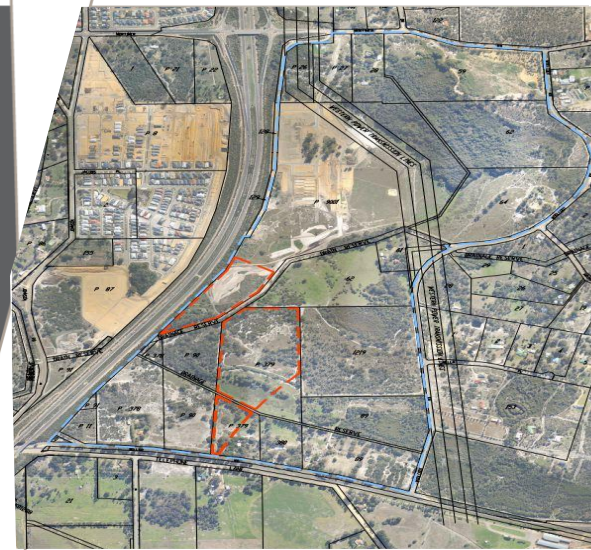


Part Lot 9001 Mortimer Road and Part
Lot 379 Millar Road, Wellard (East)
Local Structure Plan

P02016-001

Prepared for
Armana Holdings















October 2015









Document Information

Prepared for Armana Holdings
 Project Name Part Lot 9001 Mortimer Road and Part Lot 379 Millar Road, Wellard (East) Local Structure Plan
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Document Control

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1	24/09/2013	Final	LVE		LVE	
2	3/10/2013	Final (included traffic study)	LVE		LVE	
3	8/11/2013	Final (minor modifications)	LVE		LVE	
6	14/4/2014	Final (minor modifications)	LVE		LVE	
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8/9/10 11	10/08/2015 21/10/15	Final (WAPC modifications)	LVE		LVE	

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This structure plan is prepared under the provisions of the City of Kwinana Town Planning Scheme No. 2

IT IS CERTIFIED THAT THIS STRUCTURE PLAN WAS APPROVED BY RESOLUTION OF THE WESTERN AUSTRALIAN PLANNING COMMISSION ON: 11 June 2015

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:

M. Wheelaw

Witness

8 December 2015

Date

Date of Expiry : 19 October 2025

TABLE OF CHANGES OR DEPARTURES FROM STRUCTURE PLAN

Change or Departure No.	Description of Change or Departure	Date Approved by the WAPC (if required)	Date Structure Plan commences operation

Executive Summary

The Wellard East Local Structure Plan encompasses land described as Part Lot 9001 (previously known as Lot 201) Mortimer Road and Part Lot 379 Millar Road, Wellard (East) and proposes development as summarised in **Table 1**. The Wellard East Concept Plan for the whole Wellard East Cell, which covers land located between Mortimer and Millar Road, proposes development as summarised in **Table 1**. This structure plan does not overlap, supersede or consolidate an approved structure plan. This structure plan is a southern extension to the adopted Local Structure Plan for Lot 27 and part Lot 201 Mortimer Road, Wellard (East).

Table 1. Structure Plan Summary Table

Item	Data		Section number referenced within the Structure Plan report
	Wellard East Cell (Concept Plan)	LSP Area	
Total area covered by the concept plan and the local structure plan	170.3 ha	16.67ha	1
Net land area covered by the concept plan and local structure plan (minus CCW wetland core, WP Easement, drainage reserves, school site, marsupial rehabilitation clinic, 1:1 year drainage basins where relevant)	129.9ha	13.29ha	
Area of each land use proposed:			3
<u>Zones</u>			
▪ Residential	60.22ha	8.25ha	
▪ Development – Marsupial rehabilitation clinic	1.08ha	Nil	
<u>Reserves</u>			
▪ Public Purposes - Primary school	4ha	3.17 ha	
▪ Parks and Recreation – Public Open Space	42.61ha	1.35ha	
Estimated lot yield	Approximately 1440	Approximately 203	3
Estimated number of dwellings	Approximately 1468	Approximately 208	3
Estimated residential density	R20 to R50 8.6 dwellings per gross hectare	R20 to R50 12.4 dwellings per gross site hectare	3.3
Dwellings per site hectare <i>As per Liveable Neighbourhoods</i>		15.3 dwellings per net site hectare	
Estimated population	3,816 (based on 2.6 persons per dwelling as per 2011 census data for Wellard West)	540.8 (based on 2.6 persons per dwelling as per 2011 census data for Wellard West)	3
Number of secondary schools	None	None	
Number of primary schools	One	A portion of one school	3
Public Open Space	11.5%	8.6%	3.2

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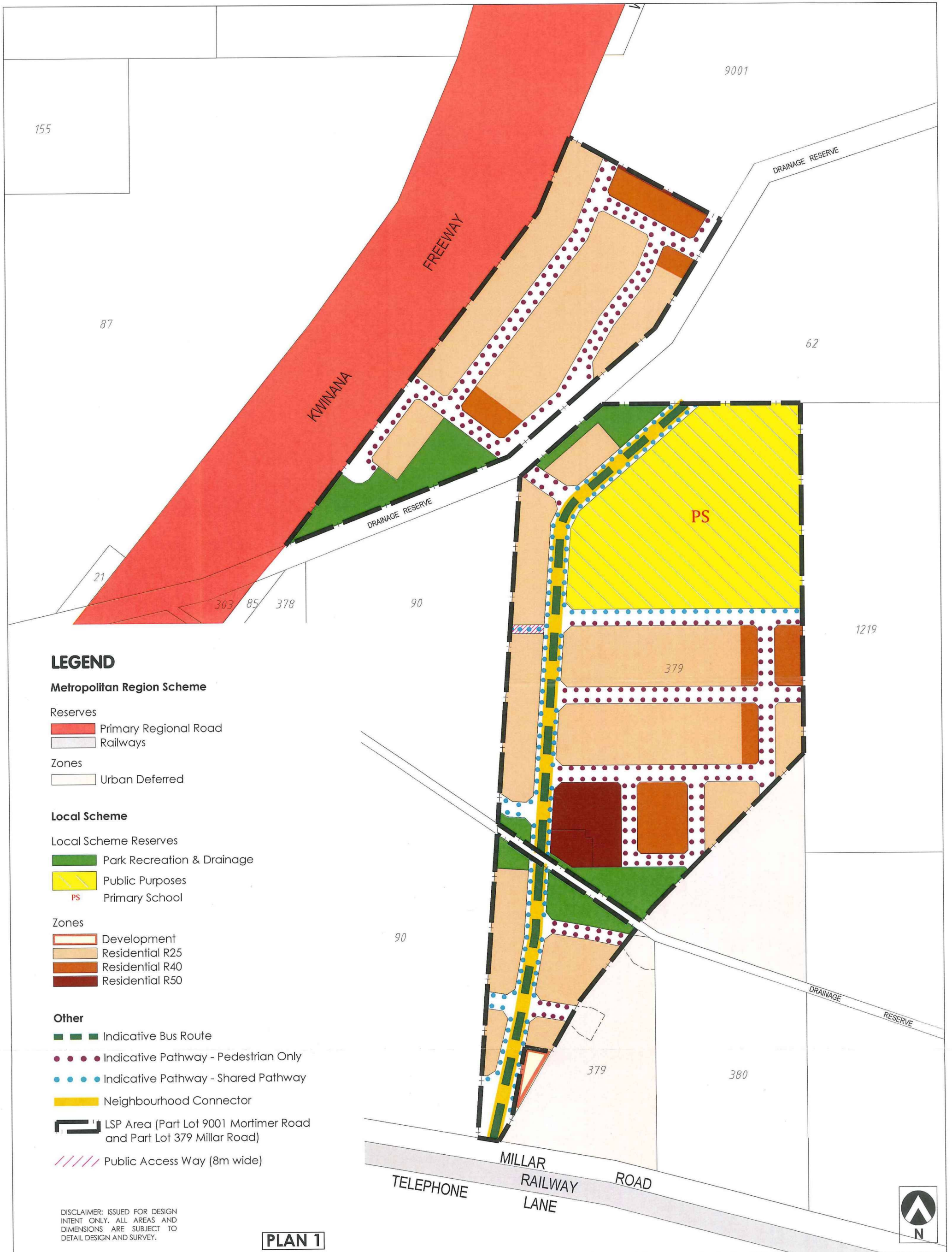
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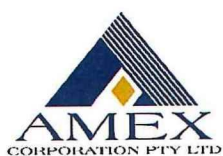
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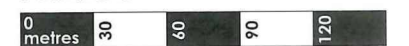
LOCAL STRUCTURE PLAN MAP

Part Lot 9001 Mortimer Road and Part Lot 379 Millar Road, Wellard (East)
Local Structure Plan

City of Kwinana

SIZE A3

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Part Lot 9001 Mortimer Road
and Part Lot 379 Millar Road, Wellard
(East) Local Structure Plan

PART ONE
STATUTORY SECTION

PART ONE – STATUTORY SECTION

1.0 Structure Plan Area

This Structure Plan shall apply to Part Lot 9001, Mortimer Road (previously known as Lot 201 Mortimer Road) and Part Lot 379, Millar Road, Wellard (East) being the land contained within the inner edge of the line denoting the structure plan boundary on the Structure Plan Map (**Plan 1**).

This Structure Plan is identified as the Part Lot 9001 Mortimer Road and Part Lot 379 Millar Road, Wellard (East) Local Structure Plan.

2.0 Structure Plan Content

The Structure Plan comprises the following sections:

- a. Part One – Statutory Section. This section includes the Structure Plan Map and any textual provisions, standards or requirements that require statutory effect.
- b. Part Two – Explanatory Section (Non-Statutory). This section provides the planning context and justification for the Structure Plan Map and the textual provisions, standards or requirements contained in Part One of the Structure Plan. Part Two is to be used as a reference to guide interpretation and implementation of Part One.
- c. Appendices, includes all specialist consultant reports and documentation used in the preparation of and to support the land use outcomes of the Structure Plan.

3.0 Interpretation and Relationship with Town Planning Scheme No. 2

3.1	Terms and Interpretations	Unless otherwise specified in this part, the words and expressions used in this Structure Plan shall have the respective meanings given to them in the City of Kwinana Town Planning Scheme No. 2 ('Scheme') including any amendments gazetted thereto.
3.2	Relationship of the Structure Plan with Town Planning Scheme No. 2	The Structure Plan has been prepared under Clause 6.17.2.1 of the Scheme as the subject land is zoned 'Development'.
3.3	Provisions, Standards or Requirements	In the case of any inconsistency between the Scheme and any provisions, standards or requirements specified under Part One of this Structure Plan, the Scheme prevails to the extent of any inconsistency.

4.0 Operation

4.1	Operation Date	This Structure Plan commences operation on the date it is adopted by the Western Australian Planning Commission pursuant to Clause 22 of the <i>Planning and Development (Local Planning Schemes) Regulations 2015</i> .
4.2	Change or Departure from Structure Plan	Clause 29 <i>Planning and Development (Local Planning Schemes) Regulations 2015</i> outlines the manner in which an amendment to a Structure Plan is determined.

5.0 Land Use

5.1	Structure Plan Map	The subdivision and development of land is to generally be in accordance with the Structure Plan.
5.2	Residential Density	Residential densities applicable to the Structure Plan Area shall be those residential densities shown on the Structure Plan Map.

6.0 Subdivision/Development

6.1	Notifications on Title	<p>In respect of applications for the subdivision of land the Council shall recommend to the Western Australian Planning Commission that conditions be imposed on the granting of subdivision approval for the following notifications on title pursuant to Section 70A of the <i>Transfer of Land Act 1893</i>:</p> <ul style="list-style-type: none"> i. Lots affected by noise levels exceeding the noise target as per <i>State Planning Policy 5.4 - Road and Rail Transport Noise and Freight Considerations in Land Use Planning</i>. ii. On lots within 1000 metres of the boundary of the livestock holding facility on Telephone Lane, Baldivis advising of potential adverse impacts associated with odour emissions from the livestock holding facility. iii. Lots with a Bushfire Attack Level (BAL) rating of BAL 12.5 or greater.
6.2	Local Development Plans	<p>Local Development Plans (LDPs) are required to be prepared and implemented pursuant to Part 6 of the <i>Planning and Development (Local Planning Schemes) Regulations 2015</i> for lots comprising one or more of the following site attributes:</p> <ul style="list-style-type: none"> i. Lots with rear-loaded vehicle access; ii. Lots with direct boundary frontage (primary or secondary) to an area of Public Open Space; iii. Lots with direct boundary frontage (primary or secondary) to a drainage reserve; iv. Grouped dwelling lots; v. Lots not rear-loaded with a frontage of less than 12 metres;

		<ul style="list-style-type: none"> vi. Lots deemed to be affected by a recognised Bush Fire Hazard as identified spatially in the accompanying Bushfire Management Plan in Appendix K (as amended); and vii. Lots deemed to be affected by noise from the Kwinana Freeway or the Mundijong Freight Railway as identified spatially in the accompanying acoustic assessment under Appendix H (as amended).
6.3	Other provisions/standards/requirements	This Structure Plan is supported by a Bushfire Hazard Level Assessment (BFHA), <i>Fire Management Plan – Local Structure Plan, Part Lot 9001 Mortimer Road and Lot 379 Millar Road, Wellard East</i> (May 2014) as amended. Any land falling within 100 metres of a bushfire hazard identified in the BFHA is designated as a Bushfire Prone Area for the purposes of the Building Code of Australia.
7.0	Other requirements	<p>The Council shall recommend to the Western Australian Planning Commission that a condition be imposed on a grant of subdivision approval requiring:</p> <ol style="list-style-type: none"> 1. A Mosquito and Midge Management Plan.

Part Lot 9001
Mortimer Road and
Part Lot 379 Millar
Road, Wellard (East)
Local Structure Plan

PART TWO

NON STATUTORY (EXPLANATORY)
SECTION

1 Planning Background

1.1 Introduction and Purpose

This following report provides justification for a Local Structure Plan (LSP) for land described as Part Lot 9001 Mortimer Road and Part Lot 379, Millar Road, Wellard (East) (referred to as the LSP Area or the site in the following report). The following report also refers to the Wellard East Cell, which is land located between Mortimer and Millar Roads (refer to **Figure 1 and Figure 2** for LSP and cell boundaries). The LSP Area is located in the southern part of the Wellard East Cell.

Whilst the LSP Area covers part of the Wellard East Cell, the following report addresses planning (urban design), environmental and engineering issues in a holistic manner, however the detailed technical reports (such as the Local Water Management Strategy Addendum) mainly focus on the LSP Area. Also the Wellard East Concept Plan (**Figure 15**) shows a design over the LSP Area, the approved LSP design over the northern portion of the cell (ie previously part Lot 201 and Lot 27 Mortimer Road) and a conceptual design over the balance of the cell. Also the design shown over part Lot 378 and Lot 90, Millar Road generally reflects the LSP design approved for these lots. The Local Structure Plan for the site is identified as **Plan 1** in Part One of the Structure Plan documentation (ie Statutory Section).

The technical reports demonstrate that recommendations for Armana landholdings will not adversely impact or prejudice future development/subdivision of adjoining land. **On this basis, LSP approval is being requested for the southern portion of Lot 9001 and a portion of Lot 379 (external to the current odour buffer).** This will enable subdivision to proceed in a timely manner, whilst other more detailed issues are addressed and resolved on adjoining land.

The following report recognises the opportunities and constraints of the Wellard East Cell, particularly in terms of the location, lot configuration, topography and environmental features as well as the specific drainage requirements reflected in the Local Water Management Strategy (LWMS) Addendum for Part Lot 9001 and Part Lot 379. The following report also includes a review of the current planning framework, environmental investigations, transport assessment, servicing analysis and design rationale for the LSP Area. It should be noted that many of the reviews in the report, including servicing, environmental and planning cover the whole cell, whilst more specific site works have been undertaken for the LSP Area only.

