

Harrisdale Green

STRUCTURE PLAN



Prepared for Cedar Woods Pty Ltd & Department of Communities
Prepared by Taylor Burrell Barnett

Cedar  Woods
PROPERTIES LIMITED



Government of Western Australia
Department of Communities

DOCUMENT HISTORY AND STATUS

**Harrisdale Green
Structure Plan – 15/023**

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Revision	Reviewer	Date Issued
1 (Draft)	LM	Mar 2018
2 (Final)	LM	May 2018
3 (Final)	RC	Feb 2019
4 (Amendments)	MB	Nov 2022

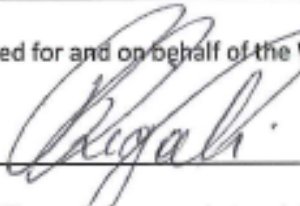
ENDORSEMENT

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

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

28 March 2019 Date

Signed for and on behalf of the Western Australian Planning Commission



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

Taym Cox Witness

28 March 2019 Date

28 March 2029 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
1	Removal of Local Centre zone from Structure Plan area and replacement with Residential zone; minor modification to coding allocation; consequential text modifications in Part 2.	Minor	21 June 2023

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 Lots 9005 and 9501 on Warton Road and Ranford Road, Harrisdale hereafter referred to as the 'structure plan area', 'subject site' or 'site'.

The subject site is located:

- within the municipality of the City of Armadale;
- approximately 11km north-west of the Armadale town centre; and
- approximately 22 km south-east of the Perth CBD.

The subject site is vacant and is generally flat.

The Structure Plan proposes development of the land for:

- 'Residential' purposes comprising a mix of medium residential densities coded R30, R40 and R60;
- Public Open Space (POS) and drainage; and
- Access streets.

The subject site falls within the boundaries of the adopted Harrisdale Estate Structure Plan. The purpose of this Structure Plan is to provide an update to the subdivision layout for the undeveloped portion of Harrisdale Green Estate, by replacing the portion of the Harrisdale Estate Structure Plan covering part of Lots 9005 and 9501. This will create two separate Structure Plans across the Estate, generally categorised by the current developed and undeveloped portions of the Estate.

STRUCTURE PLAN SUMMARY

ITEM	DATA	STRUCTURE PLAN REF (SECTION NO.)
Total area covered by the Structure Plan	10.1461 hectares	1.2
Area of each proposed Land Use Zones		
<ul style="list-style-type: none"> • Residential 	6.2739 hectares	3.3, 3.4 & 3.5
Reserves		
<ul style="list-style-type: none"> • Road Reserve • Public Open Space 	2.8399 hectares 0.8868 hectares* *includes 0.3595 hectares of drainage POS area provided for this Structure Plan only.	
Estimated Lot and Dwelling Yield	214 lots or dwellings	3.2 Development Concept – Figure 7
Estimated Residential Density		
<ul style="list-style-type: none"> • Dwellings per gross hectare (as per Liveable Neighbourhoods) • Dwellings per site hectare (as per Liveable Neighbourhoods) 	21.09 dwellings per gross hectare 34.10 dwellings per site hectare	3.3
Estimated Population	600 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) 	2.8160 hectares 10 % Creditable POS 0.5630 hectares (0.5592 hectares creditable)	3.4 Table 9: POS Schedule / Figure 8
Composition of Public Open Space:		
<ul style="list-style-type: none"> • Neighbourhood • Local Parks 	2.0672 hectares (68%)* 0.9340 hectares (32%)* *includes drainage totalling up to 0.9587 hectares	3.4
POS allocation and calculations are provided based on the entire Harrisdale Green Estate area, including the balance developed areas contained within the Harrisdale Estate Structure Plan, unless advised otherwise.		
For context, the Harrisdale Green Estate as a whole, provides for a total land area of 28.78ha; an estimated overall dwelling yield of 500; and an estimated total population of 1,330 persons.		



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APPENDIX A	PRE-LODGEMENT CONSULTATION
APPENDIX B	BUSHFIRE MANAGEMENT PLAN
APPENDIX C	TRANSPORTATION NOISE ASSESSMENT
APPENDIX D	ENGINEERING SERVICES REPORT
APPENDIX E	LANDSCAPE STRATEGY
APPENDIX F	URBAN WATER MANAGEMENT PLAN
APPENDIX G	TRANSPORT IMPACT ASSESSMENT



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).

- a) This structure plan supersedes portions of the Harrisdale Estate Structure Plan (TPG 2007) to the extent of the structure plan boundary.

3 STAGING

Subdivision will be undertaken in 40-60 lot stages depending on market conditions at the time. Subdivision will extend from the central developed portions of the Estate in a northwards direction.

4 SUBDIVISION AND DEVELOPMENT REQUIREMENTS

- a) Land use permissibility within the Structure Plan area shall accord with the corresponding land use classification in the City of Armadale Local Planning Scheme No. 4 (as amended).
- b) Public Open Space is to be provided in accordance with the Structure Plan Map.
- c) This Structure Plan is supported by a Bushfire Management Plan (BMP), Bushfire Management Plan – Harrisdale Green (May 2018) prepared by Strategen Environmental. Any land falling within 100 metres of a bushfire hazard identified in the BMP is designated as a Bushfire Prone Area for the purpose of the Building Code of Australia.
- d) This Structure Plan is supported by a Transportation Noise Assessment, Transportation Noise Assessment (28 April 2018) prepared by Lloyd George Acoustics. Any land with a noise level in excess of 55dB is subject to the Transportation Noise Assessment.
- e) 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*.
- f) 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

- g) Development applications for noise sensitive uses affected by noise levels exceeding 55db are to be accompanied by a noise assessment and management plan.
- h) Prior to the lodgement of subdivision and development applications for the site designated as Residential fronting Wright Road, an acoustic assessment is to be prepared that addresses the existing kennels in Shepherd Court. Subdivision and development proposals must provide measures to mitigate or avoid the impacts of kennel noise.
- i) Prior to the lodgement of subdivision and development applications for the site designated as Residential fronting Wright Road, an acoustic assessment is to be prepared that addresses the existing adjacent commercial development and is to provide measures to mitigate the impacts of that commercial development.
- j) Subdivision, development and/or works within the structure plan boundary which may impact on vegetation within the adjacent Bush Forever reserve must identify and protect that vegetation at the subdivision, development and/or subdivision works stage.
- k) Subdivision within the structure plan boundary is to account for the land requirements of the Ranford Rd upgrade as per the Ranford Road Reservation Study (Department of Planning, 2016).

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) having the potential for grouped and/or multiple dwellings;
- d) with frontages of less than 10.5 metres;
- e) abutting POS; and
- f) with a BAL rating of 12.5 or greater.





PART TWO
EXPLANATORY
INFORMATION

1 PLANNING BACKGROUND

1.1 INTRODUCTION AND PURPOSE

This Structure Plan has been prepared on behalf of Cedar Woods Pty Ltd and Department of Communities and covers Lots 9005 and 9501 on the corner of Ranford Road and Warton Road in Harrisdale. The site is currently being development and marketed as 'Harrisdale Green' Estate.

The Structure Plan will accommodate the future subdivision and development of the site for residential purposes, including Public Open Space (POS) and access streets.

The Structure Plan has been prepared to address the requirements of the City of Armadale Local Planning Scheme No. 4 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 purpose of the Structure Plan is to provide an update to the subdivision layout for the undeveloped portions of Harrisdale Green Estate, by replacing the portions of the Harrisdale Estate Structure Plan covering part of Lots 9005 and 9501, which are undeveloped. The Harrisdale Estate Structure Plan will remain in operation for the portions of the Estate which include existing development and those outside the area of the Harrisdale Green Structure Plan.

As a result of the age of and the existing subdivision pattern depicted on the Harrisdale Estate Structure Plan, Cedar Woods Properties and Department of Communities determined it was appropriate to undertake a design and product review to ensure a contemporary development pattern which responds to trends in the housing industry and housing market conditions. As discussed with Technical Officers from the Department of Planning, Lands and Heritage (DPLH) and City of Armadale, it was determined that a new Structure Plan be prepared over the areas in which redesign was undertaken, to replace portions of the Harrisdale Estate Structure Plan.

The following technical documentation has been prepared in support of this town planning report:

Bushfire Management Plan (refer **Appendix B**);
Transportation Noise Assessment (**Appendix C**);
Engineering Services Report (refer **Appendix D**);
Landscape Strategy (Refer **Appendix E**).
Urban Water Management Plan (refer **Appendix F**);
Transport Impact Assessment (**Appendix G**); and

The Project Team responsible for preparing the information contained within this report, (in consultation with the City of Armadale, 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
Hydrology	JDA
Bush Fire Hazard Assessment and Management	Strategen
Landscape	LD Total
Traffic/Transport Assessment	Flyt
Transportation Noise Assessment	Lloyd George Acoustics
Economic and Retail Analysis	Urbis

1.2 LAND DESCRIPTION

LOCATION

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

The subject site is located:

- South of Ranford Road;
- East of Warton Road;
- West of Wright Road;
- North of a Bush Forever site;
- approximately 11km north-west of the Armadale town centre; and
- approximately 22 km south-east of the Perth CBD.

Land surrounding the subject site generally consists of developed residential land and various commercial land uses to the north, east and south. A Bush Forever

site is located south-west of the site.

The subject site is in close proximity to the Livingston Marketplace Shopping Centre (District Centre) (3km north of the subject site), the Vale Shopping Centre (2.5km east of the site) (Neighbourhood Centre) and the Southern River Shopping Centre (Neighbourhood Centre), which is located opposite the south-east corner of the site along the northern side of Ranford Road. There are also large format retail stores located along the southern side of the site on Wright Road and similarly planned uses located on the opposite side of Ranford Road on the eastern side of the intersection of Ranford Roads and Warton Road.

