



TWO ROCKS LOCAL STRUCTURE PLAN

OCTOBER 2017



ENDORSEMENT PAGE

This structure plan is prepared under the provisions of the City of Wanneroo District Planning Scheme No. 2

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

2007

In accordance with Schedule 2, Part 4, Clause 28 (2) and refer to Part 1, 2. (b) of the Planning and Development (Local Planning Schemes) Regulations 2015.

Date of Expiry:

19 OCTOBER 2030

DOCUMENT STATUS

07/032		Revision	Date Issued
Prepared By: Taylor Burrell Barnett Town Planning and Design 187 Roberts Road SUBIACO WA 6008 Phone: 9382 2911 Fax: 9382 4586 admin@tbbplanning.com.au In association with: Tabec RPS Sinclair Knight Merz Plan E Syme Marmion & Co. ARUP Sustainability Creating Communities MP Rogers & Associates Golder Associates Ethnoscience Arbor Logic Whelans Bennelongia		0	Dec 2007
		1	Apr 2008
		2	Apr 2009
		3	May 2009
		4	Jun 2009
		5	Feb 2011
		6	Mar 2011
		7	Mar 2014
		8	Nov 2015
		9	Oct 2017

TABLE OF AMENDMENTS

Amendment No.	Summary of the Amendment	Date endorsed by Council	Date approved by the WAPC
1	Undertake changes to the Agreed Structure Plan document by: - Inserting a new Section 3.1 in Part 1 'Staged Upgrading of Breakwater Drive' and accompanying Plan 4. - Replacing Figures 5.13: Stage B Major Road Construction and Figure 5.15: Stage D Major Road Construction in Part 2. Inserting additional text and modifying existing text within Section 5.3.1 of Part 2.	14 Nov 2013	30 Dec 2013
2	Undertake changes to the Agreed Structure Plan document by: - Replacing existing Part 1 - Plan 1 with a revised and updated Plan 1 which reflects the rationalisation of Public Open Space, reservation of land within the coastal setback area as 'Parks and Recreation Foreshore Reserve', identification of Shearwater Avenue as 'District Distributor B', extension of northern 'Local Distributor' connecting with Shearwater Avenue, identification of remaining fragment of Lisford Avenue road reserve as 'Residential' and relocation of the private K-12 site and portions of mixed use and business zones. - Replacing existing Part 1 - Plan 2 with a revised and updated Plan 2 which reflects the relocation of the portions of mixed use and business zones. - Replacing existing Part 1 - Plan 3 with revised and updated Plan 3 which reflects the rationalisation of Public Open Space and, removal of northern and central areas of Precinct A (Landform), identification of land within the coastal setback area as 'Open Space / Foreshore', identification of Shearwater Avenue as 'District Distributor B', extension of northern 'Local Distributor' connecting with Shearwater Avenue, identification of remaining fragment of Lisford Avenue road reserve as 'Residential' and relocation of the private K-12 site and portions of mixed use and business zones. - Inserting additional strategies within Section 2.1.2 of Part 1 relating to Movement Network. - Replacing Part 2 – Figure 5.1, the Masterplan with an updated Masterplan reflecting the Public Open Space rationalisation and relocation of the private K-12 site and portions of mixed use and business zones. - Replacing Part 2 – Figure 5.3 Public Open Space Provision and associated Individual Public Open Space Schedule to represent amendments to the Public Open Space provision. - Replacing Part 2 – Tables 5.1, 5.2 & 5.3 to represent amendments to dwelling yields, non residential land use site and floor areas reflected in the updated Masterplan. - Replacing the existing numeric values in Part 2, section 5.1.2.6 Public Open Space with numeric values that provides consistency with the revised Public Open Space Schedule and	15 Sept 2015	23 Oct 2015

Amendment No.	Summary of the Amendment	Date endorsed by Council	Date approved by the WAPC
	inserting corresponding text relating to Public Open Space credits for drainage areas. Replacing Part 2 – Precinct Plans for Precincts 1-11 to represent amendments to the Public Open Space provision, the corresponding amendment of measurement of areas and dwellings in the land use and lot type tables for Precincts 1-11 and the relocation of the private K-12 site and portions of mixed use and business zones and their immediate surrounds.		
3	Undertake changes to the Agreed Structure Plan document by: - Including the following text within Part 1 – Section 6; The City of Wanneroo’s ‘Medium-Density Housing Standards (R-MD)’ Local Planning Policy 4.19 (R-MD Codes LPP 4.19) sets out acceptable variations to the deemed-to-comply provisions of the R-Codes for lots coded R25-R60. Except in a situation where an approved LDP imposing R-Code variations for lots applies, the standards set out in the R-MD Codes LPP 4.19 apply to this Local Structure Plan.” - Updating Residential Density Plan - Plan 3 accordingly		

CONTENTS

PART ONE IMPLEMENTATION SECTION	1
1 IMPLEMENTATION PLANNING	2
1.1 STRUCTURE PLAN AREA	2
1.2 STRUCTURE PLAN CONTENT	2
1.3 INTERPRETATION	2
1.4 OPERATION DATE	3
1.5 RELATIONSHIP WITH THE SCHEME	ERROR! BOOKMARK NOT DEFINED.
1.6 MONITORING AND REVIEW	3
2 VISION IMPLEMENTATION	4
2.1 PRINCIPLES, OBJECTIVES AND STRATEGIES	4
2.1.1 HOUSING	4
2.1.2 MOVEMENT NETWORK	5
2.1.3 COMMUNITY/SOCIAL	6
2.1.4 ENVIRONMENTAL	8
2.1.5 ECONOMY & EFFICIENCY	9
3 OPERATION OF STRUCTURE PLAN	11
3.1 STAGED UPGRADING OF BREAKWATER DRIVE	13
4 STRUCTURE PLAN MAP	14
5 ZONES	14
6 RESIDENTIAL DENSITIES	14



PART ONE IMPLEMENTATION SECTION

1 IMPLEMENTATION PLANNING

1.1 STRUCTURE PLAN AREA

This Structure Plan shall apply to the Capricorn Village Joint Venture (CVJV) landholding, and a 5 ha portion of surplus road reserve (Lisford Avenue) being the land contained within the inner edge of the black line as shown on the Structure Plan Map (**Plan 1**).

The Structure Plan area comprises approximately 423 hectares as outlined below:

Lot	Description	Vol/Folio	Registered Proprietor	Area
Lot 11	Damepattie Drive, Two Rocks	2229/903	Yanchep Sun City Pty Ltd	63.4294 ha
		2229/908	Capricorn Investment Group Pty Ltd	
Lot 12	Damepattie Drive, Two Rocks	2229/904	Yanchep Sun City Pty Ltd	64.0683 ha
		2229/909	Capricorn Investment Group Pty Ltd	
Lot 13	Damepattie Drive, Two Rocks	2229/905	Yanchep Sun City Pty Ltd	77.984 ha
		2229/910	Capricorn Investment Group Pty Ltd	
Portion of Lot 207	Shearwater Avenue, Two Rocks	2230/403	Yanchep Sun City Pty Ltd	70.4119 ha
		2230/404	Capricorn Investment Group Pty Ltd	
Lot 500	Lisford Avenue, Two Rocks	229/901	Yanchep Sun City Pty Ltd	142.3734 ha
		2229/906	Capricorn Investment Group Pty Ltd	
-	Portion of Lisford Avenue extending from Breakwater Drive	-	State of WA	5.1700 ha
Total Area				423.437 ha

1.2 STRUCTURE PLAN CONTENT

This Structure Plan comprises:

- Implementation Planning Section (Part 1)
- Explanatory Report (Part 2)
- Appendices – Detailed Technical Reports

1.3 INTERPRETATION

The words and expressions used in this Structure Plan shall have the respective meanings given to them in the Scheme, or where not defined in the Scheme, as set out hereunder:

‘The Scheme’ shall mean the City of Wanneroo District Planning Scheme No. 2 (as amended) or such amendments or modifications thereto that may be current.

1.4 OPERATION DATE

In accordance with sub-clause 9.8.1 of the Scheme, this Structure Plan shall come into operation when it is certified by the Western Australian Planning Commission (WAPC) pursuant to sub-clause 9.6.3 of the Scheme or adopted, signed and sealed by the Council under sub-clause 9.6.5 of the Scheme.

1.5 MONITORING AND REVIEW

The Yanchep-Two Rocks District Structure Plan is subject to monitoring and review by the City of Wanneroo and/or the Western Australian Planning Commission commencing in 2017. Any amendments to the Yanchep-Two Rocks District Structure Plan may result in consequential amendments to the Local Structure Plan, which must be consistent with the District Structure Plan.

2 VISION IMPLEMENTATION

The principles, objectives and strategies which will inform and guide the sustainable planning and development of the CVJV Two Rocks Structure Plan area are outlined below. The figure below demonstrates how the overarching principles have informed the objectives and strategies of the Structure Plan.



The Principles are broad statements derived from Liveable Neighbourhoods and the City of Wanneroo's Smart Growth Strategy which will guide the detailed design and development of the land.

The various strategies referred to in the Structure Plan shall be implemented as part of the subdivision and development of the Structure Plan area.

2.1 PRINCIPLES, OBJECTIVES AND STRATEGIES

2.1.1 HOUSING

PRINCIPLE

To provide a diversity of housing choice for the community at a density that can support the provision of local services.

OBJECTIVES

- O1 To provide a range of lot sizes.
- O2 To facilitate a range of housing types.
- O3 To provide opportunity for affordable housing.
- O4 To appropriately locate densities.
- O5 To provide robust housing and mixed-use development.
- O6 To promote a variety of lifestyle options.
- O7 To respond to changing community needs.

STRATEGIES

- S1 Provide for a wide range of housing and lot types in a variety of density settings consistent with the targets outlined in the Housing Diversity Requirements for 2021 in the City of Wanneroo Housing Strategy.
- S2 Provide the market with a variety of lot types at a range of price points, including appropriate provision for affordable lots that make home ownership more accessible for first home buyers and lower income earners.

- S3 Appropriately locate affordable lots to provide access to public transport, employment and retail and community services.
- S4 Provide opportunities for the development of innovative housing typologies that offer more affordable housing products.
- S5 Allocate higher residential densities in areas that have easy access to, or are in close proximity to:
 - Public Transport;
 - Major arterial routes;
 - Retail and employment centres;
 - Areas of high amenity including public open space and recreation facilities;
 - Education institutions including primary and secondary schools; and
 - Community facilities.
- S6 Showcase best practice in energy and water efficient design and development through the incorporation of an 'Eco Precinct(s)'.
- S7 Through Local Development Plans, provide for adaptable buildings/units that allow for changing use over time along Breakwater Drive.
- S8 Through Local Development Plans, provide for dwellings on lots abutting passive open space and Bush Forever Site 397 to overlook and survey these bushland areas.
- S9 Promote, in housing layouts for R30 and above, the incorporation of passive solar design principles through variations to conventional residential standards.
- S10 Promote energy and water efficiency principles in all housing through purchaser information packages.
- S11 Respond to changing community needs and lifestyle demands by allowing for 'aging in place' through the provision of a range of lot sizes to facilitate different dwelling types, including those suitable for older residents.

2.1.2 MOVEMENT NETWORK

OBJECTIVES

- O1 To provide an interconnected road network.
- O2 To provide an integrated movement network for private vehicles, public transport, pedestrians and cyclists.
- O3 To provide a clear road hierarchy.
- O4 To facilitate connectivity to the coast.
- O5 To facilitate connectivity to the Two Rocks Town Centre/Marina Village.
- O6 To facilitate and enhance connectivity to the future Northern Town Centre.
- O7 To provide walkable neighbourhoods with pleasant street environments.
- O8 To create well designed roads that contribute to the amenity of the area.
- O9 To ensure efficient access from major roads.
- O10 To provide for a high quality, high frequency public transport service.

STRATEGIES

- S1 District Distributor and Local Distributor roads are to be located generally in accordance with the Structure Plan (Plan 1).
- S2 Develop an interconnected street network for private vehicles, public transport, pedestrians and cyclists, connecting with the existing Two Rocks street network and providing strong links to the Two Rocks Town Centre and Marina, the coastline and the future Northern Town Centre.
- S3 Ensure a clear and efficient road hierarchy.
- S4 Ensure the major roads are designed to provide an environment amenable to pedestrian, cyclists, homes and businesses.
- S5 Ensure local streets are designed to create safe low-speed environments consistent with *Liveable Neighbourhoods* standards for widths, cross sections, truncations, street trees and other matters.
- S6 Provide a comprehensive pedestrian and cycle network that is enhanced by attractive landscaping and interconnected public open space linkages.
- S7 Ensure road design responds to the topographical conditions of the land in Planning Precinct A - Landform, where landform retention forms a critical component of the subdivision design.
- S8 Facilitate the staged provision of efficient bus route(s) and access points that provide maximum accessibility in accordance with PTA policy.
- S9 Direct vehicular access to lots fronting district distributor roads is not permitted unless a traffic assessment satisfactorily demonstrates that the access would not impact on traffic safety and efficiency.
- S10 Three way intersections onto district distributor roads are to be left in left out unless a traffic assessment including an intersection Sidra analysis satisfactorily demonstrates that the access would not impact on traffic safety and efficiency.

2.1.3 COMMUNITY/SOCIAL

PRINCIPLE

To foster a sense of community, strong local identity and sense of place.

OBJECTIVES

- O1 To integrate the development with the existing Two Rocks community.
- O2 To create cohesive neighbourhoods with their own distinct character and sense of identity.
- O3 To appropriately locate schools.
- O4 To appropriately locate local centres.
- O5 To appropriately locate POS.
- O6 To appropriately distribute passive and active POS.
- O7 To optimise public and private view corridors and vistas.
- O8 To stage development to encourage early public transport provision and use.
- O9 To stage development to encourage community formation.

STRATEGIES

- S1 Prepare a Community Development Plan within 12 months of the commencement of development, to determine the need, appropriate size and location of community purpose sites in accordance with the principles of Liveable Neighbourhoods.

If the Community Development Plan concludes that community purpose sites are required in alternative locations to those proposed in the Local Structure Plan (LSP) area, then the following modifications are to be undertaken:

- The LSP is to be modified to identify the revised location sites;
 - An implementation provision being included in Part 1 of the LSP; and
 - The public open space discussion and schedule being modified, with the site included as part of the 10% POS provision, in accordance with Liveable Neighbourhoods.
- S2 Integrate the development with the existing Two Rocks community through a connected movement network, and a sensitive interface between the existing development and the new development which provides a smooth transition in urban form.
- S3 Create neighbourhoods with distinct character based on the protection and enhancement of landform and urban form that, where applicable, responds to the coast, the surrounding activity centres or features such as public open space and community/civic facilities.
- S4 Create cohesive neighbourhoods centred around the co-location and integration of schools, local centres, community facilities and open space.
- S5 Locate schools in general accordance with the Structure Plan (Plan 1) and in a manner that ensures:
- The setting aside of land of a sufficient size, configuration and topography to accommodate the intended use;
 - School buildings that address adjoining streets;
 - Provision of safe access by a range of transport modes; and
 - Multiple use of school infrastructure by the broader community through partnerships.
- S6 Appropriately locate centres to maximise access by all modes of transport, with an emphasis on pedestrian accessibility.
- S7 Appropriately locate POS to ensure all residents have access to a variety of passive and active public open space.
- S8 Optimise public and private view corridors and vistas that take advantage of the site's natural features.
- S9 Maximise the amenity for all residents and visitors through the development of an interconnected network of formal and passive open space areas, linear parks, arborways and landscaped boulevards that provide pleasant walking and cycling routes.
- S10 Ensure that landscape design in the development is carried out/ generally in accordance with the Landscape Masterplan (as amended from time to time) in Part 2 of this Local Structure Plan.
- S11 Encourage timely provision of public transport through the staging of development in order to promote high public transport use and community formation.

- S12 A Community Development Plan will be prepared in consultation with the City of Wanneroo and the Capricorn Village Joint Venture and will address the staging of community facilities.

2.1.4 ENVIRONMENTAL

PRINCIPLE

To incorporate significant environmental and cultural features of the site into the design and provide for their ongoing management.

OBJECTIVES

- O1 To integrate development with existing environmental features, where possible.
- O2 To conserve biodiversity and habitat values by conserving examples of pre-development vegetation types within the Local Structure Plan design.
- O3 To conserve and enhance examples of existing dunal landform within the development.
- O4 To design POS areas within the development to promote the retention of the ecological values of these sites.
- O5 To respect places of cultural/social/historical significance.
- O6 To appropriately manage the environmental issues relevant to the development.

STRATEGIES

- S1 Create a plan that provides a synergy between environmental features and development, so as to provide an economically viable, high amenity urban landscape, strengthen the sense of place in Two Rocks and conserve the ecological values of the landscape.
- S2 Conserve a minimum of 3% of the net subdivisible area as remnant Quindalup vegetation complex in accordance with the City of Wanneroo Local Biodiversity Strategy 2008-2013. This remnant vegetation is to be conserved within the Passive Public Open Space areas depicted on Plan 1.
- S3 Retain the existing dunal landform within the Passive Public Open Space.
- S4 The design of Passive Open Space will aim to provide appropriate facilities for passive recreation while preserving the ecological functions of the areas and minimising potential edge effects from the development area, in accordance with the Vegetation, Flora and Fauna Management Plan.
- S5 Prepare a Foreshore Management Plan prior to the first subdivision of Lot 13, to guide the management of foreshore areas and Bush Forever Reserve 397. The Foreshore Management Plan shall be broadly in accordance with the City's Yanchep-Two Rocks Foreshore Management Plan 2007 (as amended).
- S6 Delineate Public Open Space and Bush Forever Reserve 397 through the strategic placement of roads, dual use paths and/or boundary fencing.
- S7 Conserve and enhance areas of locally significant vegetation through POS allocation, subdivision design and Local Development Plans, while balancing development requirements.
- S8 Through Local Development Plans, provide for the retention of landform outside of building envelopes on lots greater than 1,000 m².

- S9 Development Applications for the landscaping of POS shall demonstrate the use of predominantly endemic and native species, with limited use of exotic species for amenity and visual effect. The use of exotic species will be suitably justified in Development Applications.
- S10 The use of endemic and native species will be encouraged within the landscaping of private gardens.
- S11 Use POS and public art to emphasise and interpret areas of environmental and cultural heritage values.
- S12 Respect the historical significance of the Trig Survey Station through its incorporation and recognition within the Passive Public Open Space.
- S13 Prior to the commencement of civil works, prepare Management Guidelines to assist in the identification of potential karst features during the earthworks stage of construction.
- S14 Carry out a Detailed Site Investigation (DSI) of the former Bower Grove tip site, prior to its subdivision or development.
- S15 Ensure that no subdivision or development takes place within the coastal setback area depicted on Plan 1, unless a further assessment of the coastal setback is undertaken to justify a lesser coastal setback due to coastal erosion being appropriately managed as part of future plans for the Two Rocks Marina.

2.1.5 ECONOMY & EFFICIENCY

PRINCIPLE

To ensure a cost-effective, resource-efficient and self-sustaining development.

OBJECTIVES

- O1 To provide opportunities for local employment.
- O2 To provide for a range of employment opportunities (eg home based businesses, commercial, retail, tourism).
- O3 To respond to, and help educate, the housing market.
- O4 To ensure the efficient use of existing and proposed infrastructure.
- O5 To integrate water management and efficiency with urban form and POS.
- O6 To optimise passive solar lot orientation and site responsive urban design.
- O7 To promote energy efficient building developments.
- O8 To facilitate the orderly and efficient provision of infrastructure and services to the development.

STRATEGIES

- S1 Prepare a Local Employment Strategy for Two Rocks, detailing a range of programs and initiatives to facilitate local economic development, training and employment.
- S2 Provide seven local centres, a mixed use corridor and Service Commercial/Business area in general accordance with the Structure Plan (Plan 1).
- S3 Promote a diversity of land uses within the Commercial, Mixed Use and Business zones.

- S4 Facilitate employment generation by mandating the development of non-residential uses at ground floor level within the mixed use corridor east of the Local Centre on Breakwater Drive.
- S5 Concentrate higher residential densities in and around the Local Centres, mixed use area and the Two Rocks Town Centre and Marina to maximise the catchment of those employment centres; improve access; promote after hours surveillance and use and maximise accessibility to services and recreational facilities.
- S6 Provide for home based employment opportunities by permitting Home Business Category 1 and 2 uses within Residential areas.
- S7 Provide high capacity telecommunications infrastructure throughout the Two Rocks Structure Plan area from the outset of development, to promote employment and work from home opportunities.
- S8 Provide information to purchasers of lots on sustainable and innovative housing ideas, alternative building construction methods and the incorporation of low water and energy use features in homes and gardens.
- S9 Through the preparation and adoption of Urban Water Management Plans, ensure an integrated approach to urban water management with the application of best practices in water-sensitive urban design consistent with Liveable Neighbourhoods objectives and requirements.
- S10 Create 'waterwise' public open spaces that meet the active recreational pursuits of the community.
- S11 Design and manage public open spaces in accordance with the design principles and objectives of the approved Local Water Management Strategy.
- S12 Through site responsive street layout and local development planning, maximise opportunities for passive solar access to lots and buildings.
- S13 Any land requirements arising out of the finalisation of the Water Corporation's sewer and water planning shall be accommodated in the development.

3 OPERATION OF STRUCTURE PLAN

Subdivision applications shall be consistent with the intent of the Agreed Structure Plan.

At the time of lodging an application for subdivision, the proponent shall provide supporting information pertinent to the relevant area detailed on the Structure Plan (Plan 1) to demonstrate how the objectives and strategies detailed at section 2.0 will be addressed. This information may include supporting documents including (where relevant) the following:

- Residential Density Code Plan
- Residential yield and housing type analysis
- Local Development Plans
- Road Layout Plan
- Public Open Space Schedule
- Foreshore Management Plan
- Tree Retention Plan
- Conceptual Landscape Designs
- Subdivision Assessment Checklist

A Residential Density Code Plan is to be submitted at the time of subdivision to the Western Australian Planning Commission in accordance with the Local Structure Plan. The Residential Density Code Plan shall indicate the Residential Density Coding applicable to each lot within the subdivision and shall be consistent with the Residential Density Plan (Plan 3) and with the residential density ranges shown in the Precinct Planning Requirement tables. Approval of the Residential Density Code Plan shall be undertaken at the time of determination of the subdivision application by the Western Australian Planning Commission.

In regard to the Residential Density Code Plan, once approved by the Western Australian Planning Commission the plan shall then form part of the Local Structure Plan and be used for the determination of future development applications. Variations to the Residential Density Code Plan will require further approval from the WAPC.

In regard to the Foreshore Management Plan, this shall only be required to be submitted once, prior to the first subdivision application for Lot 13.

In addition to the provision of the abovementioned documents, Urban Water Management Plans will be required as a condition of subdivision and shall be submitted prior to subdivision clearance.

In regard to the portion of Lot 500 which was formerly used for the purpose of landfill (i.e. the former Bower Grove tip site), a Detailed Site Investigation (DSI) will be required to be undertaken prior to any subdivision or development of the land.

In regard to the Subdivision Assessment Checklist, this shall be completed by the developer in order to demonstrate that the relevant strategies detailed at section 2.0 have been complied with, or provide justification for any non-compliance.

Where appropriate, Local Development Plans (LDPs) will be prepared and submitted at the time of lodging an application for subdivision or prior to subdivision clearance, consistent with the provisions of clause 9.14 of the Scheme. All LDP applications will be required to be accompanied by a LDP Assessment Checklist, completed by the developer to demonstrate that the relevant strategies detailed at section 2.0 have been complied with, or provide justification for any non-compliance. Once adopted, an LDP will be used for subdivision and development control purposes.

At the time of subdivision where relevant, the City of Wanneroo shall recommend to the WAPC conditions inclusive of a requirement to implement the following strategies:

- i) Vegetation, Flora and Fauna Management Plan (prepared and approved as part of this LSP)
- ii) Local Water Management Strategy (prepared and approved as part of this LSP)
- iii) Aboriginal Culture and Heritage Management Plan (prepared and approved as part of this LSP)
- iv) Karst Features report.

Development Applications for the landscaping of public open spaces and streets will be required to be accompanied by a Development Application Checklist, completed by the developer to demonstrate that the relevant strategies detailed at section 2.0 have been complied with, or provide justification for any non-compliance.

Where a Plan of Subdivision or an LDP is inconsistent with the Zoning Plan (Plan 2) and Residential Density Plan (Plan 3), the City or the Western Australian Planning Commission (WAPC) may require an amendment to the Agreed Structure Plan pursuant to the requirements of Part 9 of the Scheme. Any such amendment will be lodged with the City and the WAPC concurrent with the subdivision application of the relevant area.

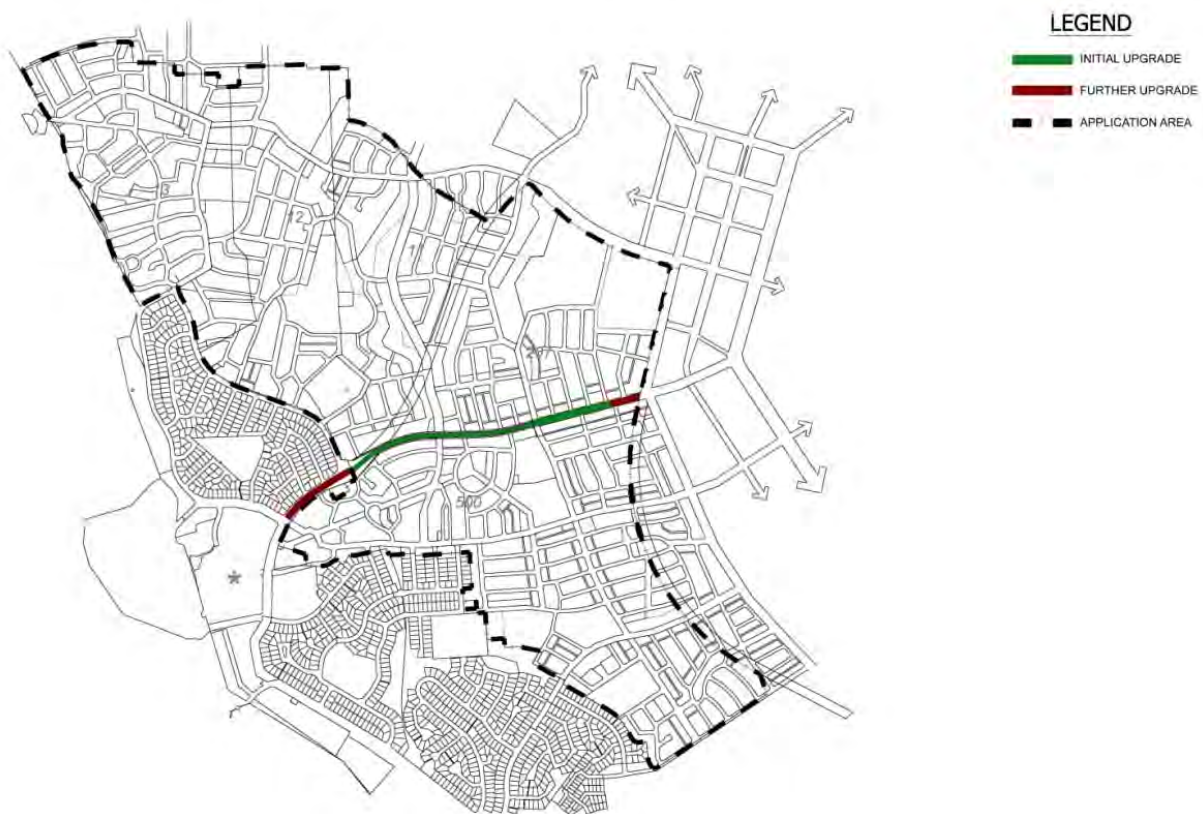
Where amendments are proposed which the City considers do not materially alter the intent of the Structure Plan, and that are consistent with the objectives and strategies detailed at section 2.0, then, pursuant to clause 9.7 of the Scheme, advertising of the amendment will be waived. An amendment to the Structure Plan will typically be accompanied by (where relevant):

- A summary report outlining how the objectives and strategies detailed in the Agreed Structure Plan are to be addressed.
- An updated version of the Structure Plan (**Plan 1**) that addresses the relevant component of each of the Urban Form Elements.
- An updated version of the Zoning Plan (**Plan 2**) and Residential Density Plan (**Plan 3**).
- Relevant technical documents, management plans and strategies.

3.1 STAGED UPGRADING OF BREAKWATER DRIVE

The upgrading of Breakwater Drive within the LSP area shall proceed in a staged manner, as follows:

- a) The complete upgrade of Breakwater Drive for a single lane in each direction, with median, including design, drainage and construction, for 100% of the length coloured green in **Plan 4** shall occur prior to the City issuing clearance for any number of residential lots in excess of 1,028 within the LSP area.
- b) The complete upgrade of Breakwater Drive for a single lane in each direction, with median, including design, drainage and construction, for 100% of the length coloured maroon in **Plan 4** shall occur prior to the City issuing its clearance for any number of residential lots in excess of 4,831 within the LSP area.



PLAN 4 – STAGED UPGRADING OF BREAKWATER DRIVE

4 STRUCTURE PLAN MAP

The Structure Plan (Plan 1) outlines the planned pattern of development for the Structure Plan area. All development should be carried out in accordance with the principles, objectives and strategies detailed in this document and described on the Structure Plan Map.

5 ZONES

The Zoning Plan (Plan 2) delineates and depicts the zones applicable to the Structure Plan according to the legends thereon.

The zones designated under this Structure Plan apply to the land within it as if they were incorporated in the Scheme.

All provisions, standards and requirements applicable to the zones in the Scheme shall apply, unless specific provision is made to the contrary in this Structure Plan.

In this regard, the land use permissibility for each zone within the four (4) Planning Precincts are outlined in the following tables.

6 RESIDENTIAL DENSITIES

The Residential Density Plan (Plan 3) delineates and depicts the density codes applicable to the Structure Plan according to the legend thereon.

The density codings designated under the Structure Plan apply to the land within it as if they were incorporated in the Scheme.

The City of Wanneroo's 'Medium-Density Housing Standards (R-MD)' Local Planning Policy 4.19 (R-MD Codes LPP 4.19) sets out acceptable variations to the deemed-to-comply provisions of the R-Codes for lots coded R25-R60. Except in a situation where an approved LDP imposing R-Code variations applies, the standards set out in the R-MD Codes LPP 4.19 apply to this Local Structure Plan.

All provisions, standards and requirements applicable to the density coding in the Scheme shall apply, unless specific provision is made to the contrary in this Structure Plan or an underlying Local Development Plan.

Development requirements applicable to the four (4) Planning Precincts identified in the Residential Density Plan (Plan 3) are outlined in the following tables.

Planning Requirements for Precinct A Landform	
1. Precinct Objectives	1.1 To provide for a lower density residential development which responds to the natural landform and promotes retention of environmental features. 1.2 To provide development that is complementary to its coastal location and parabolic dune formation with sensitive and innovative design responses.
2. Residential Density Range	2.1 Lower densities (R5–R20) will generally be provided as follows: a. R5-R12.5 within, and adjacent to, areas where natural vegetation and/or landform are to be retained. b. R20 will be provided elsewhere.
3. Landuse Permissibility & Variations to Scheme Requirements	3.1 Land use permissibility within the 'Residential Zone' of this precinct shall be in accordance with the 'Residential Zone' of the Scheme with the following additional uses: Permitted ('P') • Home Business Category 2; • Educational Establishments, where generally shown on the Structure Plan Map (Plan 1). Discretionary ('D') • Educational Establishment, where not shown on the Structure Plan Map (Plan 1).
4. Development Requirements and Variations to Scheme Requirements	4.1 Development shall have regard to the natural environment and demonstrate retention of vegetation outside of building areas, where practical. 4.2 Development shall be designed to respond to the landform and minimise disturbance to the ground levels, where practical. 4.3 Dwellings on lots abutting POS shall be orientated to overlook POS areas and this shall be demonstrated through an LDP to ensure surveillance of the POS. 4.4 Outdoor living areas shall be located on the northern side of lots which are generally oriented east-west, where practical. 4.5 Any other variations to these development requirements, R-Codes or Scheme requirements shall be demonstrated through an LDP to be approved by the City.

Planning Requirements for Precinct B Residential	
1. Precinct Objectives	1.1 To provide for a predominantly residential environment. 1.2 To provide for diversity of housing choice for the community at densities and in locations that can support the provision of local services.
2. Residential Density Range	2.1 Low to medium densities (R20–R40) will generally be provided as follows: - Medium densities (R30–R40) in proximity to local centres, in areas of high amenity (i.e. areas adjacent to POS), along public transport routes and in other suitable locations to promote diversity of housing product and housing affordability. - R20 in all other areas. 2.2 Higher densities (up to R100) may be provided on landmark/iconic sites.
3. Landuse Permissibility & Variations to Scheme Requirements	3.1 Land use permissibility within the 'Residential Zone' of this precinct shall be in accordance with the 'Residential Zone' of the Scheme with the following additional uses: Permitted ('P') - Home Business Category 2; - Educational Establishments, where generally shown on the Structure Plan Map (Plan 1). Discretionary ('D') - Educational Establishment, where not shown on the Structure Plan Map (Plan 1). 3.2 For the areas shown as 'Commercial – Local Centre' in this precinct on the Structure Plan Map (Plan 2), land use permissibility shall be in accordance with the 'Commercial Zone' of the Scheme in this general location, with the following additional uses: Permitted ('P') - Bakery; - Child Care Centre; - Civic Building; - Kindergarten and Hall.
4. Development Requirements and Variations to Scheme Requirements	4.1 Front loaded medium density residential lots opposite POS, and laneway lots, shall have a minimum front setback of 3m and maximum of 4.5m. 4.2 Dwellings on lots abutting POS shall be orientated to overlook POS areas and this shall be demonstrated through an LDP to ensure surveillance of the POS. 4.3 A nil side setback boundary wall is mandatory along the southern boundary of lots generally orientated east-west and for all lots less than 12m in width. 4.4 Outdoor living areas should be located on the northern side of lots generally oriented east-west, where practical. 4.5 All laneway lots shall gain vehicle access from the rear laneway, where practical. 4.6 Local centres shall comprise a maximum combined retail net lettable area of 2000m², with each centre comprising no more than 500m² of retail NLA. 4.7 Any other variations to these development requirements, R-Codes or Scheme requirements shall be demonstrated through an LDP to be approved by the City.

Planning Requirements for Precinct C Activity Corridor	
1. Precinct Objectives	1.1 To provide for mixed use development and other employment generating activities on the major vehicular corridor linking the Two Rocks Marina Village Centre and the Northern Town Centre. 1.2 To promote the integration of commercial, business and residential uses within the mixed use corridor. 1.3 To complement the role of the activity centres by encouraging higher density development in adjacent areas.
2. Residential Density Range	2.1 Medium densities will generally be provided as follows: a. R40 - R60 in mixed use developments along Breakwater Drive.
3. Landuse Permissibility & Variations to Scheme Requirements	3.1 Land use permissibility within the 'Residential Zone' of this precinct shall be in accordance with the 'Residential Zone' of the Scheme, with the following additional uses: Permitted ('P') • Home Business Category 2; • Educational Establishments, where generally shown on the Structure Plan Map (Plan 1). Discretionary ('D') • Educational Establishment, where not shown on the Structure Plan Map (Plan 1). 3.2 For the areas shown as 'Commercial – Local Centre' in this precinct on the Structure Plan Map (Plan 2), land use permissibility shall be in accordance with the 'Commercial Zone' of the Scheme in this general location, with the following additional uses: Permitted ('P') • Bakery; • Child Care Centre; • Civic Building; • Kindergarten and Hall. 3.3 Land use permissibility within the 'Mixed Use Zone' of this precinct shall be in accordance with the 'Mixed Use Zone' of the Scheme with the following additional uses: Permitted ('P') • Art Gallery; • Bakery; • Restaurant. Discretionary ('D') • Hardware Store (maximum floor area 150m²); • Laundromat; • Liquor Store, excluding drive thru; • Pharmacy; • Shop (maximum floor area 150m²); • Showroom (maximum floor area 150m²); • Take-Away Food Outlet; • Video Hire.
4. Development Requirements and Variations to Scheme Requirements	4.1 Front loaded medium density residential lots opposite POS, and laneway lots, shall have a minimum front setback of 3m and maximum of 4.5m. 4.2 Dwellings on lots abutting POS shall be orientated to overlook POS areas and this shall be demonstrated through an LDP to ensure surveillance of the POS. 4.3 A nil side setback boundary wall is mandatory along the southern boundary of lots generally orientated east-west and for all lots less than 12m in width. 4.4 Outdoor living areas should be located on the northern side of lots generally oriented east-west, where practical.

Planning Requirements for Precinct C Activity Corridor

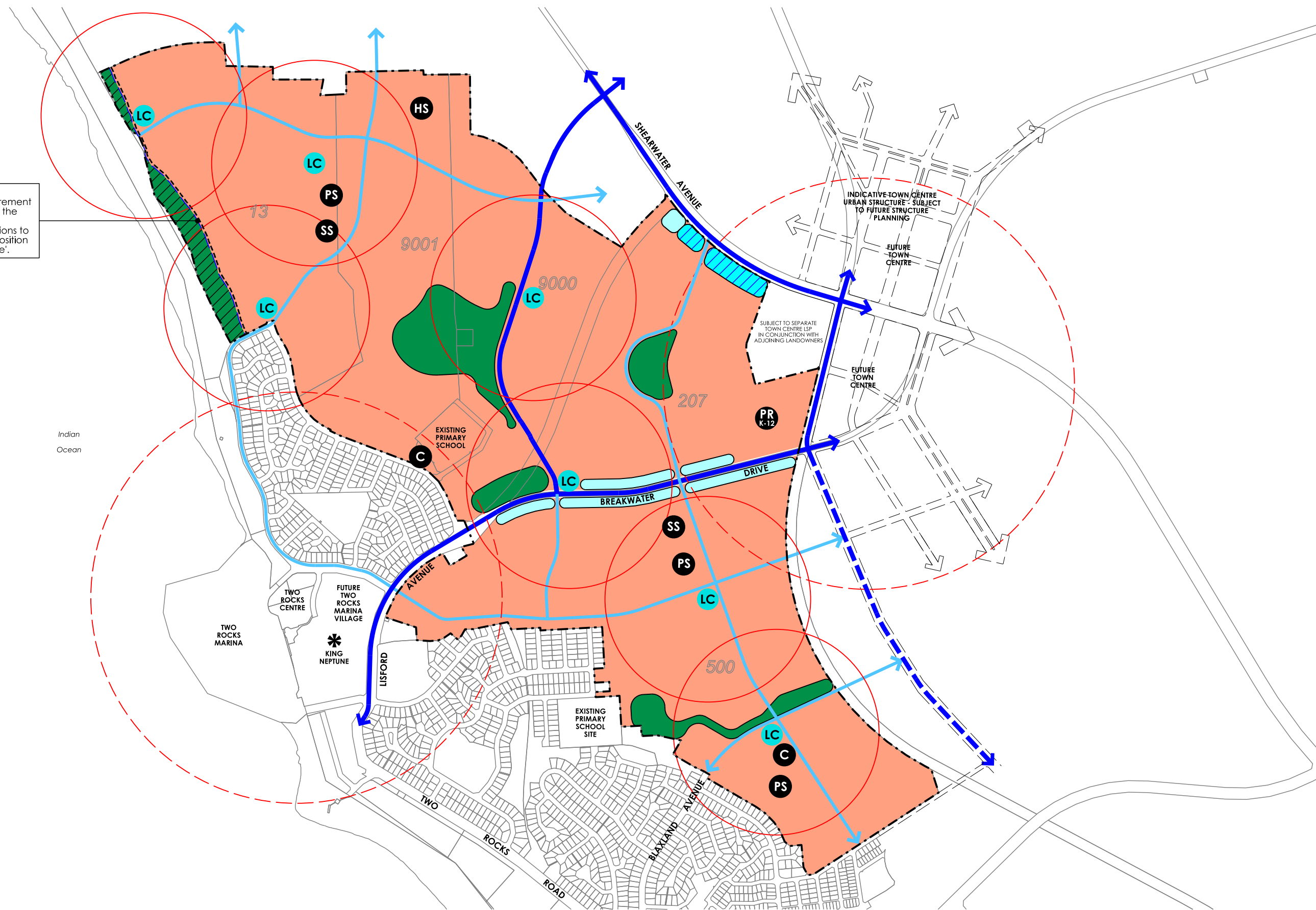
- 4.5 All laneway lots shall gain vehicle access from the rear laneway, where practical.
- 4.6 Local centres shall comprise a maximum combined retail net lettable area of 2000m², with each centre comprising no more than 500m² of retail NLA.
- 4.7 On land zoned 'Mixed Use', buildings shall be designed so that the ground floor units are capable of being adapted from residential use to commercial use over time in recognition of the intent of the Mixed Use Corridor on Breakwater Drive.
- 4.8 Any other variations to these development requirements, R-Codes or Scheme requirements shall be demonstrated through an LDP to be approved by the City.

Planning Requirements for Precinct D Town Centre and Coastal	
1. Precinct Objectives	1.1 Strengthen and support the town centres by providing higher density residential development within proximity of the proposed Northern Town Centre and Two Rocks Marina Village. 1.2 To provide commercial, business and other employment activities on arterial roads with strong linkages to the Town Centres. 1.3 To promote development that is complementary to the coastal setting of the site and contributes to the creation of a local sense of place. 1.4 To celebrate the coastal location and parabolic dune formation with sensitive and innovative design responses. 1.5 Creation of a vibrant coastal location which is an integral part of, and focus for the broader community.
2. Residential Density Range	2.1 Medium and High Densities (R40 – R80) will generally be provided within 800m of a Town Centre. 2.2 Medium densities (R40-R60) will generally be provided in high amenity coastal locations. 2.3 Higher densities (up to R100) may be provided on landmark/iconic sites.
3. Landuse Permissibility & Variations to Scheme Requirements	3.1 Land use permissibility within the 'Residential Zone' of this precinct shall be in accordance 'Residential Zone' of the Scheme with the following additional uses: Permitted ('P') • Home Business Category 2; • Educational Establishments, where generally shown on the Structure Plan Map (Plan 1). Discretionary ('D') • Educational Establishment, where not shown on the Structure Plan Map (Plan 1). 3.2 For the areas shown as 'Commercial – Local Centre' in this precinct on with the Structure Plan Map (Plan 2), land use permissibility shall be in accordance with the 'Commercial Zone' of the Scheme in this general location, with the following additional uses: Permitted ('P') • Bakery; • Child Care Centre; • Civic Building; • Kindergarten and Hall. 3.3 Land use permissibility within the 'Mixed Use Zone' of this precinct, shall be in accordance with the 'Mixed Use Zone' of the Scheme with the following additional uses: Permitted ('P') • Art Gallery; • Bakery; • Restaurant. Discretionary ('D') • Hardware Store (maximum floor area 150m²) • Laundromat • Liquor Store, excluding drive thru; • Pharmacy; • Shop (maximum floor area 150m²); • Showroom (maximum floor area 150m²); • Take-Away Food Outlet; • Video Hire. 3.4 Land use permissibility within the 'Business Zone' of this precinct shall be in accordance with the 'Business Zone' of the Scheme, with the following additional uses Permitted ('P') • Auction Room; • Video Hire. Discretionary ('D')

Planning Requirements for Precinct D Town Centre and Coastal	
	• Cinema Complex; • Light Industry; • Motor Vehicle repairs.
4. Development Requirements and Variations to Scheme Requirements	4.1 Front loaded medium to high density residential lots opposite POS, and laneway lots, shall have a minimum front setback of 3m and maximum of 4.5m. 4.2 Dwellings on lots abutting POS shall be orientated to overlook POS areas and this shall be demonstrated through an LDP to ensure surveillance of the POS. 4.3 A nil side setback boundary wall is mandatory along the southern boundary of lots generally orientated east-west and for all lots less than 12m in width. 4.4 Outdoor living areas should be located on the northern side of lots generally located east-west, where practical. 4.5 All laneway lots shall gain vehicle access from the rear laneway, where practical. 4.6 Local centres shall comprise a maximum combined retail net lettable area of 2000m², with each centre comprising no more than 500m² of retail NLA. 4.7 Any other variations to these development requirements, R-Codes or Scheme requirements shall be demonstrated through an LDP to be approved by the City.

