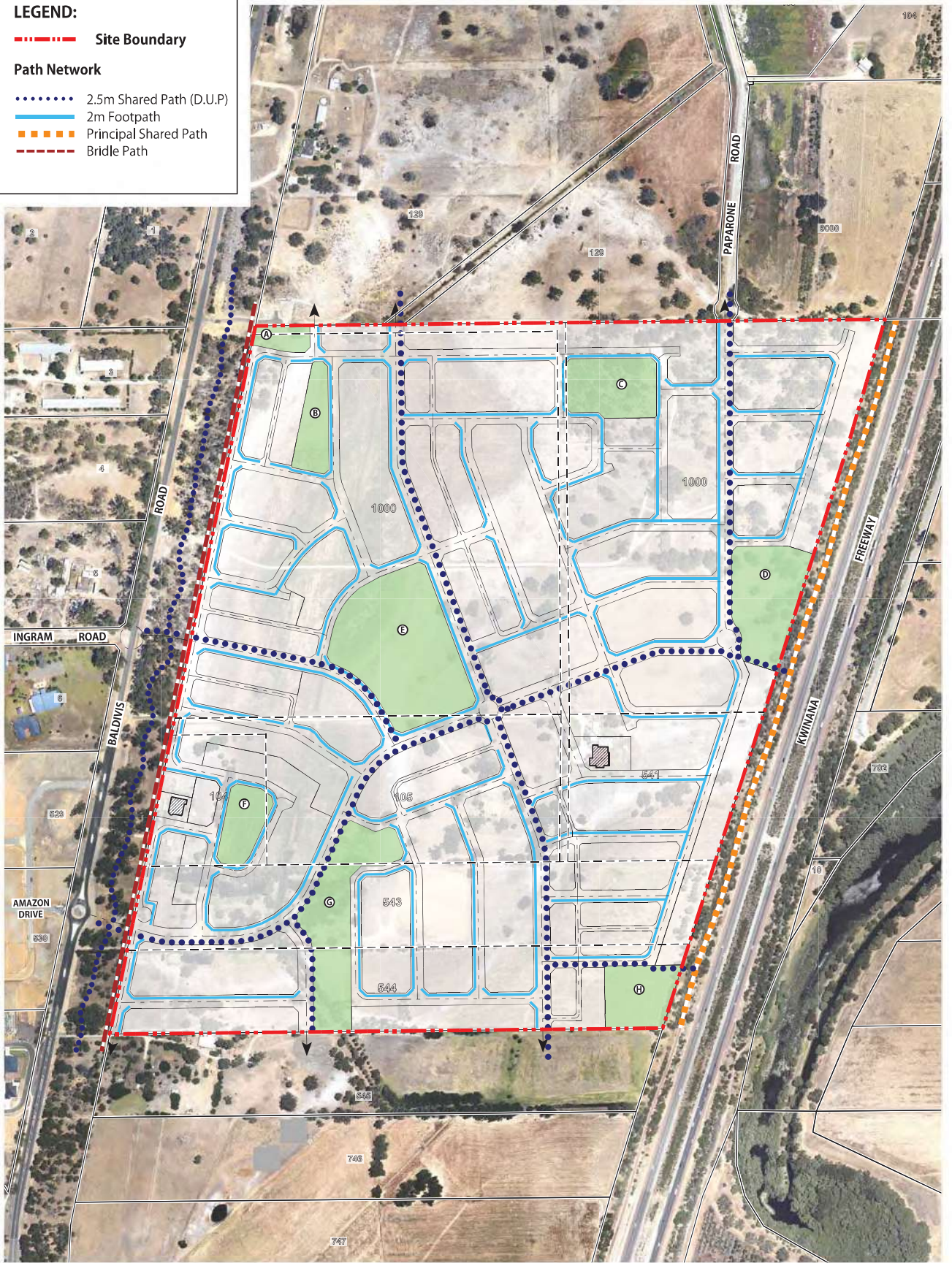
FIGURE 4c

**LEGEND:**

 Site Boundary

**Path Network**

-  2.5m Shared Path (D.U.P)
-  2m Footpath
-  Principal Shared Path
-  Bridle Path




**PLAN 7 - Indicative Path Network**

Lots 104, 105, 541, 543, 544,  
1000 Baldvis Road, BALDIVIS

for: Frasers Property



 NORTH Scale 1: 6000 @ A4 0 50 100 150 200 metres	
COMPILED: CD+P	DRAWN BY: JP
DATE: 04/02/2013	REVISED: 08/06/2016
GMD: MGA 50	DATUM: AHD
DRAWING NUMBER: AUSEB-5-003E	JOB CODE: AUSEBLS P
FILE ID: M:\AUSEB\BASE\REPORT DIAGRAMS\AUSEB-5-003E PATH NETWORK.dgn	

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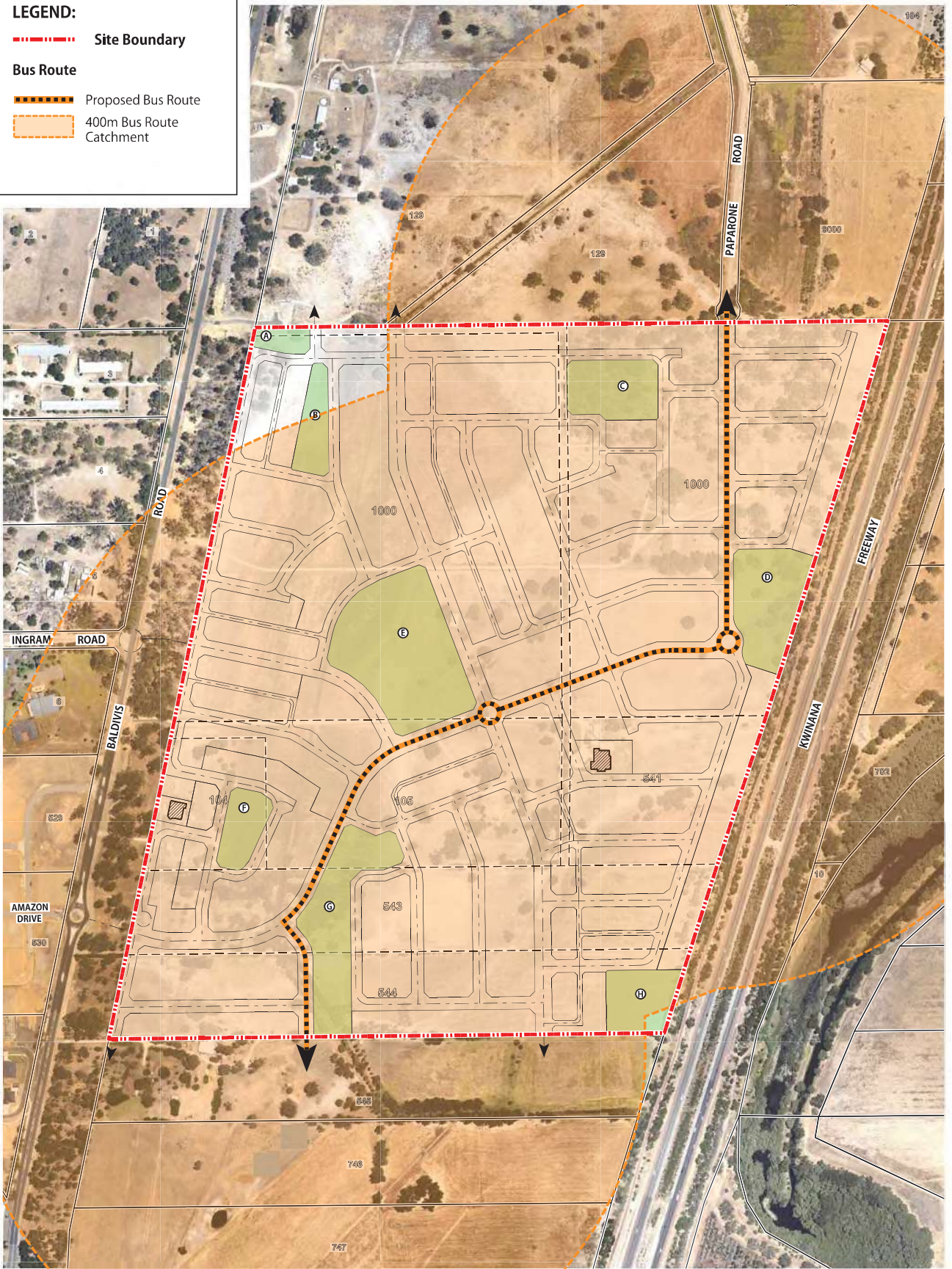
**LEGEND:**

 Site Boundary

**Bus Route**

 Proposed Bus Route

 400m Bus Route Catchment



**PLAN 8 - Preferred Bus Routes**

Lots 104, 105, 541, 543, 544,  
1000 Baldvis Road, BALDIVIS

for: Frasers Property



<p>NORTH</p> <p>Scale 1: 6000 @ A4</p> <p>0 50 100 150 200 metres</p>	
COMPILED: CD+P	DRAWN BY: JP
DATE: 05/02/2013	REVISED: 09/06/2016
GMD: MGA 50	DATUM: AHD
DRAWING NUMBER: AUSEB-5-004D	JOB CODE: AUSEBSP
FILE ID: M:\AUSEB\BASE\REPORT DIAGRAMS\AUSEB-5-004D BUS ROUTE.dgn	

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## 5.9 Public Open Space

The provision of a minimum of 10% Public Open Space (POS) is provided in accordance with the WAPC's *Liveable Neighbourhoods*. POS is to be provided generally in accordance with **Plan 1** under Part One of the Structure Plan; with specific drainage detail and open space credits including relationship to Council Policy Provisions demonstrated in **Plan 9 – Public Open Space** and **Figures 5 - 18** below. All figures are rounded up for the purpose of Structure Plan calculations and will be reviewed in detail at the Subdivision Design phase.