The site is located approximately 5km east of the Jandakot Airport, and 5km south of the Canning Vale industrial area

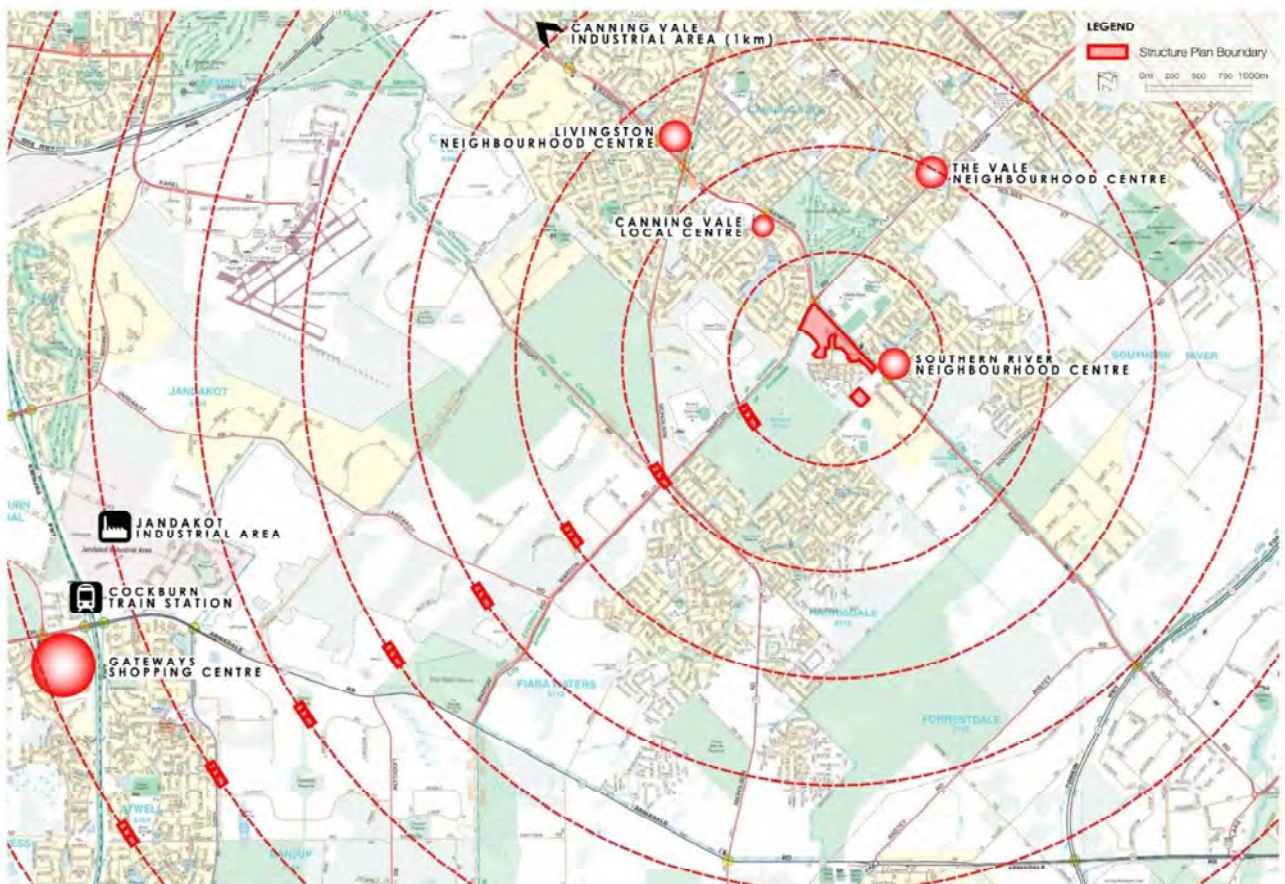


Figure 2 Location Plan

AREA AND LAND USE

The subject site consists of two lots, (refer **Table 2** for lot areas). The site is generally cleared with areas of low-level vegetation re-growth in the northern 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
9005	2911	404	406544	Housing Authority	8.9882ha
9501	2911	405	406544	Housing Authority	1.0060ha

1.3 PLANNING FRAMEWORK

ZONING AND RESERVATIONS

METROPOLITAN REGION SCHEME

The majority of the subject site is zoned 'Urban' under the Metropolitan Region Scheme (MRS) (refer **Figure 4**). Ranford Road and the northern portion of Warton Road abutting the subject site are reserved as 'Other Regional Roads', a portion of which is within the subject site. Land abutting the subject site to the south is Reserved and included within Bush Forever site 253.

CITY OF ARMADALE LOCAL PLANNING SCHEME NO. 4

The subject site is zoned 'Urban Development' under the City of Armadale Local Planning Scheme No. 4 (LPS 4) (refer **Figure 5**). The 'Other Regional Roads' reservation of Ranford Road and Warton Road in the MRS is reflected in LPS 4. Refer **Table 3** for area and zoning summary.

The southern portion of the site is also included within Special Control Area - Wetland Protection Areas Groundwater Environmental Protection Area. Based on the extent of existing Urban development within the locality this is not an impediment to development in accordance with the Structure Plan.

The subject site is included in Development Area 8, which requires future subdivision and development of the land to be coordinated by a Structure Plan.

The southern portion of the site is included within a 500m kennel buffer on the Special Control Area 1, due to the presence of existing kennels south-east of Wright Road. However, we understand the existence of kennels has significantly reduced in the Shepherd Court and Hatch Court locality, which is further evidenced by development proposals for the land on the south east corner of Ranford Road and Wright Road. Existing residential development north of Ranford Road is also located closer than 500m of the kennel area.