PROPOSED TWO ROCKS LOCAL STRUCTURE PLAN - PLAN 1

NOTE:
minimum coastal setback requirement
is 151 metres to 191 metres from the
horizontal setback datum, in
accordance with the modifications to
SPP 2.6 reflected in the WAPC Position
Statement 'SPP 2.6 Sea Level Rise'.

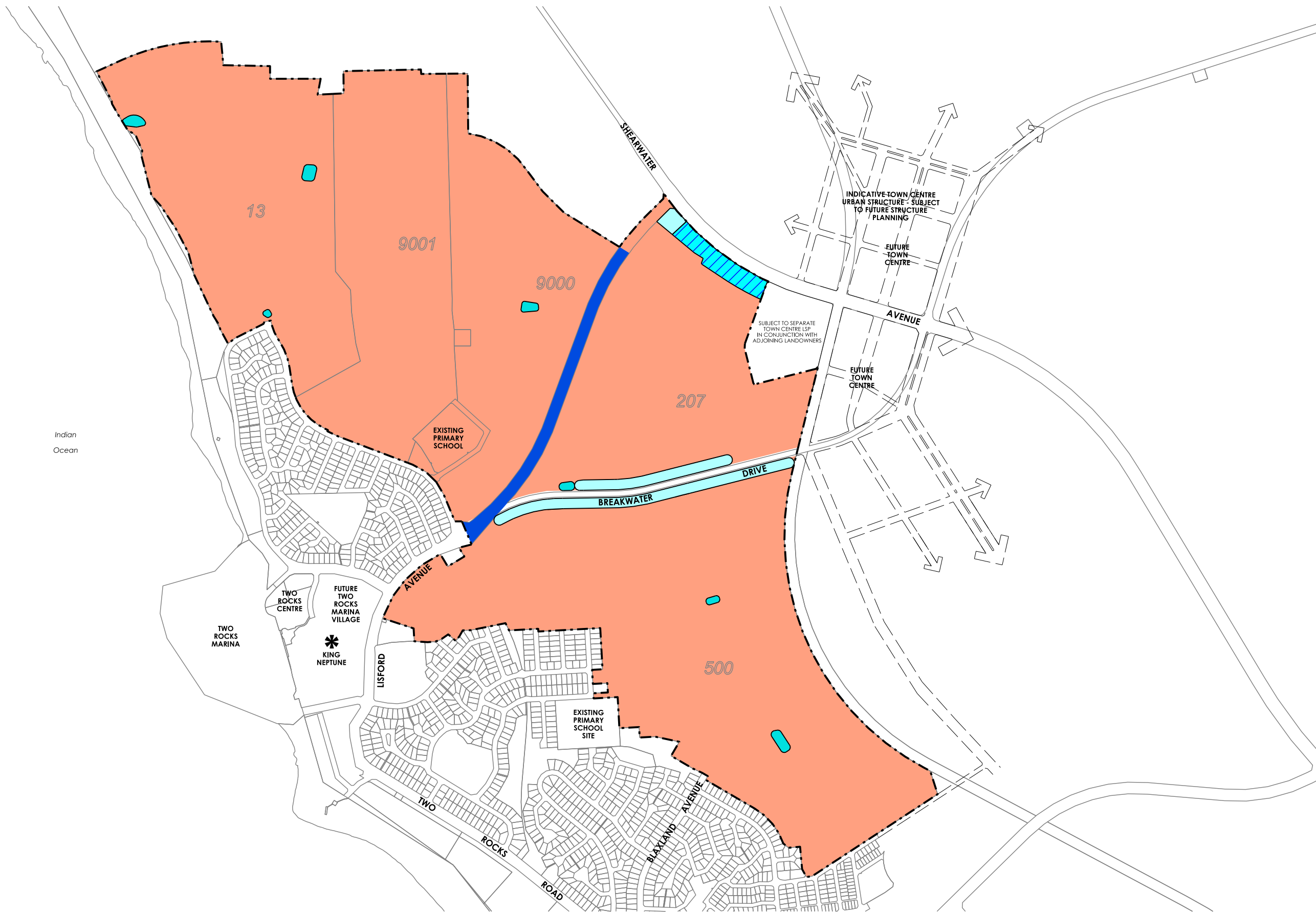


LEGEND

ZONES	RESIDENTIAL	LC COMMERCIAL - LOCAL CENTRE The size and number of local centres shall be determined by, and consistent with, the Yanchep-Two Rocks District Structure Plan and will be subject to more detailed planning at subdivision stage.	community	HS HIGH SCHOOL	C COMMUNITY PURPOSE The Community Development Plan will review the number and location of the Community Purpose sites in consultation with the City of Wanneroo and the Capricorn Village Joint Venture.	other	KEY OPEN SPACE	DISTRICT DISTRIBUTOR 'B'	LOCAL DISTRIBUTOR
	MIXED USE		PS PRIMARY SCHOOL	PR K-12 PRIVATE SCHOOL K-12	SS SENIOR SIZED OVAL Senior sized oval in conjunction with community purpose site.	PARKS AND RECREATION / FORESHORE	INDICATIVE DISTRICT DISTRIBUTOR 'B'	INDICATIVE LOCAL CENTRE 400m WALKABLE CATCHMENT	INDICATIVE TOWN CENTRE 800m WALKABLE CATCHMENT
	BUSINESS					COASTAL SETBACK	INDICATIVE COASTAL ROAD		

STRUCTURE PLAN AREA
NOTE: ALL BOUNDARIES SHOWN ARE INDICATIVE ONLY
0m 100 200 300m
PLAN - 07/032/084E

PROPOSED TWO ROCKS ZONING PLAN- PLAN 2



LEGEND

ZONES

- RESIDENTIAL
- MIXED USE
- BUSINESS
- COMMERCIAL

MRS RESORTS

- OTHER REGIONAL ROADS

(CLOSED ROAD - LISFORD AVENUE, SUBJECT TO MRS AMENDMENT 1197 / 57 TO REMOVE RESERVATION AND ZONE LAND 'URBAN', FOLLOWING THE REPLACEMENT OF THE 'OTHER REGIONAL ROAD' RESERVATION WITH THE 'URBAN ZONE' UNDER THE MRS, THE LAND WILL BE ZONED 'RESIDENTIAL' UNDER THIS LOCAL STRUCTURE PLAN.

OTHER

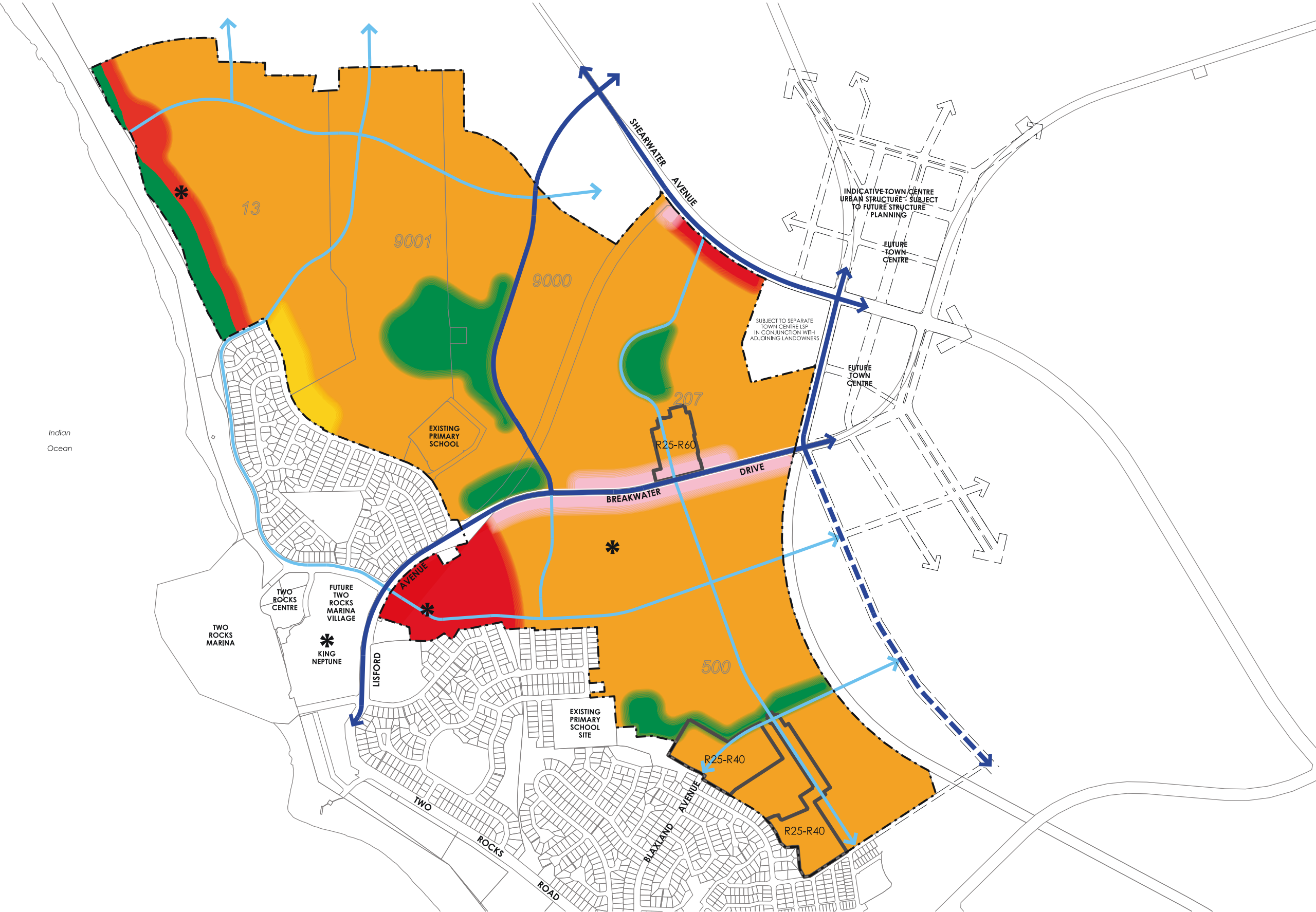
- STRUCTURE PLAN AREA

NOTE: ALL BOUNDARIES SHOWN ARE INDICATIVE ONLY

0m 100 200 300m
PLAN - 07/032/1028



PROPOSED TWO ROCKS RESIDENTIAL DENSITY PLAN - PLAN 3 (AMENDMENT 3)



LEGEND

- | | | |
|-------------------------------------|------------------------------|---|
| DISTRICT DISTRIBUTOR 'B' | STRUCTURE PLAN AREA | R20 & RMD25-40 PRECINCT B - RESIDENTIAL |
| INDICATIVE DISTRICT DISTRIBUTOR 'B' | OPEN SPACE / FORESHORE | R40-R60 & RMD40-60 PRECINCT C - ACTIVITY CORRIDOR |
| LOCAL DISTRIBUTOR | R5-R20 PRECINCT A - LANDFORM | RMD40-60 & R80 PRECINCT D - TOWN CENTRE AND COASTAL |

- LANDMARK/ICONIC SITES
(Higher density permitted up to R100)
- LDP APPROVED AREAS

Notes:
Precinct Boundaries and Open Space areas are indicative only
Lots with a designated R-Code may be subject to an approved LDP and/or Structure Plan provisions which vary R-Code & Scheme requirements
Lots with a designated RMD-Code are subject to LPP4.19-Medium Density Housing Standards

0m 100 200 300m
PLAN - 07/03/08BE | DATE - 20/03/2017





TWO ROCKS LOCAL STRUCTURE PLAN

DECEMBER 2015



DOCUMENT STATUS

07/032		Revision	Date Issued
Prepared By: Taylor Burrell Barnett Town Planning and Design 187 Roberts Road SUBIACO WA 6008 Phone: 9382 2911 Fax: 9382 4586 admin@tbbplanning.com.au In association with: Tabec RPS Sinclair Knight Merz Plan E Syme Marmion & Co. ARUP Sustainability Creating Communities MP Rogers & Associates Golder Associates Ethnoscience Arbor Logic Whelans Bennelongia		0	Dec 2007
		1	Apr 2008
		2	Apr 2009
		3	May 2009
		4	Jun 2009
		5	Feb 2011
		6	Mar 2011
		7	Mar 2014
		8	Dec 2015
		9	Jan 2016

CONTENTS

PART TWO	EXPLANATORY INFORMATION	10
1	INTRODUCTION	11
1.1	PURPOSE	11
1.2	SITE OVERVIEW	11
1.2.1	SITE DESCRIPTION	11
2	BACKGROUND	14
2.1	STRATEGIC COOPERATION AGREEMENT	14
2.1.1	IDEAS PROJECT	14
2.2	DEED OF INFRASTRUCTURE	15
2.3	TWO ROCKS ENQUIRY-BY-DESIGN WORKSHOP	16
2.4	AGREED LOCAL STRUCTURE PLAN	17
2.5	COMMUNITY CONSULTATION	17
2.5.1	COMMUNITY QUESTIONNAIRE	19
2.5.2	COMMUNITY VISION WORKSHOP NO. 1	19
2.5.3	DESIGN OPTIONS WORKSHOP	19
2.5.4	COMMUNITY VISION WORKSHOP 2	20
3	PLANNING CONTEXT	21
3.1	STATUTORY PLANNING CONTEXT	21
3.1.1	METROPOLITAN REGION SCHEME	21
3.1.2	CITY OF WANNEROO DISTRICT PLANNING SCHEME NO. 2	21
3.2	STATUTORY ENVIRONMENTAL CONTEXT	21
3.2.1	ENVIRONMENTAL APPROVALS	21
3.2.2	ENVIRONMENTAL CONDITIONS	23
3.3	STRATEGIC PLANNING CONTEXT	28
3.3.1	THE WESTERN AUSTRALIAN STATE SUSTAINABILITY STRATEGY	28
3.3.2	NETWORK CITY	28
3.3.3	STATE COASTAL PLANNING POLICY	29
3.3.4	BUSH FOREVER	29
3.3.5	OTHER STATE PLANNING POLICIES	30
3.3.6	NORTH WEST CORRIDOR STRUCTURE PLAN (NWCSP)	31
3.3.7	ST ANDREWS DISTRICT STRUCTURE PLAN	32
3.3.8	CITY OF WANNEROO SMART GROWTH STRATEGY	40
3.3.9	SURROUNDING LOCAL STRUCTURE PLANNING	40
3.3.10	CITY OF WANNEROO LOCAL HOUSING STRATEGY	41
3.3.11	CITY OF WANNEROO EMPLOYMENT POLICY	42
4	THE SITE	43
4.1	SITE DESCRIPTION	43
4.1.1	LOCATION	43
4.1.2	CURRENT LAND USE	43
4.1.3	SURROUNDING LAND USES	43
4.2	TWO ROCKS COMMUNITY	46
4.2.1	POPULATION	46
4.2.2	HOUSING	47
4.2.3	EMPLOYMENT	47

4.3	ENVIRONMENTAL	50
4.3.1	TOPOGRAPHY	50
4.3.2	LANDFORM, SOILS AND GEOMORPHOLOGY	50
4.3.3	SURFACE HYDROLOGY AND GROUNDWATER	52
4.3.4	VEGETATION AND FLORA	53
4.3.5	FAUNA	61
4.3.6	COASTAL PROCESSES	63
4.3.7	KARST FORMATIONS	65
4.3.8	POTENTIAL CONTAMINATED SITES	65
4.3.9	UNEXPLODED ORDNANCE	66
4.4	ABORIGINAL HERITAGE	66
4.5	LANDSCAPE	67
4.5.1	LANDFORM AND SITE CHARACTER	67
4.5.2	ADJACENT LAND USES	67
4.5.3	FOCAL POINTS AND VIEWS	71
4.5.4	RECREATIONAL CONNECTIONS	71
4.5.5	CLIMATIC INFLUENCES	71
4.6	MOVEMENT NETWORK	72
4.6.1	REGIONAL ROADS	72
4.6.2	LOCAL ROADS	72
4.6.3	PEDESTRIANS AND CYCLISTS	73
4.6.4	PUBLIC TRANSPORT	73
4.7	SERVICE INFRASTRUCTURE	75
4.7.1	SEWERAGE SYSTEM	75
4.7.2	WATER SUPPLY	75
4.7.3	ELECTRICITY	75
4.7.4	TELECOMMUNICATIONS	75
4.7.5	GAS	76
4.8	OPPORTUNITIES AND ISSUES	78
4.8.1	LOCATION	78
4.8.2	LAND USE	78
4.8.3	LANDFORM	78
4.8.4	ENVIRONMENT	81
4.8.5	FLORA, VEGETATION AND FAUNA	82
4.8.6	MOVEMENT NETWORK	82
4.8.7	SERVICING	83
4.8.8	COMMUNITY (EXISTING AND PROPOSED)	84

5	THE PLAN	86
5.1	OVERVIEW OF THE PLAN	86
5.1.1	DESIGN PRINCIPLES	86
5.1.2	LAND USES AND YIELDS	90
5.1.3	PRECINCTS	103
5.1.4	PROJECTED POPULATION	124
5.2	LANDSCAPE DESIGN	125
5.2.1	LANDSCAPE THEMING	125
5.2.2	LANDSCAPE VISION	125
5.2.3	LANDSCAPE MASTERPLAN	126
5.2.4	PUBLIC ART	132
5.3	MOVEMENT NETWORK	134
5.3.1	PROPOSED ROAD NETWORK AND STAGING	134
5.3.2	ROAD NETWORK	143
5.3.3	PARKING	145

5.3.4	PEDESTRIANS AND CYCLISTS	145
5.3.5	PUBLIC TRANSPORT AND STAGING	146
5.4	ENGINEERING	148
5.4.1	EARTHWORKS	148
5.4.2	STORMWATER MANAGEMENT	148
5.4.3	WATER SUPPLY	152
5.4.4	WASTE MANAGEMENT	152
5.4.5	POWER SUPPLY	153
5.4.6	TELECOMMUNICATIONS	156
5.4.7	GAS SUPPLY	156
5.5	SUSTAINABILITY APPRAISAL	158
5.6	IMPLICATIONS OF THE PLAN	160
5.6.1	ENVIRONMENTAL	160
5.6.2	SOCIAL (COMMUNITY FORMATION AND INTEGRATION)	165
5.6.3	ECONOMIC (EMPLOYMENT)	165
5.7	RELATIONSHIP TO STRATEGIC PLANNING FRAMEWORK	170
5.7.1	NORTH WEST CORRIDOR STRUCTURE PLAN REVIEW	170
5.7.2	ST ANDREWS DISTRICT STRUCTURE PLAN	171
6	IMPLEMENTATION	175
6.1	ADOPTION OF LOCAL STRUCTURE PLAN	175
6.2	METROPOLITAN REGION SCHEME AMENDMENTS	175
6.3	CITY OF WANNEROO DISTRICT STRUCTURE PLAN NO. 2	175
6.4	CLOSURE OF ROAD AND RAIL RESERVES	175
6.5	VARIATIONS TO INFRASTRUCTURE DEEDS OF AGREEMENT	176
6.6	ENVIRONMENTAL MANAGEMENT PLANS	176
6.6.1	VEGETATION, FLORA AND FAUNA MANAGEMENT PLAN	176
6.6.2	FORESHORE MANAGEMENT PLAN	176
6.6.3	DRAINAGE, NUTRIENT AND WATER MANAGEMENT PLAN	176
6.6.4	KARST MANAGEMENT GUIDELINES	177
6.6.5	STYGOFUNA AND/OR TROGLOBITIC FAUNA MANAGEMENT PLAN	177
6.6.6	ABORIGINAL HERITAGE MANAGEMENT PLAN	177
6.7	UXO MANAGEMENT	177
6.8	CONTAMINATED SITES ASSESSMENT	177
6.9	STAGING/SUBDIVISION	178
6.10	DESIGN GUIDELINES AND DETAILED AREA PLANS	178

TABLES

TABLE 1.1	LEGAL DESCRIPTION OF SUBJECT LAND	12
TABLE 2.1	DEED OF INFRASTRUCTURE OBLIGATIONS	16
TABLE 3.1	ENVIRONMENTAL MANAGEMENT PROVISIONS	24
TABLE 3.2	ST ANDREWS DSP EMPLOYMENT	35
TABLE 4.1	POPULATION BY AGE, 2006	46
TABLE 4.2	HOUSEHOLD TYPES, 2006	46
TABLE 4.3	DWELLING TYPES, 2006	48
TABLE 4.4	MEDIAN WEEKLY INCOME, 2006	48
TABLE 4.5	OCCUPATIONS, 2006	48
TABLE 4.6	EMPLOYMENT BY INDUSTRY, 2006	49
TABLE 4.7	VEGETATION COMPLEX AND AREA ON THE SWAN COASTAL PLAIN	53
TABLE 4.8	SIGNIFICANT FAUNA SPECIES THAT MAY OCCUR IN THE TWO ROCKS LSP AREA	62
TABLE 4.9	RECOMMENDED SETBACK ALLOWANCES	63

TABLE 5.1	DWELLING YIELDS	90
TABLE 5.2	NON-RESIDENTIAL LAND USES	95
TABLE 5.3	NON-RESIDENTIAL FLOOR AREAS	95
TABLE 5.4	PROJECTED SITE POPULATION BY AGE	124
TABLE 5.5	PERFORMANCE SUMMARY	159
TABLE 5.6	VEGETATION UNITS (AREAS) ON THE SITE AND AREAS TO BE RETAINED IN PASSIVE OPEN SPACE IN THE LSP	163
TABLE 5.7	VEGETATION CONDITION (AREAS) ON THE SITE AND AREAS TO BE RETAINED IN PASSIVE OPEN SPACE IN THE LSP	164
TABLE 5.8	AREAS OF NATIVE VEGETATION PROPOSED TO BE RETAINED IN THE LSP	164
TABLE 5.9	LABOUR FORCE PROJECTION	166
TABLE 5.10	ON-SITE EMPLOYMENT SUMMARY	166
TABLE 5.11	ON SITE AND ADJACENT RETAIL & COMMERCIAL PROVISION AND EMPLOYMENT GENERATED	169
TABLE 5.12	EMPLOYMENT GENERATED THROUGH SCHOOLS PROVISION	169
TABLE 5.13	EMPLOYMENT GENERATED DURING CONSTRUCTION	169
TABLE 5.14	EMPLOYMENT SELF-SUFFICIENCY	169

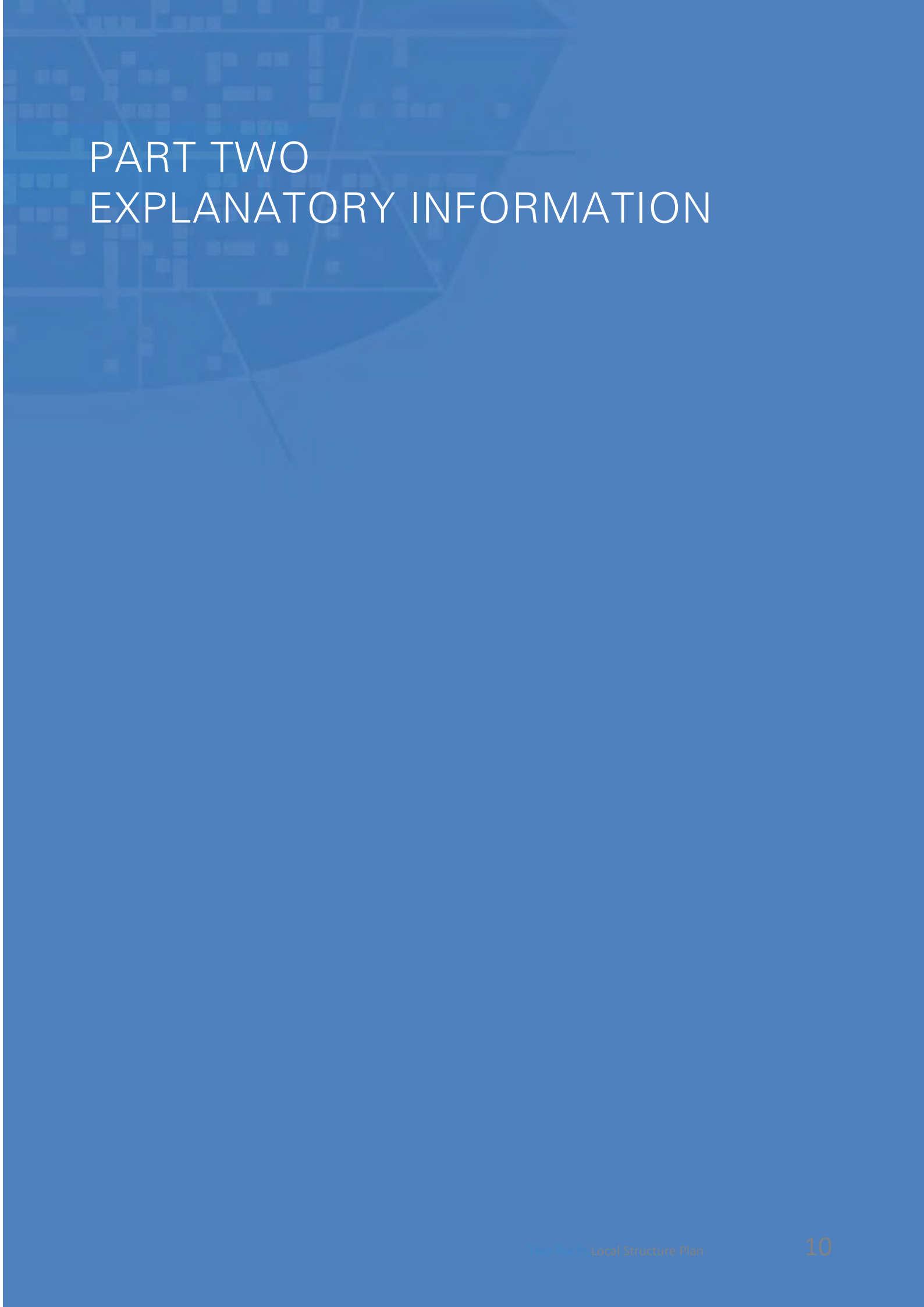
FIGURES

FIGURE 1.1	LOCATION PLAN	13
FIGURE 2.1	AGREED LOCAL STRUCTURE PLAN – NORTHERN PRECINCT	18
FIGURE 3.1	METROPOLITAN REGION SCHEME	22
FIGURE 3.2	CITY OF WANNEROO DISTRICT PLANNING SCHEME NO. 2	22
FIGURE 3.3	ST ANDREWS DISTRICT STRUCTURE PLAN	33
FIGURE 3.4	EMPLOYMENT PRECINCTS	36
FIGURE 3.5	ST ANDREWS DISTRICT STRUCTURE PLAN: REGIONAL ROAD NETWORK	39
FIGURE 4.1	REGIONAL CONTEXT	44
FIGURE 4.2	LOCAL CONTEXT	45
FIGURE 4.3	TOPOGRAPHY AND SOILS [SOURCE: RPS]	51
FIGURE 4.4	VEGETATION UNITS [SOURCE: RPS]	56
FIGURE 4.5	SITE SOIL ZONES [SOURCE: GOLDER & ASSOCIATES]	57
FIGURE 4.6	VEGETATION CONDITION [SOURCE: RPS]	58
FIGURE 4.7	BUSH FOREVER SITES [SOURCE: RPS]	59
FIGURE 4.8	FLORISTIC COMMUNITY TYPES [SOURCE: RPS]	60
FIGURE 4.9	RECOMMENDED COASTAL SETBACK [SOURCE: MP ROGERS & ASSOCIATES]	64
FIGURE 4.10	PRELIMINARY SITE RESPONSE [SOURCE: PLAN E]	68
FIGURE 4.11	LANDFORM ANALYSIS [SOURCE: PLAN E]	68
FIGURE 4.12	EXISTING LAND USE [SOURCE: PLAN E]	69
FIGURE 4.13	BUS ROUTE SERVICING EXISTING TWO ROCKS TOWN SITE [SOURCE: SKM]	74
FIGURE 4.14	WATER CORPORATION PRELIMINARY SEWER PLANNING	76
FIGURE 4.15	EXISTING WESTERN POWER INFRASTRUCTURE	77
FIGURE 4.16	OPPORTUNITIES AND ISSUES	79
FIGURE 4.17	SLOPE ANALYSIS [SOURCE: TABEC]	80
FIGURE 4.18	WATER RETICULATION [SOURCE: TABEC]	85
FIGURE 5.1	MASTERPLAN	87
FIGURE 5.2	HOUSING PLAN	92
FIGURE 5.3	PUBLIC OPEN SPACE PROVISION	99
FIGURE 5.4	LANDSCAPE MASTERPLAN [SOURCE: PLAN E]	127
FIGURE 5.5	PASSIVE OPEN SPACE [SOURCE: PLAN E]	128
FIGURE 5.6	PASSIVE OPEN SPACE [SOURCE: PLAN E]	129
FIGURE 5.7	FORMALISED PUBLIC OPEN SPACE [SOURCE: PLAN E]	130
FIGURE 5.8	FORMALISED PUBLIC OPEN SPACE [SOURCE: PLAN E]	131
FIGURE 5.9	ARBORWAYS [SOURCE: PLAN E]	133
FIGURE 5.10	STREETSCAPES [SOURCE: PLAN E]	133
FIGURE 5.11	ROAD HIERARCHY [SOURCE: SKM]	135
FIGURE 5.12	STAGE A MAJOR ROAD CONSTRUCTION [SOURCE: SKM]	136

FIGURE 5.13	STAGE B MAJOR ROAD CONSTRUCTION [SOURCE: SKM]	136
FIGURE 5.14	STAGE C MAJOR ROAD CONSTRUCTION [SOURCE: SKM]	137
FIGURE 5.15	STAGE D MAJOR ROAD CONSTRUCTION [SOURCE: SKM]	137
FIGURE 5.16	DISTRICT DISTRIBUTOR B	138
FIGURE 5.17	LOCAL DISTRIBUTOR (OPTION 1)	140
FIGURE 5.18	LOCAL DISTRIBUTOR (OPTION 2)	140
FIGURE 5.19	SPECIAL DUNAL ROAD (OPTION 3)	140
FIGURE 5.20	INDICATIVE CROSS-SECTION FOR RESIDENTIAL STREETS (INFORMAL PARKING)	141
FIGURE 5.21	INDICATIVE CROSS-SECTION FOR RESIDENTIAL STREETS (FORMAL PARKING)	141
FIGURE 5.22	CROSS SECTION PLAN [SOURCE: SKM]	142
FIGURE 5.23	PROPOSED INTERSECTION TREATMENTS [SOURCE: SKM]	142
FIGURE 5.24	ESTIMATED TRAFFIC VOLUMES [SOURCE: SKM]	144
FIGURE 5.25	PEDESTRIAN/CYCLE PATHS ON KEY ROADS [SOURCE: SKM]	146
FIGURE 5.26	ULTIMATE PLANNED PUBLIC TRANSPORT SERVICE TO THE TWO ROCKS AREA [SOURCE: SKM]	147
FIGURE 5.27	PROPOSED INTERIM BUS ROUTES [SOURCE: SKM]	147
FIGURE 5.28	PRELIMINARY DRAINAGE PLANNING AND EARTHWORKS [SOURCE: TABEC]	150
FIGURE 5.29	PRELIMINARY DRAINAGE PLANNING AND EARTHWORKS [SOURCE: TABEC]	151
FIGURE 5.30	PRELIMINARY SEWER DESIGN AND CATCHMENTS 1 BY TABEC CONSULTING ENGINEERS	154
FIGURE 5.31	PRELIMINARY SEWER DESIGN AND CATCHMENTS 2 BY TABEC CONSULTING ENGINEERS.	155
FIGURE 5.32	SUMMARY SPEAR® DIAGRAM FIRST APPRAISAL	158
FIGURE 6.1	STAGING PLAN	179

APPENDICES

APPENDIX 1	TWO ROCKS COMMUNITY VISION WORKSHOP SERIES REPORT (CREATING COMMUNITIES)
APPENDIX 2	TWO ROCKS LOCAL STRUCTURE PLAN DESIGN OPTIONS WORKSHOP – ATTENDEES, DESIGN OPTIONS AND PREFERRED OPTIONS (TAYLOR BURRELL BARNETT)
APPENDIX 3	AMENDMENT 787 ENVIRONMENTAL CONDITIONS (MINISTER FOR THE ENVIRONMENT)
APPENDIX 4	ENVIRONMENTAL CONDITION AREAS (CITY OF WANNEROO DPS NO. 2)
APPENDIX 5	LOCAL WATER MANAGEMENT STRATEGY (RPS)
APPENDIX 6	ETHNOGRAPHIC ABORIGINAL HERITAGE SURVEY (ETHNOSCIENCES)
APPENDIX 7	ABORIGINAL HERITAGE MANAGEMENT PLAN (ETHNOSCIENCES)
APPENDIX 8	ASSESSMENT OF THREATS TO SUBTERRANEAN FAUNA (BENNELONGIA)
APPENDIX 9	KARST FEATURES CAPRICORN VILLAGE, TWO ROCKS (GOLDER ASSOCIATES)
APPENDIX 10	TWO ROCKS LOCAL EMPLOYMENT STRATEGY(TAYLOR BURRELL BARNETT)
APPENDIX 11	FLORA AND VEGETATION SURVEY (RPS)
APPENDIX 12	COASTAL SETBACK ASSESSMENT (MP ROGERS & ASSOCIATES)
APPENDIX 13	ENVIRONMENTAL SITE INVESTIGATION, FORMER BOWER GROVE TIP SITE (RPS)
APPENDIX 14	MELALEUCA CARDIOPHYLLA ANALYSIS: ST ANDREWS-TWO ROCKS-YANCHEP (ATA ENVIRONMENTAL 2007)
APPENDIX 15	TWO ROCKS LOCAL STRUCTURE PLAN TRAFFIC MODELLING REPORT (SKM)
APPENDIX 16	SUSTAINABILITY APPRAISAL (ARUP)
APPENDIX 17	COMMUNITY DEVELOPMENT STRATEGY (CVJV)
APPENDIX 18	ABORICULTURAL ASSESSMENT (ARBOR LOGIC)
APPENDIX 19	TREE SURVEY PLAN (TAYLOR BURRELL BARNETT)
APPENDIX 20	TARGETED FLORA SURVEY (RPS)
APPENDIX 21	SUPPLEMENTARY COASTAL SETBACK ASSESSMENT (MP ROGERS & ASSOCIATES)
APPENDIX 22	DUE DILIGENCE ENVIRONMENTAL SITE INVESTIGATION: FORMER BOWER GROVE TIP SITE, LOT 500 BREAKWATER DRIVE, TWO ROCKS (RPS)
APPENDIX 23	VEGETATION FLORA AND FAUNA MANAGEMENT PLAN - LOTS 11, 12, 13, 207 AND 500 TWO ROCKS (REV 2, JULY 2010) (RPS)
APPENDIX 24	SKM TECHNICAL NOTE - TWO ROCKS TRANSPORT ADVICE (28 JANUARY 2009) (SKM)



PART TWO EXPLANATORY INFORMATION

1 INTRODUCTION

The Two Rocks Local Structure Plan (LSP) and report has been prepared to guide the subdivision and development of 423 hectares of undeveloped land surrounding the existing Two Rocks town site (refer **Figure 1.1** Location Plan).

This LSP and report has been prepared on behalf of Capricorn Village Joint Venture (CVJV) by Taylor Burrell Barnett Town Planning and Design, in collaboration with a team of specialist consultants, as outlined below.

- **Tabec** - Civil Engineering
- **RPS** - Environmental
- **Sinclair Knight Merz** - Traffic Engineering
- **Plan E** - Landscape Architecture
- **Syme Marmion & Co.** - Economic
- **ARUP Sustainability** - Sustainability
- **Creating Communities** - Community
- **MP Rogers & Associates** - Coastal Engineering
- **Ethnoscience** - Aboriginal Heritage
- **Golder Associates** - Geotechnical
- **Arbor Logic** - Arboriculture
- **Whelans** - Surveying
- **Bennelongia** - Subterranean Fauna

1.1 PURPOSE

A Local Structure Plan (LSP) is a forward-planning document which provides an overarching framework to guide the development or redevelopment of land. A LSP is intended to address the coordinated provision of land use, infrastructure, services and development. LSPs are often a precursor to more detailed planning.

This LSP has been prepared in accordance with the provisions of Part 9 of the City of Wanneroo District Planning Scheme No. 2, as required by clause 3.14.3 of Council's Scheme. The LSP will be submitted to the City of Wanneroo for its consideration and approval by Council, and subsequently forwarded to the Western Australian Planning Commission for its endorsement.

Once endorsed, the Local Structure Plan and Report will become the reference document for all future subdivision and development within the LSP area.

1.2 SITE OVERVIEW

1.2.1 SITE DESCRIPTION

The LSP area encompasses 423 hectares of land, comprising of five lots which immediately surround the existing Two Rocks town site and a 5 ha portion of surplus road reserve, Lisford Avenue (refer **Figure 1.1**). With the exception of Lisford Avenue, the entire landholding is owned by CVJV.

CVJV is a joint venture partnership between Yanchep Sun City (a Western Australian subsidiary of the Tokyu Corporation) and a Melbourne based group, known as the Capricorn Investment Group.

The legal description of the Structure Plan area is outlined below.

TABLE 1.1 LEGAL DESCRIPTION OF SUBJECT LAND

Lot	Description	Vol/Folio	Registered Proprietor	Area
Lot 11	Damepattie Drive, Two Rocks	2229/903	Yanchep Sun City Pty Ltd	63.4294 ha
		2229/908	Capricorn Investment Group Pty Ltd	
Lot 12	Damepattie Drive, Two Rocks	2229/904	Yanchep Sun City Pty Ltd	64.0683 ha
		2229/909	Capricorn Investment Group Pty Ltd	
Lot 13	Damepattie Drive, Two Rocks	2229/905	Yanchep Sun City Pty Ltd	77.984 ha
		2229/910	Capricorn Investment Group Pty Ltd	
Portion of Lot 207	Shearwater Avenue, Two Rocks	2230/403	Yanchep Sun City Pty Ltd	70.4119 ha
		2230/404	Capricorn Investment Group Pty Ltd	
Lot 500	Lisford Avenue, Two Rocks	229/901	Yanchep Sun City Pty Ltd	142.3734 ha
		2229/906	Capricorn Investment Group Pty Ltd	
-	Portion of Lisford Avenue extending from Breakwater Drive	-	State of WA	5.1700 ha
Total Area				423.437 ha

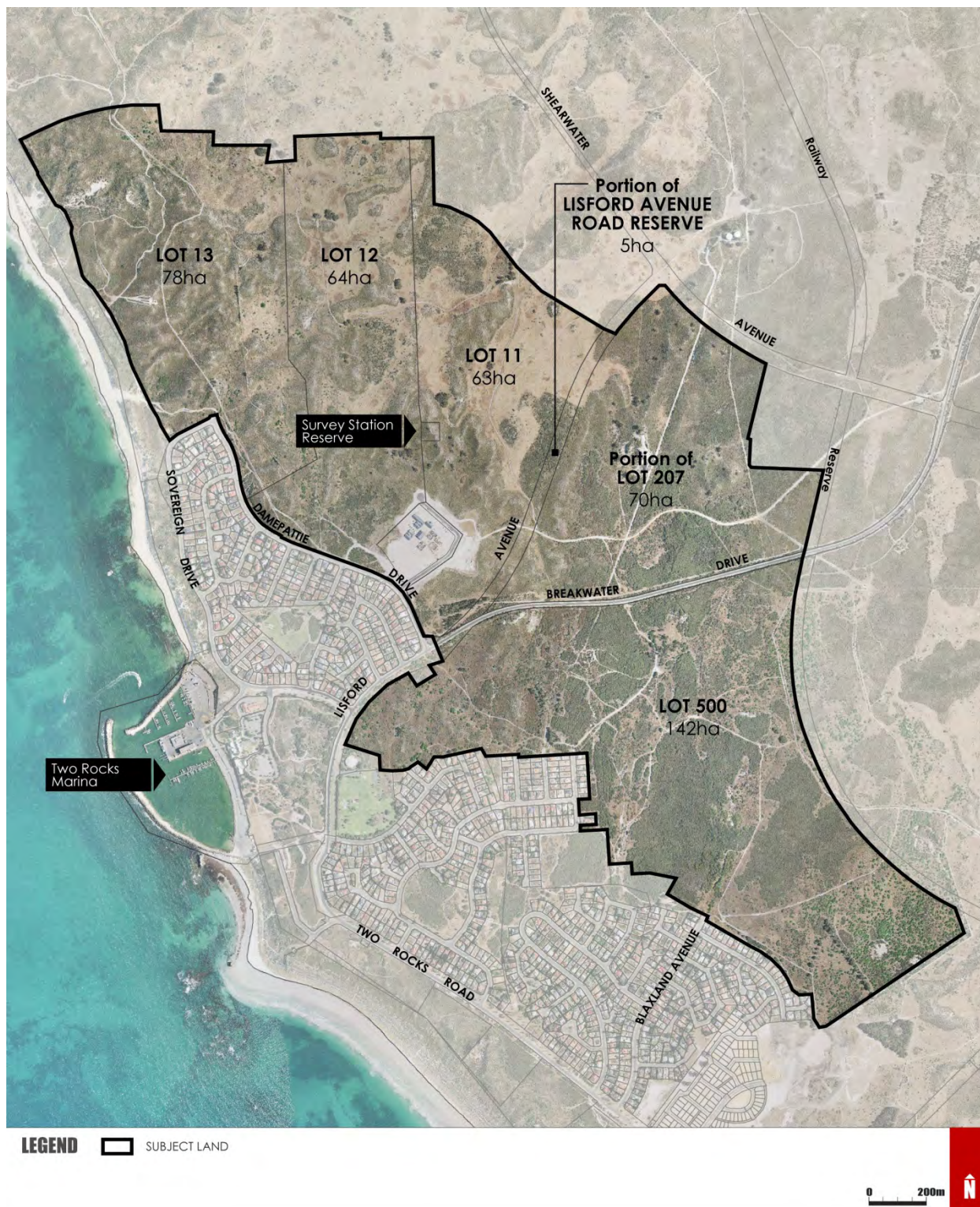


FIGURE 1.1 **LOCATION PLAN**

2 BACKGROUND

The land the subject of this Structure Plan forms part of the Yanchep-Two Rocks district, formerly referred to as the St Andrews district, and has been the subject of local structure planning, district structure planning and State Government agreements initiated by Tokyu Corporation and Yanchep Sun City Pty Ltd since 2000.