### 5.9.1 Overview

The Structure Plan proposes a total of 8 areas of Public Open Space (POS). The POS areas are distributed and will be designed so as to create local 'precinct' amenity and character. All future residents will be within walking distance to the primary POS 'E'; with the furthest residents ~ 550m from this POS. The POS areas will retain stands of remnant mature trees and vegetation wherever practical (namely to the north-east), and urban water drainage measures.

The Structure Plan offers a total 'green space' of 6.87 ha; the creditable POS provision equates to greater than 10% of the gross subdivisible area, being a total of approximately 6.01 ha. It is acknowledged that in some POS areas the stormwater drainage percentages exceed the City's prescribed '25% maximum 1:10 year Average Recurrence Interval (ARI) drainage' guideline pursuant to Clause 4.7.3 of the City's Planning Policy 3.4.1 – Public Open Space. However, 1:5 year ARI drainage percentages generally comply with the 25% ruling, which is consistent with current WAPC policy and recognising all POS areas will provide sufficient recreational space.

The configuration of each POS to achieve 10% credit across the Structure Plan area will be subject to final subdivision, engineering and drainage design.

Updating of the POS schedule is to be provided at the time of subdivision for determination by the WAPC, upon advice of the City of Rockingham.

Ceding of the final Public Open Space areas to the State will occur at the time of subdivision.

### 5.9.2 Design and Drainage Rationale

In addition to the design rationale provided in **Figures 5 – 19**, the Public Open Space areas and location have been influenced by the following design attributes:

**'POS A'** – Inclusion of this ~0.19ha 'Local' POS is to primarily serve as a buffer to the Water Corporation pump station on the adjacent Peet landholding, Lot 129 Baldivis Road. Given the 30 metre residential buffer requirement of the pump station, it is anticipated that open space will also be developed on the Peet landholding, thus creating an open space in excess of 4,000m<sup>2</sup>. Landscaping of the adjacent Tramway Reserve (generally cleared in this location) will further increase the usability of the open space. No drainage is proposed within this open space.

**'POS B'** – This ~0.41ha 'Neighbourhood' POS is to cater for residents generally within a 200 metre walkable catchment. No drainage is proposed within this open space.

Suitable treatment of the residential interface will ensure the open space is not 'privatised' for those direct frontage lots to the west; this through measures including:

- landscaping treatments – vegetation providing a barrier between the POS and dwellings;
- footpaths locations – suitable path treatments adjacent or proximate to the residential lot boundary thus making the POS boundary of lots 'public'; and
- elevation of lots – elevation of dwellings above the POS provides suitable separation to the POS whilst also improving surveillance, particularly with rigid building design controls through LDPs/Guidelines.

**'POS C and D'** – These 'Neighbourhood' open spaces of ~0.73ha and ~1.04ha respectively will cater for residents within a 200 – 400 metre walkable catchment.

As part of preparing the Structure Plan, consideration was given to a range of environmental factors including vegetation (and fauna) retention.

Specifically within the north-eastern portion of Lot 1000 comprises areas of Banksia, Marri and Tuart Woodlands, of which these woodlands include black cockatoo roosting and foraging habitat (**Appendix 1** and **1A** refer). POS has been suitably positioned to retain as much of the woodland areas as practical. Use of the woodlands for passive recreational space will be subject to detailed landscaping design.

Whilst POS C provides no drainage provision, POS D will provide stormwater compensation for the entire north-east drainage catchment area – **Figure 19** refers. The on-site drainage provision is currently projected to accommodate up to 0.23ha (22%) of the open space for 1:10 year storm events; or 0.23ha (22%) of the open space for 1:5 year storm events. This percentage is within the parameters of Council’s Policy 3.4.1 – Public Open Space acknowledging the majority of the open space is available for general recreational use outside of larger storm events.



*Natural shade from remnant trees - children's playground,  
Yokine Reserve.*

**'POS E'** – This ~2.18ha 'Neighbourhood' POS is the primary open space within the Structure Plan area and will attract residents from all parts of the Estate, the majority within a 400 metre walkable catchment. The open space will provide both an important recreational and drainage function for the Estate. Large areas of open turf will provide ample kick-about spaces and will include drainage provision for larger storm events. The on-site drainage provision is projected to accommodate up to 0.48ha (22%) of the open space for 1:10 year storm events; or 0.45ha (20%) of the open space for 1:5 year storm events.

Further detailed design has been undertaken through the subdivision process and as a result the 1:10 year drainage provision no longer exceeds the 25% target set by Council’s Policy 3.4.1 – Public Open Space. Nevertheless, it is worthwhile noting the following factors:

- the open space provides drainage compensation for a very large catchment across the Structure Plan area as illustrated in **Figure 19**. Notwithstanding this, the 1:5yr ARI drainage percentage complies with the 25% ruling, hence consistent with current WAPC policy; and
- the effective area for general recreational use is not compromised with ample kick-about space, playground and picnic facilities and potential community building space available within this open space. The **Figure 13** concept plan provides illustration of the effective recreational space available for the local community.

**LEGEND:**

--- Site Boundary

**Public Open Space**

Public Open Space

**Walkable Catchments**

--- 200m --- 200m POS Walkable Catchment

--- 400m --- 400m POS Walkable Catchment



Public Open Space		Area Ha
Site Area		59.07
Deductions		
Drainage 1:1yr (Uncredited):		0.86
Gross Subdivisible Area		58.21
POS Requirement 10%		5.82
Maximum Restricted Open Space (20%):		1.16
Maximum Unrestricted Open Space (80%):		4.66

POS Area	Land Area (Ha)	Drainage Provision and Creditable Open Space					City Policy 3.4.1 and Liveable Neighbourhoods Comparison	
		1:1 Year (Ha)	Restricted Open Space >1:1 - 1:5 Year (Ha)	Unrestricted Open Space >1:5 - 1:100 Year (Ha)	Unencumbered Open Space (No Drainage)	Total Credit Open Space Combined (Ha)	City Policy 1:1yr Drainage (% of POS)	Liveable Neighbourhoods 1:5yr Drainage (% of POS)
A	0.19	0.00	0.00	0.00	0.19	0.19	0.00 - 0%	0.00 - 0%
B	0.41	0.00	0.00	0.00	0.41	0.41	0.00 - 0%	0.00 - 0%
C	0.73	0.00	0.00	0.00	0.73	0.73	0.00 - 0%	0.00 - 0%
D	1.04	0.19	0.04	0.15	0.65	0.85	0.23 - 22%	0.23 - 22%
E	2.18	0.38	0.07	0.40	1.33	1.80	0.46 - 22%	0.45 - 20%
F	0.42	0.00	0.00	0.00	0.42	0.42	0.00 - 0%	0.00 - 0%
G	1.29	0.12	0.04	0.19	0.95	1.18	0.15 - 12%	0.15 - 12%
H	0.60	0.17	0.03	0.16	0.24	0.43	0.20 - 34%	0.20 - 34%
<b>Total</b>	<b>6.87</b>	<b>0.86</b>	<b>0.17</b>	<b>0.91</b>	<b>4.93</b>	<b>6.01</b>	<b>1.06</b>	<b>1.03</b>
					<b>Surplus</b>	<b>0.19</b>		

**PLAN 9 - Public Open Space**

Lots 104, 105, 541, 543, 544 & 1000 Baldvis Road, BALDIVIS

for: Frasers Property



NORTH  
Scale 1:4000 @ A3  
0 50 100 150 200 metres

COMPILED: CD-P  
DATE: 05/02/2013  
GRID: MGA 50  
DRAWING NUMBER: AUSEB-5-005F  
FILE: M:\AUSEB\BASE\REPORT DIAGRAMS\AUSEB-5-005F POS.dgn

DRAWN BY: RF  
REVISED: 27/07/2016  
DATUM: AHD  
JOB CODE: AUSEBLSF

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**FIGURE 5 - LANDSCAPE STRATEGY**