The LSP (**Plan 1**) will guide the subdivision of part of the Wellard East Cell and ensure that development proceeds in a sustainable manner facilitating the objectives of the Western Australian Planning Commission (WAPC), as advocated through Liveable Neighbourhoods and in accordance with the objectives of the City of Kwinana. The LSP reflects the intended use of the site for urban development as identified in the Jandakot Structure Plan and the Draft District Structure Plan, referred to as the Eastern Residential Intensification Concept (ERIC).

1.2 Land Description

1.2.1 Location

The LSP Area (also referred to as the site) is located approximately 36 kilometres south of Perth's Central Business District (refer to **Figure 1**). The LSP Area is located within the Wellard East Cell, which is situated in the South West Corridor of Perth and is bounded by Kwinana Freeway to the west, Mortimer Road to the north, Millar Road to the south and Woolcoot Road to the east. The Wellard East Cell is situated wholly within the municipality of the City of Kwinana.

1.2.2 Area and Land Use

The LSP Area has a total land area of 16.67 hectares. The site is currently vacant of any built structures and comprises remnant vegetation of varying quality. Lot 379 is dissected by an existing drainage reserve (ie. Peel sub-drain) (refer to **Figure 2 and Figure 3**).

The Wellard East Cell has a land area of approximately 170 hectares. The cell (including the LSP Area) comprises predominantly cleared farmland, although there are some significant wetland areas and other

physical constraints to development including existing drains and power lines. Also Armana Holdings has constructed its subdivision in the approved LSP Area in the northern part of the cell. An existing marsupial rehabilitation clinic is located on part of Lot 379 on land that fronts Millar Road. This use is excluded from the LSP Area. **Figure 2** provides an aerial photograph of the LSP Area and the Wellard East Cell.

1.2.3 Legal Description and Ownership

The LSP Area covers Part Lot 9001 (previously Lot 201) Mortimer Road and Part Lot 379 Millar Road, Wellard (East) (refer to **Table 2**), which are both owned by Armana Holdings Pty Ltd. A copy of the certificates of title for the LSP Area are included in **Appendix A**.

Table 2. Land Ownership and Site Details

Owner	Lot No.	Plan/Diagram	Volume/Folio	Street Address	Area (ha)
Armana Holdings Pty Ltd	379	144536	1778/685	593 Millar Road Wellard	15.3781 (not all of land area included in the LSP)
Armana Holdings Pty Ltd	9001	72800	2815/182	N/A	36.005 (not all of land area included in the LSP)

The Wellard East Cell comprises a number of lots under varying ownership as outlined in **Table 3** below. The lots owned by Armana Holdings Pty Ltd are highlighted. It should be noted that Lots 201 and 27 have been subdivided and now comprise numerous lots and a balance of title lot (known as Lot 9001). Lots 128 and 129 (previously owned by Main Roads) have now been created as Wake Way (gazetted local road).

Table 3. Lot Description, Ownership and Areas

Lot No. and Street	Owner	Land Area (ha)
Pt 27 Mortimer Road (now comprises a road reserve and balance of title Lot 9001)	Armana Holdings	3.51 (including the road reserve)
Pt 28 Mortimer Road	C. Berry, D. Berry, K. Griffin, B. Munro	3.79
126 Mortimer Road	Main Roads Western Australia	0.23
127 Mortimer Road	Main Roads Western Australia	0.67
201 Mortimer Road (now comprises multiple lots, road reserves and balance of title Lot 9001)	Armana Holdings Pty Ltd and multiple landowners	39.93
59 Woolcoot Road	Geographe Development Pty Ltd	12.48
61 Woolcoot Road	LM + C Morley	2.69
62 Woolcoot Road*	A. Bombara, M. Bombara, M. Verheggen and Robin Lodge Pty Ltd	12.71
62 Woolcoot Road*	VN Nguyen & Thi Hoa Vo	9.84
64 Woolcoot Road	Sienna Properties Pty Ltd	11.77
89 Woolcoot Road	Bertolini	14.13
1219 Woolcoot Road	Como Residential Pty Ltd	15.18
0 Johnson Road	Main Roads Western Australia	0.10
500 Wake Way	Main Roads Western Australia	2.39
601 Millar Road	Wellard Land Pty Ltd	1.47
90 Millar Road	Mary Donald Nominees (D.J. MacCormick Property Group) and multiple landowners (in the process of being subdivided)	8.94
Pt 378 Millar Road	Mary Donald Nominees Pty Ltd and multiple landowners (in the process of	7.85

Lot No. and Street	Owner	Land Area (ha)
	being subdivided)	
Pt 379 Millar Road	Armana Holdings Pty Ltd	15.37
Pt 380 Millar Road	S. Liang, J. W Wang, C. Ye	2.70
Closed Road Reserve	Landgate Update	0.15
Drainage Reserves	Water Corporation	3.87
TOTAL		170.0

Notes:* There are two lots known as Lot 62 Woolcoot Road

The location and area of each lot are reflected in **Figure 3**.

1.3 Planning Framework

1.3.1 Zoning and Reservations

1.3.1.1 *Metropolitan Region Scheme*

The majority of the Wellard East Cell is zoned Urban in the Metropolitan Region Scheme (MRS) (refer to **Figure 4**). The Urban Zone includes all of the LSP Area (ie. part Lot 9001 and part Lot 379).

The balance of the cell (ie. south-eastern portion) is still zoned Urban Deferred under the MRS as it is affected by an interim buffer from a livestock holding facility, which is located to the south of Millar Road (outside the Wellard East Cell). This interim buffer is subject to further odour investigations as part of a separate process to the LSP.

This Wellard East Cell is surrounded by the following zones and reservations:

- > Urban Deferred and Other Regional Roads to the north;
- > Rural to the east and south; and
- > Primary Regional Roads and Urban to the west.

1.3.1.2 *City of Kwinana Town Planning Scheme No. 2*

Under the City of Kwinana Town Planning Scheme No. 2 (TPS2), the majority of the Wellard East Cell is zoned Development (including all of the LSP Area), which occurred concurrently with the lifting of the Urban Deferred Zone in accordance with Section 126(3) of the *Planning and Development Act* (refer to **Figure 6**).

The south-eastern portion of Wellard East Cell, which is still zoned Urban Deferred under the MRS, remains zoned Rural A and Cluster/Communal Rural Settlement under TPS2.

TPS2 Zoning Map also shows a number of landscape protection areas (ie. special control areas) that generally align with the wetlands and vegetation located within the cell. Under Clause 6.16 of the Scheme, the general intent is to protect areas of ecological value or landscape amenity whilst at the same timing allowing development. The LSP Area is not contained within any special control area.

All of the cell is located in a Drainage Catchment Management Area. The implications of this are dealt with through the Local Water Management Strategy Addendum (refer to **Appendix E** and the overall Jandakot Drainage and Management Plan (refer to **Section 3.5**).

According to the Scheme, the purpose of the Development Zone is to:

“provide for orderly planning and development of larger areas of land in an integrated manner within a regional context whilst retaining flexibility to review planning with changing circumstances...Council will have due regard to the desirability of higher densities, transit related development and good pedestrian and vehicular access to stations in order to promote public transport usage.

The objective of this zone is to:

- a. *Designate land for future development;*

- b. *Provide a planning mechanism for the identification and protection of areas of conservation value whilst facilitating the growth of the Town;*
- c. *Provide for the orderly planning of large areas of land for residential, commercial, industrial and associated purposes through a comprehensive structure planning process;*
- d. *Enable planning to be flexible and responsive to changing circumstances throughout the development stages of the area; and*
- e. *Provide sufficient certainty for demand forecasting by service providers”.*

According to Clause 6.15 of TPS 2, the Development Zone triggers the need for a local structure planning process to be completed prior to subdivision of the site. Clause 16 of the *Planning and Development (Local Planning Schemes) Regulations 2015* Scheme sets out the elements to be included in a local structure plan. The LSP has been designed to meet the intent and principles of the Development Zone and is consistent with the Structure Plan requirements in the Regulations. The focus of the technical reports is on part Lot 9001 and part Lot 379. Notwithstanding this, the Wellard East Concept Plan (refer to **Figure 15**) incorporates the balance of the cell, although landowners in these areas will be required to carry out further technical studies to justify the detailed planning and development of their land.

Clause 6.17.3.5 in the Scheme allows Council to consider a proposed structure plan over part of a Development Area or Development Zone, although Council require demonstration of how planning for the site may be integrated with the planning for the balance of the Development Area (ie. Wellard East Cell), including how broad land uses, essential services, main movement systems and major conservation and recreation areas are to be integrated. The integration of land uses, public open space and movement systems across the cell and the site are all demonstrated on the Wellard East Concept Plan and Public Open Space Plan (refer to **Figure 15 and Figure 16**). Section 3.5 deals with general water management issues over the cell and the site, although the LWMS Addendum has been prepared for the site only. Whilst the Transport Assessment (included in **Appendix D**) primarily addresses the site, it also considers the movement network over the whole cell. Also Section 3.7 of the report addresses the servicing of the site and how and where the major services will be brought to the cell. Council and the WAPC have already set a precedent for adopting Structure Plans over part of a Development Area by adopted a LSP for Lots 201 and 27 Mortimer Road. It is proposed that a similar process (adoption by the WAPC) be undertaken for the subject site so that subdivision can continue to progress over the cell.

Under the Scheme, all of the Wellard East Cell is located in Policy Area 6. The provisions in the policy area are mostly outdated as it reflects that area’s previous rural land uses.

A Development Contribution Plan for Community Infrastructure, which affects the Wellard East Cell, is included in Schedule 5 of the Scheme. This is further discussed in **Section 3.8** of the report.

1.3.2 Regional and Sub-Regional Structure Plans

1.3.2.1 Southern Metropolitan Sub-Regional Structure Plan

The Draft South Metropolitan Sub-Regional Structure Plan was released for public comment in June 2009. It is only a broad strategic guidance document that aims to guide more detailed planning. The plan outlines a range of key objectives including creation of vibrant and sustainable communities, efficient use of land and infrastructure, protection of natural assets, creation of reliable transport network, and provision of a range of housing densities.

The plan includes Wellard East, which is identified as “Undeveloped Urban and Urban Deferred”. The area to the south of Millar Road is identified as “Industrial Investigation”.

1.3.2.2 Jandakot Structure Plan

In August, 2007 the Western Australian Planning Commission (WAPC) released the final Jandakot Structure Plan (JSP) following on from the draft JSP released in October, 2001.

The purpose of the Structure Plan is to:

“plan and coordinate the development expectations of the area while balancing environmental issues following a number of reviews and studies of the area”.

The JSP recognises potential development areas and proposed indicative road layouts and locations for commercial facilities, whilst retaining environmentally sensitive features such as wetlands. The plan is based on Liveable Neighbourhood principles and aims to accommodate the projected growth of the corridor. The overall intent is to create contained and environmentally responsive urban developments. **Figure 5** illustrates the JSP and shows Wellard East at the southern end of the plan.

The JSP acknowledges that a "Water Resource Management Strategy" will need to be prepared, together with more detailed Local Structure Plans for future development proposals within the JSP area. This requirement has been addressed by the Department of Water (DoW), through the release of the Jandakot Drainage and Water Management Plan. This Drainage Plan is addressed in **Sections 3.5** of this report and the Local Water Management Strategy Addendum for part Lot 9001 Mortimer Road and part Lot 379, Millar Road (refer to **Appendix E**).

According to the JSP, MRS and local scheme amendments are required prior to subdivision proceeding. This has now occurred over the majority of the Wellard East Cell.

The JSP proposes urban development in the Jandakot Region over three timeframes – short (0-5 years), medium (5-10 years) and long term (10+ years). Five urban precincts are identified in the Structure Plan area, with the Wellard East Cell included in Area 4.

Within Area 4, which contains an area of some 300ha, the estimated ultimate population is 8,190 of which 4,990 would be accommodated in the precinct by 2026. Area 4 was estimated to be the most occupied of the 5 precincts by 2026 with 60% of its land area developed by this time.

The JSP earmarks Area 4 for medium term urban development in the draft document when it was released in 2001 (i.e. within 5-10 years) on the basis the land was then zoned Rural. This timeframe was not updated when the JSP was finalised 6 years later. Following the lifting of the Urban Deferred Zone over the majority of the cell, various LSPs and the subdivision approval for Lots 27 and 201, subdivision commenced in the cell in 2012 and the first stages of subdivision were completed in 2013. This is generally consistent with the timeframe in the JSP.

Whilst a significant portion of the Wellard East Cell is shown as medium term urban, the JSP also shows indicative road layouts (key roads only), significant wetlands, commercial centres, primary school, power lines, drainage lines and urban transition areas along the eastern and southern boundaries of the cell. The JSP also shows notional walkable neighbourhoods focussed around commercial centres.

Many of these land uses are reflected in the LSP and the Wellard East Concept Plan and are discussed further in **Section 3** of this report. It should be noted that the JSP states that the land use designations are indicative only and will guide the more detailed planning and other technical investigations at the LSP stage. Guidelines for urban design are required to be based on Liveable Neighbourhoods. In accordance with the JSP there will need to be a clear transition between rural and urban areas (ie. Woolcoot Road for Wellard East), linear road linkages between neighbourhoods located along the freeway and incorporation of green linkages within LSPs.

1.3.2.3 Eastern Residential Intensification Concept

In November 2005, the then Town of Kwinana released for comment the Eastern Residential Intensification Concept, commonly referred to as ERIC (refer to **Figure 7**).

According to the City of Kwinana, ERIC *"has been prepared to provide an overarching framework for the co-ordination of subdivision and development within the areas designated under the Jandakot Structure Plan area as having potential for urban development"*.

The plan aims to provide a greater level of detail than the JSP and is in effect a district structure planning framework within which to develop local structure plans.

ERIC has been advertised but has not been finalised by the City of Kwinana. Council officers advised that ERIC is a guidance document only. The LSP for the site generally reflects the design principles in ERIC, as advertised. This is further discussed in **Section 3**.

In terms of land uses within Wellard East, ERIC shows the majority of land being developed for Residential R20 and R30/40 and conservation areas (ie. wetlands). Other land uses proposed in the cell include local primary school, POS and community centre. ERIC also shows how the Wellard East Cell will connect to

land directly to the north of Mortimer Road, which is via a north-south collector road through Wellard East connecting with Nicolas Road in Casuarina. This collector road is reflected on the LSP for the site.

1.3.3 Planning Strategies

1.3.3.1 **State Planning Strategy**

On 19 December 2012, the Minister for Planning launched the draft revised *State Planning Strategy* for public consultation until 29 March 2013. This Strategy presents a vision for Western Australia to 2050 and beyond based on a framework of planning principles, strategic goals and State strategic directions in response to the opportunities and challenges Western Australia is likely to face in the future.

The purpose and function of the document is to provide a sound basis for the integration and coordination of strategic planning across state, regional and local jurisdictions. It is the lead strategic planning document within Government.

The State Planning Strategy is an overarching strategic document that informs all other State, regional and local planning strategies, policies and approvals. The following is an extract from the *Draft State Planning Strategy 2012*, illustrating the structure of the strategy and how it relates to other policies and strategies, including Structure Plans.



The *State Planning Strategy* states that the primary aim of planning is to provide for the sustainable use and development of land. The Strategy identifies the five key principles (Environment; Community; Economy; Infrastructure and Regional Development), which further define this primary aim and describe the considerations which influence good decision-making in land use planning and development.

1.3.3.2 **Directions 2031 and Beyond**

The WAPC released *Direction 2031 and Beyond* in August 2010. The purpose of this framework is to establish a vision for future growth of the Perth and Peel Regions and provide a framework to guide detailed planning and the delivery of housing, infrastructure and services to accommodate that growth. It builds on from many of the principles in Network City.