TABLE 3: LOT AREA AND ZONING DETAILS

LOT	AREA (HA)	DEVELOPMENT AREA (HA)	OTHER REGIONAL ROADS RESERVE (HA)
9005	8.9882	8.8431	0.1451
9501	1.0060	1.0060	-

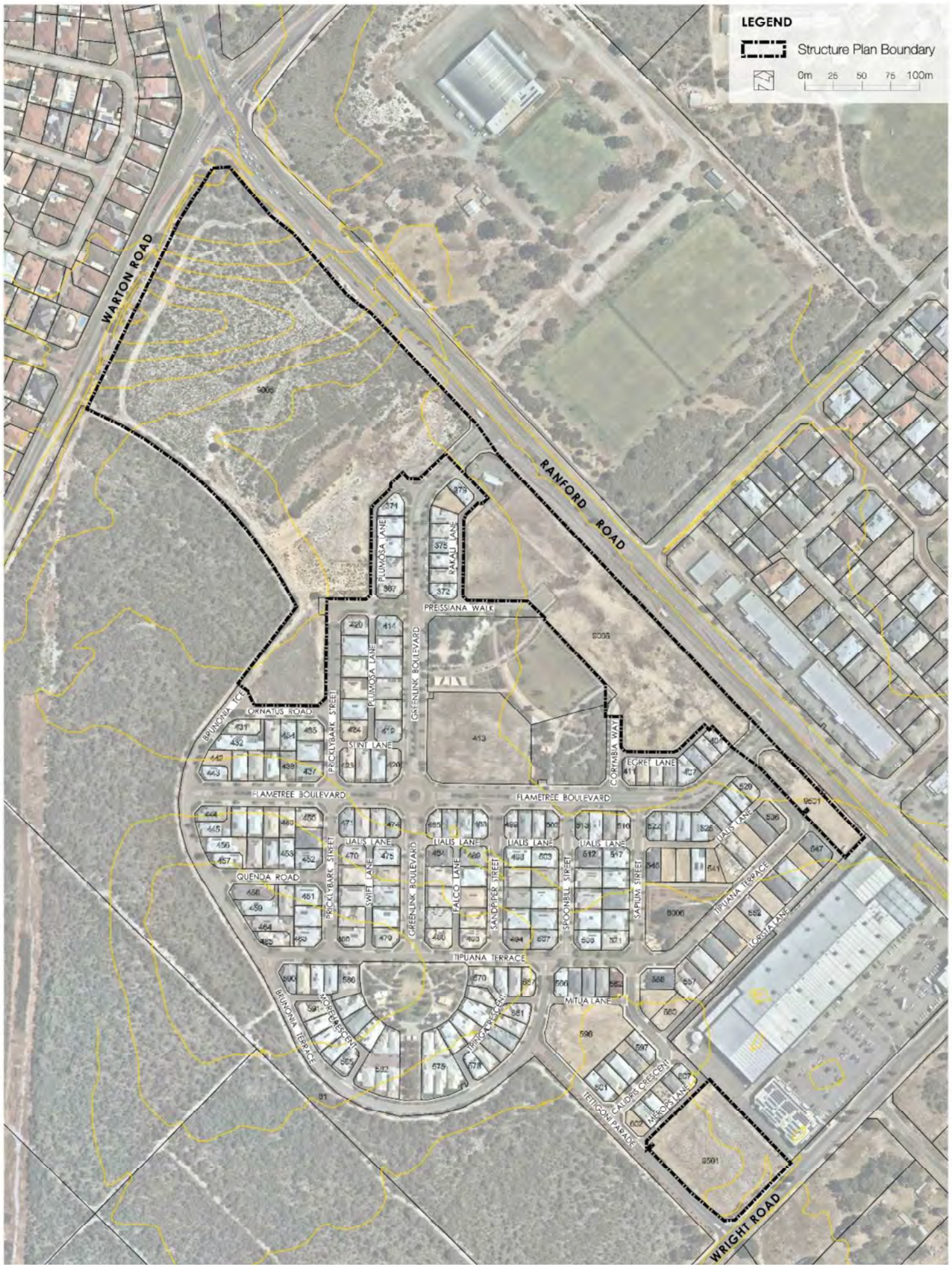


Figure 3 Subject Site

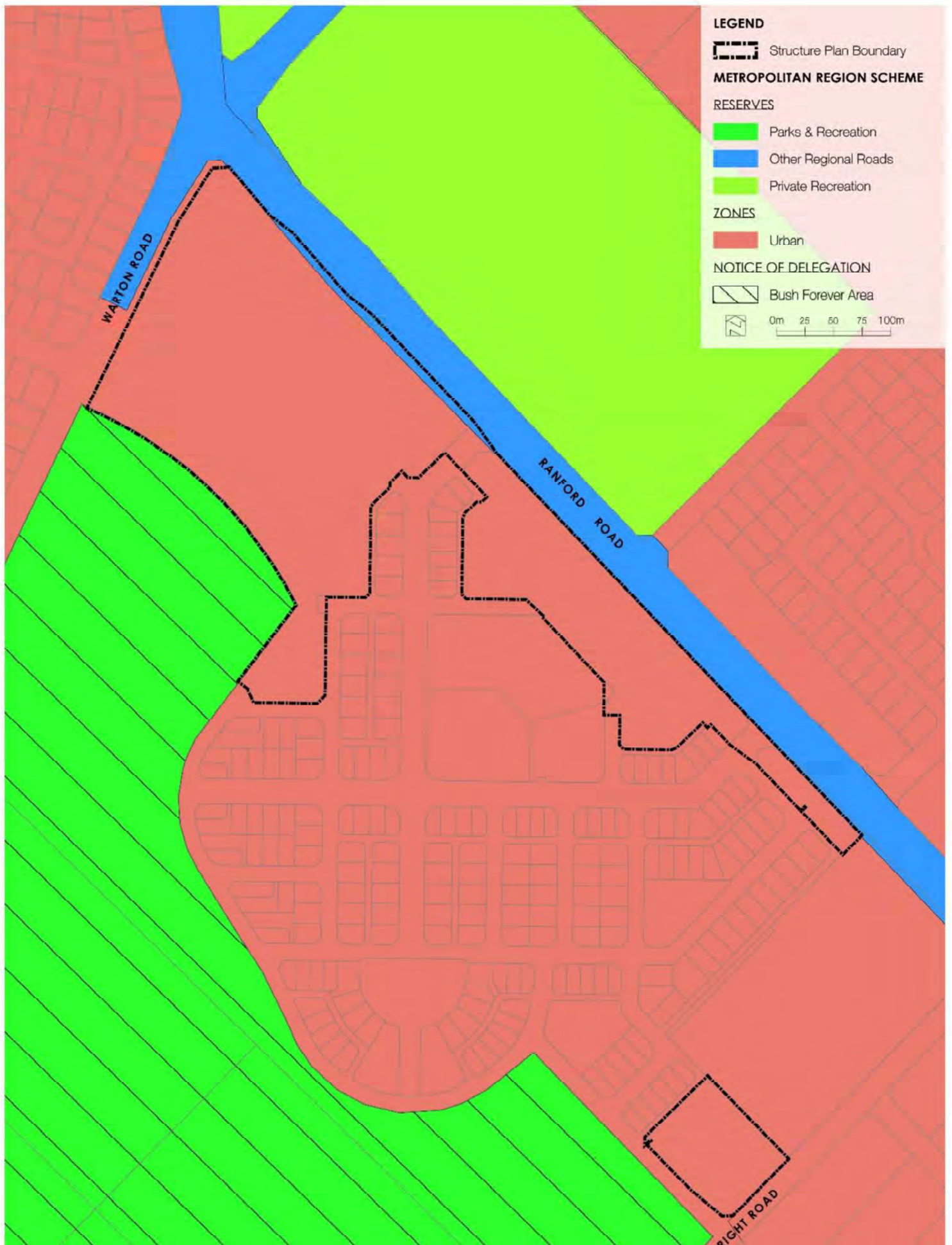


Figure 4 Metropolitan Region Scheme

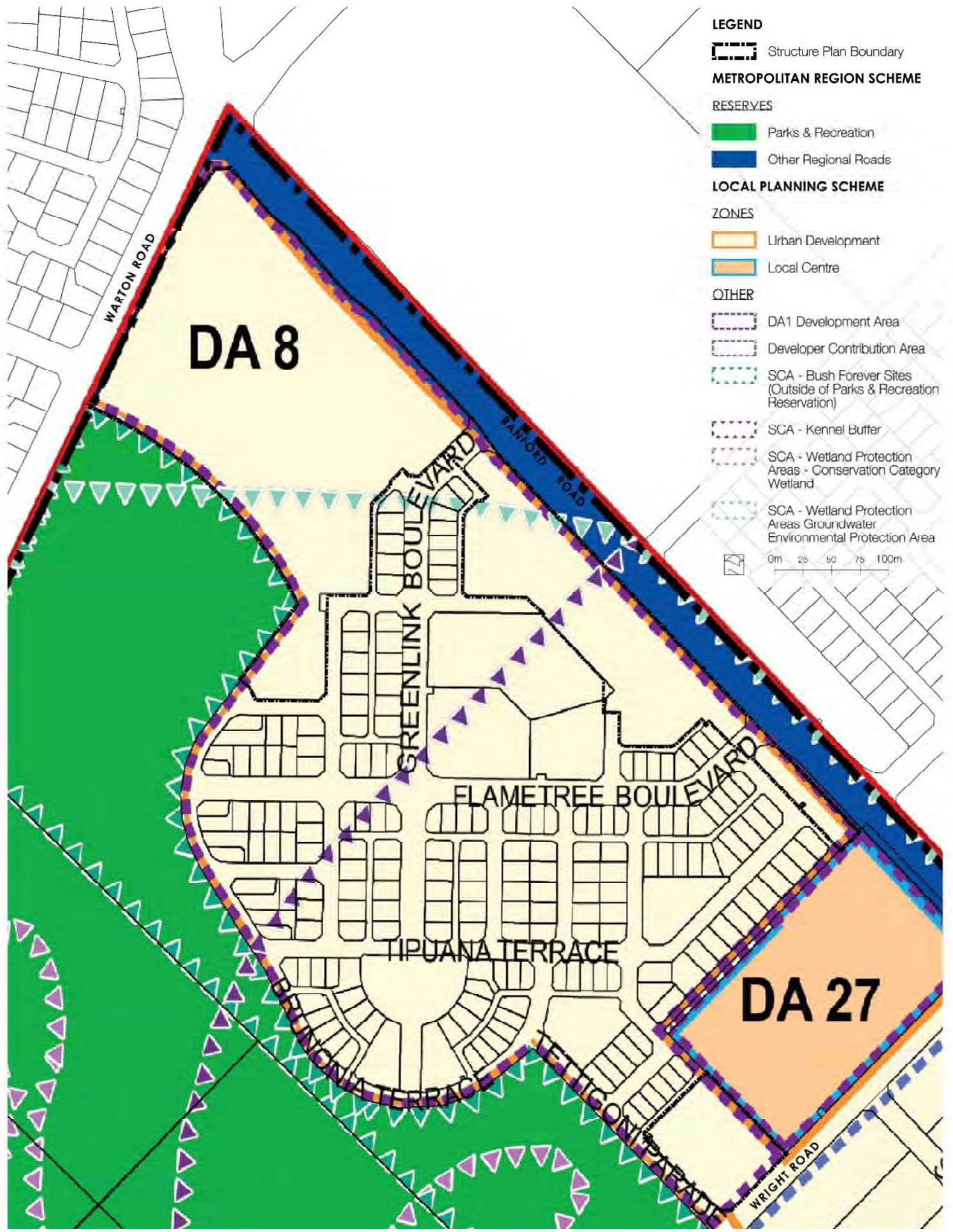


Figure 5 City of Armadale Local Planning Scheme No. 4

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.

CITY OF ARMADALE DEVELOPER CONTRIBUTIONS

The subject site is not included within any Development Contribution Areas.

SOUTHERN RIVER / FORRESTDALÉ / BROOKDALE / WUNGONG DISTRICT STRUCTURE PLAN

The subject site is identified as Urban in the Southern River/Forrestdale/Brookdale/Wungong District Structure Plan (DSP), a strategic planning instrument to guide ongoing development in the district, which was finalised in January 2001. The DSP depicts a Village Centre adjacent to the site at the intersection of Wright and Ranford Roads, with the associated walkable catchment which captures the southern portion of the site.

A 500m Kennel Area Buffer is identified on the DSP which covers a portion of the subject land, though as stated in the endorsed Harrisdale Structure Plan, the land subject of the Kennel Area Buffer is identified as Urban under the DSP, and therefore it is intended to be planned and used for residential purposes in the long-term. Accordingly, consideration of proposals for development of the subject site and the remaining kennel precinct must recognise residential use as the predominant land use for the area.

HARRISDALE ESTATE STRUCTURE PLAN

The subject site is contained within the Harrisdale Estate Structure Plan, which was first adopted in 2007, and revised in 2013. The Structure Plan covers the Urban precinct located between Warton Road, Ranford Road, Wright Road and the Bush Forever site. The majority of Harrisdale Green Estate has been developed in accordance with the Harrisdale Estate Structure Plan which includes:

- Extensive single residential areas.
- Multiple grouped dwelling areas. in the portion of land adjacent to Warton Road and Ranford Road.
- Active and passive POS areas.

The central, southern and western portions of the site are for the most part developed, categorised by single residential housing and POS.

Due to advances in the housing industry relating to housing design and construction as well as changing market conditions, Cedar Woods and the Department of Communities determined it was appropriate to undertake a design review of the undeveloped portions of the Estate. As a result of the extent of changes required to Structure Planning for the site, it was determined in consultation with the Technical Officers from the DPLH and City of Armadale that a new Structure Plan is prepared. This Structure Plan will replace portions of the Harrisdale Estate Structure Plan to meet the new vision for the Estate.

The areas subject of this Structure Plan will be removed from the Harrisdale Estate Structure Plan, which will remain in operation for the balance land.

Schedule 8 of LPS 4 requires the Structure Plan in Development Area 8 to make adequate provision for protection of Category Conservation Wetlands, Bush Forever sites and interfacing with adjacent existing and proposed Reservation for Parks and Recreation and existing kennels to the satisfaction of the Environmental Protection Authority and the Local Government. This Structure Plan satisfies these requirements, as outlined in this report

SURROUNDING LOCAL STRUCTURE PLANNING

The majority of land north, east and south of the subject site is established, well advanced and covered by existing Structure Plans.

As mentioned, the Harrisdale Estate Structure Plan will remain in operation. This Structure Plan has been prepared to fit seamlessly with the Harrisdale Estate Structure Plan.

The Wright Road Village Centre – Centre Plan has guided the development on the western corner of Wright Road and Ranford Road, comprising large format retail and showroom.

The Shepherd Court Structure Plan has been prepared and is currently under consideration by the City of Armadale for the land located on the southern side of the intersection of Wright Road and Ranford Road for a Local Centre and residential development.

