

Casuarina Central Precinct

STRUCTURE PLAN



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

IT IS CERTIFIED THAT THIS STRUCTURE PLAN WAS APPROVED BY RESOLUTION OF THE WESTERN AUSTRALIAN PLANNING COMMISSION ON: **11 MAY 2021**

Signed for and on behalf of the Western Australian Planning Commission



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



Witness

11 MAY 2021

Date

11 MAY 2031

Date of Expiry

TABLE OF AMENDMENTS

Each time the Structure Plan is amended, the amendment is to be recorded in the table of amendments at the front of the Structure Plan, including the amendment type (minor or major).

AMENDMENT NO.	SUMMARY OF THE AMENDMENT	AMENDMENT TYPE	DATE APPROVED BY WAPC

TABLE OF DENSITY PLANS

Each time a density plan is approved, the plan is to be recorded in the table of density plans at the front of the Structure Plan.

DENSITY PLAN NO.	AREA OF DENSITY PLAN APPLICATION	DATE ENDORSED BY WAPC

EXECUTIVE SUMMARY

This Structure Plan is prepared to guide the subdivision and development of the area referred to be the City of Kwinana's Local Planning Policy No. 6 as the Casuarina Central Precinct. This area includes the part of the Casuarina Urban Cell which extends east of the Kwinana Freeway to the western edge of the Jandakot Groundwater Projection area, from the southern side of Orton Road to the northern boundary of the lots located at the northern end of Lugg Place. Hereafter referred to as the 'structure plan area', 'subject site' or 'site'.

The subject site is located:

- within the municipality of the City of Kwinana; and
- approximately 38 km south of the Perth CBD.

The subject site's natural features include existing stands of vegetation; wetlands; and an undulating topography.

The Structure Plan has been prepared to accommodate development of the land for:

- 'Residential' purposes comprising a mix of medium residential densities;
- Public Open Space (POS) and drainage;
- 'Service Commercial';
- 'Commercial' (Local Centre);
- a Primary School; and
- the Movement Networks consisting of a Neighbourhood Connector, Major Access streets and Access streets.

The design principles in which the Structure Plan is based, include:

- a careful response to the site's natural features requiring protection including wetlands and associated buffers, landform and vegetation;
- appropriately responding to other existing features on and surrounding the site including the power easement, mushroom farm and existing road network;
- provision of a robust Public Open Space design;
- incorporating the requirement for a Primary School and co-located Public Open Space;
- provisions of an interconnected pedestrian network, integrating with the open space network, Primary School and future district open space; and
- orientating local road directions for efficient earthworks and drainage flows.

STRUCTURE PLAN SUMMARY

ITEM	DATA	STRUCTURE PLAN REF (SECTION NO.)
Total area covered by the Structure Plan	96.1223 hectares	1.2
Area of each proposed Land Use Zones <ul style="list-style-type: none"> • Residential • Service Commercial • Commercial (Local Centre) Reserves <ul style="list-style-type: none"> • Road Reserve • Public Purpose – Primary School • Public Open Space 	48.9109 hectares 7.1018 hectares 0.0701 hectares 7.8057 hectares 3.5003 hectares 28.7341 hectares* *includes drainage	3.3, & 3.4
Estimated Lot and Dwelling Yield	952 lots or dwellings	3.3 Development Concept – Figure 13
Estimated Residential Density <ul style="list-style-type: none"> • Dwellings per site hectare (as per Liveable Neighbourhoods) 	19.47 dwellings per site hectare	3.3
Estimated Population	2,666 people @ 2.8 people/household in single residential dwellings	3.3
Amount of Public Open Space: <ul style="list-style-type: none"> • Amount of credited Public Open Space: (As per Liveable Neighbourhoods) • Amount of restricted Public Open Space: (As per Liveable Neighbourhoods) 	12.6060 hectares / 18.37% Creditable POS 6.5549 (1.3721 hectares creditable)	3.4 Table 9: POS Schedule / Figure 17
Composition of Public Open Space: <ul style="list-style-type: none"> • Neighbourhood • Local Parks 	10.4578 hectares (93%) 0.7761 hectares (7%)	3.4 Table 9: POS Schedule / Figure 17

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PART ONE
IMPLEMENTATION

1 STRUCTURE PLAN AREA

This Structure Plan applies to the land contained within the inner edge of the line denoting the Structure Plan boundary on the Structure Plan Map.

2 OPERATION

The Structure Plan commences operation on the date it is approved by the Western Australian Planning Commission (WAPC).

3 STAGING

Subdivision will be undertaken in 40-60 lot stages depending on market conditions at the time. Subdivision will extend from the north via Orton Road to the south through the central portions of the structure plan area, then extending east and west.

4 SUBDIVISION AND DEVELOPMENT REQUIREMENTS

- a) The Structure Plan Map defines the broad residential density ranges that apply to different areas within the Structure Plan. Lot specific residential densities, generally in accordance with the defined residential density ranges, are to be assigned in accordance with a Residential Density Code Plan determined by the WAPC.
- b) A Residential Density Code Plan is to be submitted at the time of application for subdivision approval to the WAPC and shall indicate the residential density code applicable to each lot within the proposed subdivision. The Residential Density Code Plan shall be generally consistent with the residential density ranges identified in the Structure Plan.
- c) The Residential Density Code Plan is to include a summary of the dwelling yield of the proposed subdivision.
- d) Determination of the Residential Density Code Plan shall be undertaken at the time of determination of a subdivision application by the WAPC. An approved Residential Density Code Plan shall then form part of the Structure Plan and be used for the determination of future development applications and building permit applications.
- e) Variations to the Residential Density Code Plan will require the approval of the WAPC. A revised Residential Density Code Plan shall generally be consistent with the approved plan of subdivision issued by the WAPC. The revised Residential Density Code Plan shall be consistent with residential density ranges identified on the Structure Plan Map.
- f) A revised Residential Density Code Plan, consistent with clause (e) above will replace, wholly or partially, the previously approved Residential Density Code Plan, and shall form part of the Structure Plan as outlined in clause (d) above.

- g) A Residential Density Code Plan is not required if the WAPC considers that subdivision is for one or more of the following:
 - i. the amalgamation of lots;
 - ii. consideration of land for 'super lot' purposes to facilitate land assembly for future development;
 - iii. the purposes of facilitating the provision of access, services or infrastructure; or
 - iv. land which by virtue of its zoning or reservation under the Structure Plan cannot be developed for residential purposes.
- h) The residential density code ranges are:
 - i. R25 – R40
 - ii. R40 – R60
- i) Where density code ranges are depicted on the Structure Plan Map, the designation of R-Codes shall be in accordance with the criteria outlined below:
 - i. R25 – R40 provides the main density code range to accommodate a variety of traditional and smaller sized lots with front access. Accommodate appropriate subdivision design and a range of opportunities for future homeowners by incorporating residential densities which offer flexibility for traditional homes which are likely to be built by project home builders.
 - ii. R40 – R60 provides for a variety of lot types to achieve single, grouped and multiple dwellings with front or rear access adjacent to areas of amenity including POS and the Primary School. Detached, semi-detached and attached housing (terrace) can be provided for within this density code range.
- j) Land use permissibility within the Structure Plan area shall accord with the corresponding land use classification in the City of Kwinana Local Planning Scheme No. 2 (as amended).
- k) Public Open Space is to be provided in accordance with the Structure Plan Map.
- l) This Structure Plan is supported by a Bushfire Management Plan (BMP) Bushfire Management Plan – Casuarina Central Precinct (December 2018) prepared by Eco Logical Australia. Subdivision applications are required to be supported by an additional BMP which addresses issues raised in subsequent development stages in accordance with State Planning Policy 3.7 – Planning in Bushfire Prone Areas.
- m) This Structure Plan is supported by a Transportation Noise Assessment, Transportation Noise Assessment – Casuarina Central Precinct (December 2018) prepared by Lloyd George Acoustics. Any land with a noise level in excess of 55dB is subject to the Transportation Noise Assessment.
- n) Notifications on Title

The Council shall recommend to the WAPC that a condition be imposed on the grant of subdivision approval for a notification to be placed on the Certificate of Title to suitably respond to the following:

- i. That a lot with a Bushfire Attack Level (BAL) rating of 12.5 or higher is subject to a *Bushfire Management Plan*.
- ii. That a lot with a noise level of 55dB or higher is subject the *Transportation Noise Assessment*.
- iii. That residential lots located within 400 metres of the mushroom facility on Orton Road are subject to potential amenity impacts due to odour and/or noise from the facility.
- iv. That lots abutting the Western Power easement are subject to amenity impacts associated with the maintenance, upgrade and expansion of power infrastructure.

o) Management plans

The Council shall recommend to the WAPC that a condition be imposed on the grant of subdivision approval to respond to the following as identified by the Structure Plan:

- i. Landscape Plan for POS areas including areas to be managed for conservation purposes.
 - ii. Wetland management plan providing for the protection of the conservation category and resource enhancement wetlands.
 - iii. Urban Water Management Plan/s.
 - iv. Prior to subdivision, a Landscape Feature and Tree Retention Strategy to be prepared in accordance with the City of Kwinana's Local Planning Policy No.1 to ensure the retention of significant trees is optimised as part of the subdivision design, civil design and earthworks.
- p) Boundary fencing is to be provided between the school site and adjacent wetland in accordance with Education Department requirements.

5 LOCAL DEVELOPMENT PLAN

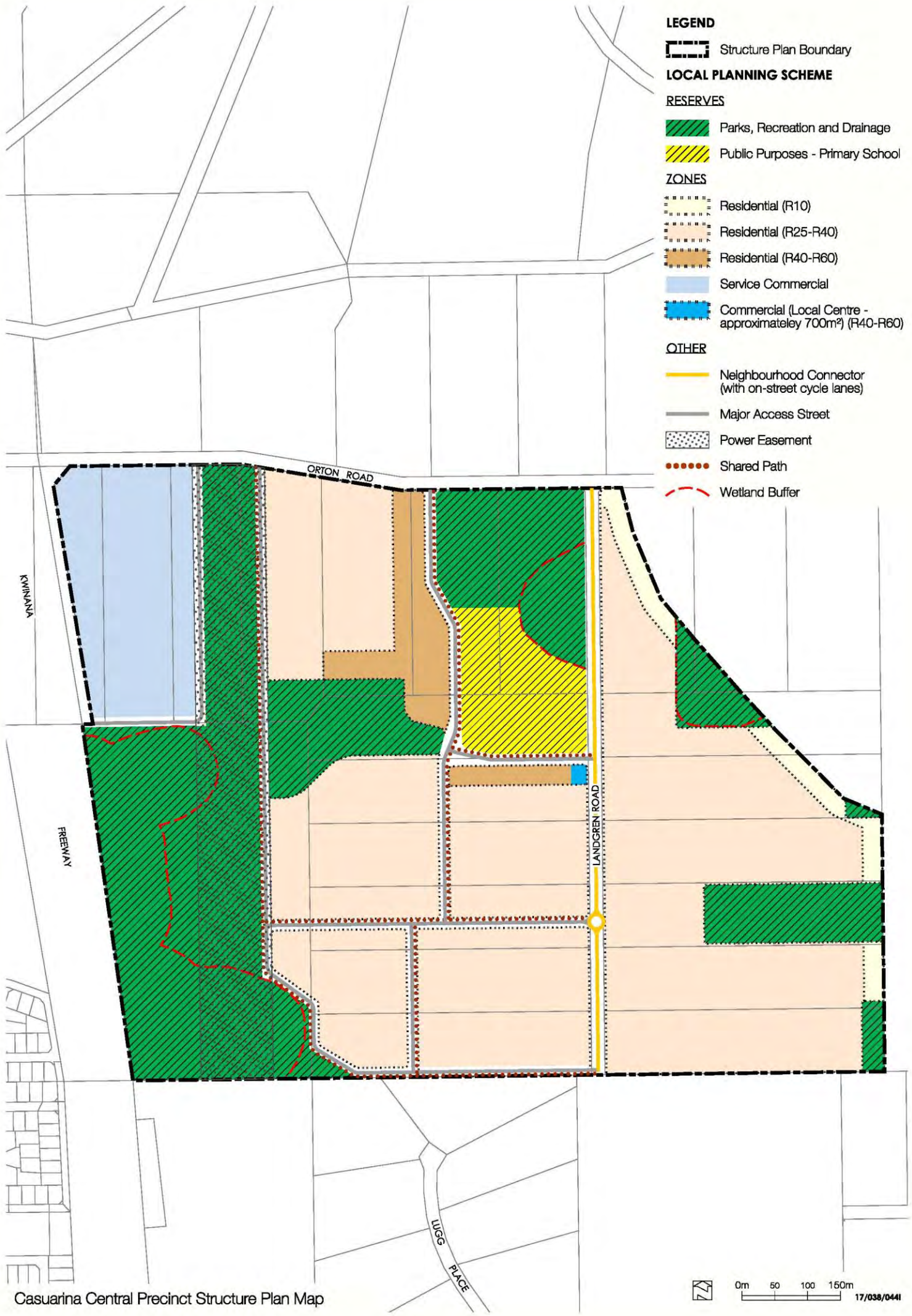
Local Development Plan(s) are to be prepared for lots with one or more of the following attributes:

- a) smaller than 260m²;
- b) rear vehicle access;
- c) with frontages of less than 10.5 metres; and
- d) abutting POS.

6 OTHER REQUIREMENTS

- a) an amendment to the City of Kwinana Town Planning Scheme No. 2 will be required to include an additional infrastructure item in the Development Contribution Plan No. 3, comprising the upgrade and extension of Landgren Road to connect into Thomas Road. The amendment can run in parallel to the assessment and implementation of Structure Plan.
- b) Costa Mushroom Farm

Supporting odour and noise studies are required prior to subdivision should any modification to the requirement for Notification on Title regarding amenity be sought.



LEGEND

Structure Plan Boundary

LOCAL PLANNING SCHEME

RESERVES

- Parks, Recreation and Drainage
- Public Purposes - Primary School

ZONES

- Residential (R10)
- Residential (R25-R40)
- Residential (R40-R60)
- Service Commercial
- Commercial (Local Centre - approximately 700m²) (R40-R60)

OTHER

- Neighbourhood Connector (with on-street cycle lanes)
- Major Access Street
- Power Easement
- Shared Path
- Wetland Buffer

KWINNANA

ORTON ROAD

FREEMAN

LANDGREN ROAD

LUCAS PLACE

1 PLANNING BACKGROUND

1.1 INTRODUCTION AND PURPOSE

This Structure Plan has been prepared on behalf of CDN No. 1 Pty Ltd, a development company managed by LWP Property Group (LWP), for Casuarina Central Precinct area, which includes the part of the Casuarina Urban Cell which extends east of the Kwinana Freeway to the western edge of the Jandakot Groundwater Projection area, from the southern side of Orton Road to the northern boundary of the lots located at the northern end of Lugg Place. CDN No. 1 Pty Ltd is a majority landowner with the structure plan area and has taken the responsibility of preparing this Structure Plan over the entire Casuarina Central Precinct to meet the requirements of the City of Kwinana Local Planning Policy No. 6 – Guidelines for Structure Planning in the Casuarina Cell.

The Structure Plan will accommodate the future subdivision and development of the site for predominantly residential purposes, service commercial purposes, a Primary School, Public Open Space (POS) and the movement network.

The Structure Plan has been prepared to address the requirements of the City of Kwinana Local Planning Scheme No. 2 and the Planning and Development (Local Planning Schemes) Regulations 2015. The Structure Plan and report have been prepared in

accordance with the WAPC's Structure Plan Framework August 2015.

The Structure Plan will guide future subdivision and development of the site with the determining authorities having due regard for it in the assessment of development and subdivision applications.

The following information and technical documentation have been prepared in support of this town planning report:

Consultation Schedule (refer **Appendix A**)
 Environmental Assessment Report (refer **Appendix B**)
 Bushfire Management Plan (refer **Appendix C**);
 Transportation Noise Assessment (**Appendix D**);
 Engineering Services Report (refer **Appendix E**);
 Local Water Management Plan (refer **Appendix F**);
 Traffic Assessment (**Appendix G**)
 Retail Needs Assessment (**Appendix H**);
 Landscape Strategy (Refer **Appendix I**); and
 Local Landscape Feature and Tree Retention Strategy (**Appendix J**).

The Project Team responsible for preparing the information contained within this report, (in consultation with the City of Kwinana, DPLH, and relevant Service Authorities) include those detailed in **Table 1**.

TABLE 1: PROJECT TEAM AND ROLE

PROJECT ROLE	CONSULTANT
Town Planning and Urban Design	Taylor Burrell Barnett
Civil Engineering	Cossill & Webley
Environment	Strategen and 360 Environmental
Hydrology	Hyd2o
Bushfire Hazard Assessment and Management	Eco Logical Australia
Landscape	Emerge
Traffic / Transport Assessment	Riley Consulting
Transportation Noise Assessment	Lloyd George Associates

1.2 LAND DESCRIPTION

LOCATION

The subject site is located within the suburb of Casuarina, situated within the City of Kwinana (refer **Figure 2**).

Land surrounding the subject site generally consists of developed and vacant rural and rural residential land, east of the Kwinana Freeway.

The subject site is located:

- south of Orton Road, a mushroom farm, and land subject to the draft 'Casuarina North Structure Plan' currently under consideration;
- east of the Kwinana Freeway;
- west of Bush Forever Site No. 273 and a Resource Enhancement Wetland;
- north of existing rural residential lots contained within the 'Casuarina South Precinct', which is subject to future structure planning;
- approximately 7km east of the Kwinana town centre;
- and
- approximately 38km south of the Perth CBD.

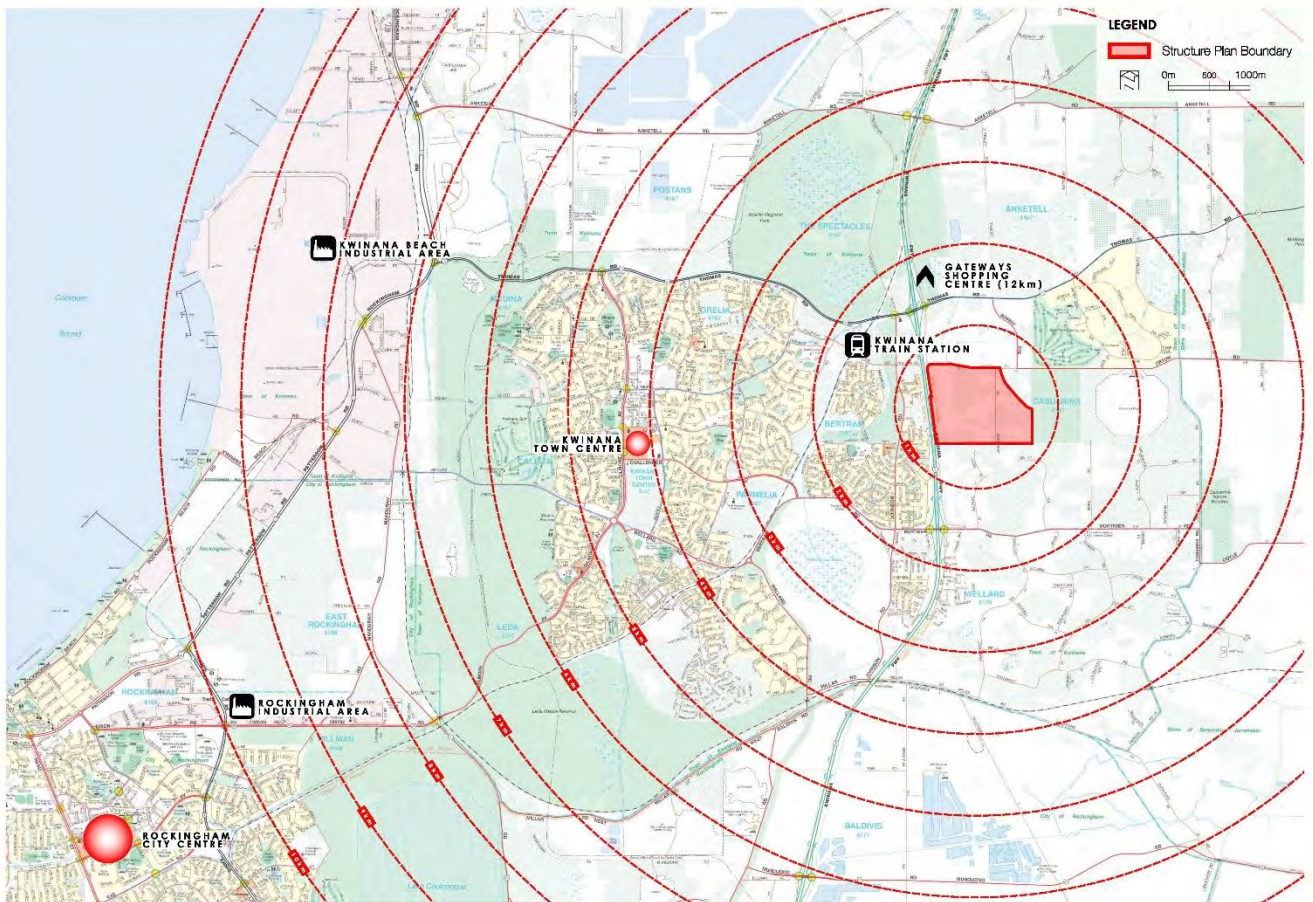


Figure 2 Location Plan

AREA AND LAND USE

The subject site consists of 22 lots, and is approximately 96.1223 hectares (refer **Table 2** for lot areas). The site has several exiting dwellings located throughout it. A Western Power transmission line protected by an easement (power easement) is located within the western portion of the site (refer **Figure 3**).

