

Anstey-Keane Urban Development Precinct – South West Precinct Structure Plan

Lots 3, 5, & 61 Armadale Road

and 23, 24 & 336 Anstey Road, Forrestdale

Prepared by
Hex Design and Planning
& Michael Glendinning Property



ENDORSEMENT PAGE

This Structure Plan is prepared under the provisions of the City of Armadale Scheme No.4

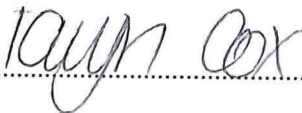
IT IS CERTIFIED THAT THIS STRUCTURE PLAN
WAS APPROVED BY RESOLUTION OF
THE WESTERN AUSTRALIAN PLANNING COMMISSION ON:

13 March 2020
.....Date

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


.....

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


.....Witness

13 March 2020
.....Date

13 March 2030
.....Date of Expiry

TABLE OF AMENDMENTS

Amendment No.	Summary of Amendment	Amendment Type	Date approved by WAPC

Executive Summary

Structure Plan - Anstey Road South Precinct

This report represents an application to the City of Armadale to consider a proposed Structure Plan over Lots 3, 5, & 61 Armadale Road and 23, 24 & 336 Anstey Road, Forrestdale, herein referred to as the 'Anstey Road South' planning precinct. The subject lots, which have a combined area of 19.18 ha, are located in the south-western quadrant of a larger precinct known as the 'Anstey-Keane Precinct', for which the City of Armadale has initiated a 'Planning and Liaison Group'.

The subject land is situated approximately 2km west of the Tonkin Highway, and 8km west of the Armadale District Centre.

The Structure Plan has been prepared concurrently to a Local Scheme Amendment to rezone the land within the Anstey-Keane Precinct to 'Urban Development'. Structure Plans for other landholdings within the Precinct are being progressed by others and the integration of the three Structure Plans is a focus of the City's Planning and Liaison Group.

The Anstey Road South Structure Plan will facilitate future subdivision and development of residential lots at Residential 30 (RMD30) and Residential 40 (RMD40) density.

The Structure Plan Summary Table below details the nature and key outcomes of the Structure Plan.

Structure Plan Summary Table

ITEM	DATA	Structure Plan Ref (section no.)
Total area covered by the Structure Plan	19.18 ha	Section 1.2.2, 1.2.3, 3.1.1
Area of each land use proposed: - Residential	7.65 ha (40 %)	Section 3.3.1
Total estimated lot yield	210 lots	Section 1.1
Estimated number of dwellings	220 dwellings	Section 3.3.1
Estimated population	570 persons	Section 3.3.1
Estimated residential site density	28.7 dwellings per residential site hectare	Section 3.3.1
Estimated area and percentage of Public Open Space given over to: - Regional open space - Local parks	Nil 4.26 ha (22.0%)	- Section 3.2.2

Part One - Implementation



Part One - Implementation

Structure Plan - Anstey Road South Precinct

1. Structure Plan Area

This Structure Plan shall apply to Lots 3, 5 & 61 Armadale Road, and Lots 23, 24 & 336 Anstey Road, Forrestdale. The Structure Plan area is defined by the line denoting the Structure Plan boundary on the Structure Plan Map (Plan 1).

2. Operation

The date the Structure Plan comes into effect is the date the Structure Plan is approved by the WAPC.

3. Subdivision and Development Requirements

- 3.1 Subdivision within the Structure Plan area is to be in accordance with the residential density code prescribed by the Structure Plan.
- 3.2 Land use permissibility within the Structure Plan area shall be in accordance with the corresponding zone or reserve under the Scheme.
- 3.3 At the time of subdivision, the following strategies and plans will be required via conditions of subdivision approval:
 - a) Urban Water Management Plan;
 - b) Landscape and Streetscape Plan;
 - c) Wetland and Buffer Management Plan;
 - d) Bushfire Management Plan;
 - e) Noise Assessment; and
 - f) Geotechnical Report.
- 3.4 Residential density targets applied under Perth and Peel @3.5million and the Southern Metropolitan Peel Sub-Regional Structure Plan of 26 dwellings per residential site hectare are to be achieved.
- 3.5 R40 lots adjacent or across the road from public open space are to be oriented to front the public open space and consolidate access points where possible.

4.0 Local Development Plans

Lots affected by road traffic noise associated with Armadale Road may require a Local Development Plan.

Local Development Plans shall address the following matters:

- *lots where specific vehicle access and egress control is required;*
- *lots abutting public open space; and*
- *“Quiet House Design” requirements.*

Plan 1 Structure Plan Map



Source of Information
 Site boundaries: Landgate, MNG
 Projection: GDA94 MGA Zone 50 South

NOTE
 All areas and dimensions are subject to survey and design changes and may change without notice.

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Michael Glendinning Property
 DESIGN | PLANNING

HEX

ANSTEY ROAD SOUTH STRUCTURE PLAN
 Lots 3, 5, 61, Armadale Road & Lots 23, 24, 336 Anstey Road, Forrestdale

20 0 20 40 100 200m

Project YOLFO | Scale 1:2000@A3 | Date February 2020

Part Two – Explanatory Report



Document Summary

VERSION	Ref	COMMENT	PREPARED BY	REVIEWED BY	REVIEW DATE	APPROVED BY	ISSUE DATE
Revision 1	YOLFOLSP	Draft	SD	MG	21.09.18	MG	25.9.18
Revision 2	YOLFOLSP	Final	MG	SD	07.02.20	MG	07.02.20
Revision 3	YOLFOLSP	Lodgement	SD	MG	25.02.20	MG	25.02.20

Prepared for: **Yolk Property Group**

Prepared by: **Hex Design and Planning**

29a Bartlett Crescent, KARRINYUP

T: 0438000235

E: sheldon@hexdesignplanning.com.au

Michael Glendinning Property

PO Box 723 Mount Lawley WA 6929

T: 0418 955 828

E: michael@mg-property.com.au

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1. PLANNING BACKGROUND

1.1 Introduction and Purpose

This submission has been prepared by Hex Design and Planning and Michael Glendinning Property on behalf of the landowners within the 'Anstey Road South' precinct. The subject area comprises of Lots 3, 5, & 61 Armadale Road and Lots 23, 24 & 336 Anstey Road, Forrestdale.

The subject site is bound by Armadale Road to the south, Anstey Road to the east, Parks and Recreation reserve to the west, and private landholdings to the north. The Structure Plan over the subject land is intended to be considered concurrently with an Amendment to the City of Armadale's Town Planning Scheme No. 4 (TPS 4) to rezone the subject land and adjacent properties to 'Urban Development'.

The ultimate objective of this proposal is to facilitate the subdivision and development of the land for a range of residential land uses in a manner that interacts appropriately with the development that is to be undertaken in land north and east of the subject site.

The intended land uses within the Structure Plan include:

- Approximately two hundred and twenty (220) residential lots including six (6) grouped sites, with residential density codings of RMD 40;
- Area identified for potential 'Child Care' development;
- Two areas of open space (POS), both restricted and unrestricted, that incorporate a CCW buffer, gas pipeline easement, district playing field and also drainage associated with the development of the subject site.

This submission is accompanied by a Structure Plan Map (**Plan 1**) prepared in accordance with the *Planning and Development (Local Planning Scheme) Regulations, 2015* which is included at Part One of this Report.

The Explanatory Section of this Structure Plan Report includes a detailed description of the proposal, provides an evaluation of the relevant town planning, environmental, fire management, acoustic assessment, local water management and servicing considerations applicable to the land, and details the rationale supporting the proposed Structure Plan.

The Structure Plan has been formulated by Hex Design and Planning and Michael Glendinning Property in collaboration with a team of specialist technical consultants, who have provided input in relation to matters as follows:

**Hex Design and Planning &
Michael Glendinning Property**

Emerge Associates

Emerge Associates

JDSi

RPS

GTA

EPCAD

Lloyd George

Urban design, town planning, project coordination

Environmental Assessment & Management Strategy

Bushfire Management Plan

Geotechnical Investigation & Engineering Services Report

Local Water Management Strategy

Transport Impact Assessment

Landscape

Transportation Noise Assessment

Copies of the relevant technical reports are included as Appendices in this report, with key findings from the respective reports incorporated within the core of this report. A Local Water Management Strategy (LWMS) has been prepared to support the Structure Plan and will be submitted concurrent to the Structure Plan Report by RPS for approval by the Department of Water.

The appended technical reports confirm there are no significant constraints to progressing urban development of the land, and is capable of being supported by Council.

Once the concurrent Scheme Amendment has been gazetted and the Structure Plan endorsed, it will be possible for urban development and subdivision to proceed in a coordinated manner as envisaged by the earlier rezoning of the site by the MRS to Urban.

1.2 Land Description

1.2.1 Location

The subject site is located within the suburb of Forrestdale and is situated approximately 2 km west of the Tonkin Highway, and 8 km west of the Armadale District Centre. The subject site abuts a Parks and Recreation Reserve to the west, and is located adjacent to Alfred Skeet Oval (**Figure 1** refers).

The site is accessed from Anstey Road, which in turn is connected to the surrounding area via Armadale Road to the south. Armadale Road provides access to the greater region, with access to the Kwinana Freeway approximately 8km to the west.