**PUBLIC OPEN SPACE SUMMARY**

**LOCAL PARKS**

- Predominantly native planted areas with pockets of turf
- Small gathering nodes and basic picnic/BBQ facilities
- Path network which links into the greater East Baldvis development
- Primary focus on passive recreation

**FEATURE PARK**

- Large expansive turf area
- Centrally located and easily accessible to the entire community
- Large gathering spaces to cater for community events
- Large all age, accessible play space and fitness nodes
- Pedestrian/Cycle Path network which links into greater East Baldvis development
- Active recreation space including informal sports field

**TRAMWAY**

- Retain and protect all existing native vegetation
- Pocket planting of revegetation species
- Informal path network to link into development and greater Tramway

**NEIGHBOURHOOD PARKS**

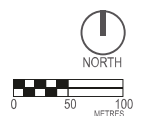
- Balance of native planted pockets and open turf areas
- Large gathering nodes with BBQ/picnic facilities
- All age play areas and fitness nodes
- Pedestrian/Cycle path network which links into the greater East Baldvis development
- Informal active recreation spaces

**GREEN LINKS/ WIDENED VERGE/ ACCESS WAY**

- Predominantly native planted widened verge
- Shaded nooks with seating opportunities
- Pedestrian/Cycle path network which links to other POS areas
- Passive use
- Entry feature/signage

**MAINTENANCE**

All Public Open Spaces within East Baldvis are to be maintained as managed Parklands. Imagery of maintained parkland is as shown and referenced on pages POS C, D and H. Refer to Bushfire Hazard Assessment for further detail.



**'POS F'** – This ~0.42ha 'Neighbourhood' POS is to cater for residents generally within a 200 metre walkable catchment. No drainage is proposed within this open space.

**'POS G'** – This ~1.29ha 'Neighbourhood' POS is to cater for residents within a 200 – 400 metre walkable catchment. The linear configuration of open space corresponds to the original Water Corporation drainage corridor traversing the Structure Plan area; this corridor extends south into Lot 545 before heading east towards a culvert under the Kwinana Freeway. The required drainage corridor will be piped through the proposed open space.

In light of the drainage corridor providing important district connection enroute to the Freeway culvert, it is expected that the linear open space will ultimately extend into Lot 545. Configuration of the open space (with open or piped drainage options) will be at the discretion of the adjoining landowner in consultation with relevant Government Agencies.

The on-site drainage provision is currently projected to accommodate up to 0.15ha (12%) of the open space for 1:10 year storm events; or 0.15ha (12%) of the open space for 1:5 year storm events. This percentage is within the parameters of Council's Policy 3.4.1 – Public Open Space acknowledging this open space provides compensation for the Structure Plan's entire south-western drainage catchment area. Notwithstanding this, the majority of the open space, particularly the northern portion, will be made available for general recreational use at all times.

**'POS H'** – This ~0.6ha 'Neighbourhood' POS is to cater for residents generally within a 200 metre walkable catchment. The POS corresponds to a low point on the site which also contains poor soils for housing development; this combined has influenced the proposed location. Similar site restrictions and design approach for any future development on Lot 545 is likely to result in a shared open space area, thus providing a combined area in excess of 1ha.

The on-site drainage provision is currently projected to accommodate up to 0.20ha (34%) of the open space for 1:10 year storm events; or 0.20ha (34%) of the open space for 1:5 year storm events. Whilst the percentages exceed the parameters of Council's Policy 3.4.1 – Public Open Space, this open space provides compensation for the entire south-eastern drainage catchment area. Notwithstanding this, the landscape concept design under **Figure 16** demonstrates there is ample kick-about space in the northern half of the open space. Anticipated parkland development of the land to the south will also contribute to the extent of kick-about space(s) as a collective.

Similar to POS B, suitable treatment of the residential interface will ensure the open space is not 'privatised' for those direct frontage lots to the west, including planting, fencing and potential retaining measures.



*Parkland with well designed direct lot frontage, Piara Waters*

**FIGURE 6 - LANDSCAPE MASTER PLAN**



*CONSIDERED*



*HOMELY*



*COMFORTABLE*



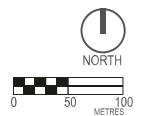
*INTERACTIVE*



*TEXTURAL*



*CONNECTED*



# FIGURE 7 - STREET TREE MASTER PLAN



*Eucalyptus victrix* - Western Coolibah



*Eucalyptus torquata* - Coral Gum



*Corymbia ficifolia* - Red Flowering Gum



*Agonis flexuosa* - WA Peppermint

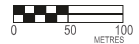


*Callistemon 'Kings Park Special'*

**Note:**  
Street trees located in Public Open Space areas with Building Protection Zone considerations are to apply to the relevant tree canopy separation requirements



NORTH



**FIGURE 8 - POS REFERENCE + TREE PLANTING PALETTE**



*Agonis flexuosa*



*Banksia attenuata*



*Banksia grandis*



*Banksia menziesii*



*Casuarina obesa*



*Corymbia ficifolia*



*Eucalyptus gomphocephala*



*Eucalyptus rudis*



*Eucalyptus victrix*



*Macrozamia reidlei*



*Melaleuca lanceolata*



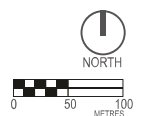
*Melaleuca preissiana*



*Melaleuca quinquemervia*



*Xanthorrhoea preissii*



## FIGURE 9 - POS A CONCEPT



### POS TYPOLOGY

- Local Informal

### SIZE (excluding verges)

- 1,930 square metres

### CONCEPT

- Provide a small local park to cater for residents within a 150 - 300m walking catchment
- Create a safe local park which is intended to be heavily planted with shade trees and provides low key picnic facilities, recreational facilities and nodes for exercise.
- Provide safe pedestrian and cycle linkages to the Tramway and other broader path network linkages.

### FUNCTIONS

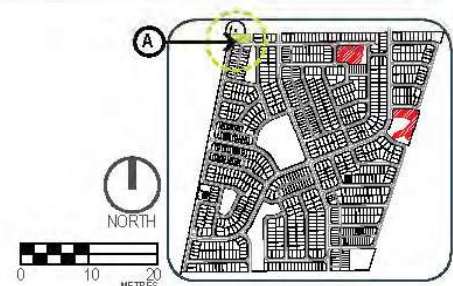
- Small turf pocket
- Native, water wise planting
- Maximise shade trees with emphasis on native species
- Retain existing vegetation where possible
- Limited picnic facilities
- Internal path network
- Path network connecting into the Tramway and broader path network

### ENVIRONMENTAL CONSIDERATIONS

- Waterwise native planting
- Planting design to be zoned according to irrigation requirements
- Planting within Building Protection Zone to be considered. Refer to the FESA planting guidelines for possible species within the BPZ
- Dry gardens with gravel mulch, clumping plants and limited irrigation
- Source local materials where possible
- Consider the long term maintenance requirements for all materials

### DRAINAGE CONSIDERATIONS

- Not Applicable



Context - Link to natural environment



Comfort - Provide built shelter for gatherings



Connectivity - Provide shaded pedestrian links

## EAST BALDIVIS LOCAL STRUCTURE PLAN

LANDSCAPE JOB NUMBER : EB-01 : JULY 2013 : REVI

(REFERENCE: DPS Plan: AUSEB-2-004h revision 16th July 2013)

**emerge**  
ASSOCIATES  
Innovated Science & Design

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## FIGURE 10 - POS B CONCEPT



### POS TYPOLOGY

- Neighbourhood Informal (B) and Greenlinks

### SIZE (excluding verges)

- 4,116 square metres

### CONCEPT

- Provide a neighbourhood park to cater for residents within a 200 - 400m walking catchingment
- Create a safe local park which is intended to be heavily planted in pockets with shade trees
- Provide low key facilities for residents to play, nodes for exercise and a mixture of both active and passive spaces.
- Provide safe pedestrian and cycle linkages to the broader path network and greenlinks.
- Provide pedestrian access to the lots fronting POS

### FUNCTIONS

- Turf - small pockets
- Native waterwise planting with areas of dry gardens
- Maximise shade trees
- Picnic Facilities for family/friend gatherings
- Play elements
- Path network connecting into broader path network.