LEGAL DESCRIPTION AND OWNERSHIP

The property details and ownership of the subject site are detailed in **Table 2**.

TABLE 2: PROPERTY DETAILS

LOT NO.	VOLUME	FOLIO	DEPOSITED PLAN	OWNER	AREA
Lot 44 Landgren Road	1706	221	8390	CDN No. 1 Pty Ltd [^]	4.0855
Lot 43 Landgren Road	1308	447	8390	CDN No. 1 Pty Ltd [^]	4.1140
Lot 42 Landgren Road	1308	446	8390	CDN No. 1 Pty Ltd [^]	4.1127
Lot 41 Landgren Road	1823	778	8390	CDN No. 1 Pty Ltd [^]	4.1113
Lot 39 Landgren Road	1308	443	8390	CDN No. 1 Pty Ltd	4.1457
Lot 34 Landgren Road (Part Lot)	1932	827	8390	CDN No. 1 Pty Ltd	4.1084
Lot 37 Landgren Road	8390	1308	441	CDN No. 1 Pty Ltd	4.1086
Lot 47 Orton Road	1369	146	8390	CDN No. 1 Pty Ltd	4.3667
Lot 40 Landgren Road	1308	444	8390	Abbott, David Antony Abbott, Debbie*	4.1097
Lot 1 Orton Road	2597	695	45805	Commissioner of Main Roads	1.8559
Lot 50 Orton Road	1391	271	8390	Sharp, David Sharp, Wayne	4.1045
Lot 49 Orton Road	1873	818	8390	Scilio, Antoinette Marie Scilio, Alexandro John	4.1181
Lot 48 Orton Road	1375	289	8390	Wong, Swee Chun Wong, Kook Moon	4.6763
Lot 46 Orton Road	1323	709	8390	Williams, Water Desmond	4.1451
Lot 45 Orton Road	1346	120	8390	Royale Australian Golf Club Pty Ltd	4.1430
Lot 32 Orton Road (Part Lot)	1411	394	8390	Harvey, Maureen Patricia Harvey, Douglas William	4.4940
Lot 31 Orton Road (Part Lot)	171	65A	8390	Muscara, Nicola	4.4016
Lot 9000 Orton Road	2608	892	48382	Megajet Enterprises Pty Ltd	16.7116
Lot 33 Landgren Road (Part Lot)	1308	437	8390	Pearson, Steven Arnold	4.1084
Lot 35 Landgren Road	1308	439	8390	Byford West Pty Ltd	4.1084
Lot 36 Landgren Road	1308	440	8390	Grubisin, Mary Grubisin, Steven Vinko	4.1085
Lot 38 Landgren Road	1308	442	8390	Harvey, Wayne Douglas Parker, Lisa Maree	4.1259

*Lot contracted by CDN No.1 Pty Ltd

[^] Subject to settlement.

1.3 PLANNING FRAMEWORK

ZONING AND RESERVATIONS

METROPOLITAN REGION SCHEME

The subject site is zoned 'Urban' under the Metropolitan Region Scheme (MRS) (refer **Figure 4**). Land abutting the subject site to the north and south is also zoned 'Urban'. The Kwinana Freeway, to the west of the subject site is reserved as a 'Primary Regional Road'. The site is abutting a 'Parks and Recreation' reserve to the east, a portion of which is located within Bush Forever Site no. 273. The land to the north is zoned 'Rural – Water Protection' and is part of the Groundwater Protection – Jandakot Groundwater Mound.

CITY OF KWINANA LOCAL PLANNING SCHEME NO. 2

The subject site is zoned 'Development' under the City of Kwinana Town Planning Scheme No. 2 (TPS 2) (refer **Figure 5**), which corresponds with the 'Urban' zone under the MRS. The adjacent land to the north-east is zoned 'Rural Water Resource' under TPS 2, corresponding with the 'Rural – Water Protection' zone under the MRS.

The 'Development' zone requires future subdivision and development of the land to be coordinated by a Structure Plan, in accordance with Clause 6.15.3 of TPS 2.

The subject site is contained within Development Contribution Areas 3 and 10 as depicted on the TPS 2 Map.

CITY OF KWINANA DEVELOPER CONTRIBUTIONS

The subject site is included in two Development Contribution Plan areas (DCPs).

Development Contribution Area 3 (DCA 3) addresses Traditional Infrastructure in the Casuarina Precinct. DCA 3 was included in Amendment 100A to the TPS 2, which was gazetted on 3 October 2017. The current rate to be paid by subdividers is based on Gross Subdivisible Area for some items and Development Area for others.

The infrastructure items included in the DCA 3 include:

- Roads – Mortimer Road and Thomas Road upgrades.
- Drainage – Peel Sub Drains upgrades.
- Public Open Space – in accordance with the Structure Plan or Public Open Space Strategy.
- District Sporting Ground – located within Casuarina.
- Community Facilities – land for a library located within the Wandii District Centre.

DCA 10 addresses with Community Infrastructure in the Casuarina Precinct and is included in Amendment 145 to TPS 2 which is still to be finalised. Amendment 145 was advertised for public comment in November 2015, and public submissions are currently being reviewed.

Contribution amounts and payment by the subdivider will be addresses at the subdivision stage.

Given the importance of the upgrade and extension of Landgren Road through the Casuarina North Cell (as discussed in **Section 3.7**) it is recommended that the City include the Landgren Road extension and upgrade as a DCP item.

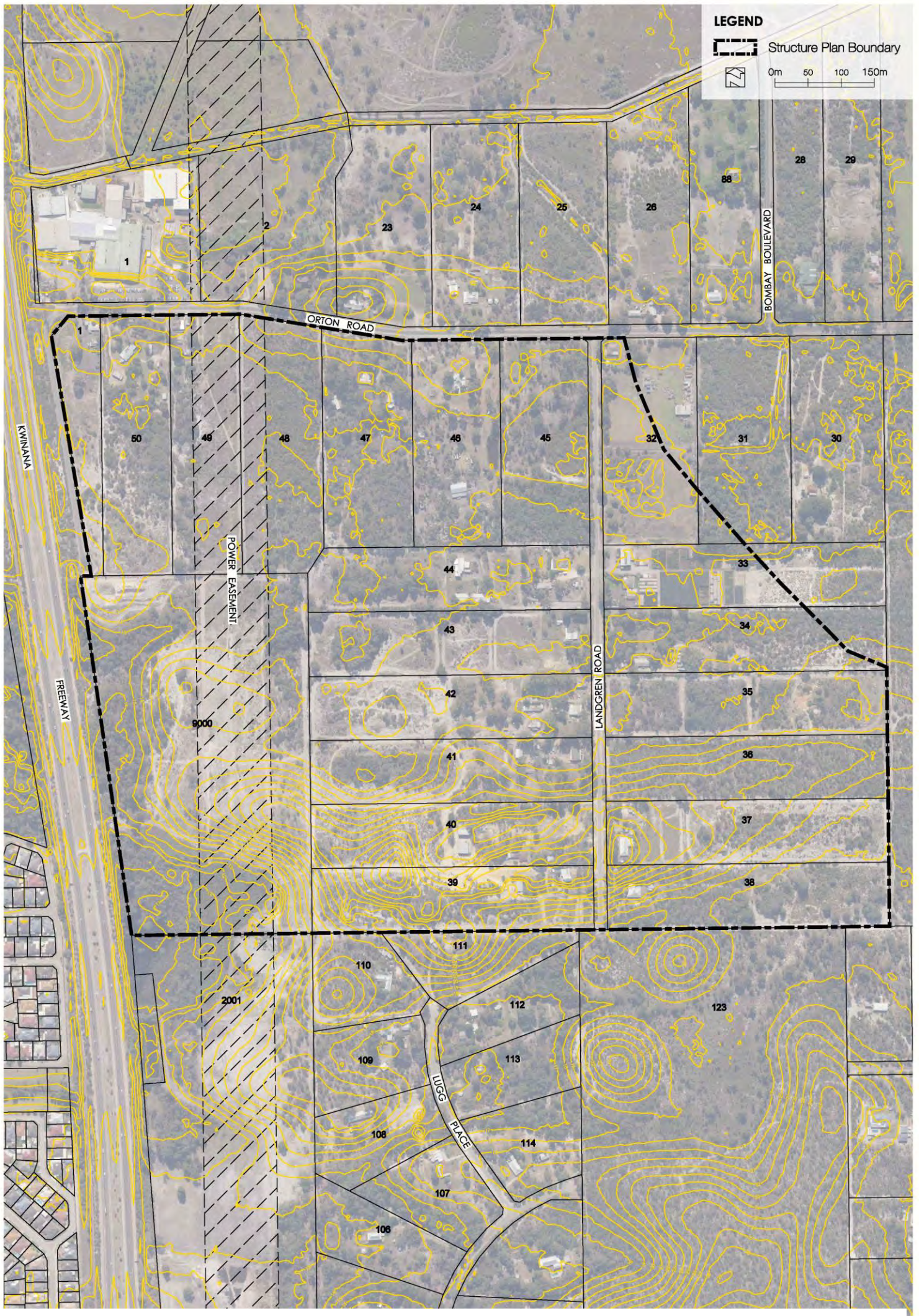


Figure 3 Subject Site



Figure 4 Metropolitan Region Scheme

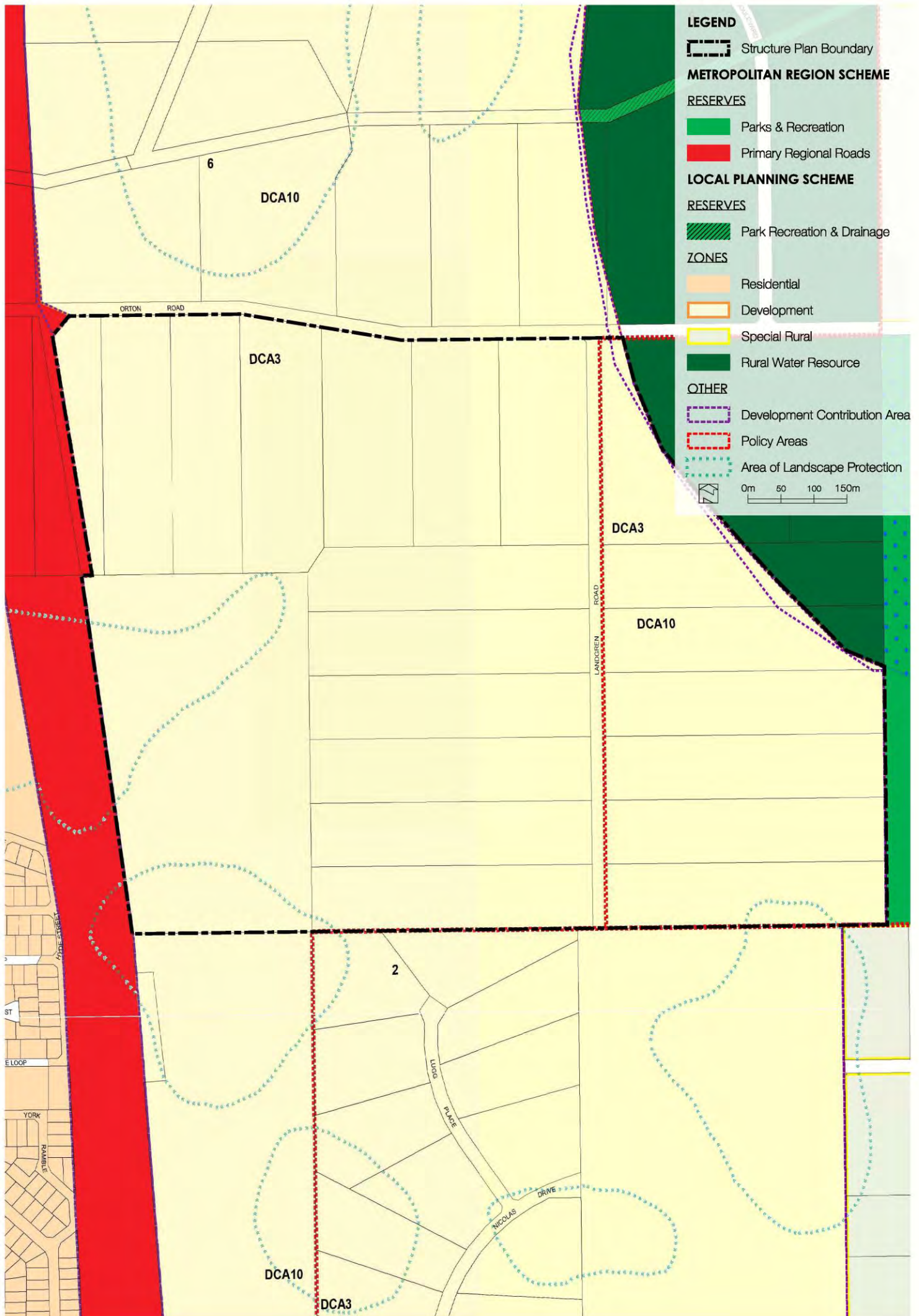


Figure 5 City of Kwinana Local Planning Scheme No. 2

PLANNING AND DEVELOPMENT (LOCAL PLANNING SCHEMES) REGULATIONS 2015

The assessment and approval of this Structure Plan will be considered under the Planning and Development (Local Planning Schemes) Regulations 2015 as detailed under Schedule 2 Part 4.

JANDAKOT DISTRICT STRUCTURE PLAN

The subject site is included within the Jandakot District Structure Plan (JDSP), which was adopted in 2007 and outlines the physical framework for the future development of the land immediately surrounding the Jandakot Underground Water Pollution Control Area, generally comprising the localities of Oakford, Mandogalup, Casuarina, Wellard, Anketell and The Spectacles.

The majority of the subject site is identified as 'Medium-Term Urban', and a 'Primary School' is identified in the northern portion of the site (refer **Figure 6**).

The JDSP also identifies an area of 'Mixed Use' and 'Home Business' adjacent to the Freeway extending south of Thomas Road to beyond Orton Road, within the subject site.

SURROUNDING LOCAL STRUCTURE PLANNING

The land to the north of the subject site between Orton Road and Thomas Road, is referred as the Casuarina North Precinct in the City of Kwinana Local Planning Policy No. 6 – Guidelines for Structure Planning in the Casuarina Cell (LPP 6). The Casuarina North Structure Plan prepared by Element was advertised for public comment in September 2018 and is currently under consideration by the WAPC. The advertised Structure Plan identifies an area of Service Commercial land in the north-eastern corner of the precinct adjacent to Thomas Road and the Kwinana Freeway, and a preliminary road layout connecting into Thomas Road and only covers approximately one third of the Casuarina North Precinct. The balance of the precinct is identified as subject to further planning; however, there is some contextual planning provided for this area within the Structure Plan documentation.

The land to the south of the subject site, referred to as the Casuarina South Precinct in LPP 6, is also zoned 'Development' in the City of Kwinana TPS 2, and is subject to the preparation and approval of a separate structure plan. Structure planning in this precinct is yet to commence.

The land north of Thomas Road is covered by various existing Structure Plans including the Anketell North Structure Plan, Wandi North Structure Plan, Mandogalup East Structure Plan and Mandogalup West Structure Plan.

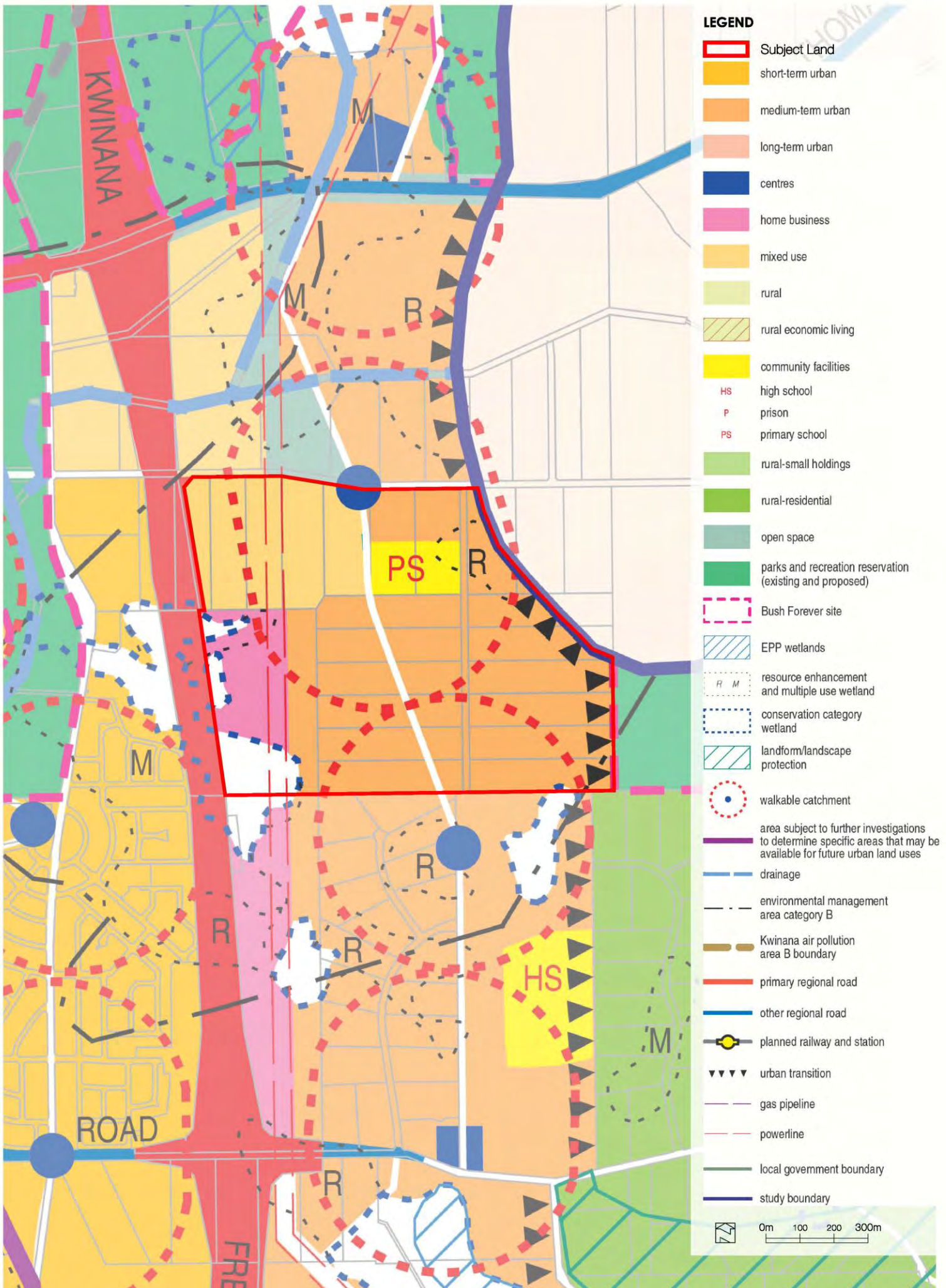


Figure 6 Jandakot District Structure Plan

1.4 PLANNING STRATEGIES

PERTH AND PEEL @ 3.5 MILLION

Perth and Peel @ 3.5 Million is a suite of documents released by the WAPC in 2018 for the Perth and Peel metropolitan regions to identify:

- where future homes and jobs should be located;
- how to protect important environmental assets;
- how to best utilise existing and proposed infrastructure; and
- appropriate areas for greater infill development and residential density.