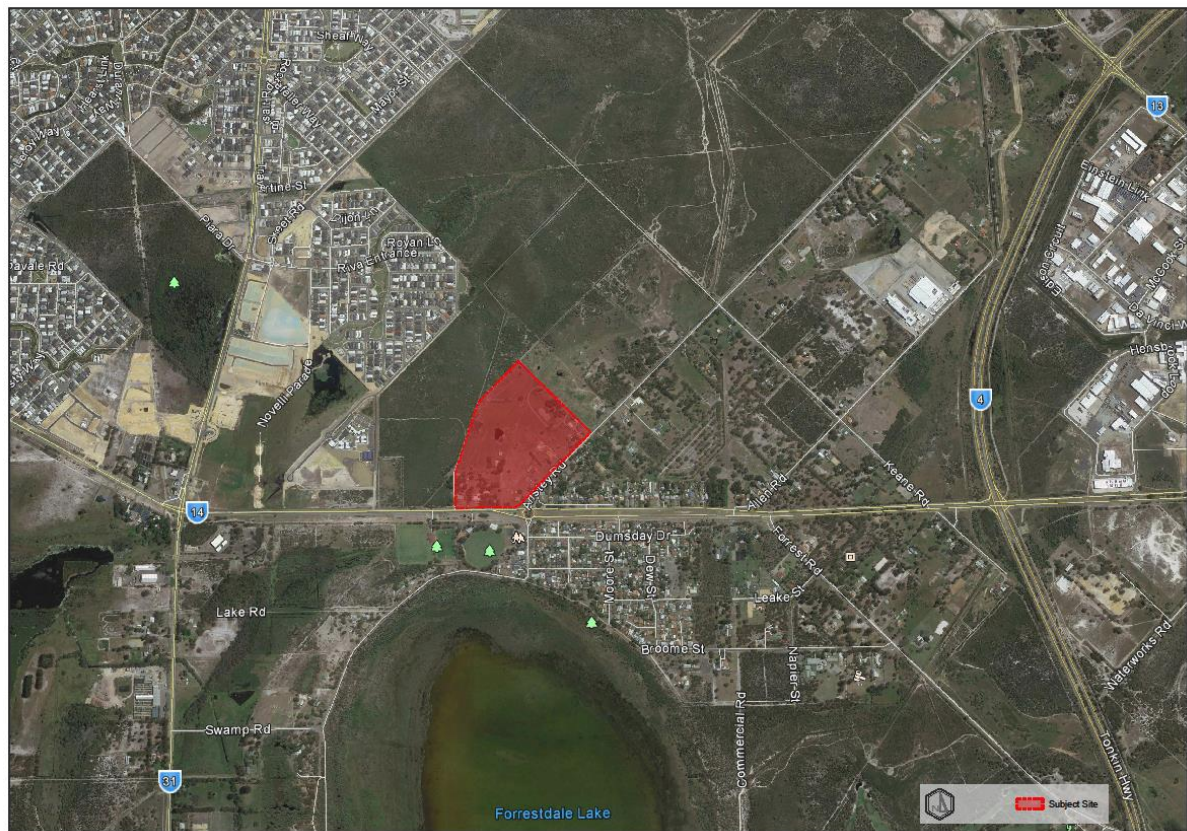


Figure 1 – Location Plan

1.2.2 Area and Land Use

The subject land is located within the City of Armadale, bounded by Armadale Road to the south, Anstey Road to the east, Parks and Recreation reserve to the West, and private landholdings to the north. The site has a combined land area of 19.18ha.

Land uses within the subject site reflect the existing zoning under TPS4 and generally comprise rural living and low key equestrian uses. The Aerial Photograph (**Figure 2**) shows the current state of the subject site.



Figure 2 – Aerial Photograph

The subject land, referred to as the 'Anstey Road South' precinct, is situated within an urban development area known as the 'Anstey-Keane Precinct', which includes landholdings to the immediate north and east. The subject land and these adjacent landholdings are the subject of a current rezoning under the City of Armadale's Town Planning Scheme No.4 (see section 1.3.1 of this report) and structure plans are being progressed for each of the landholdings, with residential development the primary land use proposed. The cell will also contain a primary school and small commercial site on the eastern side of Anstey Road, which will service the whole cell and thereby support the primarily residential development of the subject site.

1.2.3 Legal Description and Ownership

The subject site comprises six (6) lots. **Table 1** below provides details of the constituent lots.

Table 1 – Legal Description and Ownership

Lot No.	Plan/ Diagram	Volume	Folio	Landowner Details	Lot Area (ha)
Lot 3 Armadale Road	D27786	1930	714	Wei Ling Li & Ziu Zhen Liu	5.7870 ha
Lot 61 Armadale Road	P226007	1928	34	Raymond Miller Corrigan & Susie Elsie Corrigan	1.1715 ha
Lot 5 Armadale Road	P36061	121	136A	Tracy Lee Taylor & Susan Lyn Taylor	0.7808 ha
Lot 23 Anstey Road	D71918	1767	490	Andrew John Findlay Green & Stephanie Karen Phillips	3.0641 ha
Lot 24 Anstey Road	D71918	1767	491	Yolk Forrestdale 108 Pty Ltd	3.0642 ha
Lot 336 Anstey Road	P31923	2506	800	Stephen Murray McLennan & Jennifer Margaret McLennan	5.3134 ha
Total Area					19.1810 ha

Copies of the Certificates of Title are attached at **Appendix 1** of this report.

1.3 Planning Framework

1.3.1 Zoning and Reservations

1.3.1.1 Metropolitan Region Scheme (MRS)

The MRS is the statutory land use planning scheme for the Perth Metropolitan Area. The primary purpose of the MRS is to reserve and zone land and control development on reserved and zoned land at the Regional level.

The subject site is zoned 'Urban' under the provisions of the MRS, pursuant to MRS Amendment 1290/57 which was gazetted in September 2016.

Armada Road, which abuts the subject land's southern boundary, is identified as a 'Regional Road' under the MRS. The land abutting the western boundary of the subject land is zoned Parks and Recreation Reserve.

1.3.1.2 City of Armadale Town Planning Scheme No. 4

The subject land is currently zoned 'Rural Living 4 (RL4) & General Rural' under the City of Armadale Town Planning Scheme No.4 (TPS4), however is in the process of being rezoned 'Urban Development'.by way of Amendment No.96 to TPS4, which is currently advertised for submissions closing 26 October 2018.

The Urban Development zone requires a Structure Plan to be prepared in accordance with the Planning and Development (Local Planning Schemes) Regulations, 2015, being the most appropriate and flexible mechanism to progress subdivision and development, having regard to the following objectives of the zone:

- a) *"To provide for the orderly planning of large areas of land for residential and associated purposes through a comprehensive Structure Plan which is able to respond to changing circumstances throughout the developmental stages of the area; and*
- b) *To promote the sustainable development of new urban communities in accordance with the social, environmental and economic goals of the City of Armadale."*

The proposed Structure Plan has been prepared having regard to the relevant provisions of the Scheme and it is understood that the City of Armadale will require the adoption of subdivision and development provisions in the process of approval of the Structure Plan.

1.3.2 Sub-Regional Planning Framework

The Western Australian Planning Commission's Sub-regional Planning Frameworks, released early 2018, establish the vision for future growth of the Perth and Peel Metropolitan Regions and provide a framework to guide the delivery of housing, infrastructure and services necessary to accommodate anticipated population growth over the next 35 years.

Consistent with the draft *Perth and Peel @ 3.5 million* document, the Sub-Regional Planning Frameworks seek to achieve a residential density target equivalent to 26 residential dwellings per residential site hectare.

The subject land is situated within the South Metropolitan Peel Sub-Regional Planning Framework, which identifies the land as 'Urban'. Development of the subject land for residential land use is consistent with the South Metropolitan Peel Sub-Regional Planning Framework and will facilitate planned residential development in the locality.

1.3.3 City of Armadale Local Planning Strategy

The draft City of Armadale Local Planning Strategy was prepared in January 2014 to support TPS 4 and is intended to set out the long-term planning direction for the City. The Strategy envisages the progression of Structure Plans in the area on a sub-precinct basis according to the conclusions of the necessary environmental and servicing investigations.

The proposed Structure Plan is consistent with the intention of the Local Planning Strategy and has been prepared having regard to the above considerations, and hence is consistent with the Local Planning Strategy.

1.3.4 Planning Policies and Guidelines

1.3.4.1 State Planning Policy 3.7 – Planning in Bushfire Prone Areas

State Planning Policy 3.7 (SPP 3.7) seeks to guide the implementation of effective risk based land use planning and development to preserve life and reduce the impact of bushfire on property and infrastructure. SPP 3.7 applies to strategic planning proposals, including Structure Plans, over land designated as bushfire prone by the *Map of Bushfire Prone Areas* prepared by the Department of Fire and Emergency Services.

The subject site is designated as Bush Fire Prone, and SPP 3.7 is applicable to the Structure Plan area. The requirements of SPP 3.7 are addressed by a Bushfire Management Plan prepared in support of the Structure Plan.

Further details are provided at section 2.4 and **Appendix 3** of this Report.