The Shepherd Court Structure Plan seeks to convert land use associated with kennels to residential and commercial uses. This Structure Plan also provides significant justification for the co-existence of the remaining kennels and new residential development. It is expected that the remaining kennels will cease operation as land use change occurs through structure planning and subdivision. Subject to support for the findings of the acoustic assessment within the Shepherd Court Structure Plan, there is not expected to be any detrimental impact on the proposed residential land within the Harrisdale Green Structure Plan adjacent to Wright Road by virtue of the greater separation distance to the kennel area.

A Structure Plan modification was recently adopted by DPLH for the land located on the eastern side of the intersection of Ranford Road and Warton Road for commercial / showroom development.

The North Forrestdale Structure Plan includes land south of the subject site, generally bound by Ranford Road, Skeet Road, Armadale Road, Wright Road and Warton Road, of which a large proportion has been developed.

This Structure Plan ensures land use compatibility; appropriate vehicle and pedestrian connections and development coordination with existing Structure Plans in the immediate surrounding locality.

1.4 PLANNING STRATEGIES

DIRECTIONS 2031 AND BEYOND

Directions 2031 and Beyond is Western Australia's high level spatial framework and strategic plan. The document provides a vision for future growth of the metropolitan Perth and Peel region, with the aim of achieving a pattern of growth which promotes a better balance between greenfield and infill development.

The subject site is located within the south-east sub-region as identified by Directions 2031, where it is noted that an additional 35,000 dwellings are required in order to accommodate a projected population of 228,000 in the region by 2031. This growth is to be achieved through a combination of infill and greenfield development.

PERTH AND PEEL @ 3.5 MILLION

Perth and Peel @ 3.5Million (draft) is a suite of documents released by the WAPC in 2015 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.

The minimum urban infill dwelling targets identified for the City of Armadale are 15,019 dwellings by 2050. This structure Plan will assist in achieving the infill dwelling targets for the City of Armadale by providing appropriate residential densities given the site's context as demonstrated in this Report.

CITY OF ARMADALE LOCAL PLANNING STRATEGY

The City of Armadale's Local Planning Strategy (LPS) was endorsed by Council on 27 September 2016 and by the WAPC on 23 December 2016. The Strategy sets out the long-term planning direction for the City of Armadale and aims to achieve a vision of being a connected, progressive and strategic metropolitan community.

The vision will be achieved by means of the following strategies:

- Housing Strategy
- Urban Development Strategy
- Heritage Properties Planning Strategy
- Metropolitan Redevelopment Authority Normalisation Strategy
- Activity and Retail (Commercial) Centres Strategy
- Hills Orchards (Karragullen/Roleystone) Strategy
- Rural Hills Visual Landscape Strategy
- Bushfire Protection Strategy
- Biodiversity Strategy

The subject site is identified as an Urban Development Area in the Strategy.

The strategies of particular relevance to the subject site include:

HOUSING STRATEGY

The Housing Strategy is aligned with the objectives of Directions 2031, and aims to ensure the City of Armadale is a place where a range of high-quality living environments can be enjoyed with:

- a range of housing and opportunities for home businesses in community neighbourhoods that are developed on good design principles;
- meeting the housing targets as identified in the Directions 2031 Annual Report Card (2012) and influencing the housing mix (particularly for one and two-bedroom dwellings) as per Directions 2031 Report Card (2012);
- Greenfields development at increasing density with the aim of achieving the Directions 2031 objective/target of 15 dwellings per hectare;
- future urban growth focussed in and around retail and employment centres, transit orientated developments and high frequency public transport corridors;
- higher R-codes applied to areas that have close proximity to community facilities and services; and
- new facilities, infrastructure and service provision assisted by appropriate forms of contributions from new developments.

URBAN DEVELOPMENT STRATEGY

The Urban Development Strategy recognises that the subject site is suitable to accommodate the rapidly growing population within the City of Armadale, as confirmed in the 2001 Southern River, Forrestdale, Brookdale and Wungong District Structure Plan. The Structure Plan meets the recommendations of the Local Planning Strategy, providing a framework to develop the site as an urban precinct, which will allow for a range of housing types to accommodate the growing population. It will also provide an opportunity for affordable housing options through the appropriate allocation of residential densities and built form outcomes

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 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 B**.

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, although it remains in an existing developed context, 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 Warton Road and Ranford Road, which are urban primary distributors.

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

LOCAL PLANNING POLICIES

PLN 2.6 WATER SENSITIVE DESIGN

The City of Armadale’s Planning Policy PLN 2.6 - Water Sensitive Design seeks to integrate quality urban development with the natural environment. The policy seeks to enhance the qualities and benefits of our natural environment by:

- Preventing contamination of stormwater through education and design;

- Using appropriate technology;
- Using the natural ability of watercourses and well managed water bodies to improve water quality; and
- Revegetating the City’s stormwater drainage system with local species to enhance its values and visual appeal.

An Urban Water Management Plan has been prepared which addresses the objectives of Water Sensitive Urban Design (WSUD) in order to effectively manage stormwater, as discussed in **Section 3.6**. Specific WSUD measures will need to be addressed during the subdivision and or development application stages.

PLN 2.9 LANDSCAPING

The City of Armadale’s Planning Policy PLN 2.9 - Landscaping recognises landscaping provides an opportunity to enhance environmental amenity and has a number of benefits including community character, community benefits, enhanced local biodiversity, water conservation, air quality and climate adaptation.

The Policy requires structure plans to address the following:

- Detailed site survey identifying any native vegetation and trees on site worthy of retention taking into consideration specie significance, size, rarity and habitat value to native fauna;
- Identify areas proposed to be revegetated including open space, conservation and verge areas; and
- Submission of a landscape / revegetation master plan addressing the points above, incorporating a minimum of 50% of local native plants in open space, conservation and verge areas.

Existing site contours are provided on **Figure 3**; lot design levels are provided in **Appendix D** Engineering Services Report; and Landscape Strategy is provided in **Appendix E** to address this Policy.

2 SITE CONDITIONS AND CONSTRAINTS

2.1 ENVIRONMENTAL CONSIDERATIONS

An Environment Assessment was prepared as part of the previous structure planning for the site which detailed the environmental considerations of the subject site, as outlined in the endorsed Harrisdale Estate Structure Plan. The Environment Assessment found that the site did not support any Declared Rare Flora or any Threatened Ecological Community, as listed under the relevant conservation Acts. Clearing permits were obtained prior to clearing the subject site, preceding the first stages of development of the Harrisdale Green Estate. As a result of the unchanged nature of the site since this reporting and subsequent clearing, there was no need to undertake further environmental assessment.

LANDFORM AND SOILS

LANDSCAPE AND TOPOGRAPHY

The pre-development topography of the area ranges from a high point of 31m AHD at the west down to 25m AHD in the east.

SOILS

The subject site is underlain by generally sandy strata consisting of Bassendean sand and sandy facies of Guildford formation. There is persistent shallow iron-cemented sand layer 'coffee rock' generally 2m to 3m thick, with the upper surface consistency at about 22.5m AHD.

The coffee rock layer isn't as permeable compared to the sand above and below it and causes a perched water-table to develop on top of the coffee rock in the winter. The perched water-table may be up to 3m above the regional water-level at times.

A preliminary geotechnical investigation was completed for the Estate in April 2006, which included water level monitoring bores, though it is considered due to the length of the bores the measured water levels were probably of the perched water table rather than the regional water table.

ACID SULFATE SOILS

The WAPC Acid Sulphate Soils (ASS) risk mapping shows the entire site as having "Moderate to Low risk of acid sulphate soils within 3 m of the natural soil surface". Monitoring and treatment of groundwater effluent during the construction of underground services will be required along with treatment of soils excavated below the groundwater table. An Acid Sulphate Soil and Dewatering Management Plan has been compiled by Parsons Brinkerhoff for Cedar Woods in 2009 (refer to **Appendix D – Engineering Services Report**).

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, and no obvious potentially contaminating industries, activities or land uses appear to have taken place within the site.

GROUNDWATER AND SURFACE WATER

Groundwater and surface water levels have been considered in the UWMP prepared by JDA. The UWMP is an update to a UWMP prepared by JDA in 2016 for Stages 1, 2 and 5 of Harrisdale Green and endorsed by the City of Armadale on 12 May 2017.

The endorsed UWMP (2016) supersedes a previous UWMP prepared for the site in 2010 which was inconsistent with the Urban Water Management Strategy (UWMS) prepared for Harrisdale Green. The 2010 UWMP did not include subsoil drainage, and as a result, following the construction of Stage 1 of the Harrisdale Green Estate, it became obvious that groundwater levels were higher than predicted under the 2010 UWMP and a change of strategy was required. The 2016 UWMP was prepared, which was based on a more rigorous monitoring of groundwater and surface water.

The UWMP has been prepared to support the Structure Plan for Harrisdale Green and presents additional detail for the remaining stages of the development, and particularly for the POS drainage infiltration basin contained within this Structure Plan.

GROUNDWATER

Groundwater investigations were conducted by JDA in 2012 to investigate high and possibly perched water table affecting Harrisdale Green Stage 1 POS. The summary of the areas investigated are:

Stage 1 POS: indicates the low permeability of the coffee rock and its extensive occurrence between Harrisdale Green and Ranford Road and the City of Gosnells land.

Harrisdale Green beyond Stage 1 POS: indicates that a perched water table is evident.

City of Gosnells: perched water table evident in most bores.

Harrisdale Swamp (located to the south west of Harrisdale Green): perched water table is evident.

FLOWS AND LEVELS

Since land development has commenced in Harrisdale, both the regional and perched water table have risen associated with rainfall recharge into the imported fill, irrigation bore recharge in Stage 1 POS and possibly rainfall recharge through Atlantis Cells along Ranford Road.

Monitoring in 2015 indicated the drainage is functioning adequately for the developed areas of Harrisdale Green following the installation of subsoil drainage system, and soakwells are functioning well for observed events up to the 1-year ARI.

QUALITY

Results of the groundwater quality monitoring is included in the UWMP. All parameters were within the guideline value for recreational water and for domestic non-potable groundwater use.

If the standing water is to be pumped out, there is a low-risk adverse impact on the environment due to the level of nutrients, metals and algae. The UWMP identifies measures required to be taken if the water is to be pumped out.

SURFACE WATER

LOCAL DRAINAGE

The 2010 UWMP suggests there was no evidence of pre-development surface water flow in the study area due to the water table being below natural surface. Surface water occurs in detention basins within the Boardwalk Estate on the opposite side of Ranford Road in the City of Gosnells.