As part of this documentation, sub-regional planning frameworks were released in March 2018 to guide future development. The subject site is included within the South Metropolitan Peel Sub-regional Planning Framework (Sub-regional Planning Framework) and is identified as Urban with a 'Short term' implementation staging timeframe (refer **Figure 7**).

The minimum urban infill dwelling targets identified for the City of Kwinana are 1,370 dwellings, to accommodate an estimated population of 3,010 by 2050. This Structure Plan will assist in achieving the infill dwelling targets for the City of Kwinana by providing appropriate residential densities given the site's context as demonstrated in this Report.

DRAFT EASTERN RESIDENTIAL INTENSIFICATION CONCEPT PLAN (ERIC)

The City released the draft Eastern Residential Intensification Concept (ERIC) plan for comment in November 2005. It remains a draft as it was never formally adopted by the WAPC. ERIC is considered by the City as an effective strategic plan, used by the City to guide the preparation and consideration of district and local structure planning, providing an additional layer of detail to the JDSP. ERIC aims to define the planning framework by which urban subdivision and development can occur in the most coordinated manner, recognising the strategic importance of the land contained within the study area, as acknowledged by the City of Kwinana.

The ERIC identifies structure planning across the subject site with land uses including Residential R20, Primary School, Local/District Recreation and Commercial Centre (refer **Figure 8**).

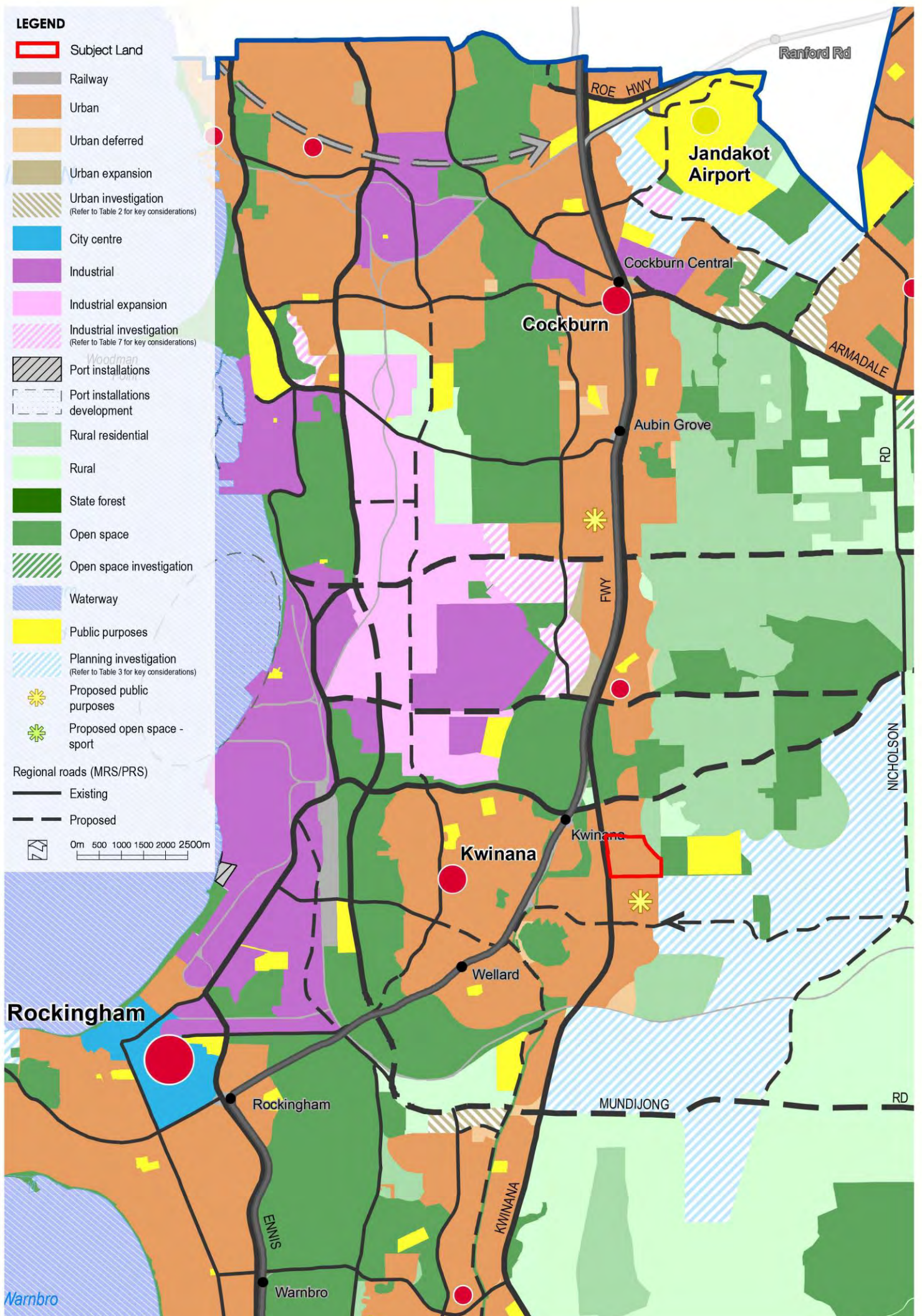


Figure 7 South Metropolitan Peel Sub-regional Planning Framework

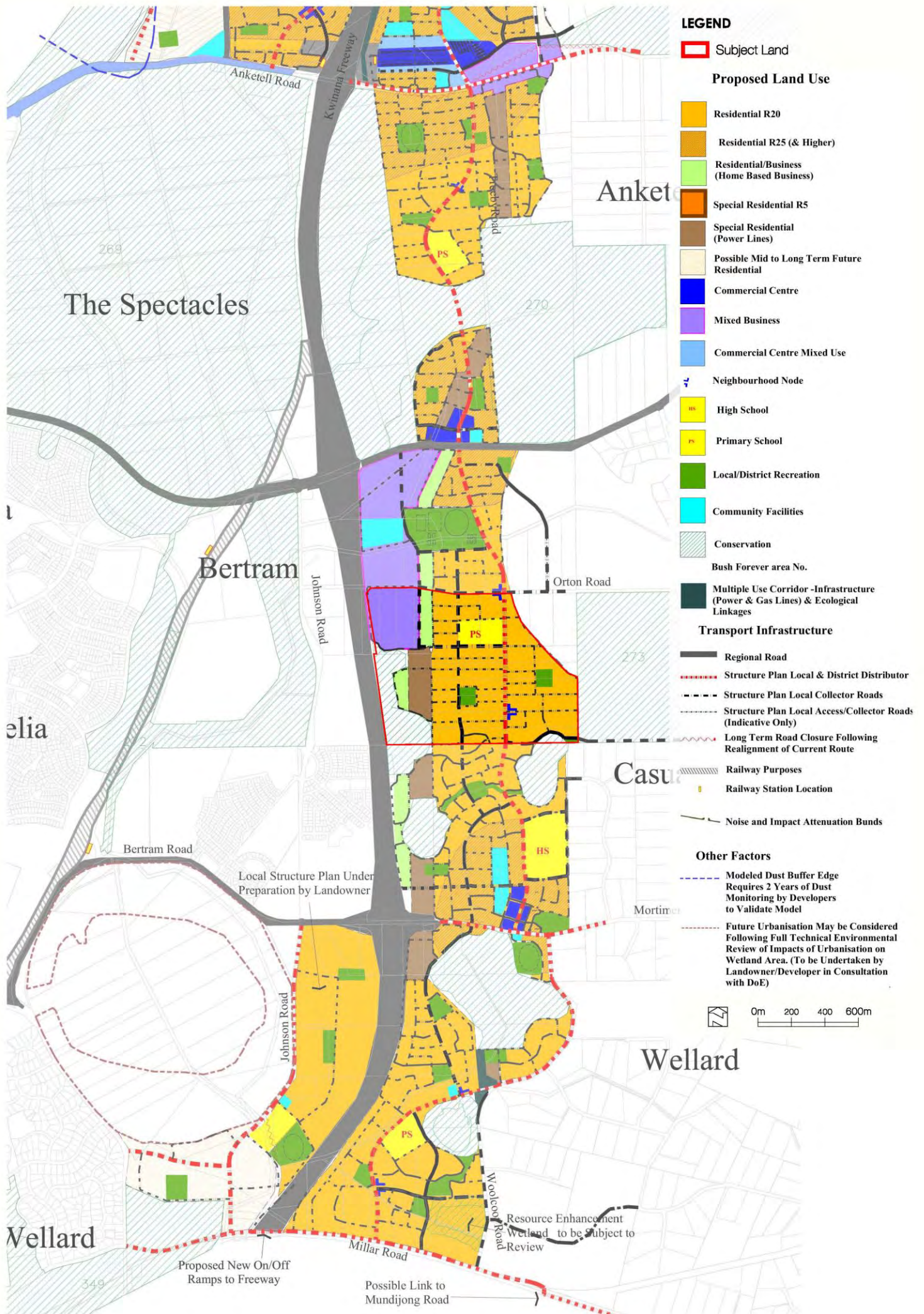


Figure 8 Eastern Residential Intensification Concept

1.5 RELEVANT PLANNING POLICIES

STATE PLANNING POLICIES

OPERATIONAL POLICY – LIVEABLE NEIGHBOURHOODS

Liveable Neighbourhoods (LN) is the WAPC's operational policy guiding the design and approval of structure plans for green field sites. The objective of LN is the delivery of new developments that provide high quality living, working and recreational environments, thereby contributing to the successful implementation of the State Planning and State Sustainability Strategies. The Structure Plan meets the aspirational requirements of LN, with a particular focus on the following key aims:

- an urban structure based on interconnected, safe and walkable neighbourhoods;
- creating a sense of community, identity and a sense of place;
- providing a variety of lot sizes and housing types to cater for the diverse housing needs of the community at a density that can support local services and public transport; and
- maximising land efficiency wherever possible.

STATE PLANNING POLICY 3.7 PLANNING IN BUSHFIRE PRONE AREAS – BUSHFIRE POLICY FRAMEWORK

State Planning Policy 3.7 Planning in Bushfire Prone Areas (SPP 3.7) forms the foundation for land use planning to address bushfire risk management in Western Australia. SPP 3.7 is used to inform and guide decision makers, referral authorities and proponents on achieving acceptable fire protection outcomes on planning proposals in bushfire prone areas.

In support of SPP 3.7 and pursuant to 'State Planning Policy 3.4 – Natural Hazards and Disasters', the Guidelines for Planning in Bushfire Prone Areas sets out a range of matters that need to be addressed at various stages of the planning process, to provide an appropriate level of protection to life and property from bushfires, and to avoid inappropriately located or designed land use, subdivision and development on land where a bushfire risk is identified.

Bushfire considerations form an integral part of the structure plan design, as outlined in **Section 2.2** of this report and the Bush Fire Hazard Assessment and Management Plan attached at **Appendix C**.

STATE PLANNING POLICY 3 URBAN GROWTH AND SETTLEMENT

State Planning Policy 3 Urban Growth and Settlement (SPP 3) establishes the broad principles and considerations which apply to planning for urban growth and settlements in Western Australia. As a result of the existing undeveloped nature of the site, SPP 3 is required to be taken into consideration as part of the structure planning process. This Structure Plan complies with the following objectives of SPP 3:

- To promote a sustainable and well-planned pattern of settlement across the State, with sufficient and suitable land to provide for a wide variety of housing, employment, recreation facilities and open space.
- To build on existing communities with established local and regional economies, concentrate investment in the improvement of services and infrastructure and enhance the quality of life in those communities.
- To manage the growth and development of urban areas in response to the social and economic needs of the community and in recognition of relevant climatic, environmental, heritage and community values and constraints.

- To promote the development of a sustainable and liveable neighbourhood form which reduces energy, water and travel demand whilst ensuring safe and convenient access to employment and services by all modes, provides choice and affordability of housing and creates an identifiable sense of place for each community.
- To coordinate new development with the efficient, economic and timely provision of infrastructure and services.

STATE PLANNING POLICY 5.4 – ROAD AND RAIL TRANSPORT NOISE AND FREIGHT CONSIDERATIONS IN LAND USE PLANNING

The WAPC’s State Planning Policy 5.4 Road and Rail Transport Noise and Freight Considerations in Land Use Planning (SPP 5.4) aims to promote a system in which sustainable land use and transport are mutually compatible. The policy and associated guidelines apply to proposals for new noise-sensitive developments and is applicable given the proximity of the site to the Kwinana Freeway.

A Transportation Noise Assessment has been undertaken to address the requirements of SPP 5.4 (**Appendix D**) and is discussed in **Section 3.8**.

LOCAL PLANNING POLICIES

LOCAL PLANNING POLICY NO. 1 LANDSCAPE FEATURE AND TREE RETENTION

The City of Kwinana’s Local Planning Policy No. 1 (LPP 1) objectives are to ensure that an appropriate level of information concerning significant trees and landscape features is provided at each stage of the planning framework, and to ensure that retention of significant trees and landscape features are optimised through the strategic and statutory planning framework to retain the character of the area.

LPP 1 requires a Local Landscape Feature and Tree Retention Strategy to be submitted to the City of Kwinana at the Local Structure Planning stage. An initial assessment of the significant trees and landscape features on the subject site has been undertaken, which has informed the Landscape Feature and Tree Retention Strategy included in **Appendix J**. As per the requirements of LPP 1, the Local Landscape Feature and Tree Retention Strategy comprises the following plans:

1. Existing Landscape Features on Site
2. Landscape Features to be Retained
3. Existing Significant Trees on Site
4. Significant Trees Proposed to be Retained and Removed

The Strategy also includes the Tree Survey Data included in a spreadsheet which identifies the location, species and size of the significant trees on site.

The Significant Trees Proposed to be Retained and Removed Plan identifies the protection methods and ongoing maintenance measures for trees proposed to be retained, as follows:

- All trees identified for retention at the detailed subdivision and engineering design stage should be clearly marked and a tree protection zone (TPZ) prepared prior to the commencement of subdivision works.
- Construction management plans should be prepared in compliance with the tree protection plan.
- Protective fencing should be erected around tree protection zones for trees proposed to be retained.
- No building materials are to be stored or disposed of within the tree protection zone.
- Placement of fill should not be stored or built up around the trunk of retained trees.
- Preparation of chemicals, refuelling and washing down and cleaning equipment should not occur within tree protection zones.

- Use of vehicles / machinery including parking should be prohibited within the tree protection zone.
- Seek arborist advice for proposed level changes or excavation within the tree protection zones.
- Where roots within the tree protection zone are exposed by excavation, temporary root protection should be installed to prevent them drying out. It is not acceptable for roots within the tree protection zone to be pruned with machinery such as backhoes or excavators.
- Pruning wounds should not be treated with dressings or paints. Seek arborist advice prior to pruning.
- Seek arborist advice for remedial works for any tree damage that has occurred during the construction process.
- Maintain mulch to a depth of 50-100mm around base of tree. Where existing landscape within the tree protection zone remains unaltered mulch may not be required.
- Monitor soil moisture levels during and post construction works.
- Supplementary watering to retained trees may be required where works are in proximity of the trees.
- All weeds should be removed by hand or controlled with appropriate use of herbicide to minimise disturbance to soil.
- Continue to monitor tree health during maintenance period.

The findings of the Landscape Feature and Tree Retention Strategy have been considered in the Development Concept Plan (**Figure 13**), and discussed in **Section 3.2**.

It is noted that the Local Landscape Feature and Tree Retention Strategy will be updated as the Development Concept Plan is refined, including an assessment of the structural health of all Significant Trees.

LOCAL PLANNING POLICY NO. 6 GUIDELINES FOR STRUCTURE PLANNING IN THE CASUARINA CELL

The City of Kwinana's *Local Planning Policy No. 6 – Guidelines for Structure Planning in the Casuarina Cell* (LPP 6) provides guidance on the district planning matters that should be considered during the preparation of Local Structure Plans within the Casuarina Urban Development zone, to ensure subdivision and / or development proceeds in an orderly and proper manner across the Casuarina Cell. The Casuarina Cell comprises three precincts; the Northern Precinct; Central Precinct in which the subject site is located; and the Southern Precinct (refer **Figure 9**).

LPP 6 identifies matters structure plans should address in the Casuarina Cell with specific requirements for each precinct. **Tables 3 and 4** identify how this Structure Plan addresses these requirements.