1.3.4.2 State Planning Policy 5.4 – Road and Rail Transport Noise and Freight Considerations in Land Use

State Planning Policy 5.4 (SPP 5.4) includes the following objectives which are relevant to the proposed Scheme Amendment:

- *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;*

Given the subject site abut Armadale Road, resulting in the potential to exceed the noise limit specified by SPP 5.4, Noise Assessment was considered appropriate.

Further details addressing SPP 5.4 are included at section 2.7 and **Appendix 4** of this Report.

1.3.4.3 Liveable Neighbourhoods

The WAPC's Liveable Neighbourhoods is an operational policy that guides the design and assessment of structure plans (regional, district and local) and subdivision for new urban neighbourhoods in the metropolitan area and country centres, on greenfield and large urban infill sites.

Liveable Neighbourhoods includes the following Principle Aims that are particularly relevant to the Study Area:

- To foster a sense of community and strong local identity and sense of place in neighbourhoods and towns.
- To ensure the avoidance of key environmental areas and the incorporation of

significant cultural and environmental features of a site into the design of an area.

- To provide for a more integrated approach to the design of open space and urban water management.
- To ensure cost-effective and resource-efficient development to promote affordable housing.
- To maximise land efficiency wherever possible.
- To provide a variety of lot sizes and housing types to cater for the diverse housing needs of the community at a density that can ultimately support the provision of local services.

Liveable Neighbourhoods outlines that Local Structure Plans should depict:

- walkable neighbourhood catchments of approximately 400m–450m radius around proposed commercial centres;
- density targets expressed as dwellings per hectare;
- existing and proposed commercial centres;
- natural features to be retained;
- proposed street block layout;
- proposed street network, including street types and path networks;
- proposed transportation corridors, public transport network and cycle and pedestrian networks;
- proposed land uses, including distribution of higher, medium and lower density residential;
- proposed schools and community facilities;
- public parkland; and
- proposed urban water management measures..

1.3.4.4 Draft DC Policy 4.3.3 - Planning for High-Pressure Gas Pipeline

This policy establishes the Western Australian Planning Commission's (WAPC) position regarding development along high-pressure gas pipelines. It seeks to protect people from unacceptable levels of risk from high-pressure gas pipelines by protecting high-pressure gas pipelines from unregulated encroachment.

The subject site is traversed by the Dampier-Bunbury Natural Gas Pipeline (DBNGP), and this structure plan has taken into consideration the objective of this policy and the easement.

1.3.4.5 City of Armadale Local Planning Policies

Relevant Local Planning Policies prepared by the City of Armadale have been considered during the preparation of the proposed Structure Plan design and documentation.

1.3.5 Other Approvals and Decisions

1.3.5.1 Concurrent Scheme Amendment

This Structure Plan is to be considered in conjunction with the associated Scheme Amendment No.96 to the City of Armadale Town Planning Scheme No. 4 (proposing to rezone the subject land from 'Rural Living 4 and General Rural' to 'Urban Development').

1.3.5.2 Scheme Amendment No.96.

An application for a Local Scheme Amendment is currently underway for the subject site, which will see the site rezoned from 'Rural Living 4' and 'General Rural' to "Urban Development". This rezoning will bring the Scheme into alignment with the MRS, which at the regional level zones the site 'Urban'.

1.3.6 Pre Lodgement Consultation

Co-ordinated planning for the Anstey Road South precinct has been subject of consultation with the City of Armadale, most recently in meetings in August and September 2018. The City's preliminary comments from those consultations are reflected in the Structure Plan Report and have been incorporated in the design of the Structure Plan.

In accordance with a request from the City of Armadale to confirm that the proponent of the Anstey Road South Structure Plan, Yolk Property Group, has consulted with the other landowners within the precinct, **Table 2** below confirms the timing and extent of these consultations:

Table 2 – Landowner Consultations

Lot No.	Landowners	Consultation undertaken
Lot 24 Anstey Road	Yolk Forrestdale 108 Pty Ltd	Having assumed ownership of this lot in July 2018 for the purpose of developing the land for residential development, Yolk Property has taken responsibility for initiating the Anstey Road South Structure Plan, has engaged the consultant team to prepare this report and has consulted with the other land owners within the Anstey Road South precinct.
Lot 23 Anstey Road	Andrew John Findlay Green & Stephanie Karen Phillips	No consultation required as Yolk Forrestdale 108 Pty Ltd have entered into an unconditional Contract of Sale with the current landowners (settlement pending).
Lot 3 Armadale Road	Wei Ling Li & Ziu Zhen Liu	Yolk Property Group contacted the landowners in August 2018 and met with them in the same month for a preliminary discussion. This was followed by email correspondence and a meeting with the owners and their planning consultant in September 2018. Consultation has been ongoing as the Structure Plan has progressed.
Lot 61 Armadale Road	Raymond Miller Corrigan & Susie Elsie Corrigan	Yolk Property Group contacted the landowners in August 2018 and met with them in the same month for a preliminary discussion. Consultation has been ongoing as the Structure Plan has progressed.
Lot 5 Armadale Road	Tracy Lee Taylor & Susan Lyn Taylor	It is understood that this property forms part of a deceased estate. Yolk Property Group has made several attempts to make contact with mobile and phone numbers searched against the property address and has left messages, however has had no contact at this point. At 0.7808 ha in area, Lot 5 is the smallest lot within the Structure Plan, representing 4.1% of the Structure Plan area.

Lot 336 Anstey Road	Stephen Murray McLennan & Jennifer Margaret McLennan	<p>Yolk Property Group contacted the landowners in August 2018 and were advised to contact their planning consultant Halsall & Associates, who referred Yolk to Jeff Barham of Ramboll Environment & Health. Yolk made contact with Jeff Barham to arrange to meet to discuss the proposed Structure Plan.</p> <p>In September 2018, Yolk Property Group and planning consultant Michael Glendinning attended the City's Anstey-Keane Precinct Planning and Liaison Group, as did Mr Barham and the owners' daughter Ms Kym Geneve, and the proposed Structure Plan and broader Anstey-Keane Precinct issues were discussed after the Liaison Group meeting, leading to a further meeting with Mr Barham the next day. Consultation is ongoing.</p>
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2 SITE CONDITIONS AND CONSTRAINTS

2.1 Biodiversity and Natural Area Assets

An Environmental Assessment and Management Strategy (EAMS) prepared by Emerge Associates (Emerge) at **Appendix 2** has investigated and reported on the environmental characteristics of the land within the Structure Plan area.

The site is bound by Armadale Road to the south, Anstey Road to the east, existing rural-residential landholdings to the north and Bush Forever Site 342 (Anstey/Keane Dampland and Adjacent Bushland, Forrestdale) to the west.

The relevant environmental attributes and values of site are summarised as follows:

- Topography across the site is relatively uniform, with elevation ranging between 23 and 25 m Australian Height Datum (m AHD).
- The majority of the site has been historically cleared to allow for agricultural activities. This has resulted in over 98% of vegetation within the site identified as being in 'completely degraded' condition on the Keighery (1994) vegetation condition scale.
- Two native plant communities were identified within the site, with vegetation condition within these communities ranging from 'degraded' to 'good'.
- No threatened or priority flora or fauna were identified within the site.
- No threatened ecological communities were identified within the site.
- The site is adjacent to a large conservation category wetland (CCW) and a multiple use wetland (MUW) is identified across the majority of the site. A small portion of the CCW is identified as extending into the north-western portion of the site.
- The majority of the site is classified as having a moderate to low risk of acid sulfate soils (ASS) occurring within 3 m of the natural soil surface, with a small portion in the centre of the site identified as having a high to moderate risk of ASS occurring within 3 m of the natural soil surface.
- There are no existing land uses in proximity to the site which are incompatible with its proposed industrial land use.

The design of the Structure Plan has been developed with consideration to the identified environmental values of the site. A number of design responses have been incorporated into the Structure Plan in this regard, including:

- Provision of a 50 m buffer to the CCW within the adjacent Bush Forever Site 342, to avoid impacts to the hydrology of the wetland.
- Preparation of the LWMS, which outlines the groundwater and surface water management strategy for the SP.
- Preparation of the BMP, which outlines how the SP responds the bushfire protection criteria specified in the Guidelines for Planning in Bushfire Prone Areas Version 1.3 (WAPC and DFES 2017).

The EAMS also outlines the environmental framework to be implemented across the site as part of future subdivision and development phases of the residential development process, including:

- Where future subdivision stages incorporate or are located directly adjacent to a POS area, an Environmental Management Plan (or similar) will be prepared. This document will identify environmental management requirements and specify management actions to be implemented within POS areas and the wetland buffer zone. This will consider factors such as vegetation and fauna habitat retention and

improvement, potential revegetation and general POS management.

- Preparation of an Urban Water Management Plan to support each stage of subdivision.
- Completion of detailed bushfire attack level (BAL) assessment and imposition of determined BAL ratings on affected lots.
- The potential requirement for an Acid Sulfate Soil and Dewatering Management Plan (ASSDMP) based on future investigations, if required.

Overall, the environmental attributes and values of the site can be accommodated within the Structure Plan design or can be managed appropriately through the future subdivision and development phases in line with the relevant state and local government legislation, policies and guidelines.