### ENVIRONMENTAL CONSIDERATIONS

- Waterwise native planting
- Planting design to be zoned according to irrigation requirement
- Dry gardens with gravel mulch, clumping plants and limited irrigation
- Source local materials where possible
- Consider the long term maintenance requirements for all materials

### DRAINAGE CONSIDERATIONS

- Not Applicable



Considered - Balance turf and planted areas



Connectivity - Pedestrian and Cycle links



Comfort - Shaded nooks

## EAST BALDIVIS LOCAL STRUCTURE PLAN

LANDSCAPE JOB NUMBER : EB-01 : JULY 2013 : REV1

(REFERENCE: DPS Plan: AUSEB-2-004h revision 16th July 2013)

**emerge**  
ASSOCIATES  
Integrated Science & Design

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**FIGURE 11 - POS C CONCEPT**



**POS TYPOLOGY**

- Neighbourhood Informal

**SIZE (excluding verges)**

- 7289 square metres

**CONCEPT**

- Provide a Neighbourhood Park to cater for residents within a 200-400m walkable catchment
- Provide a park for informal community gatherings, play and turf pockets around existing vegetation

**FUNCTIONS**

- Turf - Informal relaxing spaces
- Native waterwise planting with areas of dry gardens
- Retained vegetation where possible
- Picnic Facilities for family/friend gatherings
- Play elements for all age groups
- Path network connecting into broader path network

**ENVIRONMENTAL CONSIDERATIONS**

- Waterwise native planting
- Planting design to be zoned according to irrigation requirement, with full irrigation requirements to the informal turf playing area
- Plant species below existing trees is to be considered. Refer to the FESA planting guidelines for possible species to propose below mature trees
- Weed/prune and remove debris from area of existing vegetation
- Retain and protect areas of native vegetation
- Source local materials where possible
- Consider the long term maintenance requirements for all materials

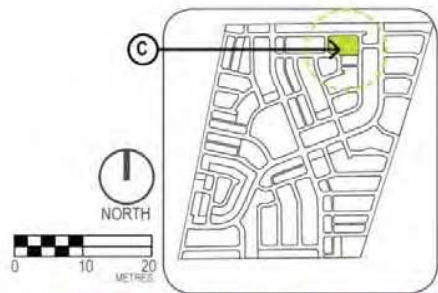
**DRAINAGE CONSIDERATIONS**

- Not Applicable

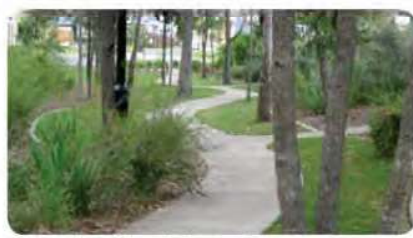


Example - Retained mature trees within a maintained parkland

*Note: Proposed vegetation below the retained mature trees is to preferably be low / groundcover native species from the current FESA planting guidelines. This area is to be maintained to ensure vegetation remains 'Low Threat'. Refer to the Bushfire Hazard Assessment for further detail.*



Comfortable - Informal gathering spaces

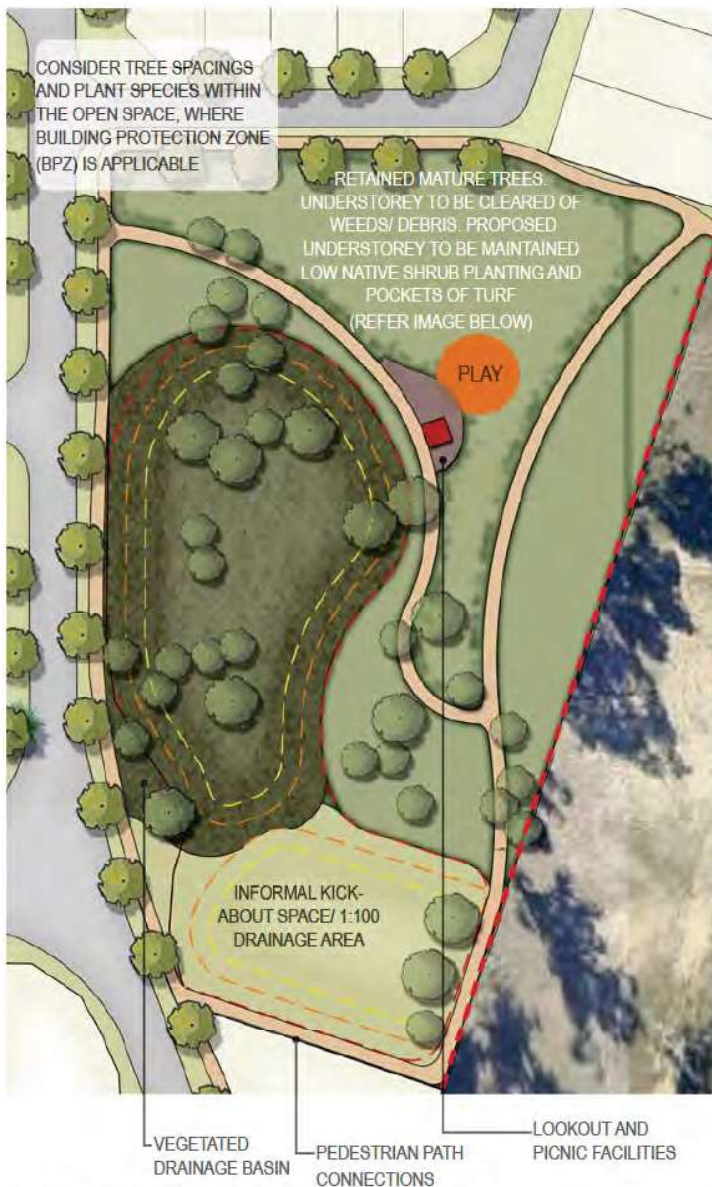


Connection - Meandering pathways



Textural - Local material palette

# FIGURE 12 - POS D CONCEPT



## POS TYPOLOGY

- Neighbourhood Passive Park (D)
- SIZE (excluding verges)**
- 10,656 square metres

## CONCEPT

- Provide a Neighbourhood Park to cater for residents within a 200-400m walkable catchment
- Provide a park which caters for drainage with pedestrian linkages and seating opportunities.
- Retain existing native vegetation

## FUNCTIONS

- Retain Existing vegetation
- Native waterwise planting with areas of dry gardens
- Maximise shade trees
- Limited picnic facilities
- Path network connecting into greenlink and broader path network.
- Drainage
- Turf informal kick about area

## ENVIRONMENTAL CONSIDERATIONS

- Waterwise native planting
- Planting design to be zoned according to irrigation requirement
- Retain and protect existing native vegetation where ever possible
- Planting within Building Protection Zone to be considered. Refer to the FESA planting guidelines
- Weed/prune and remove debris from area of existing vegetation
- Source local materials where possible
- Consider the long term maintenance requirements for all materials

## DRAINAGE CONSIDERATIONS

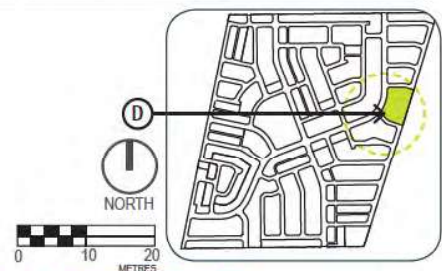
- 1:1                    820 m3 storage required    - - - - -
- 1:5                    1524 m3 storage required    - - - - -
- 1:10                  1524 m3 storage required    - - - - -
- 1:100                2772 m3 storage required    - - - - -

Note: Figures to be finalised during detailed design.



Example - Retained mature trees within a maintained parkland

Note: Proposed vegetation below the retained mature trees is to preferably be low / groundcover native species from the current FESA planting guidelines. This area is to be maintained to ensure vegetation remains 'Low Threat'. Refer to the Bush/Tree Hazard Assessment for further detail.



Connectivity - Nodes along journey



Comfort - Shaded gathering spaces



Interactive - All age facilities

## EAST BALDIVIS UWMP - LANDSCAPE INPUT

LANDSCAPE JOB NUMBER : EB-01 : JULY 2016 : REV B

(REFERENCE: JUNE 2014 BASE PLAN AND DEC UWMP DATA



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# FIGURE 13 - POS E CONCEPT



VEGETATED DRAINAGE BASINS WITH SUB-SOIL DRAINAGE

SHADED BBQ AND PICNIC FACILITIES

PEDESTRIAN PATH CONNECTIONS

## POS TYPOLOGY

- Neighbourhood Feature Park (E)

## SIZE (excluding verges)

- 21,578 square metres

## CONCEPT

- Provide a large active turf space for the broader community
- Large accessible play space with interest for all ages
- Provide safe pedestrian and cycle linkages
- Exercise circuit linking the functions within the POS
- Provide shaded picnic facilities, bbqs and toilet.
- Community focal area with space for small events/markets

## FUNCTIONS

- Turf - Larger turf areas for informal recreation
- Native waterwise planting with areas of dry gardens
- Maximise shade trees
- Picnic Facilities for family/friend & community gatherings
- Play elements for all age groups
- Path network connecting into broader path network and green-ways.
- Drainage

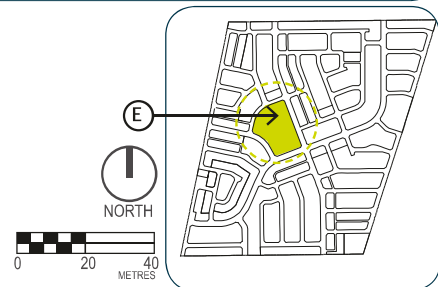
## ENVIRONMENTAL CONSIDERATIONS

- Waterwise native planting
- Planting design to be zoned according to irrigation requirement, with full irrigation requirements to the informal turf playing area
- Dry gardens - gravel mulch, clumping plants & limited irrigation
- Source local materials where possible
- Consider the long term maintenance requirements for all materials

## DRAINAGE CONSIDERATIONS

- |         |                                      |       |
|---------|--------------------------------------|-------|
| • 1:1   | 1914 m <sup>3</sup> storage required | ----- |
| • 1:5   | 3475 m <sup>3</sup> storage required | ----- |
| • 1:10  | 3620 m <sup>3</sup> storage required | ----- |
| • 1:100 | 6479 m <sup>3</sup> storage required | ----- |

Note: Figures to be finalised during detailed design.