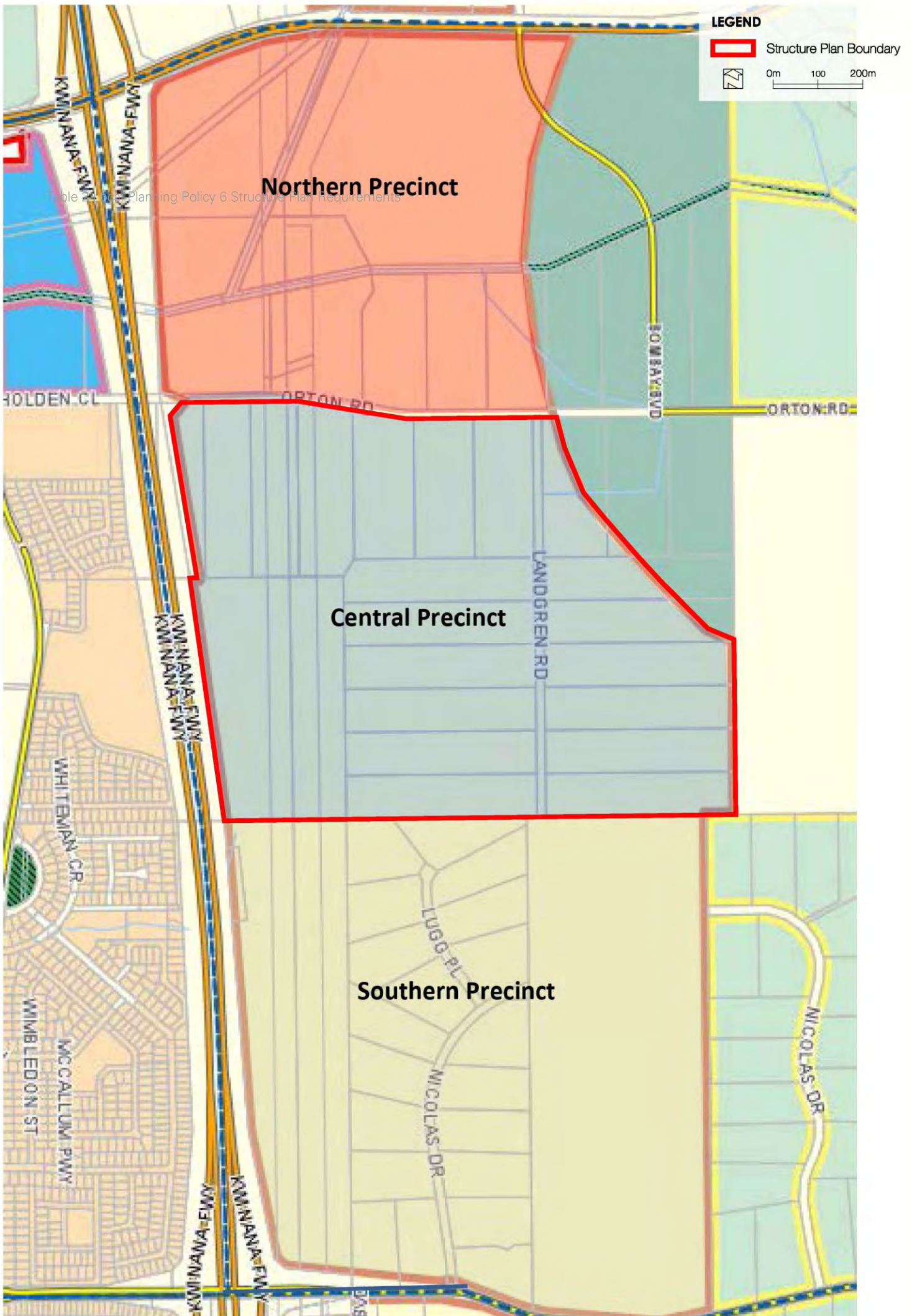


Figure 9 Local Planning Policy No. 6 – Guidelines for Structure Planning in the Casuarina Cell

TABLE 3 LOCAL PLANNING POLICY 6 STRUCTURE PLAN REQUIREMENTS - CASUARINA

CASUARINA CELL STRUCTURE PLAN - GENERAL REQUIREMENTS	ADDRESSED IN STRUCTURE PLAN
<p>Bushfire Protection – structure plans must consider bushfire protection requirements. The City will not support structure plans where vulnerable and high-risk land uses are proposed in a manner in which the associated risk cannot be sufficiently mitigated.</p>	<p>A Bushfire Management Plan has been prepared to address the requirements of SPP 3.7 as discussed in Section 2.2 and included in Appendix C, which will ensure compliance with this requirement.</p>
<p>Compatible land uses in the vicinity of the mushroom farm – evidence obtained from onsite noise studies, odour studies and modelling will be required where sensitive land uses are proposed in the vicinity of the mushroom farm on Lot 1 (45) Orton Road Casuarina to demonstrate that proposed land uses will not be exposed to unacceptable odour and noise emissions, to the satisfaction of the City.</p>	<p>Onsite noise and odour assessments have been undertaken as discussed in Section 2.1 and in Appendix B – Environmental Assessment Report. The Structure Plan has been designed to ensure sensitive land uses will not be impacted by the mushroom farm through appropriate separation by locating the Service Commercial land use area opposite it, in the north-western corner of the site. In addition, Orton Road and the power easement will provide suitable separation to residential development.</p>
<p>Interface treatment between Development and Rural zones - in locations where the boundary of a Structure Plan, within the Development zone, abuts the Rural Water Resource zone, the following potential land use compatibility matters should be taken into account and appropriately mitigated:</p> <ul style="list-style-type: none"> • The potential impact of future land uses within the Development zone on the visual amenity (light emissions, fencing and landscaping) and character of the Rural zone; and • The potential impact of land use activities (noise, dust and odour) within the Rural zone on future sensitive land uses within the Development zone. 	<p>The Structure Plan design has considered the interface of the subject site with the abutting Rural Water Resource zone by:</p> <ul style="list-style-type: none"> • Providing a R10 density code range along the eastern sections of the Structure Plan area. • Locating POS on the eastern edge of the Structure Plan boundary. • As depicted on the Development Concept Plan locating roads along eastern edge of the Structure Plan boundary. • Limiting residential land use along the edge of the Structure Plan boundary. • Balance lots created within the Rural Water Resource zone adjacent to the Structure Plan area will be of a size consistent with rural lifestyle lots, which will provide a transition to larger lots to the east. These lots, which there are three, are unlikely to be used for extensive rural uses given their site.
<p>Local Water Management – stormwater drainage should be contained within each precinct, and peel sub-drains should be upgraded to an appropriate standard in accordance within the DCP.</p>	<p>A Local Water Management Strategy has been prepared as discussed in Section 3.6 and included in Appendix F, which addresses these requirements.</p>
<p>Residential Densities should accord with Liveable Neighbourhood principles with higher densities located near the activity centre or areas of higher amenity, such as POS.</p>	<p>The residential densities depicted on the Structure Plan have been are in accordance with Liveable Neighbourhood principles, as discussed in Section 3.3.</p>

TABLE 4 LOCAL PLANNING POLICY 6 STRUCTURE PLAN REQUIREMENTS - CASUARINA CENTRAL PRECINCT

CENTRAL CELL STRUCTURE PLAN REQUIREMENTS	ADDRESSED IN STRUCTURE PLAN	REFERENCE IN STRUCTURE PLAN REPORT
i) A Primary School site located near the intersection of Landgren Road and Orton Road.	A Primary School is located near the intersection of Landgren Road and Orton Road, as depicted on the Structure Plan Map. This location is also generally consistent with the JDSP and ERIC, which are key strategic planning documents for precinct.	Structure Plan Map
ii) POS co-located with the Primary School to the satisfaction of the City and the Department of Education.	POS is co-located with the Primary School, which provides sufficient room to accommodate a senior-sized oval and pavilions. Liaison with the Department of Education has been undertaken to confirm the location and design of the POS, which satisfies the Department's requirements.	Section 3.4
iii) A maximum of 80% of the total POS requirement in the Central Precinct shall be provided within the precinct with the shortfall (maximum 20%) being provided as a cost contribution through the DCP.	<p>As discussed in Section 3.4 the allocation and distribution of POS on the Structure Plan has been based on several key criteria as listed below:</p> <ul style="list-style-type: none"> • A senior-sized oval being co-located with the Primary School. • The protection of TEC vegetation. • The protection of Geomorphic Wetlands and the provision of their buffers. • The protection of significant trees. • Drainage. <p>Consequently, these factors combined result in a maximum of 8% POS provision being exceeded within the Structure Plan area.</p>	Section 3.4
iv) Landgren Road as the main north-south road link through the Casuarina Cell.	Landgren Road is identified as the main north-south road link through the Casuarina Cell, providing a connection to Orton Road to the north through to the Casuarina South precinct. Landgren Road will be upgraded to the requisite urban standard to include footpaths, kerbing and piped drainage. Landgren Road will operate as a Neighbourhood Connector, and is anticipated to carry less than 5,000 vehicles per day at its full capacity.	Section 3.7
v) The identification of a site for a Local Centre (commercial and activity centre) (800m2 retail floor space) provided at the intersection of Landgren Road and Orton Road, either in the Central Precinct or the North Precinct. – need discussion	As discussed in detail in Section 3.3 a Local Centre has been provided on Landgren Road, immediately south of the Primary School Site. This location is equidistant from the Anketell South (north of Thomas Road) and Casuarina South neighbourhood centres, in accordance with the City of Kwinana's recommendation.	Section 3.3

CENTRAL CELL STRUCTURE PLAN REQUIREMENTS	ADDRESSED IN STRUCTURE PLAN	REFERENCE IN STRUCTURE PLAN REPORT
vi) Commercial uses and floor areas should be consistent with the City's Local Commercial and Activity Centres Strategy (2013).	A Service Commercial land use area is located in the north-western corner of the subject site on the western side of the powerline easement, consistent with the City's Local Commercial and Activity Centres Strategy, as well as other key strategic planning documents including the JDSP and ERIC. As discussed in Section 3.3 and Appendix H , the extent of the commercial area may need to be reduced at an appropriate time in the future to respond the poor accessibility, and the over provision of commercial / mixed business areas within proximity to the subject site.	Section 3.3
vii) As part of the submittal of a structure plan, the applicant shall consider and address the key land uses proposed in the Jandakot Structure Plan and Eastern Residential Intensification Concept for this Precinct area.	The land use distribution and allocation depicted on the Structure Plan is consistent with the land uses identified on the JDSP and ERIC as referenced throughout this report.	Structure Plan Map

LOCAL PLANNING POLICY PLANNING FOR BUSHFIRE PROTECTION GUIDELINES

The objective of Local Planning Policy Planning for Bushfire Protection Guidelines, is to provide for an appropriate level of protection to life and property from bush fires and avoid inappropriately located or designed land uses, subdivision and development on land where a bush fire risk is identified.

The Policy states that the City of Kwinana adopts the WAPC's Planning for Bush Fire Protection Guidelines as a Local Planning Policy. The WAPC's SPP 3.7 and Guidelines have been discussed in **Section 1.5**, and addressed in the Bushfire Management Plan in **Appendix C**.

LOCAL PLANNING POLICY PUBLIC OPEN SPACE

The City of Kwinana's Local Planning Policy on Public Open Space requires structure plans to identify areas of regional and district open space, in accordance with the City of Kwinana's Community Infrastructure Plan, and include notional locations of local open space areas in addition to other land use elements.

The Policy sets out location requirements for where POS shall be provided, and landform requirements for the design of the POS. The Policy also includes provisions regarding POS credits for drainage facilities and wetlands. A POS plan and POS calculation have been prepared to address the requirements of this Policy, included in **Section 3.4**.

LOCAL PLANNING POLICY NO.2 STREETSCAPES

The City of Kwinana's Local Planning Policy No.2 Streetscapes (LPP 2) objectives are to enhance the character of local streets through the delivery of an urban street canopy; and encourage attractive streetscapes and enhance neighbourhood amenity. LPP 2 requires structure plans to include a Landscape Masterplan, to generally include:

- Indicative areas of irrigated and dry garden bed and turf proposed to be handed over to the City.
- Indicate number and locations of bores.
- Indicative proposed planning palettes.

- Indicative number, location and species of all proposed trees.
- Indicative existing trees to be retained.
- Indicative locations of footpaths and service alignments and setbacks between street tree planting locations and footpaths/services.

A Landscape Strategy is included in **Appendix I**, which addresses the requirements of LPP 2, noting that additional detail will be provided at the subdivision stage.

LOCAL PLANNING POLICY NO. 7 UNIFORM FENCING

Local Planning Policy No. 7 Uniform Fencing (LPP 7), recognises the importance for appropriately managed, uniform fencing to provide for good quality visual and aesthetic outcomes where it adjoins the public domain including roads and areas of Public Open Space.

The policy requirements and criteria will be addressed as a condition of subdivision / development requiring the construction of uniform fencing in key areas.

LOCAL PLANNING POLICY NO. 8 DESIGNING OUT CRIME

Local Planning Policy No. 8 Design Out Crime (LPP 8) sets out design guidelines to reduce the likelihood of crime and anti-social behaviour in the City of Kwinana. The objectives of LPP 8 are to encourage urban development within the City to incorporate 'designing out crime principles'; provide guidance in relation to built form outcomes that support in actual and perceived crime and anti-social behaviour; and guidance on design and assessment of planning proposals.

The principles of LPP 8 for designing out crime have been addressed in the Structure Plan map and Concept Plan (**Figure 13**), in the type and location of land uses, the local movement network, and through the location of POS, which have been designed to encourage natural surveillance and provide clear sight lines to public realm areas from adjacent buildings. Additional principles have been applied, as demonstrated in the Landscape Strategy in **Appendix I**, including effective lighting of public places, and appropriate landscaping design.

2 SITE CONDITIONS AND CONSTRAINTS

2.1 ENVIRONMENTAL CONSIDERATIONS

An Environment Assessment Report has been prepared by Strategen Environmental to support the Structure Plan (refer **Appendix B**).

The assessment included analysis of previous flora and fauna surveys undertaken by 360 Environmental on the site, as well as a target spring flora survey and follow up fauna assessment to confirm aspects of the flora and fauna. Due to limited site access the target spring flora survey was undertaken over CDN landholdings only.

Due to the presence of Matters of National Environmental Significance (MNES) within the subject site, a referral under the requirements of EPBC Act will be undertaken.

ENVIRONMENTAL ASSETS AND CONSTRAINTS

VEGETATION AND FLORA

Regional vegetation association mapping identifies the Heddle vegetation complex and Bassendean Complex Central South is mapped within the subject site. Historically, a significant portion of the subject site has been cleared of remnant vegetation on site and has been fragmented through semi-rural land development and clearing. There are some remaining areas of vegetation on several lots.

No species listed as Threatened under the EPBC Act or Threatened under the Wildlife Conservation Act 1950 (WC Act) were recorded in the survey area.

A total of three Priority flora species were observed within the subject site: *Cyathochaeta teretifolia* (P3), *Jacksonia gracillima* (P3) and *Tetraria* sp. *Chandala* (P2).

In the target spring flora survey, no new conservation significant species or locations were observed in the survey area. Suitable habitat was observed for *Drakaea elastica*. It is noted the area identified as suitable habitat is located within the central POS area on the Structure Plan and; therefore, will be retained.

The vegetation condition through the subject site ranged from Excellent to Completely Degraded and is primarily in a Completely Degraded state.

Two sub-communities of the Federally listed Threatened Ecological Communities (TEC) *Banksia* woodlands of the Swan Coastal Plain under the EPBC Act were determined to occur within the subject site: Central *Banksia attenuata* – *Eucalyptus marginate* woodlands, and Central *Banksia attenuata* – *Banksia menziesii* woodlands. Based on the approved Conservation advice on *Banksia* woodlands of the Swan Coastal Plain, due to the varying densities and condition of the species identified, only 11 remnants, equating to 9.21ha are considered to be representative of *Banksia* woodlands of the Swan Coastal Plain (refer *Banksia* Woodland TEC Plan in **Appendix B**). Further flora and vegetation surveys will be required across the lots that have not been surveyed.

The western portion of the subject site is mapped as an Environmentally Sensitive Area (ESA), associated with the CCW and its designated 50m wetland buffer.

FAUNA

The fauna assessment observed three different Black Cockatoo foraging habitats totalling 26.39ha on the subject site.

The fauna assessment identified a total of 56 trees to contain hollows greater than 120mm. No evidence of breeding or roosting was recorded during the survey. A follow-up Black cockatoo hollow assessment was undertaken to assess the trees containing hollows and determine their suitability for Black Cockatoo nesting. Due to access restrictions this was undertaken on the CDN No. Pty Ltd landholdings only. The assessment found that of the 31 trees identified with hollows greater than 120mm, 28 were unsuitable for nesting. 3 trees had potential to be suitable for nesting; however, require closer inspection of each hollow.

WETLAND, BUFFERS AND RECLASSIFICATION

Regional geomorphic mapping indicates that four wetlands categorised as either Resource Enhancement Wetland (REW) or Conservation Category Wetland (CCW).

All three CCWs are located within the south western corner of the subject site, adjacent to the Kwinana Freeway.

The REW is located within the north eastern corner of the subject site and extends further east of the site. Within the subject site (Lot 32), the REW has been cleared and is now a grassed paddock. Lot 45 contains the western most tip of the wetland and the vegetation is still intact, whereas Lot 31 contains the majority of the REW, and the vegetation is also still intact.

MUSHROOM FARM

A mushroom farm is located to the north of the subject site within the Casuarina North Structure Plan area (Costa Mushroom Farm). As a result of the mushroom farm leakages from odour sources, an odour assessment has been undertaken on the mushroom farm (Environmental Alliances 2015) and is included in the **Appendix B**. In the absence of any formal guidance, the 2.5ou, 1 hour, 99.5 Percentile contour is used as a criterion for acceptable odour impacts.

The 2.5ou, 1-hour contour was modelled for a number of scenarios/sources, and based on the 2.5ou, 1-hour contours that were modelled, only the northern most portion of Lots 1, 50 and 49 were impacted under some scenarios and at worst, extending only 50 m into the subject site.

Additional field odour assessments were undertaken by Strategen-JBS&G in 2019 and 2020, and are included in **Appendix B**.

A noise assessment was undertaken (Herring Storer Acoustics 2015) to determine acoustic impacts of the mushroom farm, which determined noise exceedances may impact the north western corner of the subject site.

LANDFORM AND SOILS

LANDSCAPE AND TOPOGRAPHY

The pre-development topography of the site is reasonably flat across the northern half, ranging between RL 17m – RL 19m AHD. The south-eastern portion of the site is relatively low-lying with a low point of approximately RL 11m AHD associated with a wetland.

There is a sand dune in the southern portion of the site with a peak elevation of RL 32m AHD. It is anticipated this sand will be cut to create fill for use elsewhere in the site due to the significant height differential with the surrounding area.

SOILS

The subject site is characterised as Bassendean Sand, with the soil type generally pale to grey sands at the surface with yellow sands at depth (refer **Appendix E-Engineering Servicing Report** for Geotechnical Mapping). It is free draining and well suited to urban development. There are some isolated pockets containing silty, clayey sands and sandy silt, which are generally associated with wetland areas.

ACID SULFATE SOILS

The Department of Environment and Conservation's Acid Sulfate Soils (ASS) risk mapping shows the majority of the site as having "*moderate to low risk of acid sulphate soils within 3 metres of the natural soil surface*" (refer **Appendix E – Engineering Servicing Report** for ASS Mapping). Small sections in the southern, south-western and north-eastern portions of the site are identified as having "*high to moderate risk of ASS occurring within 3 metres of natural soil surface*". An ASS investigation will be conducted across the subject site to advise appropriate management measures prior to subdivision.

CONTAMINATION

A search of the Department of Water and Environmental Regulation (DWER) Contaminated Sites Database did not identify any contaminated sites present within the subject site. There is currently no identified contaminated material; however, uncontrolled fill has been observed within the subject site which may have introduced hydrocarbons or Asbestos contaminated material.

Land uses such as agriculture and horticulture are likely to have previously occurred on portions of the subject site. Practices associated with these activities may have introduced fertilisers and pesticides to the subject site.

A Preliminary Site Investigation will be required prior to subdivision to determine if a Detailed Site Investigation is required.

GROUNDWATER AND SURFACE WATER

GROUNDWATER

The Perth Groundwater Atlas indicates the superficial aquifer base at the site is approximately -15m AHD.

FLOWS AND LEVELS

Groundwater levels in the Atlas are representative of typical end of summer groundwater levels and estimate groundwater levels ranging from 11m AHD to 16m AHD across the site, with groundwater flow in a westerly direction.

Eleven groundwater monitoring wells installed across the subject site observed the depth to groundwater varies from at surface to 15m below surface in elevated areas.

QUALITY

A total of four groundwater quality sampling occasions were undertaken. Results of the groundwater quality sampling are included in the LWMS. Whilst the TN and TP concentrations within the groundwater are above the concentrations in the relevant guidelines, they represent typical groundwater nutrient values for the Swan Coastal Plan for land that has been historically used for farming purposes.

SURFACE WATER

The subject site is located within the Peel-Harvey Coastal Catchment. No natural surface water flows occur within the subject site.