This section describes the agreements in place with the State Government for the St Andrews (Yanchep-Two Rocks) district, previous structure planning over the subject land and community consultation undertaken to date.

2.1 STRATEGIC COOPERATION AGREEMENT

The St Andrews Strategic Cooperation Agreement (SCA) defines a series of projects and establishes commitments and administrative arrangements between Tokyu Corporation, Yanchep Sun City Pty Ltd, the State of Western Australia, Western Australian Planning Commission and the City of Wanneroo, to progress the planning for the St Andrews region (Yanchep-Two Rocks) during the feasibility phase of development. The Agreement was endorsed by the aforementioned parties in July 2000.

One of the key aspects of the Agreement is the adoption of a shared vision for the St Andrews project which includes two essential elements, as outlined below.

Firstly, the development of the St Andrews landholding generally will be based on the following potential outcomes:

- Around 55,000 serviced residential lots with a population of some 148,000;
- 50,000 to 60,000 jobs, with the first 1000 over the next five years;
- A regional strategic commercial centre; and
- Approximately 1,600 ha of regional open space on land already ceded for this use along the Indian Ocean foreshore and in extensions to the Yanchep National Park.

Secondly, development of the land, should it proceed, is to be undertaken in a manner which:

- is environmentally, socially and economically sustainable;
- recognises and uses world best practice in urban design wherever possible;
- accords with relevant State and Local Government policies; and
- places a high priority on the encouragement of public transport use.

A number of strategic projects and responsibilities are also identified including the IDEAS Project Feasibility Study in relation to employment generation.

The Agreement provides a contextual framework for progressing planning within the Two Rocks landholding with greater certainty and ensures a coordinated approach to achieving the shared vision for the St Andrews region.

2.1.1 IDEAS PROJECT

Economic development at St Andrews is being pursued through the IDEAS (Innovation, Development, Employment, Application Strategy) Project. The objectives of the Project are to:

- develop a framework and strategy to create a favourable environment to attract preferred industries to locate their businesses within the boundaries of an identified area of the property in an enterprise zone, science city or the like;
- make an assessment of the possibility of sufficient suitable potential employers;
- provide employment opportunities through the creation of 1000 positions between 2003 and 2008 subject to demand and ultimately 50,000 to 60,000 positions by 2030; and
- address the financial viability of the implementation of such a proposal.

The St Andrews District Structure Plan (DSP) provides for the employment opportunities specified in the IDEAS project, thereby establishing a framework which allows the ultimate employment targets identified in the Strategy to be achieved. This is discussed in more detail in section 3.3.7 of this report.

2.2 DEED OF INFRASTRUCTURE

The CVJV site is subject to an Infrastructure Deed of Covenant between the landowner and the WA Planning Commission which relates to infrastructure contributions, land vestings and road construction. Lots 11, 12 and 13 are subject to key infrastructure contribution and land vesting requirements, including the provision of public open space areas, density sites, school sites, community purpose sites and a retail site. The requirement for the Deed was based on the previous landowner's intent to create smaller landholdings (superlots) to facilitate joint venture arrangements in order to progress development in St Andrews. Accordingly, the Deeds were prepared to ensure the landholdings delivered key infrastructure and community facilities.

The key infrastructure obligations required by the Deed, which impact on the LSP design, are outlined in **Table 2.1**.

The Two Rocks LSP area includes Lots 207 and 500, in addition to Lots 11, 12 and 13. The additional landholdings allow a more comprehensive and flexible approach to the Structure Plan design. Consideration has also had to be given to the new district planning framework proposed by the St Andrews DSP. Accordingly, some modifications to the Deeds are proposed.

However, the principles of the infrastructure obligations, including the requirement to provide land for schools, recreation, community purposes, commercial and higher density residential have informed the LSP design. The required modifications are intended to be progressed as variations to the Deeds following approval of the LSP.

TABLE 2.1 DEED OF INFRASTRUCTURE OBLIGATIONS

Deed of Infrastructure Obligations	
Lot 11 Damepattie Drive, Two Rocks	a) Private school site of 6 ha; b) R40 density site or sites totalling 2.4 ha; c) 7.87 ha of appropriately earthworked public open space to be ceded free of cost to the Crown; d) A 4 ha primary school site to be ceded free of cost to the Crown; and e) A 5000 m ² community purpose site to be ceded free of cost to the Crown.
Lot 12 Damepattie Drive, Two Rocks	a) 9000 m ² being maintained for development as a retail site; b) R40 density site or sites totalling 2.44 ha; c) Subdivisional road access from Damepattie Drive; and d) 6.45 ha of appropriately earthworked public open space to be ceded free of cost to the Crown.
Lot 13 Damepattie Drive, Two Rocks	a) R40 density site or sites totalling 5.18 ha; b) Subdivisional road access from Damepattie Drive; c) 6.6030 ha of appropriately earth worked public open space to be ceded free of cost to the Crown; d) A 4 ha primary school site to be ceded free of cost to the Crown; and e) The Reserve for Foreshore Management to be ceded free of cost to the Crown.

2.3 TWO ROCKS ENQUIRY-BY-DESIGN WORKSHOP

The Two Rocks Enquiry-by-Design Workshop was facilitated and coordinated by the Ministry for Planning in October 2000, at the request of Tokyu Corporation, to determine residential expansion options for approximately 200 hectares of land surrounding the existing Two Rocks town site.

The main aims of the workshop are outlined below:

- Investigate how Two Rocks may integrate with the broader St Andrews development area.
- Consider the short-term expansion of Two Rocks to provide more people to support facilities, services and employment in accordance with Liveable Neighbourhoods principles.
- Investigate the existing urban structure, explore opportunities for town centre upgrading and define possible superlot subdivision options.

The key outcomes from the workshop are listed below:

- Confirmed that the Two Rocks town centre would remain the commercial focus of the area for the short to medium term. The town centre accessibility issue is resolved by the town centre having direct frontage and immediate accessibility to key connections. The town centre must be legible to first-time visitors to Two Rocks.
- Identified the potential for four new neighbour-hoods.
- Recommended the relocation of the primary school site from Carfax Way.
- Incorporated distinct features into a neighbourhood design.

- Proposed an east-west main street extension of the town centre to Lisford Avenue, supported by an eastern extension of University Boulevard through a future employment node, in accordance with the IDEAS project.
- Identified six potential superlots in relation to the subject site.

The town and neighbourhood structure prepared at the workshop provided a framework to facilitate structure planning over the subject landholdings.

2.4 AGREED LOCAL STRUCTURE PLAN

An agreed Local Structure Plan has previously been prepared, and adopted by the City of Wanneroo on 26 October 2004, for Lots 11, 12 and 13 Damepattie Drive Two Rocks, known as Two Rocks Northern Precinct Local Structure Plan (refer **Figure 2.1 Agreed Local Structure Plan**). The Northern Precinct LSP was initially prepared in relation to Pt Lot 220 and Pt Lot 207 and was largely based on the town and neighbourhood structure produced at the Two Rocks Enquiry-by-Design Workshop.

The LSP facilitated the preparation and lodgement of a subdivision application for the Structure Plan area in February 2001 to create six superlots, in accordance with the subdivision design defined at the Two Rocks Enquiry-by-Design Workshop. However, the WA Planning Commission only issued subdivision approval in relation to Pt Lot 220, for three superlots (Lots 11, 12 and 13 Damepattie Drive, Two Rocks), in March 2003. The Two Rocks Northern Precinct LSP was amended accordingly and adopted on 26 October 2004.

The Deeds of Infrastructure in relation to Lots 11, 12 and 13 directly relate to the Two Rocks Northern Precinct Local Structure Plan and essentially ensure that key infrastructure identified on the Structure Plan will be delivered. As discussed previously, the replacement of the Agreed Structure Plan for Lots 11, 12 and 13 with a comprehensive Structure Plan which also includes Lots 207 and 500, will necessitate amendments to these Deeds.

This Structure Plan, once approved, will replace the existing Agreed Structure Plan for Lots 11, 12 and 13.

2.5 COMMUNITY CONSULTATION

Community and stakeholder consultation was an integral component of the design process for the new CVJV Two Rocks LSP. Given the proximity of the site to the existing Two Rocks town site, community input was essential to designing an integrated development which positively contributes to the Two Rocks community. The engagement of relevant stakeholders (particularly government agencies) during the formative stages of the design process ensures the Structure Plan is a well informed proposal which reflects a sound understanding of the issues which are important to the Two Rocks community. The key elements of the community and stakeholder consultation process are discussed in detail below. A comprehensive report listing the attendees and outcomes of the community workshops has been prepared by Creating Communities and is included as **Appendix 1**.



FIGURE 2.1 AGREED LOCAL STRUCTURE PLAN – NORTHERN PRECINCT

2.5.1 COMMUNITY QUESTIONNAIRE

Following the inception of the project, a questionnaire was distributed to Two Rocks residents in July 2007, seeking their views in relation to the following:

- Which local features do they value most?
- What are the top two challenges facing the community?
- What are the outcomes the development might bring to the community?

The key responses from the questionnaire fell into two distinct groups. Some residents were unsupportive of the development due to the potential adverse impact on the environment, whilst other residents were cautiously optimistic of the potential of the project to deliver facility and infrastructure improvements if planned appropriately. Ultimately, the residents demonstrated a strong desire to preserve the existing natural and built environment and unique seaside town atmosphere.

2.5.2 COMMUNITY VISION WORKSHOP NO. 1

Following the community questionnaire, a Community Vision Workshop was held in early August 2007. The purpose of the workshop was to determine the existing community's values and aspirations in relation to Two Rocks and the proposed development of the CVJV Two Rocks landholding. The workshop was attended by residents, representatives from local community groups and businesses, and representatives from the Two Rocks Primary School, in addition to representatives from the City of Wanneroo.

The key outcome of the workshop is the value placed on the preservation and management of Two Rocks' marine heritage, seaside lifestyle and natural environment by the existing community. Ensuring the proposed development complements and enhances these values was the main challenge identified by the community for the project. The provision of improved community facilities and infrastructure for Two Rocks was also an important consideration for the workshop participants.

2.5.3 DESIGN OPTIONS WORKSHOP

A Design Options Workshop was held later in August 2007 at the City of Wanneroo. The workshop was attended by representatives from the Department for Planning and Infrastructure, the City of Wanneroo, CVJV and the Project Team. The purpose of the workshop was to review and critique three preliminary concept Structure Plan design options which had been prepared for the Two Rocks landholding and determine preferred options in relation to the broad design of the Two Rocks LSP. The attendees of the workshop were divided into four groups. Each group critiqued the design options against the project principles and objectives, and prepared a preferred option. A full list of the workshop attendees, a copy of the design options and each group's preferred option are contained in **Appendix 2**.

The key issues identified at the workshop are summarised below.

- Retention of landform and defining precincts based on landform retention;
- Provision of employment;
- Developing a road network which facilitates the provision of public transport;
- Provision of affordable housing;
- Staging of development;
- Creating a sustainable community at Two Rocks; and
- The interface with the existing Two Rocks community.

These issues have been addressed and are discussed in further detail in Chapter 5 of this report.

The common underlying principle of all the preferred options prepared at the workshop is the retention of landform, particularly the prominent dune systems north of Breakwater Drive. Other key, common elements of the preferred options are listed below.

- A coastal node located north of the Two Rocks marina;
- A key linkage connecting this coastal node and the planned Northern Town Centre;
- A key linkage connecting Two Rocks Marina Village and the planned Northern Town Centre, via Breakwater Drive, activated by mixed-use development;
- A key east/west linkage to the Two Rocks Marina Village, south of Breakwater Drive;
- Continuation of the existing east/west green link south of Breakwater Drive;
- A low speed, coastal road located adjacent the foreshore reserve, within Lot 13; and
- High density residential development adjacent the Two Rocks Marina Village.

Given landform retention is the fundamental design principle of all the preferred options, the structural framework of the preferred options are similar to each other (as identified above) and provided a consistent basis to progress the LSP design.

2.5.4 COMMUNITY VISION WORKSHOP 2

A second Community Vision Workshop was held in early April 2008, to provide attendees of the initial Community Vision Workshop an opportunity to comment on the draft Two Rocks Local Structure Plan and Masterplan. The workshop was attended by representatives from local community groups and businesses, and representatives from the Two Rocks Primary School.

Responses from the group work indicated that participants were supportive of the draft Masterplan's focus on maintaining and enhancing the natural environment and connecting with the existing community. There was also a strong sentiment that the draft Masterplan would result in an attractive development with native landscaping throughout, as well as the retention of the area's topography.

Suggested improvements to the draft Masterplan included incorporating a light industrial area, providing structured activity areas for youth, including traffic-free or pedestrian friendly shopping areas and addressing the interface between the proposed local centre on Damepattie Drive and the existing residential development (it was suggested this centre be relocated). Overall comments from the workshop were positive, with no major issues identified by participants.

The following response is provided to the comments raised:

- The Business Zone area adjacent to the future Northern Town Centre may incorporate some form of service commercial development in the long term. In relation to large scale light industrial areas, the DSP already provides for this form of development in the broader St Andrews region.
- The formalised public open space areas in the Masterplan will be developed to include kickabout areas and possibly other sporting facilities, such as tennis courts and bocce courts. Furthermore, there will be a number of sports ovals provided at the six school sites within the LSP area. Community use of these ovals will be negotiated with the Department of Education and Training (DET). District level recreational facilities have been provided for in the DSP, outside of the LSP area.
- The local centres proposed within the LSP are small scale and pedestrian orientated, whilst still providing vehicle access and parking.
- In relation to the local centre proposed on Damepattie Drive, as a result of the feedback from the community, the size of the centre has been scaled down to ensure minimal impact on the adjoining residences. The location of the centre has been retained given its position at a prominent intersection and its ability to appropriately service the existing and future residents within its catchment.

3 PLANNING CONTEXT

3.1 STATUTORY PLANNING CONTEXT

3.1.1 METROPOLITAN REGION SCHEME

The majority of the subject land is zoned 'Urban' under the Metropolitan Region Scheme (MRS), with a portion of Lot 207 and Lot 500 zoned 'Urban Deferred' and a very small portion of Lot 11 reserved 'Other Regional Roads' (Lisford Avenue), as identified in **Figure 3.1**. Lisford Avenue and Shearwater Avenue are classified 'Other Regional Roads' and the eastern boundary of the site abuts 'Railways' reservation. Lot 13 abuts 'Parks and Recreation' reservation and is also subject to a Clause 32 Notice of Resolution in relation to Coastal Buildings above Specified Heights.

3.1.2 CITY OF WANNEROO DISTRICT PLANNING SCHEME NO. 2

Under the City of Wanneroo District Planning Scheme No. 2, the site is predominately zoned 'Urban Development', with a small slither of Lot 11 classified as 'Other Regional Roads' Metropolitan Region Scheme reservation (Lisford Avenue) (refer **Figure 3.2**). The site is also identified as being within an 'Environmental Condition Area' with associated provisions detailed in Council's Scheme Text (refer section 3.2.2).

3.2 STATUTORY ENVIRONMENTAL CONTEXT

3.2.1 ENVIRONMENTAL APPROVALS

In 1996, the City of Wanneroo proposed to rezone an area of approximately 4,000 ha around the existing towns of Yanchep and Two Rocks to 'Urban Development Zone', 'Centre Zone' and 'Industrial Development Zone' under their Town Planning Scheme (TPS) No. 1. This amendment (Amendment No. 787) was initiated in order to make the zonings in the City of Wanneroo's TPS No. 1 consistent with the zonings in the Metropolitan Region Scheme (MRS).

Amendment 787 was referred to the Environmental Protection Authority (EPA) under Section 48A of the *Environmental Protection Act 1986*. The EPA subsequently set the level of assessment for the proposed scheme amendment at environmental review. According to EPA (1999) the level of assessment was set at environmental review principally because the land abutted a substantial area of regionally significant vegetation; now Bush Forever sites 397 (Coastal Strip) and 288 (Yanchep National Park), and the indirect potential impacts to the subterranean fauna in aquatic root mat communities in the Yanchep National Park would need to be managed.

Alan Tingay and Associates was commissioned to assist in the development of the environmental review, including the completion of additional studies such as a fauna survey, a vegetation and flora assessment, a coastal planning strategy for Yanchep, hydrogeology and water resource development assessment.

The EPA concluded that Amendment 787 could be implemented to meet the EPA objectives, provided the conditions recommended were imposed and enforced (EPA, 1999). The Minister for the Environment released Ministerial Statement 538 which contains conditions relating to the implementation of Amendment 787 in early 2000 (**Appendix 3**).

The Two Rocks LSP site was part of the subject area for Amendment 787, and therefore the Two Rocks LSP site has been assessed by the EPA under Section 48 of the *Environmental Protection Act 1986* and is subject to Ministerial Statement 538.

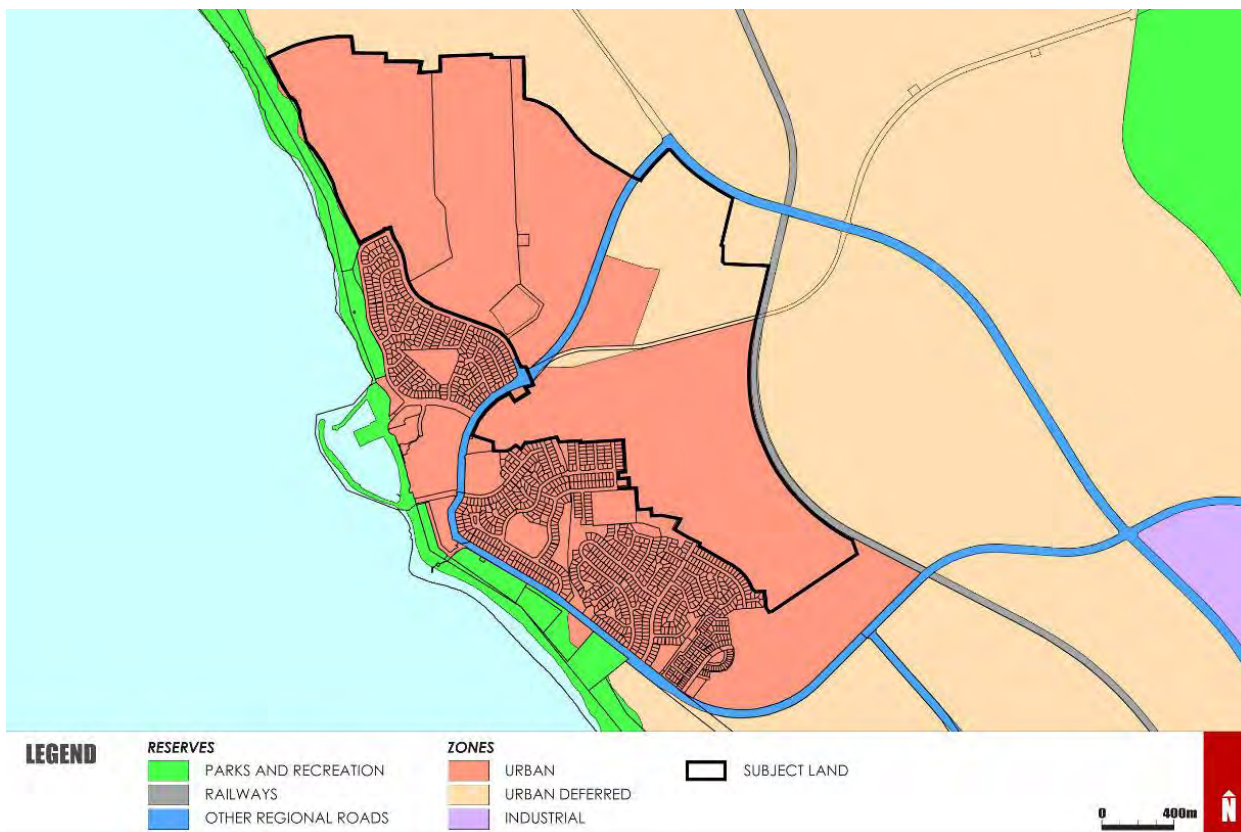


FIGURE 3.1 METROPOLITAN REGION SCHEME

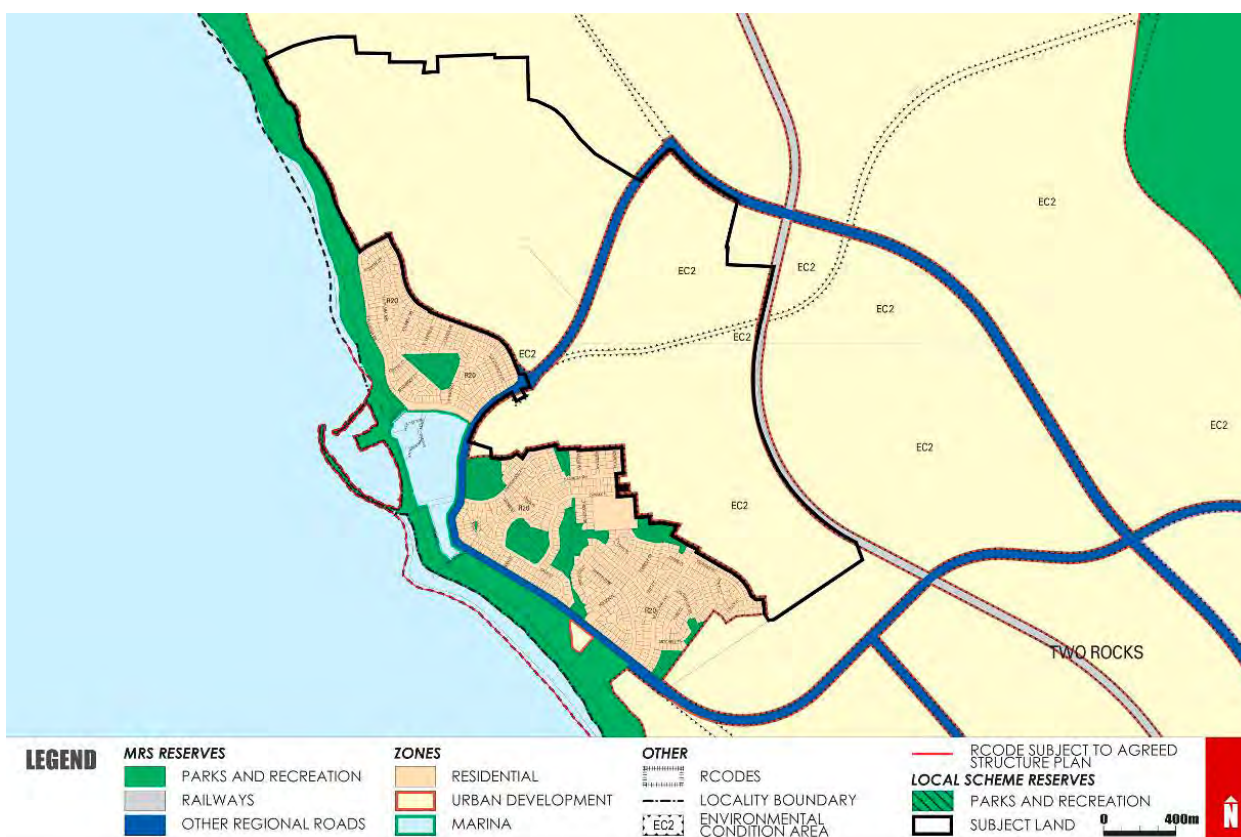


FIGURE 3.2 CITY OF WANNEROO DISTRICT PLANNING SCHEME NO. 2

3.2.2 ENVIRONMENTAL CONDITIONS

The Minister for the Environment released Statement 538 under Section 48F of the *Environmental Protection Act 1986* which contains conditions relating to the implementation of Amendment 787 to the City of Wanneroo's TPS1 on 15 February 2000 (**Appendix 3**). In accordance with Clause 4.22 of the City of Wanneroo's DPS2, environmental conditions imposed by the Minister for the Environment have subsequently been included in Item 2 of Schedule 12 (Clause 4.22) of DPS2. The areas that are affected by the Minister for the Environment's Statement 538 are identified as 'Environmental Condition Areas' with associated provisions in the City of Wanneroo's DPS2 text (**Appendix 4**).

The Two Rocks LSP area is subject to the Minister for the Environment's Statement 538 (Note: at the time the statement was published the Two Rocks LSP area comprised Lot 207, Lot 221 and part Lot 220).

According to Attachment 1 of the Minister for the Environment's Statement 538, the following management plans are required at LSP stage:

- Drainage, Nutrient and Water Management Plan
- Karst Management Strategy
- Solid and Liquid Waste Management Plan
- Aboriginal Culture and Heritage Management Plan

Not all these management plans are relevant to the LSP area. The requirements of Statement 538 and its relevance to the Two Rocks LSP are provided in **Table 3.1**.

TABLE 3.1 ENVIRONMENTAL MANAGEMENT PROVISIONS

Item	Environmental Issue	Environmental Condition (Minister for the Environment Statement 538 for Amendment 787 – 15/02/2000)	Status
2.2 2.2-1 2.2-2	Environmental Management Plans	The following Environmental Management Plans shall be prepared in accordance with the specifications set out in Attachment 1 of the Minister for the Environment's Statement that a scheme may be implemented No. 538 published on 15 February 2000: • Stygofauna and/or Troglotic fauna Management Plan; • Drainage, Nutrient and Water Management Plan; • Karst Management Strategy; • Solid and Liquid Waste Management Plan; and • Aboriginal Culture and Heritage Management Plan. The Environmental Management Plans referred to in condition 2.2-1 shall be prepared and implemented in accordance with the provisions of the Plans, to the requirements of the Responsible Authority.	Attachment 1 to the Ministerial Conditions provides an outline for the preparation of each of these management plans. According to Attachment 1 of Statement 538 the following plans are required at LSP stage: 1. Drainage, Nutrient and Water Management Plan 2. Karst Management Strategy 3. Solid and Liquid Waste Management Plan 4. Aboriginal Culture and Heritage Management Plan Notes: • A Local Water Management Strategy (LWMS) now replaces the Drainage, Nutrient and Water Management Plan. A LWMS has been prepared and forms part of the LSP and is included as Appendix 5. • The likelihood of karst features occurring at ground surface level in the Two Rocks LSP site is low and therefore it is not considered that a Karst Management Strategy is required for the Two Rocks LSP site. Whilst it is not anticipated that karst features at ground surface level will be encountered, it is considered good practice that management guidelines are in place to ensure that the risks associated with potential collapse related features are minimised. In order to facilitate this, karst management guidelines will be developed by Golder Associates, in conjunction with the Capricorn Village Joint Venture and the consultant civil engineer, to assist in the identification of karst features during the earthworks stage of construction. • A Solid and Liquid Waste Management Plan is not required because this condition relates to industrial zones, of which there are none in the Two Rocks LSP area. • A desktop study of Aboriginal sites and a subsequent ethnographic survey by specialist consultant, Ethnoscience, confirmed that there are no known ethnographic impediments to development within the LSP area. The ethnographic survey has been forwarded to DIA and an Aboriginal Heritage Management Plan has been prepared and forms part of this LSP. These are included as Appendix 6 & 7.

Item	Environmental Issue	Environmental Condition (Minister for the Environment Statement 538 for Amendment 787 – 15/02/2000)	Status
2.3 2.3-1	Vegetation and Fauna Management	Regionally significant vegetation (Bush Forever sites) which surrounds the amendment area shall be protected from indirect and direct impacts associated with the development of the amendment area by the following: • Clear delineation of regionally significant areas of vegetation from the amendment area through the use of dual use paths, roads, public open space area and the like; • Control of off-road vehicle use and dumping of rubbish; • Fire Management; and • Promotion of community awareness and bushland protection.	A portion of Bush Forever Site 397 Coastal Strip from Wilbinga to Mindarie is located adjacent to Lot 13. No other bushland identified as regionally significant occurs adjacent to or within the Two Rocks LSP site. A Vegetation Flora and Fauna Management Plan is being prepared and will be submitted prior to endorsement of the LSP by WAPC.
2.4 2.4-1	Stygofauna and Troglotic Fauna Management	If studies in relation to karst and hydrology (see 2.5-1) indicate the likelihood of significant stygofauna and/or troglotic fauna assemblages being present in or immediately adjacent to the amendment area, the landowner (with assistance from relevant scientific experts) shall undertake a survey (at the LSP stage) to assess the nature and extent of any population/s. The survey shall be completed prior to finalisation of the LSP and to the requirements of the Responsible Authority on advice from CALM and UWA (Department of Zoology).	An assessment of threats to subterranean fauna has been completed for the LSP area and is included as Appendix 8. It concluded that the identified threats to subterranean fauna biodiversity from the development are expected to be inconsequential and therefore a management plan for subterranean fauna is not required.
2.5 2.5-1	Assessment of Karst Landform	At the DSP and LSP stage, the landowner shall review existing geotechnical information and undertake further site investigations to confirm the nature and extent of karst landform within the amendment area. This review shall be completed prior to the finalisation of the DSP and LSP and to the requirements of the Responsible Authority on advice from the DEC.	The proponent obtained independent geotechnical advice on whether karst is likely to occur in the Two Rocks LSP area from Golder Associates. Golder Associates advised that the LSP site is located significantly west of the known nearby karst areas that generally occur in a north-south trending line that includes Lake Joondalup and Yanchep National Park in an area that is low lying with the groundwater table relatively close to the surface. Golder Associates advised that the ground surface level of the LSP site is generally over 20 to 30 m above groundwater level, and given that there is generally over 20 m of soil and rock cover over the zone in which karstification may occur it is unlikely effects of any karstification at depth will be transferred to the ground surface. Although the likelihood of karst features occurring at ground surface level in the Two Rocks LSP site is low, Golder Associates have recommended that earthworks in building areas be inspected to assist in characterising areas that may be susceptible to karst features. In particular it is during the stripping of top soil and during periods in which heavy

Item	Environmental Issue	Environmental Condition (Minister for the Environment Statement 538 for Amendment 787 – 15/02/2000)	Status
			machinery is used to carry out ground compaction that karst features are most likely to become apparent. Accordingly management guidelines will be developed by Golder Associates, in conjunction with the Capricorn Village Joint Venture and the consultant civil engineer, to assist in the identification of karst features during the earthworks stage of construction. Whilst it is not anticipated that karst features at ground surface level will be encountered, it is considered good practice that management guidelines are in place to ensure that the risks associated with potential collapse related features are minimised. The full report by Golder Associates on karst features is at Appendix 9.
2.6 2.6-1	Solid and Liquid Waste Management	The landowner shall ensure that lots within the industrial zone are connected to the deep sewerage system for the disposal of appropriate liquid wastes as approved by the relevant Government Agency/ies.	This condition is not relevant to the Two Rocks LSP area because there are no industrial zones proposed.
2 2-1	Drainage, Nutrient and Water Management Plan	At the LSP stage, the landowner shall prepare a Drainage, Nutrient and Water Management Plan to ensure that surface and groundwater are managed to the minimum requirements of a Priority 3 Underground Water Pollution Control Area, to the requirements of the Responsible Authority on the advice of the WRC and the Water Corporation. This plan shall include: • Identify the environmental outcome (including sustainability indicators) to be achieved through the implementation of this plan. • Include provisions for the connection of all areas of development to the deep sewerage. • Demonstrate that best practice WSUD principles are incorporated to maximise on-site water infiltration generally. • Provide details of reporting mechanisms to demonstrate compliance with performance criteria specified in the plan. • Provide details of contingency plans in the event that the performance criteria specified in the plan are not achieved.	A LWMS now replaces the Drainage, Nutrient and Water Management Plan. A LWMS has been prepared and forms part of the LSP.

Item	Environmental Issue	Environmental Condition (Minister for the Environment Statement 538 for Amendment 787 – 15/02/2000)	Status
5 5-1	Aboriginal Culture and Heritage Management Plan	- The landowner shall prepare an Aboriginal Culture and Heritage Management Plan at the LSP stage to the requirements of the Responsible Authority with the concurrence of the Aboriginal Affairs Department. This plan shall include: - The identification of the environmental outcome to be achieved through the implementation of this plan. - Management strategies for the archaeological site (if it becomes necessary to disturb the site, the subdivider shall obtain the necessary clearances under the Aboriginal Heritage Act 1972). - Management strategies to ensure that employees and workers involved in construction activities in the vicinity of the archaeological site receive training regarding protection of its values. - Management strategies to ensure that prior to commencement of site works, staff undergo a briefing on Aboriginal Heritage issues, to enable staff to recognise materials that may constitute an Aboriginal Site. During earthworks, all contractors shall be supervised by a Site Manager, who shall seek specialist advice to confirm the identification of any suspected site.	A desktop study of Aboriginal sites and a subsequent ethnographic survey by specialist consultant, Ethnoscience, confirmed that there are no known ethnographic impediments to development within the LSP area. The ethnographic survey has been forwarded to DIA and an Aboriginal Heritage Management Plan has been prepared and forms part of this LSP.

3.3 STRATEGIC PLANNING CONTEXT

3.3.1 THE WESTERN AUSTRALIAN STATE SUSTAINABILITY STRATEGY

In September 2003, the State Government adopted and published The Western Australian State Sustainability Strategy – a vision for quality of life in Western Australia (SSS). Its relevance as part of the planning for the urban expansion of Two Rocks is by virtue of the Planning and Development Act 2005 (PD Act), the purpose of which is to “*promote the sustainable use and development of land in the State*” (PD Act S3(1)(c)).

The key principle of the Strategy, in relation to settlement efficiency and quality of life, is that:

“Sustainability recognises that settlements need to reduce their ecological footprint (i.e. less material and energy demands and reduction in waste), while simultaneously improving their quality of life (health, housing, employment, community)...” (p31).

The Strategy also states (on page 167) that, “to be sustainable, settlements require the integration of environmental, social and economic dimensions”.

The planning for the expansion of Two Rocks has been underpinned by these principles. This Structure Plan recognises the environmental aspects of the land, seeks to maintain the character of the land, promotes site responsive development and energy efficient building and lot design, whilst also facilitating increased employment and business opportunities through the provision of land for community services, retail and commercial purposes.

The development of the CVJV Two Rocks landholdings represents a planned, logical extension of the existing Two Rocks settlement and provides opportunities for new and expanded business and employment opportunities for existing and future residents, as well as new community facilities and diverse recreational and housing alternatives, which are currently lacking in the existing settlement.

3.3.2 NETWORK CITY

At the centre of the WAPC’s Network City policy is an enhanced emphasis on growth management, in a bid to contain urban sprawl. In doing so, Network City integrates transport and land use in a network of places connected by activity corridors and supported by nearby transport corridors to ensure a lively community.

The Network City framework identifies Two Rocks and surrounding land as being within a area where, “*future communities will be designed around networks and centres*”, with the extension of Marmion Avenue identified as the future activity corridor, where activity centres will be located, and the extension of the Mitchell Freeway representing the future transport corridor.

The LSP for the CVJV Two Rocks landholding recognises this framework for the development of the region and reinforces the existing Two Rocks Town Centre (Marina Village) as the main activity centre for the short to medium term. Provision is also made for future connections to the extended Marmion Avenue, ensuring excellent high frequency public transport between the existing and proposed new activity centres in Two Rocks (the future Northern Town Centre), Yanchep (the future St Andrews City Centre) and further south. The land uses provided for within the LSP, which will support public transport, include high density residential and commercial uses (i.e. offices and retail uses within local centres and mixed use corridors, as well as service commercial uses) linking future residents, students and workers with retail, employment, higher education and specialised services within the activity centres.

3.3.3 STATE COASTAL PLANNING POLICY

The *Statement of Planning Policy No 2.6: State Coastal Planning Policy* (WAPC, 2003) provides guidelines for determining coastal development setbacks to protect development against coastal processes such as erosion, storms and future sea level change. The objectives of the policy are to:

- Protect, conserve and enhance coastal values, particularly in areas of landscape, nature conservation, indigenous and cultural significance;
- Provide for public foreshore areas and access to these on the coast;
- Ensure the identification of appropriate areas for the sustainable use of the coast for housing, tourism, recreation, ocean access, maritime industry, commercial and other activities; and
- Ensure that the location of coastal facilities and development takes into account coastal processes including erosion, accretion, storm surge, tides, wave conditions, sea level change and biophysical criteria.

A Coastal Processes Setback Assessment has been undertaken in order to determine the appropriate setback for development of Lot 13, adjacent to the coast. The LSP for Two Rocks will need to have regard to this setback when determining the location of the coastal road, coastal facilities and development, and also make allowances for other factors which may influence coastal processes in the future, including modifications to the Two Rocks Marina. The coastal processes setback assessment is discussed in more detail in section 4.3.6.

3.3.4 BUSH FOREVER

Bush Forever is a ten-year strategic bushland conservation plan for the Perth Metropolitan Area (Government of Western Australia, 2000).

Bush Forever identifies 51,200ha of regionally significant bushland for protection on both public and privately held land. Bush Forever includes 26 vegetation complexes on the Swan Coastal Plain of the Perth Metropolitan Region and one of its key aims is to achieve, where practical, a target of the retention of at least 10 percent of the estimated pre-European extent of each vegetation complex (Government of Western Australia, 2000).

The following criteria were used to select regionally significant bushland for future protection (Government of Western Australia, 2000):

- Representation of ecological communities: a number of areas selected to represent the range of ecological communities and the places in which these communities merge.
- Diversity: areas with a high diversity of flora and/or fauna species or communities in close association.
- Rarity: areas containing rare or threatened communities or species, or species of restricted distribution.
- Maintaining ecological systems or natural processes: maintenance of ecological processes or natural systems at a regional or national scale.
- Scientific or evolutionary importance: areas containing evidence of evolutionary processes either as fossilised material or as relict species and areas containing unusual or important geomorphological or geological sites. Areas of recognised scientific and educational interest as reference sites or as examples of important environmental processes at work.
- General criteria for the protection of wetland, streamline, and estuarine fringing vegetation and coastal vegetation: conservation category wetlands, including fringing vegetation and associated upland vegetation. Coastal vegetation within the accepted coastal management zone.

- Criteria not relevant to determination of regional significance but which may be applied when evaluating areas having similar values: attributes, which taken alone do not establish regional significance, but which can add to the value of bushland and enhance its contribution to Bush Forever.

Bush Forever outlines individual recommendations for each of the 287 Bush Forever sites and a framework for implementation. The recommendations for the Bush Forever site (No. 397 – Coastal Strip) will need to be given careful consideration in the design of the LSP, particularly the planning of roads and coastal facilities within the adjacent Foreshore Reserve.

3.3.5 OTHER STATE PLANNING POLICIES

URBAN GROWTH AND SETTLEMENT

Following the principles embedded in the State Sustainability Strategy, the WAPC adopted State Planning Policy No. 3 (SPP3), Urban Growth and Settlement (gazetted 17 March 2006).

The overall aim of SPP3 is to, “facilitate sustainable patterns of growth and settlement by setting out the requirements of sustainable settlements and communities and the broad policy in accommodating growth and change.”

The objectives of SPP3 are:

- “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 and 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 convenience 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.”

Underpinning the overall aim and objectives of the policy is the creation of sustainable communities. The key requirements of a sustainable community are outlined by the Commission in the policy, and can be summarised as comprising:

- a strong, diversified and sustainable economic base with assured access to jobs and employment;
- sufficient and suitable serviced land in the right locations for housing, employment, commercial, recreational and other purposes, coordinated with the efficient and economic provision of transport, essential infrastructure and human services;
- a variety of choice in the size, type and affordability of housing to support a range of household sizes, ages and incomes;
- urban expansion directed into designated growth areas which will be well serviced by employment and public transport;

- higher densities in the most accessible locations, i.e. around town and neighbourhood centres, high frequency public transport nodes and adjacent to high amenity areas such as parks and foreshores;
- good urban design which creates and enhances community identity, sense of place, liveability and social interaction;
- proper consideration of the environment, recognising the need to restore and enhance as well as protect biodiversity and to minimise development impacts on land, water, energy and other natural resources; and
- a positive planning framework which is not overly focussed on regulation and control and includes community involvement.

Accordingly, new settlements and major town expansions, like that proposed for Two Rocks, need to be considered and assessed in the context of their ability to satisfy these key requirements. The planning for the expansion of Two Rocks has been influenced by the need to incorporate new and varied employment opportunities for existing and proposed new residents, a greater mix of land uses and an increase in overall housing densities, all of which combine to achieve a new sustainable Two Rocks community.

In particular, the LSP for the CVJV landholdings in Two Rocks seeks to address a significant demand for affordable land, affordable housing and a variety of choices in lot sizes and housing types, by offering serviced lots ranging in size from approximately 150 m² to 2,000m² for apartment style living, the construction of single storey homes and to accommodate multiple families.

The other critical elements of a sustainable community, which are currently lacking in Two Rocks, are employment opportunities and access to regular and efficient public transport. The allocation of suitable land in the right locations for employment, commercial uses and human services, which are linked to residential areas via efficient transport routes and a variety of transport modes, addresses this critical element.

The LSP for Two Rocks addresses all of the existing deficiencies while at the same time plans for a sustainable, expanded community that is positioned alongside a new town centre (the Northern Town Centre) where additional services and facilities will be available for the Two Rocks community in the future.

3.3.6 NORTH WEST CORRIDOR STRUCTURE PLAN (NWCSP)

The NWCSP was prepared by the WA Planning Commission in 1992 and establishes the principles for the integrated and detailed planning of local areas. It sets a framework and guides the preparation of District Structure Plans (DSP) for the comprehensive development of the North West Corridor.

The Yanchep Structure Plan, prepared in 1993, effectively extended the NWCSP. The new Structure Plan was then intended to guide development in the corridor up to the year 2021, and include regular reviews in order to incorporate new policies and strategic government directions, as well as updating population projections, land and housing demand.

In recognition of the significant change in planning theory, policy and practice since 1992, the Commission has sought a review of the NWCSP. The review is unlikely to be completed until the end of 2008. However, in the meantime, the historically high level of demand, coupled with higher than normal levels of migration to WA as a result of the resources boom, has necessitated an interim policy approach being undertaken by the Commission

The Interim Policy Statement for the North West Growth Corridor will provide the Commission with additional guidance in the determination of district structure plans lodged in the region. It has been prepared in a draft form to enable comments and feedback to be provided by stakeholders.

The principles of the Interim Policy Statement are derived from Liveable Neighbourhoods and are also embedded in the City's Smart Growth Policy, and the Commission Urban Growth and Settlement Policy. The measures contained within the Interim Policy Statement also largely reflect the proposals contained within the St Andrews District Structure Plan, as it relates to the CVJV Two Rocks landholdings. The development staging, transport networks, housing density targets, employment generation and environmental elements of the Interim Policy Statement are generally consistent with the outcomes sought in the DSP and achieved through this LSP.

While no major inconsistencies were found with the proposals contained in the DSP, this LSP and the Interim Policy Statement, it is noted that the Interim Policy Statement is a guiding document only, providing the Commission with a framework in which to consider and determine DSPs and LSPs within this growth corridor. It does not contain site specific information, nor will it contain the necessary detailed structure planning that forms part of any DSP or LSP. The knowledge obtained in detailed site investigations and analysis have influenced the preparation of the St Andrews DSP and, subsequently, the Two Rocks LSP, ensuring the appropriate level of detail has been included in this structure planning phase.