RANFORD ROAD DRAINAGE

Ranford Road was converted from a single carriageway to a dual carriageway in 2009, and the design drawings show Atlantic Cells for infiltration and containment of stormwater runoff from Ranford Road into the insitu ground. East of Hatch Court, the drawings show discharge to outlet to Balannup Swamp.

Rainfall recharge for stormwater runoff from Ranford Road may be locally contributing to a higher perched, and possibly higher regional water table beneath Ranford Road as well as beneath Harrisdale Green and areas within the City of Gosnells.

MODELLING

Monitoring of the median swales in Greenlink and Flametree Boulevards was undertaken in 2015 and the results indicated that the installed subsoil drainage is controlling groundwater levels sufficiently so that the median swales have clearance to groundwater and are able to infiltrate water during events.

SURFACE WATER QUALITY

Surface water quality results for Stage 1 POS and rain gardens collected in 2013 are included in the UWMP. The results indicate all parameters were below the trigger guideline value for recreational contact.

If water is required to be pumped out, certain measures must be applied to the standing water to minimise the risk on the receiving environment of the water. The measures are detailed in the UWMP.

2.2 BUSHFIRE HAZARD

A portion of the subject site is designated as bushfire prone on the WA Map of Bush Fire Prone Areas (DFES 2017). A Bushfire Management Plan (BMP) has been prepared by Strategen Environmental in support of the Structure Plan (refer **Appendix B**). 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.

BUSHFIRE ATTACK LEVEL ASSESSMENT

As depicted on the Bushfire Attack Level map contained within the BMP, all of the proposed development areas have capacity to be located within areas of Bushfire Attack Level (BAL) 29 or lower.

IDENTIFICATION OF BUSHFIRE HAZARD ISSUES

The worst-case bushfire scenario capable of impacting the proposed development is from the west and southwest within Bush Forever site 253. On this basis, bushfire management response measures should be targeted at the interface with the Bush Forever site including provision of sufficient defensible space and separations (APZs), vehicular access, water supply and increasing building construction standards where required.

The bushfire risk from other interfaces with classified vegetation identified in the BMP, such as to the east and south, are already expected to be adequately managed through the provision of existing separation, access and emergency water supply along Ranford Road and Wright Road, respectively. Some application of BAL 12.5 building construction standards will likely be required at these interfaces to mitigate the potential risk of ember attack.

The Development Concept plan (refer **Figure 7**) has taken into consideration the recommended strategies within the BMP, which aims to deliver a safe and compliant level of bushfire mitigation and protection of future life and property assets through provision of standard management responses as per acceptable solutions in the Guidelines for Planning in Bushfire Prone Areas.

2.3 HERITAGE

ABORIGINAL

A search of the Department of Aboriginal Affairs' 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 Warton Road on the north-western boundary of the site and Ranford Road on the north-eastern boundary of the site which provide connections to Nicholson Road and Armadale Road as well as Roe Highway.

DISTRICT AND LOCAL ROADS

RANFORD ROAD

Ranford Road which runs along the north-eastern boundary of the site is classified as a Distributor A Road under Main Roads WA's Functional Road Hierarchy. Ranford Road is constructed as a two-way road with two lanes in each direction, with additional turn lanes provided at key intersections. There is a wide median island adjacent to the subject site which is used to facilitate right turn auxiliary lanes at key intersections such as Greenlink Boulevard and Flametree Boulevard accesses into the subject site. The speed limit along Ranford Road is 70km/h which increases to 80km/h south-east of the subject site. Ranford Road has a total of 27,750 vehicles per day in both directions.

WARTON ROAD

Warton Road is classified as a Distributor A Road and the majority of the road is constructed as a two-way road with two lanes in each direction with additional turn lanes provided at key intersections. The portion of the road adjacent to the subject site between Ranford Road and Nicholson Road is constructed as a two-way road with one lane in each direction, with additional turn-lanes at key intersections. Median islands exist to create a right turn auxiliary lane to access Roebuck Avenue. It has a speed limit of 70km/h which increased to 80km/h west of the subject site. Warton Road has a total of 11,000 vehicles per day in both directions.

WRIGHT ROAD

Wright Road runs in a northeast-south-west direction and is located on the southern boundary of the subject site. It is a two-way road constructed with one lane in each direction. There is a wide median island located on the road adjacent to the site to facilitate right turn auxiliary lanes at key intersections such as Tettigoni Parade. Approximately 8,800 vehicles per day travel in both directions along Wright Road adjacent to the subject site.

GREENLINK BOULEVARD

Greenlink Boulevard runs in a north-south direction through the subject site from Ranford Road to Tipuana Terrace. It is a two-way road with one lane in each direction with a wide landscaped median strip.

FLAMETREE BOULEVARD

Flametree Boulevard runs in an east-west direction through the subject site from Ranford Road to Brunonia Terrace. It is a two-way road configured with one lane in each direction with a wide landscaped median strip.

TETTIGONI PARADE

Tettigoni parade runs in a north-south direction through the subject site from Wright Road to Brunonia Terrace. It is a two-way road configured with one lane in each direction with two speed cushions to slow vehicles entering the development.

EXISTING ROAD STANDARD, WIDENING AND UPGRADES

As mentioned, the major road network surrounding the subject site including Ranford Road and Wright Road are constructed to suitable standards. These roads will not require any further upgrades as part of the subdivision of the subject site. No additional or intersection upgrades will be required to these roads.

Warton Road will require upgrading for the majority of its length adjacent to the subject site, which will include a new intersection created by a new Major Access Street from the subject site.

Widening of Ranford Road has been accommodated on the Structure Plan in accordance with the Other Regional Road Reserve under the MRS and will be ceded at the subdivision stage. No other road widening will be required.

WALKING AND CYCLING

The extent and quality of the existing pedestrian infrastructure within and surrounding the Harrisdale Green site is of a standard that is commensurate with the extent of existing development and form of land uses across the site. There are footpaths along the major road network surrounding the subject site, as well as along the existing internal road network.

There is limited formal segregated cycling infrastructure or signed bike route within the immediate vicinity of the subject site. A High-Quality Shared Path is located along Ranford Road, providing a connection between Southern River Road and Warton Road. The paths along the existing local road network are identified as Other Shared Paths, which are shared by pedestrians and cyclists.

PUBLIC TRANSPORT

The closest available bus stops to the subject site are located on Ranford Road between Greenlink Boulevard and Flametree Boulevard, as well as a bus stop on Wright Road, east of Tettigoni Parade. Bus Route No. 518 services these stops, which provides access to North Livingston Marketplace Shopping Centre, Canning Vale Industrial Area and Murdoch Activity Centre (Murdoch Station, Murdoch University, Fiona Stanley Hospital and St John of God Hospital), as well as Piara Waters and Cockburn Activity Centre (Cockburn Central Station and Cockburn Gateway Shopping Centre).

2.5 SERVICE INFRASTRUCTURE

An Engineering Services Report has been prepared by Cossill and Webley in support of the Structure Plan (refer **Appendix D – 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 Services Report suggests the site is capable of the proposed development with the logical, progressive extension of infrastructure and base capacity.

WATER RETICULATION

A water reticulation servicing concept for the servicing of the subject site has previously been agreed with the Water Corporation through their Advanced Works Agreement. This servicing concept involves the extension of the existing network northward.

SEWERAGE RETICULATION

The subject site is within the Balannup wastewater reticulation catchment. As part of the servicing of this catchment, sewer reticulation within Harrisdale Green grades to the existing permanent waste water pump station (WWPS) named Balannup WWPS B No 1, located on Balfour Street to the east of the subject site.

POWER

The proposed development can be supplied via a connection to the existing high voltage (HV) network within the subject site and the existing overhead power in Warton Road. Western Power determined there was between 15 and 20MVA spare capacity in the Harrisdale Green area in June 2017.

All power to the proposed development will be underground and fed from transformers located strategically within the subject site.

TELECOMMUNICATIONS

The subject site is within the fixed line footprint of the National Broadband Network (NBN), and development can be serviced with optic fibre under their roll-out scheme for greenfield developments. Cedar Woods has expressed an interest in continuing to service the Harrisdale Green development with NBN Co pipe and pit network.

GAS

ATCO Gas has advised that the site can be supplied with reticulated gas via an extension from existing reticulation gas mains within the Harrisdale Green development.

STORMWATER MANAGEMENT

The drainage collection and conveyance system has been designed to cater for the runoff from stops up to a 5-year recurrence interval. A swale located in the proposed POS adjacent to the Bush Forever site will attenuate runoff prior to discharge into the Bush Forever site for events greater than the 5-year ARI storm. In all cases, roads and POS will cater for the surface overflow for more severe storms with building pad levels set 300mm above the 1:100-year flood levels in roadways and storage/attenuate basins.

3 STRUCTURE PLAN

The Harrisdale Green Structure Plan provides for a diverse range of housing choices through of the application of R-Code density ranges including R30, R40 and R60, which are identified on the Structure Plan. The Structure Plan also depicts the areas of POS and drainage areas, informed through urban design and hydrological modelling, along with 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 is relatively free of environmental and physical constraints; however, the existing development structure for the Estate was a major contributing factor for the design response. The principle considerations are identified on the Site Analysis in **Figure 6** and with the design responses in **Table 4**.

TABLE 4 DESIGN RESPONSE TO SITE ANALYSIS

ANALYSIS ITEM	RESPONSE
Existing Natural Landform	Create a development pattern that responds to the existing landform.
Open Space Areas – existing and proposed	Future high amenity has been maximised through allocation of residential density and lots with passive surveillance and built form activation adjacent all open space areas.
Existing Built Form Amenity	The existing Harrisdale Green development offers a high level of amenity through established streetscapes and quality homes, which will be utilised as defining place character.
Existing Road Connections	Provide an internal road network with a legible hierarchy that complements the existing road network.
Noise Mitigation	Traffic noise attenuation will need to be considered for development adjacent arterial roads.
Higher Density Potential	Higher density should be investigated in areas which maximise amenity, including adjacent to the bushland, POS, the commercial node and existing neighbourhood shopping nearby.
View Corridors and POS linkages	Existing view corridors have been protected and new opportunities forged through public links and lot orientation.
Estate Entry	A key estate entry road is proposed from Warton Road providing direct access and egress to the Estate from the south west.
Existing Structure	Original Ranford Road Commercial Development site constraints of shallow lot depth, poor accessibility and low parking capacity to be considered in new design.
Existing Residential Development	Proposed development design complements the existing Harrisdale Green development form and style.
Existing Infrastructure	Consider the powerline infrastructure alignment along Warton Road and prepare an appropriate development interface. Consider the sewer outfall point at Ranford Road in the final road alignment designs.
Drainage	Consideration of natural topography, existing drainage network and catchments in the design.
Access restrictions	Access restrictions apply to Warton Road and Ranford Road, consequently the design responds by applying internal access streets for adjacent lots.