The framework provides three growth scenarios:

1. **Linear City** – continuation of business as usual development patterns with the majority of growth occurring on the urban fringe;
2. **Connected City** – more balanced distribution of infill and greenfield development with a target density of 15 dwelling units per hectare of Urban zoned land; and

3. **Compact City** – more consolidated pattern of growth with an emphasis on infill development.

To achieve the preferred “Connected City” scenario, the framework proposes that new growth occurs in a more balanced way around a diverse activity centres network, which is linked by a robust movement network and supported by a green network of parks, conservation and biodiversity areas.

There are six sub-regional areas identified within the framework and the Wellard East Cell is situated within the South-West Sub-Region. The South-West Sub-Region encompasses the cities of Cockburn, Rockingham and Kwinana. Rockingham is the primary centre, providing a full range of services, facilities and activities necessary to support the community within its catchment. In general accordance with Directions 2031, the Wellard East Concept Plan and the LSP provides for residential development connected to movement networks and supported by conservation and public open space areas, infrastructure provision and school facilities. The density targets outlined in *Directions 2031 and Beyond* are addressed for the LSP in Section 3.3 of the report.

The South-West Sub-Region is also supported by major industrial locations such as Kwinana and Latitude 32 (Hope Valley-Wattleup), which will generate significant employment self-sufficiency (60% to 70%) for the Region. Whilst there is limited employment opportunities within the Wellard East Cell due to its size and range of proposed land uses, there will be significant employment opportunities for future residents within the sub-region.

Directions 2031 also identifies a possible industrial area to the south of Millar Road. This possible industrial use is identified as an area under investigation. Whilst there are a range of existing and proposed land uses to the south of Millar Road, any industrial development should only accommodate light and service type industrial uses that do not impact on the residential growth in Wellard East. This possible industrial area would form an important employment node for Wellard East in the future.

Directions 2031 also recommends the preparation of growth management strategies and structure plans for the sub-regional areas.

1.3.3.3 Outer Metropolitan Perth and Peel Sub-Regional Strategy

The Outer Metropolitan Perth and Peel Sub-Regional Strategy was released in August 2010 as a “follow-on” planning document to *Directions 2031 and Beyond* and provides broad guidelines for implementation, particularly in terms of achieving housing needs. The Strategy also provides for a balance between greenfield and infill development consistent with *Directions 2031 and Beyond*. The Strategy also includes an urban management programme to retain a sufficient land supply for development on an ongoing basis to meet projected population growth.

The Strategy addresses each of the sub-regions including the South-West in which the Wellard East Cell is located. The cell is identified as “urban deferred zone undeveloped”, which does not reflect the MRS zoning over the majority of the cell (ie. Urban). Also the Strategy has estimated a dwelling yield of 1500 for the Wellard East Cell based on the ‘Connected City Scenario’. Land to the south of Millar Road is identified as a “priority industrial site – subject to investigation”.

1.3.3.4 Economic and Employment Lands Strategy: Non-heavy Industrial Perth Metropolitan and Peel Regions

The Economic Employment Lands Strategy: Non-heavy Industrial Perth Metropolitan and Peel Regions was published by the WAPC in April 2012 in response to a recognised shortfall in general and light industrial land supply. The Strategy focuses on the identification and de-constraining of land suitable for industrial activity for the long term, with the aim of providing an industrial land bank in the Perth metropolitan and Peel regions over the next 20 years and beyond. Heavy industry is reliant on a different set of drivers and conditions to light and general industry and is therefore not included in the Strategy.

The Strategy provides a framework to facilitate the delivery of appropriately zoned industrial land to the market, allowing the market to respond to forecast demand over the next 20 years. The Strategy identifies 37 potential areas for future industrial land use investigation, designated as either short (0-4 years planning timeframe), medium (4-10 years planning timeframe) or long term sites (10 years plus planning timeframe).

The Strategy does not identify the Wellard East Cell area for any future industrial land uses. However, the Strategy identifies a 1026 hectare portion of land to the south of the Wellard East Cell area (generally bound by Millar Road, the Kwinana Freeway and Mundijong Road) referred to as 'North East Baldvis', as a potential medium-term non-heavy industrial area. The site is identified as the preferred site for future industrial development in the South-West Metropolitan Sub-Region.

The site is likely to be suitable for larger lot general industrial uses. Given the low-lying characteristics of the land, the Strategy states that low-polluting and low water use industries would be suited to the location. It is noted that the majority of the site is envisaged to be utilised for general industrial uses that are non-hazardous. It is possible that some consumer services may locate within the site, with light/service industry adjoining the special rural interface (presumably along Millar Road).

The Strategy notes that existing and surrounding uses may present conflicts with the potential industrial development, particularly with the encroachment of Special Rural land uses. The Strategy recommends that future detailed planning should be undertaken to ensure that the amenity of residential areas is not adversely affected. As such, the visual impact of the potential industrial development will require thorough consideration during the appropriate planning processes, with the rural buffer adjacent to the Freeway likely to be a key issue.

1.3.4 State Planning Policies

1.3.4.1 *Liveable Neighbourhoods*

The LSP and the Wellard East Concept Plan has generally been designed in accordance with the provisions and principles of Liveable Neighbourhoods, in particular the road design. Liveable Neighbourhoods encourages street networks that have a high level of internal connectivity and good external linkages to cycle, pedestrian and bus networks. The road design should also be legible and minimise car travel.

Another key provision in Liveable Neighbourhoods is the promotion of walkable access to activity nodes or destinations with a general requirement for 400 metre walkable catchments. In this case, the location of the primary school, community centre site, public open space and wetland conservation areas within the Wellard East Cell are of relevance. This is further addressed in **Section 3** of the report.

Liveable Neighbourhoods provides guidance on the location, distribution and amount of POS required. A Public Open Space (POS) table has been prepared for the Wellard East Cell and the LSP area in accordance with Liveable Neighbourhoods Table 11 (refer to **Appendix I**).

Liveable Neighbourhoods require Local Structure Plans to specify residential densities and encourages diversity in residential densities and dwelling types thereby providing more choice for changing household types. Residential densities proposed in the LSP Area meet these objectives and are addressed in **Section 3.3** of the report.

Liveable Neighbourhoods also emphasises connections to adjoining development within and external to the Wellard East Cell.

According to Liveable Neighbourhoods it is important for the LSP and the Wellard East Concept Plan design to respond to the site context and characteristics, such as wetlands, Western Power easement and the drainage reserves. This is also important in terms of achieving a Liveable Neighbourhoods objective of an urban structure that achieves a balanced outcome between urban and environmental sustainability.

1.3.5 Local Planning Policies

1.3.5.1 *Local Planning Policy 4.3.3 - Public Open Space*

The policy was last reviewed in 2006 and as such some parts of the policy are inconsistent with Liveable Neighbourhoods. Notwithstanding this, the POS design shown over the cell and LSP Area is based on key principles in this policy, in particular preservation and enhancement of biodiversity values and preservation of significant trees and remnant vegetation. The policy requires the standard 10% of gross subdividable area as POS, which is consistent with Liveable Neighbourhoods. The policy also requires the provision of district recreational facilities, however the POS function within Wellard East will be largely limited to conservation and local recreational needs. This is consistent with proposed community infrastructure, which proposes the location of district recreational facilities to the north of Wellard East such as the Casuarina District Sporting Ground. The policy also prescribes absolute minimum sizes of POS: 4000m² for public use and 1000m² for

landscaped area and no POS shall have dimensions of less than 20m for public use and 10m for landscaping areas. However, the policy allows these provisions to be varied to preserve a significant natural feature or recreational asset. The amount and location of POS for the LSP Area and the Wellard East Cell are discussed in **Section 3.2** of the report.

The policy allows for POS to be used for drainage provided Council is satisfied that the recreational and/or landscape function of the reserve are not adversely affected. The policy outlines that no more than 50% of the POS is to be inundated at any time. **Appendix I** includes the POS table and a portion of the drainage areas are included in the 10% POS contribution in accordance with Liveable Neighbourhoods. However, the 1 in 1yr drainage areas are excluded from the 10% POS contribution.

The policy also states that EPP and conservation category wetlands are excluded from POS, which is consistent with Liveable Neighbourhoods. However, buffers to these type of wetlands may be included in POS as per the policy and Liveable Neighbourhoods. This matter is further addressed in **Section 3.2** and **Appendix I**.

1.3.5.2 Local Planning Policy 3.3.7 – Community Facilities Sites

This Policy was also reviewed in 2006 and is based on the key objective of ensuring that social infrastructure (ie. community facilities sites) are incorporated into the design of new residential areas. The Policy discusses the provision of land for private community facilities such as medical centres, however no commercial or neighbourhood centres are proposed within the Wellard East Cell. Such uses may be more appropriately located near the commercial centre on Mortimer Road (just to the north of the Wellard East Cell).

The Policy also addresses the provision of public community centres and allows for such sites to be included in 10% POS contribution as part of the residential subdivision. The sites are required to be at least 2000m². The Policy also recommends the community centre be located close to nodes of activity such as primary schools, in order to maximise co-location advantages (ie. shared parking and good access).

The Wellard East Concept Plan shows a community centre located within POS in the centre of the cell. The provision and use of community facilities within Wellard East has already been given detailed consideration by City of Kwinana through preparation of the Community Infrastructure Plan. The need for local and district community infrastructure is currently being reviewed by the City of Kwinana as a result of changing circumstances within the development cells.

1.3.5.3 Local Planning Policy 4.3.1 – Conservation of Remnant Vegetation

This Policy addresses Council's objective of protecting remnant vegetation as part of residential subdivisions by giving a high priority to retaining existing trees and retaining representative samples of different vegetation complexes (ie. biodiversity) and ecological linkages. The Policy requires existing trees to be shown on structure plans and planting of local species occurring naturally in the area will be encouraged by Council. Management measures and recommendations for protecting native flora and fauna for the LSP Area are discussed in **Section 2** and **Appendix B**. Also a landscaping masterplan has been provided in **Appendix G**.

2 Site Conditions and Constraints

Emerge Associates has undertaken a desktop investigation of the Wellard East Cell in order to determine the environmental values of the cell and, in particular, for the site. This included, but was not restricted to, a review of investigations previously conducted for the Wellard East Cell, regional environmental investigations and federal, state and local-level databases and mapping.

The site specific environmental investigations, studies and reports that informed our analysis include the following:

- > Wellard East – Local Structure Plan (Cardno, 2011)
- > Flora and Vegetation Survey and Wetland Assessment (Cardno 2008)
- > Preliminary Acid Sulfate Soils Assessment (Cardno 2009)
- > Preliminary Site Contamination Investigation (Cardno 2008)
- > District Water Management Strategy (Cardno 2009)
- > Local Water Management Strategy Addendum (Emerge Associates 2013)
- > Acoustic Assessment (Lloyd George Acoustics 2013)
- > Fire Management Plan (Emerge Associates and Bushfire Safety Consulting 2014).

This section broadly addresses the requirements of an Environmental Assessment and Management Strategy, outlining the environmental values and issues applicable to the site and the management of these values or issues.

2.1 Biodiversity and Natural Area Assets

2.1.1 Regional Context

The Wellard East Cell lies within the Swan Coastal Plain Interim Biogeographic Regionalisation for Australia (IBRA) region. This region is broadly categorised as *Banksia* low woodland on leached soils with *Melaleuca* swamps on ill-drained soils and woodlands of Tuart (*Eucalyptus gomphocephala*), Jarrah (*E. marginata*) and Marri (*Corymbia calophylla*) on less leached soils (Thackway and Cresswell 1995).

Vegetation complex mapping undertaken by Heddlé *et al* (1986) for parts of Western Australia uses a combination of landform, soils and rainfall parameters and indicates that the site is within the 'Bassendean Complex – Central and South'. This complex is described as a range of woodland of *E. marginata* (Jarrah), *Casuarina* sp. (Sheoak) and *Banksia* sp. on the low dunes, to low woodland of *Melaleuca* sp. and sedgelands in the swamps and depressions.

2.1.2 Flora and Vegetation

A *Flora and Vegetation Survey and Wetland Assessment* (Cardno 2008) was undertaken for portions of the Wellard East Cell, including the site and is provided in **Appendix B**. The field survey was conducted by two botanists in August, September, and November 2008 in accordance with *Environmental Protection Authority Guidance Statement No. 51 – Terrestrial flora and vegetation surveys for environmental impact assessment in Western Australia* (EPA 2004). Two of the visits were conducted in spring, which is the optimal flowering period for the majority of flowering plants in the south west of Western Australia. It should be noted that some of photos included in the flora and vegetation survey for the approved LSP Area (ie. land north of the site) are no longer current as the land is in the process of being subdivided. Therefore, the report included in **Appendix B** is now only relevant to the site (the subject of this LSP report).

The survey area was traversed on foot and the vegetation values assessed based on vegetation communities present and the condition of the vegetation, to assist in determining the conservation values of the survey area. A total of 94 taxa (including subspecies and varieties) from 78 genera and 31 families were identified as part of the survey. Of these, 45 were identified as weed species (48% of the total species

recorded), and five species were not known to occur endemically in the area but were likely a result of previous revegetation efforts.

The Wellard East Cell retains limited remnant vegetation values due to historic clearing and subsequent grazing of livestock, however areas that retain remnant vegetation values are largely associated with the mapped wetland areas. In terms of the site, the majority of remnant vegetation values are associated with the adjacent drainage reserves or are found adjacent to the Kwinana Freeway in the south-west portion of the site.

Within the Wellard East Cell, the flora and vegetation values have been given spatial consideration through the retention of wetland areas and the provision of public open space in locations where remnant vegetation is found. In the site itself, consideration was given to the area of remnant vegetation adjacent to the Kwinana Freeway, with the majority of vegetation proposed to be retained within public open space while paddock trees associated with public open space through the central portion of the site will be retained, where possible.

2.1.2.1 Vegetation communities

Based on the *Flora and Vegetation Survey and Wetland Assessment* (Cardno 2008), plant communities were identified and described according to the dominant species present. Three plant communities (PC) of differing condition were identified within the site and are described below:

- > PC4: Low lying woodland-forest of *Eucalyptus rudis* – *Melaleuca preissiana* over *Kunzea glabrescens* – *Pultenaea reticulata* over *Dielsia stenostachya* – *Opercularia hispidula* - **Zantedeschia aethiopica* on grey sandy loam.
- > PC5: Low upland woodland of *Corymbia calophylla* – *Eucalyptus marginata* over *Agonis flexuosa* – *Casuarina obesa* – *Banksia menziesii* – *Banksia grandis* over *Eremaea pauciflora* – *Calothamnus quadrifidus* over *Conostylis aculeate* subsp. *cygnorum* – *Kennedia prostrate* - **Ehrharta longiflora* - **Lolium rigidum* - **Carpobrotus edulis* on grey sandy loam.
- > PC6: Tall Scrub of *Kunzea glabrescens* – *Melaleuca teretifolia* over pasture grasses and **Carpobrotus edulis* on grey sandy loam.

The vegetation communities within the site are shown in **Figure 8**.

2.1.2.2 Vegetation condition

The condition of vegetation within the site was described based on the Keighery (1994) rating system, refer to **Table 4** below, and shows that the vegetation across the majority of the site is 'Completely Degraded' condition. The northern portion of Lot 379 Millar Road is described as 'Degraded' condition, while the south-western portion of Lot 9001 Mortimer Road is in 'Good' condition, and is described as having a heavily disturbed understorey. **Figure 9** shows the condition of vegetation within the site.