The site has four topographic surface water catchments. In three of the catchments, runoff travels as diffuse overland flow towards topographic low points. On one catchment, runoff is directed towards the Peel Sub P1A drain located in the north eastern area of the subject site.

MODELLING

A local arterial drainage strategy is presented in the Jandakot Drainage and Water Management Plan, which provides allowable discharges from each catchment post-development. The post-development catchments are completely contained within the subject site area and contribute to the Peel Sub1A drainage.

Surface water modelling shows that the 1 in 100 year ARI top water level in the drain upstream of Landgren Road is 16.35m AHD.

2.2 BUSHFIRE HAZARD

The majority of the subject site is designated as bushfire prone on the WA Map of Bushfire Prone Areas (DFES 2018). A Bushfire Management Plan (BMP) has been prepared by Eco Logical Australia in support of the Structure Plan (refer **Appendix C**). The BMP is a strategic level plan which identifies the bushfire protection measures to be applied to development on the subject site to accommodate compliance with:

- State Planning Policy 3.7 Planning in Bushfire Prone Areas (SPP 3.7);
- Guidelines for Planning in Bushfire Prone Areas; and
- Australian Standard for the construction of buildings in bushfire-prone areas (AS3959-2009).

The purpose of the BMP is to:

- Provide guidance on how to plan for and manage the bushfire risk to future life and property assets of the project area through implementation of a range of bushfire management measures;
- outline how future on-site assets can be protected during the summer months when the threat from bushfire is at its peak, particularly when existing fire appliances in the area may be unable to offer an immediate emergency suppression response and therefore, development planning and design should aim to provide mitigation strategies that protect future life and property from bushfire as a priority; and
- achieve consistency with the objectives and requirements of the current bushfire risk management planning regulations, policy and guidelines.

IDENTIFICATION OF BUSHFIRE HAZARD ISSUES

The on-site vegetation extent is proposed to be cleared to enable development of a significant urban built footprint amongst areas of landscaped / managed POS and various easements. Therefore, the current on-site vegetation extent is not considered to be a bushfire hazard issue post-development, as these hazards can be managed through a staged clearing process, adequate separation of future built assets from classified vegetation, and ongoing fuel management.

On this basis the bushfire hazards within and adjacent to the subject site are readily manageable through standard management responses and compliance with acceptable solutions outlined in the Guidelines and AS 3959-2009. These management measures will be factored into the development design as early as possible to ensure a suitable, compliant and effective bushfire management outcome is achieved to ensure protection of future life and property assets.

Demonstration of compliance with the relevant requirements of SPP 3.7, the Guidelines and AS 3959-2009 at future planning stages will also depend on the developer's ability to coordinate the timing and staging of clearing and development works within the subject site with those developments proposed on adjacent landholdings in the aim of avoiding bushfire impacts from temporary retained vegetation.

Updated BMPs will be prepared to support subsequent planning applications where relevant and will contain re-assessments of bushfire risk including Bushfire Attack Level assessments.

2.3 HERITAGE

ABORIGINAL

A search of the Department of Planning, Lands and Heritage Aboriginal Heritage Inquiry System confirmed there are no registered Aboriginal Sites in or immediately adjacent to the subject site.

EUROPEAN

The State Heritage Office's inherit database did not identify any Federal, State or Local heritage places or listings within the subject site.

2.4 MOVEMENT NETWORKS

REGIONAL ROADS

The road network surrounding the site is legible and well defined, providing the site with good levels of connectivity at a local and regional level to locations in all directions. The subject site is connected to the regional road network via Bombay Boulevard to the north which provides a connection to Thomas Road and the Kwinana Freeway.

DISTRICT AND LOCAL ROADS

LANDGREN ROAD

Landgren Road runs which in a north-south direction through the subject site, is classified as an access street under Main Roads WA's Functional Road Hierarchy. Landgren Road is subject to the residential speed limit of 50kph. No traffic data is currently available for Landgren Road.

Landgren Road is constructed with a single pavement of approximately 6.0 metres wide. It is constructed to the southern boundary of the subject site. Landgren Road is expected to be extended to connect through to Thomas Road and to Mortimer Road (via Nicolas Drive), forming the major link between Thomas Road and Mortimer Road.

ORTON ROAD

Orton Road which runs along the northern boundary of the subject site, is classified as an access street under Main Roads WA's Functional Road Hierarchy between Bombay Boulevard and the Kwinana Freeway. East of Bombay Boulevard it is classified as a local distributor road. It is constructed with a single pavement of approximately 7.0 metres wide, and is subject to a 70 kph speed limit west of Bombay Boulevard. The portion of Orton Road adjacent to the subject site has a total traffic volume of 533 vehicles per day in both directions.

BOMBAY BOULEVARD

Bombay Boulevard is located north of the subject site. It is classified as an access street in the Main Roads WA's Functional Road Hierarchy and is constructed with a single rural standard pavement of approximately 7.0 metres wide. Bombay Boulevard currently carries 1,446 vehicles per day, with the capacity to carry up to 13,500 vehicles per day.

Bombay Boulevard currently provides access from Orton Road to Thomas Road, although only the southern portion of Bombay Boulevard is a gazetted road. The northern portion of Bombay Boulevard is in private ownership, meaning there is no legal access to Thomas Road. Formal access to Thomas Road is an essential requirement as Thomas Road provides the only connection to the Kwinana Freeway and the Kwinana Town Centre from the Casuarina Central Precinct. This section of Bombay Boulevard or an appropriate alternative must be secured as part of the adoption of the Casuarina North Structure Plan.

The ongoing use of Bombay Boulevard is appropriate and will assist with traffic distribution. A future connection to the Landgren Road extension through the Casuarina North Precinct will rationalise intersections to Thomas Road.

MORTIMER ROAD

Mortimer Road runs in an east-west direction along the southern boundary of the Casuarina South Precinct, providing a connection to the Kwinana Freeway. It is classified as a regional distributor in Main Roads WA's Functional Road Hierarchy. It is constructed with a single pavement of approximately 8.5 metres wide. It carries 4,913 vehicles per day with capacity to carry up to 13,500 vehicles per day.

THOMAS ROAD

Thomas Road is located along the norther boundary of the Casuarina North Precinct, and runs in an east-west direction, providing a regional link between Armadale in the east to Kwinana in the west. It is constructed with a single pavement of approximately 7.5 metres wide. Traffic data indicates a daily traffic demand of 17,622 vehicles per day, with capacity to carry up to 22,000 vehicles per day.

KWINANA FREEWAY

The Kwinana Freeway located along the western edge of the Structure Plan area, although without direct access, is a Primary Regional Road under the control of Main Roads WA. It provides a regional link between Perth and the South West of the State. It is constructed with four lanes adjacent to Casuarina and carries 75,851 vehicles per day between Thomas Road and Mortimer Road.

PUBLIC TRANSPORT

There are currently no existing public transport services within the subject site. The subject site is approximately 1.6km from the Kwinana railway station as the crow flies, and just over 3km by public road.

CYCLING

There are currently no cycle facilities within the subject site, however the Western Australian Bicycle Network Plan (2014 -2031) sets out to provide a principal shared route along Orton Road to connect to Byford / Mundijong to Rockingham.

2.5 SERVICE INFRASTRUCTURE

An Engineering Services Report has been prepared by Cossill and Webley in support of the Structure Plan (refer **Appendix E – Engineering Services Report**). The objective of the Services Report is to identify the matters to be addressed as part of the subdivision stage and to confirm that the site is capable of being developed for residential purposes. The Engineering Services Report suggests the site is capable of the development as accommodated by the Structure Plan with the logical, progressive extension of infrastructure and base capacity.

WATER RETICULATION

An existing 220mm water reticulation main is located in Orton Road. The Water Corporation advised that no water reticulation planning has been undertaken for the subject site. Notwithstanding, no water servicing issues are anticipated.

Water Corporation planning advice indicates a large steel water main may need to be constructed through the structure plan area from the south, travelling along Landgren Road, then headlining west at Orton Road and extending beneath Kwinana Freeway. It is anticipated due to the size of these mains that they would be pre-funded by the Water Corporation at a later date.

SEWERAGE RETICULATION

The existing sewerage reticulation near the subject site comprises a pressure main in Orton Road. There is insufficient existing sewer network in the vicinity to service the subject site.

Water Corporation wastewater planning information identifies the subject site as falling within two sewer catchments. The majority of the site will be serviced with conventional gravity reticulation that grades towards a pump station located north of Orton Road. Coordination with adjoining landowners north of Orton Road has occurred by CND No. Pty Ltd with an agreement reached to ensure the development of the subject site has access to the pump station location.

A small section of the southern portion of the subject site falls within a sewer catchment which grades southwards.

POWER

The Western Power Network Capacity Mapping Tool indicates the electricity network will have more than 20,000kVa remaining capacity in the future. This is adequate capacity to supply the future residential development in the subject site. This will be formally confirmed with Western Power during the detailed planning and design phase of development.

There are two existing 330kV overhead transmission lines located parallel to the western boundary of the subject site, which are protected via an easement.

There are also co-located overhead high and low voltage distribution lines along Orton Road and Landgren Road, which will need to be reconstructed as underground power as part of the development.

All future power infrastructure within the proposed development will be underground and fed from existing infrastructure in the adjacent areas. It is not anticipated any off-site headwork upgrades will be required.

TELECOMMUNICATIONS

The subject site is within the fibre footprint of the National Broadband Network (NBN), and development can be serviced with optic fibre under their roll-out scheme for greenfield developments.

The subdivider will be required to provide pit and pipe service infrastructure within the subject site, which will be handed over to NBN Co upon completion.

GAS

ATCO Gas has advised there will be sufficient capacity in the surrounding network to service the proposed development. ATCO Gas has advised the preferred option is to extend a main from Thomas Road along Bombay Boulevard to the subject site, however, this relies on a pressure main being constructed in Thomas Road by the time development commences. If this has not occurred, ATCO Gas will consider alternative arrangements.

STORMWATER MANAGEMENT

The stormwater management will be undertaken consistent with the DWER water sensitive design practices. The system will consist of lot soakwells, piped road drainage system, biofiltration areas, and stormwater storage detention and infiltration areas.

2.6 SITE CONTEXT

A Structure Plan Context Plan has been prepared to illustrate the likely road layout and land use distribution in the Casuarina North and Casuarina South precincts in relation to the subject site (refer **Figure 10**).

The Structure Plan Context Plan includes the Development Concept which was prepared in support of the Casuarina North Precinct Plan. The Development Concept in the Casuarina North Precinct depicts District Open Space on Orton Road, adjacent to the senior-sized oval within the subject site. If the District Open Space is developed, the potential future reconfiguration of Orton Road will assist the final merger of additional recreation facilities north of Orton Road in the form of District Open Space within the Northern Precinct.

A Structure Plan is yet to be prepared for the Casuarina South precinct and the location of land uses is still to be determined, however based on the requirements of LPP 6 and the City of Kwinana Draft Community Infrastructure Plan, the likely land uses within the southern precinct have been identified, including:

- High School;
- Local Sporting Ground (with a facility building and kiosk) – multipurpose sports and recreation facility incorporating a grass active playing space with training level lighting that can accommodate a wide variety of sports (ideally collocated with the high school);
- District Community Centre (7,000m²) – largescale multipurpose community centres, caters for higher order social and community needs;
- District Youth Centre (7,000m²) – caters for both indoor and outdoor activities; and
- Local Centre (6,000m²).

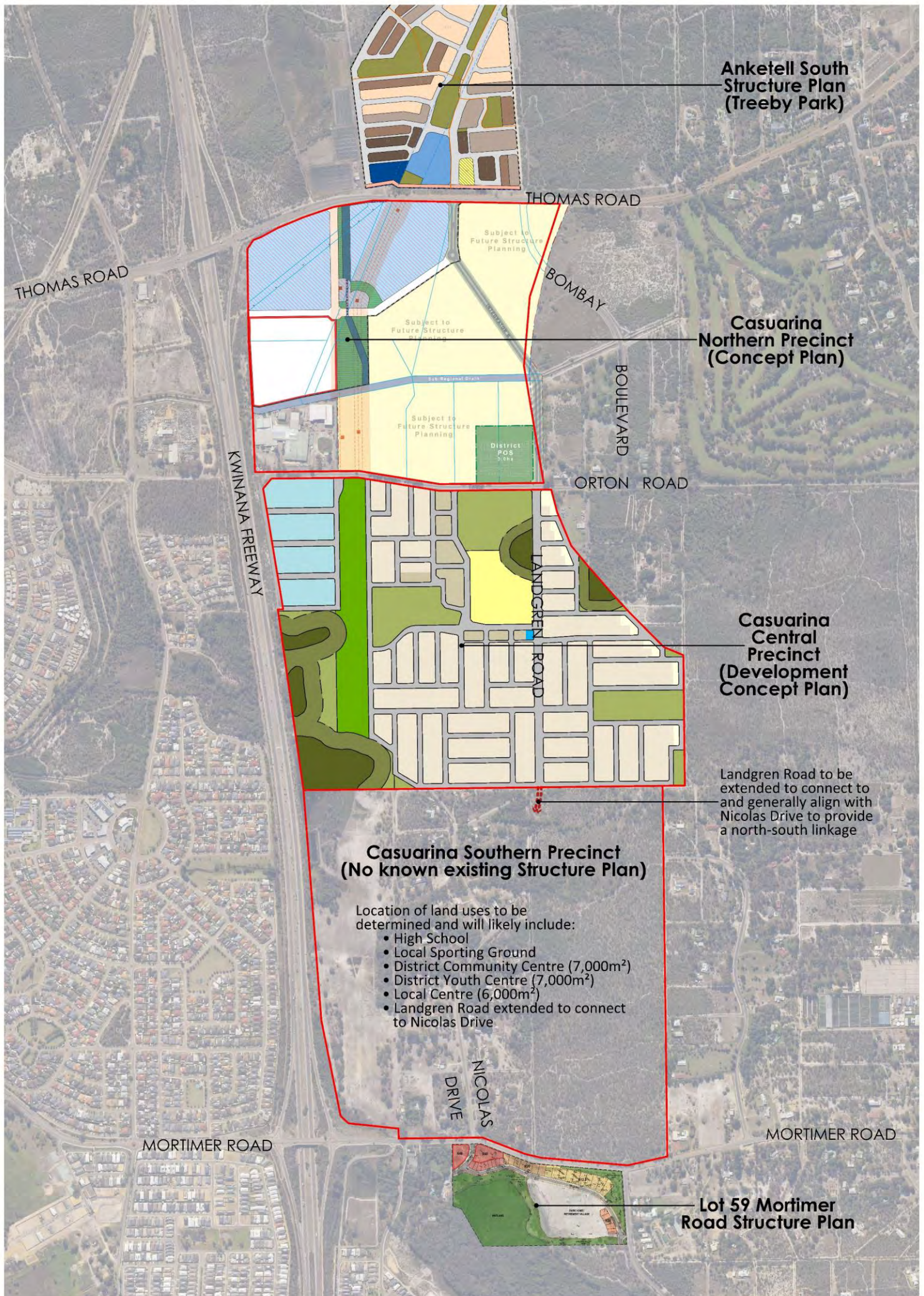


Figure 10 Structure Plan Context

3 STRUCTURE PLAN

The Casuarina Central Structure Plan provides for a diverse range of housing choices through of the application of R-Code densities and density ranges including R10, R25-R40 and R40-R60, which are identified on the Structure Plan Map. A Service Commercial area is located in the north-western corner of the site, adjacent to the Kwinana Freeway and Orton Road. A Primary School and co-located POS for a senior-sized oval is located at the intersection of Landgren Road and Orton Road. The Structure Plan also depicts the areas of POS and drainage areas, informed through urban design and hydrological modelling, as well as the Neighbourhood Connector (Landgren Road) and Major Access Streets informed through urban design and traffic modelling.

3.1 DESIGN PRINCIPLES

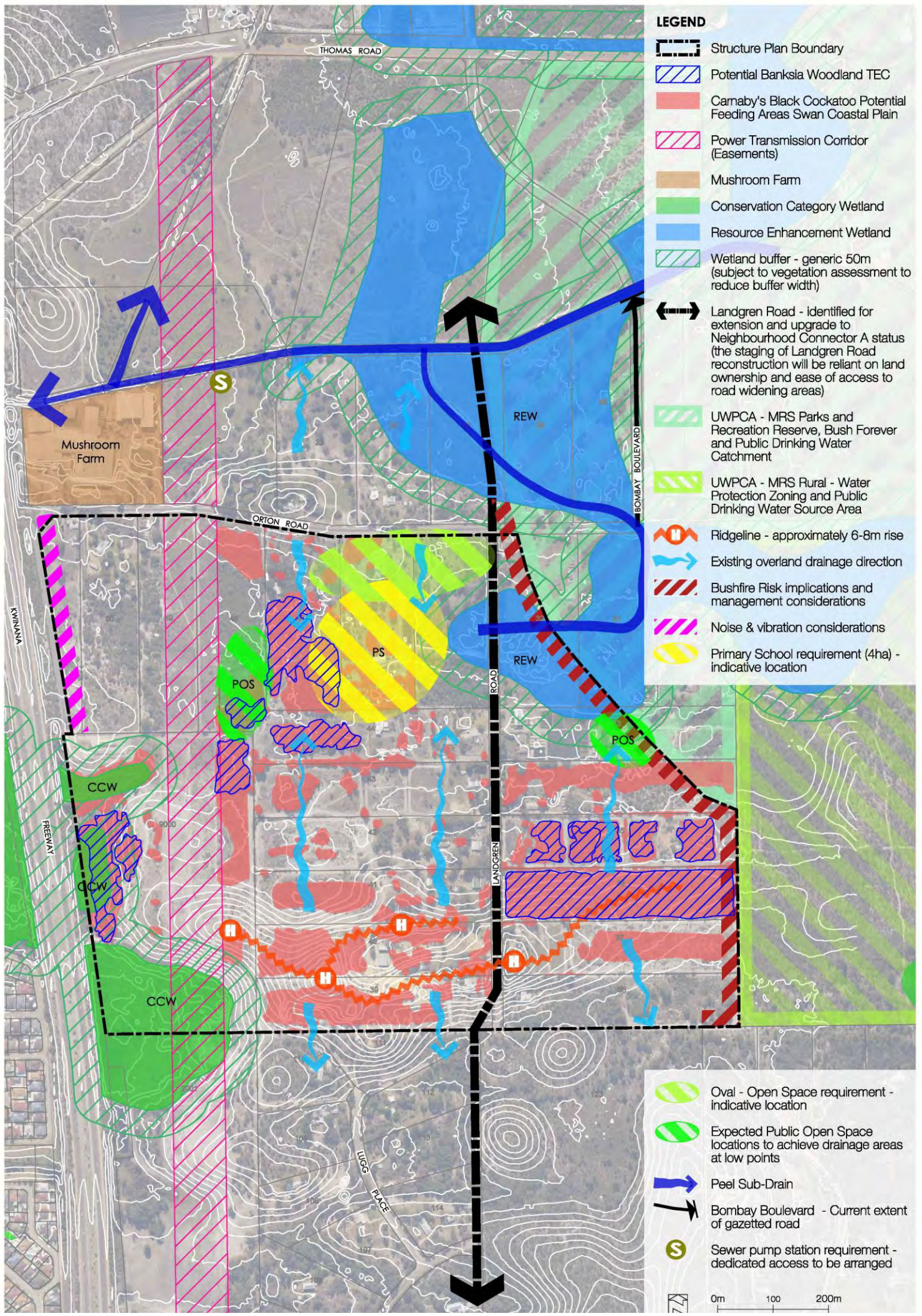
STRUCTURE PLAN RESPONSE TO PHYSICAL ASSETS AND CONSTRAINTS

SITE ANALYSIS






















An Opportunities and Constraints exercise was undertaken to inform the design considerations over the site. As detailed in Section 2 of this report, the subject site contains some environmental and physical constraints requiring addressing including existing wetlands and associated buffers, landform, vegetation, and existing road network. All of these were contributing factors for the design response. The principle considerations are identified on the Issues and Considerations Plan in **Figure 11** and Site Opportunities at **Figure 12**, along with appropriate design responses in **Table 5**.