Fun - Space to run



Comfort - Shaded nooks



Unique - Varied play areas

## EAST BALDIVIS UWMP - LANDSCAPE INPUT

LANDSCAPE JOB NUMBER : EB-01 : JULY 2016 : REV.B

(REFERENCE: JUNE 2014 BASE PLAN AND DEC UWMP DATA)



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## FIGURE 14 - POS F CONCEPT



### POS TYPOLOGY

- Neighbourhood Informal

### SIZE (excluding verges)

- 4,198 square metres

### CONCEPT

- Provide a neighbourhood park to cater for residents within a 200-400m walkable catchment
- Provide informal kick about space with areas for exercise and play.
- Gradual grass mounding and cospes of native trees create enclosure and a informal amphitheatre.

### FUNCTIONS

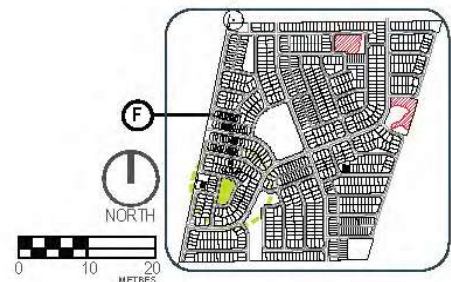
- Turf kick-about areas
- Native waterwise planting with areas of dry gardens
- Maximise shade trees
- Picnic facilities for family/friend gatherings
- Play and informal sport elements for all age groups
- Path network connection to broader pedestrian network

### ENVIRONMENTAL CONSIDERATIONS

- Waterwise native planting, dry gardens.
- Planting design to be zoned according to irrigation requirement.
- Dry gardens with gravel mulch, clumped planting and limited irrigation requirements
- Source local materials where possible
- Consider the long term maintenance requirements for all materials

### DRAINAGE CONSIDERATIONS

- No drainage within POS



Environment - Mixed native planting



Fun - Play spaces



Community Interaction

## EAST BALDIVIS LOCAL STRUCTURE PLAN

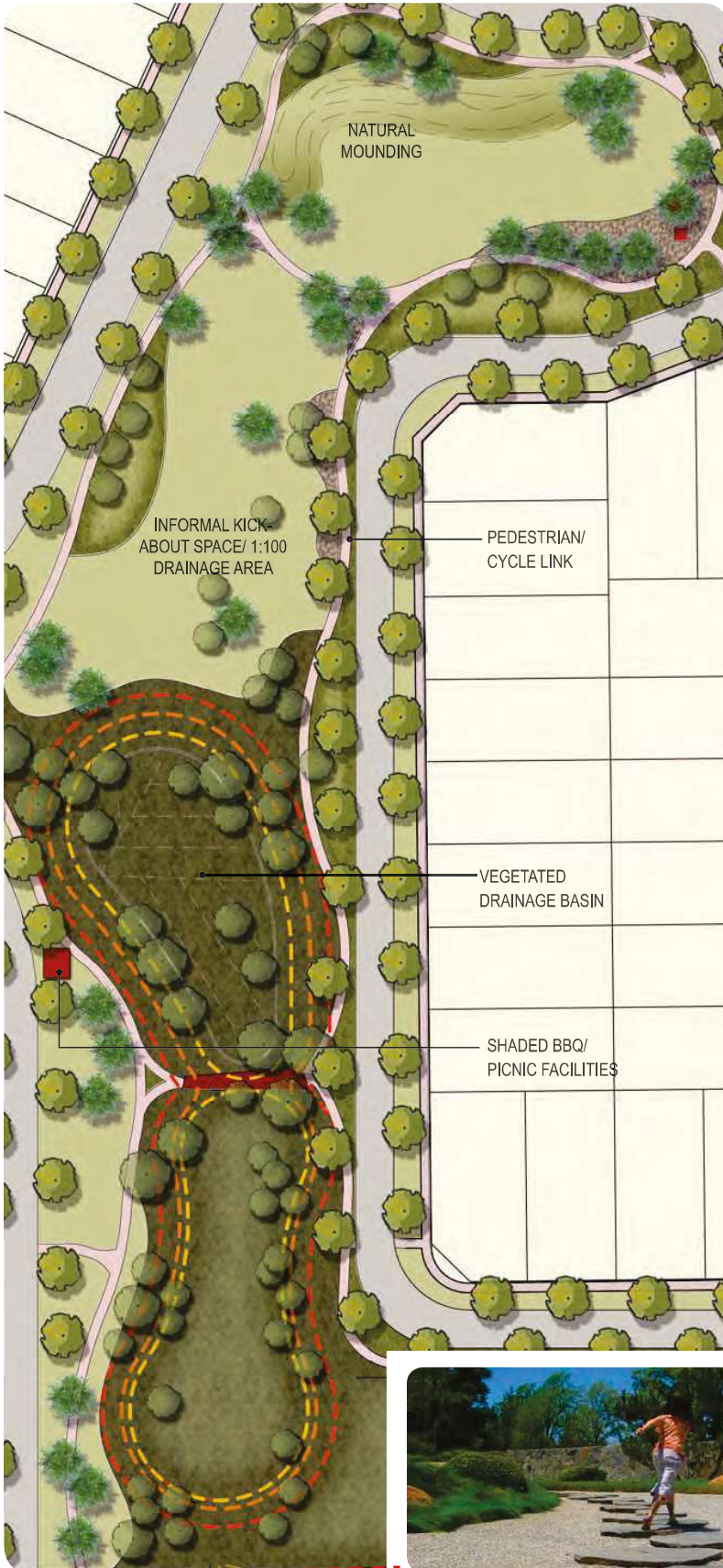
LANDSCAPE JOB NUMBER : EB-01 : JULY 2013 : REV I

(REFERENCE: DPS Plan: AUSEB-2-004h revision 16th July 2013)



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

# FIGURE 15 -POS G CONCEPT



## POS TYPOLOGY

- Neighbourhood Informal

## SIZE (excluding verges)

- 12,510 square metres

## CONCEPT

- Provide a neighbourhood park to cater for residents within a 200 - 400m walking catchment
- Create a mixed use park which is a mixture of planting pockets and open turf areas which provides low key picnic facilities, recreational facilities and nodes for exercise.

## FUNCTIONS

- Turf - informal kick-about areas
- Native waterwise planting with areas of dry gardens
- Maximise shade trees around the perimeter of turf
- Picnic facilities for family/friend gatherings
- Play elements for all ages
- Path network connecting into broader path network
- Drainage

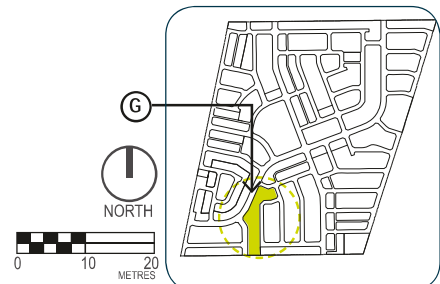
## ENVIRONMENTAL CONSIDERATIONS

- Waterwise native planting
- Planting design to be zoned according to irrigation requirement, with full irrigation requirements to the informal turf playing area
- Dry garden with gravel mulch, clumping plants and limited irrigation
- Source local materials where possible
- Consider the long term maintenance requirements for all materials

## DRAINAGE CONSIDERATIONS

- 1:1 581 m3 storage required ---
- 1:5 1031 m3 storage required ---
- 1:10 1031 m3 storage required ---
- 1:100 2040 m3 storage required ---

Note: Figures to be finalised during detailed design.



Fun - Nature play spaces



Connection - Utilising drainage areas

## EAST BALDIVIS UWMP - LANDSCAPE INPUT

LANDSCAPE JOB NUMBER : EB-01 : JULY 2016 : REV B

(REFERENCE: JUNE 2014 BASE PLAN AND DEC UWMP DATA)



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

# FIGURE 16 - POS H CONCEPT



## POS TYPOLOGY

- Neighbourhood Informal
- SIZE (excluding verges)**
- 6,014 square metres

## CONCEPT

- Provide a Neighbourhood Park to cater for residents within a 200-400m walkable catchment
- Provide a park with a balance of native planting and open turf areas for recreation.
- Provide connection through the site via a cycle/pedestrian pathway which also links to the broader POS network.