2.2 Landform and Soils

The EAMS prepared by Emerge at **Appendix 2** has investigated and reported on the landform and soils of the land within the Structure Plan area.

The site is generally flat, with elevation ranging from 23 m Australian Height Datum (mAHD) in the central portion of the site (associated with a man-made dam) to 25 mAHD across the majority of the site (DoW 2008). The topographical characteristics of the site are shown in Figure 2 of **Appendix 2**.

Regional soil association mapping indicates that the majority of the site occurs within the Southern River soil association (Churchward and McArthur 1980). Based on regional landform mapping of the Swan Coastal Plain (Gozzard 2011), the majority of the site is located in within the Pinjarra Plain, with the northern corner and southern portion located within the Bassendean Dunes. The Pinjarra Plain lies between the Bassendean Dunes and the Piedmont Zone and comprises a relatively flat landscape of fertile heavy alluvial soils. The Pinjarra Plain is dominated by channels which, when combined with the flatness of the plain and underlying soil characteristics, results in the formation of the small seasonal swamps (Seddon 2004).

The Geological Survey of Western Australia, as documented in Perth Metropolitan Region 1: 50,000 Environmental Geology Series Armadale Part Sheets 2033 I & 2133 IV (Jordan 1986) indicates the majority of the site is comprised of 'Sand' (S10) and 'Peaty Sand' (Sp1). The general descriptions of these soil units and their extent across the site are provided in Table 1 and Figure 3 of **Appendix 2**.

A geotechnical investigation was completed by JDSi in September 2018 for Lots 23 and 24 Anstey Road, confirming the natural soils encountered at the site were consistent with regional mapping and that they consider that the site is geotechnically capable of supporting the proposed development.

A review of the DWER mapping indicates that the majority of the site is classified as having a moderate to low risk of ASS occurring within 3 m of the natural soil surface, with an area in the northern portion of Lot 3 Armadale Road having a high to moderate risk of ASS occurring within 3 m of the natural soil surface.

2.3 Groundwater and Surface Water

The EAMS prepared by Emerge at **Appendix 2** has investigated and reported on the groundwater and surface water within the Structure Plan area.

Data from the Perth Groundwater Atlas shows that historical regional maximum groundwater levels below the site range from 23-24 m AHD in the northern portion to 24-25 m AHD in the southern portion (DWER 2018). Based on this data, depth to groundwater ranges from approximately 1 m to 4 m below ground level. Generally, depth to regional groundwater is lower along in the northern portion of the site and higher in the southern portion.

The characteristics of groundwater underlying the site are discussed further in **Appendix 5**, the Local Water Management Strategy for this Structure Plan area (RPS 2018).

In terms of surface water, there are no existing natural waterways within the site, however there are three constructed dams within the site.

Wetlands are areas which are permanently, seasonally or intermittently waterlogged or inundated with water. Naturally occurring wetland features are common across the Swan Coastal Plain and can contain fresh or salty water, which may be flowing or still.

DBCA maintains the Geomorphic Wetlands of the Swan Coastal Plain dataset (DBCA 2018b), which categorises geomorphic wetland features into types and management categories to guide land use and conservation. Wetland types are based on landform shape and water permanence (hydroperiod) and management categories of wetlands are determined based on hydrological, biological and human use features.

A review of the Geomorphic Wetlands, Swan Coastal Plain dataset (DBCA 2018) indicated that one 'multiple use' category wetland (MUW) feature (UFI 14987) occurs within the north eastern, northern and western portions of the site. This feature is classified as a 'dampland' wetland. This feature extends beyond the site and is adjacent to a 'conservation' category wetland (CCW) that lies outside of the site within Bush Forever Site 342 (UFI 14893).

2.4 Bushfire Hazard

A Bushfire Management Plan (BMP) prepared by Emerge Associates (Emerge) at **Appendix 3** has identified the Structure Plan area as a 'bushfire prone area' and reported on management measures required to enable the development of the land for primarily residential purposes.

The site is currently identified as 'bushfire prone area' under the state-wide Map of Bush Fire Prone Areas prepared by the Office of Bushfire Risk Management (OBRM 2018). The identification of an area within a declared bushfire prone area necessitates further assessment of the bushfire risk and suitability of the proposed development to be undertaken in accordance with State Planning Policy 3.7 Planning in Bushfire Prone Areas (SPP 3.7) (WAPC 2015) and the Guidelines for Planning in Bushfire Prone Areas Version 1.3 (the Guidelines) (WAPC and DFES 2017).

The purpose of SPP 3.7, and its policy intent, is best summarised as preserving life and reducing the impact of bushfire on property and infrastructure through effective risk-based land use planning. Pursuant to SPP 3.7, this BMP examines the likely long-term bushfire risk risks and advances responses that will make the ultimate use of the land suitable for its intended purpose.

A majority of the site is cleared of native vegetation and is composed of areas of unmanaged grassland (Class G). There is an area of scrub (Class D) located in the north-west portion of the site (associated with areas of regrowth), in addition to two small areas of forest (Class A) vegetation within the northern portion of the site. Outside and to the east of the site, forest vegetation has been identified; associated with an unmanaged private landholding. Located to the west and northwest is Bush Forever Site 342 containing shrubland and scrub vegetation. Areas of grassland are located to the north and south.

In order to consider the likely bushfire risk applicable to development within the site, a post development vegetation classification scenario has been assumed in which all classified vegetation, will be removed or managed to a 'low threat' standard except for the scrub vegetation in the northwest portion of the site, as part of future development in accordance with the structure plan. Vegetation outside the site, apart from the grassland vegetation to the north-east of the site and the forest vegetation to the east, will remain the same as the pre-development assessment.

The outcomes of this BMP demonstrate that as development progresses, it will be possible for an acceptable solution to be adopted for each of the applicable bushfire protection criteria outlined in the Guidelines. This includes:

- Location: future habitable buildings can be located in an area that will, on completion, be subject to a low or moderate bushfire hazard. Habitable buildings can be constructed in areas subject to a BAL rating of BAL-29 or less.
- Siting and Design: all future habitable buildings can be sited within the proposed development so that

BAL-29 or less can be achieved based on the proposed structure plan.

- **Vehicular Access:** the proposed structure plan provides for an interconnected loop road network within the site that will connect to the existing public road network, specifically Anstey Road to the east of the site. Anstey Road allows for egress to the north and south, including south towards Armadale Road, which allows egress to the east and west.
- **Water:** the development will be provided with a permanent and reticulated water supply to support onsite firefighting requirements.

The measures to be implemented through this structure plan and associated future subdivision process have been outlined as part of this BMP and can be used to support future planning and development approval processes.

A revised BMP is likely to be required to support any future subdivision applications, particularly if the lot layout detail is different, and will respond to the subdivision design.

2.5 Heritage

The EAMS prepared by Emerge at **Appendix 2** has investigated the heritage values of the Structure Plan area and confirms that no Registered Aboriginal Heritage Sites or Other Heritage Places are mapped within the Structure Plan area.

2.6 Dampier-Bunbury Natural Gas Pipeline (DBNGP)

The subject site is traversed by the Dampier-Bunbury Natural Gas Pipeline (DBNGP), which is contained within a 30 metre easement. The DBNGP traverses the north-western portion of the Structure Plan area and, together with the 50 metre CCW buffer and the bushfire prone nature of this area, prohibits development in the northernmost part of Lots 3 and 336, but does not inhibit the recreational use of the land.

The Western Australian Planning Commission's Draft Development Control Policy 4.6 – Planning for High Pressure Gas Pipelines, and Planning Bulletin 87 - High Pressure Gas Transmission Pipelines in the Perth Metropolitan Region deals with development in the vicinity of high pressure gas pipelines. Table 6 of Planning Bulletin 87 stipulates that residential development is permissible up to the boundary of the easement, and the Structure Plan has taken this into consideration.

The DBNGP corridor contains one single gas main with space for an additional gas main in the future. Prior to development works Australian Gas Infrastructure Group (AGIG), asset manager for DBNG, will determine any need for a Section 41 approval with the Department of Planning, Lands and Heritage as the development works will be in close proximity to the DBNG corridor.

2.7 Interface with Armadale Road

A Transportation Noise Assessment of Armadale Road adjacent the Structure Plan area was conducted by Lloyd George Acoustics to inform a road traffic noise assessment of the Structure Plan area where it abuts Armadale Road. A copy of the Transportation Noise Assessment report is included at **Appendix 4**.

The report indicates that it will be practicable for the proposed Structure Plan to satisfy the requirements of State Planning Policy (SPP) 5.7: Road and Rail Transport Noise and Freight Considerations in Land Use Planning. The recommended noise control requirements consist of:

- Indicative noise wall height of 3.6m at the westernmost interface with Armadale Road, reducing to 3.3m adjacent the intersection of Armadale Road with Anstey Road and continuing for a short distance along Anstey Rd to a height of 2.3m;
- The wall is to be solid, free of gaps and of a material having a minimum surface mass of 15kg/m²;

- Dwellings adjacent to the all to incorporate 'Package A' architectural treatments and notifications on lot title. Alternative treatment to the 'deemed to satisfy' provisions can be accepted if supported by a report by a suitably qualified acoustical engineer (member firm of the Association of Australasian Acoustical Consultants);
- Where an affected lot is to be of double storey construction, specialist advice must be sought since the upper level will not receive the same level of attenuation provided by walls or other dwellings.