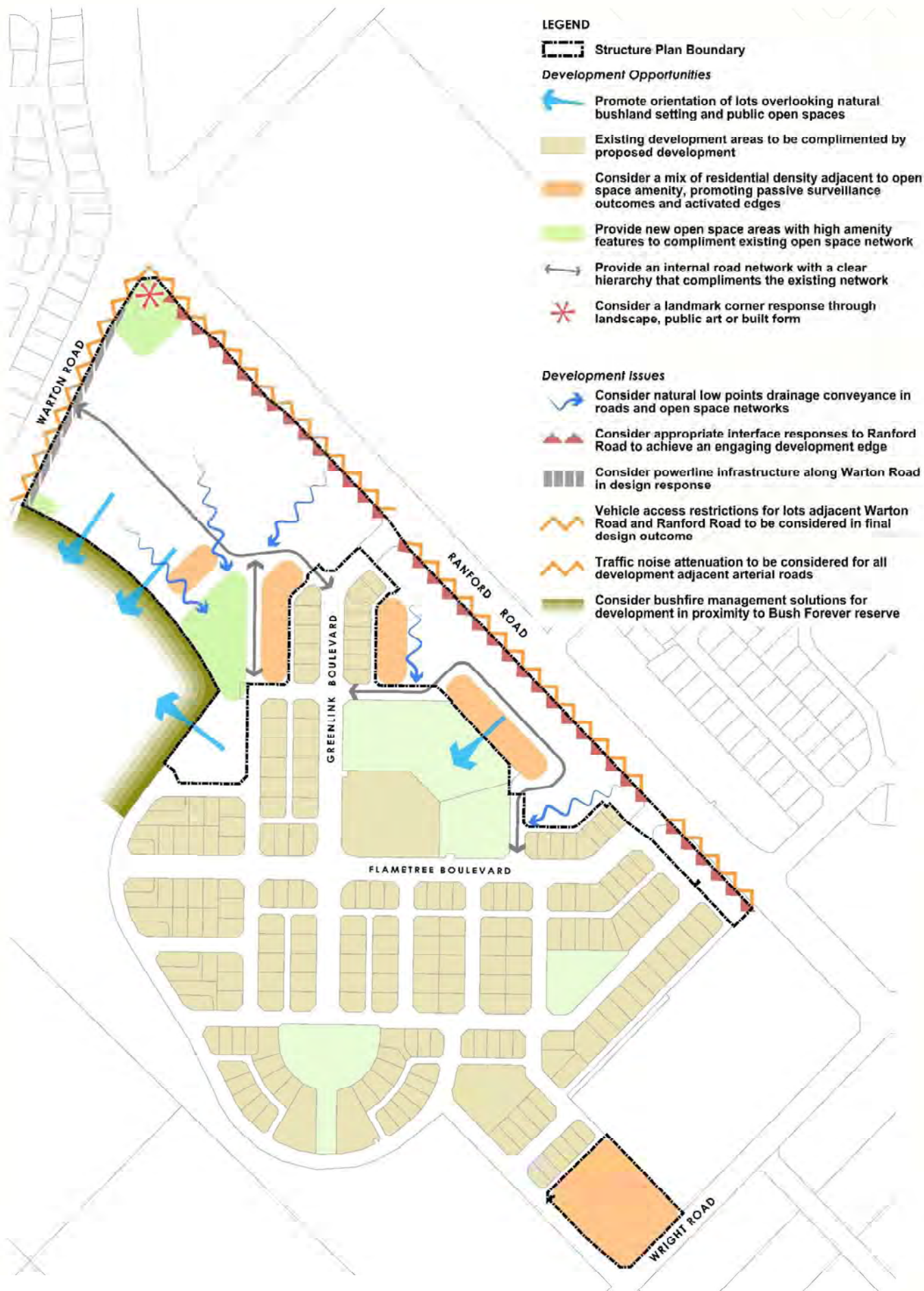


Figure 6 Site Analysis

CONCEPT CHARACTERISTICS

In response to the Site Analysis, specific design characteristics were prioritised in preparing the Development Concept Plan (**Figure 7**). These primary considerations are identified in **Table 5**.

TABLE 5: KEY DESIGN CHARACTERISTICS

CHARACTERISTIC	COMMENT
Drainage Requirement	Orient local roads and POS to support drainage direction and minimise earthworks.
Development Interface	Design appropriate development interfaces to Ranford Road to achieve an engaging development edge, whilst considering the noise attenuation issues.
Diverse Housing Choices	Provide a diversity of housing choices, with areas of higher density adjacent to areas of amenity.
View Corridors	Subdivision road direction should enhance view line potential of the adjacent open space and bushland opportunities.
Public Open Space	Position POS in response to existing site characteristics of drainage patterns and geology. Interlink POS elements with a robust pedestrian pathway network. Accommodate key City of Armadale Municipal entrance.
Environmental Sustainability	Create a development that embraces environmental sustainability through water sensitive urban design.
Relationship with natural surrounds	Enhance and maximise the relationship between development and the natural surrounds including adjacent bushland.
Surveillance	Provide surveillance and activation adjacent high amenity open space focal areas to maximise safety and use of these community assets.
Aesthetic Streetscapes	Enhance the existing high amenity and highly aesthetic streetscape network, by incorporating pedestrian paths and street tree planting.
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 7** 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 density locations and movement network recommendations.

Importantly, the Development Concept Plan establishes the key design themes in which the subdivision and estate development will be guided. Key elements / Development Concept Plan notes include:

- 1. City of Armadale Municipal Boundary Edge (northern corner of site):** Opportunity for a response to this prominent location through the use of POS to provide a focal point and entrance into the city as well as announcing the Estate.
- 2. Ranford Road Interface:** An appropriate design response shall integrate required noise mitigation as a key consideration.
- 3. Permeable Road Network:** Achieve an interconnected and hierarchical street network that enhances the existing neighbourhood movement system.
- 4. Public Open Space:** Situated in specific location to achieve amenity uplift, drainage functionality and the following benefits:
 - estate entry view-line focal point/node;
 - landscaped to accommodate key active play area(s);
 - view corridor opportunities to the Bushland;
 - drainage within a landscaped swale;
 - easily accessible and within walking distance for all residents;
 - natural outlook for adjacent residential development;
 - pedestrian linkages; and
 - increased separation from bushfire hazard within Bush Forever site.
- 5. Lot Diversity - Traditional Lots:** Main lot type, front vehicle access and oriented to maintain solar efficiencies for buildings. A diverse lot size range is achievable in the structure with a variety of lot depths and frontage widths.
- 6. Terrace Lots:** Medium density, rear accessed lots to enhance key points of estate amenity and achieve a specific streetscape appearance. These dwelling types will provide alternative and affordable housing within the development, currently not widely available within this locality.
- 7. Lifestyle diversity:** Opportunity within the neighbourhood design for diverse living options for a wide range of ages achievable through the variety of choices. The potential for an over 55's strata development could be contemplated in this location.
- 8. Affordable living opportunities:** Opportunity for affordable housing options to be introduced adjacent to areas of high service amenity. These opportunities have been considered in overall diversity of lifestyle choices for the Structure Plan area.
- 9. Pedestrian Access:** Resident access to public amenity has been prioritised with the location of extensive pedestrian links maximising neighbourhood permeability and POS entry.
- 10. Bushfire Mitigation:** Perimeter road located to moderate fire impact and promote asset protection to adjoining dwellings.



Figure 7 Development Concept

3.3 LAND USE

The primary land use within the Structure Plan area is residential, with open space and an internal road network. A summary of the land uses and their areas are provided in **Table 6**.

RESIDENTIAL

The Structure Plan provides for a variety of housing choices through the designation of a range of residential R-Codes. The density codes and their applicable lot typology are detailed in **Table 7**. The 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 code ranges and their intent are outlined below:

a) Residential R30: This density code range will apply to the majority of land within the northern portion of 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.

b) Residential R40 – R60: This density code range will apply to the land adjacent Ranford Road in the central portion of the Structure Plan. This density provides the necessary flexibility to accommodate lots of a consistently smaller and more affordable size as the subdivision design responds to the constraints of the existing road locations and infrastructure alignments. Lot vehicle access will be achieved through a mix of rear laneway and front accessed lots to complement the adjacent established homes.

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. Development in these areas will provide a desirable streetscape character and framing to the POS experiences. This coding also incorporates a distinct area adjacent Wright Road that has the potential to form a strata development and further enhance the diversity of lifestyle opportunities for the Estate.

This density range also provides the flexibility for grouped development or apartment living opportunities to diversify the housing typology and maximise affordable housing opportunities. It will provide for appropriate built form opportunities to the key intersection location adjacent Ranford Road and Warton Road.