## FUNCTIONS

- Turf - informal kick-about areas
- Native waterwise vegetation
- Maximise shade trees
- Picnic facilities for family/friend gatherings
- Play elements for all ages
- Path network connecting into broader path network
- Drainage

## ENVIRONMENTAL CONSIDERATIONS

- Waterwise native planting
- Planting design to be zoned according to irrigation requirement, with full irrigation requirements to the informal turf playing area
- Planting within Building Protection Zone to be considered. Refer to the FESA planting guidelines for possible species within the BPZ
- Dry garden with gravel mulch, clumping plants and limited irrigation
- Source local materials where possible
- Consider the long term maintenance requirements for all materials

## DRAINAGE CONSIDERATIONS

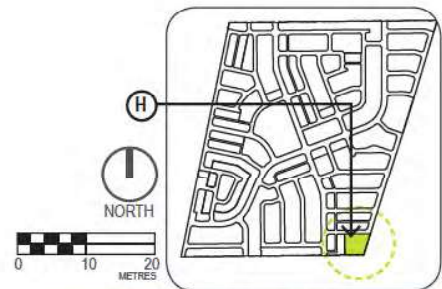
- 1:1            574 m<sup>3</sup> storage required
- 1:5            1043 m<sup>3</sup> storage required
- 1:10          1043 m<sup>3</sup> storage required
- 1:100        1931 m<sup>3</sup> storage required

Note: Figures to be finalised during detailed design.



Example - Vegetated drainage basin

Note: Proposed vegetation within high frequency drainage areas to be low / sedge native species from the current FESA planting guidelines. This area is to be maintained to ensure vegetation remains 'Low Threat'. Refer to the Bush/Tree Hazard Assessment for further detail.



Considered - Planted drainage retention



Fun - Active play



Gathering - Create levels to form meeting spaces

## EAST BALDIVIS UWMP - LANDSCAPE INPUT

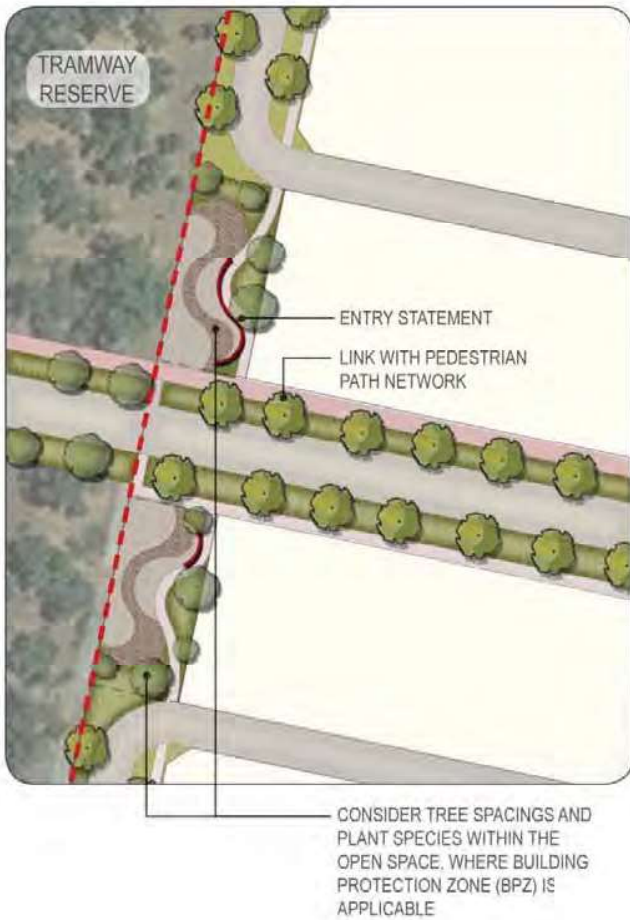
LANDSCAPE JOB NUMBER : EB-01 : JULY 2016 : REV B

(REFERENCE: JUNE 2014 BASE PLAN AND DEC UWMP DATA)



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## FIGURE 17 - ENTRY CONCEPT



### TYOLOGY

- Local Informal (Entry Open Spaces)

### SIZE (excluding verges)

- 364 + 364 square metres

### CONCEPT

- Demarcation of entry point into East Baldivis
- Mass native planting in formalised bands to mark entry road which is complementary to the Tramway reserve planting and the broader local environment
- Reflect distinctiveness of East Baldivis

### FUNCTIONS

- Native waterwise planting with areas of dry gardens
- Path network connecting into and out of the development.
- Entry feature/planting

### ENVIRONMENTAL CONSIDERATIONS

- Waterwise native planting
- Planting design to be zoned according to irrigation requirements
- Planting within Building Protection Zone to be considered. Refer to the FESA planting guidelines for possible species within the BPZ
- Dry gardens with gravel mulch, clumped planting and low irrigation requirements.
- Source local materials where possible
- Consider the long term maintenance requirements for all materials

### DRAINAGE CONSIDERATIONS

- Not Applicable



Considered - Interpretation of place



Textural - Mixed native planting



Unique - Entry statement/sculpture

## EAST BALDIVIS LOCAL STRUCTURE PLAN

LANDSCAPE JOB NUMBER : EB-01 : MARCH 2014 : REV J (REFERENCE: DPS Plan: AUSEB-2-004k revision 26th Feb 2014)



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

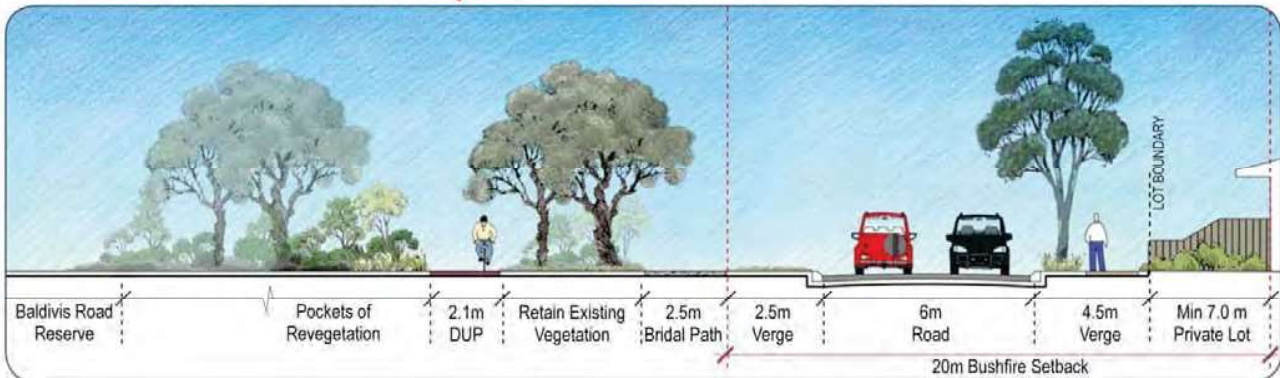
# FIGURE 18 - TRAMWAY TYPOLOGY PLAN



- CONCEPT**
- Maintain and protect all existing vegetation within tramway reserve
  - Meandering dual use path runs the length of the tramway and links to greater tramway path networks.
  - Limestone Bridal trail runs adjacent to boundary
  - Planting pockets of native re-vegetation

- FUNCTIONS**
- Native re-vegetation planting
  - Crushed limestone bridal path
  - Dual use path
  - Entry Statement at Baldvis Road
  - Provide linkages to pedestrian networks within and outside of the development area

- ENVIRONMENTAL CONSIDERATIONS**
- No irrigation
  - Re-vegetation of native plant communities to strategic nodes. Locations to be determined in detailed design
  - Removal of weed species



Linkage - Mark connection with East Baldvis



Meandering Pathway



Pockets of Native Re-vegetation

**EAST BALDIVIS LOCAL STRUCTURE PLAN**

LANDSCAPE JOB NUMBER : EB-01 : MARCH 2014 : REV J (REFERENCE: DPS Plan: AUSEB-2-004k revision 26th Feb 2014)



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

## 5.10 Urban Water Management

Urban water management falls under the jurisdiction of the Department of Water in Western Australia, which requires the preparation of plans and strategies at the different stages of planning as administered by Local Government and the Western Australian Planning Commission (WAPC). Planning Bulletin 92 Urban Water Management (WAPC 2008) provides the State Government Policy in relation to this urban water management framework, which requires the following:

- A District Water Management Strategy, to be submitted in support of a District Structure Plan, local planning strategy or region scheme amendment.
- Local Water Management Strategy, to be submitted in support of a Structure Plan or TPS amendment.
- Urban Water Management Plans, 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 Local Water Management Strategy has been prepared by RPS, this consistent with the requirements of Better Urban Water Management (WAPC 2008); **Appendix 6** refers.