TABLE 5 DESIGN RESPONSE TO SITE ANALYSIS

OPPORTUNITIES	
ANALYSIS ITEM	RESPONSE
Existing Natural Landform	Create a development pattern that responds to the existing natural landform. Sand will be cut from the existing high point in the southern portion of the site to create fill for use else in the structure plan area due to a significant height differential with the surrounding area. This will contribute to a more efficient, cost effective and sustainable development outcome significant reducing the amount of imported fill required.
Land Use Diversity	Consider opportunities for non-residential development, to provide an appropriate interface with the Kwinana Freeway and the Mushroom Farm, and to diversify the land uses on offer. This will also assist with the employment offering. However, as will be detailed in Section 3.3 , concerns are raised with the extent of the Service Commercial area provided adjacent to the Freeway.
Response to existing vegetation	Interrogate vegetation condition and opportunities for retention of Banksia Woodland of Swan Coastal Plain to provide high-quality POS and to ensure appropriate assessment under the EPBC Act.
Existing Infrastructure	Utilising existing Power Transmission Corridor to locate local subdivision roads and drainage within the power easement for development efficiencies. Some recreation opportunities may also be supported in this area.
POS amenity and wetland responses	Provide for CCW and REW protection including buffers and appropriate interfaces for robust POS design.
Precinct Structure and Accessibility	Promote extension and upgrade of Landgren Road to form main north-south connection through the subject site.
Fauna permeability	Consider locating proposed vegetation retention to achieve continuous connection to the adjacent Bush Forever site.
Community infrastructure	Incorporate the requirement for Primary School and co-located Oval Open Space. Consider the long-term accessibility of this infrastructure in the final subdivision design.
Pedestrian network	Provide interconnected pedestrian network via key network integrating open space with the Primary School and future district open space.
Landform response	Orientate local road directions for efficient earthworks and drainage flows.
CONSTRAINTS	
Land Use allocation	Consider appropriate interface response to the Kwinana Freeway in terms of noise and vibration implications. Potential for non-residential in this location.
Power Easement visual amenity	Existing Power Transmission Corridor (Easement) acts as a development constraint and potential visual impact. Consider appropriate landscape opportunities.
Landuse interface - Mushroom	Mushroom farm may incur limited noise and odour issues, consider compatibility of surrounding land uses.
Fire Management and vegetation retention considerations	Consider bushfire management solutions for development in proximity to Bush Forever reserve and Rural – Water Protection zone.
Landuse interface – Water Resource Zone	Provide an appropriate interface treatment to the adjacent Rural Water Resource zone, considering visual amenity and the character of the Rural zone.
Existing natural landform	Consider natural low points for drainage conveyance in roads and open space networks and consideration of earthworks required to natural ridgeline.
Resource Enhancement classified Wetlands	Investigate wetland integrity, quality and opportunity for development.



LEGEND

-  Structure Plan Boundary
-  Potential Banksia Woodland TEC
-  Carnaby's Black Cockatoo Potential Feeding Areas Swan Coastal Plain
-  Power Transmission Corridor (Easements)
-  Mushroom Farm
-  Conservation Category Wetland
-  Resource Enhancement Wetland
-  Wetland buffer - generic 50m (subject to vegetation assessment to reduce buffer width)
-  Landgren Road - Identified for extension and upgrade to Neighbourhood Connector A status (the staging of Landgren Road reconstruction will be reliant on land ownership and ease of access to road widening areas)
-  UWPCA - MRS Parks and Recreation Reserve, Bush Forever and Public Drinking Water Catchment
-  UWPCA - MRS Rural - Water Protection Zoning and Public Drinking Water Source Area
-  Ridgeline - approximately 6-8m rise
-  Existing overland drainage direction
-  Bushfire Risk implications and management considerations
-  Noise & vibration considerations
-  Primary School requirement (4ha) - indicative location
-  Oval - Open Space requirement - indicative location
-  Expected Public Open Space locations to achieve drainage areas at low points
-  Peel Sub-Drain
-  Bombay Boulevard - Current extent of gazetted road
-  Sewer pump station requirement - dedicated access to be arranged

0m 100 200m

Figure 11 Issues and Considerations

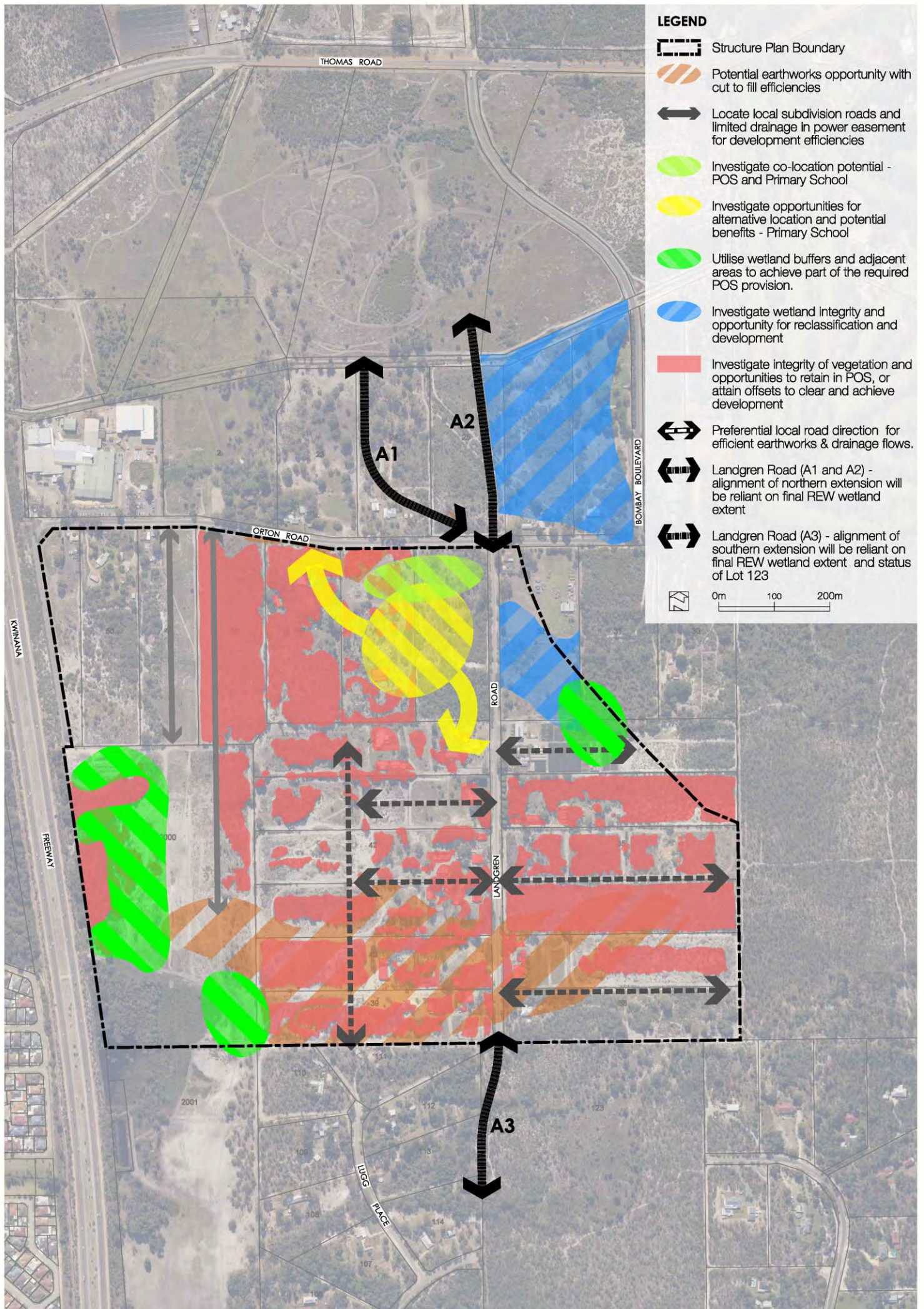


Figure 12 Site Opportunities

CONCEPT CHARACTERISTICS

In response to the Opportunities and Constraints analysis, specific design characteristics were prioritised in preparing the Development Concept Plan (**Figure 13**). These primary considerations are identified in **Table 6**.

TABLE 6 KEY DESIGN CHARACTERISTICS

CHARACTERISTIC	COMMENT
Drainage Requirement	Orient local roads and position POS to support drainage direction and minimise earthworks.
Development Interface	Design appropriate development interfaces to achieve an engaging development edge to the precinct features and perimeter.
Diverse Housing Choices	Provide the ability for a wide diversity of housing choices, with areas of higher density adjacent to areas of amenity and the school.
View Corridors	Subdivision road direction should enhance view line potential of the open space and conservation opportunities, enhancing the sense of place.
Public Open Space	Position POS in response to existing site characteristics and significant vegetation. Interlink POS elements with a robust pedestrian pathway network. Accommodate local wetlands in POS network in order to enhance their amenity and accessibility. Provide for recreation opportunities through provisions of a co-located senior sized oval with the Primary School. Ensure convenient and easy access to future District Open Space to be located with the Norther Precinct.
Service Commercial Node	A Service Commercial Activity Node has been integrated to provide a suitable interface to Kwinana Freeway and Mushroom Farm activities. The street network surrounding the Activity Node will be directed to provide direct access to it.
Environmental Sustainability	Create a development that embraces environmental sustainability through water sensitive urban design, vegetation retention and integration of wetlands.
Relationship with natural surrounds	Enhance and maximise the relationship between development and the natural surrounds including adjacent bushland, Rural - Water Protection zone.
Surveillance	Provide surveillance and activation adjacent high amenity open space focal areas to maximise safety and use of these community assets.
Aesthetic Streetscapes	Promote a high amenity and highly aesthetic streetscape network, by incorporating pedestrian paths and street tree planting along key connectors.
Access	Provide a hierarchy of highly connected streets ensuring a permeable, legible and robust vehicle and pedestrian network.

3.2 DEVELOPMENT CONCEPT PLAN

The Development Concept Plan in **Figure 13** has been prepared to support the Structure Plan by providing an illustration of the development intent. This illustration is indicative only; however, it assists in understanding and guiding residential subdivision responses, density locations and movement network recommendations. Importantly, the Development Concept Plan establishes the key design themes in which the subdivision and development will be guided. Key elements / Development Concept Plan notes include:

- 1. Landgren Road:** Opportunity for this neighbourhood connector to be configured as a character tree-lined boulevard to provide improved amenity for the structure plan area. This road configuration will also aid lot accessibility and road functionality.
- 2. Recreation Oval:** Senior-sized oval specifically located to respond to the District Open Space facility in the Casuarina Northern Precinct, providing the potential to form a consolidated POS area. The potential future reconfiguration of Orton Road will assist the final merger of additional recreation facilities north of Orton Road in the form of District Open Space within the Northern Precinct. The oval has also been oriented to retain existing vegetation along the eastern edge adjacent to Landgren Road.
- 3. Primary School:** Primary School specifically located to share the recreation opportunities of the oval space and achieve an efficient land area outcome. Primary School pedestrian and vehicle access has been achieved through a highly permeable road network. Primary School located generally in accordance with JDSP and ERIC. The Primary School has been positioned to retain the existing REW and a 30m REW buffer if required. Refer to **Section 3.4** for further detail in this regard.
- 4. Road Network:** Achieve an interconnected and hierarchical street network that provides legible accessibility to the range of community assets.
- 5. Public Open Space:** Situated in specific locations to achieve vegetation retention, drainage functionality and the following benefits:
 - estate entry view-line focal point/node;
 - landscaped to accommodate key active play area(s);
 - fauna corridor opportunities to the adjacent Bushland;
 - drainage within landscaped swales;
 - easily accessible and within walking distance for all residents;
 - retention of Banksia Woodland TEC areas;
 - retention of significant vegetation;
 - pedestrian linkages; and
 - placemaking benefits through character retention.
- 6. Land Use Diversity:** Opportunity for local employment benefits through Service Commercial development. This proposal addresses interface issues of Kwinana Freeway and Mushroom Farm activities. These uses located in accordance with recommendations of JDSP and ERIC although the ongoing viability of these uses in this location is questioned as detailed in **Section 3.3**.
- 7. Lot Diversity - Traditional Lots:** Main lot type, front vehicle access and solar efficiencies for buildings through cardinal oriented road network. A diverse lot size range is achievable in the structure with a variety of lot depths and frontage widths.
- 8. Terrace Lots:** Medium density, rear accessed lots to enhance key points of estate amenity and achieve a specific streetscape appearance. These lot types have the flexibility to achieve alternative and affordable housing within the development.

9. **Wetland Protection:** Development outcome promotes retention of REW and CCW wetlands and their buffers in these locations given their integral local environmental functionality and amenity benefits.
10. **Power Easements:** Promote local road interfaces to the existing power easements, with the ability for local drainage to enter the power easement for the benefits of sustaining appropriate landscaping as an amenity enhancer.
11. **Pedestrian Access:** Resident access to public amenity areas has been prioritised with the recommendation of formalised pedestrian links across power easement.
12. **Bushfire Mitigation:** Perimeter roads located to moderate fire impact and promote asset protection to adjoining dwellings.



Figure 13 Development Concept Plan

3.3 LAND USE

The primary land use within the Structure Plan area is residential, supplemented by a Primary School, service commercial area, a local centre, with open space and an associated internal road network. A summary of the land uses and their areas are provided in **Table 6**.

RESIDENTIAL

The Structure Plan will provide for a variety of housing choices through the designation of a range of residential R-Codes (through the application of the RMD codes). The density codes and their applicable lot typology are detailed in **Table 7**. The density codes and density code ranges are outlined on the Structure Plan. The allocation of residential densities shall be identified at the subdivision stage through the provision of a Residential Density Code Plan.

The density code ranges applied on the Structure Plan are consistent with those recommended by the WAPC's Structure Plan Framework August 2015. A description of the density codes, and density code ranges and their intent are outlined below:

- a) Residential R10: This density code will apply to the land on the eastern edge of the land to provide larger sized lots to accommodate an appropriate interface to the adjacent Rural Water Resource zone. This density code will accommodate single detached dwellings (refer **Figure 14** for extract Development Concept Plan depicting R10 density code).
- b) Residential R25 – R40: This density code range will apply to the majority of land within the Structure Plan, maximising flexibility for the design to respond to market conditions and demand. It will provide for front accessed lots and traditional housing with a range of lots sizes intended. This range will also ensure that individual development stages can provide a range of lot and housing types without any particular stage being oversupplied with a particular lot type. Based on the developer's intent and in response to market conditions, it is expected that the majority of housing will be in the R25-R30 range, with medium density housing of an approximate R40 density code applying closer to key access roads and public amenity (refer **Figure 15** for extract Development Concept Plan depicting R25-R40 density code range).
- c) Residential R40 – R60: This density code range will apply to the land adjacent to the Neighbourhood Parks and the Primary School in the central and northern portion of the Structure Plan area. This density range provides the necessary flexibility to accommodate lots of a smaller and more affordable size to complement the predominately traditional and small traditional sized lots throughout the Structure Plan area. Lot vehicle access will be achieved through a mix of rear laneway and front accessed lots (refer **Figure 16** for extract Development Concept Plan depicting R40-R60 density code range). It will provide an opportunity for attached terrace housing outcomes, which have been deliberately located adjacent areas of high amenity to overlook and interact with POS. Possible two-storey development in these areas will provide a desirable streetscape character and framing to the POS experiences. This coding provides the potential to diversify the lifestyle opportunities for the Structure Plan area.

TABLE 7: STRUCTURE PLAN LAND USE SUMMARY

STRUCTURE PLAN ZONE / RESERVE	AREA (HA)
Residential	48.9109
Service Commercial	7.1018
Commercial (Local Centre)	0.0701
Roads	7.8057
Public Open Space (including drainage)	28.7341
Public Purpose – Primary School	3.5003
Total	96.1229

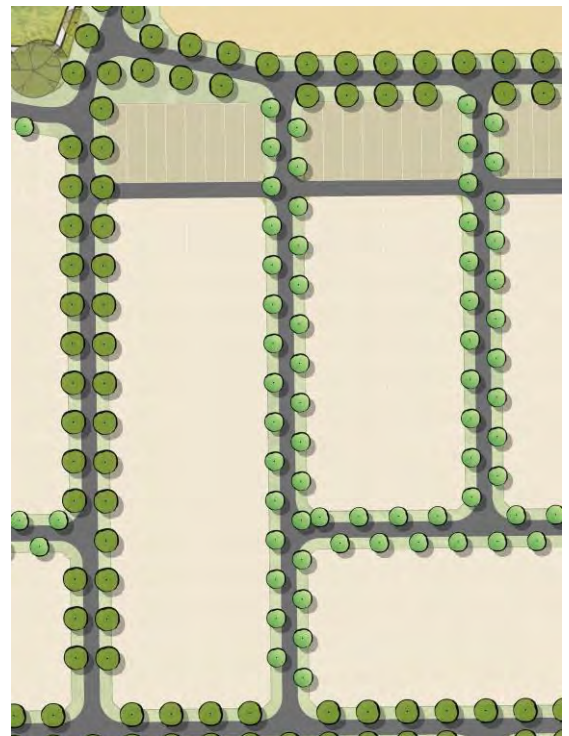


Figure 15 Development Concept Extract - Residential R25 – R40 density code range.



Figure 14 Development Concept Extract - Residential R10 density code (along the eastern edge of the site).



Figure 16 Development Concept Extract - Residential R40 - R60 density code range.

TABLE 8: DENSITY CODE RANGES AND LOT AND HOUSING TYPOLOGY

DENSITY CODE RANGE	TYPICAL LOT/DWELLING TYPE AND SIZE
Residential R25 – R40	<p>Narrow, front accessed lots:</p> <p>7.5m x 30.0m – 225m²</p> <p>8.5m x 30.0m – 255m²</p> <p>Traditional, front accessed lots:</p> <p>10.5m x 25.0m – 262m²</p> <p>12.5m x 25.0m – 312m²</p> <p>15.0m x 25.0m – 375m²</p> <p>10.5m x 30.0m – 315m²</p> <p>12.5m x 30.0m – 375m²</p> <p>15.0m x 30.0m – 450m²</p> <p>Squat, front accessed lots:</p> <p>15.0m x 20.0m – 300m²</p> <p>12.5m x 25.0m – 312.5m²</p> <p>15.0m x 25.0m – 375m²</p>
Residential R40 – R60	<p>Narrow, front accessed lots:</p> <p>8.5m x 20.0m – 170m²</p> <p>8.5m x 25.0m – 212m²</p> <p>7.5m x 30.0m – 225m²</p> <p>Squat, front accessed lots:</p> <p>10.5m x 20.0m – 210m²</p> <p>12.5m x 20.0m – 250m²</p> <p>10.5m x 25.0m – 262m²</p> <p>12.0m x 15.0m – 180m²</p> <p>Terrace, rear accessed lots:</p> <p>6.0m x 25.0m – 150m²</p> <p>7.5m x 25m – 187m²</p> <p>6.0m x 28.0m – 168m²</p> <p>7.5m x 28.0m – 210m²</p>

DENSITY TARGETS

Liveable Neighbourhoods (LN) recommends that in new urban areas, densities of at least 15 dwellings per urban hectare, and an average of 22 dwellings per site hectare (encompassing land purely zoned for residential purposes) should be provided.