Table 4. Vegetation Condition rating (Keighery 1994)

Condition Rating	Description
Pristine	Pristine or nearly so, no obvious signs of disturbance
Excellent	Vegetation structure intact; disturbance affecting individual species; weeds are non-aggressive species
Very Good	Vegetation structure altered; obvious signs of disturbance For example, disturbance to vegetation structure caused by repeated fires; the presence of some more aggressive weeds; dieback; logging & grazing
Good	Vegetation structure significantly altered by very obvious signs of multiple of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires; the presence of some very aggressive weeds at high density; partial clearing; dieback & grazing
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by frequent

Condition Rating	Description
Completely Degraded	fires; the presence of very aggressive weeds; partial clearing; dieback & grazing The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs

Areas of vegetation that are classed as 'Good' and better have been given consideration within the site through placement of public open space, and vegetation will be retained where possible.

2.1.2.3 Conservation Significance

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) promotes the conservation of biodiversity by providing statutory protection for plants at a species level. Sections 178 and 179 of the EPBC Act provides for the lists and categories of threatened species, and is summarised in **Table 5** below.

Table 5. Categories of threatened species (Environmental Protection Biodiversity Conservation Act, Section 178 and 179, 1999)

(Only categories marked with an * are matters of national environmental significance under the EPBC Act)

Conservation Code	Category
E	Extinct Taxa which is known only to survive in cultivation, in captivity or as a naturalised population, well outside its past range; or it has not been recorded in its known/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
CE*	Critically Endangered Taxa which is facing a very high risk of extinction in the wild in the immediate or near future, as determined in accordance with the prescribed criteria.
E*	Endangered Taxa which are not critically endangered and is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
V*	Vulnerable Taxa which is not endangered and is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
CD	Conservation Dependent A species that is the focus of a specific conservation program; the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of five years.

Species of flora acquire Declared Rare Flora or Priority Flora conservation status within Western Australia where populations are restricted geographically or threatened by local processes. The Department of Environment Regulation recognises these threats and applies regulations towards population protection and species conservation. The Department of Environment Regulation enforces regulations under the Wildlife Conservation Act 1950 (WC Act) to conserve Declared Rare Flora species and protect significant populations. Priority Flora is described as potentially rare or threatened species and is classified in order of threat. Declared Rare Flora and Priority Flora categories are listed below in **Table 6**.

Table 6. Definition of Rare and Priority Flora species (Atkins 2006)

Conservation Code	Category
R	Declared Rare Flora – Extant Taxa. Taxa which have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection, and have been gazetted as such.
X	Declared Rare Flora – Presumed Extinct Taxa Taxa which have not been collected, or otherwise verified, over the past 50 years despite thorough

Conservation Code	Category
	searching, or of which all known wild populations have been destroyed more recently, and have been gazetted as such.
P1	Priority One – Poorly Known Taxa Taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat e.g. road verges, urban areas, farmland, active mineral leases etc., or the plants are under threat, e.g. from disease, grazing by feral animals etc. May include taxa with threatened populations on protected lands. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.
P2	Priority Two – Poorly Known Taxa Taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat (i.e. not currently endangered). Such taxa are under consideration for declaration as 'rare flora', but urgently need further survey.
P3	Priority Three – Poorly Known Taxa Taxa which are known from several populations, and the taxa are not believed to be under immediate threat (i.e. not currently endangered), either due to the number of known populations (generally >5), or known populations being large, and either widespread or protected. Such taxa are under consideration for declaration as 'rare flora' but need further survey.
P4	Priority Four – Rare Taxa Taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5-10 years.

No species of Declared Rare Flora or Priority Flora were located within the site, and as such require no specific consideration with regard to retention or management in the LSP.

2.1.2.4 Threatened Ecological Communities

Generally, ecological communities can be described as vegetation communities that are assemblages of species that occur together in a particular type of habitat. They are the sum of species within an ecosystem and, as a whole provide many of the processes which support a specific ecosystem.

Specific communities are afforded statutory protection at a federal level pursuant to the EPBC Act. Threatened Ecological Communities (TECs) are listed under Section 181 of the EPBC Act, and are defined as 'Critically Endangered', 'Endangered' and 'Vulnerable' under Section 182.

In Western Australia, TECs are defined by the Department of Environment Regulation, with advice provided by the Western Australian Threatened Ecological Communities Scientific Advisory Committee on community listings. TECs are not afforded direct statutory protection at a state level but their significance is acknowledged through other state environmental approval processes (i.e. environmental impact assessment pursuant to Part IV of the *Environmental Protection Act 1986*). Under the state process the Department of Environment Regulation has been identifying and informally listing TECs since 1994, using a range of definitions to indicate the level of threat. These definitions are outlined below in **Table 7**.

In addition to TECs, the Department of Environment Regulation defines Priority Ecological Communities (PECs), which are communities that do not meet the survey criteria; are adequately known; are rare but not threatened or meet the criteria for near threatened.

Table 7. Categories of Threatened Ecological Communities utilised by the Department of Environment and Conservation (DEC 2007)

Code	Category
PD	Presumed Totally Destroyed An ecological community that has been adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure in the foreseeable future.
CR	Critically Endangered An ecological community that has been adequately surveyed and found to have been subject to a

Code	Category
	major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated. Generally it has been found to be facing an extremely high risk of total destruction in the immediate future.
EN	Endangered An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future. An ecological community will be listed as Endangered when it has been adequately surveyed and is not Critically Endangered but is facing a very high risk of total destruction in the near future.
VU	Vulnerable An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range. An ecological community is considered Vulnerable when it is facing a high risk of total destruction or significant modification in the medium to long-term future

No Threatened Ecological Communities or Priority Ecological Communities were recorded within the site, and as such require no specific consideration with regard to retention or management.

2.1.3 **Bush Forever**

The Government of Western Australia's Bush Forever Policy is a strategic plan for conserving regionally significant bushland within the Swan Coastal Plain portion of the Perth Metropolitan Region. The overarching objective of Bush Forever is to protect comprehensive representations of all original ecological communities by targeting a minimum of 10% of each vegetation complex for protection (Government of Western Australia, 2000). Bush Forever (BF) sites are representative of regional ecosystems and habitat and have a key role in the conservation of Perth's biodiversity (Government of Western Australia, 2000).

No BF sites are located within the Wellard East Cell. BF Site 349 is located approximately 800 metres to the west of the Wellard East Cell and is separated from the site by the Kwinana Freeway. Two other sites, BF Site 70 and BF Site 360, are located a further three kilometres east of the site, separated from the site by extensive areas used for agricultural purposes.

2.1.4 **Wetlands**

The *Environmental Protection (Swan Coastal Lakes) Policy 1992* (EPP Lakes) protects the environmental values of selected lake wetlands on the Swan Coastal Plain. Two wetlands within the Wellard East Cell and outlined below within **Table 8** are identified under EPP Lakes.

The Department of Environment Regulation also maintains the *Geomorphic Wetlands of the Swan Coastal Plain* database, which identifies wetland areas and categorises individual wetlands into specific management categories, as outlined in **Table 8** (DEC 2012). The significance of each wetland is based on hydrological, biological and human use features, which are the key components for the classification of management categories.

Table 8. Geomorphic Wetlands of the Swan Coastal Plain management categories (DEC 2012)

Management category	General Description	management objectives
Conservation (CCW)	Wetlands which support a high level of attributes and functions.	Highest priority wetlands. Objective is to preserve and protect the existing conservation values of the wetlands through various mechanisms including: <ul style="list-style-type: none"> ▪ Reservation in national parks, crown reserves and State owned land ▪ Protection under Environmental Protection Policies ▪ Wetland covenanting by landowners. No development or clearing is considered

Management category	General Description	management objectives
		appropriate. These are the most valuable wetlands and any activity that may lead to further loss or degradation is inappropriate.
Resource Enhancement (REW)	Wetlands which may be partially modified but still support substantial ecological attributes and functions.	Priority wetlands. Ultimate objective is to manage, restore and protect towards improving their conservation value. These wetlands have the potential to be restored to Conservation category. This can be achieved by restoring wetland function, structure and biodiversity. Protection is recommended through a number of mechanisms such as crown reserves, state or local government owned land, environmental protection policies and sustainable management on private properties.
Multiple Use (MUW)	Wetlands with few remaining important attributes but still provide important hydrological functions	Use, development and management should be considered in the context of ecologically sustainable development and best management practice catchment planning through land care.

The *Geomorphic Wetlands of the Swan Coastal Plain* dataset (DEC 2011b) indicates that there are seven wetlands mapped as part of the dataset within the Wellard East Cell. The location of these wetlands is presented in **Figure 10** and detailed within **Table 9** below.

Table 9. Wetland areas within the Wellard East Cell

UFI Number	Wetland Type	management Category	EPP Lakes
6672	Sumpland	Resource Enhancement	Yes
12918	Dampland	Conservation	Yes
12919	Dampland	Resource Enhancement	No
12921	Dampland	Multiple Use	No
15798	Sumpland	Multiple Use	No
15799	Sumpland	Multiple Use	No
15801	Sumpland	Resource Enhancement	No

Within the Wellard East Cell, the Conservation Category Wetland and Resource Enhancement Wetlands outlined in **Table 9** and **Figure 10** have been retained in their entirety, with appropriate buffers provided between the proposed development and these wetland values. A Wetland Management Plan (Cardno 2012) has been approved by the Department of Environment Regulation and City of Kwinana for the Conservation Category Wetland and Resource Enhancement Wetlands located within the northern portion of the Wellard East Cell.

Based on the *Geomorphic Wetlands of the Swan Coastal Plain* mapping, a Multiple Use Wetland occurs over the majority of the site and is shown in **Figure 10**. There are limited ecological values associated with the MUW areas within the site as these areas have been historically cleared.

Multiple Use Wetland areas are afforded no statutory and limited policy protection by the Environmental Protection Authority and the Department of Environment and Regulation. The prevailing policy framework focuses on ensuring that all reasonable measures are made to retain the wetlands hydrological and other wetland functions, primarily through the urban water management framework. The LSP has considered the Multiple Use Wetland within the site and the associated existing drainage lines and they are proposed to be retained and managed within a multiple use corridor and areas of public open space.

2.1.5 Environmentally Sensitive Areas

Environmentally Sensitive Areas (ESAs) are areas prescribed under the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*, and occur over areas of vegetation that are considered to contain high conservation values, or to protect the native vegetation values of areas surrounding significant,

threatened or scheduled ecosystems or communities. For any area that is situated within an ESA, none of the exemptions pursuant to the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* apply.

An ESA is located in the north-eastern portion of the Wellard East Cell and is associated with the Conservation Category Wetland. The values associated with the Conservation Category Wetland are protected through the application of a suitable buffer and implementation of the Wetland Management Plan (Cardno 2012).

No ESAs are identified within the site, and as such do not require specific consideration within the LSP.

2.1.6 **Biodiversity Linkages**

Biodiversity or ecological linkages can be described as any area of native vegetation that provides a corridor or linkage between larger patches of vegetation to allow movement of flora and fauna and their genetic material through the landscape, and can prevent the isolation of flora and fauna. Biodiversity linkages can either be continuous or near continuous, with the more fractured the linkage, the less efficient the movement of flora and fauna along that corridor (Government of Western Australia 2000).

Regional linkages have been designated by the State Government in Bush Forever, Perth's Greenways and the System 6 study and are supported by the Western Australian Local Government's (WALGA) Perth Biodiversity Project (PBP). The linkages aim to conserve and enhance regional biological linkages and reflect the on-ground linkages throughout the Perth Metropolitan area.

Biodiversity linkage No. 75 encompasses the central portion of the site, as shown in **Figure 10**. This linkage runs east-west across the site and links with Bush Forever (BF) Site 349 in the west and BF Sites 360 and 70 in the east.

The proposed biodiversity linkage has been accommodated within the Local Structure Plan by the provision and placement of public open space which aligns with the drainage corridors adjacent to the site.

2.1.7 **Fauna**

The conservation status of fauna species in Western Australia is assessed under the WC Act, which utilises a set of schedules described in **Table 10**. In addition to this, the Department of Parks and Wildlife also produces a list of priority species, which while not considered threatened under the WC Act, there is concern over their long-term survival. These categories are outlined below in **Table 11**.

As well as those species protected under the WC Act, the Federal government also maintains a list of protected species under the EPBC Act.

Table 10. Categories of Department of Parks and Wildlife threatened fauna

Category	Code	Description
Schedule 1	S1	Fauna which is rare or likely to become extinct
Schedule 2	S2	Fauna which is presumed extinct
Schedule 3	S3	Birds which are subject to an international agreement between the governments of Australia and other countries relating to the protection of migratory birds and birds in danger of extinction
Schedule 4	S4	Fauna that is otherwise in need of special protection

Table 11. Department of Parks and Wildlife priority fauna categories

Category	Code	Description
Priority 1	P1	Taxa with few, poorly known populations on threatened lands.
Priority 2	P2	Taxa with few, poorly known populations on conservation lands.
Priority 3	P3	Taxa with several, poorly known populations, some on conservation lands.
Priority 4	P4	Taxa in need of monitoring (Not currently threatened or in need of special protection but could be if present circumstances change) .
Priority 5	P5	Taxa in need of monitoring (Not considered threatened but are subject to specific

Category	Code	Description
		conservation program, the cessation of which would result in the species becoming threatened within five years).

To assess the potential for the site to contain specifically protected fauna species, searches of the Department of Parks and Wildlife *NatureMap Database* and the Department of the Environment (Federal) *Protected Matters Search Tool* were undertaken by Greg Harewood (Zoologist), in addition to a review of various fauna surveys undertaken in nearby areas. The searches of databases and review of various previous surveys indicated that a number of species of conservation significance may potentially occur within or use the site, and have been listed in **Table 12** below. Within **Table 12**, the likelihood of the species occurring within the site and potential impact from the proposed development have also been considered.

Table 12. Significant fauna species occurring or potentially occurring within the site

Species Common name	Scientific name	Conservation Code		Likelihood of occurrence and/or possible impacts
		Federal	State (WA)	
BIRDS				
Painted snipe	<i>Rostratula benghalensis</i>	Endangered, Migratory	Schedule 1, Schedule 3	Unlikely, no habitat present.
Carnaby's black cockatoo	<i>Calyptorhynchus latirostris</i>	Endangered	Schedule 1	Present. Loss/modification of some areas of natural habitat, no significant impact likely.
Forest red-tailed black cockatoo	<i>Calyptorhynchus banksii naso</i>	Vulnerable	Schedule 1	Present. Loss/modification of some areas of natural habitat, no significant impact likely.
Baudin's black cockatoo	<i>Calyptorhynchus baudinii</i>	Vulnerable	Schedule 1	Unlikely, no habitat present.
Malleefowl	<i>Leipoa ocellata</i>	Vulnerable, Migratory	Schedule 1	Unlikely, species locally extent.
Fairy tern (Australia)	<i>Sternula nereis nereis</i>	Vulnerable	-	Unlikely, no habitat present.
Rainbow bee-eater	<i>Merops ornatus</i>	Migratory	Schedule 3	Present. Loss/modification of some areas of man-made and natural habitat, no significant impact likely.
Cattle egret	<i>Ardea ibis</i>	Migratory	Schedule 3	Possible. Loss/modification of areas of very marginal habitat, no significant impact likely.
Great egret	<i>Ardea alba</i>	Migratory	Schedule 3	Possible. Loss/modification of areas of very marginal habitat, no significant impact likely.
Fork-tailed swift	<i>Apus pacificus</i>	Migratory	Schedule 3	Unlikely, flyover only.
White-bellied sea-eagle	<i>Haliaeetus leucogaster</i>	Migratory	Schedule 3	Unlikely, no habitat present.
Glossy ibis	<i>Plegadis falcinellus</i>	Migratory	-	Unlikely, no habitat present.
Osprey	<i>Pandion haliaetus</i>	Migratory	-	Unlikely, no habitat present.
Peregrine falcon	<i>Falco peregrinus</i>	-	Schedule 4	Possible. Loss/modification of small areas of degraded natural habitat, no significant impact likely.
Little Bittern	<i>Ixobrychus minutus</i>	-	Priority 4	Unlikely, no habitat present.
Bush Stone Curlew	<i>Burhinus grallarius</i>	-	Priority 4	Unlikely, no habitat present.
Hooded Plover	<i>Charadrius rubricollis</i>	-	Priority 4	Unlikely, no habitat present.
INSECTS/INVERTEBRATES				
Graceful Sun-Moth	<i>Synemon gratiosa</i>	-	Priority 4	Unlikely, no habitat present.
MAMMALS AND MARSUPIALS				
Chuditch	<i>Dasyurus geoffroii</i>	Vulnerable	Schedule 1	Unlikely, no habitat present.
Western Ringtail Possum	<i>Pseudocheirus occidentalis</i>	Vulnerable	Schedule 1	Unlikely, no habitat present.
Quokka	<i>Setonix brachyurus</i>	Vulnerable	Schedule 1	Unlikely, no habitat present.
Southern brush-tailed Phascogale	<i>Phascogale tapoatafa</i>	-	Priority 3	Unlikely, no habitat present.
Southern brown bandicoot (Quenda)	<i>Isodon obesulis fusciventer</i>	-	Priority 5	Present. Loss/modification of small areas of marginal natural habitat, no significant impact likely.
Western Brush Wallaby	<i>Macropus Irma</i>	-	Priority 4	Unlikely, no habitat present.
Western False	<i>Falsistrellus</i>	-	Priority 4	Unlikely, no habitat present.