The noise mitigation requirements are to be finalised once the subdivision design is complete along with finished lot levels and will be applied through conditions imposed on the affected homesites by way of a Local Development Plan.

3 LAND USE AND SUBDIVISION REQUIREMENTS

3.1 Land Use

3.1.1 Design overview

The Structure Plan design has been developed having regard to the site specific environmental assessment, detailed engineering investigation, local water management and bushfire planning requirements.

The Structure Plan has been prepared to guide the development of the 19.18 ha site for residential subdivision. The Structure Plan will facilitate the development of a high quality, liveable urban precinct offering a diversity of lot product, and hence, housing choice, with access to the full range of urban services and facilities in the area, including the district playing field which will be partly situated on the easternmost part the Structure Plan area.

The design is based upon the existing perimeter network of roads defining the precinct and access point, and taking into account access required for the district playing field and associated facilities, located in the eastern portion of the Structure Plan area.

Detailed structure planning has been informed by an integrated approach with inputs from specialist consultants to appropriately address planning, water management environmental and bushfire management objectives. Collectively, these factors have influenced the proposed road and lot layout, as depicted on the Structure Plan included as **Plan 1** at **PART ONE** of this document

3.1.2 Integration with Adjoining Lands

The Structure Plan abuts a Parks and Recreation Reserve to the north-west, Armadale Road to the south and Anstey Road to the east. As such the precinct is standalone, with its main road access being a planned intersection with Anstey Road immediately west of the planned district playing field, and its secondary access being a connection around the northern end of the district playing field with the road system proposed within the structure plan proposed for the land to the north-east of the district playing field, the location and dimensions of which have been established by the City of Armadale.

The Structure Plan area's primary access point with Anstey Road is defined by the access distance permitted from the intersection of Anstey and Armadale Road and the location of the proposed district playing field.

Linkages to the structure plan area to the north-east shall also be reinforced by the provision of a system of footpaths and shared paths, including a shared path within the gas pipeline easement.

3.2 Public Open Space

The Structure Plan proposes open space that utilises the DBNGP easement that traverses the property, and also the district open space that is to be provided in the north-eastern portion of the site. The Structure Plan provides predominantly for two (2) area of open space which serve different functions, though have resulted due to the requirements of the site (ie drainage etc) and also aspects that exist which the structure plan must reflect. Whilst there is a statutory requirement to provide

10% of the land area as open space, due to these aspects, 38% of the gross site area has been identified as green space, and is to be vested as open space in a combination of credited and uncredited areas.

The design and location of Public Open Space with the Structure Plan area is reflective of the following requirements;

- Retention of the DBNGP easement in open space, which will accommodate a pedestrian path network linking the area north of the subject site to Armadale Road. This network provides access to the wider area, and will form part of a greater open space network.
- Integration with adjoining reserves to maximise available areas for a range of uses and functions, as well as achieving improved efficiencies in terms of maintenance and management;
- Incorporate natural features, including the identified wetland and associated buffer along the western boundary;
- Incorporate 75% of the district playing fields open space as defined by the City of Armadale. The balance of this facility will be accommodated on the property abutting the northern boundary;
- Be compatible with local water management requirements and accommodate drainage integrated with landscaping to improve useability and amenity for residents;
- Encourage maximum surveillance of POS areas to discourage opportunities for anti-social behaviour.

A total of 7.83ha of green space is provided by the structure plan. This area is made up from a combination of various open space categories as detailed in the table below. It is acknowledged that there are several 'green areas' that are not credited as open space, though form part of the overall open space network.

Area	Credited Open Space			Uncredited Open Space				
	CCW Buffer	Council Playing Field	Unconstrained Open Space	1:1 Drainage (15mm)	CCW Buffer	CCW Core	Gas Pipeline Easement	
POS 1	3.37	3.25	0.12					
POS 2	4.46	0.34	0.27	0.86	1.54	0.07	1.39	
Total	7.83	0.34	3.25	0.39	0.86	1.54	0.07	1.39

* Areas taken from LWMS

* Credited buffer area allocated on pro rata basis of 18%

POS 2 incorporates a 50m buffer to the CCW Wetland that abuts the site and is contained within the Parks and Recreation Reserve. This will be rehabilitated in accordance with a Wetland Management Plan that will be prepared as a condition of subdivision.

As detailed in the above table an area of 3.98 ha of creditable Public Open Space has been provided, some of which also serves a drainage function as detailed in the LWMS (including Engineering Plans) prepared to support the Structure Plan. The POS Schedule and Calculations at **Table 2** overleaf illustrate the subject land is required to provide 1.69ha of land for public open space, in accordance with the 10% site contribution required by Liveable Neighbourhoods. The structure plan results in a surplus of 2.28ha (16%) which has resulted due to the location of the district open space. This surplus is attributed to the playing fields open space, which is to be reimbursable through the Development Contribution Plan.

The drainage swale areas included as restricted open space have been calculated from the 1 in 5yr Top of Water (ToW) level area but exclude the 1:1 year ToW for all proposed swale. The drainage areas are detailed in the Local Water Management Strategy (LWMS) at **Appendix 8**. And have informed the Landscape Concept Plans at **Appendix 5**.

Table 2 POS Schedule (all areas in ha)

Developable Area				
Lots	3	5.79		
	61	1.17		
	5	0.78		
	23	3.06		
	24	3.06		
	336	5.31		
	Total			19.18
Deductions	1:1 Year Drainage (1.5% of GLA)	0.86		
	Pipeline Easement	1.40		
	Road Widening	0.05		
Total Deductions			2.30	
Gross Subdivisible Area (GSA):				16.88
Public Open Space Requirement				
10% of Gross Subdivisible Area			1.69	
	80% Unrestricted	1.35		
	20% Restricted	0.34		
Open Space Provided				
Unrestricted			3.64	
	POS 1	3.37	3.37	
	POS 2	0.27	0.27	
Restricted			1.88	
	POS 2 CCW Buffer	1.88	1.88	
Restricted Open Space Surplus			1.54	
Revised Gross Subdivisible Area				15.34
Summary of Public Open Space (Revised Gross Subdivisible Area)				
	Unrestricted POS Provided	3.64	0.92	
	Restricted Open Space Provided	0.34	0.08	
Total Unrestricted & Restricted Public Open Space Provision				3.97
Total Public Open Space Provision as a % of GSA				26%

Notes:

1. In accordance with Liveable Neighbourhoods: the area subject to inundation more frequently than a one year average recurrence interval rainfall event is not included as restricted or unrestricted open space and is a deduction from the net site area (LN R33); areas for the detention of stormwater for a greater than one year average recurrence interval up to the five year recurrence interval is restricted open space; areas for the detention of stormwater for a greater than five year average recurrence interval is within unrestricted open space (LN R25)
2. Buffer to Category Conservation Wetland has been taken as forming restricted open space in accordance with Liveable Neighbourhoods (LN R33).

Table 3 Apportionment of POS between landholdings (all areas in ha)

Lot	Area	Credited Open Space			Uncredited Open Space			
		CCW Buffer	Council Playing Field	Unconstrained Open Space	1:1 Drainage (15mm)	CCW Buffer	CCW Core	Gas Pipeline Easement
POS 1								
	336	2.49	2.49					
	24	0.88	0.76	0.12				
		3.37	3.25	0.12				
POS 2								
	5	0.22	0.03	0.06	0.01	0.12		
	3	2.32	0.12		0.64	0.57		0.99
	336	1.92	0.19	0.21	0.20	0.85	0.07	0.40
		4.46	0.34	0.27	0.86	1.54	0.07	1.39
Total	7.83	0.34	3.25	0.39	0.86	1.54	0.07	1.39

* Areas taken from LWMS

* Credited buffer area allocated on pro rata basis of 18%

3.2.1 Landscape Concept

An indicative Landscape Concept prepared by landscape architects EPCAD Pty Ltd at **Appendix 6** demonstrates a proposed landscape outcome which respects the natural attributes of the site and its surrounds while delivering a quality urban outcome.

The concept proposes a mix of exotic and native street trees which would provide a clear road hierarchy within the estate. Jacarandas in particular would be used to delineate the key arterial roads, particularly the entrance point of Anstey Road, adjacent to the planned district playing field. The large trees would provide an instant focal point within the estate. Native trees would be used along secondary roads and would be installed as part of the Front Garden Packages.

Plant species would be drawn from a native planting palette proven to succeed in this area. This would include but not be limited to species such as *Lomandra tanika*, *Alyogyne hakeifolia*, *Anigozanthos flavidus* and *Grevillea obtusifolia* Gin Gin Gem. Landscape structure within the planting would start off using natives in a more formal application towards the entrance of the estate and around the district playing field. This would meander through the estate and loosen into less formalised plantings towards the CCW Wetland to the north of the site.

The entrance to the estate off Anstey Road will be defined with an entry wall with key art work. This wall will serve the purpose of announcing the estate to those driving along Anstey Road, but will also provide a buffer, and shelter to those using the district playing field. This wall will create an intimate space that can be utilised by users of the playing field for gathering, but also for spectating. This area will also provide overflow parking for the district playing field and its facilities.