TABLE 6: STRUCTURE PLAN LAND USE SUMMARY

STRUCTURE PLAN ZONE / RESERVE	AREA (HA)
Residential	6.2739
Roads	2.8399
Public Open Space (including drainage)	0.8868
Other Regional Road Widening	0.1454
Total	10.1460

TABLE 7: DENSITY CODE RANGES AND LOT AND HOUSING TYPOLOGY

DENSITY CODE RANGE	TYPICAL LOT/DWELLING TYPE AND SIZE
Residential R30 – R40	<p>Narrow, front accessed lots: 7.5m x 30.0m – 225m² 8.5m x 30.0m – 255m²</p> <p>Traditional, front accessed lots: 10.5m x 25.0m – 262m² 12.5m x 25.0m – 312m² 15.0m x 25.0m – 375m² 10.5m x 30.0m – 315m² 12.5m x 30.0m – 375m² 15.0m x 30.0m – 450m²</p> <p>Squat, front accessed lots: 15.0m x 20.0m – 300m² 12.5m x 22.0m – 275m² 15.0m x 22.0m – 330m²</p>
Residential R40 – R60	<p>Narrow, front accessed lots: 8.5m x 20.0m – 170m² 10.5m x 20.0m – 210m² 8.5m x 25.0m – 212m² 10.5m x 25.0m – 262m²</p> <p>Squat, front accessed lots: 8.5m x 20.0m – 170m² 10.5m x 20.0m – 210m² 12.5m x 20.0m – 250m² 8.5m x 25.0m – 212m² 10.5m x 25.0m – 262m² 12.0m x 14.0m – 168m²</p> <p>Terrace, rear accessed lots: 10m x 30.0m – 300m² 10.5m x 25.0m – 262m² 12m x 30.0m – 360m²</p>

DENSITY TARGETS

Liveable Neighbourhoods 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 are 21.09 lots per gross hectare and 34.10 lots per net site hectare; based on 214 dwellings. This accomplished yield has the potential to increase if the possible maisonette type development in some of the terrace locations is successfully progressed.

The density codes applied and the resultant lot typology will accommodate maximum flexibility for the Estate, 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 between 214-230 lots. This could accommodate a total population of up to 600 persons, based on 2.8 people per household in single residential dwellings.

OTHER LAND USES

Supporting the Residential land use are the relevant open space reserves, as will be discussed under **Section 3.4**; and public utilities for roads required to service all residential development within the subject site, as will be discussed under **Section 3.7**.

3.4 OPEN SPACE

The consideration of POS allocation, distribution and calculations provided in this section are analysed in the context of the Harrisdale Green Estate as a whole. The Harrisdale Estate Structure Plan accounted for 10% POS in the form of land with the requirement for POS calculations in accordance with the statutory requirements to be undertaken at the subdivision stage. This Structure Plan provides an opportunity to bring these calculations up to date for the entire Estate. This Structure Plan identifies two Neighbourhood Parks totalling 0.8333ha and two local parks totalling 534m², which will combine with the existing Estate POS to achieve a total of 2.8160 hectares of varying POS forms and functions. The POS network, is detailed in **Table 8**.

PUBLIC OPEN SPACE

The location and purpose of the POS located within the Structure Plan has addressed site opportunities and constraints generally associated with drainage requirements, providing amenity to existing development, as well as addressing demand for appropriate recreation for this northern component of the Estate. The ease of access to this POS area is evident through the walkable catchment detailed on the POS Plan; providing only a short walking distance for the majority of Harrisdale Green residents, providing an alternative area of POS to the existing areas. Importantly, it will provide the closest area of POS to residents within the northern portion of the estate, all within 250m. The POS will be linked to residents via a permeable network of roads; shared paths and footpaths.

The POS area contained within this Structure Plan is part of a wider Estate network of three existing parks of varying sizes and function, including active play and passive recreation areas. A detailed POS calculation has been prepared for the entire Estate in accordance with Liveable Neighbourhoods, as detailed in **Table 9**. The POS table identifies the provision of 10% POS of in line with the minimum requirement under State Government planning policy.

TABLE 8: PUBLIC OPEN SPACE NETWORK

OPEN SPACE REFERENCE	PURPOSE
1. Existing Neighbourhood Park (outside Structure Plan area)	A multiple use area consisting of a turf drainage swale provided in the centre, with two raingarden nodes, pedestrian pathways, community barbeques, shade structures and feature planting surrounding the swale. Extensive pedestrian and shared pathways provide multiple connection points to residential development. This POS area provides an estate focal point.
2. Existing Local Park (outside Structure Plan area)	Local Park with limited drainage function. Includes feature tree planting, and a north-south pedestrian link as well as multiple passive recreation nodes with shade structures.
3. Neighbourhood Park	Neighbourhood Park which will provide a multiple use function containing a drainage swale located in the southern portion of POS with pedestrian connections provided throughout. A play space is located adjacent to the swale, and there are several pathway space/ activity nodes within this POS. Turfed area is also incorporated for recreational opportunities.
4. Neighbourhood Park	Neighbourhood Park at the intersection of Ranford Road and Warton Road to provide a focal point and prominent entrance into the City of Armadale Municipality as well as providing an opportunity to announce the Estate. Features a pedestrian path network joining the existing shared use path along Ranford Road, surrounded by feature tree planting in the northern corner reflecting its prominent entrance location.
5. Existing Local Park (outside Structure Plan area)	Local Park providing drainage function. Features a perimeter pedestrian path with central bushland retention. Park is overlooked by direct frontage lots.
6. Local Park	A local park with no drainage function, providing a pedestrian link from the estate to Warton Road and providing a connection to adjacent Bush Forever site.
7. Local Park (extension of existing POS 1)	Local Park extension of existing POS 1, in order to rationalise subdivision design with clear edges to public and private realm. Park is overlooked by direct frontage lots.

POS identification number referenced on POS Plan

POS PROVISION SUMMARY

③	Neighbourhood Park (Active Play Area)	0.5351ha
④	Neighbourhood Park	0.2982ha
⑥	Local Park	0.0452ha
⑦	Local Park (expansion of POS 1)	0.0082ha
D3	Drainage Swale (1:1 year ARI event)	0.0600ha
D3	Drainage Swale (1:5 year ARI event)	0.1387ha

LEGEND

-  Structure Plan Boundary
 -  Structure Plan Public Open Space Provision (with identification number)
 -  Drainage
 -  Deduction Identification portion
 -  Existing Estate Public Open Space
 -  Park Walkable Catchment - 400m radius (within LSP area)
- 0m 25 50 75 100m



Figure 8 Public Open Space

TABLE 9: PUBLIC OPEN SPACE SCHEDULE

GROSS SITE AREA - (HA)		
ENTIRE ESTATE SITE AREA (DEVELOPED AND UNDEVELOPED PORTIONS)	28.825	
Total Gross Site Area	28.8285	28.7848
Deductions		
Road widening (Ranford Road and Wright Road)	0.2047	
Drainage Reserves (1:1)	0.3295	
Surplus Restricted Public Open Space	0.1420	
Total Deductions	0.6762	
Gross Subdivisible Area		28.1523
Required Public Open Space (10%)		2.8152
PUBLIC OPEN SPACE REQUIREMENTS		
Unrestricted public open space (minimum 80% total)	2.2522	
Restricted public open space (maximum 20% total)	0.5630	
Total		2.8152
PUBLIC OPEN SPACE PROVISION		
Unrestricted Public Open Space		
Formalised POS		
1:5 to 1:100yr drainage	1.0226	
Balance POS Unrestricted Area		
POS 2	0.5114	
POS 3	0.3400	
POS 4	0.2982	
POS 5	0.0274	
POS 6	0.0452	
POS 7	0.0082	
Total Unrestricted Public Open Space		2.2530
Restricted Public Open Space		
Drainage (1:1 to 1:5)	0.6975	
Total Restricted Public Open Space		0.6975
Total Credited Restricted Public Open Space		0.5630
TOTAL CREDITED PUBLIC OPEN SPACE		2.8160
TOTAL PUBLIC OPEN SPACE AND DRAINAGE REQUIRED		3.2800
Percentage of Public Open Space Provided (Unrestricted and Restricted POS Contribution)		10%

LANDSCAPE DESIGN

A Landscape Strategy has been prepared by LD Total in order to inform open space development, the UWMP and Bushfire Hazard Assessment (refer **Appendix E**). 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 unite the Estate's existing areas into a cohesive open space network. Refer **Figure 7** 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 Estate access streets. Footpaths will be located in accordance with LN and integrate with the existing Estate pedestrian and cycle network.

POS FUNCTIONALITY

The POS is intended to contain public facilities deemed suitable for the intended local population which differentiate it to the existing open space features in the Estate. POS will include a playground area, picnic nodes with park furniture, an expansive open turf area and a raingarden swale for local drainage purposes. POS areas will contain a variety of materials that complement the Estate's established theming and 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.



Figure 7 Landscape Concept Extract

3.5 COMMERCIAL – GENERAL AND RATIONALISATION OF NON-RESIDENTIAL USES

The Harrisdale Estate Structure Plan identified Mixed Business and Local Centre uses adjacent to Ranford Road and the central POS area and Showroom / business lots adjacent to Wright Road. In addition, there is Business / Showroom uses identified at the eastern end of the Estate adjacent to Wright Road. We understand non-residential uses were identified for this location due the kennel area located further to the east on Shepherd Court and Hatch Court.

It was considered necessary to rationalise the extent of non-residential zoned land within the Estate given the proliferation of existing commercial and retail uses within the vicinity of the Estate. There is also extensive new land being planned for commercial and retail uses as mentioned under **Section 1.3**. There is a recently adopted modification to the structure plan at the corner of Ranford Road and Warton Road and a structure plan adopted for the land at the corner of Ranford and Wright Road, both which will provide additional commercial and retail floorspace. As a result of the existing and planned commercial and retail floorspace in the immediate locality, supply will sufficiently accommodate demand as detailed by Urbis' analysis of non-residential uses within the site and locality (Refer **Appendix H**). Further discussion on this is provided below.

In addition to the above, the cell structure adjacent Ranford Road makes it difficult to accommodate appropriate floor plates for non-residential uses and mixed uses which would accommodate residential development as well. Acknowledging the site's prominent location on Ranford Road and the surrounding residential catchment, alternative non-residential uses were explored, including an assessment of potential retail and commercial uses within the site. Uses explored in detail included medical centre and childcare facilities. Refer to Urbis' report contained within **Appendix H** in support of this Structure Plan.

Urbis' report recommends that there is no strong evidence to suggest significant demand for mixed use and commercial uses within Harrisdale Estate, evidenced by the existing Ranford Road catchment being adequately serviced by a mix of existing and planned retail and commercial uses. Urbis' review also concludes the extent of mixed business and commercial uses identified on the Harrisdale Estate Structure Plan is significantly overstated and would result in a dispersed precinct with limited market appeal. Urbis also suggest development of the commercial land on Wright Road within the site would be problematic given its context in the existing commercial / retail uses on the corner of Ranford Road and Wright Road (it is set behind it with poor exposure to Ranford Road) and the access restrictions.