Species		Conservation Code		Likelihood of occurrence and/or possible impacts
Common name	Scientific name	Federal	State (WA)	
Pipistrelle	<i>mackenziei</i>			
REPTILES AND RODENTS				
Southern carpet python	<i>Morelia spilota imbricata</i>	-	Schedule 4	Unlikely, no habitat present.
Perth lined lerista	<i>Lerista lineata</i>	-	Priority 3	Possible. Loss/modification of areas of very marginal habitat, no significant impact likely.
Black-striped snake	<i>Neelaps calonotos</i>	-	Priority 3	Unlikely, habitat not present.
Water rat	<i>Hydromys chrysogaster</i>	-	Priority 4	Unlikely, no habitat present.

A level 1 fauna assessment was undertaken within the site by Greg Harewood in March 2014 and has been provided in **Appendix J**. The fauna assessment identified five fauna habitats, which were based predominantly on the plant communities and soils and landform identified within the site:

- > Low lying woodland-forest (medium height) of *Eucalyptus rudis* – *Melaleuca preissiana* over *Kunzea glabrescens* - *Pultenaea reticulata* over *Dielsia stenostachya* - *Opercularia hispidula* – **Zantedeschia aethiopica* on grey sandy loam. This area is approximately 1.1 ha in extent.
- > Low upland woodland (>10m) of *Corymbia calophylla* – *Eucalyptus marginata* over *Agonis flexuosa* – *Casuarina obesa* – *Banksia menziesii* – *Banksia grandis* over *Eremaea pauciflora* – *Calothamnus quadrifidus* over *Conostylis aculeata* – *Kennedia prostrata* – **Ehrharta longiflora* – **Lolium rigidum* – **Carpobrotus edulis* on grey sand. This area is approximately 1.5 ha in extent.
- > Tall Scrub (to 10m) of *Kunzea glabrescens* – *Melaleuca teretifolia* over pasture grasses and **Carpobrotus edulis* on grey sand. Some emergent *Eucalyptus gomphocephala* and non-endemic eucalypts. This area is approximately 2.3 ha in extent.
- > Open woodland of *Eucalyptus rudis* – *Melaleuca preissiana* over pasture grasses/weeds on grey sandy loam. Seasonally inundated/waterlogged. This area is approximately 0.5 ha in extent.
- > Planted endemic and non-endemic trees and shrubs over pasture grasses/weeds on grey sand. This area is approximately 0.9 ha in extent.
- > Cleared (open grassland, bare sand) with scattered trees. This area is approximately 10.3 ha in extent.

Overall, the fauna assessment identified the majority of the site as being cleared of native vegetation, and/or that the areas containing remnant native vegetation were highly degraded and as a result direct impacts on fauna, particularly the species identified in **Table 12**, or fauna habitat are likely to be minimal/negligible. Therefore, no significant impact on any fauna species is considered likely as a result of the proposed development.

As part of the fauna assessment, a black cockatoo habitat assessment was also undertaken within the site. The assessment identified potential breeding and foraging habitat for the two black cockatoo species identified as potentially occurring within the site. No evidence of historic or current use of the site for breeding was observed, and foraging evidence by the black cockatoos was limited to one example. The assessment largely indicates that the potential foraging habitat within the site is low-value (being limited in extent and poor-quality), while breeding is unlikely to occur within the site as there is limited breeding habitat and it is outside documented breeding areas. It is therefore unlikely that any impacts on the foraging and potential breeding habitat from the proposed development would be considered a significant impact.

Broadly within the Wellard East Cell, the areas that support the majority of habitat values, namely the Conservation Category Wetland and Resource Enhancement Wetlands and associated remnant vegetation have been retained as either public open space or conservation areas. Remnant vegetation located within the drainage reserves and southern portion of Lot 9001 will be retained where possible.

2.2 Landform, Soils and Topography

2.2.1 Topography

Topographical contours indicate that the Wellard East Cell is generally flat to gently undulating. The northern portion of the cell has a largely eastern aspect while the southern portion of the cell generally has a south-westerly aspect. The cell ranges in elevation from approximately 8 metres Australian Height Datum (mAHD) at the lowest elevated area in the south-west, up to approximately 16mAHD through the south-central portion. The areas of lowest relief in the cell generally coincide with areas of wetlands and/or drains.

The topography of the site is gently undulating, with a generally south-westerly aspect. The site ranges from 8mAHD through the central portion of the site (and coincides with an agricultural drain) to 16mAHD in the north-east portion of the site, as shown in **Figure 11**.

2.2.2 Landforms and Soil

The site is located on the Swan Coastal Plain and is composed of two wide belts of sediment that differ in origin, with one formed from alluvial deposits (water-laid) and the other formed from aeolian origins (wind-laid). It is approximately 20 to 30 kilometres wide, consisting of a series of geomorphic entities that run parallel to the coastline with the alluvial deposits in the east and the aeolian deposits in the west. The site is located within the Bassendean Dune System, which is described as low relief, leached grey, siliceous Pleistocene sand dunes with well drained grey sands intervening sandy and clayey swamps and gently undulating plains. These sands are mostly leached, infertile and generally contain little silt or clay and very low levels of nutrient elements.

The Perth Metropolitan Region 1: 50,000 Environmental Geology Series, Rockingham (Part Sheets 2033 II and 2033 III) (Gozzard 1983) shows the site is comprised of "Sand", S₈ and S₁₀, and indicates that the site is capable of development for urban purposes. This is in line with the information detailed in previous geotechnical surveys of the Wellard East Cell. The general descriptions of these are provided in **Table 13** below.

Table 13. Soil units found on site

Map Unit	Description	Geological Unit
S8	Sand – very light grey at surface, yellow at depth, fine to medium grained, sub rounded quartz, moderately well sorted and of eolian origin.	Bassendean Sand (Qpb)
S10	Sand – as S8 as relatively thin veneer over C2, M4 and Mc2	Thin Bassendean Sand over Guildford Formation (Qpb/Qpa)

Coffee Geotechnics carried out several site investigations within Sunrise Estate in 2008 and 2009. These geotechnical investigations covered both the subject site area and the previously approved Local Structure Plan area. The results of the investigations were summarised in their report dated 29 April 2009. This report identifies two areas within the subject site with distinct geotechnical characteristics: the area in the direct vicinity of the earth drain running southeast-northwest through Lot 379 (Zone B), and all other areas (Zone A).

All areas within the site are deemed suitable for residential development, subject to the construction of earthworks in accordance with recommendations made within the report. Lots within Zone A can achieve a Site Classification of 'A', subject to the removal of topsoil and subsequent proof compaction. Lots within Zone B can achieve a Site Classification of 'S', subject to approximately 1m of unsuitable material being excavated and removed from the surface, followed by proof compaction.

2.3 Acid Sulfate Soils

Acid Sulfate Soils (ASS) is the name commonly given to naturally occurring soils and sediment containing iron sulphide (iron pyrite) materials. In their natural state ASS are generally present in waterlogged anoxic conditions and do not present any risk to the environment. ASS can present issues when oxidised, producing sulphuric acid, which can impart a range of impacts on the surrounding environment, infrastructure and human health.

A desktop survey indicates that the site has been classified as predominantly having a 'moderate to low' risk of ASS occurring within three metres of the natural soil surface, as shown in **Figure 12**. A preliminary ASS site investigation undertaken by Cardno (2009) (refer to **Appendix C**) determined that the soil conditions were generally slightly acidic, however disturbance of soil above the water table was unlikely to result in ASS related impacts.

Within the Local Structure Plan, no spatial response has been provided or is required for the potential presence of ASS. In line with the Preliminary ASS investigation (Cardno 2008) and Department of Environment Regulation guidelines *Identification and investigation of acid sulfate soils and acidic landscapes* (DEC 2009b), ASS is considered to only be potentially disturbed in those areas where excavation occurs below the natural water table. If required, further detailed ASS investigations will be undertaken as a part of the subdivision process and may be associated with areas where excavation occurs below the natural water table (i.e. for the installation of services such as sewerage). A detailed investigation was undertaken in 2011 for the extension of the main sewer along the southern portion of Lot 9001 to service the approved LSP area. A copy of this report, which was approved by the Department of Environment Regulation in October 2011, can be provided to council if required.

2.4 Groundwater and Surface Water

2.4.1 Groundwater

The groundwater underlying the Wellard East Cell ranges between approximately 13mAHD in the north to approximately 4mAHD in the south, at its lowest level in the seasonal cycle (Cardno 2009). This corresponds to a depth to groundwater ranging from approximately 12 metres below ground surface (mBGS) in the north-west to approximately 6mBGS in the south-east. These contours indicate a groundwater flow direction from south to south-east.

Within the site, groundwater is approximately 9mAHD in the north and 7mAHD in the south, flowing in a south to south-east direction.

Both the groundwater levels and quality within the site will be maintained and managed in accordance with an approved Urban Water Management Plan, to be prepared as a part of future subdivision of the site. An addendum to the Local Water Management Strategy has been prepared in support of the LSP. The requirements of this strategy are further discussed in **Section 3.5** and **Appendix E**.

2.4.2 Surface Water

The Wellard East Cell is situated within the Serpentine River Catchment, which forms part of the Peel-Harvey Drainage Catchment. The cell contains three drains that were historically developed to support agricultural activities within the area, Peel Sub N Drain, Peel Sub N1 Drain and Peel Sub N2 Drain (Cardno 2011a).

As detailed in previous studies of the Wellard East Cell, surface water monitoring was undertaken as part of a three year monitoring program, which determined that there is minimal surface runoff within the cell. This is likely due to the high permeability of the sandy soils and observations made during and following rainfall events (Cardno 2009). The surface water flow observed within the various drains within the cell is generally considered to be an expression of groundwater.

A drain is located adjacent to the central portion of the site. This drain is also located adjacent to the north-eastern boundary of the site. The local structure plan retains the function of the drains through the provision of a multiple use corridor and public open space. An addendum to the Local Water Management Strategy has been prepared in support of the LSP and outlines water quality objectives to be achieved as part of ongoing development of the site. The requirements of this strategy are further discussed in **Section 3.5** and **Appendix E**.

Water issues, including water supply and bore licenses are addressed in the LWMS Addendum in **Appendix E**.

2.5 Bushfire Hazard

A Fire Management Plan (FMP) has been prepared for Armana Holdings Pty Ltd by Bushfire Safety Consulting and Emerge Associates to support the LSP as per WAPCs *Planning for Bushfire Protection Guidelines Edition 2* (WAPC et al 2010) and WAPCs *Structure Plan Preparation Guidelines* (WAPC 2012). The FMP is provided in **Appendix K**. The FMP details the likely bushfire hazards associated with the site, both currently and in the long-term and outlines mitigations strategies to manage the associated risk.

All areas within 100m of the site boundary have been assessed for vegetation classification and bushfire hazard rating levels. Following implementation of the LSP, areas of remnant vegetation within the site will be cleared or where remnant vegetation is retained within the site, it will be landscaped and managed as maintained public reserves and parklands, and are therefore considered as low threat vegetation areas ("Low" bushfire hazard). The majority of the remnant vegetation outside of the site is likely to remain in the short to long term, and as a result will pose differing levels of bushfire hazard to development within the site. The extent of post-development classified vegetation that may pose a bushfire hazard to the site is restricted to the following main areas:

- > Closed scrub situated in the freeway road reserve, adjacent to the northwest boundary of the site. This vegetation is likely to pose a permanent hazard consideration.
- > Open forest, woodland and open and closed scrub to the west, east and north-east of the site. This vegetation is located in areas intended for future urban development in accordance with the Wellard East Concept Plan and therefore poses only temporary bushfire hazard considerations.
- > Woodland and open scrub to the east of the site. A portion of this vegetation is likely to pose a permanent hazard consideration which is associated with a resource enhancement wetland. The remainder of this vegetation is located in areas intended for future urban development in accordance with the Wellard East Concept Plan and therefore poses only temporary bushfire hazard considerations.
- > Woodland over a managed understorey to the south of the site, within the Millar Road and the adjacent railway reserve. This vegetation is likely to pose permanent hazard considerations.

The FMP determined that all proposed future dwellings resulting from the LSP will fall within the acceptable level of risk as per *Planning for Bushfire Protection Guidelines* (WAPC et al 2010). The temporary and permanent Building Protection Zones (BPZ) requirements have been assessed and can be accommodated within the LSP. An indicative Bushfire Attack Levels (BALs) assessment was completed as part of the FMP and indicates that the indicative BAL for proposed future lots does not exceed BAL-29. The indicative BAL assessment is considered to be conservative as it does not include consideration of the shielding of dwellings from radiant heat flux by the required acoustic wall (to be located between the site and vegetation within the Kwinana Freeway). Detailed engineering and planning design, to be undertaken as part of the subdivision process, is required before this assessment can be completed, however a preliminary shielding assessment suggests that the BAL for the dwellings adjacent to the Kwinana Freeway will be reduced.

Access and egress from and within the site will adequately service the development. Reticulated water will be available within the site and hydrants will be spaced according to Department of Fire and Emergency Services and Water Corporation standards.

Any new dwellings constructed within 100m of identified classified vegetation will require consideration of the potential need for increased construction requirements to address *AS3959 Construction of Buildings in Bushfire Prone Areas*. In order to pre-empt this requirement, a BAL assessment will be undertaken as part of the subdivision process to determine the BAL ratings for each individual new lot created. A detailed and specific BAL assessment will need to be completed at the subdivision approval stage for all lots currently determined to be within "Bushfire Prone Areas", as outlined within the FMP (refer to **Appendix K**). As part of the subdivision process, any lots deemed to require fire management responses through the BAL assessment will be subject to a notification pursuant to section 70A of the *Transfer of Land Act 1893* placed on the certificate(s) of title indicating that the lot is subject to the requirements of a fire management plan (ie. increased construction standards to meet increased BAL ratings).

It is expected that the final BAL rating assessment at the subdivision stage, in accordance with this FMP, will reduce the threat to future residents, visitors and fire fighters in the areas proposed for urban development associated with this FMP.

2.6 Heritage

2.6.1 Indigenous Heritage

Based on the *Cultural Heritage Due Diligence Guidelines* (DIA 2013), there is a low to moderate risk of Aboriginal heritage sites being disturbed within the Wellard East Cell. The majority of the cell has been subject to ethnographic and archaeological investigations of different extents since 1970, with the most recent being in 1996 to support the extension of the Kwinana Freeway.