A sculptural shade structure will provide a focal point and will draw people into the estate. This shade structure will be situated next to the discovery play within the district playing field. This small area of interpretative play will provide young families with a key break out space carefully located near the playing field.

The concept suggests that public access to the proposed Public Open Space (POS) in the north of the Structure Plan be accessed via a Public Access Way which can be a key feature of the estate, with an arbor providing a key focal point. This arbor would be covered in native climbers, shading a footpath which will link to the footpath within the pipeline corridor, providing a cohesive path network within the estate. The pipeline corridor provides a green belt through the estate, linking the wetland and buffer to the POS's. This pipeline corridor can provide a walking trail with low, native groundcovers.

The POS to the north of the estate should remain sympathetic to the adjacent wetland and associated buffer. A decked lookout would provide key views through to the retained wetland bush back drop, with fauna and flora interpretation. Turf and a small play area associated with the lookout and deck would provide a space for all ages to enjoy. The wetland buffer itself would be rehabilitated and appropriate new plantings will be incorporated into the existing vegetation.

3.3 Residential

3.3.1 Land Use and Residential Density

The Structure Plan reflects the intended use of the subject site for primarily residential purposes and land uses permissible within the associated zone. Whilst the residential zoning will permit primarily single and grouped housing development, the development of a Child Care land use is also envisaged at the intersection of Anstey Road and the proposed estate entry road (as indicated on the Structure Plan).

The proposed residential density is consistent with the strategic direction of the WAPC's Sub-regional Planning Frameworks which promote higher densities in undeveloped areas zoned for urban use, particularly in areas close to transit corridors and high amenity. The Sub-regional Planning Frameworks encourage new urban development to use an average residential density target of 15 dwellings per gross hectare of urban zoned land and 26 dwellings per residential site hectare to

guide the allocation of residential densities.

Given the location of the subject site to regional playing fields immediately south of Armadale Road, the new district playing field within the site and easy access to Armadale Road, development is proposed at a density coding of RMD 30 and RMD 40. The base coding of RMD 30 will facilitate the creation of a range of lot product, which will also address the affordability aspect of residential development, with a range of family dwellings able to accommodate sufficient open space on the smaller lot product, with compromising the house design.

The application of the RMD 30 enables a reduction in the setbacks for the dwelling, which in turn will enable a greater area of private open space on the lot. This will facilitate the development of dwellings that can accommodate 3-4 bedrooms easily, without comprising the streetscape.



Figure 3 – Indicative housing typologies

The proposed densities achieve an appropriate residential density of 28.7 dwellings per site hectare. Based on 2011 ABS statistics and an expected dwelling yield of 220 dwellings, the estimated population of the Structure Plan area is 570 persons at 2.6 persons per dwelling.

3.3.2 Residential Lot Layout

The road network has been designed to facilitate the creation of regular shaped lots, capable of accommodating standard residential dwellings, with direct access to a public street. A suitable mix of lot types are able to be accommodated by the structure plan, including a standard 12.5-15m x 25-30m RMD 30 product and 8m x 30m rear loaded RMD 40 product. To demonstrate the potential subdivision pattern refer to the preliminary Subdivision Concept at **Appendix 5**.

Orientation towards all areas of open space has been maximised, allowing for passive surveillance of these areas. All POS areas within the Structure Plan area shall be provided with passive surveillance from surrounding lots, and in turn aims to promote use of these areas by residents.

Several lots area proposed to directly front the gas pipeline, and will have development controlled through the provision of Local Development Plans. The configuration of these lots also provide a break in the road reserve that runs along the boundary of the pipeline easement, assisting in traffic calming of this road.

3.3.3 Residential Lot Size

The Structure Plan proposes a road network that results in the creation of standard street blocks that are robust and adaptable to accommodate a variety of lot sizes. Density codings of RMD 30 and RMD 40 are proposed, which can accommodate standard lot depths ranging from 20m – 30m. Standard RMD 30 coded lots would be 300-350m² in area, with standard R40 lots being 200-240m² in area.

3.4 Movement Networks

3.4.1 Existing Movement Network

A Transport Impact Assessment (TIA) prepared by transport professionals GTA Consultants (GTA) at **Appendix 7** has investigated movement networks around the subject land and have forecast future transport impacts from the development and occupancy of the Structure Plan area.

3.4.1.1 Regional Road Network

The subject site is well connected to the Metropolitan and wider Regional road network, given its close proximity to Armadale Road, with its connections to the Tonkin Highway and the Kwinana Freeway. The Regional road network provides efficient access to the wider Perth Metropolitan Region including commercial and employment centres, notable Armadale to the east and Cockburn Central to the west.

Armadale Road is designated as a Primary Regional Road under the Metropolitan Region Scheme (MRS) and a Primary Distributor under the Main Roads Functional Hierarchy.

3.4.1.2 Local Road Network

The subject land has direct frontage to Anstey Road, being the only point of ingress/egress to the subject site form the existing road network. Anstey Road is a local road, and set to be widened under the City of Armadale's Development Control Area/Plan No.4 which is proposed for the Anstey-Keane Precinct. The existing 20m reserve for Anstey Road is expected to be widened to 24.6m, with the additional road reserve and the upgrade of Anstey Road itself to be funded by DCP No.4.

3.4.1.3 Public Transport Network

The site is well situated with respect to existing public transport. Armadale Road is serviced by several bus routes, and service the Armadale Train Station which is located 8km east of the subject site.

Transperth operates the Perth to Armadale passenger rail service seven days a week. The service operates:

- Monday to Friday from 5.11am to 12:39am;
- Saturday from 5.16am to 2:54am; and
- Sundays & Public Holidays from 7:16am to 12.39am.

3.4.1.4 Cycle Network

The subject land is located within close proximity to the Perth Bicycle Network, which includes a shared path along Armadale Road that is being reconstructed as part of a current upgrade of Armadale Road.

The Structure Plan will be designed to encourage cycling through the provision of a dual use path network within the gas pipeline easement, connecting to the existing external footpath network. The dual use path will generally follow the easement and connect the path network within Armadale Road with the district playing field and also the nearby primary school.

3.4.1.5 Pedestrian Network

The progressive development of the area will facilitate the provision of a significantly upgraded pedestrian network.

Future subdivision within the subject site will result in a highly connected network of shared paths and pedestrian paths linking the district playing field, nearby primary school, and the existing surrounding footpath network.

3.4.2 Proposed Movement Network

Anstey Road is to be widened to a 24.6m reserve to facilitate its upgrading to urban standard Neighbourhood Connector, which will be funded by the City of Armadale's DCP 4 for the Anstey Keane Precinct (Forrestdale) Urban Development Area. The DCP includes the construction of roundabouts on Anstey Road where necessary due to forecast traffic volumes and public land uses which will create a need for traffic to cross Anstey Road. Anstey Road will ultimately be a duplicated road with a single lane of traffic in each direction and embayed parking. No other changes to the external network are proposed.

The primary vehicular access to and from the Structure Plan area is to be via an intersection with Anstey Road, the design and configuration of which will be determined at detailed subdivision design stage. The entry road, which is adjacent the Playing Field POS and may therefore have a reduced reserve under Liveable Neighbourhoods, is to be an Access Street B with a reduced verge on the POS side and will have a reserve width of 16.9m. All other internal roads are proposed to be Access Streets C or D in accordance with Liveable Neighbourhoods.

Access streets adjacent to POS (other than the entry road) are to be 15.4m wide unless a reduced width down to 13m can be achieved where the subdivider can demonstrate that ground levels can be co-ordinated and that services, footpaths and road infrastructure can be accommodated within a lesser road reserve width.

3.4.3 Traffic Generation

GTA's Transport Impact Assessment at **Appendix 7** uses projects traffic generation rates in accordance with the WAPC's Transport Assessment Guidelines for Development (2006) and makes the following recommendations:

- The ultimate/total development scenario could take between 5 to 10 years before the development of the whole area is realised;
- As a "worst case scenario" the proposed amendment is expected generate in the order of 2,000 vehicular trips per day with 150 of these in the AM peak (two-way) and 200 in the PM peak;
- The impacts of the traffic volumes associated with the development on the road network are considered acceptable now and in the future;
- There is no requirement for any of the existing road network to be modified as a result of this development alone, with the exception of the new main entry to the site in the form of an all movements intersection; and
- Delays and queues at the main entry to the site are expected to be minimal with good levels

of service now and to 2031

3.5 Water Management

The WAPC's Better Urban Water Management (BUWM) document identifies the requirement to prepare a Local Water Management Plan (LWMS) to support Structure Plan proposals. The LWMS for this Structure Plan is being prepared by RPS Australia in accordance with the requirements of the BUWM and will reflect the District Urban Water Management Strategy (DWMS) that has been approved for the wider area.

The complete LWMS has yet to be finalised and will be appended to this report in due course. Meantime, a Summary Table of the LWMS content is included at **Appendix 8**.

Implementation of the LWMS will be facilitated by an Urban Water Management Plan (UWMP), which will be required through a WAPC condition of subdivision.