*Urban Water Management design- Public Open Space, Harrisdale*

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

The water management criteria that are proposed for the development include:

- Retain and infiltrate the 1 yr 1 hour ARI events as close to source as possible.
- 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.
- Where pre-development catchments indicate there will be runoff leaving the site, the discharge rates and volumes should be consistent with pre-development conditions.
- Post-development aquifer levels shall be maintained relative to pre-development conditions.
- 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.
- Provide commitment to a Mosquito Management Plan being implemented prior to any subdivisional development (Table 5 under the 'Implementation' section refers).

The LWMS is 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 objectives are met.

## 6 INFRASTRUCTURE CO-ORDINATION AND SERVICING

An Engineering Service report has been prepared by Development Engineering Consultants (DEC) to support the Structure Plan (**Appendix 3** refers). The following section represents a summary of the report findings.

### 6.1 Roads

All roads will be constructed to City of Rockingham standards.

As part of subdivision works, Baldvis Road is required to be upgraded to an urban standard; in this case a single lane boulevard design consistent with the upgrading commensurate with subdivision development to the south. This will include reconstruction where required plus kerbing, sheeting, drainage and underground services between the existing roundabout at the intersection of Ingram and Baldvis Roads to the northern boundary of the development.

### 6.2 Sewerage

The structure plan area will be connected to the one existing pump station, known as Baldvis North Pump Station 'E'; located adjacent to Baldvis Road and immediately north of the Structure Plan area. This pump station currently has restricted temporary discharge to the Water Corporation's Kwinana Waste Water Treatment Plant (WWTP), via Waste Pump Station No. 6 (Bertram Road), some 8 kilometres north of the site. This station currently serves only existing *Urban* zoned land; with the permanent discharge for this pump station to be the East Rockingham WWTP. The required 30 metre buffer surrounding this pump station has been shown on the Structure Plan (Plan 1). Through the strategic positioning of POS 'A', the Structure Plan design ensures that no residential land is located within the 30 metre buffer.

### 6.3 Drainage and Stormwater Management

The original site contained an unregistered Main Drain (or 'Trunk Drain') which traversed the site in a north south direction. As part of the original stages, this has been piped to convey upstream existing flows, plus outflows from basins within the development. It has also been laid as a subsoil drain to control the maximum groundwater level to current plotted AAMGL's in a similar fashion to the existing drain.

The open drain which also incorporates catchments both upstream and downstream of the structure plan area forms part of the Water Corporation's Peel Main Drain catchment, for which the Corporation controls the maximum flow rates permitted to be discharged from the site; this being 31s/ha and 4.5l/s/ha for the 10 year and 100 year flows respectively. The pipe system has been sized on the basis of the 100 year flow.

Despite the catchments linkage to the main drain, the City of Rockingham will ultimately control the drainage on site by virtue of the area being developed for *Urban* purposes.

Given the 1:100 year floor fill requirements for the Peel Main Drain (RL5.2m AAHD) and the requirements for filling to facilitate sewerage, the vast majority of the site will require at least 1.5m – 2m of fill above the natural surface levels and AAMGL. This will enable site soakwells to operate efficiently, hence lot drainage will be disposed on individual allotments.

Where small lot product is provided (i.e. less than 300m<sup>2</sup>), whereby a greater percentage of on-site paving is typically provided, overflow drainage connections will be provided although prior on site storage will be required to contain the 1 in 1 year 1 hour storm.

The site has been divided into a number of drainage catchments, as determined by the preliminary road design and the natural catchment boundaries. Swale locations and treatment is proposed to consist of bio-retention areas (1:1 year events) to treat the flows prior to outfall. A higher sill area is proposed to accommodate the larger recurrence interval storms. No untreated surface water will be connected to the Main Drain.

The base of the bio-retention areas are proposed to be set approximately 300mm above the controlled groundwater levels (CGL's) to reduce risk of long term standing water over the winter months. The sill area is proposed to be set a minimum of 0.5m above CGL to ensure that these areas are useable as public open space apart from during storm events. A UWMP for the whole of the site has been prepared and approved by the City of Rockingham and the changes required due to the amended structure plan proposed herein.

The UWMP details the size and volumes of the detention areas. Ground water monitoring bores have been established on site, with readings undertaken since September 2009.

The proposed drainage system for the subdivision will also be accommodating drainage flows from Baldvis Road, with swales provided along Baldvis Road.

## 6.4 Ground Water

The groundwater level at the site has been measured from September 2009.

Groundwater levels are controlled by the existing drainage line through the site and the existing freeway drainage and the groundwater levels appear to be the result of the surface water 'perching' on the sand/clay interface and grading to the outfall drains along this interface.

The resulting site Annual Average Maximum Groundwater Levels (AAMGL) is therefore at RL 3.7m AHD along the Main Drain corridor, peaking at RL 4.2m AHD in the eastern half of the land before dropping as the impact of the Freeway drain occurs (RL 4.0m AHD) along the Freeway boundary.

The invert of the existing drain through the development grades from RL 3.7m AHD at the northern boundary of the site, to RL 2.8m AHD on the southern boundary. The invert of the existing 1050 diameter culvert under the Freeway is RL 2.4m AHD.

## 6.5 Power

Sufficient power supply exists in the area to supply the development and the first stages of the development have resulted in the existing overhead power systems being removed.

All aerial lines have been removed with the exception of the lines along Baldivis Road which will be lowered when the works north of Ingram Road are undertaken.

All internal power reticulation lines and transformer installations will be constructed at the cost of the developer. Transformer sites will be determined at the detailed subdivision design stage and will typically be located in POS areas.

## 6.6 Telephone and NBN

The development incorporates the installation NBN for internet and communications. The developer will install 'pipe and pit' for future NBN cable installation, and these will be designed and installed with the development construction.

## 6.7 Gas

The current development is fully connected to the ATCO gas reticulation system and this can be extended through the Structure Plan area.

## 6.8 Water reticulation

At present there is a 300mm distribution main in Baldivis Road south of Ingram Road and a DN600 main north to Fifty Road. Both these main connect across to the Tamworth Reservoir on Eighty Road meaning there is sufficient capacity to serve the development.

The 250mm reticulation main has been extended into the initial stages of the development which will be linked north and south into the adjacent developments to serve the greater area.

# 7 IMPLEMENTATION

## 7.1 East Baldivis District Structure Plan and City of Rockingham Scheme Amendment No 122

Following the WAPC's resolution to lift the 'Urban Deferment' zoning exclusively for the AHB Co-Venture landholdings in February 2012, the site was subsequently gazetted 'Urban' on 13<sup>th</sup> March 2012 (MRS Amendment 1229/27).

Subsequent to the Lifting of Urban Deferment, in June 2012 the City of Rockingham initiated a Town Planning Scheme Amendment (Amendment No. 122) to rezone the Structure Plan area from 'Rural' and 'Special Rural' to 'Development'; this being undertaken in accordance with Section 124 of the Planning and Development Act 2005. The 'Development' zone was formally gazetted on 26 March 2013.

Concurrent to the assessment and endorsement of the Local Structure Plan included the assessment and endorsement of the encompassing East Baldivis District Structure Plan. Whilst the DSP includes outstanding items with respect to the agreed location of the Secondary School and District Playing Field site to the north, and road and intersection treatments associated with Mundijong Road, such issues did not directly affect this Structure Plan and future subdivision development of the subject landholding.

Notwithstanding the above, the DSP was conditionally approved by the City on 25 February 2014.

## 7.2 Earthworks and Retaining Walls

Each lot will be finished level as required for clearance to the 1 in 100 year flood level. This level exceeds the normal requirement of 1.2m above the AAMGL, which in this case ranges between RL 3.7m AHD to RL 4.2m AHD in the centre of the site, and falling to RL 4.0m AHD along the eastern boundary. The above existing levels will require a minimum fill level ranging between RL 4.9 to RL 5.4m AHD. In comparison, the estimated minimum fill level for the 1:100 year flood for the afflux for the Peel Main Drain/ Serpentine River is RL 6.1m AHD, which governs the final development level requirements.

Minimal retaining walls will be required due to the level nature of the filled land at the development stage (**Figure 19** refers). Any walls will be subject to Council Building approval.

Earthworks on site will entail removal of all unsuitable soils to clean base and importing of fill with clean free drainage sand to meet the designated levels.

It is proposed to negotiate with neighbouring land owners to allow boundary fill to spill onto such land so that coordination of filled lot and road levels can be made. Roads and lot levels at boundaries will be set to suit the flood determined levels. The earthworks are proposed to be designed in accordance with the DEC conceptual design.

## 7.3 Developer Contributions to Infrastructure

The Structure Plan relates to one landowner only, therefore no Developer Contributions Arrangements need to be introduced for this development. Notwithstanding, the upgrade of Baldivis Road to a boulevard treatment and associated intersection upgrades, as well as path treatments through the Baldivis Tramway are anticipated conditions of subdivision approval for the Structure Plan area.