3.3.6.1 REGIONAL TRANSPORT AND EMPLOYMENT STUDY

The Department for Planning and Infrastructure, in conjunction with the City of Wanneroo, is undertaking strategic planning studies to consider the regional transport and employment implications of residential development in the North West Corridor. As part of this study, an economic development and employment workshop was held on 26 March 2008 and a strategic transport planning workshop was held on 30 April 2008. It is envisaged that these workshops will result in the resolution of a number of issues and facilitate a pathway to enable the district structure plan and local structure plans to proceed to resolution.

3.3.7 ST ANDREWS DISTRICT STRUCTURE PLAN

The St Andrews District Structure Plan (DSP) was advertised for public comment in September and October 2007, and the submissions are currently being considered by City officers. Following this assessment, the DSP will be formally considered by Council for approval and forwarded to the WAPC for final endorsement. Formal consideration of the DSP by Council is on hold pending progress of the North West Corridor Interim Policy Statement. **Figure 3.3** identifies the Two Rocks site in the context of the DSP.

The Two Rocks LSP has had due regard to the planning framework proposed in the St Andrews DSP. This relationship is discussed further in section 5.7.2.

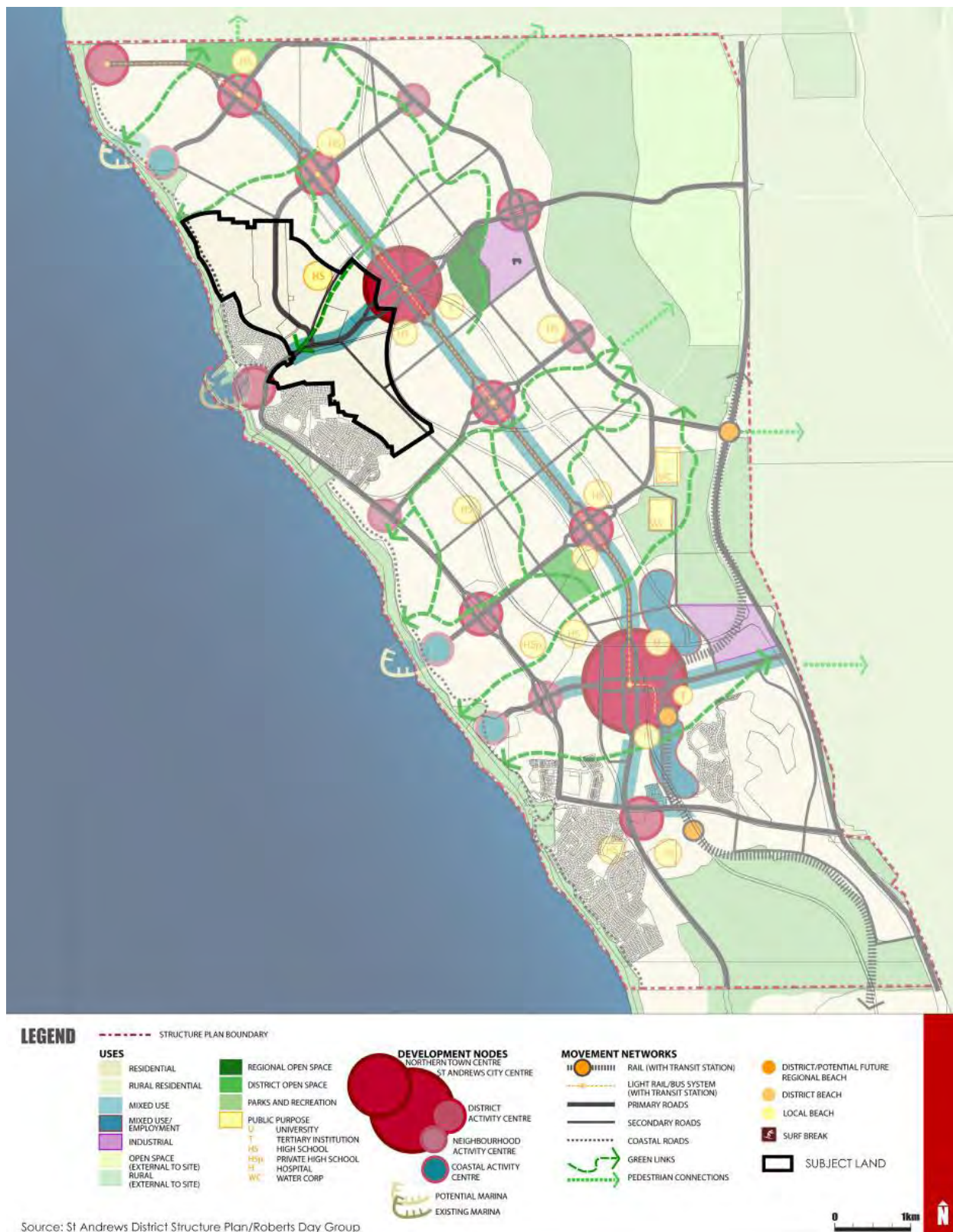


FIGURE 3.3 ST ANDREWS DISTRICT STRUCTURE PLAN

3.3.7.1 PLANNING

The DSP establishes the broad planning framework for 7,550 hectares of land encompassing the Two Rocks and Yanchep localities, to the west of the Yanchep National Park. The Plan is largely based on the St Andrews District Concept Plan, which was advertised for public comment in 2005, and was generally supported by both the City of Wanneroo and the WAPC as being an appropriate guide to the future development of the St Andrews region.

The Two Rocks LSP will need to have due regard to the development framework established in the DSP. In relation to the CVJV landholding, the St Andrews DSP primarily identifies the site for residential development. Other key elements identified for the site include:

- a portion of the Northern Town Centre;
- two primary roads, including an east/west connection extending from the Northern Town Centre to the Two Rocks Marina Village, which is to be activated by mixed use development and intended to accommodate a 'couplet' road system, forming a 'paired couplet' configuration within the Northern Town Centre;
- a secondary road, orientated north-west/south-east which 'T's' into the main east/west connection;
- a coastal road which extends north from the existing Two Rocks community, adjacent to the coast;
- a government high school site, situated in the north east corner of the site; and
- green links which extend generally from the east-north-east towards the coast.

3.3.7.2 EMPLOYMENT

The Two Rocks Local Structure Plan area forms part of the St Andrews District Structure Plan area which is projected to house 154,000 people in 67,000 dwellings with a workforce of 72,000 and jobs provision of 55,000 or an employment self sufficiency of 76%.

The ultimate employment self sufficiency of 76% within the St Andrews District Structure Plan area compares with the 2006 City of Wanneroo and City of Joondalup employment self sufficiency ratios of 46.0% and 40.3% respectively.

The employment self sufficiency within the Two Rocks LSP area needs to be considered in the wider context of the St Andrews District Structure Plan employment self sufficiency target. While the Local Structure Plan will have its own employment self sufficiency target, it needs to be recognised that the District Structure Plan provides for most of its employment to be generated in centres that are outside of the Two Rocks LSP area. **Figure 3.4** shows the location of these centres and **Table 3.2** sets out the number of jobs that are estimated to be provided in each centre.

There are two centres just outside of the Two Rocks LSP area where a considerable amount of employment will be generated. They are Centre K (the Two Rocks Town Centre), where 957 jobs will be provided, and Centre B (the future Northern Town Centre), where 4,139 jobs are anticipated to be provided. The population growth resulting from the development of the Two Rocks LSP area will be pivotal in ensuring the economic viability of these two centres in the future.

TABLE 3.2 ST ANDREWS DSP EMPLOYMENT

Centre	Centre Type	Jobs
A	City Centre	15,001
B	Regional	4,139
C	District	871
D	District	517
E	District	669
F	District	681
G	District	534
H	District	306
I	District	390
J	District	415
K	District	957
L	Neighbourhood	460
M	Neighbourhood	484
N	Neighbourhood	136
O	Neighbourhood	293
P	Neighbourhood	85
Q	Neighbourhood	179
R	Neighbourhood	231
	N Industrial	1,737
	S Industrial	2,182
	Tech Precinct	10,634
	Corridors	8,807
	Education/Hospital	2,612
	Home based	2,680
	TOTAL EMPLOYMENT	55,000

The table shows that a large proportion of the anticipated employment will be located in the centres, the industrial areas and the Tech Precinct. These employment opportunities will be all available at full development, which is likely to take approximately 50 years. The employment anticipated on site within the Two Rocks Structure Plan area forms a proportion of the employment listed in the above table under the Corridor, Education and Home Based types.

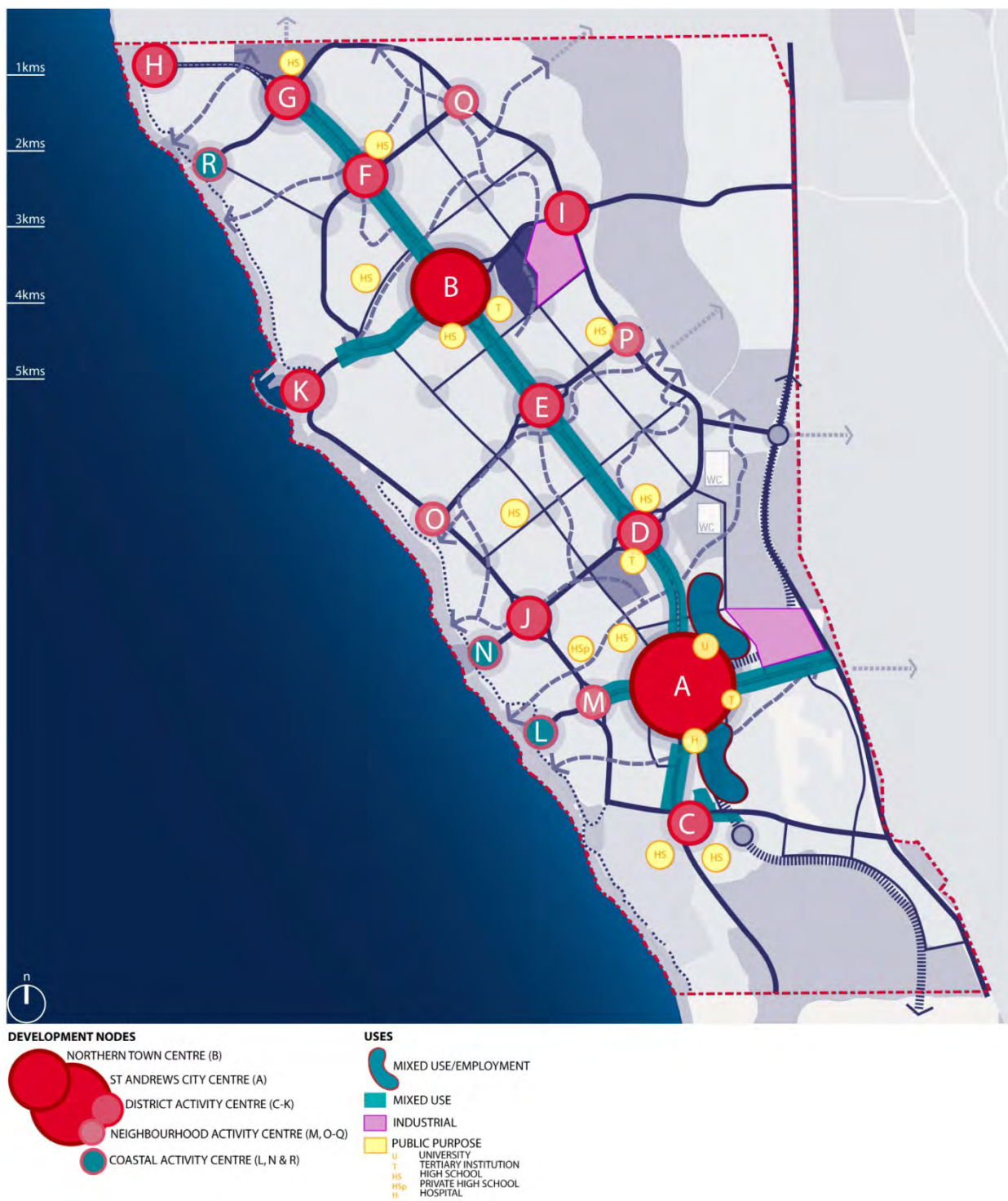


FIGURE 3.4 EMPLOYMENT PRECINCTS

3.3.7.3 RETAIL

The DSP provides for an equitable distribution of centres, generally based on defined catchments and located on key transport linkages. The hierarchy of activity centres within the DSP comprises of a major city centre, a regional centre (Northern Town Centre), district centres and neighbourhood centres (refer **Figure 3.4**). As previously discussed, a portion of the Northern Town Centre is located within the CVJV landholding. The Northern Town Centre, as a regional centre within the DSP area, is intended to service the northern communities of the St Andrews region. This Centre (Centre B in **Figure 3.4**) is projected to have a total floorspace of 130,000m², including 44,000m² of retail floorspace and a total employment of 4,139 persons.

The portion of the CVJV landholding designated 'Northern Town Centre' in the DSP is excluded from the Two Rocks LSP area in order to allow the boundary of the Centre to be more clearly defined and the detailed structure planning of the Centre to be undertaken in a comprehensive manner, in conjunction with the other landowners. The proposed Northern Town Centre extends over four landholdings and three landowners, and the preparation of a separate structure plan for the Centre, as required by the DSP, will ensure a coordinated approach to development of the centre.

Whilst no other activity centres are identified within the subject land, the DSP does identify a District Centre (Centre K) adjacent to the Two Rocks marina (the Two Rocks Marina Village), which is intended to serve a tourism function in conjunction with the maritime industrial services of the Two Rocks marina. The DSP identifies Centre K as a district level centre with shopping floorspace of approximately 10,900 m², total floorspace of 26,500m² and employment of 957 persons. It is likely this total level of floorspace will be realised within the timeframe of the Two Rocks Local Structure Plan. The DSP acknowledges that local activity centres will be provided for at the local structure planning stage. Accordingly, these smaller, local centres are identified in the Two Rocks LSP. The final number and size of the local centres in the LSP area will be in accordance with the DSP and take into account the findings and adopted recommendations of the Retail Strategy Study which is currently being reviewed.

3.3.7.4 MOVEMENT

The St Andrews District Structure Plan movement system has been based on as many trips as possible being made on foot, by bicycle or by public transport to reduce the dependence on the private car for travel to, from and within the area.

The District Structure Plan notes that the following key principles have guided planning for the transport elements:

- "maximise accessibility and choice by catering for a variety of transport modes through best practice integration of land use and transport planning;
- reduce car dependency by providing more opportunity to travel by public transport and good facilities for walking and cycling;
- reduce car travel by providing a better balance between jobs and the workforce within St Andrews, than has occurred in the remainder of the North West corridor;
- apply transit-oriented design near stations and along transit corridors, including clusters of mixed uses in walkable neighbourhoods and activity centres focussed around public transit stations;
- encourage public transport use through efficient bus/rail interchanges, regular services and accessible stops and stations;
- make connections an essential part of place-making by ensuring all routes respond to their context and portray a distinctive urban character;
- develop a permeable, legible and fine grained street network that is highly interconnected so as to reduce total vehicle kilometres travelled and consequently lower emissions and energy use;

- eliminate six lane roads (other than the freeway on the periphery of the area) and minimise four lane roads, whilst maintaining high capacity priority routes; and
- provide for safe direct walking and cycling routes”

The major constraint in providing transport infrastructure to service St Andrews is the limited road connections and road capacity that can be provided to link St Andrews with the remainder of the Perth Metropolitan Area (refer to **Figure 3.5**). The demand for travel by road, based on current trends, is likely to be close to or greater than the practical road corridor capacity during peak periods.

The recognition that an extension of current trends will not provide for sufficient transport capacity on a sustainable basis, has led to the adoption of the following strategies:

- A better balance of jobs and residents within the St Andrews area. The projected 55,000 jobs within St Andrews for a projected population of 155,000 people is estimated to increase the counter peak demand on the rail system to 35% at full development, as opposed to between 10% to 15% at present.
- A more balanced road and public transport system in which a much higher proportion of trips are made by public transport, with a commensurate reduction in dependence on car travel.

These strategies provide the opportunity to develop a more sustainable transport system for the entire north-west metropolitan corridor.

3.3.7.5 ENVIRONMENT

The Two Rocks LSP site is primarily identified as a residential development area in the DSP. The DSP identifies a potential open space linkage (active and passive) that enters the Two Rocks LSP site from the north-east (**Figure 3.3**). It is understood that an additional green link is proposed, extending from the east in the southern portion of the Two Rocks LSP area.

The DSP identifies the following key environmental considerations:

- Retention of defining landscape elements;
- Protection of groundwater resources;
- Protection of remnant vegetation, flora and fauna values;
- Karst; and
- Coastal planning.

The DSP is supported by an Environmental Assessment (ATA Environmental, 2007) which is included in Part 3 of the DSP.

ATA Environmental (2007) includes recommendations that the following management plans are prepared at LSP stage:

- Foreshore Management Plan;
- Open Space Management Plan; and
- Vegetation, Flora and Fauna Management Plan.

ATA Environmental (2007) also recommends the following environmental issues are resolved during the LSP process:

- Management of local (remnant) vegetated areas.
- Areas of *Melaleuca cardiophylla* that are identified for retention in the DSP are included in POS.
- Management of fauna habitat (particularly habitat for significant fauna).
- The location of any linkages between conservation areas.



FIGURE 3.5 ST ANDREWS DISTRICT STRUCTURE PLAN: REGIONAL ROAD NETWORK

- The location of coastal nodes.
- Groundwater protection measures in the Priority 3 groundwater source protection area.

The recommendations of the DSP have been taken into account in the preparation of this LSP, and are discussed in greater detail in the relevant sections of this report.

3.3.8 CITY OF WANNEROO SMART GROWTH STRATEGY

The City of Wanneroo Smart Growth Strategy provides the guiding framework against which the City will assess all proposed structure plans.

The Strategy outlines various Smart Growth objectives, broadly based on sustainability principles, which structure plans must demonstrate compliance with.

The principles and objectives of the Two Rocks LSP have been modelled on the Smart Growth objectives. The strategies for meeting the objectives represent the quantifiable elements on which subsequent subdivision plans will be measured and assessed. These elements comprise Part One of this LSP and, as such, comprise the statutory provisions of the LSP.

3.3.9 SURROUNDING LOCAL STRUCTURE PLANNING

Local structure planning in this growth corridor is already underway to the north-east and south of the CVJV landholdings. The structure planning for the CVJV landholdings has been mindful of the existing Agreed Structure Plans and the preliminary structure planning that has been undertaken for these areas, ensuring linkages are provided and addressing the interface, particularly as it relates to future land use and development.

3.3.9.1 THE REEF (LOT 501 TWO ROCKS ROAD, TWO ROCKS)

The Agreed Structure Plan (ASP) for 'The Reef' development adjoins this LSP area to the south and was adopted in June 2005. Due to the need to resolve the future alignment of district roads, only a portion of the area is permitted to be subdivided and developed at this stage. This comprises the portion of the ASP area immediately adjacent to existing development in Two Rocks.

The following elements of 'The Reef' ASP have influenced the design of the Two Rocks LSP:

- The provision of 700 residential lots (at ultimate development capacity) ranging in density from R10 to R40. This represents approximately half of the catchment required for a school site. Accordingly, the projected number of new dwellings in 'The Reef', along with existing dwellings in Two Rocks, will need to be taken into consideration when determining the number of school sites required to be provided in the Two Rocks LSP.
- Limited employment opportunities through the provision of mixed use sites in selected locations.

3.3.9.2 LOT 204 BREAKWATER DRIVE, TWO ROCKS

Lot 204 is situated in the north-eastern corner of the St Andrews DSP and immediately adjoins the subject land. While a local structure plan has not been prepared, the planning for the urban development of this land has progressed to a stage where a Concept Plan has been prepared to support a request to transfer the land to the 'Urban' zone under the MRS.

The Concept Plan has been prepared having regard to the proposed road networks and land uses within the north-eastern section of the Two Rocks LSP. It also recognises that more detailed, comprehensive planning is required for the future Northern Town Centre, which according to the St Andrews DSP, is proposed to be accommodated within the CVJV landholding, Lot 204 and adjacent lots. Although more detailed, comprehensive planning is required for the town centre, the planning for both Lot 204 and the subject land ensure an integrated road network and a main street transit based centre is provided in accordance with the St Andrews DSP.

3.3.10 CITY OF WANNEROO LOCAL HOUSING STRATEGY

The preparation and implementation of a Local Housing Strategy (LHS) by the City of Wanneroo was a direct outcome of its Smart Growth Strategy and seeks to ensure a range of lot sizes to cater for different lifestyle choices and a range of housing types in appropriate locations to meet current and future market demand.

The Strategy recognises the dominant role the City plays in Perth's housing growth, contributing the highest number and growing proportion of new dwelling approvals, and the dominance of single detached housing (95% in the North West Corridor) when compared to other regions. It also recognises that new housing activity in the City, dominated by large single detached dwellings, is contributing to Perth's changing housing stock.

In recognising these existing characteristics and the principles of its Smart Growth Strategy, the LHS recommends:

- a mix of housing types, based on 76% separate houses, 15% semi-detached houses and 9% flats or apartment living for all new household growth up to 2021;
- appropriately located higher densities;
- gross density targets for different geographic locations;
- innovative development solutions in greenfields sites to create housing choice;
- setting of benchmarks for affordable housing which is suitably located with access to public transport, employment and community services;
- greater involvement by the City in the facilitation, provision and management of affordable housing, including public/private sector partnering, density/height bonuses and particular regard to standards (i.e. engineering) that may impact on housing cost;
- provision of housing for seniors, people with disabilities and students to increase the supply and diversity of residences; and
- larger lot housing be provided in peripheral to neighbourhood locations in environmentally sensitive areas where larger lots are needed to retain vegetation.

The LSP for Two Rocks must strive to achieve the mix of housing types, densities and dwelling yields in the Local Housing Strategy. In seeking to achieve the desired mix of housing for the City of Wanneroo by 2021, consideration must be given to the existing dominant housing type in Two Rocks, being separate houses (98% of all housing types). Considerably higher densities and the introduction of new housing types will be a key feature of the Two Rocks LSP.

3.3.11 CITY OF WANNEROO EMPLOYMENT POLICY

The City's Employment Policy includes strategies to be implemented at the DSP and LSP stage to encourage and retain local employment and maximise opportunities for employment self-sufficiency. The strategies include the incorporation of design elements in a Structure Plan which support the provision of employment generating land uses, as well as strategies which provide incentives for businesses to locate in the Structure Plan area, job networking opportunities and the incorporation of local employment preferences in construction contracts, to name a few.

A Local Employment Strategy is required to be prepared as part of the local structure planning process, outlining the initiatives and programs that the proponent will implement, in partnership with the City, in order to promote local employment in the LSP and surrounding area. A Local Employment Strategy for the Two Rocks LSP area, with broader application to the Yanchep/Two Rocks locality, forms part of this LSP and is included as **Appendix 10**. It notes the programs and initiatives already implemented by CVJV in the Capricorn Project (Yanchep) and provides additional strategies to be applied in the Two Rocks LSP area.

In addition to the Local Employment Policy, the Two Rocks LSP Part 1 provisions incorporate strategies appropriate to a predominantly residential development cell, which respond to the City's Employment Policy.

4 THE SITE

4.1 SITE DESCRIPTION

4.1.1 LOCATION

The CVJV landholding surrounds the existing Two Rocks community (to the north and east) and is located approximately 60 km north-west of Perth, within the St Andrews region (refer **Figure 4.1**). The Railway reservation and Shearwater Avenue reservation form the eastern boundary of the site and the western boundary of Lot 13 abuts the foreshore reserve.

4.1.2 CURRENT LAND USE

The site is largely undeveloped, with the exception of the Two Rocks Primary School which is located within Lots 11 and 12. Historically, the site has been a pastureland used for cattle grazing up until the present day.

4.1.3 SURROUNDING LAND USES

The existing Two Rocks town site is located south and west of the CVJV landholding and comprises mainly of low density residential development. The existing Two Rocks community is the most northern, coastal residential settlement within the Perth Metropolitan Region and is centred around the Two Rocks Marina and Two Rocks Town Centre (refer to **Figure 4.2**). The Town Centre incorporates Atlantis Village, Two Rocks Village, a tavern and holiday units. The Town Centre is to be included in an overall Marina Village redevelopment which also includes areas further east and south of the existing centre.

The Phil Renkin Recreation Centre is located on Lisford Avenue and accommodates most of Two Rocks' community facilities including the public library; badminton and basketball courts; function and meeting rooms; a crèche; and is the meeting place for a number of the local community groups including the senior citizens, the CWA, the craft society, and the local home-support organization. A new residential estate, The Reef, is currently being developed adjacent to the southern end of the existing Two Rocks township. The land surrounding the LSP area to the north, east and south is generally undeveloped, with some areas still used for grazing cattle. It is expected that urban development will eventually extend into these areas in the future.

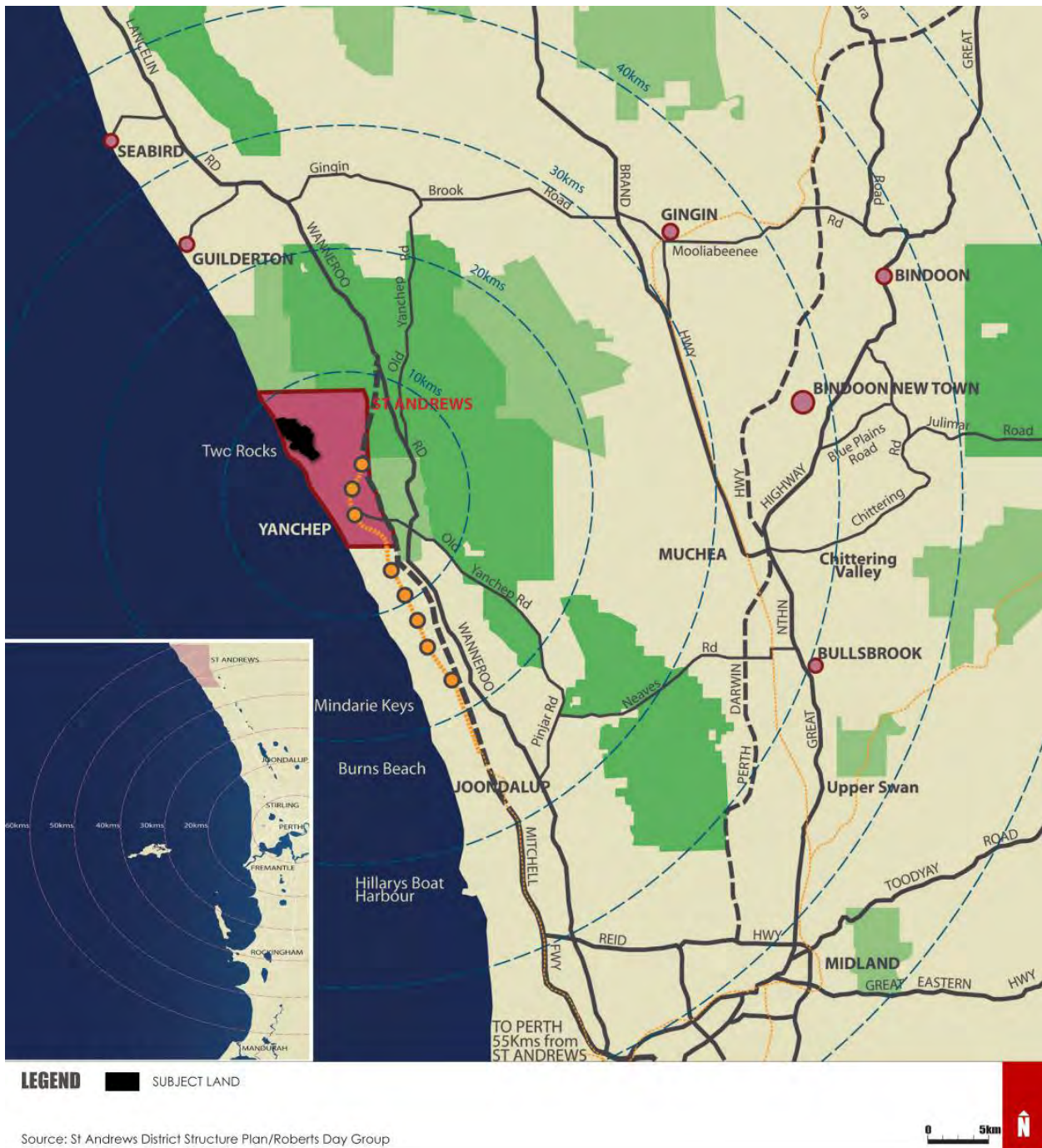


FIGURE 4.1 REGIONAL CONTEXT

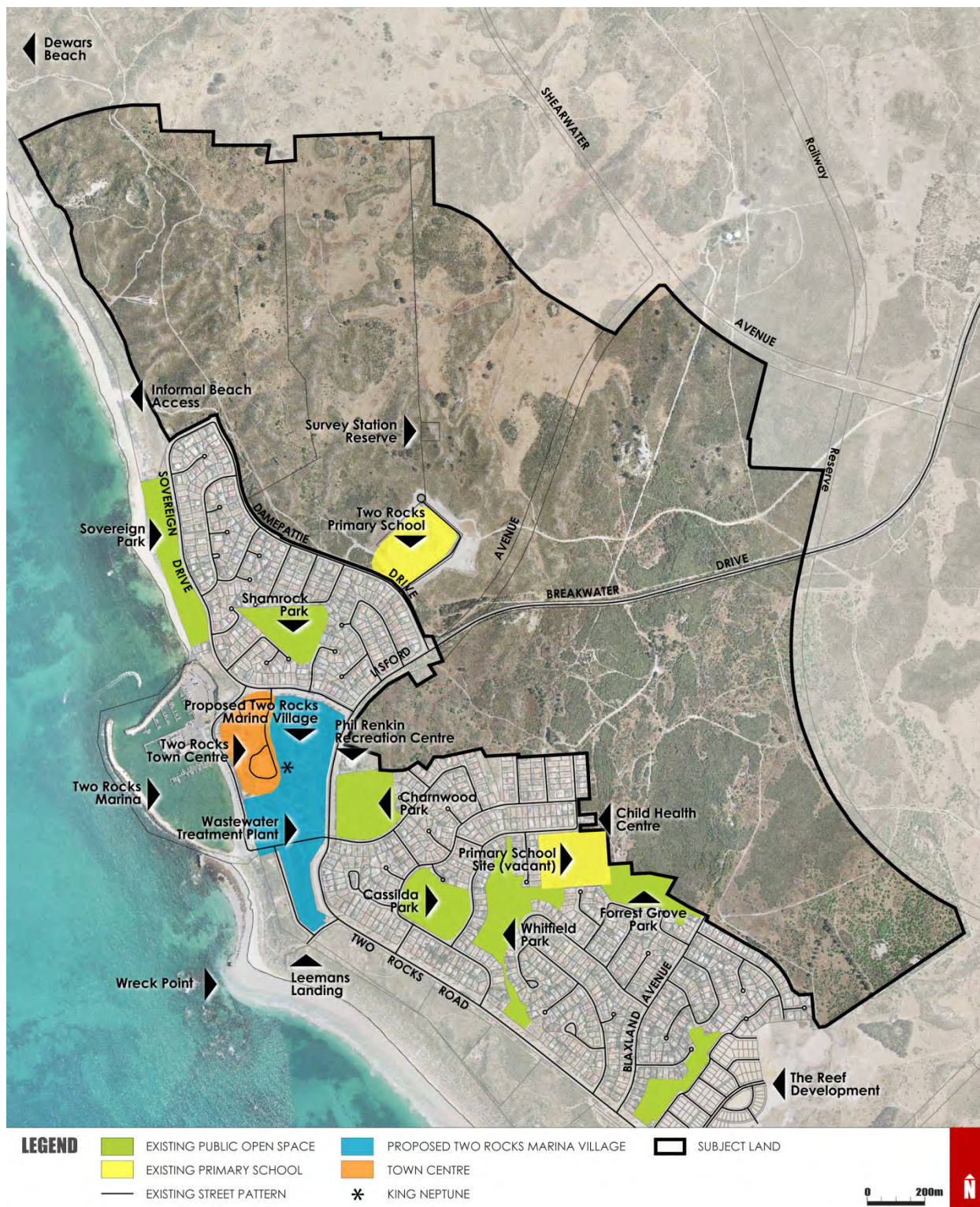


FIGURE 4.2 LOCAL CONTEXT

4.2 TWO ROCKS COMMUNITY

4.2.1 POPULATION

Table 4.1 shows the 2006 population by age in the existing Two Rocks town compared with the City of Wanneroo and the Perth Metropolitan Area. The table shows that the proportion of persons aged 14 and under in Two Rocks is slightly lower than in the City of Wanneroo, however on par with the Perth Metropolitan Area. There is a significantly lower proportion of people aged between 15 and 34 in Two Rocks compared to both the City of Wanneroo and the Perth Metropolitan Area. Two Rocks has a much higher proportion of residents aged 55 plus compared to Wanneroo and Perth.

Two Rocks has a similar proportion of family households to the Perth Metropolitan Area, however a significantly lower proportion than the City of Wanneroo, as shown in **Table 4.2**. However, Two Rocks has a lower proportion of couples with children and a higher proportion of couples without children and one-parent families compared to both Wanneroo and Perth. There is also a greater proportion of lone person households in Two Rocks compared to both Wanneroo and Perth, this could be due to the higher proportion of older residents living in the area (as per **Table 4.2**).

TABLE 4.1 POPULATION BY AGE, 2006

Age	Two Rocks Urban Centre		City of Wanneroo		Perth Metro	
	Persons	%	Persons	%	Persons	%
0-4	104	6.4%	8,976	8.1%	89,305	6.2%
5-14	231	14.2%	18,776	16.9%	192,912	13.3%
15-24	142	8.7%	15,217	13.7%	214,361	14.8%
25-34	155	9.5%	16,014	14.4%	196,786	13.6%
35-44	231	14.2%	18,511	16.7%	218,066	15.1%
45-54	215	13.2%	13,656	12.3%	204,923	14.2%
55-64	239	14.7%	9,904	8.9%	155,177	10.7%
65+	310	19.1%	9,885	8.9%	173,548	12.0%
Total	1,627	100.0%	110,939	100.0%	1,445,078	100.0%

Source: ABS (2006) Census of Population and Housing

TABLE 4.2 HOUSEHOLD TYPES, 2006

	Two Rocks Urban Centre		City of Wanneroo		Perth Metro	
	Households	%	Households	%	Households	%
Family Households	457	71.4%	29,679	81.1%	376,112	71.2%
• Couples with Children	137	21.4%	15,278	41.7%	173,915	32.9%
• Couples without Children	224	35.0%	9,665	26.4%	138,117	26.1%
• One Parent	88	13.8%	4,367	11.9%	56,720	10.7%
• Other	8	1.3%	369	1.0%	7,360	1.4%
Lone Person Household	168	26.3%	6,175	16.9%	132,174	25.0%
Group Household	15	2.3%	742	2.0%	20,249	3.8%
Total	640	100.0%	36,596	100.0%	528,535	100.0%

Source: ABS (2006) Census of Population and Housing

4.2.2 HOUSING

Table 4.3 shows the dwelling types in Two Rocks compared with the City of Wanneroo and the Perth Metropolitan Area. The majority of the dwellings in Two Rocks are separate houses, however the centre has a high proportion of unoccupied dwellings. Two Rocks has 1,627 people and 890 dwellings, giving a ratio of 1.83 persons per dwelling. This compares with the City of Wanneroo, which averages 2.67 persons per dwelling and the Perth Metropolitan area, which averages 2.37 persons per dwelling.

4.2.3 EMPLOYMENT

The median weekly income levels for individuals, households and families in Two Rocks are significantly lower than the averages for the City of Wanneroo and Perth Metropolitan Area, as shown in **Table 4.4**. The lower average income in Two Rocks may be partially due to the older, retired population living in the area.

Table 4.5 shows the occupations of the labour force in Two Rocks compared with the City of Wanneroo and Perth Metropolitan Area. Two Rocks has a higher proportion of Trades, Machinery Operator and Labourer type workers and a lower proportion of Professional and Manager type workers compared with Wanneroo and Perth.

The three main industries of employment for residents within the Two Rocks urban centre, as shown in **Table 4.6**, are construction, mining and manufacturing. In comparison to the City of Wanneroo and Perth Metropolitan Area, Two Rocks has:

- A greater proportion of people employed in construction, mining, agriculture/forestry/fishing, wholesale trade, administrative/support services and accommodation and food services;
- A lower proportion of people employed in retail trade, transport/postal/warehousing, finance/insurance, professional/scientific/technical services, public administration/safety and health care/social assistance.

Residents in the new development at Two Rocks are likely to have employment and demographic characteristics closer to those for the City of Wanneroo as a whole. This implies a high proportion of persons employed in construction, retail trade, manufacturing, public administration and transport.

TABLE 4.3 DWELLING TYPES, 2006

	Two Rocks Urban Centre		City of Wanneroo		Perth Metro	
	Dwellings	%	Dwellings	%	Dwellings	%
Separate House	672	75.5%	34,592	83.1%	437,302	71.8%
Semi Detached, Row/Terrace or Townhouse	0	0.0%	2,411	5.8%	66,736	11.0%
Flat, Unit or Apartment	5	0.6%	815	2.0%	52,395	8.6%
Other	3	0.3%	440	1.1%	3,374	0.6%
Not Stated	0	0.0%	32	0.1%	263	0.0%
Unoccupied	210	23.6%	3,329	8.0%	48,651	8.0%
Total	890	100.0%	41,619	100.0%	608,721	100.0%

Source: ABS (2006) Census of Population and Housing

TABLE 4.4 MEDIAN WEEKLY INCOME, 2006

Median Income	Two Rocks Urban Centre	City of Wanneroo	Perth Metro
Individual Income	\$365	\$491	\$513
Household Income	\$658	\$1,094	\$1,086
Family Income	\$827	\$1,184	\$1,298

Source: ABS (2006) Census of Population and Housing

TABLE 4.5 OCCUPATIONS, 2006

	Two Rocks Urban Centre		City of Wanneroo		Perth Metro	
	Persons	%	Persons	%	Persons	%
Technicians and Trades Workers	117	22.2%	10,296	20.5%	112,972	16.3%
Labourers	89	16.9%	6,477	12.9%	68,596	9.9%
Machinery Operators and Drivers	68	12.9%	3,819	7.6%	44,646	6.4%
Clerical and Administrative Workers	67	12.7%	8,176	16.3%	110,539	15.9%
Professionals	58	11.0%	6,424	12.8%	144,972	20.9%
Sales Workers	51	9.7%	5,265	10.5%	69,348	10.0%
Community and Personal Service Workers	42	8.0%	4,741	9.4%	64,002	9.2%
Managers	36	6.8%	5,042	10.0%	79,202	11.4%
Total	528	100.0%	50,240	100.0%	694,277	100.0%

Source: ABS (2006) Census of Population and Housing

TABLE 4.6 EMPLOYMENT BY INDUSTRY, 2006

	Two Rocks Urban Centre		City of Wanneroo		Perth Metro	
	Persons	%	Persons	%	Persons	%
Agriculture, Forestry and Fishing	17	3.2%	751	1.5%	5,454	0.8%
Mining	48	9.0%	1,423	2.8%	22,163	3.1%
Manufacturing	49	9.2%	5,524	10.8%	69,138	9.8%
Electricity, Gas, Water and Waste Services	0	0.0%	490	1.0%	7,015	1.0%
Construction	79	14.8%	6,530	12.8%	62,726	8.9%
Wholesale Trade	37	6.9%	2,439	4.8%	30,639	4.4%
Retail Trade	47	8.8%	6,298	12.3%	79,936	11.4%
Accommodation and Food Services	43	8.0%	2,660	5.2%	40,493	5.8%
Transport, Postal and Warehousing	12	2.2%	1,952	3.8%	29,716	4.2%
Information Media and Telecommunications	5	0.9%	755	1.5%	10,731	1.5%
Financial and Insurance Services	9	1.7%	1,742	3.4%	23,835	3.4%
Rental, Hiring and Real Estate Services	7	1.3%	885	1.7%	14,344	2.0%
Professional, Scientific and Technical Services	20	3.7%	2,438	4.8%	52,146	7.4%
Administrative and Support Services	27	5.0%	2,037	4.0%	23,581	3.3%
Public Administration and Safety	24	4.5%	2,938	5.7%	46,100	6.5%
Education and Training	36	6.7%	2,869	5.6%	54,941	7.8%
Health Care and Social Assistance	36	6.7%	5,031	9.8%	75,396	10.7%
Arts and Recreation Services	11	2.1%	583	1.1%	9,881	1.4%
Other Services	10	1.9%	2,265	4.4%	27,300	3.9%
Inadequately Described/Not Stated	18	3.4%	1,504	2.9%	18,580	2.6%
Total	535	100.0%	51,114	100.0%	704,115	100.0%

Source: ABS (2006) Census of Population and Housing

4.3 ENVIRONMENTAL

4.3.1 TOPOGRAPHY

The topography of the site is gently undulating; it varies from 5 mAHD on the coast to 55 mAHD on dune ridges (**Figure 4.3**). Lots 11, 12, 13 and 207 are more undulating with dune ridges and valleys.

4.3.2 LANDFORM, SOILS AND GEOMORPHOLOGY

The Quindalup Dune System is the dominant landform on the site. The Quindalup Dune System extends along the modern shoreline of the Swan Coastal Plain, from Dongara in the north to Geographe Bay in the south. It is characterised by a complex pattern of parabolic dunes which were formed in four main phases of activity; the oldest phase was generally the most extensive with younger phases becoming less in extent. According to McArthur and Bartle (1980), the Quindalup Dunes System can be classified into the following soil units:

- Q1: The oldest phase: Dunes or remnants with low relief; soils have organic staining to about 30 cm, overlying pale brown sand, and with definite cementation below one metre.
- Q2: The second phase. A complex pattern of dunes with moderate relief; soils have organic staining to about 20 cm, passing into pale brown sand; some cementation below one metre.
- Q3: The third phase. Steep irregular dunes with high relief; soils consist of loose sand with little surface organic staining and incipient cementation at depth.
- Q4: The youngest phase. Steep irregular dunes on loose pale brown sand with no soil profile development.
- Qu: Presently unstable sand.
- Qp: Undulating landscapes with deep calcareous sands overlying limestone; soils have dark grey-brown sand to about 50 cm and then pale brown sand; remnants of hummocks are often present.
- Qs: Undulating landscapes with shallow calcareous sand over limestone and much rock outcrop.

There are two distinct landform areas on the site, these are roughly divided by Breakwater Drive.

Lots 11, 12, 13 and the western portion of Lot 207 contain long linear dunes orientated in a south-westerly direction which have been created over time by the prevailing south-westerly winds. In between the linear dunes are valleys which have since been sheltered from the prevailing winds by the formation of more recent dunes at the coast.

According to McArthur and Bartle (1980) the dominant linear dunes on Lot 11 and 207 are from the oldest Quaternary phase (Q1). The fretted dunes on Lot 12 and the eastern portion of Lot 13 are from the second Quaternary phase (Q2). The two most recent Quaternary phases (Q3 and Q4) are restricted to the western portion of Lot 13 and the foreshore reserve. The dune blowout in the foreshore reserve is classified as Qu. Most of the areas that have been cleared in the past for agricultural (grazing) purposes are Qp which occurs in the valleys between Q1 and Q2 ridges.