A search of the Department of Aboriginal Affairs *Aboriginal Heritage Inquiry System* and associated mapping indicates that no indigenous heritage sites are identified within the site.

While no Aboriginal heritage sites have been identified within the site, it is acknowledged that there is the potential that Aboriginal heritage sites may be found during civil and construction works. It is recognised that if during construction Aboriginal artefacts or sites are uncovered, that these are protected under the *Aboriginal Heritage Act 1972* and that works will need to cease and suitably qualified experts will be brought in to survey the potential site, and if required permission under the *Aboriginal Heritage Act 1972* to manage and disturb sites will be sought.

2.6.2 Non-Indigenous Heritage

A desktop survey undertaken by Emerge indicated that there are no European heritage sites present within the site. There are two listed sites west of the site, on the western side of the Kwinana Freeway. These sites are in reference to the site of the former Wellard Hospital, which was the first medical facility in the area circa 1926, and the site of the house built in 1925 for the first attending physician, Dr Day-Lewis. The hospital was dismantled and relocated to Esperance in 1930.

In addition, a number of heritage sites are listed on the Municipal Heritage Inventory within the City of Kwinana, predominantly to the west of the Kwinana Freeway. The closest is Bollard Bullrush Swamp which is located approximately 500 metres west of the Wellard East Cell, on the western side of the Kwinana Freeway.

No non-indigenous heritage values will be impacted by the Local Structure Plan.

2.7 Context and Other Land Use Constraints

Historical aerial photography indicates that the Wellard East Cell was likely to have been historically used for grazing/agricultural purposes in accordance with the previous Rural Zone and consistent with land use in the wider area. The site has been predominantly cleared since at least 1953, with some regrowth of vegetation in more recent years.

Figure 14 shows the site within the context of the Wellard East Cell and the existing aerial photography and road network. Various constraints and features such as the wetlands, Western Power infrastructure, Mundijong freight line and drainage reserves are shown over the site and Cell. This plan shows there are no major constraints affecting the proposed residential development of the site. Also where there are constraints located nearby, such as the Freeway and the Mundijong freight line, these have been considered as part of the structure plan design and documentation through the preparation of a noise assessment.

2.8 Potential Site Contamination

Broadly, the State Government, through the Department of Environment and Regulation, has the overall responsibility for developing, administering and enforcing the *Contaminated Sites Act 2003* and its associated procedures. Part of this responsibility includes maintenance of the Contaminated Sites Database and Register. The Contaminated Sites Database holds information on known contaminated sites within Western Australia. A search of this database indicated that the site was not listed.

A preliminary site investigation (Cardno 2011) has been undertaken for portions of the Wellard East Cell, with the site specifically considered as part of this investigation. Historically the central portion of Lot 9001 (previously Lot 201), which is located to the north of the site, was identified as containing a former market garden. Based on this, all of Lot 9001 and lots already subdivided (including the portion within the site) was subject to a detailed site investigation, in accordance with Department of Environment and Regulation guidelines. This investigation found that apart from the former market garden, which is located north of the site, the majority of Lot 9001 has only been used for grazing or agricultural-based activities.

The investigations to date indicate that the site has only been used for grazing and agricultural-based activities which are generally not identified by the Department of Environment and Regulation as potentially contaminating land uses. Therefore contamination is not expected to be an issue within the site and the overall risk of contamination being present is therefore considered to be low.

2.9 Adjacent Land Uses

Within the vicinity of the Wellard East Cell, there are a number of different land uses which, based on *Environmental Protection Authority Guidance Statement No. 3 – Separation distances between industrial and sensitive land uses* (EPA 2005), are considered to potentially generate emissions that at times may exceed amenity levels considered acceptable to residential areas and other sensitive land uses. These land uses are shown in **Figure 13** and include:

- > Livestock Holding Facility.
- > Kwinana Freeway.
- > Mundijong freight line.
- > Power boat facility.
- > *Environmental Protection (Kwinana) (Atmosphere Wastes) Policy 1999* boundary.
- > *State Planning Policy (SPP) No. 2.4 Basic Raw Materials*
 - Sand 'Extraction Area' within the central portion of the Wellard East Cell.
 - Clay 'Priority Resource Area' directly south of the Wellard East Cell.

These land uses and associated management are discussed further below.

2.9.1 Livestock Holding Facility

A livestock holding facility is located on part of Lot 732 Telephone Lane, Baldivis, 300 metres south-east of the Wellard East Cell, and approximately one kilometre from the site. The livestock holding facility is licensed under Part V of the *Environmental Protection Act 1986*, to operate as a 'livestock saleyard or holding pen'. Under the associated regulations, a 'livestock saleyard or holding pen' is defined as a premise on which live animals are held pending their sale, shipment or slaughter. This facility is owned, licensed and operated by Wellard Rural Exports Pty Ltd.

Environmental Protection Authority Guidance Statement No. 3 – Separation distances between industrial and sensitive land uses (GS3) (EPA 2005) provides generic separation distances for a range of land uses that could cause noise, dust, odour, gaseous and/or particulate emissions which may affect the amenity of people and the environment, which are referred to as 'sensitive land uses'. Livestock holding facilities are recognised by the Department of Environment Regulation and Environmental Protection Authority as potentially resulting in noise, dust and odour emissions that may exceed the amenity levels considered acceptable in residential areas. According to *Environmental Protection Authority Guidance Statement No. 3 – Separation distances between industrial and sensitive land uses* (EPA 2005), the recommended separation distance for such land uses, depending on the size of the facility, is 1 000 metres from the boundary of the facility.

The WAPC, in its determination of the application for the lifting of urban deferment over the northern portion of the Wellard East Cell in 2009 supported the measurement of the 1000 metre separation distance from the livestock holding sheds based on the applicant's arguments, which included the claim that the sheds were the primary source of odour.

In its consideration of the adjoining LSP to the west (*Lot 90 and Part Lot 378 Millar Road LSP*) in 2013 the City assessed the advice from the then Department of Environment and Conservation (DEC) regarding the methodology to be used in determining an odour buffer for the facility and recommended that the WAPC place a notification on title alerting the landowner to the possibility of odour impacts in the area.

Consistent with its recommendation for the adjoining LSP, the WAPC has adopted the LSP subject to the requirement for a notification on the title of lots pursuant to Section 70A of the *Transfer of Land Act 1893* notifying of potential adverse impacts associated with odour emissions from the livestock holding facility.

2.9.2 Power Boat Facility

A power boat facility, commonly known as Bonney's Water Ski Park, is located approximately one kilometre south-east of the site, within the City of Rockingham and has operated in the local area since 1985. The facility caters for a wide range of water-related activities including water skiing and jet boat racing, operating most days of the week. Jet boat racing events generally occur from October to April, with evening events generally running until 2100 hours on weekends.

It is our understanding that based on previous investigations undertaken by the City of Kwinana and City of Rockingham and the presence of a range of residences within the vicinity of the power boat facility (in closer proximity to the power boat facility than the Wellard East Cell), any potential noise impacts on future residents within the site will be managed by the facility's operator and in accordance with an approved Noise Management Plan and the *Environmental Protection (Noise) Regulations 1997*. On the 29th January, 2011 the City of Rockingham undertook noise readings of the Water Ski Park. According to a City of Rockingham Council report, a number of noise readings were obtained from a variety of locations. The majority of the readings conducted on this day complied with the assigned noise levels under the *Environmental Protection (Noise) Regulations 1997*. There were some exceedances noted during the noise readings, which appear to be attributed to individual boats. The City of Rockingham Health Services gave an undertaking to continue liaising with the Water Ski Park to further improve the site's operations. This outcome facilitated the lifting of the Urban Deferred Zone over the site.

Notwithstanding the proposed amendments to the *Environmental Protection (Noise) Regulations 1997*, under which motor sports may be able to exceed the limits outlined in the regulations, it is understood that the Water Ski Park will still need to operate under a noise management plan that has been approved by the City of Rockingham and Chief Executive Officer of the Department of Environment Regulation. Whilst it is recognised that the power boat facility has the potential to result in noise impacts, a number of dwellings are already located closer to the power boat facility than the Wellard East Cell, noise impacts should be managed by the facility in accordance with the *Environmental Protection (Noise) Regulations 1997*. The regulations set assigned noise levels for noise emitted on premises or public places, and provide for a level of amenity for a receiver.

2.9.3 Kwinana Freeway

The Kwinana Freeway is located directly adjacent to the western boundary of the Wellard East Cell and the north-western boundary of the site.

The potential noise impacts from the Kwinana Freeway have been considered in the context of the *State Planning Policy 5.4 Road and Rail Transport Noise and Freight Considerations in Land Use Planning* (WAPC 2009). A noise assessment has been completed for the site in accordance with this policy and indicates that there is likely to be noise impacts from the Kwinana Freeway along the north-western boundary of the site (Lloyd George Acoustics 2013) (refer to **Appendix H**). The findings of this assessment indicate that noise impacts from the Kwinana Freeway can be managed through:

- > A 3.0m high noise wall along the western boundary of the site, adjacent to the Kwinana Freeway; and
- > Architectural treatments (predominantly Package A) for the first row of houses adjacent to the Kwinana Freeway. The indicative architectural treatments are shown within Figure 5.3 of **Appendix H**.

The 3.0m high noise wall will be located adjacent to the noise wall proposed within the LSP to the west (i.e. Lot 90 and part Lot 378 Millar Road). Based on the noise assessments undertaken to date, the gap between

the two separate walls, created as a result of the drainage reserve, is unlikely to result in noise amelioration requirements in addition to those outlined above.

It is important to note that the exact noise amelioration measures will be determined when detailed engineering and planning has been completed for the site (ie. when final lot levels and layout have been determined). A detailed noise assessment will be prepared as a condition of subdivision approval, which will detail the specific height of the noise wall and any architectural treatments that may be required.

2.9.4 Mundijong Freight Line

The Mundijong freight line runs along the southern boundary of the site, with only a small portion of the site located directly adjacent to the freight line. It is described as one of the most heavily used (in terms of tonnage) freight movement corridors in Western Australia.

The potential noise impacts from the freight line have been considered in the context of the *State Planning Policy 5.4 Road and Rail Transport Noise and Freight Considerations in Land Use Planning* (WAPC 2009). A noise assessment completed for the site (Lloyd George Acoustics 2013) (refer to **Appendix H**), indicates that there is the potential for noise impacts along the southern boundary of the site. Due to the configuration of the site and location of the Marsupial Rehabilitation Clinic, there are no future residential lots adjacent to the southern boundary of the site and as a result the Mundijong Freight Line will have less impact on the site than the LSP to the west (i.e. Lot 90 and part Lot 378 Millar Road). Based on the noise assessment, the predicted noise impacts can be managed with either:

- > 2.0m high barrier on the residential lot boundary; or
- > Architectural treatment (Package A) for the first row of houses.

It is important to note that the exact noise amelioration measures will be determined when detailed engineering and planning has been completed for the site (ie. when final lot levels and layout have been determined). A detailed noise assessment will be prepared as a condition of subdivision approval, which will detail the specific treatment and will be either a boundary fence or architectural treatment.

2.9.5 Environmental Protection (Kwinana) (Atmosphere Wastes) Policy 1999 Boundary

The Wellard East Cell, and specifically the site, is located within the Kwinana Atmosphere Policy Boundary where the provisions of the Environmental Protection Authority's *Environmental Protection (Kwinana) (Atmospheric Wastes) Policy 1999 (Kwinana Atmospheric Wastes EPP)* apply. The policy aims to set sulphur dioxide and total suspended particle standards and limits for the Kwinana Industrial Area. This policy describes three areas (A, B and C) each with ambient air quality standards and limits, increasing in stringency from Area A (industrial) through to Area C (largely residential).

The site is found within Area C and is provided a level of protection under this policy in line with land uses for residential and rural purposes. Since the *Kwinana Atmospheric Wastes EPP* was enacted in 1992, the 1-hour averages used to measure ambient air quality have not been exceeded (EPA 2009). It is highly unlikely that future residents within the site will be adversely affected by emissions as emission concentrations are required to remain within the levels prescribed in the *Kwinana Atmospheric Wastes EPP*.

Given the site is found within Area C and complies with the allowed land use under this policy, the requirements of this policy requires no specific consideration or management.

2.9.6 Basic Raw Materials

Basic raw materials are described as sand (including silica sand), clay, hard rock, limestone (including metallurgical limestone) and gravel and other construction and road building materials, which are generally important to land development. *State Planning Policy No. 2.4 Basic Raw Materials* provides for the protection of the basic raw materials, with the intention of this policy to ensure these resources can be fully utilised, through appropriate land uses and timeframes for development that may otherwise conflict with this intention.

Under *State Planning Policy 2.4 Basic Raw Materials* a number of basic raw materials are mapped as occurring within the vicinity of the site, and have been considered below:

- > Sand 'extraction area' within previous Lot 201 Mortimer Road, to the north of the site. This resource has been extracted as part of the development of this portion of the Wellard East Cell and is therefore not expected to impact future residents.
- > Clay 'priority resource area' located approximately 1 200 metres directly south-west of the site, as shown within recent mapping prepared by the Geological Survey of Western Australia (Strickland 2012) and within **Figure 13**. *Environmental Protection Authority Guidance Statement No. 3 – Separation distances between industrial and sensitive land uses* (EPA 2005) recommends a separation distance of 500 metres between clay extraction activities and sensitive land uses. The site is located outside of the recommended separation distance and it is considered that future residential development would not impede extraction of this resource.

The presence of these basic raw materials within the vicinity of the site is not expected to impact on the health or amenity of future residents, while future residents are unlikely to impede the future extraction of these resources.

3 Land Use and Subdivision Requirements

3.1 Proposed Land Use

A Concept Plan has been prepared for the Wellard East Cell to facilitate the co-ordinated development of the whole cell (refer to **Figure 15**). In addition, a statutory LSP plan has been prepared for the site and included in Part One of the Structure Plan (refer to **Plan 1**). This plan is consistent with the Wellard East Concept Plan. Future subdivision of the site will be in accordance with the statutory LSP.

The Concept Plan for the Wellard East Cell and the LSP are generally based on the previous LSP adopted for part Lots 201 and 27, the Jandakot Structure Plan and the Eastern Residential Intensification Concept (ERIC).

Both the JSP and ERIC recognise a linear urban form will result within the Wellard East Cell given the limited width of available land between the freeway and the rural wedge to the east.

The Cell is heavily constrained by the existence of four wetlands (Conservation Category and Resource Enhancement), two (2) drainage reserves traversing the developable area and the 110m wide Western Power 330kv easement. As recognised in ERIC, these constraints largely confine urban development to a linear configuration through the western and central sections of the cell as depicted in the Wellard East Concept Plan.

The design principles underpinning the Concept Plan and LSP are largely based on Liveable Neighbourhoods, and were guided by several influences. The LSP and Concept Plan design endeavours to:

- > Where possible maximise the proportion of lots with good solar orientation on the east-west axis to more easily facilitate solar passive housing designs;
- > form a modified grid structure to provide strong permeability throughout the development;
- > give appropriate consideration to the wetland and buffer areas by demarking the public realm and providing a management barrier;
- > clearly identify the north-south neighbourhood connector road that links the whole design together; and
- > locating the school centrally within the Cell.

Furthermore, the Wellard East Concept Plan offers a degree of flexibility to enable an innovative and creative response to any future unforeseen issues or needs that may arise. As such, the Concept Plan is intended to operate as a guiding framework for subdivision and development that can evolve and adapt over time, rather than function as a rigid and finalised design.

As previously mentioned, the Concept Plan has been prepared in accordance with the principles of Liveable Neighbourhoods including optimising land efficiency, providing lot diversity, and the integration of urban water management strategies.