The applicable density targets under the Structure Plan, as measured in accordance with LN is 19.47 lots per net site hectare; based on 952 dwellings.

The density codes applied and the resultant lot typology will accommodate maximum flexibility for the Central Precinct, whilst addressing the needs of the local residential housing market. There are a variety of different lot types which will provide ample opportunities for purchasers to select their lot and a project home to meet their needs.

The Development Concept Plan suggests a potential yield of 952 lots. This could accommodate a total population of 2,666 persons, based on 2.8 people per household in single residential dwellings.

RETAIL AND MIXED BUSINESS

A Retail Needs Assessment (RNA) was undertaken by Taktics4 to determine the market demand and implications for providing a retail centre and service commercial / mixed business area within the Structure Plan area (refer **Appendix H**). Particularly, the RNA assesses the recommendations within the planning framework (i.e. recommendations of LPP 6, JDSP and ERIC) to accommodate the following uses within the subject site:

- A Local Retail Centre of 800m²; and
- A service commercial / mixed business area as an expansion of the mixed business area planning for in the Casuarina North Structure Plan area.

The provision and design of retail activity and service commercial / mixed business land uses within and in proximity to the Structure Plan area are guided by a range of state and local government policies, as follows:

- **SPP 4.2 – Activity Centre Perth and Peel** – allocates a District Centre (Wandi District Centre) in or around the Anketell Road and Kwinana Freeway interchange. It also promotes the spatial planning of neighbourhood and local centres to the responsible local authority.
- **Jandakot District Structure Plan** – allocates the general location of several centres, including Neighbourhood Centres on Thomas Road and Mortimer Road and a local centre on Orton Road within the subject site. It does not allocate the role, function or size of the centres and no formal justification or analysis has been completed to support the spatial planning for these centres and mixed business area. The land use designations shown on the JDSP are indicative only and are intended to guide the more detailed planning, environmental and land capability studies to confirm the land use designations and arrangements depicted on the plan. The final land use outcomes are intended to be determined via more detailed local structure planning.
- **Draft Eastern Residential Intensification Concept** – broadly reconfirms the general location for commercial centres and mixed business areas previously adopted by the JDSP, including the neighbourhood centres in Thomas Road and Mortimer Road, and the smaller local centre in Orton Road. ERIC does not allocate roles or sizes to any of the centres and does not provide evidence or justification to support the spatial planning and role of the centres and mixed business area.
- **City of Kwinana – Local Commercial Activity Centres Strategy (LCACS)** – identifies a range of other activity centres and mixed business precincts in the vicinity of the Structure Plan area. This includes a Local Centre on Orton Road in the subject site, expected to generate 800m², which is only capable of supporting a small number of convenience-based shops without an anchor supermarket.

The LCACS also identifies a total of 40,000m² of other retail floor space allocation within commercial mixed business areas.

- **Anketell South Local Structure Plan** - provides a 1.35ha area for a commercial activity site, which is capable of accommodating 3,500m² of retail floor space. The Structure Plan yields about 420 dwellings, capable of supporting a population of 1,300 residents. The commercial activity centre therefore has a very limited catchment to the north of Thomas Road and will rely heavily on the catchment to the south of Thomas Road to be commercially sustainable.
- **Draft Casuarina North Local Structure Plan** – intends to generate 13.9ha of service commercial area and 6.5ha of Special use. The service commercial zone is intended to primarily provide for showroom and bulky goods retail type uses. Based on the concept plan included in the advertised Casuarina North Local Structure Plan, it is estimated approximately 1,800 jobs will be generated by the service and commercial and special uses in this locality

As such, despite the intent of the planning framework for a retail centre and mixed business / service commercial centre to be provided in the subject site, there is very little documented supporting evidence that these uses are sustainable. It is more likely the commercial market will respond in the following matter:

- **Wandi District Centre** – initially expected to develop as a single and possible double supermarket-based district centre. It remains unclear if a discount department store would be capable here.
- **Anketell South Neighbourhood Centre** – limited residential catchment, servicing the Anketell South Structure Plan community and the Casuarina North and Central Structure Plan communities. May only attract a smaller supermarket operator and ultimately function as a small neighbourhood or local centre.
- **Mortimer Road Neighbourhood Centre** – limited catchment, expected to service the Casuarina south and Wellard East Structure Plan communities.

- **Local Centres** – The local convenience centres allocated within JDSP and ERIC are all within 1km of higher order convenience-based neighbourhood or district centres, hindering the ability of local centres to capture sustainable amount of retail sales to be viable centres.

The Structure Plan has responded to the recommendations of the RNA as outlined below.

LOCAL RETAIL CENTRE

A Local Centre of approximately 700m² has been provided on Landgren Road, immediately south of the Primary School site. This location is equidistant from the Anketell South (north of Thomas Road) and Casuarina South neighbourhood centres, and in accordance with the City of Kwinana's recommendations.

MIXED BUSINESS / SERVICE COMMERCIAL AREA

As highlighted, the planning framework incorporates a precinct for non-residential uses and activities that span across the Casuarina North and Central Structure Plan areas.

The Casuarina Central Structure Plan intended service commercial / mixed business area will form part of the broader service commercial / mixed business area to the north. The area is 7.5ha and is anticipated to accommodate 22,500m² of floor space and create opportunities for 650 employees.

The overall area incorporating service commercial / mixed business zones in both the Casuarina North and Casuarina Central Precincts is therefore 28.7ha, capable of containing 86,000m² of floor space and generating 2,450 employees.

The RNA considers the amount of floor space within this area to be excessive for the population it is intended to serve, and in the context of the additional service commercial / mixed business in the Wandi District Centre. Additionally, the location of the service commercial / mixed business precinct has compromised exposure and accessibility within the Structure Plan area.

Despite this consideration, the service commercial / mixed business area has been included in the Structure Plan to address the requirements of the policy framework including the JDSP and ERIC. It is acknowledged the extent of the service / commercial area may be need to be scaled back to reflect the conditions of the market or alternatively be removed all together when development area matures. The extent of the service commercial / mixed business area can be modified at an appropriate time, either through a Structure Plan amendment, or alternatively in 10 years' time when the Structure Plan expires. Surrounding development and market conditions are likely to have changed during this period regardless.

As recognised in the policy framework, provision of the service commercial / mixed business area in this location is twofold, and importantly can act as an appropriate buffer to the mushroom farm to the north, and will assist sensitive land uses not being impacted by unacceptable noise and odour emissions identified in **Section 2.1**.

3.4 OPEN SPACE

The location and purposes of each POS has addressed site constraints generally associated with the CCWs on the western edge of the site, the TEC Banksia Woodland of the Swan Coastal Plain in various localities across the site, significant trees as defined in the City's LPP 1, the power easement, natural contours and drainage requirements of the site.

The Structure Plan has consolidated the existing fragmented environmental areas to retain and conserve viable significant CCWs, TEC and fauna habitat, and the highest quality vegetation, and thereby, creating an outcome which will ensure long-term protection and management of the proposed POS areas for conservation.

The open space has also considered regional ecological linkages, with the POS areas providing an east west ecological link across the site.

The POS provisions satisfy Council's requirements identified in LPP 6 to co-locate an oval with a Primary School near the intersection of Landgren Road and Orton Road.

The POS design has also been developed to satisfy Council's requirements in LPP 1, to retain significant trees and landscape features where viable.

The POS areas are located within the walkable catchments of each residence; providing only a short walking distance for all residents to at least passive recreation areas. The POS will be linked by the permeable road, shared path and footpath networks.

PUBLIC OPEN SPACE

A POS Calculation has been prepared in accordance with Liveable Neighbourhoods, as detailed in **Table 9**. A total of 12.6060 ha of Open Space is provided on the Structure Plan of differing forms and functions, including active open space, passive open space and wetland buffers, as detailed on **Figure 17** and **Table 8**.

A total of 18.37% POS is provided, identifying a surplus of POS in comparison to the minimum 10% requirement under State Government Planning Policy. The total POS provided will be refined at subdivision stage to ensure the obligations of State Planning Policy are met by the Structure Plan.

The POS will be provided in accordance with the Structure Plan and POS Schedule and will be landscaped by the developer to a standard commensurate to, or above LN requirements and to the satisfaction of the City of Kwinana.

The total POS provision is suitable to the proposed development and composition of land uses. The Landscape Masterplan (**Appendix I**) provides a graphical representation of the public realm vision for the ultimate development of the site.

TABLE 9: PUBLIC OPEN SPACE NETWORK

OPEN SPACE REFERENCE	PURPOSE
1. Neighbourhood Park (Active Play Area)	The POS co-located with the Primary School will be used by residents and the Primary School providing a senior-sized oval. It provides sufficient space to accommodate an oval and pavilions, while still retaining existing trees which are located on the western side of Landgren Road. Liaison with the Department of Education has been undertaken to confirm the location and design of the POS is satisfactory to the Department's requirements. A drainage basin will also be accommodated in the north-eastern corner of the POS.
2. Neighbourhood Park (Tree Retention / Active and Passive)	The POS area retains and conserves high quality vegetation including viable significant Banksia Woodlands of the Swan Coastal Plain and Black Cockatoo Potential Breeding Trees, and suitable habitat for the <i>Drakeaea elastica</i> , and thereby, creating an outcome which will ensure long-term protection and management of the proposed POS areas for conservation. The POS also contains a large number of significant trees in accordance with the requirements of LPP 1. The POS will also provide active and passive recreation opportunities, featuring a shelter and picnic facilities, an adventure playground and irrigated native planting and turf. Pedestrian links will also provide connections to adjacent residential areas and POS.
3. Local Park	Local Park which contains a drainage swale, and forms a linkage with the adjacent CCW and CCW buffer. The park will incorporate pedestrian connections to the adjoining CCW buffer tracks, and will feature non-irrigated native planting.
4. Neighbourhood Park	Neighbourhood park forming a connection with the CCW and CCW buffer, and located on the western side of the power easement. The park will provide pedestrian connections from adjacent residential areas through the power easement. The POS will feature irrigated native planting and turf areas.
5. Local Park	Local park providing drainage function. Features native, non-irrigated planting.
6. Local Park	Local park providing drainage function and ecological linkage with adjacent bush forever site. Features pedestrian links to adjacent residential lots and irrigated native planting and turf.
7. Neighbourhood Park	A neighbourhood park which has been designed in the context of the adjacent Bush Forever site, positioned to provide a continued connection of vegetation, forming a regional ecological linkage. The park will retain and conserve Banksia Woodlands of the Swan Coastal Plain and Black Cockatoo Potential Breeding Trees. Weed eradication and revegetation will be provided where appropriate. The park will feature limestone firebreaks.
8. Local Park	A local park with no drainage function, providing an interface to the adjacent rural water resource area. The POS will feature irrigated native planting.
9. Local Park (incorporates REW buffer)	A local park which incorporates the 30m REW buffer, ensuring protecting of the REW whilst also providing an appropriate interface to the rural water resource area. Existing trees to be retained. Weed eradication and revegetation will be provided as required. A 1-year drainage basin is located in the 30m wide REW buffer.
10. Conservation Category Wetland	The CCW will be preserved, and minimal landscape works are to take place, involving weed eradication and revegetation as required.
11. Conservation Category Wetland Buffer	The CCW buffer will feature limestone footbaths, which will have a dual functionality as firebreaks. Weed eradication and native non-irrigated planting and revegetation will be provided as required.
12. Power Easement	The power easement will incorporate the 1:100 drainage basin. Features an irrigated turf area connection to the adjacent POS 4 (subject to Western Power / City of Kwinana approval). Limestone access tracks to Western Power Towers will also be provided. Non-irrigated native planting and revegetation will be provided, with trees and planting limited to typically 1m in height.



POS PROVISION SUMMARY

①	Neighbourhood Park (Active Play Area - incorporates REW buffer)	4.0744 ha
②	Neighbourhood Park (Tree Retention/Active and Passive)	3.1492 ha
③	Local Park	0.1745 ha
④	Park Neighbourhood	1.0091 ha
⑤	Local Park	0.3165 ha
⑥	Local Park	0.3600 ha
⑦	Neighbourhood Park	2.4363 ha
⑧	Local Park	0.0904 ha
⑨	Local Park (incorporates REW buffer)	0.7840 ha

⑩	Wetland Buffer (CCW)	4.9217 ha
⑪	Wetland Core (REW)	0.4288 ha
⑫	Wetland Core (REW)	0.6158 ha

DEDUCTIONS

Ⓓ1	Drainage Swale (1:1 year event)	0.0450 ha
Ⓓ2	Drainage Swale (1:1 year event)	0.1750 ha
Ⓓ3	Drainage Swale (1:1 year event)	0.0074 ha
Ⓓ4	Drainage Swale (1:1 year event)	0.1970 ha
Ⓓ5	Drainage Swale (1:1 year event)	0.0675 ha
Ⓓ6	Drainage Swale (1:1 year event)	0.0800 ha
Ⓓ7	Wetland Core (CCW)	3.9362 ha
Ⓓ8	Powerline Easement	6.3674 ha

Figure 17 Public Open Space

TABLE 10 PUBLIC OPEN SPACE SCHEDULE

	HECTARES	
Total Structure Plan Area¹		94.3238
Deductions		
Primary School	3.5000	
Service Commercial	6.0898	
Local Centre	0.0701	
CCW Core	3.9362	
Drainage (1:1)	0.5719	
Powerline Easement	6.3674	
Surplus Restricted Public Open Space	5.1813	
Total Deductions	25.7167	
Gross Subdivisible Area		68.6071
Required Public Open Space (10%)		6.8607
PUBLIC OPEN SPACE REQUIREMENTS		
Unrestricted public open space (minimum 80% total)	5.4886	
Restricted public open space (maximum 20% total)	1.3721	
PUBLIC OPEN SPACE PROVISION		
Unrestricted Public Open Space		
POS 1 (incorporates REW Buffer)	4.0602	
POS 2	2.9522	
POS 3	0.0945	
POS 4	1.0091	
POS 5	0.2490	
POS 6	0.2152	
POS 7	2.4363	
POS 8	0.0904	
POS 9 (incorporates REW Buffer)	0.1270	
Total Unrestricted Public Open Space		11.2339
Restricted Public Open Space		
CCW Buffer	4.9217	
REW Core	0.4288	
REW Core 2	0.6158	
Drainage (1:5)	0.5886	
Total Restricted Public Open Space		6.5549
Total Credited Restricted Public Open Space		1.3721
TOTAL CREDITED PUBLIC OPEN SPACE		12.6060
Percentage of Public Open Space Provided (Unrestricted and Restricted POS Contribution)		18.37%

¹ Land area excludes Landgren Road (1.7985 hectares)

WETLANDS AND BUFFERS

CONSERVATION CATEGORY WETLANDS

All three CCWs in the south west corner of the subject site have been prioritised for retention. Implementation of the Structure Plan will lead to long-term conservation of the wetland and subsequent enhancement of their buffer, which is currently completely degraded, providing greater protection for the riparian vegetation within the CCWs.

In relation to the wetland mapping for the largest CCW located within the south western portion of the site, the mapped wetland boundary does not align with the area of intact wetland vegetation that has been mapped by 360 Environmental (2018). The completely degraded state of the western portion of the mapped CCW has been considered in the Structure Plan design, and a 50m buffer has been defined by following the area of intact wetland vegetation.

As part of the future development and prior to subdivision, a detailed wetland assessment will be undertaken to evaluate the wetland's values and accurately map the CCW boundary.

RESOURCE ENHANCEMENT WETLANDS

Consistent with the policy framework, the Primary School and co-located oval is located within the north eastern portion of the subject site, which falls across the western most tip of the REW. Aerial imagery identifies the same REW has been dissected by a road, and has been cleared within Lot 32. This has resulted in a small pocket of REW within Lot 45 becoming isolated from the remainder of the wetland located further to the east within Lot 31. The Primary School and the oval have been oriented to retain the wetland and a 30m buffer in this location if required.

The remaining REW within Lot 31, which is part of the larger intact wetland vegetation that extends further east into the adjacent Bush Forever site 273 is proposed to be retained, along with the provision of a 30m wetland buffer.

LANDSCAPE DESIGN

A Landscape Masterplan has been prepared by Emerge Associates in order to inform open space development, the LWMP and Bushfire Hazard Assessment (refer **Appendix I**). The Landscape Strategy is indicative only and subject to detailed design at the subdivision stages.

The landscape treatments for the development will occur over a series of distinct areas as outlined below. The project theming, detailing and material selection will inform a cohesive open space network. Refer **Figure 13** which includes the Landscape Concept over the main area of POS.

STREETSCAPES

The streetscapes consist of a variety of treatments from typical residential streets with street trees on standard alignments to wider verges in major access streets which accommodate landscape planting and drainage within adjacent POS areas where necessary.

Street tree planting will be provided along access streets and avenue tree planting will be provided along the Structure Plan area's major access streets. Footpaths will be located in accordance with LN and will be integrated throughout the Structure Plan area.

POS FUNCTIONALITY

The POS is intended to contain public facilities deemed suitable for the intended local population. POS will include a playground area, picnic node with park furniture, expansive open turf areas and swales for local drainage purposes. The CCW and CCW buffers will be revegetated as required to ensure the environmental qualities are preserved. A series of pedestrian paths are provided throughout the POS areas and across the power easement to ensure maximum pedestrian accessibility to and throughout the POS. POS areas will contain a variety of materials that meet the City's long-term maintenance needs. The location of landscape elements within the POS have been arranged for maximum accessibility by all future residents and meeting CPTED and good urban design principles.

3.5 WATER MANAGEMENT

LOCAL WATER MANAGEMENT STRATEGY

A Local Water Management Strategy (LWMS) has been prepared by Hyd2o in support of the Structure Plan (refer **Appendix F**). The LWMS has been developed to establish the concepts and broad level design measures for flood mitigation and stormwater management for the Structure Plan area. The intention of the LWMS is to guide the general stormwater management principles and to guide the preparation of the Urban Water Management Plan(s) (UWMP) that will be prepared at the subdivision stage.

The LWMS has been prepared to:

- provide the conceptual stormwater management framework for urban development;
- describe the proposed design measure and Best Management Practices (BMP) to be incorporated in the stormwater management system;
- minimise development construction costs and ongoing operation and maintenance costs for landowners and the City of Kwinana; and
- to obtain the Department of Water and City of Kwinana's support for the stormwater management strategy.

Key elements of the system which are reflected in the Structure Plan include:

- maintenance of existing CCWs within the site with all stormwater infrastructure located outside of the wetland buffers;
- promotion of infiltration through the soil profile; and
- discharge of the 1 in 100-year events consistent with the Jandakot District Water Management Plan (DoW, 2009).

The stormwater management concept and post development mapping for the site is included in the LWMS. Six main stormwater catchments have been identified in consultation with the project engineers Cossill & Webley, five of which are catchments which infiltrate and one which discharges towards the Peel Sub 1A drain.

Development levels in the site will be largely dominated by fill requirements to achieve adequate separation to groundwater, given the proximity of groundwater levels to natural surface. Whilst it is not envisaged that subsoil drainage will be required within the development, should localised subsoil drainage be required to manage groundwater within the stormwater storage areas this will be investigated at detailed design stage.

Finished lot levels and fill requirements are a detailed design issue to be addressed during the preparation of detailed engineering design drawings and preparation of the UWMP.

3.6 MOVEMENT NETWORK

A Traffic Assessment was completed by Riley Consulting for the Structure Plan and based on the detailed design elements contained on the Development Concept Plan (**Appendix G**). The Structure Plan and supporting Development Concept Plan have been designed based on the recommendations of Liveable Neighbourhoods relating to the movement network. The Movement Network / Road Hierarchy Plan in **Figure 21** describes and supports this approach.