3.6 Education Facilities

There is a need for a Government Primary School within the Anstey-Keane precinct and, in liaison with the relevant landowners, the City of Armadale and Department of Education have determined that the school will be located on the south-eastern side of Anstey Road in close proximity to the district playing fields, on a 4ha site approximately 500m north-east of the subject site. As such there is no need for the provision of a school site within this Structure Plan.

3.7 Activity Centres and Employment

In terms of local convenience shopping the subject land is located approximately 1.5 km east of the developing local commercial centre at the junction of Armadale and Nicholson Road.

In terms of comparison shopping and larger scale retail, the subject land is almost equidistant from the Armadale and Cockburn Central centres, both of which are designated Strategic Metropolitan Centres and both of which are within 8km the subject land. Each of these centres provides a broad range of community facilities as well as large scale retail and specialties.

In terms of local employment opportunities, the Forrestdale Business Park is located on the north side of Keane Road only 1km north-east of the subject land and offers a range of employment opportunities at a local level. The Business Park covers 190 hectares and accommodates up to 700 industrial lots, with potential to ultimately create more than 12,000 jobs.

Several Sub-regional employment opportunities are located within 10 km of the subject land at Armadale and Kelmscott to the east, and in the vicinity of Cockburn Central to the west, where the Beeliar Drive and North Lake Road Mixed Business Areas and the Jandakot East and Jandakot West Industrial Centres offer a broad range of opportunities.

3.8 Infrastructure Coordination, Servicing and Staging

An Engineering Servicing Report prepared by consulting engineers JDSi at **Appendix 9** has identified the Structure Plan area as a 'bushfire prone area' and reported on management measures required to enable the development of the land for primarily residential purposes.

This report has been based on the civil engineering aspects of the primarily residential land uses. The report covers the engineering infrastructure requirements to service the proposed development. The engineering review has covered earthworks, roads, stormwater drainage and utility services with a particular emphasis on

outlining how all major utility services will be available once the structure planning of the landholding has been completed. This will outline completed studies or studies currently underway and show that utility services are not an impediment on the development.

The investigations and preparation of the report are largely based on preliminary advice from the various service authorities. The information is current as of August 2018 and is subject to change as development proceeds in the Perth south-east corridor resulting in the extension of service infrastructure and the creation of new capacity. The key findings are as follows:

3.8.1 Topography

The Development site is generally flat grading from the south at RL25.8 m AHD to RL24.0 m AHD at the north.

3.8.2 Groundwater

Based on natural surface levels being between 25.8 m AHD and 24 m AHD and the topography of the site there is likely to be a 0.5 – 1.3m clearance to the maximum groundwater levels. Bores have been installed and pre-development groundwater monitoring is being conducted to refine the analysis of the AAMGL and assess any perched groundwater table within the site.

The site is characterised by high groundwater levels which will require a combination of subsoil drainage and fill in order to achieve adequate separation between finished lot levels and groundwater.

It is expected dewatering will be required during elements of the construction development, and will be at its most critical point during the winter months. Dewatering will have a temporary drawdown effect on the local groundwater, and at certain locations will present a risk of exposing Acid Sulphate Soils (ASS). This will need to be considered and managed concurrently with any ASS requirements for the site.

All dewatering must be carried out in accordance with Department of Parks and Wildlife (DPaW) and DoW regulations. It is currently envisaged that dewatering will be limited to deep service trenches given the expectation of imported fill across the site based on the current earthworks concept.

3.8.3 Geological Conditions

The existing ground surface generally consists of grass cover with minimal topsoil (0.1m). The Armadale Geology Sheet indicates that the site is underlain by a white to pale grey Sand forming part of the Bassendean Sand geological unit over alluvial Silty Sand (Guildford Formation). Refer to Figure 3-2 below. The site is classified as a Class A site, in accordance with AS 2870 – 2011. It is recommended that a preliminary design Californian Bearing Ratio (CBR) of 10% is applicable.

3.8.4 Acid Sulphate Soils .

Acid Sulphate Soil mapping compiled by the Department of Environment and Conservation indicates that the development site has a combination of low to moderate & moderate to high risk of ASS occurring within 3m of the natural soil surface. A small portion of the site (northern and southern corner) is classified as having a “moderate to high risk” of acid sulphate soils (ASS) beyond 3m of natural soil surfaces. The majority of the site is classified as “moderate to low” risk occurring within 3m of the surface.

Given there will be some fill importation proposed for the site it is expected ASS management will be only be restricted to deep service excavations greater than 2m depth i.e. sewer and drainage services. These works may require treatment of both soils and water associated with dewatering.

DPaW guidelines require detailed ASS investigations for all excavations below 3m or below the groundwater. It is recommended that further detailed investigations be confined to these areas and deep excavations identified during detailed design with subsequent detailed ASS studies prior to development to determine the presence and extent of ASS. Management plans for treatment will need to be put in place if investigation identifies the presence of ASS.

3.8.5 Demolition & Clearing

All scattered vegetation, with the exception of those marked for retention will need to be removed prior to undertaking earthworks on the site.

Any scrap material or rubbish located on the site will need to be removed and disposed of to an approved tipping location prior to works on site. Asbestos Containing Material (ACM) will require removal in accordance with applicable standards or Remediation and Validation Plan (RVP) and disposed at licensed facilities.

As part of the Development works, existing asbestos dwellings or sheds will need to be removed and disposed of offsite in accordance with applicable standards and disposed at licensed facilities. In particular ACM shall be removed by a licensed asbestos Contractor in accordance with the Health (Asbestos) Regulations 1992.

3.8.6 Earthworks and Retaining Walls

Based on preliminary geotechnical and hydrogeological advice for the site, the current earthworks concept allows for the following:

- 200mm topsoil strip, of which 70% will be reused (screened and blended) as part of general fill.
- Up to 800mm of structural fill to be placed and compacted above the natural surface.

The earthwork levels will also consider the following:

- Separation requirements from the groundwater. Fill levels across the site are, however, likely to be dictated by the separation to groundwater criteria rather than clearance above the 100 year ARI flood level. Thus, separation from groundwater subsequently constrains the drainage outfall for the stormwater and subsoil drainage system. Although the drainage systems will follow the design grade of the site, they generally require a free outfall above the AAMGL.
- Maintaining a fully gravitational sewer reticulation concept for the site. The development will be connected into a future pump station which is being constructed by others.
- The tie-in levels to existing roads such as Anstey Road and Armadale Road.

Given the relatively flat nature of the site, the design levels of the site are generally consistent thus minimal mass retaining walls are required. Generally only structural limestone spine walls between proposed and existing lots have been assumed to be required.

3.8.7 Sewer Reticulation

The Water Corporation owns and maintains all sewerage reticulation systems in the area. Any sewer connection point provided to the development site will need to be designed and constructed in accordance with Water Corporation requirements.

The development will be serviced via an extension of a DN150 gravity sewer main connecting into the proposed Balannup Wastewater Pump Station L (WWPS) to the east of the site. This WWPS is currently being designed by others with construction commencing in 2019. It is of an understanding that the pump station will cater for the sewer flows generated by the future Development site. Based on a developable area of 19 hectares with 210 lots yielded, the expected design flows (GSDF) generated from the Development site are in the order of 3.0L/s.

The proposed sewer connection will be into an extension along Anstey Road from stage 1 of the Dept of Communities / PRM project to the east of the Development. This extension is likely to be constructed at the same time as the Anstey Rd upgrade to minimise any major re-works to Anstey Rd. This information is subject to confirmation from the WC planning branch during the subdivision approval process and detailed design, in accordance with conceptual planning provided from the Water Corporation.

3.8.8 Roadworks

As part of any development and as required under WAPC subdivision approval, the portion of roads fronting the development typically require upgrading to provide suitable access into the development site. The upgrading of Anstey Road will be the responsibility of the adjacent developers and will likely be delivered as part of any DCP upgrades throughout the area. The internal roads will be designed and constructed to the City of Armadale's subdivisional standards laneways, local access roads, and local distributors. Intersections, sweeps/corners, and roundabouts will be designed for vehicle turning movements defined in AUSTRROADS design guidelines. Upon handover all internal roads will owned and maintained by the City of Armadale.

3.8.9 Stormwater Drainage

Stormwater drainage management is a major component of an overall Urban Water Management Plan (UWMP) strategy for which achievement of the principles of the plan may be facilitated through the application of Water Sensitive Urban Design (WSUD) techniques during planning, design and construction of urban development projects. Objectives of WSUD include but are not limited to the following:

- Detention of stormwater rather than rapid conveyance to maintain pre development flows for quantity management Use of vegetation for filtering purposes and nutrient stripping for quality management;
- Use of stormwater to conserve potable water; and
- Water efficient landscaping.

The existing surface drainage for the site is managed by a combination of natural drainage lines and excavated drains which convey runoff into Water Corporation's Baileys Branch Main Drain located to the east and north of the Site. The stormwater drainage from the development area will need to be designed and constructed in accordance with City of Armadale Guidelines. The current drainage strategy for the site is based on advice currently developed in conjunction with RPS. The site generally drains in a south to north direction. Permission has been obtained by Water Corporation for the 100yr ARI to be contained within the Bailey's Branch Main Drain. The conveyance of the water to the drain to the north of the site will be via the Dampier to Bunbury Natural Gas pipeline corridor. This is a similar philosophy as shown in the District Water Management Strategy (DWMS) for the locality.