The Concept Plan shows how the different land uses, POS and local roads integrate across different lots within the Cell. Generally the design for Lot 379 integrates with Lot 378 to the west with a number of road and public access way (PAW) (Pedestrian and Cyclist) linkages. It should be noted that the PAW linkage between the lots has been required by the Department of Planning/WAPC. The only minor exception to this is the area immediately south of the drainage reserve, where no road connection is proposed at this location (ie. between Lots 378 and 379). Armana Holdings has liaised with landowner of part Lot 378 and they have no objection to this proposal.

A 4.0ha primary school site is proposed to be located centrally within the Wellard East Cell, which is discussed in greater detail in **Section 3.6**.

The Concept Plan also makes reference to a 'marsupial rehabilitation clinic' situated at the southern end of the cell on Millar Road. Armana Holdings understands the significant contribution this facility makes to the wider community and the Concept Plan makes provision for the continuation of this land use.

Whilst no neighbourhood centre is shown on the LSP and Concept Plan, a local retail centre is proposed just to the north of the cell on Mortimer Road that will also service the Wellard East Cell. The projected population for the cell is relatively low due to wetlands and other constraints that reduce the developable land area. However, in response to the requirements of the City of Kwinana, a potential home store (maximum floorspace of 100m²) is shown on the Concept Plan opposite the primary school site. This will allow residents to purchase daily convenience goods within the cell and therefore reduce car reliance for daily retail needs.

The land use areas for the cell and LSP Area are provided in **Table 14**.

Table 14. Structure Plan Summary Table

Item	Data		Section number referenced within the Structure Plan report
	Wellard East Cell (Concept Plan)	LSP Area	
Total area covered by the concept plan and the local structure plan	170.3ha	16.67ha	1
Net land area covered by the concept plan and local structure plan (minus CCW wetland core, WP Easement, drainage reserves, school site, marsupial rehabilitation clinic, 1:1 year drainage basins where relevant)	129.9ha	13.29ha	
Area of each land use proposed:			3
<u>Zones</u>			
▪ Residential	60.22ha	8.25ha	
▪ Development – Marsupial rehabilitation clinic	1.08ha	Nil	
<u>Reserves</u>			
▪ Public Purposes - Primary school	4ha	3.17 ha	
▪ Parks and Recreation – Public Open Space	42.61ha	1.35ha	
Estimated lot yield	Approximately 1440	Approximately 203	3
Estimated number of dwellings	Approximately 1468	Approximately 208	3
Estimated residential density	R20 to R50 8.6 dwellings per gross hectare	R20 to R50 12.4 dwellings per gross site hectare	3.3
Dwellings per site hectare <i>As per Liveable Neighbourhoods</i>		15.3 dwellings per net site hectare	
Estimated population	3,816 (based on 2.6 persons per dwelling as per 2011 census data for Wellard West)	540.8 (based on 2.6 persons per dwelling as per 2011 census data for Wellard West)	3
Number of secondary schools	None	None	
Number of primary schools	One	A portion of one school	3
Public Open Space	11.5%	8.6%	3.2

3.2 Open Space

The public open space (POS) is presented on a plan and in schedules for the LSP Area and the cell in accordance with Liveable Neighbourhoods. The POS plan is shown on **Figure 16** and the schedules are

included in **Appendix I**. The POS provision for the LSP Area and the Wellard East Cell are 8.6% and 11.5%, respectively. It is important to note that overall table and Wellard East Concept Plan includes extensive areas of uncredited restricted POS (30 hectares), mainly comprising the wetlands and their buffers.

Whilst the POS area for the site is below the requirement of 10% (as specified in Liveable Neighbourhoods), the average percentage of POS provided over land owned by Armana Holdings is 11%, which satisfies the 10% POS requirement. The previously approved LSP area provided 13.9% credited public open space. It should be noted that two LSPs over Armana's landholdings were required as the land was subject to different Urban Deferred Lifting proposals, otherwise all of the land would have been developed under one LSP. The need for two LSPs should not prevent the addition of POS across all land owned by Armana Holdings.

POS areas shown over some parts of the cell are indicative as they are subject to more detailed urban design, environmental and drainage investigations and POS calculations. The size of the CCW and REW wetlands and buffers in the north-eastern and eastern portions of the cell may change and some drainage calculations included in the POS schedule are estimates only (ie. where no LWMS has been prepared).

The POS areas along the northern and eastern sides of the cell will have a major conservation function as it protects various Conservation Category and Resource Enhancement Wetlands. There is also a POS area in the north-east portion of the cell, which will comprise a senior oval for active POS. Many of the other smaller POS areas will be used for passive and informal active POS and drainage.

The allocation of Public Open Space (POS) has been based on the following principles:

- > Provision of useable portions of POS in each proposed urban area;
- > Linkage of POS networks;
- > Provision of POS within a walkable catchment of all urban development;
- > Retention of remnant vegetation in either multiple use corridors or parks where possible; and
- > Dual use of multiple use corridors as drainage swales and POS in certain locations.

The LSP and Concept Plan are consistent with the intent of Liveable Neighbourhoods as all lots are within 400 metres of POS.

Armana Holdings has prepared a detailed wetland management plan for the Conservation Category and Resource Enhancement Wetlands over their land in the northern part of the cell. It is anticipated that other landowners will prepare similar wetland management plans for the other REW wetlands and the balance of the CCW wetland.

A Landscape Masterplan is included in **Appendix G** which shows the different functions of each POS area within the site and previously approved LSP Area. There are three main POS areas within the site; POS Areas Q, X and BB (refer to **Figure 16**). Area Q (also identified as Area 14 on the Landscape Masterplan) is located adjacent to the Kwinana Freeway and has a total area of 5480m². The primary function of POS Area Q is to provide for passive recreation (inclusion of park furniture as identified on the Landscape Masterplan), retention of trees and provision of drainage. It is not appropriate for Area Q to provide an informal kick-about area as it is not centrally located within the subdivision. Instead POS Area X will perform this function.

It is intended that the design and treatments within POS Area X (also identified as Areas 16, 17, 18 and 19 on the Landscape Masterplan) will be consistent with adjoining POS areas along the drainage reserve (ie. POS Area W), where possible. POS Area X will provide an informal kick-about area where it widens out on the northern side of the drain. It provides sufficient land area (approximately 400m²) that satisfies Council's requirement for a 20m X 20m space. Also play equipment is proposed to be installed on the southern side of POS Area X. Flood storage areas for storm events up to the 100 year are proposed on both sides of POS Area X, however these areas will be shallow turfed depressions that will still permit passive recreation.

Whilst POS Area BB (also identified as Area 15 on the Landscape Masterplan) only encompasses 2126m², it is not an isolated POS parcel as it joins with POS Area DD on a separate lot and ultimately the POS Area will be much larger with a total area of 1.04ha. This situation commonly occurs when there is multiple land ownership, which is the basis for requiring an overall conceptual LSP design to show the integrated provision of POS across the whole Wellard East Cell. Whilst the landowner of Area DD may propose a slightly

different design they would need to have regard to the overall concept plan and the likely requirement for POS along the drainage reserve.

In addition to the various POS areas, active recreation areas will be located within the school site with a series of ovals, which may potentially be available to the public outside school hours. Liveable Neighbourhoods promotes the use of school ovals by the community outside school hours as it leads to the more efficient use of land and it allows schools to form part of the local community.

All POS areas within the cell will be ultimately managed by the City of Kwinana.

3.3 Residential

As outlined in ERIC, the expansion of this broader development corridor would be predominantly for residential purposes and the principal land use within the Wellard East Cell is low density residential (indicated as being R20 and R25 on ERIC). In accordance with ERIC, the majority of the Concept Plan and LSP propose a residential density range of R20-R25 (the higher code is shown on the LSP).

In line with Directions 2031 and Beyond, additional higher densities are shown within the Concept Plan and LSP, including medium density residential areas (nominally indicated as being R40). In addition, an area of R50 (medium density residential) is identified opposite POS to provide alternative housing choices (ie. single level attached housing and grouped dwellings) for smaller households.

The proposed residential densities are also generally consistent with the densities identified on the Wellard East LSP (conceptual component), which was adopted by the WAPC and Council in 2011.

The total dwelling yield estimated by the City of Kwinana for the whole Wellard East Cell is approximately 1468, however this will depend on the final size of wetlands and their buffers and the removal/reduction of the odour buffer.

Under Directions 2031 and Beyond the connected city scenario expects an improvement in the residential densities being achieved for new greenfield development on the urban front. At present, new residential development is being constructed at densities of approximately 10 dwelling units per gross urban zoned hectare. The connected city scenario has set a target of 15 dwellings per gross urban zoned hectare. Based on this target, the Wellard East Cell would need to deliver 2550 dwellings. However, this is not possible to achieve given the presence of the various wetlands and buffers and the odour buffer. In terms of the LSP area, 208 dwellings is projected over 13.58ha (school site has been subtracted from the LSP area), which equates to a density of 15.3 dwellings per hectare. This is just above the density recommended in Directions 2031 and Beyond.

Under Liveable Neighbourhoods the relevant dwelling target for the site is 12 to 20 dwellings per site hectare. The site achieves the target with a density of 15.3 dwellings per hectare.

3.4 Movement Networks

The latest Transport Assessment prepared by Shawmac is an update of the previous transport assessment, which was approved by the then Town of Kwinana as part of the previously adopted Local Structure Plan for Lots 27 and part Lot 201.

The site is located adjacent to Kwinana Freeway, which is the major north south route connecting the CBD to southern suburbs, Mandurah and the South-West, with an estimated traffic volume in the order of 39,000 vpd (vehicles per day). Mortimer Road to the north of the cell is a District Distributer (B) with direct freeway access from both directions, and currently carries approximately 2,300 vpd. To the south and east of the cell are Miller and Woolcoot Roads respectively, with daily volumes estimated at 2,600 vpd and 500 vpd respectively, based on 2006 counts and catchment observations.

No pedestrian or cyclist facilities are provided adjacent to the site, with the nearest facilities being the Principal Shared Path running adjacent to the western side of Kwinana Freeway.

The nearest public transport route is the Transperth 543 bus route through Bertram to the West of Kwinana Freeway, connecting to the Kwinana Station on the Perth – Mandurah Train Line (off Thomas Road).

Further details of the existing road and transport network are presented in Transport Assessment Report by Shawmac (refer to **Appendix D**).

3.4.1 Vehicular Access and Transport Assessment

The Transport Assessment (refer to **Appendix D**) was conducted primarily with respect to the proposed development of the site, and with reference to the remainder of the Wellard East Cell. The Report focused on the following key transport issues:

- > Local road capacity for additional traffic generated by the proposal to develop the lots within the site;
- > The extent that increased traffic loads can be safely managed on the adjacent current and future road networks;
- > The provision of safe access to the proposed development within the site;
- > Safe access to the school site; and
- > Safety and efficiency of the internal road network including adequate provision for pedestrians and cyclists, and provision for public transport.

The assessment involved modelling of increased traffic flows and the impact of the increased flows on existing and proposed roads and intersections. The assessment also provides recommendations on the intersection and road location and treatments required for upgrading of existing roads and design of proposed roads within the site.

Findings of the assessment are summarised below. For detailed findings refer to the Transport Assessment Report (refer to **Appendix D**).

The proposed internal road layout consists of a main north-south link road running through the Sunrise Estate between Mortimer Road and Millar Road. The remainder of the network is generally permeable with street design and layouts to reinforce the road hierarchy.

Access to the site will be provided from Mortimer Road to the north through the previously approved and partly constructed subdivision area of Sunrise Estate. Once the development front reaches Millar Road, access to the site will be provided from the north and south, via Mortimer Road and Millar Road. As access to the freeway is available only from Mortimer Road, the vast majority of external traffic accessing the site is predicted to remain from Mortimer Road. The intersection of Mortimer Road and the north-south road has previously been approved as part of the adopted LSP and the approved subdivision (now under construction).

Due to the much lower anticipated traffic loads at the entry to the estate via Millar Road, an unsignalised channelised "T" intersection with splitter islands on the east bound and south bound left turn approaches is deemed adequate. It is noted that the potential for a reduction in the speed limit along Millar Road from 80km/h to 60km/h would have an effect on geometric design considerations. This will need to be discussed with Main Roads at the time of detailed design.

The Transport Assessment finds that proposed internal road reservations are able to adequately manage predicted ultimate traffic flows based partly on Liveable Neighbourhood road categories and road reservations previously approved by Council (refer to **Appendix G** and **Figures 18** and **19**). **Figure 20** provides an indicative subdivision design for the laneway lots, demonstrating there is sufficient access and surveillance in this area. Truncations on corner lots have been increased to allow for maximum surveillance and service vehicle turning movements. Sufficient visitor parking for laneway lots is provided in adjacent 15m wide road reserves as shown on **Figure 20**. No visitor parking is proposed within the laneways.

The Report recommends the adoption of 'T' intersections as an alternative to four way intersections as they provide fewer conflict points and are inherently safer, although one internal 4 way intersection is proposed. This intersection will be treated by stop signs on both minor road legs in accordance with MRWA guidelines (refer to Figure 6 in the Transport Assessment Report). These recommendations have been incorporated into design where appropriate. It is also confirmed that based on the recommended road profile, direct lot access will be acceptable for all roads within the site, including the primary north-south road.

Pedestrian and cycle networks have been assessed within the Transport Assessment including dual use path (or path and cycle lanes), footpaths, shared road facilities and crossing facilities. Recommendations have been incorporated into the design, including the provision of footpaths on both sides of the road within 400m (walkable distance) of the primary school, the potential homestore and the proposed community centre (Objective and R31 Element 2 of *Liveable Neighbourhoods*). In addition, Council may consider in the future

the provision of potential pedestrian crossings over the central drainage reserve to provide connectivity consistent with *Liveable Neighbourhoods* through the overall Wellard East Cell.

The Public Transport Authority (PTA) has acknowledged the possible future need to service the cell, and indicated a new provisional bus service (548) could potentially operate within the area. The service would operate between Wellard East and the Kwinana Town Centre, and would be assessed in the future depending on demand. The PTA has a stated goal of providing a bus stop within 500m of 95% of Perth's population.

The Transport Assessment finds that modifications to the surrounding external transport network including Mortimer, Millar and Woolcoat Roads are not required from a traffic load perspective, aside from intersection upgrades at entry points to the cell.

3.5 Water Management

The Local Water Management Strategy (LWMS) for the site has been prepared as an addendum to the approved Lot 27 and Lot 201 Wellard East LWMS (Cardno 2010) and is intended to provide additional details specific to the water management strategy within the site. The LWMS addendum (refer to **Appendix E**) has been developed in accordance with Better Urban Water Management (DoW 2008), State Planning Policy 2.9 Water Resources (WAPC 2006) and Planning Bulletin 92 Urban Water Management (WAPC 2008). The LWMS addendum has also considered the objectives and principles detailed in the Jandakot District Water Management Plan (DWMP) (DoW 2009), the Wellard East District Water Management Strategy (DWMS) (Cardno 2010) and the Lot 27 and Lot 201 Wellard East LWMS (Cardno 2010) (refer to **Appendix F**), and should be read in conjunction with the Addendum. Water will be managed using an integrated water cycle management approach, which has been developed using the philosophies and design approaches described in the Stormwater Management Manual for Western Australia (DOW 2007). The key principles of integrated water cycle management that have guided the water management approach within the site include:

- > Considering all water sources, including wastewater, stormwater and groundwater;
- > Integrating water and land use planning;
- > Allocating and using water sustainably and equitably;
- > Integrating water use with natural water processes; and
- > Adopting a whole of catchment integration of natural resource use and management.

The overall objective for integrated water cycle management for residential developments is to minimise pollution and maintain an appropriate water balance. The LWMS Addendum design objectives seek to deliver best practice outcomes using a Water Sensitive Urban Design (WSUD) approach, including detailed management approaches for:

- > Potable water consumption;
- > Flood mitigation;
- > Stormwater quality management; and
- > Groundwater management.