According to McArthur and Bartle (1980) the eastern portion of Lot 207 and Lot 500 is dominated by Qs, in between two long Q1 linear dunes (which occur outside the Two Rocks LSP site). The most westerly portion of Lot 500 is the southern extent of a Q2 system that occurs on Lots 11, 12 and 13.

The landforms that are present on the site are part of larger systems that continue outside the site, this is particularly evident in the case of the Q1 dunes that extend beyond the site for several kilometres in a north-easterly direction.

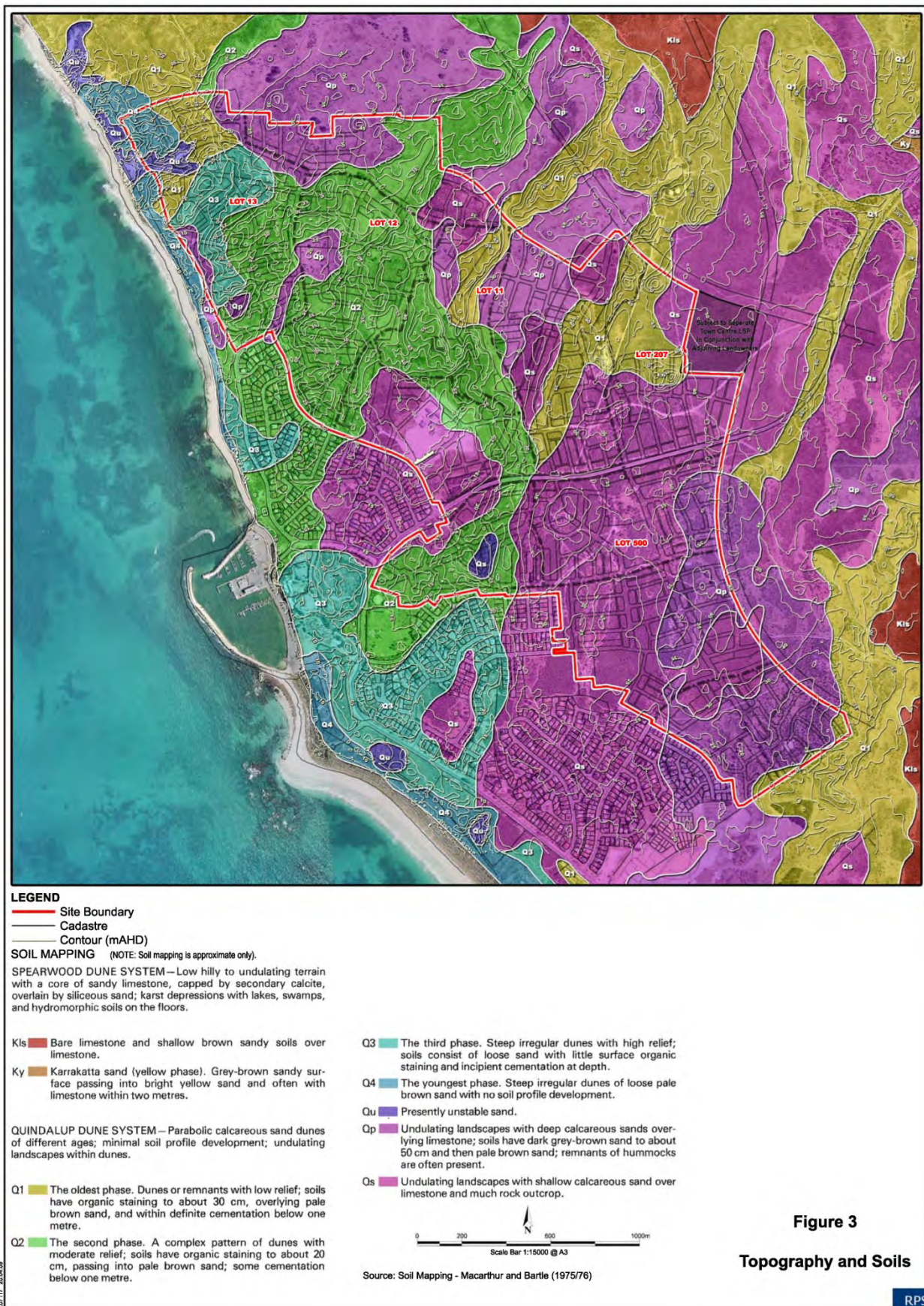


Figure 3
Topography and Soils

FIGURE 4.3 TOPOGRAPHY AND SOILS [SOURCE: RPS]

The Quindalup Dunes are the geomorphic expression of the Safety Bay Sand geological unit and are composed of calcareous sand (Geological Survey of Western Australia, 1975). Safety Bay Sand is prevalent as a soil type close to the coast where sand dunes are younger and more mobile, this is the case for the majority of Lots 11, 12 and 13. In contrast, most of Lot 500 is underlain by Tamala Limestone (from the older Spearwood Dunes) of Pleistocene origin.

Regional soil mapping by Geological Survey of Western Australia (1975) for the Perth Metropolitan Area only extends into the southern half of Lot 500. According to this mapping, there are four main soil types present on site, as follows:

- Limestone (LS1) - light yellowish brown, fine- to coarse-grained, sub-angular to well-rounded quartz, with shell debris and a trace of feldspar; kankar at surface common.
- Limestone (LS4) - pale yellowish brown, weakly cemented, friable, medium-grained, sub-rounded quartz and shell debris, of eolian origin.
- Calcareous Sand (S2) – white, fine to medium-grained, sub-rounded quartz and shell debris, of eolian origin.
- Safety Bay Sand (Qhs).

Given the limitations of the soil mapping by Geological Survey of Western Australia (1975) in the area, the McArthur and Bartle (1980) mapping has been used to inform this study (**Figure 4.3**).

In addition to the McArthur and Bartle mapping, further site specific information has been produced by Golder Associates, who were engaged last year to undertake a preliminary geotechnical investigation of the LSP area. They characterised the soils throughout the site as generally calcareous sands (Safety Bay Sand) overlying Tamala Limestone. The Safety Bay Sand is medium grained and moderately poorly graded. It may contain cemented intervals, although their occurrence is not widespread. The Tamala Limestone is typically siliceous calcarenite but in the upper few metres is typically leached to siliceous sand. The Tamala Limestone is highly variable with material properties varying from uncemented sand through to very high strength rock over a matter of centimetres.

Following an initial site reconnaissance to investigate areas of geotechnical interest, Golder Associates broadly delineated the site into four zones, as depicted in **Figure 4.5**:

- Sand;
- Limestone boulders, gravel at surface, some consistent outcrop;
- Areas of limestone outcrops; and
- Minor outcrop associated with the recent system superficial cementation (grey coating), light crust associated with very weak to weak calcium carbonate cementation.

Tamala limestone outcrops are visible in the more elevated areas, particularly to the east.

The geotechnical report prepared by Golder Associates is available upon request.

4.3.3 SURFACE HYDROLOGY AND GROUNDWATER

There are no surface water features on the site.

The Perth Groundwater Atlas indicates groundwater can be expected to occur slightly above sea level, and up to RL3. Therefore, groundwater is not expected to have a significant impact on the development potential of the site and is expected to occur at a depth of greater than 20m over most of the site. Surface drainage systems are absent in the area. This is attributed to the high permeability of the surface sands which prevent the build up of surface waters.

There are three aquifers in the vicinity of the site; the superficial aquifer that occurs in the underlying Tamala Limestone and is recharged by rainwater, the confined Leederville formation beneath the superficial aquifer and the confined Yarragadee formation beneath the Leederville formation.

The eastern sections of Lot 207 and Lot 500 (approximately 250m wide) are included in the Priority 3 Perth Coastal Underground Water Pollution Control Area (DoW, 2007). Priority 3 areas cover land where protection of the water source is managed to co-exist with other land uses, and will normally apply to land where more intensive development has occurred such as residential, commercial and industrial (or is thus zoned in the MRS).

The Priority 3 Perth Coastal Underground Water Pollution Control Area protects a groundwater abstraction area for drinking water to the east of the site. Protection of this area is achieved through management guidelines rather than restrictions on land use (Water Corporation and DoE, 2005).

The following are the minimum requirements for development within Priority 3 areas:

- Installation of reticulated sewerage in new urban centres with appropriate disposal of wastewater effluent, preferably off catchment;
- Ensure that septic tank densities and location in non-urban areas comply with Water Corporation or Department of Water recommendations;
- Observe restrictions on development of industries handling or processing noxious or polluting substances;
- Commercial areas are designed to prevent catchment contamination through stormwater runoff or discharge of wastes;
- Observe restrictions on intensive agriculture development; and
- Restriction of disposal sites for polluting wastes (sites with suitable location, construction, and management to ensure no significant pollution can occur and may be acceptable).

4.3.4 VEGETATION AND FLORA

VEGETATION COMPLEXES

Vegetation Complexes are a broad level of vegetation description which is based on underlying geomorphology and rainfall (Hedde et al., 1980). The vegetation on the site can be broadly classified as belonging to the Quindalup Complex which is characterised by coastal dune vegetation consisting mainly of two alliances; the strand and fore-dune alliance and the mobile and stable dunes alliance (Hedde et al., 1980). According to Bush Forever (Government of WA, 2000), as shown in **Table 4.7**, there is currently approximately 48% of the original amount of Quindalup Complex (i.e. pre-European settlement) on the Swan Coastal Plain still remaining. Of the original amount of Quindalup Complex on the Swan Coastal Plain, approximately 14% has some form of existing protection, with approximately 5% in Bush Forever sites.

TABLE 4.7 VEGETATION COMPLEX AND AREA ON THE SWAN COASTAL PLAIN

Complex	Original Area (ha)	Remaining Area (ha)	Some Existing Protection (ha)	Bush Forever Implemented	Total Area Proposed for Protection
Quindalup Complex	24,381	11,598 (48%)	3,527 (14%)	1,229 (5%)	4,756 (20%)

[Source: Bush Forever, 2000]

VEGETATION AND FLORA SURVEYS

ATA Environmental (2007) provides a history of the several vegetation and flora assessments that have been conducted on the site since 1991, the results of these for the Two Rocks LSP site can be summarised as follows:

- Vegetation condition on the site ranges from Excellent-Very Good to Completely Degraded.
- Areas of *Melaleuca cardiophylla* are considered locally significant as it has limited protection in existing reserves and is not common close to the coast outside the Yanchep to Two Rocks area in the Perth Metropolitan Region. ATA Environmental (2007) provides mapping of the *M. cardiophylla* stands in the DSP area and provides recommendations on which areas should be retained in POS. Several areas of *M. cardiophylla* occur in the Two Rocks LSP area.
- No Floristic Community Types (FCTs) listed as Threatened Ecological Communities (TECs) occur in the study area.

Vegetation and flora mapping undertaken by ATA Environmental was generally performed on a regional scale, supplemented by several site visits to confirm the presence of vegetation and flora species and condition.

Some inconsistencies and insufficiencies were found in the available vegetation and flora mapping for the Two Rocks LSP site by RPS during a desktop analysis. Consequently, RPS botanists undertook a vegetation and flora survey for the site (during October and November 2007), results from this investigation are presented in *Lots 11, 12, 13, 207 and 500 Two Rocks – Level 2 Vegetation and Flora Survey* (RPS, 2008) and the main findings are summarised in the following sections and in **Figures 4.4 and 4.6**. The complete vegetation and flora survey prepared by RPS is included as **Appendix 11**.

The survey methodology was based on a 'Level 2' flora and vegetation survey as outlined in Guidance Statement 51 (EPA, 2004) and is consistent with methodology established for the Swan Coastal Plain by Keighery et al., (1994).

SIGNIFICANT FLORA AND VEGETATION

No Declared Rare Flora were recorded on the site. One Priority 1 *Leucopogon* sp. Perth Coastal (A.S. George 17305) and three Priority 3 *Conostylis pauciflora* subsp. *euryrhipis*, *Hibbertia spicata* subsp. *leptotheca* and *Stylidium maritimum* were recorded from the survey area (**Figure 4.4**).

There are no Bush Forever sites within the Two Rocks LSP area; however, Bush Forever Site No. 397 (Coastal strip from Wilbinga to Mindarie) is adjacent to the western boundary of Lot 13 (refer **Figure 4.7**).

The FCTs of the site were determined using a multivariate analysis and inferred information from Gibson et al., (1994). No FCTs that are listed as TECs were found on the site. The FCTs that occur on the site are shown in **Figure 4.8**, they include:

- 29a – Coastal shrublands on shallow soils. This FCT generally comprises heaths on shallow sands over limestone close to the coast, it occurs on the coastal dunes of the site.
- 29b - Acacia shrublands on taller dunes. This generally occurs on the parabolic dunes on the site.
- 24 - Northern Spearwood shrublands and woodlands. This generally occurs on the limestone soils on Lot 500, and part of Lot 207.

All these FCTs are considered Priority 3 Priority Ecological Communities (PECs). According to DEC (2007), the definition and criteria for Priority 3 PECs is as follows:

PRIORITY THREE: POORLY KNOWN ECOLOGICAL COMMUNITIES

- i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or:
- ii) Communities known from a few widespread occurrences, which are either large or within significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat, or:
- iii) Communities made up of large, and/or widespread occurrences, that may not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, and inappropriate fire regimes.

Communities may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them.

VEGETATION TYPES

The vegetation types mapped during the 2007 survey by RPS are shown in **Figure 4.4**.

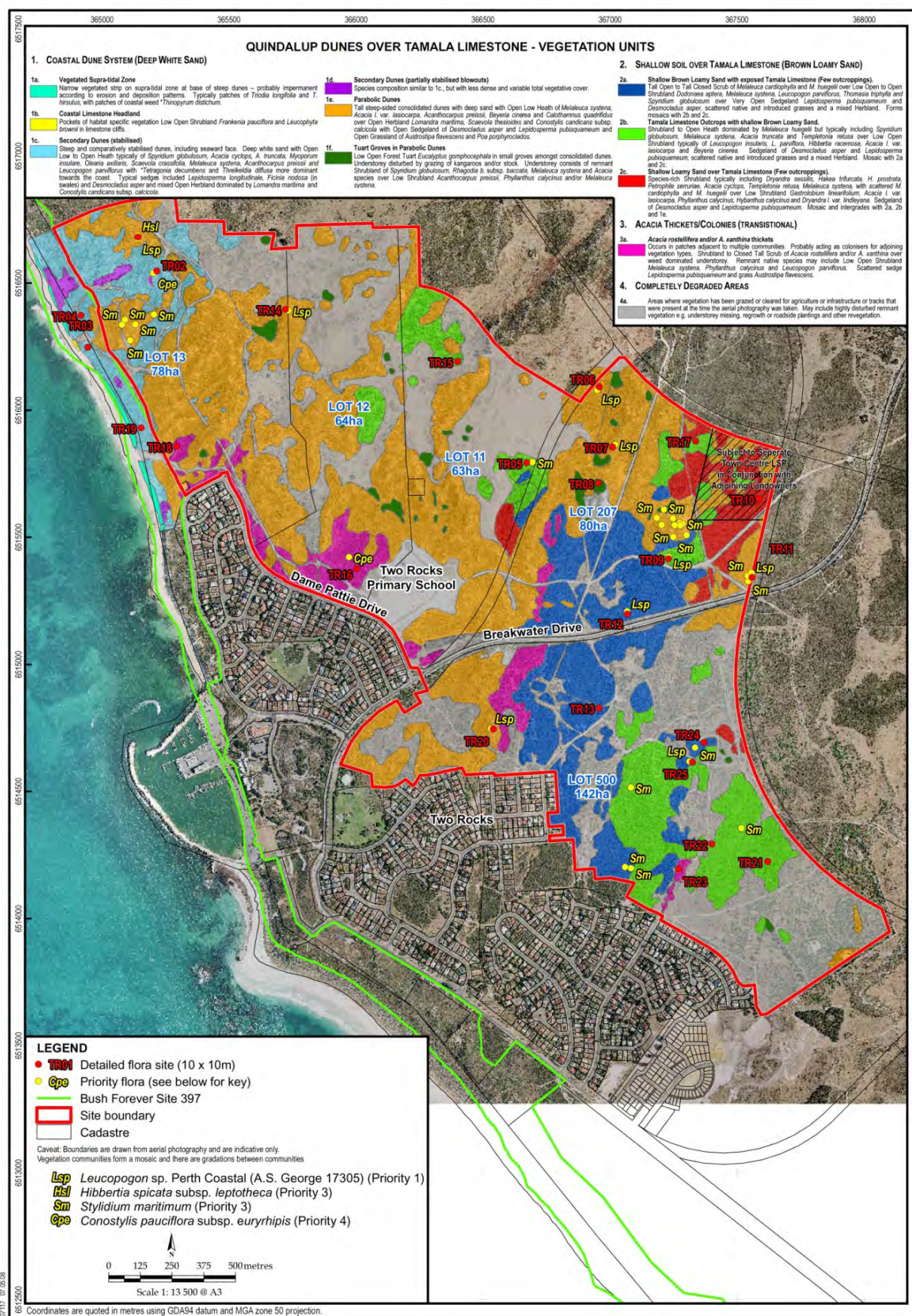


FIGURE 4.4 VEGETATION UNITS [SOURCE: RPS]

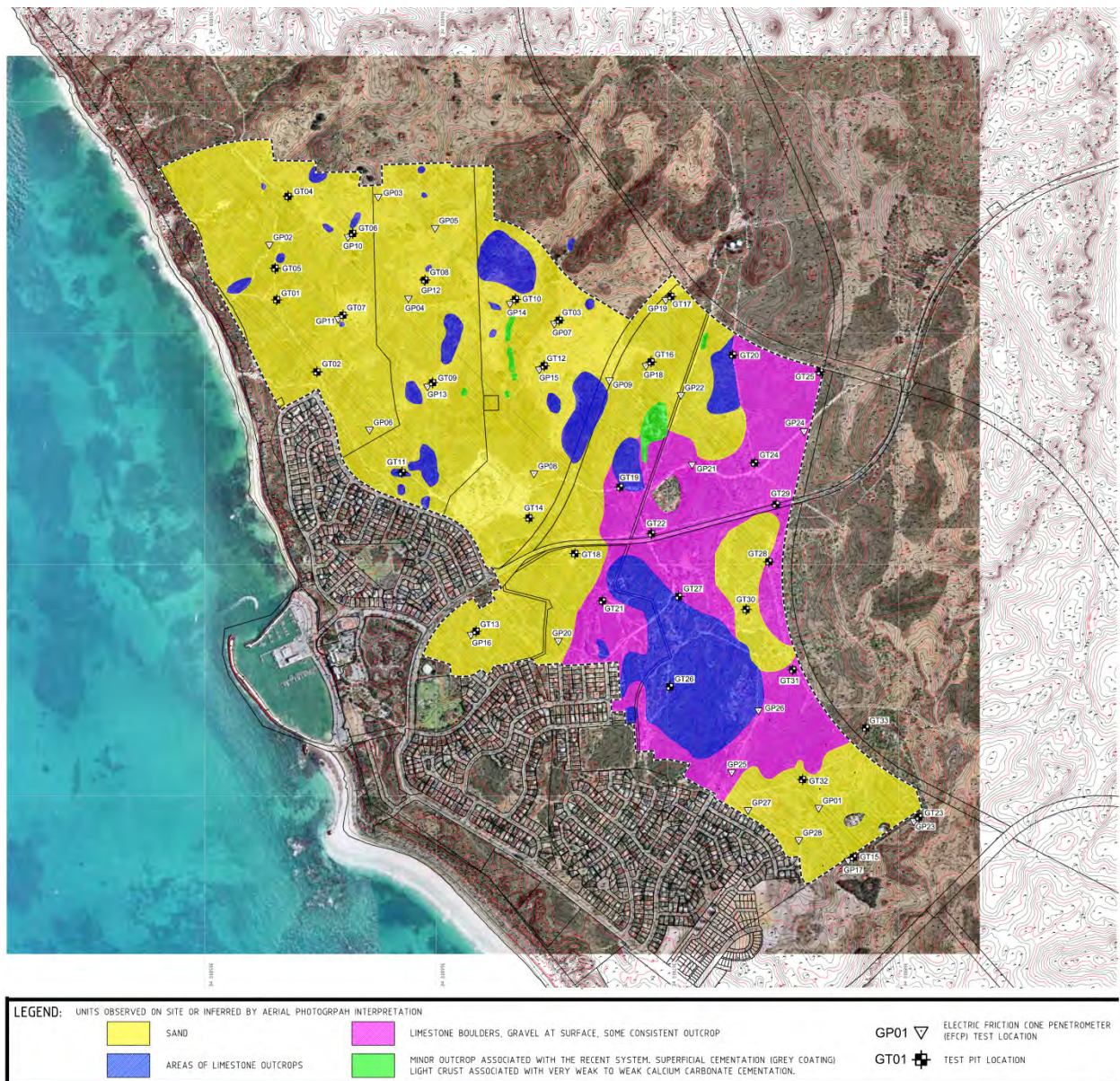


FIGURE 4.5 SITE SOIL ZONES [SOURCE: GOLDER & ASSOCIATES]

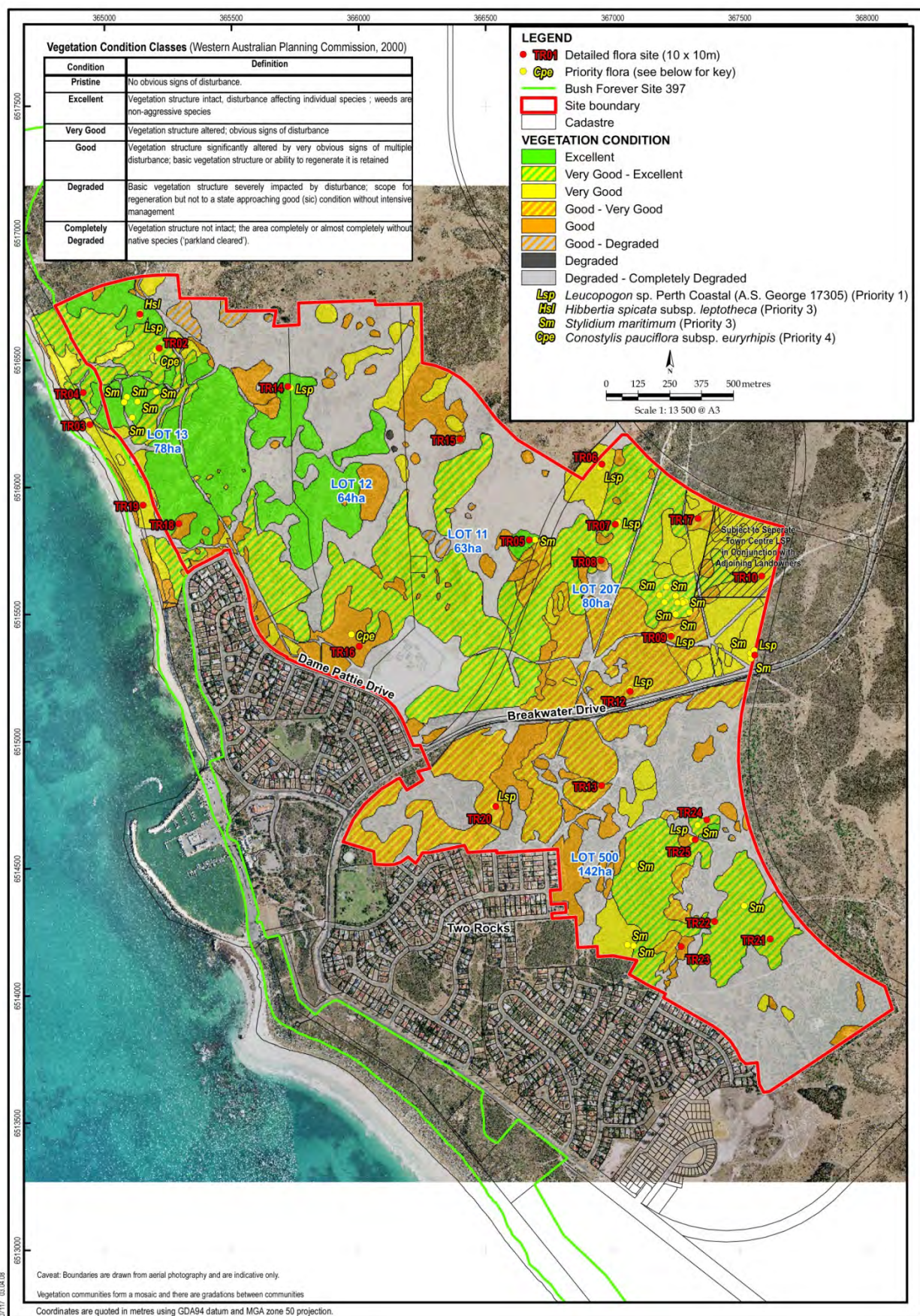


FIGURE 4.6 VEGETATION CONDITION [SOURCE: RPS]

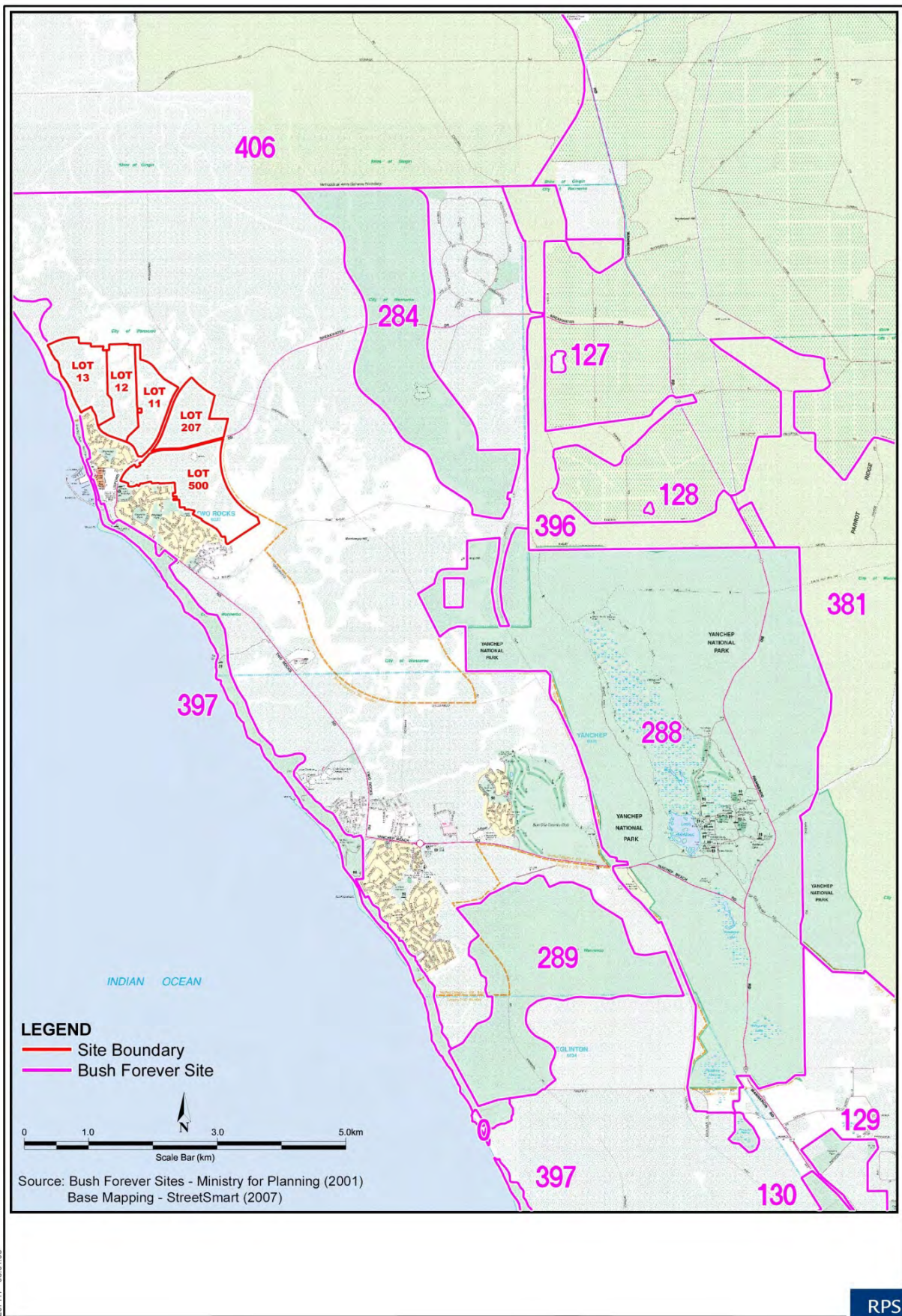


FIGURE 4.7 BUSH FOREVER SITES [SOURCE: RPS]

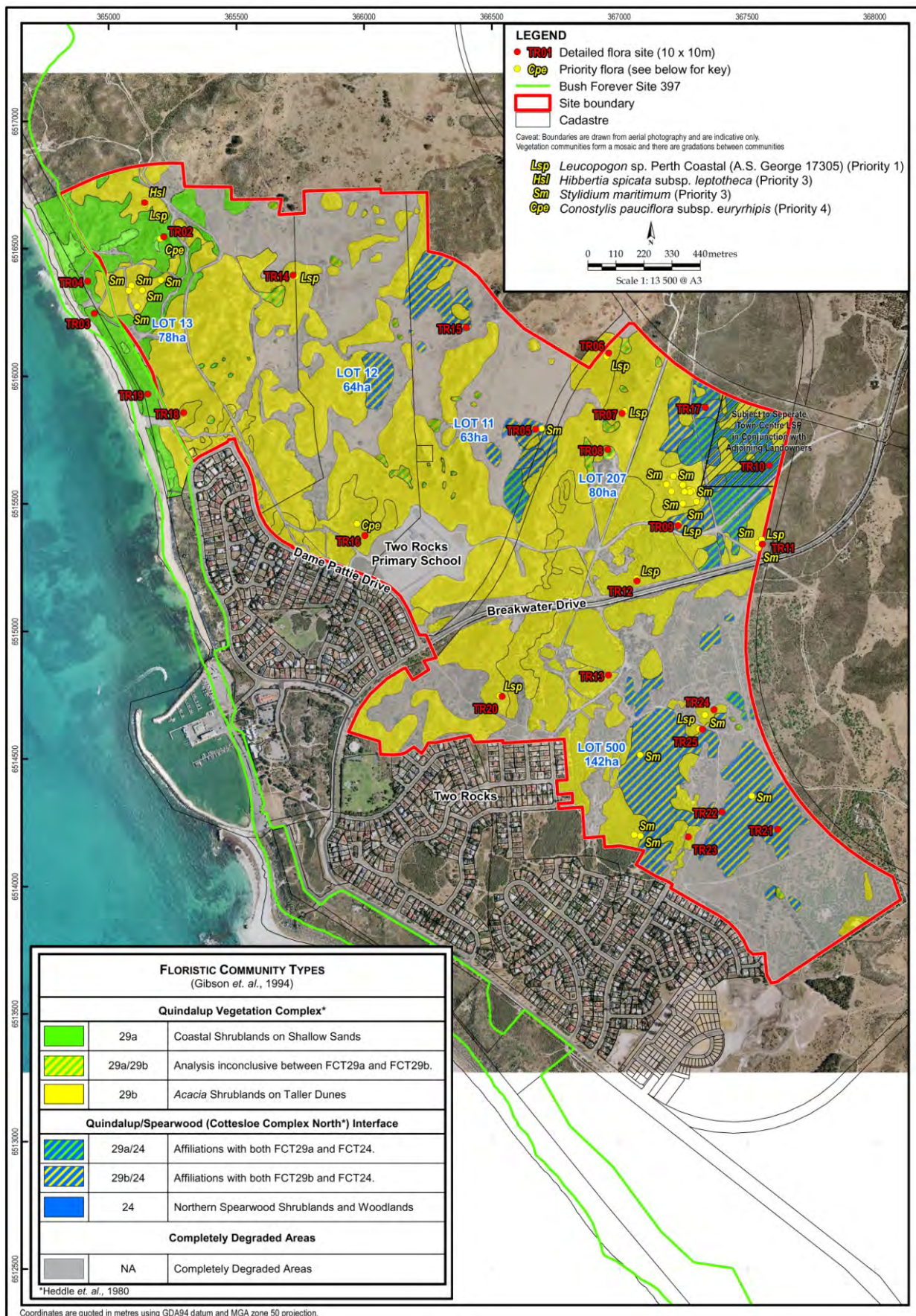


FIGURE 4.8 FLORISTIC COMMUNITY TYPES [SOURCE: RPS]

VEGETATION CONDITION

A total of 227 taxa were recorded from the survey area, of which 148 or 65% were native, and the remaining 35% of the total flora recorded were introduced flora taxa (weeds). The condition of the site was mapped according to the condition scale provided in Bush Forever (Government of WA, 2000), it is shown in **Figure 4.6** and can be summarised as follows:

- 10% of the site is in Excellent condition
- 23% of the site is in Very Good – Excellent condition
- 9% of the site is in Very Good condition
- 11.5% of the site is in Good – Very Good condition
- 9% of the site is in Good condition
- 0.5% of the site is in Good – Degraded condition
- 37% of the site is in Degraded – Completely Degraded condition

Naturalised bushland weeds were recorded at low densities within intact vegetation (Good to Excellent areas) (**Figure 4.6**). The most extensively weed infested areas were along tracks, firebreaks and in pasture areas that had been historically cleared for grazing purposes, and areas where there had been dumping of garden refuse in the past (particularly in Lot 500) (Degraded to Completely Degraded areas) (**Figure 4.6**).

Four declared weeds listed for the Wanneroo Region under the Agricultural Protection Board Act 1950 were recorded within the survey area: Arum Lily **Zantedeschia aethiopica*, Bridal Creeper **Asparagus asparagoides*, Cape Tulip **Homeria flaccida* (**Moraea flaccida*) and Paterson's Curse **Echium plantagineum*.

4.3.5 FAUNA

A comprehensive regional fauna survey was undertaken in the Yanchep-Two Rocks area by Alan Tingay & Associates in 1991. According to ATA Environmental (2007), the survey recorded three amphibians, 24 reptiles, 63 native and three introduced birds and six native and five introduced mammals on the Tokyu landholding, which at the time included the Two Rocks LSP area.

ATA Environmental conducted an additional fauna survey in the south-eastern portion of the DSP area in 2005 (near the existing St Andrew's golf course). The results of this survey are not relevant to the Two Rocks LSP area, other than to indicate what species have been recorded in proximity to the Two Rocks LSP site.

According to ATA Environmental (2007) the fauna assemblage that was recorded in the 1991 and 2005 surveys was fairly typical of coastal habitats on the Swan Coastal Plain. The Two Rocks LSP area is a coastal environment of coastal heath vegetation. Comprehensive information on fauna exists from the previous surveys in the area, so the completion of a Level 1 Fauna Survey is considered sufficient for the Two Rocks LSP area. This will form part of the Vegetation, Flora and Fauna Management Plan.

Significant fauna species that may potentially occur on the site are listed in **Table 4.8**.

TABLE 4.8 SIGNIFICANT FAUNA SPECIES THAT MAY OCCUR IN THE TWO ROCKS LSP AREA

Species	Status under Wildlife Conservation Act 1950	Status under Commonwealth Environment Protection and Biodiversity Conservation Act 1999	Historical recordings in general Yanchep-Two Rocks area	Likelihood of occurring on Two Rocks LSP site
<i>Calyptorhynchus latirostris</i> (Carnaby's Black Cockatoo)	Schedule 1	Endangered	Recorded during 1991 and 2005 surveys	There is negligible to minimal foraging habitat opportunities for this species in the Two Rocks LSP area; there is no suitable breeding habitat in the LSP area. This species may fly over the site from time to time to forage on nearby Banksia and Dryandra vegetation.
<i>Dasyurus geoffroii</i> (Chuditch)	Schedule 1	Vulnerable	Recorded in region	It is unlikely that this species would occur on the site; it favours riparian vegetation and jarrah forests.
<i>Falco peregrinus</i> (Peregrine Falcon)	Schedule 4	-	Recorded during 1991 survey	This occurs throughout the world and in all parts of Australia. It is a bird of prey, feeding mostly on other birds, it does not favour any particular habitat. This species may visit the site from time to time. It is not considered that the implementation of the LSP will have a significant effect on this species.
<i>Morelia spilota imbricata</i> (Carpet Python)	Schedule 4	-	Recorded in region	This species is widespread from Northampton, south to Albany and east to Kalgoorlie. This species may occur on the site. It is not considered that the implementation of the LSP will have a significant effect on this species.
<i>Phascogale tapoatafa tapoatafa</i> (Southern Brush-tailed Phascogale)	Priority 3	-	Recorded in region	This species is unlikely to occur on the site; Phascogales preferred habitat is forests with hollow-bearing trees.
<i>Neelaps calonotos</i> (Black-striped Snake)	Priority 3	-	Recorded during 2005 survey	Unlikely to inhabit the site; prefers habitat near watercourses or wetlands.
<i>Macropus irma</i> (Western Brush Wallaby)	Priority 4	-	Recorded during 2005 survey	This species may occur on the site; it inhabits similar habitat to the kangaroo.
<i>Isoodon obesulus fusciventer</i> (Southern Brown Bandicoot)	Priority 5	-	Recorded in region	Unlikely to occur on the site; Quenda are usually found in habitat with wetlands or watercourses.
<i>Merops ornatus</i> (Rainbow Bee-eater)	-	Migratory	Recorded during 2005 survey	This species is migratory and is likely to occur on the site from time to time. It burrows in the ground and favours disturbed areas, this species may persist in the passive areas following the implementation of the LSP.

Source: ATA Environmental (2007) and Department of Environment, Water, Heritage and the Arts website

4.3.6 COASTAL PROCESSES

Within the Structure Plan area, Lot 13 Damepattie Drive has a coastal frontage. Accordingly, a coastal setback assessment has been undertaken by MP Rogers & Associates for this lot and is included as **Appendix 12**. This coastal setback assessment, completed in accordance with the intent of Statement of Planning Policy No. 2.6, State Coastal Planning Policy (SCPP), provides guidance on the required setback to development to provide a low level of erosion risk over the coming 100 year period.

Short, in *Beaches of the Western Australian Coast: Eucla to Roebuck Bay* (2006), classifies the beach adjacent to Lot 13 as generally sandy with sections of beach rock. Inspection of the beach by coastal engineers from MRA during February 2008 found that the beach is generally characterised by a narrow berm and steep eroding dunes, significant sections of rock on the beach face were also noted. These observations are further supported by MRA in *Northern Perth Metropolitan Coast - Coastal Setback Study* (2005), which noted a similar profile classification. The average wave conditions experienced at the shoreline are estimated to be in the order of 1 m (Short 2006).

The Two Rocks marina has interrupted the littoral drift of sediment and has resulted in accretion of sediment on the southern side of the marina and erosion on the northern side. The erosion on the northern side of the Two Rocks marina was taken into account as part of the coastal setback assessment. Modelling of the beach profile evolution during a severe storm period was also completed for the shoreline adjacent to the landholdings and an allowance for shoreline recession as a result of climate change induced sea level rise was included.

Summation of each of these factors resulted in a recommendation by MRA in 2008 of total setback distances to allow for the action of physical coastal processes over the coming 100 years. These setback distances are given in **Table 4.9** and should be measured in a landward direction from the horizontal setback datum. According to this table, the total setback distance ranges from 99 at the northern end to 139 m at the southern end (towards the marina). This setback is also shown diagrammatically in **Figure 4.9**.

It should be noted that, since undertaking this coastal setback assessment, the WAPC endorsed a Position Statement 'SPP2.6 Sea Level Rise', which has resulted in an increase in setback of an additional 52 m. Accordingly, there is a requirement for a 151 m to 191 m coastal setback from the horizontal setback datum, as reflected in **Table 4.9**.

It should be noted that investigations have recently commenced on the redevelopment of the marina, which will have a significant impact on the future coastal processes setback. Accordingly, there may be a case for further reducing the coastal setback distances in **Table 4.9**, if sand by-passing is implemented as part of any future plans for the marina.

TABLE 4.9 RECOMMENDED SETBACK ALLOWANCES

Chainage ¹ (m)	S1 Allowance (m)	S2 Allowance (m)	S3 Allowance (m)	Total Setback (m)	WAPC Endorsed Setback (m)
700 to 900	31	70	38	139	191
900 to 1000	31	50-70	38	119-139	171-191
1000 to 1300	31	50	38	119	171
1300 to 1400	31	30-50	38	99-119	151-171
1400 to 2000	31	30	38	99	151

Note 1: Chainage refers to the distance in metres from the Two Rocks Marina.



FIGURE 4.9 RECOMMENDED COASTAL SETBACK [SOURCE: MP ROGERS & ASSOCIATES]

4.3.7 KARST FORMATIONS

The Lake Joondalup-Yanchep area is a known area of karstic formations (e.g. caves, swallow holes, dolines, gorges and pinnacles). According to ATA Environmental (2007) preliminary investigations of the DSP area identified a number of possible karst features (about 6% of the property) mainly in the eastern area.

CVJV engaged Golder Associates to provide advice on the likelihood of karst occurring within the LSP area. According to Golder Associates dissolution can occur in Tamala Limestone where it meets the groundwater and solution slots are formed and caves develop by collapse of the overlying material until a stable arch is formed or a collapse doline develops.

Information available to Golder Associates indicates that karst features, such as caves occur in the Two Rocks region, however, observed karst features generally occur in a north-south trending line that includes Lake Joondalup and Yanchep National Park. These areas are low lying with the groundwater table relatively close to ground surface level. The occurrence of caves and collapse dolines can be expected in these areas as karstification occurs at close to groundwater level.

The LSP area is located significantly to the west of the area in which karst features have been observed in the past and ground surface level across the site is generally about 20-30 m above groundwater level. Golder Associates have advised that given there is generally over 20% of soil and rock cover over the zone in which karstification may occur, it is unlikely effects of any karstification at depth will be transferred to the ground surface.

A copy of Golder Associates karst features assessment is included as **Appendix 9**.

4.3.8 POTENTIAL CONTAMINATED SITES

While the majority of the structure plan area comprises undeveloped native bushland, it is known that a quarry once operated in a small section of Lot 500. Following decommissioning of the quarry it is believed the area was used for the purpose of land filling building waste materials.

CVJV engaged RPS to undertake an Environmental Site Assessment in accordance with DEC guidelines, to identify the potential for the site to be adversely impacted from past contaminating activities or land uses, such as the landfill. A copy of the Environmental Site Assessment is included as **Appendix 13**. This involved a desktop study including a review of the site and its environmental features, a search of relevant government databases, a review of historical site activities and developments, a site inspection and recommendations for further investigations and management.

The historical review and site inspection identified the 'Former Bower Grove Landfill' as a potential source of contamination. It is located along the northern boundary of Lot 500 adjacent to Breakwater Drive and is accessible from Bower Grove (refer **Figure 4.16** – Issues and Opportunities Plan). The landfill covers an area of approximately 1ha and can be distinguished by the former limestone quarry walls which are visible at the northern end of the landfill and along the western side.

An investigation into the soil quality and potential contamination within the former landfill area was also undertaken to determine the location and extent of potential contaminants. The analytical results suggest that minimal impacts have occurred within the soil profile and the majority of the buried waste is inert and thus unlikely to represent a significant environmental issue.

Based on the findings RPS has recommended that the most suitable future use of the site would be public open space or sporting and recreational fields.