Urbis' report indicates that there may be the potential for a smaller variety of non-residential uses that are complimentary to the residential zoning, specifically child care which is a discretionary land use. Based on Urbis' assessment and recommendations, further interrogation of demand for non-residential land uses which are permissible within the Residential zone should be undertaken at the time of development.

3.6 WATER MANAGEMENT

URBAN WATER MANAGEMENT PLAN

As detailed under **Section 2.1** an UWMP has been prepared by JDA in support of the Structure Plan (refer **Appendix F**). The UWMP has been developed to establish the concepts and design measures for flood mitigation and stormwater management for the site in accordance with Water Sensitive Urban Design (WSUD).

As agreed, to with the city, a UWMP was prepared given an extensive UWMP which had already been prepared over the majority of the Estate. Given access to a greater level of detail compared to that associated with a Local Water Management Strategy (LWMS), it was appropriate to provide a UWMP rather than update the existing or prepare a new LWMS. This approach will ensure access to the highest level of information to inform future decisions relating to subdivision and engineering.

The Structure Plan has responded to the recommendations of the UWMP and drainage strategy by ensuring:

- infiltration of smaller, frequently occurring storm events on lots and POS areas; and
- overflow of larger storm events to the road network and to Harrisdale Swamp at critical control points.

The major drainage system has been designed to manage rainfall events greater than the 5-year ARI, up to the 100-year ARI. The major drainage system includes the pipe drainage system, roads, swales and the POS basins.

The installed and proposed subsoil drainage system is designed to manage groundwater levels such that Stage 1 and 5 POS basins do not have standing water within the infiltration basins, ensuring that full basin storage is available for rainfall events.

The minor drainage system is designed to manage rainfall events up to the 5-year ARI and includes raingardens, soak wells, other underground storage devices and the pipe drainage system. The key elements of the minor drainage system design are:

- residential lot downpipes will be connected to soak wells that meet the City of Armadale specifications for 'larger' lots; and
- the road drainage system is via a roadside pipe network with capacity for a 5-year ARI.
- For smaller laneway lots, the application of soakwells is problematic, particularly where rear laneways and associated services are already constructed. Where there is existing soakwells in laneways, these lots will drain via overland flow to soakwell grates and then raingardens downstream. The first 15mm rainfall will occur partially in laneway soakwells and the remainder in POS raingardens.

For the remainder of the smaller laneway lots that are unconstrained, underground infiltration cells will be used as joint storage for the first 15mm rainfall prior to discharge to the stormwater system downstream.

- The UWMP includes a range of non-structural and structural measures to ensure water quality management is achieved, including bio-retention storage to treat minor storm events, native plantings, street sweeping and landscape packages for lot purchasers.

3.7 MOVEMENT NETWORK

A Transport Impact Assessment was completed by Flyt for the Structure Plan and based 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 9** 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. With an existing dwelling yield of 195 and an indicative additional dwelling yield of approximately 230, a total dwelling yield of approximately 500 in the Harrisdale Green Estate is expected to generate up to a total of 412 vehicular trips during the PM peak hour and 572 vehicular trips in the AM peak.

A Ranford Road Reservation study was completed on behalf of the Department of Planning in 2016 to review the road reservation requirements for Ranford Road between Vahland Avenue and Armadale Road. The study established an agreed role for Ranford Road, and developed a recommended corridor geometry, which formed the basis for the recommended adjustments to the MRS boundary.

If the modifications to the signalised intersection geometry outlined in the Ranford Road Reservation study are adopted, the road network in the immediate vicinity of the subject site will have sufficient capacity to accommodate the traffic volumes associated with the ultimate development of the Harrisdale Green Estate.

INTERNAL ROAD NETWORK

The internal road network features a series of additional roads to complement the existing network constructed as per the Harrisdale Estate Structure Plan (refer **Figure 9**).

In the northern area of the site, a series of Access Streets with road reserve widths ranging between 13.0m - 16.0m are provided. A higher order Access Street connection will provide a connection between Greenlink Boulevard and Warton Road, with the Warton Road intersection being restricted to left in/left out site access only.

In the central area there are two existing Neighbourhood Connectors (Greenlink Boulevard and Flametree Boulevard) which provide access to the site from Ranford Road with road reserve widths of 22.0m, as well as a network of Access Streets (13.0m – 16.0m road reserve widths) and Laneways (6.0m road reserve widths). Additional Access Streets (13.0m – 16.0m) and Laneways (6.0m road reserve widths) are planned to provide access to future lots.

In the southern area of the site, there is an existing extensive road network providing access to the developed lots, including the southern portion of Greenlink Boulevard, and six other Access Street connections from Flametree Boulevard (13.0m-15.0m road reserve widths). There is a Higher Order Access Street connection to Wright Road to the south (an uncontrolled all movement intersection), as well as a network of Laneways (6.0m road reserve widths) providing access to properties. Additional Laneways (6.0m road reserve widths) are planned to provide access to the undeveloped lots in the southern portion.

The Access Streets layout is based on a modified grid to accommodate ease of access to the Major Access Streets, with short trips to Warton Road and Ranford Road. The road network has a strong north south and east west layout to maximise solar efficiencies for dwellings and accommodate appropriate drainage.



Figure 9 Road Network

INTERSECTIONS

The intersections of the subject site with the surrounding road networks are predominantly priority-controlled intersections, with traffic signal-controlled intersections on the corner of Ranford Road and Warton Road, and Ranford Road and Wright Road / Bristle Road.

The fundamental road configuration of this Structure Plan does not vary from the original structure. All original access and egress points to adjacent Integrator Arterials and Neighbourhood Connectors have been maintained.

All internal intersections will be priority (stop or give way) controlled intersections with the exception of three roundabouts located within the subject site. Based on the predicted traffic flows the proposed intersection types are considered to be adequate.

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 the public open spaces.

Whilst paths are not considered necessary along lower order access roads and laneway networks as these roads will carry relatively low volumes of traffic, the recommended pathway network is consistent with the surrounding development. This will maintain the high level of service to all pedestrians and cyclists within the estate.

The Principal Shared Path located adjacent Ranford Road is interconnected with cycle paths through the proposed subdivision pattern.

This pedestrian and shared path network is detailed on **Figure 9** with shared paths also depicted on the Structure Plan.

PUBLIC TRANSPORT ROUTES

As detailed under **Section 2.6.4** there are bus stops located adjacent to the subject site on Ranford Road and Wright Road. The road and path network will provide appropriate connectivity for residents to access the public transport network in a safe manner.

Transperth have confirmed that additional bus stops may be required along Ranford Road between Warton Road and Greenlink Boulevard to service the additional population of Harrisdale Green Estate.

3.8 TRANSPORTATION NOISE ASSESSMENT

A Transportation Noise Assessment has been undertaken by Lloyd George Acoustics to assess the noise impact on the subject site from transportation along Ranford Road and Warton Road in accordance with the criteria of SPP 5.4.

The assessment included noise monitoring and modelling which concluded with no noise control, road traffic noise levels for most future dwellings along Ranford and Warton Roads will exceed the acceptable outdoor noise limit by the forecast year of 2037, with the highest noise levels predicted on buildings on the corner of Ranford Road and Warton Road. As such, noise mitigation must be implemented. In order to achieve the maximum target noise level for habitable facades as specified in SPP 5.4, a noise wall is required to be constructed to both road frontages. The noise wall is to be solid, free of gaps and of a minimum surface mass of 15kg/m². In cases where the dwelling facades are still exceeding the policy's noise targets, various architectural treatments will be applied to future dwellings, in addition to noise walls depending on the location of each dwelling and the associated noise impact. The Quiet House packages A, B and C will be used to inform the acoustic measures for each dwelling depending on their proximity to the noise source in order to achieve acceptable maximum noise levels. All of the impacted lots are to provide one outdoor entertaining area where noise levels are below the limit specified in SPP 5.4.

If a multi-storey dwelling is constructed on any of the impacted lots, specialist advice will be required to determine the architectural treatment and buffer distances required to achieve an appropriate level of attenuation on upper levels.

All affected lots are to have notifications on lot titles as per the requirements of SPP 5.4. New development will be oriented away from the service / loading area of the adjacent Bunnings with an existing masonry wall screening residential development from access and car parking areas. Therefore, it is unnecessary to undertake acoustic assessment for the SP in the southern corner of the site adjacent to Wright Road.

4 IMPLEMENTATION AND STAGING

4.1 STRUCTURE PLAN

This Structure Plan will supersede the relevant portion of the adopted Harrisdale Estate Structure Plan. The balance of the Harrisdale Estate Structure Plan will continue to operate until such time as the Town Planning Scheme has been 'normalised'.

4.2 MANAGEMENT PLANS

A Landscape Plan will be prepared at the subdivision stage, as detailed in Part One.

4.3 STAGING

Development staging is still to be refined; however, the following provides the basis for future decision-making:

- i. Utilise access to existing road and service infrastructure through a logical extension of the existing subdivision pattern.
- ii. 'Round-off' existing development central to the Estate adjacent to Ranford Road.
- iii. Extend development from the existing subdivision in the central portion of the site in a northward's direction.
- iv. Construction to occur in 40-60 lots stages.
- v. Construction to occur in consecutive staging subject to market conditions

APPENDIX A

PRE-LODGEMENT CONSULTATION

APPENDIX B

BUSHFIRE MANAGEMENT PLAN

The background features a blue gradient with a faint, semi-transparent graphic of a city grid and a globe. The grid lines are thin and light blue, while the globe is represented by a series of curved lines and small squares, suggesting a map or satellite imagery. The overall aesthetic is clean and professional.

APPENDIX C

TRANSPORTATION NOISE ASSESSMENT



APPENDIX D
ENGINEERING SERVICES
REPORT

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 a darker shade of blue, partially visible on the left side of the page.

APPENDIX E

LANDSCAPE STRATEGY

APPENDIX F

URBAN WATER MANAGEMENT PLAN

The background features a blue gradient with a faint, semi-transparent graphic of a city grid and a globe. The grid lines are thin and light blue, while the globe is a darker shade of blue, showing a portion of its surface.

APPENDIX G

TRANSPORT IMPACT ASSESSMENT