The first step in applying integrated water cycle management in urban catchments is to establish agreed environmental values for receiving waters and their ecosystems. The LWMS Addendum provides a summary of the existing environment, based on a number of National and State policies and guidelines and site specific studies undertaken in and around the site. The characteristics and environmental values of the site have guided the design criteria, which will achieve the design objectives for the key management areas discussed above.

The WSUD approach and measures that are proposed for the site include:

- > Maintaining existing flow regimes by matching pre-development peak flow rates leaving the site;
- > Treatment of minor event runoff prior to infiltration to groundwater;

- > Bio-retention areas incorporated in POS areas;
- > Major event flood storage requirements addressed within POS areas;
- > Co-location of flood storage areas with natural landforms and native remnant vegetation wherever possible;
- > Adopting appropriate non-structural best management practices;
- > Adopting a fit for purpose water use approach; and
- > Minimising use of both scheme and non-potable water.

The LWMS Addendum demonstrates that the design approach for the site is consistent with a best practice WSUD approach, that the water management objectives for the site can be achieved within the spatial allocation of the LSP Area, and the requirements of the relevant State and local government policies and guidelines will be satisfied.

The proposed roads for the site cross the Peel Sub N and Peel Sub N1 drains in a number of locations. Indicative cross-sections for the Peel Sub N and Peel Sub N1 drains are provided in Appendix B of the LWMS addendum. The design of the road and drain crossings will be provide at the detailed engineering design stage and will also be included in the future UWMP.

3.6 Education Facilities

The Wellard East Concept Plan and the LSP include a primary school site (4ha in size) in the same location as identified on ERIC and the Jandakot Structure Plan. It is located slightly further north than the previous Wellard East LSP, in line with ERIC and the Jandakot Structure Plan. This location is viewed as a more appropriate central location within the Wellard East catchment area. The configuration of the site is driven by the REW Wetland and buffer to the east and the proposed alignment of the north-south neighbourhood connector road to the west. The majority of the primary school site is located within Lot 379 (ie. 3.17ha).

3.7 Infrastructure Co-ordination, Servicing and Staging

In accordance with the following sections, all of the services can be brought to the site within the short term (0-5 years) as they are just extending through Sunrise Estate from the north (refer to **Figure 17**). The only partial exception to this is the sewer required to service the lots in the southern portion of the site, as it is planned to be constructed through land to the west and is subject to the adjacent subdivision proceeding. This issue is further discussed in **Section 3.7.1**.

3.7.1 Sewerage

Wood & Grieve Engineers (WGE) on behalf of the Water Corporation has prepared a conceptual sewer catchment plan for an area east of the Kwinana Freeway, which covers both the subject site and the previously approved Local Structure Plan (LSP) area of the Sunrise Estate. Based on this plan, the site will be fully serviceable via the DN375 gravity sewer crossing of Kwinana Freeway, to the adjacent Kwinana D Pump Station (PS) located west of the Freeway on Johnson Road (refer to **Figure 17**). The catchment area for this pump station extends over both the subject site and the previously approved LSP area to the north of the Estate. The bored Freeway crossing has been designed and construction is expected to commence shortly.

The WGE catchment plan currently has no formal status with the Water Corporation. However approvals of previous Sunrise Estate sewer reticulation plans have been provided based on the expected future adoption of the catchment plan.

The northern portion of the cell within the previous Lot 201 will utilise the DN300 main which runs south through the Estate to the freeway crossing. This main has been recently been constructed in order to serve the previously approved LSP area of the Estate. The northern portion of Lot 379 will gravitate sewer internally to the location of the freeway crossing. The southern portion of Lot 379 falls within a separate sub catchment, which will require the construction of a DN225 main through subdivisional roads north of Millar Road. Although flows from this sub catchment will also gravitate to the Freeway crossing, the main is planned to be constructed through subdivisional road reserves not yet created within the adjacent land to the west (refer to **Figure 17**).

The proposed development on adjacent land (Lot 90 and part Lot 378) is currently proceeding, which will include construction of the DN225 from the eastern boundary of Lot 379 to the freeway crossing. The LSP for this area has recently been supported in principle by the City of Kwinana subject to modifications, with structure plan adoption and subdivision approval from the WA Planning Commission expected to follow. In the event that development of the southern portion of Lot 379 proceeds before the adjacent development, the DN225 gravity main will have to be constructed through private land in order to connect the sub catchment to the freeway crossing. If this cannot be negotiated, an alternate arrangement will need to be investigated.

The Water Corporation has advised there is currently sufficient capacity in the wider scheme to cater for development within the cell. No additional offsite modifications or upgrades are required to provide the necessary capacity to serve the subject site.

3.7.2 Water Supply

The Water Corporation has advised that the Medina Scheme, under which the site is proposed to be serviced with water, is currently under review.

In order to provide the previously approved LSP area with water supply services, a DN250 main was constructed along Mortimer Road, connecting the Sunrise Estate to the DN300 main located at the corner of Johnson Road and Mortimer Road (refer to **Figure 17**). Water Corporation advised at the time (June 2010) that this supply would be capable of servicing up to 400 lots to the south of Mortimer Road and west of Woolcoat Road. This would cover all of the previously approved structure plan area, and a portion of the subject site.

Water Corporation has recently advised (August 2013) that this DN250 main may be sufficient to supply all lots within the Sunrise Estate with water services. However, this will require some pressure testing and possibly modelling by the Water Corporation before confirmation can be provided.

Subject to the results of this modelling, the Water Corporation has advised additional offsite upgrades and extensions may be required. The existing DN300 main within Johnson Road may be required to be extended south to the intersection with Millar Road, then east along Millar Road to the site frontage. The Water Corporation also noted the potential requirement to extend a DN700 main along Sulphur Road between Sicklemore and Johnson Roads, as per the current Medina Scheme. Both extensions would be developer prefunded via a Customer Constructed Works Agreement (CCWA).

Pending the outcome of the Medina Scheme review, the Water Corporation will provide further advice as to the future sizing and location of any mains that may be required. However the Water Corporation has confirmed there is no concern that the outcome of the review will indicate the site is unable to be serviced.

3.7.3 Natural Gas

Natural gas has been supplied to the Sunrise Estate via an extension of gas mains along Mortimer Road, as required for the subdivision within the previously approved LSP area (refer to **Figure 17**). This extension was undertaken by ATCO Gas in 2013 at no cost to the developer. Newly constructed gas infrastructure within the Sunrise Estate can be extended into the site, assuming development proceeds in a southerly direction.

Advice from ATCO Gas is that ultimately reinforcement to the gas infrastructure in the area will be required. However at this stage, the existing infrastructure which has been constructed to serve the previously approved LSP area also has the capacity to serve the site.

ATCO notes that if other developments in the area proceed before the subject site, available capacity will be reduced and headworks reinforcement may be required.

Depending on the timing of development, ATCO will determine what upgrades are required and when, and the nature of the cost contribution arrangement between Sunrise Estate, other developers in the area and ATCO Gas.

3.7.4 Power

The existing development within the previously approved LSP area to the north has extended a 22kV feeder (MED501) throughout the development via the extension of Ringmain cable to new Switchgears within that site.

It is proposed to continue to extend this feeder through the subject site, and interconnect with the existing 22kV feeder MED514 along Millar Road (refer to **Figure 17**). This would provide flexibility in the creation of the lots either from the northern section or southern section of the development. The existing overhead distribution lines fronting Millar Road will require undergrounding as part of the subdivision works.

Transformers and Switchgears will be installed to distribute the power throughout the development to distribution pillars provided within the respective lot boundaries (one pillar per two lots).

Two feasibility studies have been previously completed by Western Power within the Wellard East Cell on behalf of Amana Holdings, covering all areas of the Sunrise Estate.

Both studies indicated that the network configuration presently had enough capacity to supply the overall development. However, as the load will span over the next 2-3 years, and with the high possibility of other future load growth in the area, new feeders or the reinforcement of existing feeders may be required to cater for the ultimate load growth in the vicinity. Should this be the case, the developer may be required to fund a proportion of these works.

3.7.5 Telecommunications

The site falls within the NBN service provision footprint. It is assumed that NBN pit and pipe infrastructure installed within the existing subdivision will be extended to provide a fibre connection to the proposed lots within the site (refer to **Figure 17**).

NBN pit and pipe will be installed / extended to suit common trenching provided as part of the subdivision works. This pit and pipe network will be handed over to NBN to facilitate the provision of fibre to the development.

3.7.6 Proposed Staging of Subdivision

Development of the site is proposed to continue from the existing subdivision (north of the site) in a southerly direction towards Millar Road. There are a number of servicing constraints that are currently preventing development from commencing in the opposite direction (ie from Millar Road). Water, gas and communications infrastructure have all been brought to the approved LSP area via Mortimer Road, and reticulated throughout the existing subdivision in a southerly direction. Development must continue in this direction in order to connect new lots to these services.

3.8 Developer Contribution Arrangements

In accordance with the Scheme, the Wellard East Cell is now located in a Developer Contribution Area (DCA 11) for contributions towards community infrastructure through a Development Contribution Plan (DCP). The DCP requires developers in Wellard East to contribute to a range of community type infrastructure at the time of subdivision that will be provided at the local level (eg. local community centre), the district level (eg. Anketell Branch Library and Casuarina Community Centre) and the regional level (eg. Kwinana Youth Facility and the Thomas Oval Recreation/Sporting Ground). This DCP was included in the Scheme via Amendment No. 115, which was gazetted in June, 2012. This DCP and associated Cost Schedules are now subject to review by Council and are the subject of a further Local Scheme Amendment (ie. Amendment No. 154).

Wellard East is affected by a further amendment to the Scheme (ie. Amendment No. 100A), which deals with developer contributions towards various forms of "hard" infrastructure, such as existing roads. The City of Kwinana previously prepared and advertised Amendment No. 100. Wellard East Cell is included in Developer Contribution Area 2. Amendment No. 100A (latest Amendment) requires developers in Wellard East and other cells to contribute to a range of infrastructure at the time of subdivision. Key infrastructure works include upgrading of Mortimer Road and western section of Millar Road and drainage. The original Amendment (Amendment No. 100) was advertised in late 2009 and numerous submissions were lodged by landowners raising a number of issues.

Discussions with Council officers confirm that Amendment No. 100A will be advertised shortly.

The progress of Amendment No. 100A will not hold up LSP and subdivision approvals as approvals will be subject to legal agreements between Council and the subdivider, if the Amendment is still not finalised.

4 Conclusion

As discussed and demonstrated throughout this report, the environmental, bushfire, fauna, acoustic, planning, servicing and transport assessments and the LWMS Addendum all support adoption/approval of the Local Structure Plan for part Lot 9001 Mortimer Road and part Lot 379 Millar Road, Wellard (East) (ie. **Plan 1**). There are no constraints affecting the site, which cannot be addressed through appropriate management strategies such as a noise assessment and a final BAL rating assessment (bushfire) at the subdivision stage. Part of Lot 379 has been excluded from the LSP due to its inclusion in the current odour buffer.

The LSP design is consistent with the overall design shown over the Wellard East Cell (ie. Wellard East Concept Plan). The LSP design for the site is also generally consistent with the various planning documents guiding the development of the site, including Liveable Neighbourhoods, Jandakot Structure Plan, ERIC and TPS2.

The statutory provisions guiding the further subdivision of the site are included in Part One of the structure plan documentation.

It is considered that this LSP provides sufficient detail and technical reports to ensure development throughout the site and cell is co-ordinated and can proceed in an orderly manner without prejudicing the development of adjacent land.

In order for subdivision to progress over part Lot 9001 and part Lot 379, it is requested that the WAPC endorse this LSP. In summary, it is considered that the LSP provides an appropriate framework to guide the future subdivision and development of the site.

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Part Lot 9001 Mortimer Road
and Part Lot 379 Millar Road, Wellard
(East) Local Structure Plan

FIGURES



- Figure 1. Location Plan**
- Figure 2. Aerial Photograph**
- Figure 3. Existing Lot Configuration**
- Figure 4. Metropolitan Region Scheme (Zoning Map)**
- Figure 5. Final Jandakot Structure Plan**
- Figure 6. City of Kwinana – Town Planning Scheme No.2 (Zoning Map)**
- Figure 7. Eastern Residential Intensification Concept**
- Figure 8. Vegetation Communities**
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- Figure 11. Topography**
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- Figure 14. Context and Constraints Plan**
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- Figure 18. Indicative Road Cross Sections**
- Figure 19. Indicative Road Cross Sections**
- Figure 20. Indicative Laneways Subdivision Design**

Technical Appendices Index

Appendix no.	Document title	Nature of document	Referral/approval agency	Summary of document modifications
A	Certificate of titles for LSP Area	Property information (supporting document only)	N/A	N/A
B	Spring Flora and Vegetation Survey and Wetland Assessment	Environmental assessment (supporting document only)	Referred to DEC as part of the approved LSP (2011)	N/A
C	Preliminary Acid Sulfate Soils Assessment	Preliminary assessment (supporting document only)	Referred to DEC as part of the approved LSP (2011)	N/A
D	Transport Assessment Report	Transport Assessment	Original document approved by City of Kwinana in 2011	Updated to address the subject site and issues discussed with Council officers at meeting on 20/3/14
E	Local Water Management Strategy Addendum	Water management assessment	Original LWMS approved by DOW (2011)	Updated to address the subject site and issues discussed with Council officers at meeting on 20/3/14
F	Local Water Management Strategy (Cardno 2010)	Water management assessment	Approved by DOW in 2011	N/A
G	Landscape Masterplan	Landscape plan (supporting document only)	Original plan considered by City of Kwinana as part of the approved LSP (2011)	Updated to address the subject site
H	Noise Assessment	Preliminary noise assessment (supporting document only)	Original preliminary noise assessment considered by Main Roads and City of Kwinana as part of the previously approved LSP	Updated to address the subject site and issues discussed with Council officers at meeting on 20/3/14
I	LSP and Wellard East Cell POS Schedules	POS calculation tables	Original POS tables considered by City of Kwinana and DOP/WAPC as part of the approved LSP (2011)	Updated to address the subject site
J	Fauna Assessment	Fauna assessment	To be referred to DPaW	N/A
K	Fire Management Plan	Fire hazard and management assessment	Extensive consultation with DFES and COK	Updated to address DFES and COK comments

Part Lot 9001 Mortimer Road
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APPENDIX A
CERTIFICATE OF TITLES FOR LSP
AREA

Part Lot 9001 Mortimer Road
and Part Lot 379 Millar Road, Wellard
(East) Local Structure Plan

APPENDIX B
SPRING FLORA AND VEGETATION
SURVEY AND WETLAND ASSESSMENT

Part Lot 9001 Mortimer Road
and Part Lot 379 Millar Road, Wellard
(East) Local Structure Plan

APPENDIX C
PRELIMINARY ACID SULFATE SOILS
ASSESSMENT

Part Lot 9001 Mortimer Road
and Part Lot 379 Millar Road, Wellard
(East) Local Structure Plan

APPENDIX D
TRANSPORT ASSESSMENT REPORT

Part Lot 9001 Mortimer Road
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APPENDIX E
LOCAL WATER MANAGEMENT
STRATEGY ADDENDUM

Part Lot 9001 Mortimer Road
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APPENDIX F
LOCAL WATER MANAGEMENT
STRATEGY (CARDNO 2010)

Part Lot 9001 Mortimer Road
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APPENDIX G
LANDSCAPE MASTERPLAN

Part Lot 9001 Mortimer Road
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APPENDIX H
NOISE ASSESSMENT

Part Lot 9001 Mortimer Road
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APPENDIX I

LSP AND WELLARD EAST CELL POS
SCHEDULES

Part Lot 9001 Mortimer Road
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APPENDIX J
FAUNA ASSESSMENT

Part Lot 9001 Mortimer Road
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APPENDIX K
FIRE MANAGEMENT PLAN