EXTERNAL ROAD NETWORK

The Structure Plan will accommodate a highly permeable grid movement network influenced by the existing road network as depicted on the Development Concept Plan.

As previously discussed, the areas to the north and south of the subject site also require structure plans prior to development. The structure plan which was advertised for the Northern Precinct proposes new road connections to Thomas Road. This will be important connections to the south to enable the Central Precinct development to access Thomas Road in the future.

The traffic modelling undertaken to determine the traffic generated by the structure plan includes the development to the north and south to ensure the future development impacts are assessed on the internal road network and an appropriate road hierarchy is provided for. As discussed in **Section 2.4**, Bombay Boulevard provides a critical link between Orton Road and Thomas Road. It is necessary that Bombay Boulevard remains open until at least the Landgren Road extension is constructed through to Thomas Road. It is preferable for consideration to be given to Bombay Boulevard's ongoing use and possible connection to the Landgren Road extension when in operation, and disconnection from Thomas Road occurs. It is necessary for the State and Local Government to ensure the ongoing use of Bombay Boulevard through necessary acquisition or securing of an appropriate public easement for the section which is with private freehold ownership.

The modelling shows traffic generated by the three land areas accessing Thomas Road and Mortimer Road, and the internal road traffic demands based on Liveable Neighbourhood thresholds.

Depending on the final design of the structure plan in the northern precinct, Orton Road may be diverted to enable a continuous area of District and Local Open Space between the Central and the Northern Precincts as understood to be the preferred open space structure by the City of Kwinana.

INTERNAL ROAD NETWORK

With an indicative dwelling yield of approximately 990 dwellings and the Service Commercial land in the north-western corner of the site, the Structure Plan is forecast to generate 8,676 residential trips and 2,100 commercial trips, resulting in a total of 10,776 trips per day.

The internal road network features a series of roads to complement the surrounding network, as identified in **Figure 21**.

NEIGHBOURHOOD CONNECTORS

Landgren Road is shown to carry less than 5,000 vehicles per day through the subject site, and is therefore to be classified as a neighbourhood connector.

Landgren Road will provide the main north-south spine through the Structure Plan area and will also provide access to the future primary school.

Landgren Road will extend through to Southern Precinct via an extension from the end at its current location when structure planning for the Southern Precinct occurs.

A 25m wide road reservation is identified for Landgren Road to provide a boulevard style treatment (Refer **Figure 18**). This road treatment is similar to that applied to Honeywood Boulevard in the suburbs of Aubin Grove / Wandu to the north.

ACCESS STREETS TYPE C

The higher order residential streets within the subject site will be classified as Access Road Type C as traffic demands are below the threshold of 3,000 vehicles per day.

A 6.5 to 7.0m road pavement is suited to these residential streets with a residual verge of a minimum of 4.5m. A minimum road reservation width of 16 metres is suited to these streets (refer **Figure 19**).

ACCESS STREETS TYPE D

Access Street Type D will be the most used road classification within the Structure Plan area. These roads are quiet residential streets and predominantly provide access to frontage properties.

Access Street connections will be provided to the land to the south for connecting into when structure planning occurs for the Southern Precinct.

A 5.5m wide pavement is suited to these streets to ensure traffic is not encouraged to drive at inappropriate speeds. Combined with 4.5m residual verges the minimum road reservation would be 15m (refer **Figure 20**).

NEIGHBOURHOOD CONNECTOR

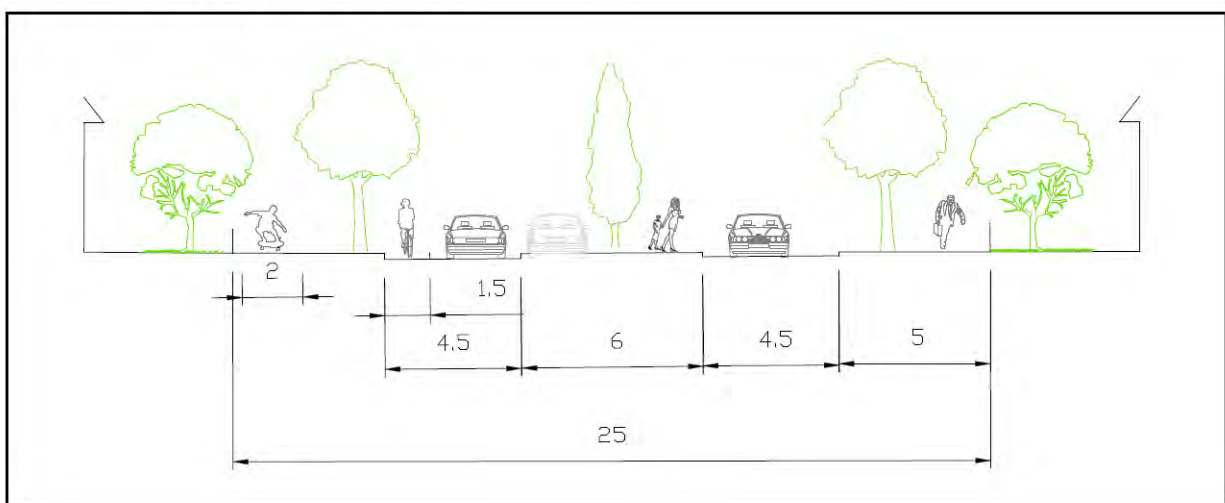


Figure 18 Neighbourhood Connector Typical Cross Section

ACCESS STREET TYPE C

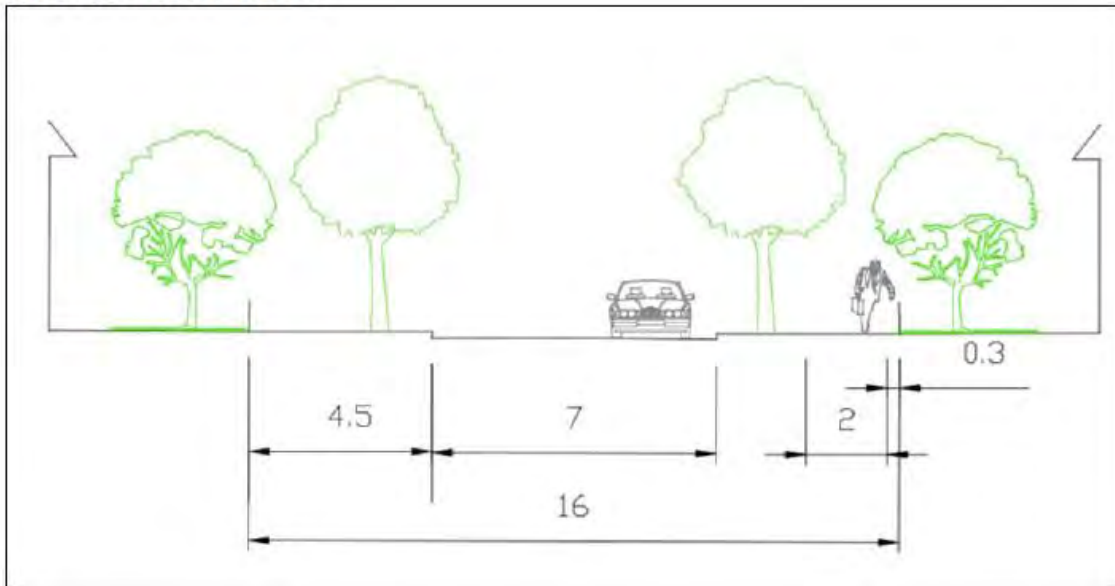


Figure 19 Access Street Type C Typical Cross Section

ACCESS STREET TYPE D

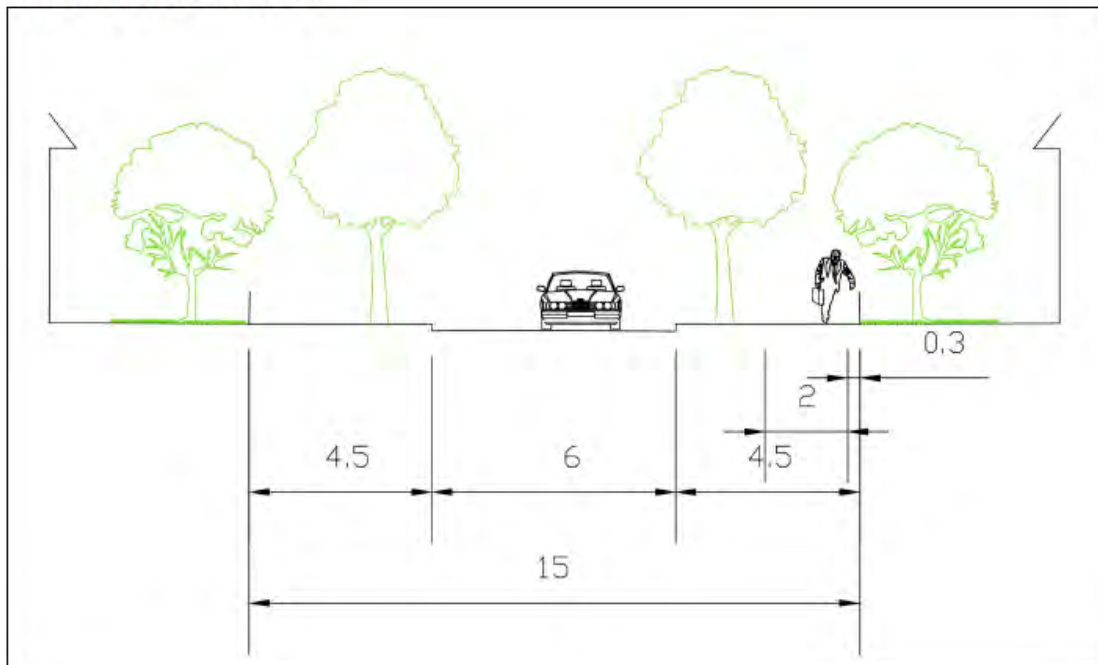


Figure 20 Access Street Type D Typical Cross Section

INTERSECTIONS

All roads within the subject site have low traffic demand with no street shown to carry more than 5,000 vehicles per day. The modelling shows that no four-way intersection between access streets will require control. Give way markings are appropriate at all internal road intersections.

Two roundabouts are proposed on Landgren Road to provide U-turn opportunity for frontage properties and to provide speed management. The northern roundabout will provide safe access to the primary school.

A potential third roundabout at the southern end of the subject site, which may be required when the land to the south is developed.

There are no roads within the subject land holding that would require control of access to frontage properties. Properties fronting Landgren Road will be restricted to left-in / left-out movements due to the median.

WALKING AND CYCLING NETWORK

A footpath will be provided along at least one side of all access streets, higher order access streets and adjacent to POS. A shared path network is also proposed to provide safe and appropriate access to the primary school. The provision of the central median in Landgren Road will also provide refuge for pedestrians, in particular children crossing this road.

All roads will have relatively low traffic flows, and therefore pedestrian crossings are not required to be provided. Pedestrians will not be restricted in crossing any internal road as a result of the passing traffic.

On street cycle lanes will be provided on both sides of Landgren Road to accommodate the high level of service to cyclists within the locality.

The Transport Impact Assessment concluded the structure plan achieves a permeable and walkable environment and a safe walking environment to the future primary school.

This pedestrian and shared path network is detailed on **Figure 21** with shared paths also depicted on the Structure Plan.

PUBLIC TRANSPORT ROUTES

The majority of dwellings will be within 400 metres of Landgren Road where future bus services can be expected to operate. The route would eventually pass through the northern and southern precincts and link to the Kwinana railway station.

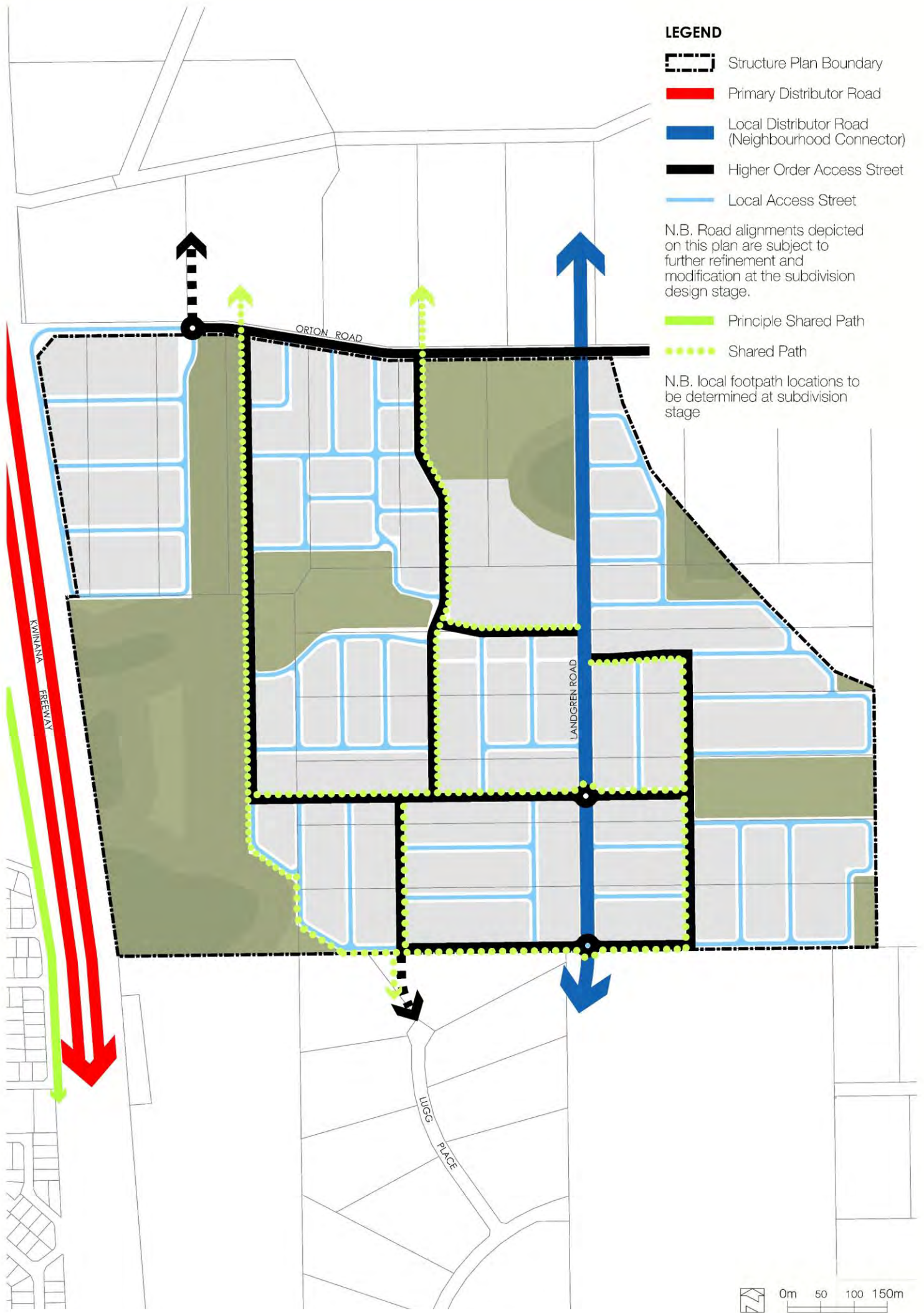


Figure 21 Movement Network

3.7 TRANSPORTATION NOISE ASSESSMENT

A Transportation Noise Assessment has been undertaken by Lloyd George Acoustics to assess the noise impact on the Structure Plan area from transportation along the Kwinana Freeway in accordance with the criteria of SPP 5.4.

The assessment included noise measuring and modelling which concluded with no noise control, road traffic noise levels for future dwellings in the south-western corner of the subject site will exceed the acceptable target by the forecast year of 2031, which is only a small portion of residents within the Structure Plan area. Additionally, the modelling concluded that road traffic noise levels for upper storeys in multi-storey dwellings along the western edge of the site, adjacent to the power easement were predicted to exceed the target by the forecast of year 2031.

As such, noise mitigation must be implemented. To achieve the target noise level required in SPP 5.4 for the lots in the south-west corner of the site, a noise wall in excess of 4.5 metres high would be required to the west of the access road in the south-west corner. This is considered impractical, in excess of the maximum acceptable wall height in Western Australia and would have a negative impact on the streetscape. Alternatively, to minimise noise levels, various architectural treatments would be applied to future dwellings in the form of Package Treatment requirements. The affected lots will also have notifications on titles, in accordance with SPP 5.4 requirements.

Additionally, architectural treatments would be applied to the upper storeys of dwellings predicted to experience future noise levels above the target along the western edge of the subject site. These lots would also require notifications on title to advise prospective purchasers that additional noise mitigation requirements are required if a multi-storey dwelling is to be constructed.

Road traffic noise will also impact the service commercial / mixed business area located on the western side of the power easement, however as this land will not be developed for residential purposes, noise mitigation measures are not required to be identified at this stage. Some form of noise mitigation may be required on these sites if land uses are proposed which are considered to be 'sensitive' in SPP 5.4, such as child care centres, educational buildings and places of worship, are proposed. The requirement for noise mitigation will depend on the location of the non-residential sensitive uses and the height and orientation of adjacent buildings. As such, these lots will have notifications on titles advising of SPP 5.4 requirements in relation to non-residential sensitive uses.

4 IMPLEMENTATION AND STAGING

4.1 STRUCTURE PLAN

This Structure Plan will be in operation until such time as the Town Planning Scheme has been 'normalised'.

4.2 MANAGEMENT PLANS

Management Plans will be prepared at the subdivision stage, as detailed in Part One.

4.3 STAGING

Development of the Structure Plan area is likely to progress in a north to south direction extending from Orton Road. The main considerations for this approach include:

- i) There is existing road access into the Structure Plan area via Orton Road and Landgren Road.
- ii) Construction of a wastewater pumping station north of Orton Road will be required to service the development and the connecting gravity sewer mains will be extended from this pumping station into the development.
- iii) All other existing services including water, power and gas are located either within Orton

Road or Landgren Road and can be extended to service development.

As mentioned, it is important that the State and Local Governments ensure the ongoing use of Bombay Boulevard as the critical link between Orton Road and Thomas Road for the Central Precinct. Until such time as the Landgren Road extension occurs, it is important that Bombay Boulevard remains in service for public use.

The initial stages of subdivision will continue to utilise Orton Road to provide access into the subject site and east of the subject site. It is acknowledged that subject to the detailed planning in the Casuarina North Precinct proposing District Open Space north of the subject site, Orton Road may be diverted to enable a continuous area of District and Local Open Space between the Central and the Northern Precincts.

Development staging is likely to be refined further, particularly given there is an element of fragmented land ownership, although the majority landowner within the Precinct is likely to commence development first. The following provides the basis for future decision-making:

- i) Construction to occur in 40-60 lots stages.
- ii) Construction to occur in consecutive staging subject to market conditions.



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APPENDIX B ENVIRONMENTAL ASSESSMENT REPORT



APPENDIX C
BUSHFIRE MANAGEMENT PLAN

The background features a light blue color with a faint, semi-transparent graphic of a city grid and a globe. The grid lines are thin and light blue, and the globe is represented by a series of curved lines and dots, suggesting a global or urban context.

APPENDIX E ENGINEERING SERVICES REPORT



APPENDIX G TRAFFIC ASSESSMENT



APPENDIX H RETAIL NEEDS ASSESSMENT



APPENDIX J
LOCAL LANDSCAPE FEATURE AND TREE
RETENTION STRATEGY