Contributions to community infrastructure by way of the City's *Developer Contributions Plan No. 2* will also be implemented by the time the first lots are developed in the Structure Plan area.

## 7.4 Staging

Development of the Structure Plan area requires detailed subdivision design and subdivision approval from the Western Australian Planning Commission.








Development has commenced in the central portion of the Structure Plan area and is anticipated to progress generally in an anti-clockwise direction. An Indicative Staging Plan is provided under **Plan 10**.

Staging and Implementation of Specialist Reports and Management Plans will be required as part of future subdivision works. **Table 5** below denotes key items that the proponent is required to undertake as part of subdivision design/Development Application phase.

Table 5 – Reports and Management Plans

Documentation	Submission Stage	Approving Authority
<b>Geotechnical Assessment Report</b>	Condition of subdivision	WAPC, CoR, DEC
<b>Urban Water Management Plan</b>	Condition of subdivision	WAPC, CoR, DoW
<b>Detailed Acoustic Report (Kwinana Freeway/Baldivis Road frontages)</b>	<ul style="list-style-type: none"> <li>• Local Development Plans; and/or</li> <li>• Development Application/Building Licence for nominated Dwellings</li> </ul>	CoR
<b>Bushfire Management Plans (Kwinana Freeway/Baldivis Tramway frontages)</b>	<ul style="list-style-type: none"> <li>• Local Development Plans; and/or</li> <li>• Development Application/Building Licence for nominated Dwellings</li> </ul>	CoR, DFES
<b>Mosquito Management Plan</b>	Condition of subdivision	CoR

**LEGEND:**

-  Site Boundary
-  Stage Boundary
-  Stage Number / Total Lots within Stage
-  Public Open Space / Reference
-  Road Reserve
-  Retained Houses
-  Indicative Lot



## PLAN 10 - Indicative Staging

Lots 104, 105, 541, 543, 544, 1000 Baldvis Road, BALDIVIS

for: AUSTRALAND



**NOTES:**

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NORTH		Scale 1:4,000 @ A3	
0 50 100 150 200 metres			
COMPILED: CD+P	DRAWN BY: RF		
DATE: 05/02/2013	REVISED: 04/07/2016		
GND: MGA 50	DATUM: AHD		
DRAWING NUMBER: AUSEB-S-006g	JOB CODE: AUSEBLSF		
FILED: M:\AUSER\BASE\REPORT\DIAGRAMS\AUSEB-S-006g STAGING.dwg			

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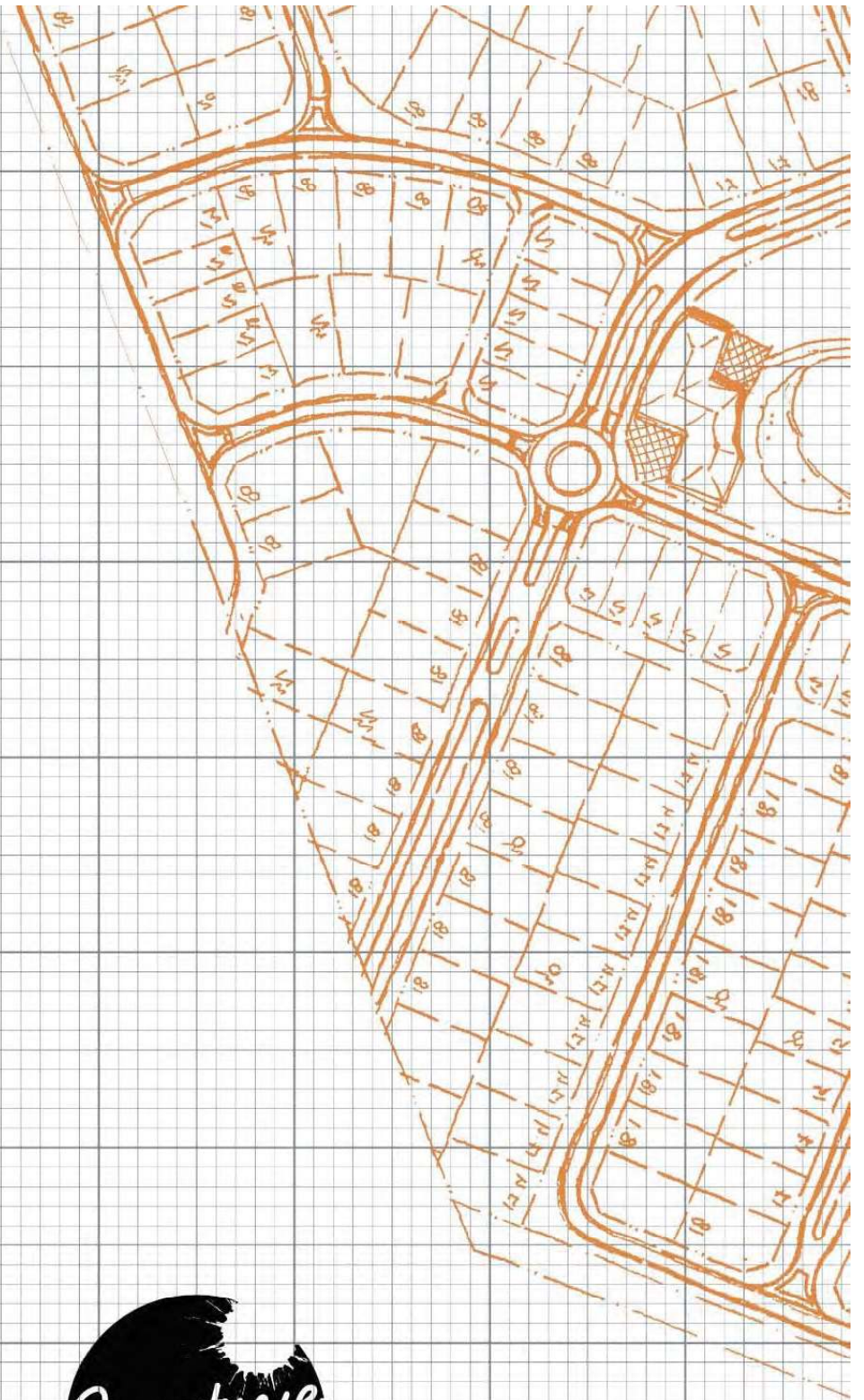


- LEGEND**
- INDICATIVE LOCATION OF 1 IN 100 YEAR OVERFLOW
  - CATCHMENT BOUNDARY
  - RETAINING WALLS
  - LOTS DIRECTLY CONNECT TO S/W SYSTEM
  - INDICATIVE 1:100 YEAR FLOW PATH
  - ROAD LEVEL
  - LOT LEVEL
  - EXISTING OPEN CHANNEL
  - 1 IN 1 YEAR STORAGE
  - 1 IN 5 YEAR STORAGE
  - 1 IN 10 YEAR STORAGE
  - 1 IN 100 YEAR STORAGE
  - AAMGL CONTOURS

- NOTES**
1. MINIMUM LOT LEVEL RL+1m AHD
  2. 100 YEAR FLOOD LEVEL PEEL MAIN DRAIN AT RL+2m AHD

**Figure 19**

<p><b>Revisions</b></p> <p>This document shall remain the property of Development Engineering Consultants Pty Ltd. No document may only be used for the purposes for which it was prepared and in accordance with the terms of engagement for the completion of the work. No part of this document may be reproduced or used in any way without the prior written consent of the author.</p>	<p>1. 21/02/14. 2D/3D/SEC AND LEVELS AMENDED FLOW PATHS REVISED</p>	SRA	<p>CLIENT:</p> <p><b>AUSTRALAND HOLDINGS LTD</b></p>	<p><b>DEVELOPMENT ENGINEERING CONSULTANTS</b></p>	<p>SUITE 3, 523A EDLIN ST. WEST PERTH, 6005 WESTERN AUSTRALIA Ph: (08) 9481 7900 Fax: (08) 9481 7300</p>	<p>PROJECT:</p> <p><b>BALDISV EAST DEVELOPMENT</b></p>	<p>DRAWING:</p> <p><b>1:100 YEAR FLOW PATHS &amp; FINISHED LOTS LEVELS</b></p>	<p>SCALE: 1:2000</p> <p>DRAWN: RG</p> <p>CHECKED: SRA</p> <p>DATE: 09/07/11</p> <p>DESIGNED: RG</p> <p>APPROVED: SRA</p>	<p>PROJECT NUMBER:</p> <p><b>PRO221-SK22</b></p>
	<p>2. 17/2/11. LAYOUT PLAN AMENDED</p>	SRA							
	<p>3. 01/02/11. W/S SETTINGS A-A &amp; B-B SHOWN (REVISED SK33)</p>	SRA							
	<p>4. 20/2/11. 1:100 YEAR FLOOD PLAN REVISED</p>	SRA							
	<p>5. 27/2/11. 1:100 YEAR FLOOD PLAN AMENDED</p>	SRA							
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