4.3.9 UNEXPLODED ORDNANCE

FESA's Unexploded Ordnance Unit has advised that the Two Rocks structure plan site falls within one of the main impact areas used by the Department of Defence in the Perth Metropolitan Region between the beginning of World War II and the early 1970s. As such it is considered to be a high risk area, with respect to the potential presence of unexploded ordnance (UXO).

Prior to the commencement of any works, reconnaissance must be completed by an UXO specialist to search the site for unexploded ordnance and undertake any remediation action as appropriate. FESA's clearance of the search and remediation operation will be required to be obtained prior to the issue of titles.

4.4 ABORIGINAL HERITAGE

A search of the Register of Aboriginal Sites found that there are currently no Aboriginal sites listed inside the Two Rocks project area, and no sites were identified inside the project area during the original ethnographic and archaeological surveys conducted by the Tokyu Corporation in 1991. Due to the potential that previously unrecorded sites could be identified during further ethnographic consultation, CVJV engaged specialist consultant Ethnoscience to engage with the relevant Aboriginal traditional owners to ascertain if any unidentified sites may exist.

This involved consultation with the Bibbulmun and Ballaruk Peoples and included a site visit on 15 April 2008. No ethnographic impediments were identified within the landholding during this consultation.

The senior consultant from the Bibbulmun Tribal Group, Mr Ken Colbung, described the area's Waugal associations and made reference to a gully where the Waugal "came up and looked around". However, he was unable to identify the precise location of this gully, other than it being somewhere north of the town of Two Rocks. Mr Colbung concluded that he had no objections to the development as long as the sand dunes were retained as per the current proposals. No ethnographic sites were reported by the Ballaruk representatives.

A report on the outcome of the recent consultation with the traditional owners has been prepared by Ethnoscience and is included as **Appendix 6**.

Notwithstanding that no Aboriginal heritage sites of significance have been identified in the LSP area, there is always the potential that unidentified archaeological material, including burials, could be present. To this end, CVJV will implement an Aboriginal Heritage Management Plan to assist contractors in recognising materials that may constitute an Aboriginal heritage site and in seeking appropriate specialist advice should a suspected site be uncovered. A copy of the Aboriginal Heritage Management Plan is at **Appendix 7**.

Furthermore, the mythological stories surrounding the general Two Rocks and Yanchep area will be explored in public art and interpretive material in the development.

4.5 LANDSCAPE

4.5.1 LANDFORM AND SITE CHARACTER

The site is very coastal in character, typified by dunal landforms, particularly in the western sector, and low coastal heath vegetation, giving an overall impression of an open, exposed landscape. It is naturally divided into several precincts through landform characteristics; this natural definition provides the opportunity for the creation of development precincts. The site can be classified by the following character zones, based on landform (refer **Figure 4.10**):

- Western Sector – this sector is closest to the ocean and the most coastal in character, and is dominated by chaotic dune formations that are generally well-vegetated with low coastal heath. This dramatically undulating topography provides great visual interest and a diversity of sensory experiences, from protected enclosed valleys to exposed, elevated hilltops and ridges with expansive ocean and inland views. There is minor degradation of vegetation, mainly through 4WD and trail bike activity.
- Central Northern Sector – this sector consists of dominant, well-vegetated ridgelines enclosing flat to undulating broad valleys of cleared pasture. This sector is still quite strongly coastal in character with views to the ocean possible from the higher dunal ridges.
- Central Sector – this is a small sector that wedges towards the coast between the existing Two Rocks town-site. This area consists mostly of degraded, chaotic dunes that offer views to the ocean from the elevated hilltops and ridges.
- North Eastern Sector – this sector consists of mostly undulating terrain with some conical hills, rising to some of the highest ground on the site in the north east corner (refer **Figure 4.11**), and contained along its western edge by a dunal ridgeline. Good quality coastal heath covers most of the area, with good views to the ocean possible from the higher ground.
- South Eastern Sector - The south eastern sector of the site is the furthest from the ocean and the least coastal in character, with a higher proportion of degraded areas than the rest of the site. It is generally flat to undulating with isolated hills and ridges, with ocean views only from the highest ground.

4.5.2 ADJACENT LAND USES

The site has several adjoining landuses (refer **Figure 4.12**) that provide a diversity of opportunities and constraints:

- The majority of the site is located behind the existing Two Rocks townsite, which creates a barrier between the site and the beach, as well as interface considerations between the existing and proposed development. Whitfield Park, which is located within the existing Two Rocks townsite, abuts the site and provides linkage opportunities to the foreshore reserve and beach.
- The north-western corner of the site abuts the foreshore reserve, with the opportunity for good linkages to the beach.
- Future urban development is proposed to the north, east and south of the site.
- Wilbinga Nature Reserve is located to the north of the site (but not directly abutting it), which provides green link and recreational opportunities.

The close proximity of the site to the foreshore reserve, beach, marina and ocean will provide tremendous lifestyle and recreational amenity, as well as visual amenity from the most elevated parts of the site.

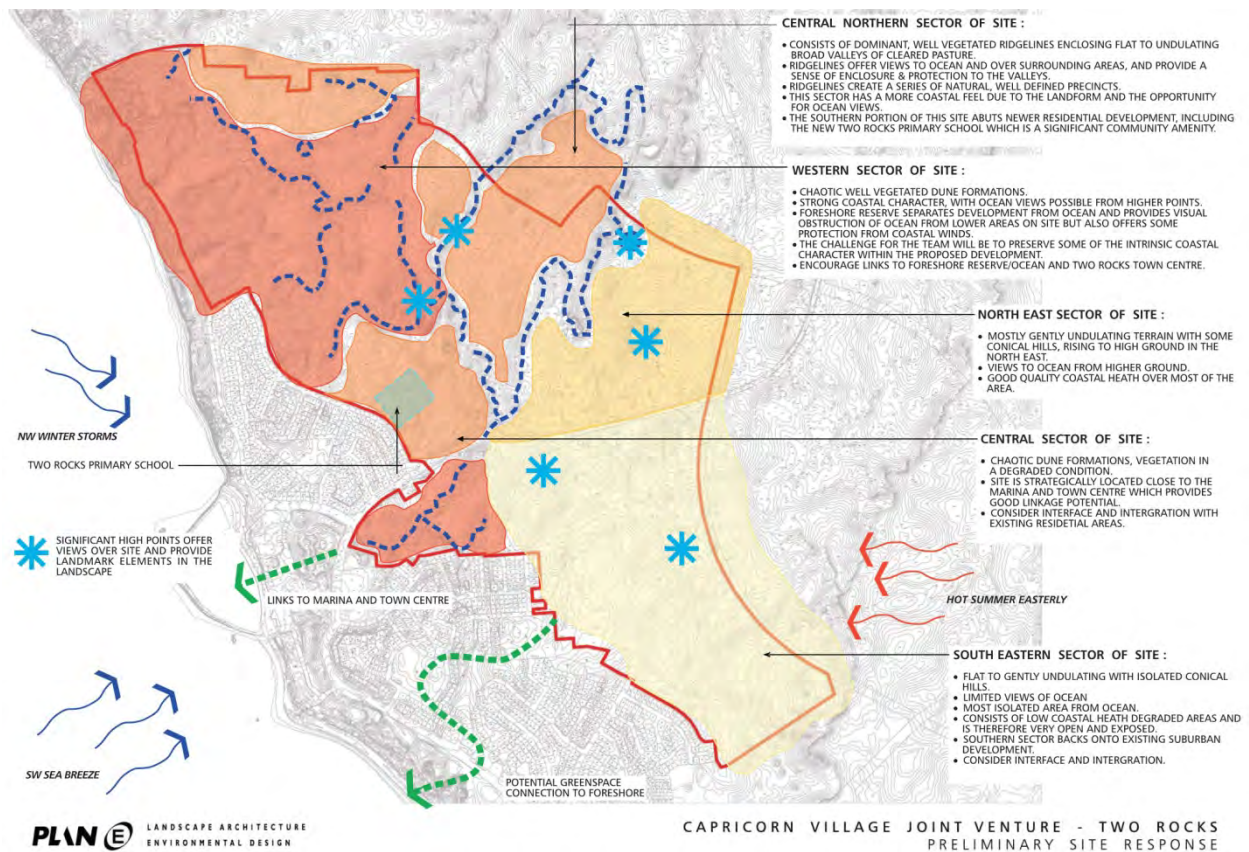


FIGURE 4.10 PRELIMINARY SITE RESPONSE [SOURCE: PLAN E]

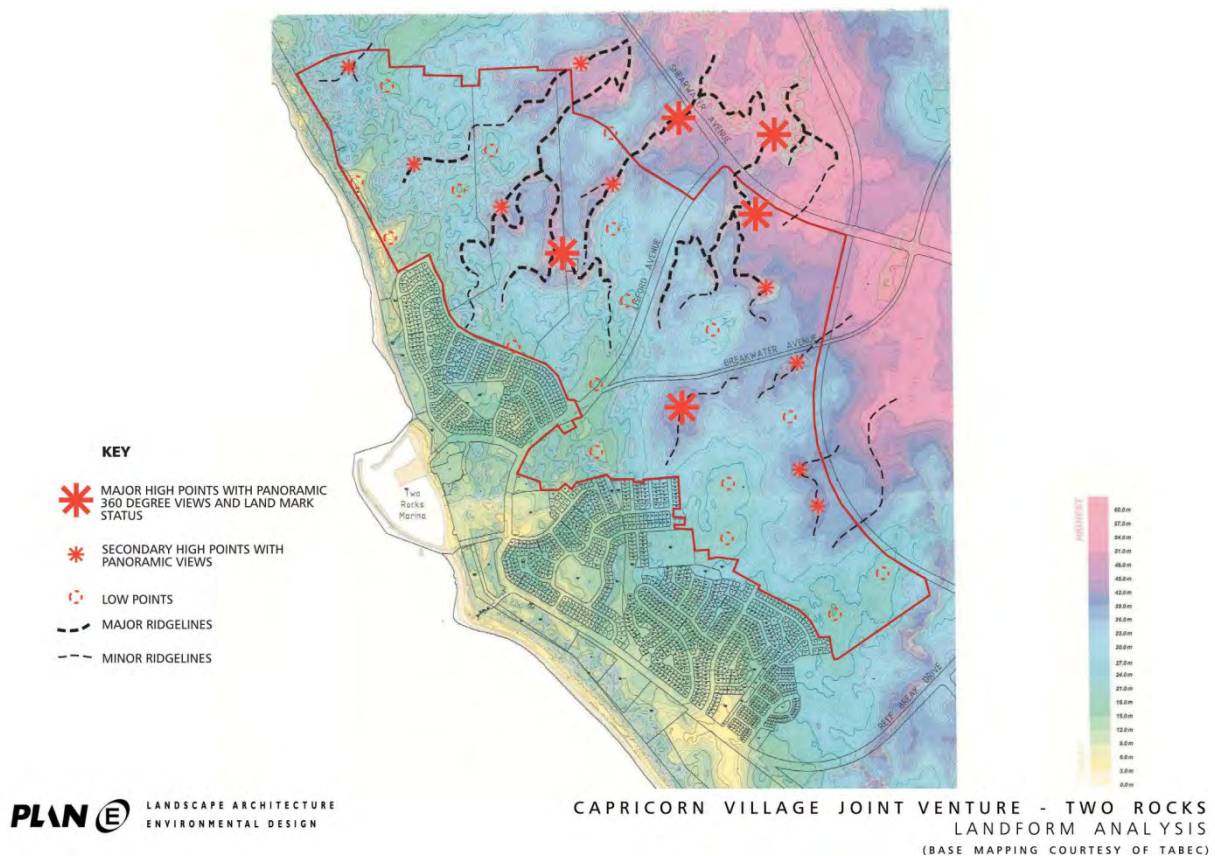


FIGURE 4.11 LANDFORM ANALYSIS [SOURCE: PLAN E]

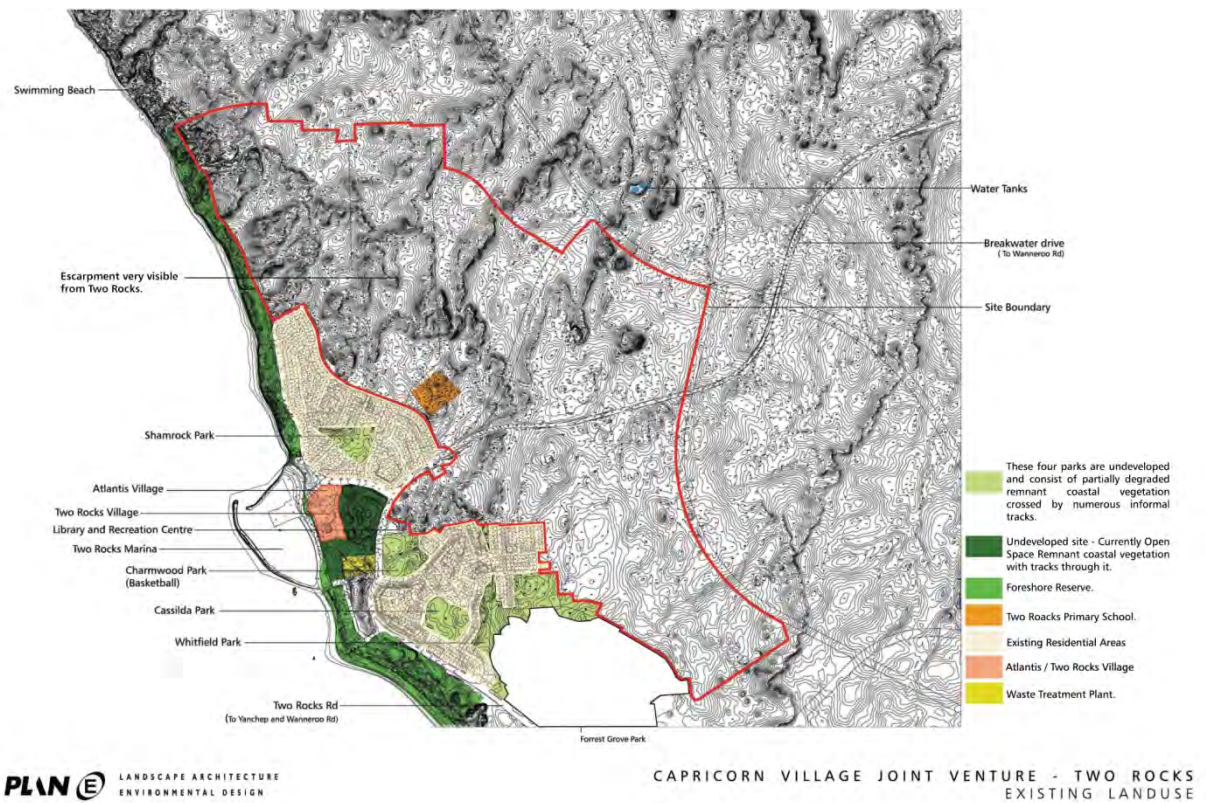


FIGURE 4.12 EXISTING LAND USE [SOURCE: PLAN E]



4.5.3 FOCAL POINTS AND VIEWS

The varied topography of the site creates numerous natural landmarks within the landscape that provide visual interest and points of orientation. The combination of the chaotic dune formations and parabolic dunes, plus the general rise in elevation of the land towards the eastern edge of the site, means that there are many high points and ridge lines that offer both contained views and expansive vistas towards the ocean and other parts of the site, particularly in the northern sector (refer **Figures 4.10 and 4.11**). This dunal landscape also contains views within lower parts of the site, providing a sense of enclosure and protection.

Retention of some of the significant landform will not only preserve some of the site character, but will also ensure that landmark elements and a variety of view opportunities remain to enhance the development.

4.5.4 RECREATIONAL CONNECTIONS

The diversity of existing and proposed landuses surrounding the site reinforces the need for a legible network of streets and public open spaces linking through the site to the adjoining amenities and facilities. These amenities and facilities include the beach, foreshore reserve, marina, Two Rocks townsite, Two Rocks Primary School, the future Northern Town Centre and the Wilbinga Nature Reserve further north.

Potential greenlink corridors that contain both areas of good quality existing vegetation and significant landform exist on the site, and some of these will be incorporated into the development plan to ensure retention of landscape character and wildlife habitat, and facilitating both pedestrian and fauna movement. These corridors will provide a natural and attractive environment for pedestrians, with safety and universal access being key considerations in the detail design of these spaces.

4.5.5 CLIMATIC INFLUENCES

The dominant winds affecting the site are from a westerly and north-westerly direction in winter bringing storms and sub-tropical weather systems, while in summer the winds are predominantly easterly (hot) in the morning and south-westerly in the afternoon resulting in a cooling sea breeze. The influence of these prevailing winds through the different seasons will need to be considered in the planning and design of opens spaces, particularly in relation to the orientation and placement of facilities and amenities.

4.6 MOVEMENT NETWORK

4.6.1 REGIONAL ROADS

The existing network in the Two Rocks area is relatively immature and is supported by a small number of key access roads.

Lisford Avenue becomes Two Rocks Road to the south of the structure plan area and Breakwater Drive to the east. Two Rocks Road provides the only major connection to development to the south and east via Yanchep Beach Road and Wanneroo Road. Lisford Avenue and a portion of Two Rocks Road are classified as Other Regional Roads within the Metropolitan Regions Scheme (MRS). However this classification was based on a road network that has since changed considerably and that classification is no longer considered relevant.

The MRS requires updating and amendment with respect to the classification and alignment of the vast majority of roads in the Two Rocks region (including the current MRS reservation of Lisford Avenue to the north east of the existing Two Rocks area), in order to reflect more recent planning decisions. The most appropriate process for the required amendment to the MRS is the St Andrews District Structure Planning process. The District Structure Plan has been subject to a public advertisement phase and is currently awaiting approval from the City of Wanneroo.

Lisford Avenue functions as a District Distributor (B) and performs a key role in the external network. The St Andrews district plan shows a change in classification for Lisford Avenue from a district distributor (B) to a district distributor (A) through the existing Two Rocks town centre. However, after further analysis of future modelled traffic volumes, it is recommended that Lisford Avenue should function as a single carriageway district distributor (B) through the existing Two Rocks town centre (i.e. retain its current classification) in order to prevent segregation and to reinforce the slower speed traffic environment adjacent to the Two Rocks town centre.

Due to the relatively remote nature of Lisford/ Breakwater Drive through Two Rocks, there are limited traffic counts available. However, the City of Wanneroo has advised that Lisford Avenue recorded traffic volumes of approximately 2000 vpd in September 2002.

By the end of 2008, Marmion Avenue will be extended from Yanchep through to Butler, creating a direct connection to the remainder of the north west corridor.

4.6.2 LOCAL ROADS

All other existing streets within the Two Rocks area and abutting the structure plan currently operate as local access streets. It is expected that these streets carry less than or about 1000 vpd, with the streets providing direct access to the existing Two Rocks town centre experiencing volumes of up to 2000 vpd.

Due to the relatively small population in the Two Rocks area, the road network does not experience large volumes of traffic and traffic counts are not undertaken on a frequent basis. The City of Wanneroo has provided available traffic counts for the following roads:

- Sovereign Drive – 2072 vpd in November 2004
- Jordan Street – 413 vpd in June 1997

Because of the immature and incomplete nature of the existing road network, a certain lack of connectivity exists. Where possible and beneficial, existing streets will be extended through connections with new streets in the structure plan. This will help improve the connectivity and permeability between the existing and proposed Two Rocks areas.

4.6.3 PEDESTRIANS AND CYCLISTS

The existing path network is relatively poor in the Two Rocks area. A shared path extends along the western side of Lisford Avenue. A two metre shared path has been constructed along Sovereign Drive, as far as Pope Street and continues along the eastern kerb line of Pope Street as far as the shopping centre, then terminates.

There are few or no paths through the marina site. There are poor pedestrian links through the shopping centre site and connecting to surrounding streets. There is also poor connectivity between the Phil Renkin Community Centre to the east of Lisford Avenue and the town centre.

There do not appear to be any formal on street facilities for cyclists within or immediately surrounding the area. It is expected that due to the relatively low traffic volumes and traffic speeds of 50 km/hr on local streets that cyclists would share the road with vehicles.

4.6.4 PUBLIC TRANSPORT

The Northern 78 service (route 490) operates between Two Rocks and Clarkson Train Station. This is currently a relatively infrequent service, with a frequency of 2 hourly all day and hourly during the peak period.

In the future, following construction of Marmion Avenue to Yanchep in late 2008, this bus route would be re-directed via Marmion Avenue to Clarkson Station.

A plan showing the existing public transport service to Two Rocks is illustrated in **Figure 4.13**

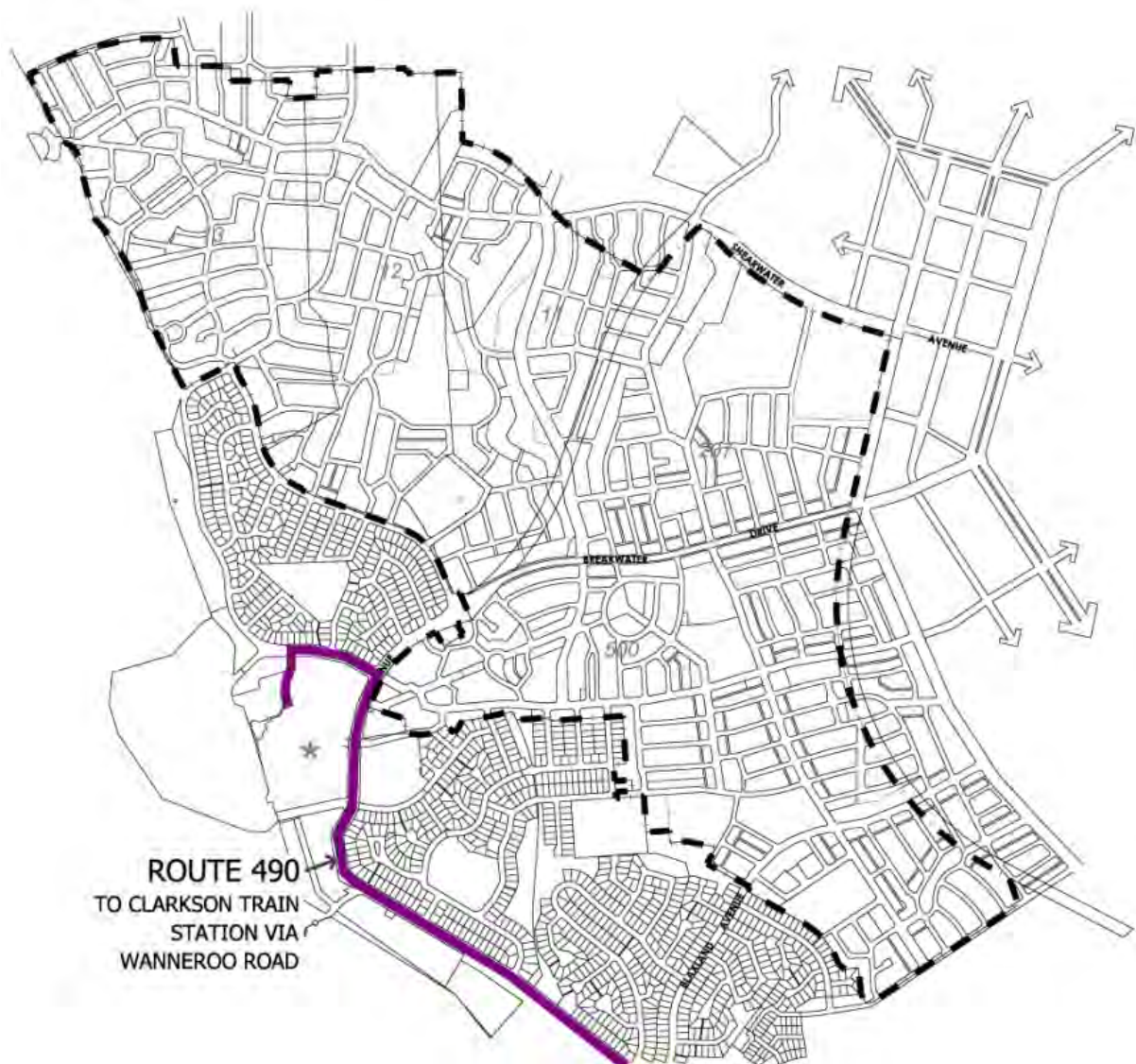


FIGURE 4.13 BUS ROUTE SERVICING EXISTING TWO ROCKS TOWN SITE [SOURCE: SKM]

4.7 SERVICE INFRASTRUCTURE

4.7.1 SEWERAGE SYSTEM

The minimal existing sewerage infrastructure available within the vicinity of the site includes an existing small package wastewater treatment plant (WWTP) located on Lot Pt. 50 within the existing Two Rocks town centre. This is shown as the 'Two Rocks Interim WWTP' on **Figure 4.14** – Water Corporation Preliminary Sewer Planning Layout for Two Rocks. The treated effluent from this plant is disposed of through leach drains located on the adjacent Lot Pt. 1000. This system currently services the marina and commercial area immediately to the north as well as the new residential development, The Reef, to the south of the existing Two Rocks township and has little to no additional capacity available.

There is also an existing Type 90 (pumps 90 litres per second) sewerage pump station located at the intersection of Two Rocks Road and Abrolhos Close. This pumps the sewerage from The Reef development via a pressure main to the interim WWTP within the town centre.

The remainder of the existing Two Rocks township is not currently sewered so the wastewater is disposed of via septic tanks and leach drains located within each individual property.

4.7.2 WATER SUPPLY

The existing Two Rocks township is currently serviced via a water treatment plant located immediately to the east of the structure plan area. The plant consists of a system of local groundwater bores connected to a treatment facility producing water of adequate potable quality. The water is stored in onsite tanks with a head of RL 62 metres.

4.7.3 ELECTRICITY

Existing power services are available within the vicinity of the site as follows and as shown in **Figure 4.15**:

- Lacey Road Feeder – a single 22 kV feeder, approximately 22 km in length running from the Yanchep zone substation.
- Wanneroo Road North Feeder (Breakwater Drive) – a single 22 kV feeder, also from the Yanchep zone substation. This feeder is provided as a back-up to the Lacey Road feeder.
- Damepattie Drive – underground LV on western road reserve boundary.
- Primary School access road – underground LV on western road reserve boundary.

Given the distances of the infrastructure from the Yanchep zone substation, there are issues regarding voltage constraints and subsequently limited existing capacity. However, the CVJV and its consulting engineer, Tabec, are liaising and working closely with Western Power to ensure future upgrades progress in time to meet the anticipated rate of development.

4.7.4 TELECOMMUNICATIONS

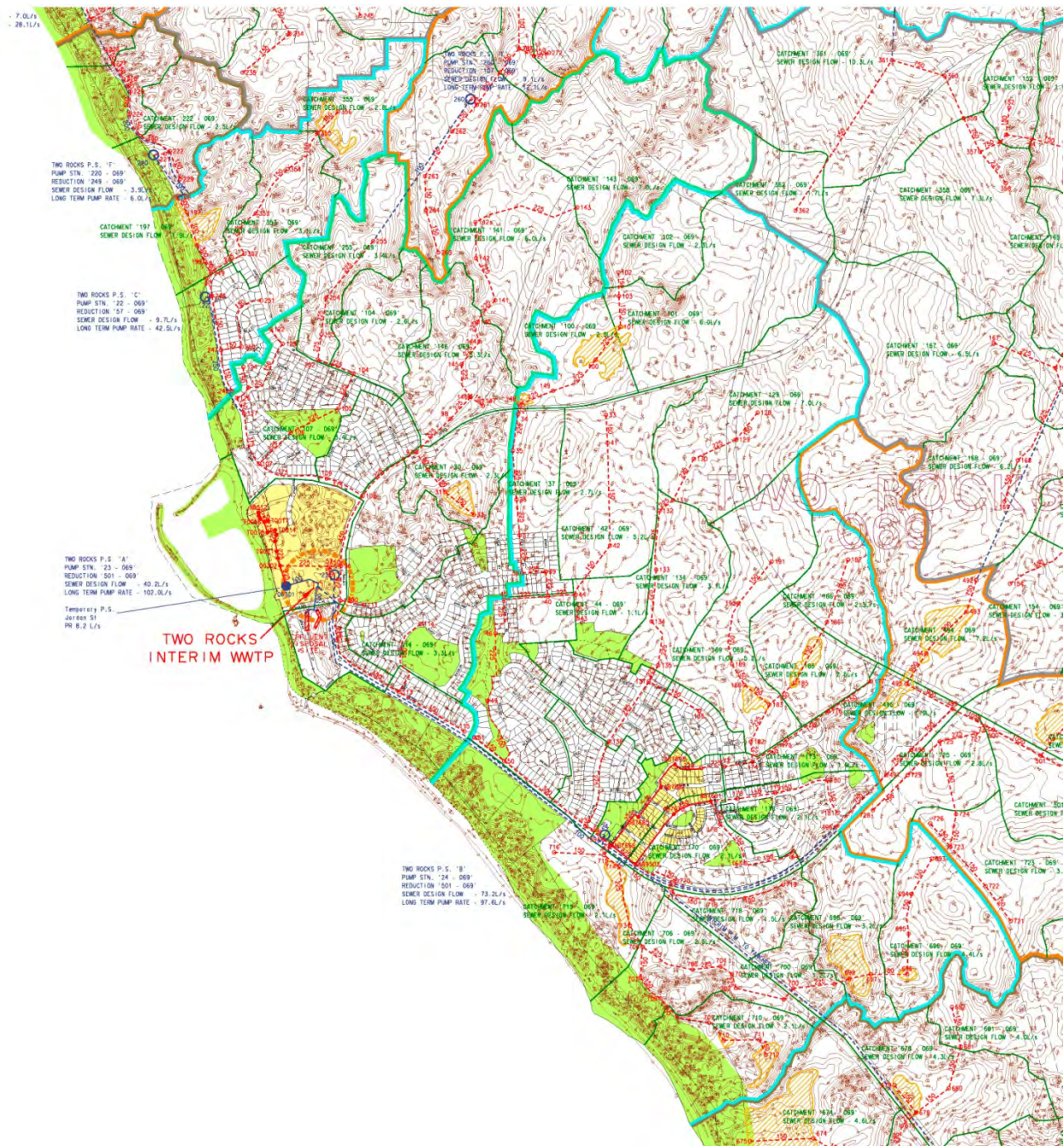
Existing telecommunications services are available within the vicinity of the site as follows:

- Breakwater Drive – underground services in 100 mm conduits on the northern side of the road reserve adjacent to the development, east of the proposed Lisford Avenue intersection.
- Breakwater Drive – underground services in 100 mm conduits on the southern side of the road reserve between the proposed Lisford Avenue and Damepattie Drive intersections.

- Damepattie Drive – underground services along the western road reserve boundary for the full length of the road. Road crossings would be required to service any lots fronting Damepattie Drive from the subject site.
- Primary School access road - underground services to the school site on the western road reserve boundary.

4.7.5 GAS

There are no existing gas services within the vicinity of the subject site. The nearest gas infrastructure is in Butler, approximately 12.5 km south of Yanchep Beach Road.



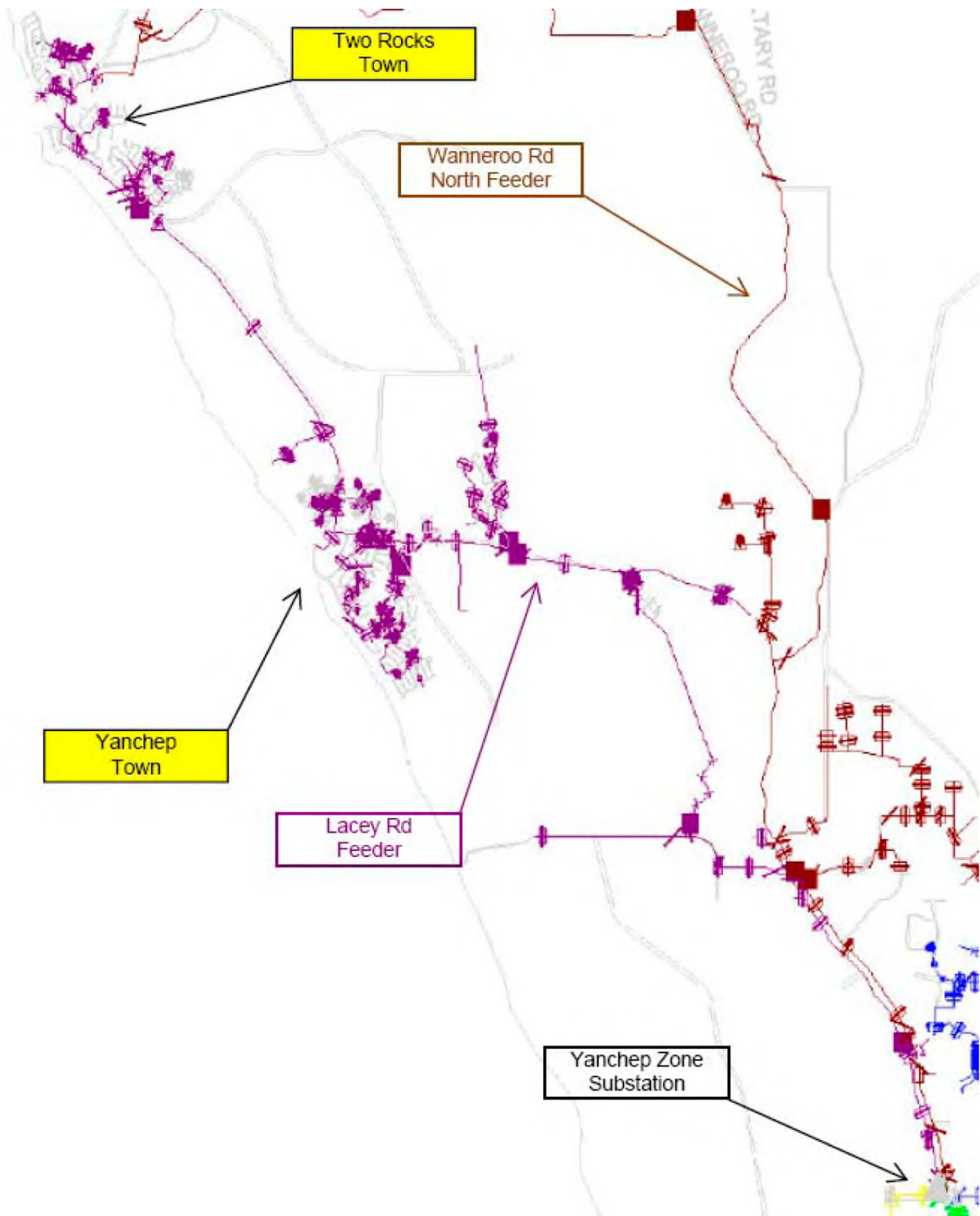


FIGURE 4.15 EXISTING WESTERN POWER INFRASTRUCTURE

4.8 OPPORTUNITIES AND ISSUES

Various opportunities and issues were identified, and have influenced the design of the LSP. The site's key opportunities and issues are identified on **Figure 4.16**.

An overview of the site's opportunities and issues is provided below.

4.8.1 LOCATION

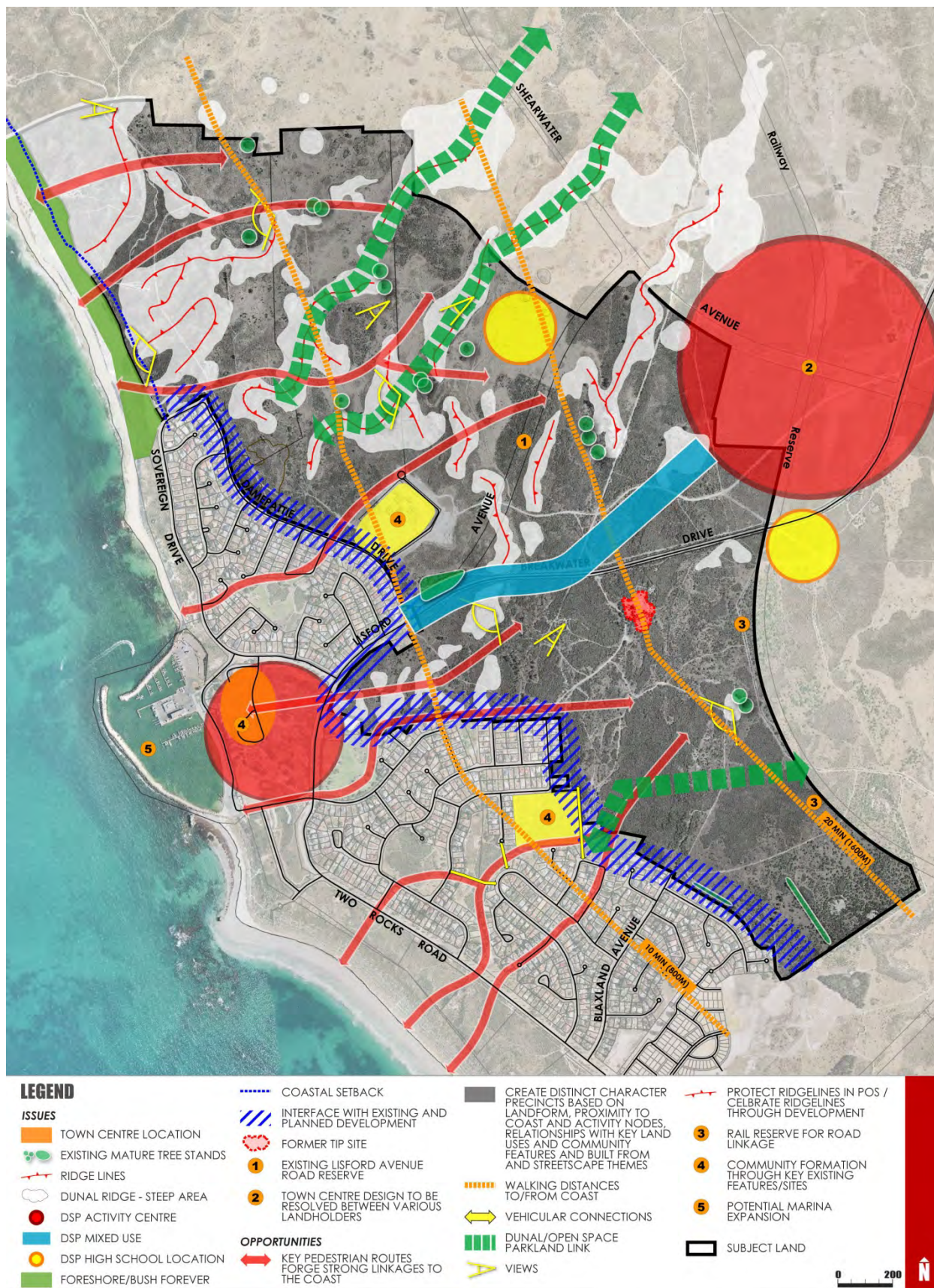
- The site is located in close proximity to the coast, which provides opportunities for beach access, ocean views and the creation of a strong sense of place in the new development.
- The site is located in close proximity to the Two Rocks Marina, the Two Rocks Town Centre, and the proposed Two Rocks Marina Village development, ensuring services and facilities are available in close proximity to the site and facilitating higher density residential development close to the Two Rocks centre.
- The site is located adjacent to the planned Northern Town Centre, east of the Structure Plan area, which will ensure the development is accessible to high level services (including hospital and tertiary education), district recreational facilities and employment opportunities in the future.
- Given the site abuts the existing Two Rocks town site, integration with the existing community will need to be appropriately planned.
- The remote location of the site, in a regional context, presents a challenge in relation to access to higher order services and facilities, and employment opportunities in the short-medium term.

4.8.2 LAND USE

- The opportunity exists to create a robust planning framework that allows development to evolve over time, particularly in relation to the planned mixed use corridor.
- There is an opportunity to provide higher densities near the Two Rocks Town Centre with social, economic and environmental benefits, and increase the locality's vitality.
- The opportunity exists to provide a variety of land uses and configure them so as to optimise the relationship/benefits with transit, economic sustainability and good amenity for residential living.
- There is the opportunity to create a stimulating, enjoyable and convenient place with a mixture of building forms, tenures and densities, to meet a variety of demands from the widest possible range of users, amenities and social groups.
- There is the potential to create a landmark development with best-practice urban design principles and high quality built form.
- The staging of land uses and infrastructure, to achieve densities and built form outcomes in the early planning phases will need to be planned suitably.

4.8.3 LANDFORM

- The site is generally very undulating with steep to very steep slopes. **Figure 4.17** shows the areas of the site with slopes in excess of 6%, which is estimated to be in excess of 80% to 90% of the entire site.
- The opportunity exists to maintain the coastal character of the area. The character of a coastal area, like the Two Rocks LSP area, is comprised of the landform and the vegetation.