It is proposed to manage drainage runoff via a pit and pipe system for minor events with infiltration and treatment of 1 year storm events through biofiltration media in the drainage swales. In addition to the pit and pipe system, major events will be managed through the road network with overflow directed into either the proposed District Open Space or POS areas. The design philosophy for the development site will need to demonstrate post development flows and volumes do not exceed pre development flows for both 1 and 100 year ARI events. Preliminary design levels have assumed outflow of the drainage lines into the DOS or POS areas will have a free flowing outlet with the headwall outlet set at the top of the swale/basin.

3.8.10 Subsoil Drainage

The high ground water is proposed to be managed/controlled via a subsoil drainage network, which will have free outfall into either the pit and pipe system or the swales/basins. The subsoil will be located at the AAMGL to maintain the predevelopment level and manage surface runoff. Further studies by RPS will be required to determine the required separation between the finished levels and the maximum groundwater levels (AAMGL). This will allow infiltration by soak wells for larger lots. For the smaller cottage lots, lot connection pits may be required. The City of Armadale notes the following desirable separations from the phreatic crest between subsoil drainage lines to establish development levels:

- 500mm to lots at the furthest point from subsoil drains (back of lot).
- 500mm to passive open spaces at the furthest point from subsoil drains.
- 750mm to active (turfed) open spaces at the furthest point from subsoil drains.
- 900mm to oval's at the furthest point from subsoil drains.

The subsoil outlets will require one way valves to prevent backflow into the pipes during events greater than 1 year ARI.

3.8.11 Water Reticulation

The Water Corporation owns and maintains the existing water reticulation system adjacent to and traversing the development site. This consists of a DN100 Cast Iron water distribution main running on the west side of Anstey Road. There is a DN1400 steel main (Serpentine – Canning Link Main) running through the middle of the road reserve along Anstey Road. This is a main supply main of water to the Perth Metro area and is managed by Waroona Water. Information obtained from the Water Corporation indicates that the development of this site can be supplied without further distribution mains, by way of extension from the existing DN100 water main adjacent to the site.

3.8.12 Power Supply

Existing Western Power owned and operated 22,000/415V electricity distribution assets have been identified in the area of the proposed development bounded by Anstey Road and Armadale Road in Forrestdale. These assets are overhead and are supplied from the Western Power Southern River Zone Substation via the 22,000 Volt Ranford Road (SNR 507.0 11 Ranford Road) Feeder.

There are existing overhead assets Anstey Road and Armadale Road adjacent to the development side of the road reserve that will require undergrounding as the project develops. These requirements are typically specified as part of the development requirements through WAPC conditions of subdivision.

The estimated total power demand for the proposed development is approx. 1,050kVA based on 4.7kVA per residential lot, with an indicative yield of 210 lots. Based on the Western Power Network Capacity Mapping Tool, the available capacity within the area is approximately 20 - 25MVA, therefore we do not anticipate that there will be any power constraints to the development of this site.

As the development can potentially be supplied from the existing surrounding infrastructure, it is foreseen that the supply of electrical power to this development is not a major constraint.

3.8.13 Gas

3.8.13.1 Supply

Reticulated gas is not considered to be an essential service and as such is not required as a condition of subdivision, however it is usual practice to install gas reticulation network for the subdivision within a common civil trench at no cost to the developer. If there is an extension required to connect to the nearest high pressure gas main the developer will be required to pay for the trenching to the gas main as a headworks cost.

3.8.13.2 Atco Gas High Pressure Gas Pipeline

Information obtained from Atco Gas indicates there is existing DN300 Steel High Pressure gas infrastructure (1920kPa) located in Anstey Road. Construction works within a 15m proximity of this infrastructure will require prior approval from Atco Gas.

3.8.13.3 Dampier to Bunbury Natural Gas Pipeline

The Dampier to Bunbury Natural Gas Pipeline (DBNGP) is considered as a major high pressure gas line which traverses the site in a northern portion of the Structure Plan area and limits development beyond the easement which protects the pipeline. In their submission on the advertised Structure Plan, Australian Gas Infrastructure Group (AGIG), asset manager for DBNG (WA) Nominees, confirmed their support for the development of residential lots up to the DBNG corridor boundary, accepted that drainage pipes from the development could cross the corridor, that their asset should be protected through the existing depth of cover being maintained, and that soft landscaping and passive recreation uses were preferred to permanent structures.

Works in proximity to the pipeline will require discussions with the pipeline operator in accordance with the provisions of Development Control Policy 4.3 – Planning for High Pressure Gas Pipelines and the Dampier to Bunbury Pipeline Act 1997.

3.8.14 Telecommunications

General communication services for the development will consist of the installation of a standard pit and pipe network in accordance with NBN Co guidelines and standards. The current design practice for road reserves, pavement and verge provisions will make adequate allowance for services including broadband in accordance with the agreed Utilities Service Providers handbook. There will be some local land requirements for equipment sites, similar to current provisions which will be accommodated at detailed subdivision stage.

3.9 Developer Contribution Arrangements

Part 6B – Development Contributions Areas of the City of Armadale’s TPS 4 provides for a cost contribution scheme to be established, to ensure the equitable sharing of costs between owners towards infrastructure required as a result of the subdivision and development of land within the Developer Contribution Area (DCA).

The subject site is situated within proposed DCA No.4, which the City will apply to the Anstey-Keane Precinct (which includes the Anstey South Structure Plan Area) to ensure equitable development contributions across all developments within the precinct with respect to the proposed Primary School site, the District Playing Fields site and other costs which accord with the requirements of State Planning Policy 3.6 ‘Development contributions for infrastructure’.

3.10 Other Requirements

3.10.1 Bushfire Management

The Structure Plan has been informed by the Bushfire Management Plan at **Appendix 3**.

The majority of the subject land is identified as having a pre-development low-moderate bushfire hazard suitable for development, provided that risk management strategies and designs are incorporated into the development as detailed in the Bushfire Management Plan.

The requirement for a Bushfire Management Plan to be prepared and implemented as a condition of subdivision approval shall be included in Schedule 12 of TPS4 or as part of Scheme Amendment No.96.

3.10.2 Environmental Management

The Structure Plan has been informed by the Environmental Assessment and Management Strategy at **Appendix 2**.

This EAMS also outlines the environmental framework to be implemented across the site as part of future subdivision and development phases of the residential development process, including:

- Where future subdivision stages incorporate or are located directly adjacent to a POS area, an Environmental Management Plan (or similar) will be prepared. This document will identify environmental management requirements and specify management actions to be implemented within POS areas and the wetland buffer zone. This will consider factors such as vegetation and fauna habitat retention and improvement, potential revegetation and general POS management.
- Preparation of an Urban Water Management Plan to support each stage of subdivision.
- Completion of detailed bushfire attack level (BAL) assessment and imposition of determined BAL ratings on affected lots.
- The potential requirement for an Acid Sulfate Soil and Dewatering Management Plan (ASSDMP) based on future investigations, if required.

Overall, the environmental attributes and values of the site can be accommodated within the Structure Plan design or can be managed appropriately through the future subdivision and development phases in line with the relevant state and local government legislation, policies and guidelines.

3.11 Implementation

The proposed Structure Plan has been prepared in accordance with the requirements of the *Planning and Development (Local Planning Schemes) Regulations 2015*. Further, the Structure Plan complies with the applicable State and Local Planning Policy Framework as set out in section 1.3 of this Report.

The *Planning and Development (Local Planning Schemes) Regulations 2015* stipulate the manner by which the Structure Plan will be processed by the City of Armadale and thereafter, the Western Australian Planning Commission to enable final approval.

Development and subdivision of the Structure Plan Area is dependent on finalisation of the Scheme Amendment and Structure Plan.

4 TECHNICAL APPENDICES INDEX

Appendix No.	Nature of Document	Assessment Agency	Approval Status
1	Certificates of Title	N/A	N/A
2	Environmental Assessment & Management Strategy	LA/DWER	N/A
3	Bushfire Management Plan	LA/DFES	For Assessment
4	Transportation Noise Assessment	N/A	For Information
5	Open Space Plan & Subdivision Concept	LA/WAPC	For Information
6	Landscape Concept	LA	For Information
7	Local Water Management Strategy	DoW	For Information
8	Transport Impact Assessment	LA	For Information
9	Engineering Report	LA/ WP/ WC	For Information

Abbreviations:

LA: Local Authority
DWER: Department of Water and Environmental Regulation
DFES: Department of Fire and Emergency Services
WAPC: Western Australian Planning Commission
DoW: Department of Water
WP: Western Power
WC: Water Corp

Appendix 1

Certificates of Title

Environmental Assessment & Management Strategy

Appendix 3

Bushfire Management Plan

Appendix 4

Transportation Noise Assessment

Appendix 5

Open Space Plan and Subdivision Concept

Appendix 6
Landscape Master Plan

Appendix 7

Transport Impact Assessment

Appendix 8

Local Water Management Strategy

Appendix 9

Engineering Servicing Report