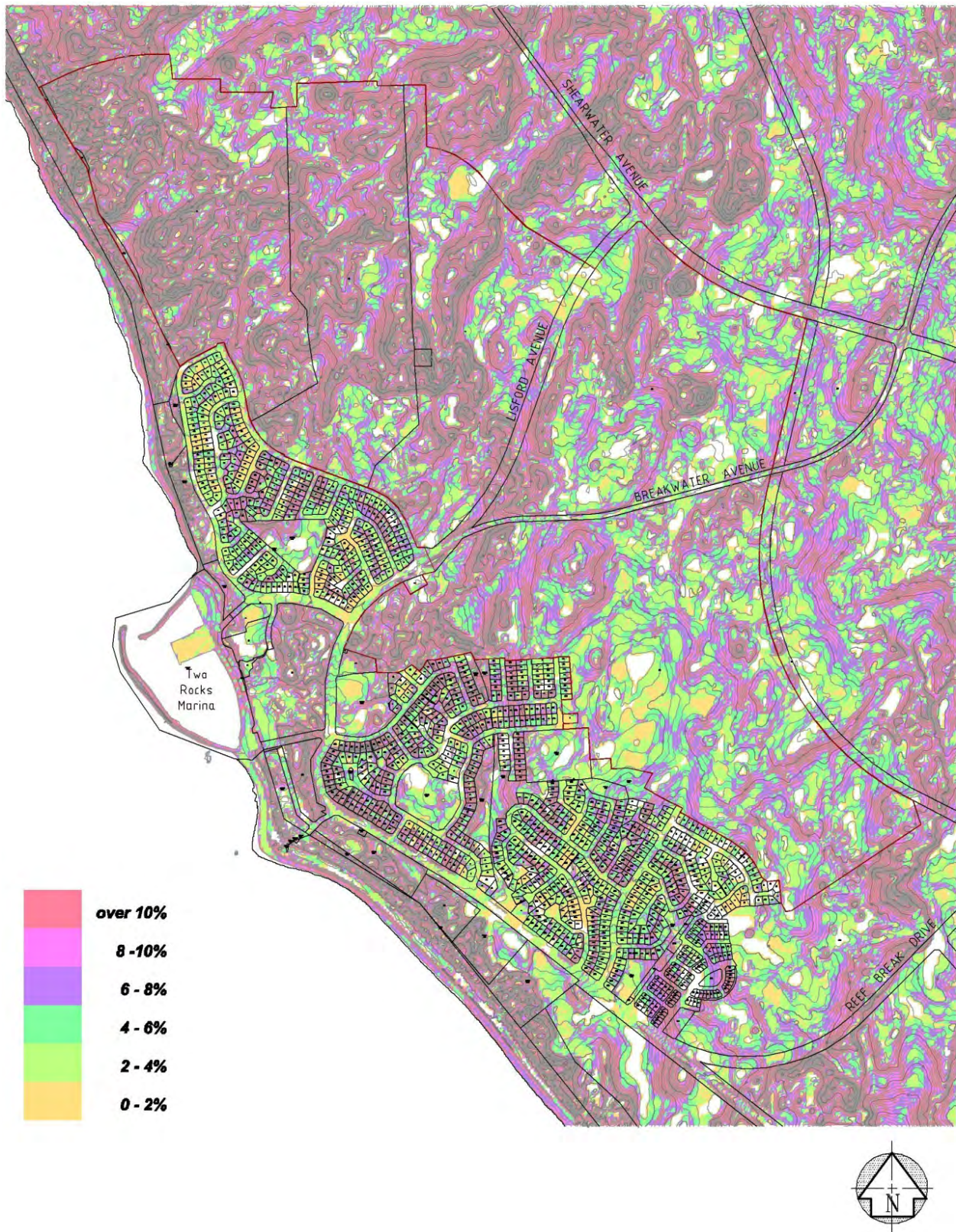


FIGURE 4.17 SLOPE ANALYSIS [SOURCE: TABEC]

- The landforms that provide the most amenity and ‘sense of place’ are the dune ridges in the northern half of the site, these areas also support some of the better areas of vegetation because, unlike the valleys, they were not cleared for grazing. Of particular significance are those landforms that are part of a coherent larger system that extend beyond the Two Rocks LSP site, such as the Q1 and Q2 dunes in Lots 11, 12, 13 and 207.
- The retention of original landforms also achieves the complimentary aim of the protection of remnant flora, vegetation and fauna habitat. Quindalup landforms are fragile if disturbed; loss of natural vegetative cover can cause the landforms to be susceptible to wind erosion and further degradation. If Quindalup landforms are to be retained in an urban setting, the management and edge treatments of these will be critical to promote long term quality retention.
- There is the opportunity to strategically locate POS areas to maintain significant local areas of vegetation and landform.
- Retention of the undulating nature of the site within certain areas will provide the opportunity to maintain diverse landform and enable alternative housing choices such as pole top homes.
- Conversely to the point above, there is an opportunity to maximise the density within certain areas/precincts close to transport and commercial nodes or community facilities by creating flat, terraced lots with retaining walls that optimise both the land and infrastructure use.
- Sea views can be maximised from POS areas and lots through the retention of the significant ridge lines in the northern portion of the site.
- Typical market expectations will require level building lots via the combination of terraced earthworks and retaining walls.
- Current recommended maximum road grades of 10% by the City of Wanneroo will limit the steepness of roads, however there may be a case for permitting sections of steeper grades in appropriate locations to enable maximum retention of landform.
- The undulating nature of the ground, combined with the expectation for level building lots may require clearing and earth working of large portions of the site.

4.8.4 ENVIRONMENT

- Retain and celebrate the ridgelines with sensitive development.
- Provide alternative forms of housing construction which respond to the landform by touching the ground lightly.
- Orientate lots to provide a good level of passive solar access and capture prevailing cooling breezes.
- Retain and enhance existing vegetation within the dominant dunal ridgelines and within larger lots.
- Provide public access along key ridgelines to enable a strong appreciation of the landform and natural setting, through inclusion within passive public open space areas.
- Maintain ecological linkages through the site, extending to the coast.
- Consideration needs to be given to the former tip site on Lot 500 to ensure appropriate remediation and land use planning is carried out. The most suitable future use of the site is public open space or school playing fields.

4.8.5 FLORA, VEGETATION AND FAUNA

- No Declared Rare Flora have been recorded on the site. One Priority 1 *Leucopogon* sp. Perth Coastal (A S George 17305) and three Priority 3 *Conostylis pauciflora* subsp. *euryrhipis*, *Hibbertia spicata* subsp. *leptotheca* and *Stylidium maritimum* were recorded from the survey area.
- There is an opportunity to preserve some of the Priority 1 species' habitat in the consolidated coastal dunes on the site. Priority 1 species *Leucopogon* sp. Perth Coastal (A S George 17305) is a low shrub from the Australian heath family (Epacridaceae) that appears to grow in consolidated coastal sand dunes. It is currently known from seven records in the Western Australian Herbarium, from between Two Rocks and Quinns Rocks, including records from Eglinton and Yanchep. It is poorly known and poorly reserved. It is likely that not all the *Leucopogon* sp. Perth Coastal (A S George 17305) that occurs on the site was recorded during the survey because it was identified at the herbarium from samples taken from quadrat sample locations.
- EPA (1999) recommends consideration of locally significant vegetation in the preparation of structure plans to optimise the value of the vegetation retained in POS as well as the creation of vegetation corridors to facilitate the movement of fauna and floristic gene pools.
- ATA Environmental (2007) maps 26 areas of *Melaleuca cardiophylla* in the DSP area, nine of these occur in the Two Rocks LSP site. Of these areas, ATA Environmental recommends the retention of two areas; 50% of area 8, and all of area 14 if possible. Unfortunately, since ATA Environmental conducted the survey of *Melaleuca cardiophylla* in the DSP area in 2005, area 8 has been cleared during the construction of the Two Rocks Primary School; this area was approximately 1 ha in size. According to ATA Environmental (2007) area 14 is 2.4 ha in area and in Very Good – Excellent condition; it is located in Lot 500 (see **Appendix 14**). There is an opportunity to preserve this area of *Melaleuca cardiophylla* in a POS area in the Two Rocks LSP.
- All the intact remnant vegetation on the Two Rocks LSP site can be classified as one of three Priority Ecological Communities; FCT 29a, FCT 29b or FCT 24. There is an opportunity to preserve some areas of these PECs in POS.
- Protected fauna species that may occur on the site are listed in **Table 4.8** in section 4.3.5. The species listed under the *Wildlife Conservation Act 1950* do not present a major constraint to the development of the site in accordance with its zoning because this proposal has been assessed by the EPA as part of Amendment 787 during 1999 and 2000.
- There is no Carnaby's Black Cockatoo habitat on the Two Rocks LSP site, therefore the proposal is not required to be referred under the *Environment Protection and Biodiversity Conservation Act 1999*.
- There is an opportunity to retain some ecological linkages through the site in POS to allow for the movement of some fauna species through the site.

4.8.6 MOVEMENT NETWORK

As a greenfield site, Two Rocks is presented with numerous opportunities to develop a liveable urban area that has both a high degree of accessibility as well as a site responsive approach to the natural environment. Some of the opportunities are a result of the following:

- Public transport links for the long term have been agreed in principle with the Public Transport Authority (PTA) through the St Andrews district planning process.
- The greenfield site provides opportunities to create a well connected network internally, with a variety of road types and hierarchy.
- There is the opportunity to create a good and direct pedestrian and cycle network within the development.
- Existing vegetation provides landscaping opportunities for verges and medians that can be used to assist in creating low-speed traffic environments.

- There may be some potential to increase the connectivity of the existing town and improve integration by connecting to existing dead-end roads. However, this would not be possible where end lots are already developed and could be considered a constraint in these cases.
- Connections into the Fini Town Centre development for local access to goods, services and amenities represents an opportunity, especially in the shorter term.
- The extension of Marmion Avenue will increase the alternatives for travel by both car and public transport.
- There is potential to create street cross sections that provide a low speed traffic environment through narrow lane width (especially visual width), pavement colouring, on-street parking, smaller kerb radius at intersections and landscaping.

As well as presenting opportunity, the existing urban area and surrounding natural landscape also present numerous challenges, including:

- The existing development area has a poorly connected road network with a relatively large number of cul-de-sacs and limited opportunities to retrofit or develop a grid network.
- Public transport in the shorter term will be limited and of poor frequency - currently around two-hourly from Clarkson Station to Two Rocks Shopping Centre. This current service would not be within walking distance for much of the proposed development.
- Steep gradients and dune systems will affect road layout and drainage, which has the potential to reduce connectivity if not approached in an innovative manner.
- There are limited connections to the regional road network (one main access in and out via Breakwater Drive and Two Rocks Road). Access points onto this regional network will be critical.
- There are limited pedestrian/cycle network in the existing area, even between key trip generators such as the recreation centre and the shopping precinct. Poor connections to the marina and the beach, and the limited footpath network on residential streets would prove a problem for certain groups, for example people with prams, young children or people who wanted to ride on a footpath rather than the road such as school children.
- Parking and access into and through the site for external users of recreation areas and beaches (e.g. Dewar's Beach) will need to be considered. Provision of a recreational path system, connected to the beach and POS will be important to residents.
- Staging of local and regional public transport networks will need to be planned with the PTA to integrate with staging of road infrastructure.
- It will be important to maintain a suitable function and type of road through the town centre. Lisford Avenue was originally planned in the St Andrews District Structure Plan to be a dual carriageway through the town centre; however traffic numbers do not appear to justify this.

4.8.7 SERVICING

- The implementation of Water Sensitive Urban Design (WSUD) where possible will reduce reliance on mains water, optimise the opportunities for the reuse of stormwater and maintain the export of stormwater runoff and associated pollutants to pre-development levels.
- Stormwater runoff should be treated and managed via Gross Pollutant Traps, on site retention and infiltration and through the reduction of impermeable surfaces. In principle the post development flows off the site should match any pre-development flow rates. Excess stormwater quantities should be detained and infiltrated at source.
- Adequate lighting to streets, POS and community facility areas should be provided to not only increase safety but also crime prevention.

- The installation of state of the art communications network(s) to aid long term economic health and growth.
- There is the opportunity to utilise local materials to balance cut and fill earthwork operations.
- The use of local suppliers of materials and labour should be encouraged wherever possible.
- The existing water mains running through the site within Lots 207 and 500, as shown in **Figure 4.18**, will pose a significant constraint to both the vertical and horizontal layout of the development in this region and will need to be reconstructed with the development in a staged approach.
- Typical constraints will result from the requirement for drainage retention basins to be located at catchment trapped low points. All efforts will be made to ensure that retention basins wherever possible are passive open space areas in order to avoid unsightly fenced drainage sumps.
- The existing water supply can only serve to a maximum elevation of 49 m AHD, however all areas with elevations in excess of this are shown as passive open space areas on the Structure Plan.

4.8.8 COMMUNITY (EXISTING AND PROPOSED)

- There is an opportunity to significantly improve the services, facilities, amenity, employment and housing opportunities within the Two Rocks locality and create a sustainable community.
- The distinct local identity and seaside lifestyle of the existing Two Rocks community provides a foundation for the new development to foster community formation and integrate with the existing town.



FIGURE 4.18 WATER RETICULATION [SOURCE: TABEC]

5 THE PLAN

5.1 OVERVIEW OF THE PLAN

The Structure Plan for Two Rocks has been designed to provide for flexibility in detailed design, but certainty in the achievement of design principles, objectives and strategies. This is a direct response to the need to accommodate refinements to the detailed design at the subdivision stage, due to the long term development timeframe of the Structure Plan area, which at this stage is estimated to be around 20 to 25 years. This approach will reduce the likelihood of numerous minor modifications being made to the Structure Plan over the next two decades.

The Structure Plan, in Part 1, and accompanying zoning and residential density plans, constitute the statutory planning component of the Two Rocks Local Structure Plan, providing guidance to the Council and Commission in their determination of subdivision and development proposals in the Structure Plan area. The Two Rocks Masterplan forms part of the explanatory documentation (Part 2) and is one desired development outcome of the Structure Plan. It represents the general development intent of the CVJV at this point in time.

The Two Rocks Masterplan (refer **Figure 5.1**) is a design response to the principles, objectives and intent of the Structure Plan, as outlined in Part 1. Furthermore, the strategies outlined in the Structure Plan, as they relate to neighbourhood design, including the desired land use mix and location, movement network, public open space allocation, residential density and built form, have been translated in the Two Rocks Masterplan. It provides a degree of certainty to the Council and Commission that the principles, objectives and strategies in Part 1 can be successfully translated into an integrated design outcome for the site.

This section of the report describes the Masterplan in detail.

5.1.1 DESIGN PRINCIPLES

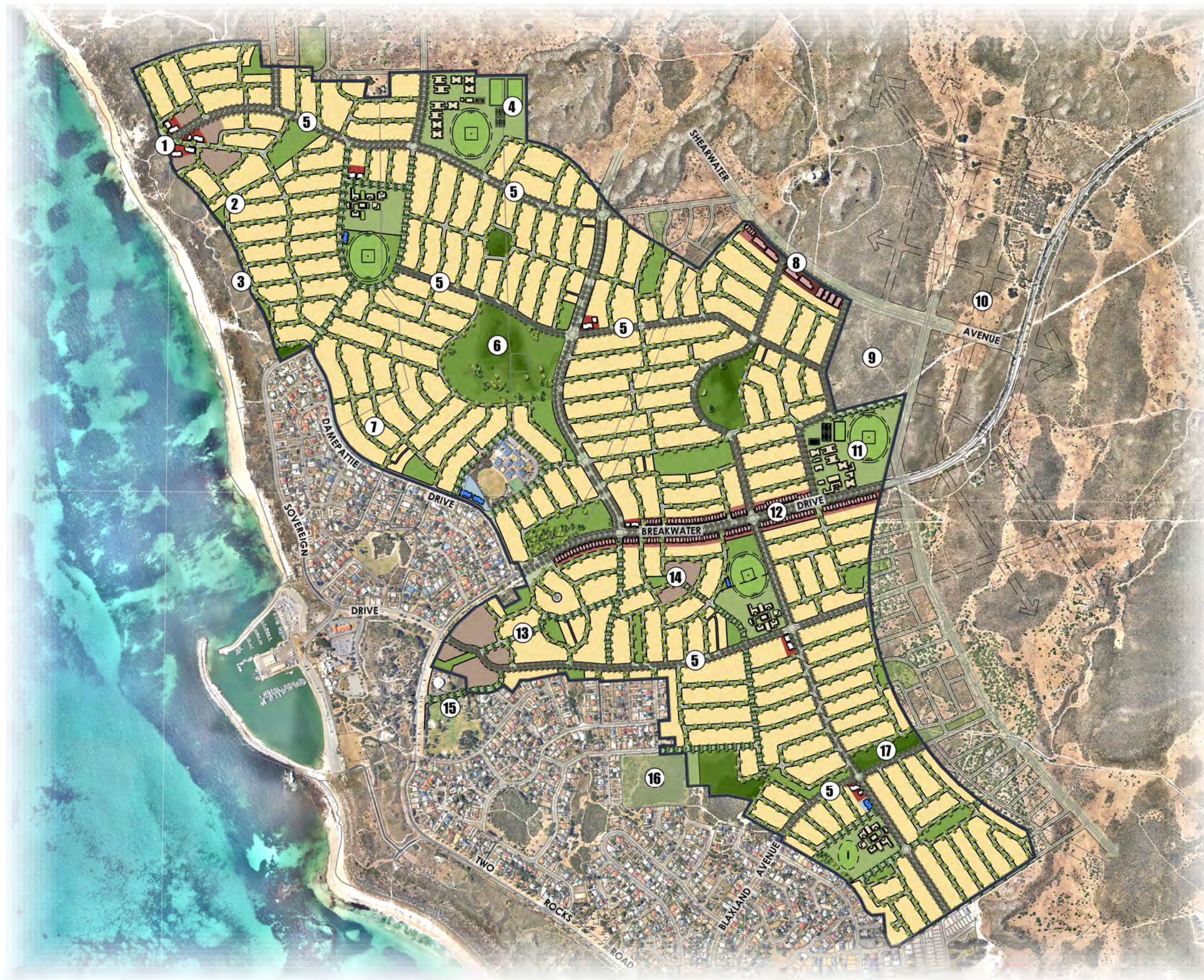
The principles that have informed the planning and design of the Structure Plan and Masterplan, as outlined in Part 1, are reiterated below.

1. To provide a diversity of housing choice for the community at a density that can support the provision of local services.
2. To provide a permeable, legible movement network which facilitates safe, efficient and pleasant walking, cycling, driving and public transport use.
3. To foster a sense of community, strong local identity and sense of place.
4. To incorporate significant environmental and cultural features of the site into the design.
5. To ensure a cost-effective, resource-efficient and self-sustaining development.

These principles were developed and refined at the CVJV Two Rocks Local Structure Plan Workshop held in August 2007. The principles are drawn from Liveable Neighbourhoods, the City of Wanneroo's Smart Growth and Housing Strategies and represent best practice in town planning and urban design.

The objectives outlined in Part 1 of the Structure Plan, elaborate on and give a more detailed expression of the ideas imbedded in the principles, while the strategies are expressed as actions to implement the objectives and realise the principles. It is these actions or strategies that the Masterplan and any future subdivision will be measured against.

TWO ROCKS MASTERPLAN AMENDMENT 2



NOTES

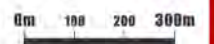
- 1 SMALL LOCAL CENTRE ADJACENT TO POTENTIAL PUBLIC CARPARK AND ENHANCED BEACHSIDE LANDSCAPED AREA
- 2 COASTAL PRECINCT DEVELOPED WITH SENSITIVITY TO EXISTING LANDFORM CHARACTER FEATURES
- 3 PROVISION OF COASTAL ROAD GENERALLY IN ACCORDANCE WITH THE STRUCTURE PLAN (PLAN 1 OF PART 1), SUBJECT TO MORE DETAILED INVESTIGATION TO DETERMINE ITS ALIGNMENT
- 4 PUBLIC HIGH SCHOOL
- 5 EAST-WEST LINKAGES DESIGNED TO PROVIDE SAFE, PLEASANT PEDESTRIAN ACCESS TO THE BEACH
- 6 KEY DUNAL RIDGE LINES RETAINED AS CHARACTER FEATURES
- 7 DEVELOPMENT ALONG DAME PATTIE DRIVE TO PROVIDE SUITABLE INTERFACE WITH EXISTING HOMES
- 8 LONG-TERM VISION FOR SHEARWATER AVENUE AS A VIBRANT MIXED-USE BOULEVARD ADJACENT TO THE FUTURE AGREED TWO ROCKS SECONDARY CENTRE
- 9 AREA SUBJECT TO FUTURE STRUCTURE PLANNING
- 10 LOCATION FOR LONG-TERM DEVELOPMENT OF FUTURE NORTHERN TOWN CENTRE
- 11 PRIVATE SCHOOL - KINDERGARTEN TO YEAR 12
- 12 LONG-TERM VISION FOR BREAKWATER DRIVE AS A VIBRANT MIXED USE BOULEVARD
- 13 SPECIAL PRECINCT PROVIDING SUPPORT FOR THE FUTURE DEVELOPMENT OF THE TWO ROCKS TOWN CENTRE
- 14 ICONIC SITE WITH DIRECT VIEW LINE TO KING NEPTUNE
- 15 POSSIBLE FUTURE LOW - KEY STREET CONNECTION INTO FUTURE VILLAGE CENTRE MAIN STREET
- 16 EXISTING PRIMARY SCHOOL SITE (VACANT)
- 17 CORRIDOR OF LINKED PARKS TO RETAIN EXISTING VEGETATION

LEGEND

FORMALISED PUBLIC OPEN SPACE / DRAINAGE	LOCAL CENTRES	RESIDENTIAL R20 - R40	MIXED USE CORRIDOR	MASTERPLAN BOUNDARY
CONSERVATION / PASSIVE OPEN SPACE	COMMUNITY PURPOSE	RESIDENTIAL R50+	SERVICE COMMERCIAL	
SCHOOLS				

NOTE: THE STREETS, LAND USE, BUILT FORM AND DENSITIES ILLUSTRATED ON THE MASTERPLAN ARE INDICATIVE ONLY AND SUBJECT TO CHANGE

FIGURE 5.1



THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK

The design philosophy for the Two Rocks Masterplan centres on a desire to create a unique development that is responsive to the coastal landform, integrated with the existing Two Rocks community and the future urban areas within the adjacent planned Two Rocks Marina Village and the Northern Town Centre, and provides new and existing residents a strong sense of community identity.

The design of the Two Rocks Masterplan also recognises the value of making efficient use of land and infrastructure, consistent with Network City urban design and development principles, of increasing society's resource and energy efficiency.

The Two Rocks Masterplan responds to the principles and objectives of the Structure Plan, outlined in Part 1, through the following specific design features:

- The allocation of key east-west connections, which extend to/from high points to enhance major view-lines to the ocean.
- The creation of distinct character precincts based on landform and land use features and built form variety.
- The incorporation of a street layout that responds to the contours and topography in certain locations, reducing the need for retaining or alteration of significant landform features.
- The creation of arborways and public open space corridors, which provide safe and attractive pedestrian connections and link residential areas to the coast, significant public open spaces and the Two Rocks Town Centre.
- The provision of public access along key ridgelines to enable a strong appreciation of the landform and natural setting for everyone in the community.
- A lot mix that facilitates the development of different housing types, including affordable housing, which in turn will support and attract a diverse range of people, including first home buyers, singles, young and middle-age couples, families with children, retirees, the elderly and weekenders/holiday-makers.
- The identification of opportunities for innovative residential built form through the adoption of design guidelines.
- The orientation of street blocks to provide residential lots with passive solar access and capture prevailing cooling breezes, except where there are topographical constraints.
- The retention and enhancement of landform and existing vegetation in large lots, with building and clearing controls enforced through the implementation of Detailed Area Plans.
- The provision of seven local centres strategically located on arterial roads, central to the neighbourhoods they serve and comprising a mix of retail, commercial, community and residential uses. The local centres will provide a range of convenience based goods and services and will serve as community focal points.
- The allocation of a mix of residential and commercial uses within a mixed use corridor extending along Breakwater Drive, providing new business and local employment opportunities.
- Strategic co-location of schools, community facilities and local mixed use centres to form neighbourhood hubs within which community networks will form.
- The strategic positioning of public open space areas to protect key landform features, including the dominant dunal ridge-line which serves as a backdrop to the existing Two Rocks residential area.
- The location and configuration of parks to support effective full water cycle management.
- The co-location of parks and activity nodes in appropriate locations that will serve as popular public gathering/leisure/recreation places.

- The provision of a variety of recreation opportunities through a diverse range of small and large formal parks, informal natural public open spaces, passive and active areas, walking/cycling trails and links to the beach.
- The provision of a connected movement network for vehicles and pedestrians which integrates the proposed residential development with the future Two Rocks Town Centre (Marina Village).
- The provision of larger single residential lots at the interface with existing development in Two Rocks which provides a smooth transition in urban form.

5.1.2 LAND USES AND YIELDS

5.1.2.1 RESIDENTIAL

The intent of the Plan for Two Rocks is to provide a range of densities to facilitate a mix of housing types and a built form character which is appropriate to, and responds to, the site's unique environmental assets, its location abutting the existing Two Rocks residential area and its proximity to both the future redeveloped Two Rocks Marina Village and the future Northern Town Centre.

The approximate residential dwelling yield achieved in the Masterplan is 5848 dwellings. The dwelling yield for the various density allocations in the Masterplan is provided in **Table 5.1**.

TABLE 5.1 DWELLING YIELDS

	High Density – Apartments (150m ² Avg lot size)	Residential component of Commercial zone (Local Centres) (150m ² Avg lot size)	Residential component of Mixed Use zone (150m ² Avg lot size)	Residential component of Business zone (150m ² Avg lot size)	Low/ Medium Density	Total
Precinct 1	182	42	0	0	774	998
Precinct 2	0	0	0	0	260	260
Precinct 3	0	5	0	0	462	467
Precinct 4	0	4	8	140	355	507
Precinct 5	0	0	0	0	496	496
Precinct 6	0	0	34	0	762	796
Precinct 7	0	0	0	0	0	0
Precinct 8	238	0	63	0	304	605
Precinct 9	102	0	198	0	292	592
Precinct 10	0	5	0	0	619	624
Precinct 11	0	4	0	0	499	503
Total	522	60	303	140	4823	5848

Notes:

1. To be read in conjunction with Masterplan (07/032/085C) dated 17 February 2015.
2. Excludes land subject to separate town centre LSP in conjunction with adjoining landowners (Future Northern Town Centre).

According to the City of Wanneroo's Housing Strategy, in order to achieve a greater diversity of housing types in the City, developers need to strive to achieve a housing mix based on the following targets by 2021:

- Separate houses – 76.2 % of total housing in the City of Wanneroo
- Semi-detached, row/terrace, townhouses – 14.4% of total housing in the City of Wanneroo
- Flats, units, apartments – 9.4% of total housing in the City of Wanneroo
- Other – 0.3% of total housing in the City of Wanneroo

According to ABS Census data for 2006, the existing Two Rocks suburb comprises predominately one housing type, being separate houses which make up 98% of all housing types. In order to achieve a greater diversity in housing types in Two Rocks, the Plan for the expansion of Two Rocks should provide for an increase in the number of alternative housing types.

The Masterplan seeks to achieve a greater diversity in housing types in the Two Rocks locality by providing a lot size and dwelling mix in accordance with the recommendations of the City of Wanneroo's Housing Strategy as follows:

- R5-R10 (average lot size 1200 m²), R12.5-R20 (average lot size 550 m²) and R25-R40 (average lot size 320m²) comprising separate houses and representing 76% of the total housing in the Plan.
- R50+ (average lot size 150 m²) comprising small lots, narrow terrace houses or semi-detached houses/townhouses and representing 14% of the total housing and apartments, flats and units representing 10% of the total housing in the Plan.

A Housing Plan (refer **Figure 5.2**) has been prepared in order to demonstrate the proposed mix of housing types provided for in the Masterplan, as discussed above, including the future location of separate houses and townhouses/apartments.

The Housing Plan provides flexibility in the end housing form, enabling different housing types within the different density ranges. In particular, within the area coded R50+, the mix of housing types will include semi-detached dwellings and apartments. Furthermore, the Housing Plan would not prevent semi-detached dwellings being provided in low density areas.

Consistent with the criteria in Part 1, the statutory component of the Structure Plan, and the City's Housing Strategy, the Masterplan allocates residential densities to appropriate locations based on a number of criteria, including:

- a) Ease of access to public transport;
- b) Proximity to major arterial routes;
- c) Proximity to retail and employment centres;
- d) Proximity to areas of high amenity, like public open space and recreation facilities;
- e) Proximity and ease of access to education institutions including primary, secondary and tertiary facilities;
- f) Proximity to community facilities, like libraries and medical centres; and
- g) Landform, topography and vegetation.

The detailed rationale and description of the different residential densities provided for in the plan is outlined below:

- R5-R10 residential densities will provide for lots comparable in size to a 'traditional quarter acre block'. These lower residential densities have been allocated where large lots are intended to help maintain landform; promote revegetation of land, limit the visual impact of urban development in proximity to environmental features, and provide compatible interface with existing residential development along Dame Pattie Drive.

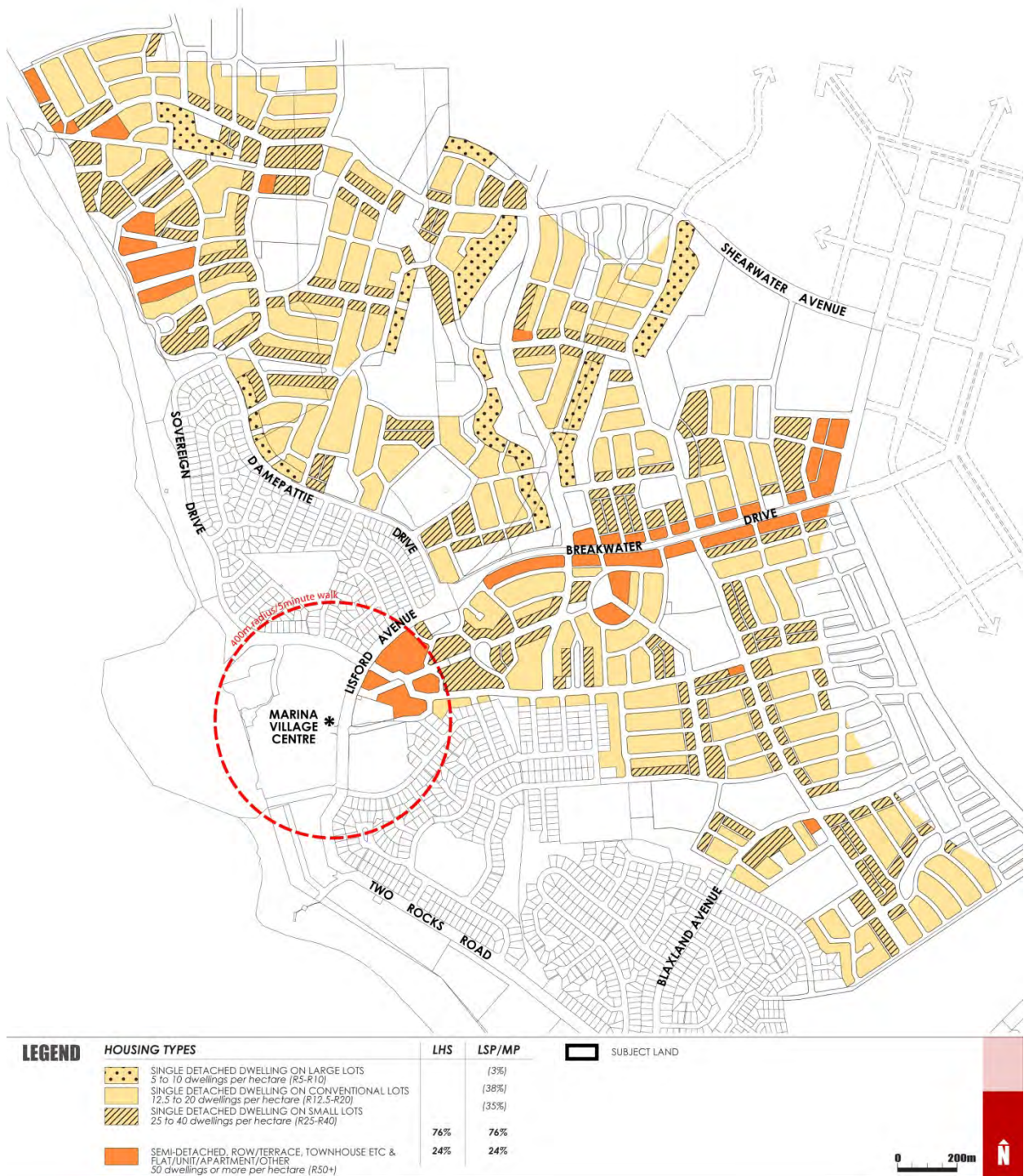


FIGURE 5.2 HOUSING PLAN

SINGLE DETACHED DWELLING



SEMI-DETACHED, ROW/TERRACE, TOWNHOUSE



FLAT/UNIT/APARTMENT/OTHER



- R12.5-R20 residential densities account for approximately half of the residential area in the Masterplan and will provide for more conventional lots sizes. These lots are intended to provide for conventional single housing options and are expected to accommodate families. As such these densities have been orientated around quiet streets.
- R25-40 residential densities will provide for 'cottage' style lots. These residential densities have been strategically located to front public open spaces and arborways. They are in close proximity to local retail centres, community facilities, public transport routes, and the beach. These lots are intended to provide diversity in housing choice and interesting neighbourhoods.
- R50 plus residential densities will provide for apartment living and narrow terrace housing. These densities are allocated in prime locations which offer high amenity. These densities front public open spaces and arborways and are in close proximity to local retail centres, community facilities, public transport routes, and the beach. These densities provide another layer to diversity in housing choice and create vital urban precincts.

The provision of a variety of lot sizes to accommodate a wide range of housing types enables a diverse community to be established and grow in Two Rocks. Affordable housing opportunities will be made available, with lots offered at a range of price points and located to ensure access to public transport, employment areas and shopping facilities. In particular, Lot 500, which is generally flatter and further away from the coast, will provide significant opportunities for the provision of affordable housing.

This, together with strategies outlined in Part 1 for implementation at the subdivision stage, will ensure that there are opportunities for first home buyers and lower income earners to enter the housing market and afford a home in Two Rocks.

5.1.2.2 MIXED USE CORRIDOR

The Masterplan provides for a mix of compatible commercial (i.e., offices, consulting rooms, restaurants and cafes) and residential uses within a mixed use corridor along Breakwater Drive, the key east-west connection between the future Northern Town Centre and the Two Rocks Marina Village. These uses are intended to create local business and employment opportunities and support diverse housing forms, including apartments above shops, or units behind shops, in close proximity to the employment and services generated from the commercial uses.



The type and location of Mixed Use development in the Masterplan is consistent with the 'Mixed Use' zoning for this land in the Structure Plan (Plan 2: Zoning and Residential Density Plan).

The Mixed Use area in the Masterplan comprises a gross site area of 4.92 ha and is expected to provide 19,922 m² of commercial net lettable floor area and approximately 415 dwelling units.

Tables 5.2 and 5.3 list areas for all non-residential land uses and their corresponding indicative floor areas on a precinct-by-precinct basis.



TABLE 5.2 NON-RESIDENTIAL LAND USES

	Local Centre (m ²)	Community Purpose (m ²)	Schools (m ²)			Commercial and Mixed Use (m ²)	Business (m ²)	Total (m ²)
			Primary	High	Private (K - 12)			
Precinct 1	3545	0	0	0	0	0	0	3545
Precinct 2	0	0	0	10000	0	0	0	10000
Precinct 3	2991	1314	35000	0	0	0	0	39305
Precinct 4	3078	0	0	0	0	2414	23300	28792
Precinct 5	0	7100	40400	0	0	0	0	47500
Precinct 6	2000	0	0	0	0	18339	0	20339
Precinct 7	0	0	0	0	80000	0	0	80000
Precinct 8	0	0	0	0	0	11872	0	11872
Precinct 9	0	832	35000	0	0	31218	0	67050
Precinct 10	2978	0	0	0	0	0	0	2978
Precinct 11	2918	2029	40000	0	0	0	0	44947
Total	17510	11275	150400	10000	80000	63843	23300	356328

Notes:

1. To be read in conjunction with the Two Rocks Masterplan (Plan No. 07/032/85C) dated 17 February 2015.
2. Excludes roads, POS, drainage sites and land subject to separate town centre LSP (future Northern Town Centre).

TABLE 5.3 NON-RESIDENTIAL FLOOR AREAS

	Shopping Retail within Local Centres		Commercial component of Mixed Use Corridor and Local Centres			Service Commercial/Business Area (adjacent to future Northern Town Centre)		
	Gross Site Area (GSA) (m ²)	Net Lettable Area (NLA) (m ²) ³	Gross Site Area (GSA) (m ²)	Gross Floor Area (GFA) (m ²) ⁴	Net Lettable Area (NLA) (m ²) ⁵	Gross Site Area (GSA) (m ²)	Gross Floor Area (GFA) (m ²) ⁴	Net Lettable Area (NLA) (m ²) ⁵
Precinct 1	1600	400	1945	972	778	0	0	0
Precinct 2	0	0	0	0	0	0	0	0
Precinct 3	1000	250	1911	995	796	0	0	0
Precinct 4	1000	250	4492	2496	1996	23300	11650	9320
Precinct 5	0	0	0	0	0	0	0	0
Precinct 6	1000	250	19339	9669	7735	0	0	0
Precinct 7	0	0	0	0	0	0	0	0
Precinct 8	0	0	11872	5936	4748	0	0	0
Precinct 9	0	0	31218	15609	12487	0	0	0
Precinct 10	1000	250	1978	989	791	0	0	0
Precinct 11	1000	250	1918	959	767	0	0	0
Total	6600	1650	74673	37625	30098	23300	11650	9320

Notes:

1. To be read in conjunction with the Two Rocks Masterplan (Plan No. 07/032/85C) dated 17 February 2015.
2. Excludes roads, POS, drainage sites and land subject to separate town centre LSP.
3. Assumes NLA is 25% of GSA
4. Assumes GFA is 50% of GSA
5. Assumes NLA is 80% of GFA

5.1.2.3 SERVICE COMMERCIAL

Additional commercial development is provided for in the Masterplan adjacent to the future Northern Town Centre, providing for a variety of commercial uses ranging from light industrial uses to service commercial uses.

It is expected that the uses which operate in the Service Commercial area will evolve over time as the Two Rocks area matures. As development in the Two Rocks Marina Village, the Two Rocks Structure Plan area and, finally, the Northern Town Centre, unfolds it is expected that demand for commercial uses will change and new business enterprises will establish. This transition will be characterised by a move from light industrial uses to business, office, showroom and general commercial uses.



Furniture showroom with residential above



Showroom



Tile warehouse with residential above

The type of uses and the locale of the Service Commercial area is consistent with the 'Business' zoning for this land in the Structure Plan (Plan 2: Zoning and Residential Density Plan). The Service Commercial area in the Masterplan comprises 2.33 ha and is expected to provide 9,320 m² of commercial net lettable floor area and approximately 155 dwelling units in the form of multiple and grouped dwellings. The residential development may occur above the service commercial or behind it, with its own street frontage.

5.1.2.4 LOCAL CENTRES

The Masterplan identifies seven local centres principally for retail, commercial and community purposes. These local centres are strategically located so as to form neighbourhood hubs. They will provide for convenience based retail enterprises and other local services and will incorporate a mix of medium to high density residential uses.

The seven local centres will enable compatible retail, commercial and residential uses to co-locate in adjacent buildings or on top of each other within the same mixed use buildings. This mix of land uses in the local centres is intended to promote the development of vibrant and sustainable neighbourhoods that integrate living, working and leisure opportunities.



Local Centre - Cafe



Local Centre - Post Office, Newsagency, Drycleaning Outlet



Local Centre - Corner Store, Deli

The location of the centres and the uses proposed in the Masterplan are consistent with the 'Commercial' zoning for this land in the Structure Plan (Plan 2: Zoning and Residential Density Plan).

The local centres in the Masterplan comprise a gross site area of 1.7197 ha and are expected to provide 1,900 m² of shopping retail net lettable floor area, 4,929 m² of other commercial net lettable floor area and approximately 146 dwelling units.

As previously mentioned, the size and number of local centres will be subject to more detailed planning. The provision of centres will be consistent with the DSP taking into account the findings and adopted recommendations of the Retail Strategy Study.

5.1.2.5 SCHOOLS

The Masterplan provides for six school sites, including four primary school sites, one government high school site and one private kindergarten to Year 12 (K-12) school site.

The primary school sites are distributed throughout the Masterplan so as to ensure all residential areas are within walking distance to a primary school and where possible so that school catchments are not dissected by major roads. Three of the primary school sites are co-located with community facilities and local centres. This co-location is intended to create a nexus of activity on which community networks may form around. The primary school sites range in area from 3.50 ha to 4.12 ha and two of the sites are co-located with public open space containing senior sized ovals.

The government high school (Years 8-12) has been located to accommodate students graduating from the six established or planned feeder primary schools in the area. The site is 10 ha in size and located on a major public transport route. The private K-12 school site is 11.11 ha in size and also located on a major public transport route, close to the future Northern Town Centre where rail services will also be easily accessible. The K-12 private school site responds to a trend for comprehensive school campuses which combine pre-primary, primary and senior school facilities on one large site.

The provision of primary schools and senior schools in the Masterplan is in accordance with the current WAPC Policy (Liveable Neighbourhoods) and Department of Education and Training Guidelines which require the provision of one public primary school for every 1500 dwellings, one non-government primary school for every three government primary schools and one government high school for every four or five primary schools.

The location of the schools in the Masterplan is consistent with the Structure Plan (Plan 1).

5.1.2.6 PUBLIC OPEN SPACE

The Masterplan provides for 40.02 ha of public open space, excluding community purposes. The public open space provision includes the allocation of land for passive purposes and areas of formal/active public open space, which may incorporate drainage, where necessary.

The passive public open space focuses on significant environmental features which are valued for their amenity and ecological assets. The total area of land set aside for passive public open space within the Masterplan is 14.48 ha. The location of the passive open space areas on the Masterplan is also consistent with the Structure Plan (Plan 1), where the key open space areas are identified.

The formal or active public open space areas comprise 25.23 ha in the Masterplan, including two senior sized ovals to cater for organised sports. Topographical low points in the drainage catchments have been incorporated into formal open space areas, where necessary to accommodate 1 in 10 year and 1 in 100 year storm events.

Overall, the Masterplan provides for a total of 40.83 ha of POS, including community purposes sites (discussed below), active and passive open space areas. The area required for stormwater drainage for the 1 in 10 and 1 in 100 year storm events, incorporated as swales and detention areas within landscaped fully functional POS areas, have been afforded a full credit. Fenced drainage basins and the coastal setback area are included as deductions from the gross site area (i.e. no credit). The total POS provision calculated in accordance with WAPC policy equates to 41.15 ha, representing 11.1% of the net subdivisible area. This exceeds the minimum requirement of 10% and is in direct response to the site's unique landform and environmental character and the desire to incorporate these natural features into the urban landscape. **Figure 5.3** provides further details of the POS provision in the Masterplan.

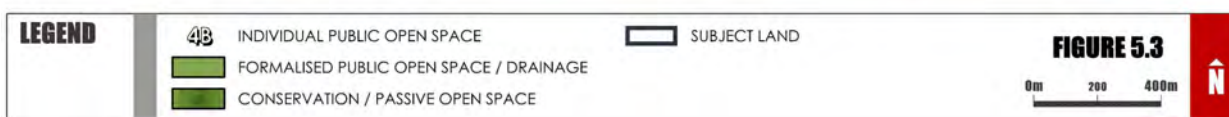
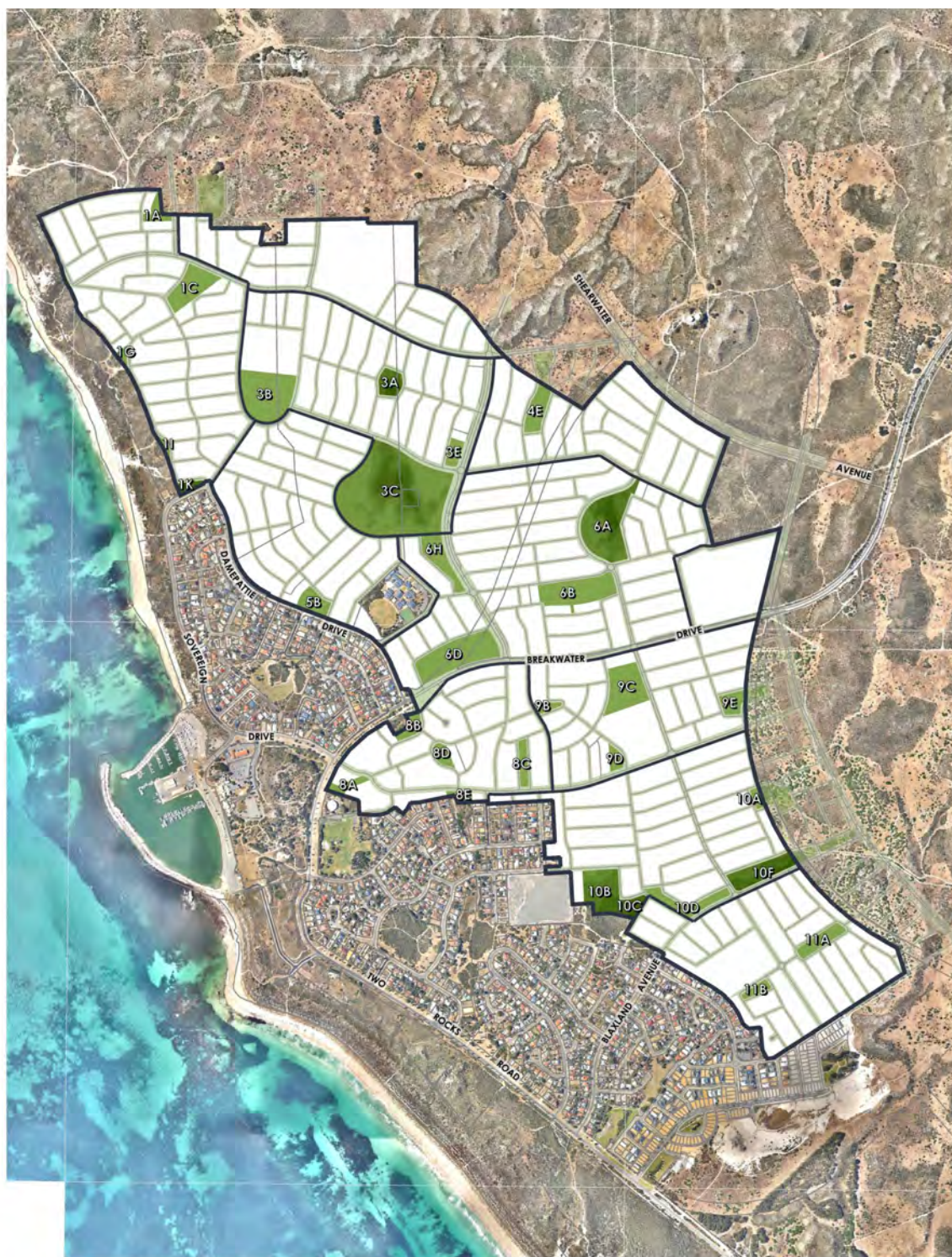


FIGURE 5.3 PUBLIC OPEN SPACE PROVISION

INDIVIDUAL PUBLIC OPEN SPACE

	Gross Area (m ²)	Drainage Provision (1:10 yr storm event)	Drainage Provision (1:100 yr storm event)	Drainage Provision (1:5 yr storm event i.e. Restricted POS, Fenced/Terraced – not usable)	Drainage Provision on 1:1 yr ARI storm event)	Nett POS - Unrestricted (m ²)
1a	5339	0	3162	0	0	5339
1b	0	0	0	0	0	0
1c	16165	3114	0	0	0	16165
1d	0	0	0	0	0	0
1e	0	0	0	0	0	0
1f	0	0	0	0	0	0
1g	1803	0	1347	1347	0	456
1h	0	0	0	0	0	0
1i	1515	0	700	700	0	815
1j	0	0	0	0	0	0
1k	2569	0	0	0	0	2569
2a	0	0	0	0	0	0
2b	0	0	0	0	0	0
3a	7488	1076	0	0	0	7488
3b	32832	1282	0	0	1105	31727
3c	110255	0	0	0	0	110255
3d	0	0	0	0	0	0
3e	4790	3180	0	0	2645	2145
3f	0	0	0	0	0	0
3g	0	0	0	0	0	0
3h	0	0	0	0	0	0
3i	0	0	0	0	0	0
3j	0	0	0	0	0	0
4a	0	0	0	0	0	0
4b	0	0	0	0	0	0
4c	0	0	0	0	0	0
4d	0	0	0	0	0	0
4e	10132	0	0	0	0	10132
4f	0	0	0	0	0	0
4g	0	0	0	0	0	0
4h	0	0	0	0	0	0
5a	0	0	0	0	0	0
5b	7384	0	3853	0	3046	4338
5c	0	0	0	0	0	0
5d	0	0	0	0	0	0
5e	0	0	0	0	0	0
6a	35212	0	5400	0	0	35212
6b	24972	0	12100	1135	1037	22800
6c	0	0	0	0	0	0
6d	30615	0	0	0	1170	29445
6e	0	0	0	0	0	0
6f	0	0	0	0	0	0
6g	0	0	0	0	0	0
6h	12337	0	1384	0	402	11935
7a	0	0	0	0	0	0
7b	0	0	0	0	0	0
7c	0	0	0	0	0	0
8a	4198	0	0	0	0	4198
8b	4601	0	3700	0	0	4601
8c	5229	0	0	0	0	5229
8d	4354	2788	0	0	0	4354
8e	2604	0	0	0	0	2604
8f	0	0	0	0	0	0
8g	0	0	0	0	0	0
9a	0	0	0	0	0	0
9b	3020	0	0	0	0	3020
9c	21200	0	4516	0	0	21200
9d	3812	2811	0	0	0	3812
9e	6307	4199	0	0	0	6307
10a	2370	0	0	0	1849	521
10b	20094	0	9200	0	9242	10852
10c	5659	0	0	0	0	5659
10d	10899	0	0	0	0	10899
10e	0	0	0	0	0	0
10f	15375	0	0	0	0	15375
11a	8576	0	3505	0	0	8576
11b	3480	0	2830	0	0	3480
Total	425186	18450	51697	3182	20496	401508

LIVEABLE NEIGHBOURHOODS PUBLIC OPEN SPACE SCHEDULE CVIV TWO ROCKS LOCAL STRUCTURE PLAN PROPOSED AMENDMENT 17 February 2015		
Gross Site Area - Excluding Existing Roads		417.4388
Deductions		
Local Centre	1.6245	
Mixed Use (Refer Note 2)	1.8950	
Service Commercial	2.3300	
Schools	33.8488	
Coastal setback area	6.4715	
1:1yr ARI	2.0496	
Total Deductions	48.2194	
Gross Subdivisible Area		369.2194
Required Public Open Space (10%)		36.9219
Public Open Space Requirements		
Unrestricted public open space – minimum 80%	29.5376	
Restricted public open space – maximum 20%	7.3844	
Total		36.9219
PUBLIC OPEN SPACE PROVISION		
Unrestricted Public Open Space		
Active (Formalised) POS (Refer Note 3)	26.3184	
Passive POS	13.3858	
Community Purposes	1.1275	
Total Unrestricted Public Open Space		40.8317
Restricted Public Open Space		
Restricted POS (Refer Note 4)	0.3182	
Total Restricted Public Open Space		0.3182
Total Credited Public Open Space		41.1499
Percentage of Public Open Space Provided		11.1%
(Unrestricted and Restricted POS Contribution)		

Notes:

1. All areas are in hectares.
2. Calculated as 50% of total Mixed Use area.
3. Does not include 1:1 year ARI or 1 in 5 year ARI but includes detention of stormwater following a greater than 1:5 year ARI (1:10 year ARI and 1:100 year ARI within POS).
4. Includes areas which will be terraced/fenced in order to accommodate the required drainage from 1:100 year storm event.

5.1.2.7 COMMUNITY FACILITIES

Four local community purpose sites have been provided within the Masterplan to meet the future needs of the Two Rocks community. The sites have been designated adjacent to senior sized ovals, near primary schools or near local centres. This co-location encourages community convergence and networking around the school sites or activity nodes. These community purpose sites are intended to provide for a variety of services and facilities such as community halls, community meeting rooms, recreation centres, sporting facilities, play areas, child and infant health centres, senior citizens clubs and out-of-school care.

The local community purpose centre adjacent to the existing Two Rocks Primary School on Dame Pattie Drive is intended to specifically provide community facilities which complement the existing primary school and which may also serve to facilitate Two Rocks Primary School becoming a 'full service school'. These complementary uses may include out-of-school care, infant health centre, community meeting rooms for private tutoring or essential services such as a local police presence.

The area of land allocated for these uses is 1.1046 ha. The provision of four sites in the Masterplan is consistent with WAPC policy (Liveable Neighbourhoods), whereby it is recommended that one community purpose site be provided for every 1500-1800 dwellings. Each site serves approximately three neighbourhoods, including the existing Two Rocks community where such sites and facilities are currently under-provided.

The location of the community purpose sites in the Masterplan is consistent with the Structure Plan (Plan 1) and compatible with the Commercial and Residential zoning of these sites in the Structure Plan Zoning and Residential Density Plan (Plan 2). The number and size of community purpose sites will be reviewed at subdivision stage, in consultation with the City of Wanneroo, taking into consideration the purpose for which they will be developed.



5.1.3 PRECINCTS

5.1.3.1 PRECINCT 1

Precinct 1 is located in the northern coastal sector of the Masterplan. The chaotic dunal landform has influenced the design and layout of streets and open space systems. Significant high points in the landscape have been retained and the street blocks have been designed to ensure minimal disturbance to the natural topography and provide for the careful placement of building on the landscape.

For the purpose of the Masterplan, it is assumed that a lesser coastal setback has been established as a result of sand bypassing being implemented at the Two Rocks Marina within the next 15-20 years. In the event that a lesser setback can not be established at the subdivision stage, then all development will need to be set back in accordance with the coastal setback line depicted on the Structure Plan (Plan 1).

A coastal road has been provided extending along the foreshore boundary in the southern portion of Precinct 1, then deviating east slightly around street blocks so as to minimise disturbance to the landform. It would be desirable to extend the coastal road along the full length of the foreshore boundary, however this can only be achieved with significant alteration of the landscape (i.e. cutting into the high dunes) or deviation into the foreshore reserve along an existing track on the coast side of the dunes. This later option can be further explored at the stage of subdivision of Precinct 1.

Precinct 1 features a range of potential housing options that will support and attract a diverse range of people from singles, young and middle-age couples, families with children, retirees, the elderly and weekenders/holiday-makers. Roughly a third of the lots provided in Precinct 1 are high density apartment lots. The majority of these lots are focused on the coast in the southern half of the precinct, in a high amenity area, with east-west arborways linking the coast with areas of formalised public open space and drainage.

Medium density cottage lots line the edge of the north-south road, which borders Precinct 3, providing greater density along a potential future bus route. Medium density cottage lots are also present in the northern part of Precinct 1, surrounding a small coastal Local Centre. Traditional lots are concentrated in the northern most part of the precinct.

Precinct 1	
Land Use Type	Area (ha)
Residential	37.7186
Non-residential	
Local Centre	0.3545
Mixed Use zone	0
Business Zone	0
Community Purpose	0
Schools	0
Public Open Space	
Formal POS (no drainage component)	0.1515
Formal POS (with drainage component)	2.3307
Passive	0.2569
Total Precinct Area (including roads)	46.3191 ha

Precinct 1	
Lot Type (average lot size)	Dwellings
High Density – Apartments (150 m ²)	224
Residential component of Commercial zone (Local Centres 150 m ²)	
Residential component of Mixed Use zone (150 m ²)	
Low/Medium Density	774
Total	998



5.1.3.2 PRECINCT 2

Precinct 2 is located on the northern edge of the structure plan area. It is bounded to the south by a major east-west connector road, which links the coast with the future Northern Town Centre to the east. The medium density cottage lots in Precinct 2 are located along this road. The remaining traditional style lots are located to the north. Careful attention has been given to the retention of the dunal landform in this precinct, with larger lots abutting the open space where it is desirable to retain the topography.

The precinct area is dominated by the provision of a government high school site. This site incorporates an area of passive open space on its eastern border, representing an extension of the dominant dunal ridgeline. Directly east, land is provided for low density residential development, at the base of a steep change in topography. The high school will serve the existing Two Rocks area to the south-west, future development in the structure plan area and long term development outside the LSP area to the north. Its location on the major east-west connector facilitates its service by public transport.

Precinct 2	
Land Use Type	Area (ha)
Residential	13.4662
Non-residential	
Local Centre	0
Mixed Use zone	0
Business Zone	0
Community Purpose	0
Schools	10.1695
Public Open Space	
Formal POS (no drainage component)	0
Formal POS (with drainage component)	0
Passive	0
Total Precinct Area (including roads)	28.3670 ha

Precinct 2	
Lot Type (average lot size)	Dwellings
High Density – Apartments (150 m ²)	0
Residential component of Commercial zone (Local Centres 150 m ²)	
Residential component of Mixed Use zone (150 m ²)	
Low/Medium Density	260
Total	260



5.1.3.3 PRECINCT 3

Precinct 3 features a diverse mix of land uses. One Local Centre is provided for in the Masterplan. It is located adjacent to a primary school site co-located with a senior sized oval and community purpose site. Furthermore, the surrounding residential land will be medium density cottage lots. Together, these elements form a local activity centre in the north-western part of the site.

A large area of passive public open space in the north-eastern corner of the precinct serves as a link with similar areas to the north and south in Precincts 2 and 4 respectively. In addition to this, east-west arborways link areas of formalised public open space and drainage with areas of passive open space in adjacent precincts, providing a pleasant walking and cycling route. These arborways are lined with medium density cottage lots, to create areas of high amenity.

A number of lower density lots have been provided for on the south-western border of the precinct. This is to facilitate the provision of a compatible interface with existing residential development along Damepattie Drive. The majority of residential areas provided across the precinct are traditional size lots.

Precinct 3	
Land Use Type	Area (ha)
Residential	23.7630
Non-residential	
Local Centre	0.2991
Mixed Use zone	0
Business Zone	0
Community Purpose	0.1314
Schools	3.5247
Public Open Space	
Formal POS (no drainage component)	0
Formal POS (with drainage component)	4.511
Passive	11.0255
Total Precinct Area (including roads)	51.9792 ha

Precinct 3	
Lot Type (average lot size)	Dwellings
High Density – Apartments (150 m ²)	5
Residential component of Commercial zone (Local Centres 150 m ²)	
Residential component of Mixed Use zone (150 m ²)	
Low/Medium Density	462
Total	467



5.1.3.4 PRECINCT 4

Precinct 4 is largely dominated by public open space. Formalised public open space and drainage and areas of passive open space account for more than half of the total precinct area. The main area of passive open space, located on the western half of the precinct, includes an existing Trig survey station reserve that was established in 1901 to facilitate the early mapping of the area and survey of the original Crown allotments. This has been retained and incorporated into the provision of public open space in the Masterplan.

The dominant ridgeline within the passive open space area provides a dramatic backdrop to the existing primary school and is highly valued by the community. It is representative of the landform character of the area and has a positive influence on the visual amenity of the locality. The retention of the dominant ridgeline will ensure that the landscape character and visual amenity is maintained and enjoyed by existing and future residents in the lower lying valley areas enclosed by this natural landform.

Low density lots are located adjacent to the areas of passive open space that run in a north-south direction on the eastern side of the precinct. Some traditional density and medium density cottage lots are provided in high amenity areas in the northern part of Precinct 4.

Precinct 4	
Land Use Type	Area (ha)
Residential	16.88
Non-residential	
Local Centre	0.3078
Mixed Use zone	0.2414
Business Zone	2.3300
Community Purpose	0
Schools	0
Public Open Space	
Formal POS (no drainage component)	1.0132
Formal POS (with drainage component)	0
Passive	0
Total Precinct Area	27.9224 ha

Precinct 4	
Lot Type (average lot size)	Dwellings
High Density – Apartments (150 m ²)	152
Residential component of Commercial zone (Local Centres 150 m ²)	
Residential component of Mixed Use zone (150 m ²)	
Low/Medium Density	355
Total	507



5.1.3.5 PRECINCT 5

Precinct 5 is located directly north of Breakwater Drive and abuts the existing Two Rocks settlement. It includes an existing primary school that has been built ahead of subdivision and development in the structure plan area due to local demand and with the support of the existing landowner (CVJV). A community purpose site is located adjacent to the primary school site providing the opportunity for a full service school to be established on the adjoining site in the future.

The majority of the land provided for residential uses is for traditional lots. Areas of medium density cottage lots are located in areas of high amenity and high accessibility, near the primary school site and public open space. A north-south arborway in the western part of the Precinct links an area of public open space and drainage in the south to passive public open space in Precinct 4 to the north. A lesser dunal ridge is retained in passive public open space on the eastern edge of the precinct and adjoining public open space areas in Precinct 6, extending to the north to form a continuous green belt in the northern central part of the Masterplan. Significant trees have been able to be retained in open space abutting Breakwater Drive, extending the green link into town.

Particular attention has been given to the interface with existing development on Damepattie Drive, with limited vehicular access opportunities provided.

Precinct 5	
Land Use Type	Area (ha)
Residential	25.7251
Non-residential	
Local Centre	0
Mixed Use zone	0
Business Zone	0
Community Purpose	0.7100
Schools	4.0400
Public Open Space	
Formal POS (no drainage component)	0
Formal POS (with drainage component)	0.7384
Passive	0
Total Precinct Area	40.2525 ha

Precinct 5	
Lot Type (average lot size)	Dwellings
High Density – Apartments (150 m ²)	0
Residential component of Commercial zone (Local Centres 150 m ²)	
Residential component of Mixed Use zone (150 m ²)	
Low/Medium Density	496
Total	496



5.1.3.6 PRECINCT 6

Precinct 6 extends north from Breakwater Drive to the edge of the Masterplan area. The precinct features two Local Centres – one in the northern half of the precinct and one to the south, located on Breakwater Drive. The northern Local Centre is surrounded by medium density cottage-style lots. The southern Local Centre has medium density cottage lots located nearby, as well as areas of mixed use fronting Breakwater Drive. The mixed use development contains a high density residential component, and forms part of the Mixed Use Corridor extending from the future Northern Town Centre to the Two Rocks Marina Village. Passive public open space and further areas of mixed use/high density apartments are also located nearby, in Precincts 5 and 8 respectively.

Two areas of passive public open space run north-south in the central and north-eastern areas of Precinct 6, retaining the lesser, but still very prominent, dunal ridge in the landscape. Low density lots are provided on the toe of the ridge to enable retention of vegetation and landform within the landscape. An east-west arborway links the passive public open space in the north-east with similar areas in Precinct 4 to the west, providing an attractive walking and cycling route to the local centres. The lots abutting the arborway are medium density cottage lots. Similarly, an east-west arborway in the southern half of the precinct provides areas of high amenity with medium density cottage lots provided on both sides.

Precinct 6	
Land Use Type	Area (ha)
Residential	39.3125
Non-residential	
Local Centre	0.2000
Mixed Use zone	1.8339
Business Zone	0
Community Purpose	0
Schools	0
Public Open Space	
Formal POS (no drainage component)	
Formal POS (with drainage component)	10.3136
Passive	3.5212
Total Precinct Area	71.6274 ha

Precinct 6	
Lot Type (average lot size)	Dwellings
High Density – Apartments (150 m ²)	34
Residential component of Commercial zone (Local Centres 150 m ²)	
Residential component of Mixed Use zone (150 m ²)	
Low/Medium Density	762
Total	796



5.1.3.7 PRECINCT 7

Precinct 7 is located in the north-eastern corner of the Masterplan and encompasses land north and south of Breakwater Drive. Mixed use development is provided for within lots fronting both sides of Breakwater Drive, which will serve as the main road link between the existing Two Rocks Town Centre and the future Northern Town Centre to the east. Precinct 7 also includes land set aside for other commercial purposes, including service commercial uses within the Business zone abutting the eastern edge of the future Northern Town Centre. Medium to high density residential development is also provided for within these mixed use, commercial and business areas.

Precinct 7 provides for a private K-12 school at its northern extremity with a natural landscape backdrop provided by the retained dunal ridge. This site is adjacent to Shearwater Avenue to the north and the major north-south connector to the west, which will enable it to be adequately served by public transport. There are three areas of formalised public open space and drainage, with medium density cottage lots located adjacent to these areas of high amenity.

Precinct 7	
Land Use Type	Area (ha)
Residential	0
Non-residential	
Local Centre	0
Mixed Use zone	0
Business Zone	0
Community Purpose	0
Schools	8.0
Public Open Space	
Formal POS (no drainage component)	0
Formal POS (with drainage component)	0
Passive	0
Total Precinct Area	9.9639 ha

¹ Includes roads, but excludes portion of the future Northern Town Centre, which will be subject to a separate LSP.

Precinct 7	
Lot Type (average lot size)	Dwellings
High Density – Apartments (150 m ²)	0
Residential component of Commercial zone (Local Centres 150 m ²)	
Residential component of Mixed Use zone (150 m ²)	
Low/Medium Density	0
Total	0



5.1.3.8 PRECINCT 8

Precinct 8, located on the south-western side of Breakwater Drive, has a large proportion of high density apartment lots. The careful placement of buildings within the landscape and design and layout of roads ensures minimal disturbance to the unique landform in this precinct. High density areas are largely concentrated in the western corner of the precinct, abutting Lisford Avenue and adjacent to the future Two Rocks Marina Village, where employment and services will be concentrated. The northern part of the precinct that borders Breakwater Drive also has a strip of mixed use/ high density housing lots provided. The ease of access to a major arterial road and public transport makes this a suitable location for apartments or mixed use development.

The Masterplan has been designed to facilitate integration with future development in the Two Rocks Marina Village, in consultation with the adjoining landowner. As outlined above, the higher density residential development in this precinct will form a natural extension of the Marina Village and maximise accessibility to the services and employment that it will offer.

Vehicular and pedestrian connections have also been considered, including a strong connection to Lisford Avenue and Sovereign Drive, providing direct access to the future Marina Village. In addition to this, the Masterplan makes provision for a strong road connection from the CVJV Two Rocks LSP area to the future 'main street' in the Two Rocks Marina Village, to enhance vehicular and pedestrian access to and from the future activity centre. The realisation of this road connection would be contingent upon a portion of Charnwood Park being dedicated for this purpose and would require the support of the City of Wanneroo.

The precinct features several areas of formalised public open space, which are linked with short arborways to create green pedestrian connections with areas of existing vegetation and proposed areas of public open space in adjoining precincts. The land is elevated and viewlines to the coast and King Neptune will be provided via the arborways. The areas of formal public open space and those allocated for drainage and arborways are bounded by medium density cottage lots to create high amenity local areas.

Precinct 8	
Land Use Type	Area (ha)
Residential	24.2291
Non-residential	
Local Centre	0
Mixed Use zone	1.1872
Business Zone	0
Community Purpose	0
Schools	0
Public Open Space	
Formal POS (no drainage component)	1.2031
Formal POS (with drainage component)	0.8955
Passive	0
Total Precinct Area (including roads)	29.9413 ha

Precinct 8	
Lot Type (average lot size)	Dwellings
High Density – Apartments (150 m ²)	301
Residential component of Commercial zone (Local Centres 150 m ²)	
Residential component of Mixed Use zone (150 m ²)	
Low/Medium Density	304
Total	605



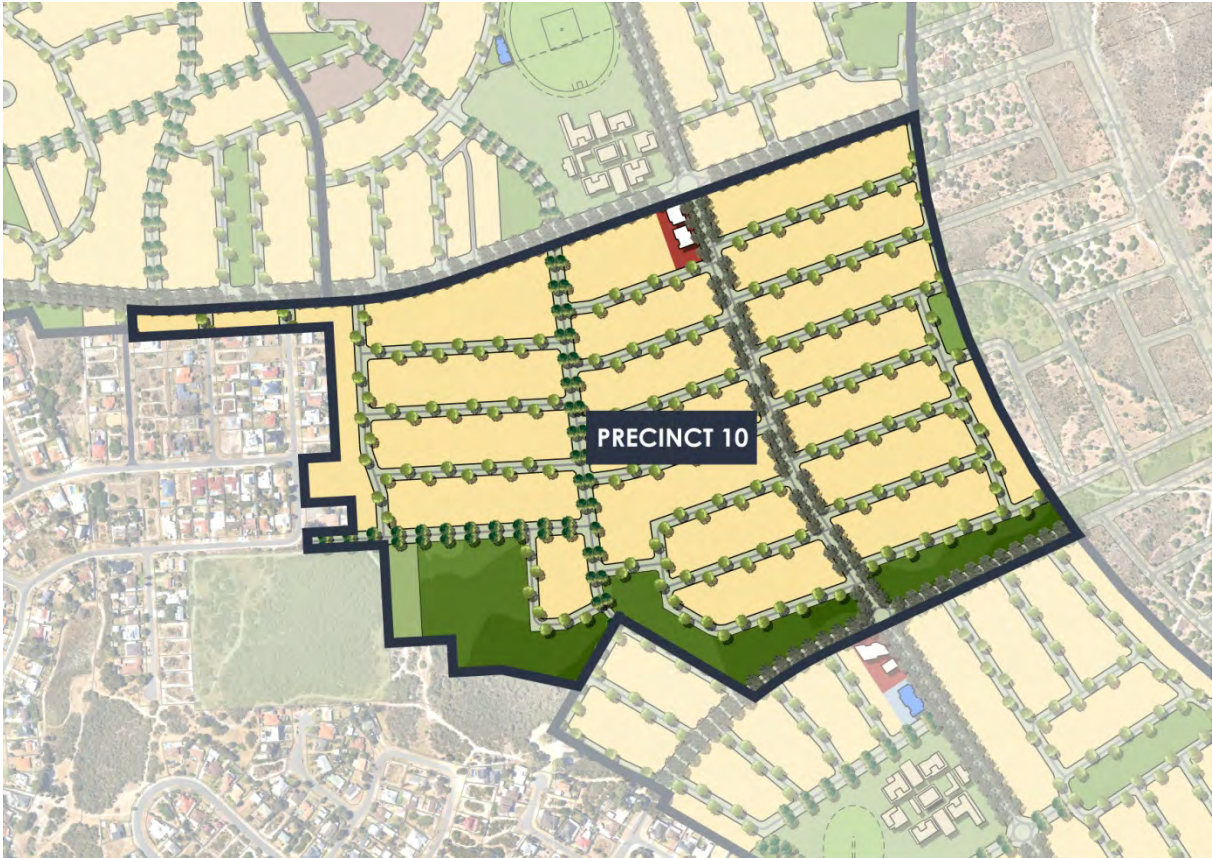
5.1.3.9 PRECINCT 9

Precinct 9 features a diverse mix of residential and non-residential land uses. There is a Primary School co-located with a senior sized oval and Community Purpose site, which together with a nearby local centre in Precinct 10 and the provision of medium density cottage style lots in the vicinity, serve to create a local activity centre.

Mixed use and high density residential lots are located close to Breakwater Drive and the main north-south connector road, providing for easy access to public transport. Traditional sized lots are present in the eastern and south-western parts of the precinct. A feature high density and formalised public open space area in the north-western corner on a high point (formerly water tank site) is linked by an arborway to public open space and drainage to the south. The feature high density site will provide for buildings to step down the hill, retaining the dominance of this feature in the landscape. Significant views to the coast and King Neptune will be afforded from this highpoint.

Precinct 9	
Land Use Type	Area (ha)
Residential	15.0937
Non-residential	
Local Centre	0
Mixed Use zone	3.1218
Business Zone	0
Community Purpose	0.0832
Schools	3.5000
Public Open Space	
Formal POS (no drainage component)	0.3020
Formal POS (with drainage component)	3.1321
Passive	0
Total Precinct Area (including roads)	34.1974 ha

Precinct 9	
Lot Type (average lot size)	Dwellings
High Density – Apartments (150 m ²)	300
Residential component of Commercial zone (Local Centres 150 m ²)	
Residential component of Mixed Use zone (150 m ²)	
Low/Medium Density	292
Total	592



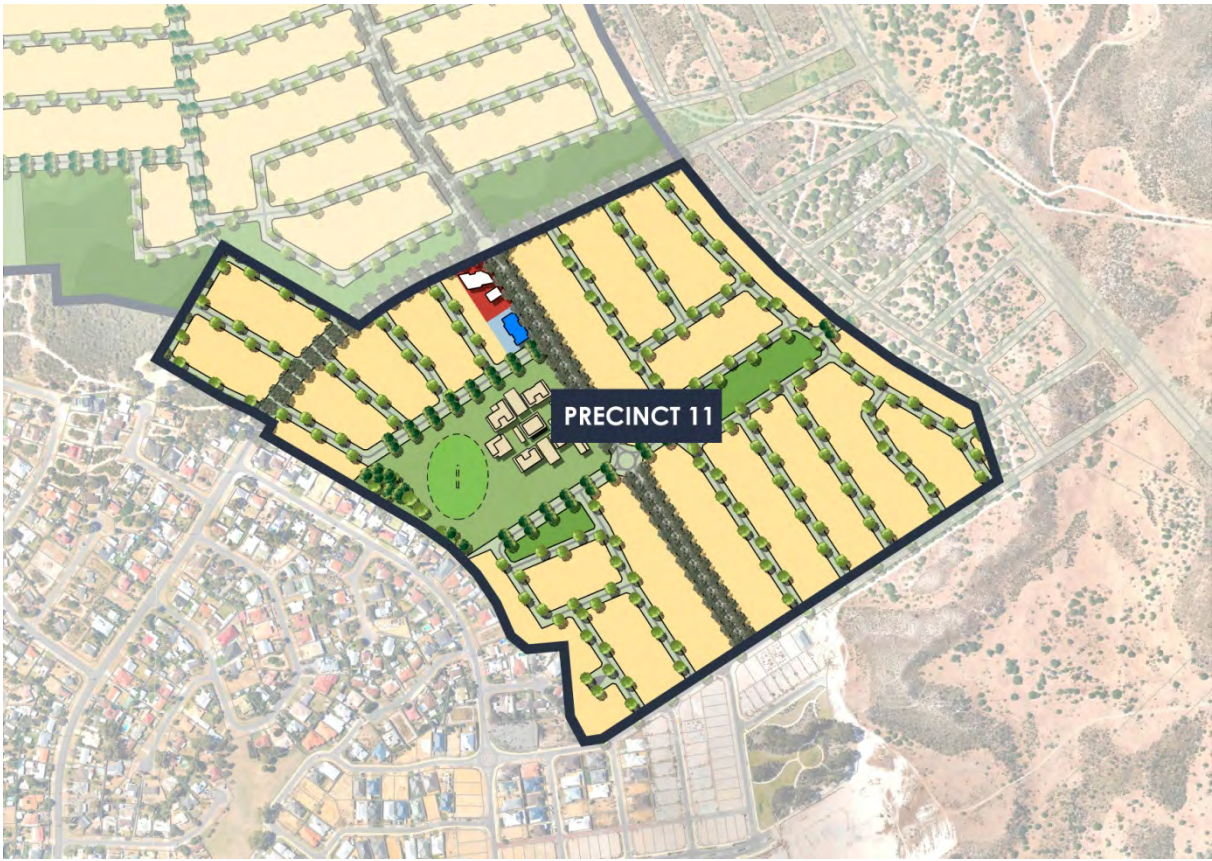
5.1.3.10 PRECINCT 10

Precinct 10 comprises a local centre on its northern boundary and land set aside for residential purposes and public open space. Traditional size lots account for the majority of the residential land in the precinct, reflecting the form of residential development abutting this precinct in the Two Rocks settlement and providing for flat lots capable of conventional, affordable housing development. The areas of medium density cottage lots are focused on the precinct's main north-south connector roads, to facilitate access to public transport.

Large areas of passive public open space are retained under the Masterplan in the southern section of Precinct 10. This green link also forms part of the major green link in the DSP, which seeks to retain and conserve locally significant vegetation. The green link extends into the existing residential area and through to the coast via existing green spaces, including the existing (undeveloped) primary school site and public open space areas.

Precinct 10	
Land Use Type	Area (ha)
Residential	26.3091
Non-residential	
Local Centre	0.2978
Mixed Use zone	0
Business Zone	0
Community Purpose	0
Schools	0
Public Open Space	
Formal POS (no drainage component)	0
Formal POS (with drainage component)	3.3363
Passive	2.1034
Total Precinct Area (including roads)	41.9745 ha

Precinct 10	
Lot Type (average lot size)	Dwellings
High Density – Apartments (150 m ²)	5
Residential component of Commercial zone (Local Centres 150 m ²)	
Residential component of Mixed Use zone (150 m ²)	
Low/Medium Density	619
Total	624



5.1.3.11 PRECINCT 11

Precinct 11 is located at the southern extremity of the Masterplan, and abuts existing residential development to the west. The land is relatively flat and provides the opportunity for conventional and affordable housing development consistent in type with the abutting residential development in Two Rocks.

It features a primary school site, carefully positioned to retain significant trees, a local centre and community purpose site all in close proximity, surrounded by medium density cottage lots. This combination of elements serves to create a local activity centre in the southern part of the Masterplan.

Medium density cottage lots are located along the major north-south connector road and along the extension of Blaxland Avenue, which provide direct access to a key future north-south distributor road and through the existing urban area to the coast. Two small areas of public open space and drainage are provided. The majority of residential lots in the precinct take the form of traditional sized residential lots and 'smart lots' (smaller single residential lots) for the development of single houses.

Precinct 11	
Land Use Type	Area (ha)
Residential	21.4231
Non-residential	
Local Centre	0.2918
Mixed Use zone	0
Business Zone	0
Community Purpose	0.2029
Schools	4.0000
Public Open Space	
Formal POS (no drainage component)	0
Formal POS (with drainage component)	1.2056
Passive	0
Total Precinct Area	36.4842 ha

Precinct 11	
Lot Type (average lot size)	Dwellings
High Density – Apartments (150 m ²)	4
Residential component of Commercial zone (Local Centres 150 m ²)	
Residential component of Mixed Use zone (150 m ²)	
Low/Medium Density	499
Total	503

5.1.4 PROJECTED POPULATION

The City of Wanneroo recorded 110,940 persons and 41,619 dwellings in the 2006 Census or an average ratio of 2.67 persons per dwelling. The Two Rocks town recorded 1,627 persons and 890 dwellings in the 2006 Census or an average of 1.82 persons per dwelling. These figures differ significantly and do not provide guidance as to the likely average persons per dwelling ratio that could reasonably be expected within the Two Rocks structure plan area.

City of Wanneroo population and dwelling forecasts (ID Forecast, March 2007) show that the Two Rocks/Yanchep area will have a population of 21,563 and total dwellings of 9,806 in 2021. This results in an average ratio of 2.20 persons per dwelling in the Two Rocks/Yanchep region in 2021. Whilst this is significantly lower than the current ratio for the whole of the City of Wanneroo and significantly higher than the current Two Rocks ratio, it is reasonable to expect that the Two Rocks structure plan area will reflect the longer-term 2.20 persons per dwelling ratio as forecast by the City.

The Two Rocks LSP area anticipates a total lot yield of approximately 5,406. Assuming the forecast persons per dwelling ratio of 2.20, it is expected that the site will house approximately 11,900 persons when fully developed.

Table 5.4 shows the current proportion of population by age group for the Yanchep/Two Rocks area and the forecast proportion by age group at 2021. Based on the forecast population proportion by age for the Yanchep/Two Rocks area, the likely ultimate number of persons by age within the Two Rocks structure plan site has been calculated.

TABLE 5.4 PROJECTED SITE POPULATION BY AGE

	Yanchep & Two Rocks				
	Persons ABS 2006		ID Forecast 2021		Site
Age (years)	Persons	%	Persons	%	Persons
0 to 4	283	6.6%	1,633	7.6%	905
5 to 9	339	7.9%	1,691	7.8%	929
10 to 14	363	8.4%	1,465	6.8%	810
15 to 19	271	6.3%	1,160	5.4%	643
20 to 24	145	3.4%	1,253	5.8%	691
25 to 29	148	3.4%	1,563	7.2%	858
30 to 34	267	6.2%	1,550	7.2%	858
35 to 39	356	8.3%	1,441	6.7%	798
40 to 44	361	8.4%	1,311	6.1%	726
45 to 49	303	7.0%	1,304	6.0%	715
50 to 54	259	6.0%	1,312	6.1%	727
55 to 59	272	6.3%	1,310	6.1%	727
60 to 64	262	6.1%	1,230	5.7%	679
65 to 69	268	6.2%	973	4.5%	536
70 to 74	184	4.3%	762	3.5%	417
75 to 79	115	2.7%	604	2.8%	334
80 to 84	71	1.7%	554	2.6%	310
85 and over	32	0.7%	447	2.1%	250
Total	4,299	100.0%	21,563	100.0%	11,913

5.2 LANDSCAPE DESIGN

5.2.1 LANDSCAPE THEMING

The inspiration for Landscape Theming will derive from the existing site character and environs, the key elements being:

- The strong coastal influence to the west of the site, including the Foreshore Reserve;
- The close proximity of the existing Two Rocks townsite, in particular the Two Rocks Marina;
- The diverse coastal vegetation communities on the site; and
- The sands and limestone underlying the site.

Plant species endemic to the site will inspire both the planting palette for the development and may also provide the inspiration for artworks and other motifs.

The proposed landscape character will reflect the coastal location, with the use of materials and colours complementary to the area. These may include:

- Predominantly off-whites or creams in paved areas, possibly with exposed aggregate and shell grit in key areas;
- Limestone, rammed limestone and/or gabion feature walls;
- Galvanised steel and timber; and
- The use of predominantly endemic or native plant species. Limited use of exotic species is proposed in key areas for amenity and/or effect.

These elements will be combined in a contemporary style to reflect a modern, sophisticated, timeless look, appropriate to the intended status of this development (refer **Figures 5.5 to 5.8** for typical imagery of the proposed landscape character).

5.2.2 LANDSCAPE VISION

The vision for Two Rocks LSP is to create a community with a distinctive sense of place and identity that responds to the coastal setting and environment of Two Rocks. The incorporation of sustainable design principles is an over-riding objective, with landform, tree and vegetation retention in several major public open spaces a key priority wherever possible.

The creation of useful open space that fulfils several functions is a key objective; these functions include the following;

- Establish significant green-link corridors incorporating retention of landform, vegetation and habitat, and promoting walkability;
- Provide a showcase for a variety of environmental features and practices to assist in community education and foster a sense of community pride, ownership and responsibility for the local environment; and
- Provide a diversity of visual and recreational opportunities and experiences.

An overall approach in the open space design of the Two Rocks LSP will be to minimise areas of irrigated grass and to retain extensive areas of coastal vegetation. Grassed spaces will be incorporated into key nodes to enable a diversity of passive and active recreational activity to occur.

5.2.3 LANDSCAPE MASTERPLAN

The proposed Landscape Masterplan incorporates a variety of public open spaces, both large and small that will provide a diversity of recreational experiences and opportunities (refer **Figure 5.4**). A primary feature of the plan is the establishment of several significant green spines incorporating retained landform and vegetation and ensuring preservation of site character and habitat. While there are relatively few large trees on this site, a priority has been placed on their retention within future open space areas and road reserves in recognition of their important visual and functional amenity. The layout of the open spaces and their connection via a legible street network will facilitate a very 'walkable' environment that will be further reinforced through the design of the open spaces. The key elements of the plan from a landscape theming perspective are the following:

5.2.3.1 PASSIVE OPEN SPACE

The retention of several major ridgeline formations and their associated coastal vegetation as open space corridors will be a significant natural feature of the site and will contribute strongly to the coastal 'sense of place,' with the vegetation clad ridges breaking, softening and containing the built form and helping to define natural precincts. The ridgelines serve as natural landmarks and points of orientation within the area, offering panoramic 360° views over the surrounding area, including good views to the ocean.

Walking trails with logical links to the adjacent street network (including arborways) and other parks are proposed through the green spines to encourage passive use and appreciation of this unique natural resource. Destination points will be provided along the routes, such as seating areas, picnic areas and viewing decks, with public art and interpretive signage (highlighting environmental and cultural values) adding another level of interest and meaning (refer **Figures 5.5 and 5.6**), and elements such as drinking fountains and bike racks providing additional amenity. The green spines provide key connections through the site to the foreshore reserve and ocean to the west.

Appropriate fencing will be installed to the perimeter of these areas to assist in the protection and management of the passive open space (the fencing will be sensitively designed to be unobtrusive and blend with the environment). Designated paths will provide controlled access into these areas.

5.2.3.2 FORMALISED PUBLIC OPEN SPACE

A diversity of more formalised open space will be provided throughout the development to complement the extensive areas of passive open space (refer **Figures 5.7 and 5.8**). These parks will range from larger open spaces incorporating passive and active recreational opportunities, to small, intimate neighbourhood parks primarily for passive recreation. Two senior sized ovals for organised sports will also be provided in the development, co-located with primary schools. Many of these parks and ovals will incorporate stormwater retention areas that will be designed as an integral component of the open space. The provision of shaded areas through the retention of existing mature trees, the planting of new shade trees and the use of shade structures in key nodes will ensure a high level of user amenity and comfort is achieved.

LARGE PARKS

The larger parks are often located adjacent to areas of good quality landform and/or vegetation worthy of retention, or near schools. These parks will include both passive and semi-active recreation facilities, and an extensive dual use and/or cycle path network. Amenities will include paths, seating areas and possibly play and/or community facilities, such as pavilions, sports equipment, tennis courts and/or bocce courts. Hard and soft landscape works within the larger parks are proposed to be sensitive to the existing environment and minimise impact on any key characteristics to be retained.



FIGURE 5.4 LANDSCAPE MASTERPLAN [SOURCE: PLAN E]

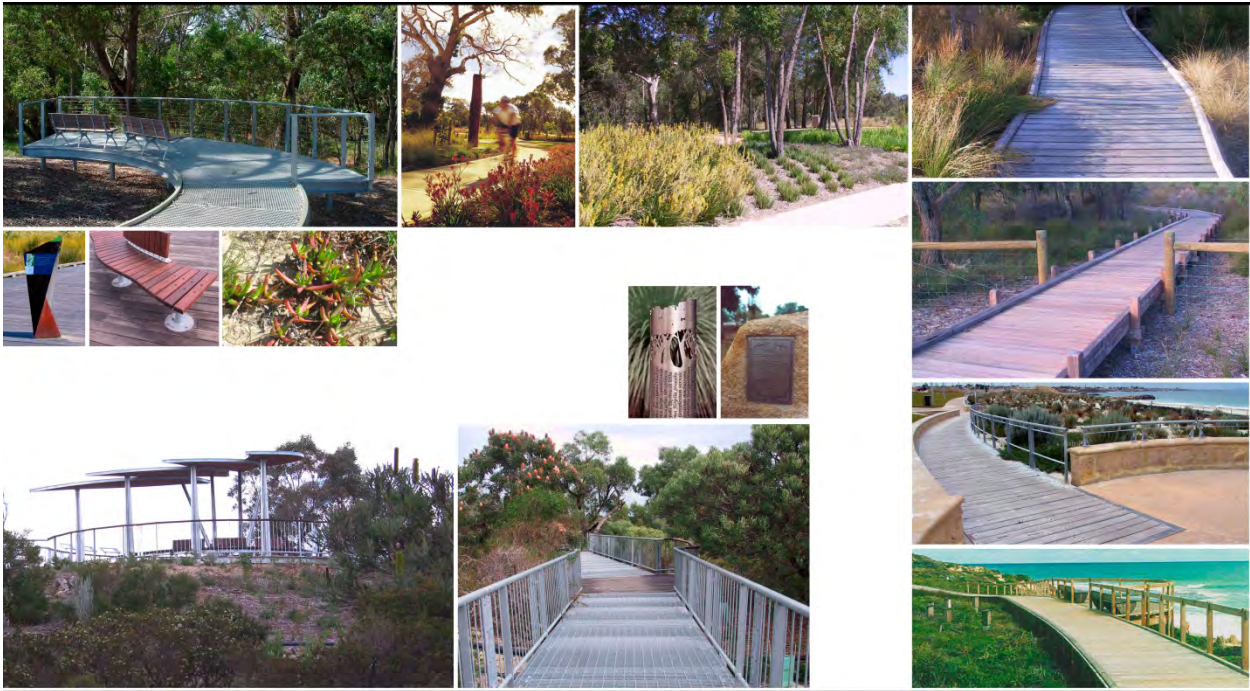


FIGURE 5.5 PASSIVE OPEN SPACE [SOURCE: PLAN E]

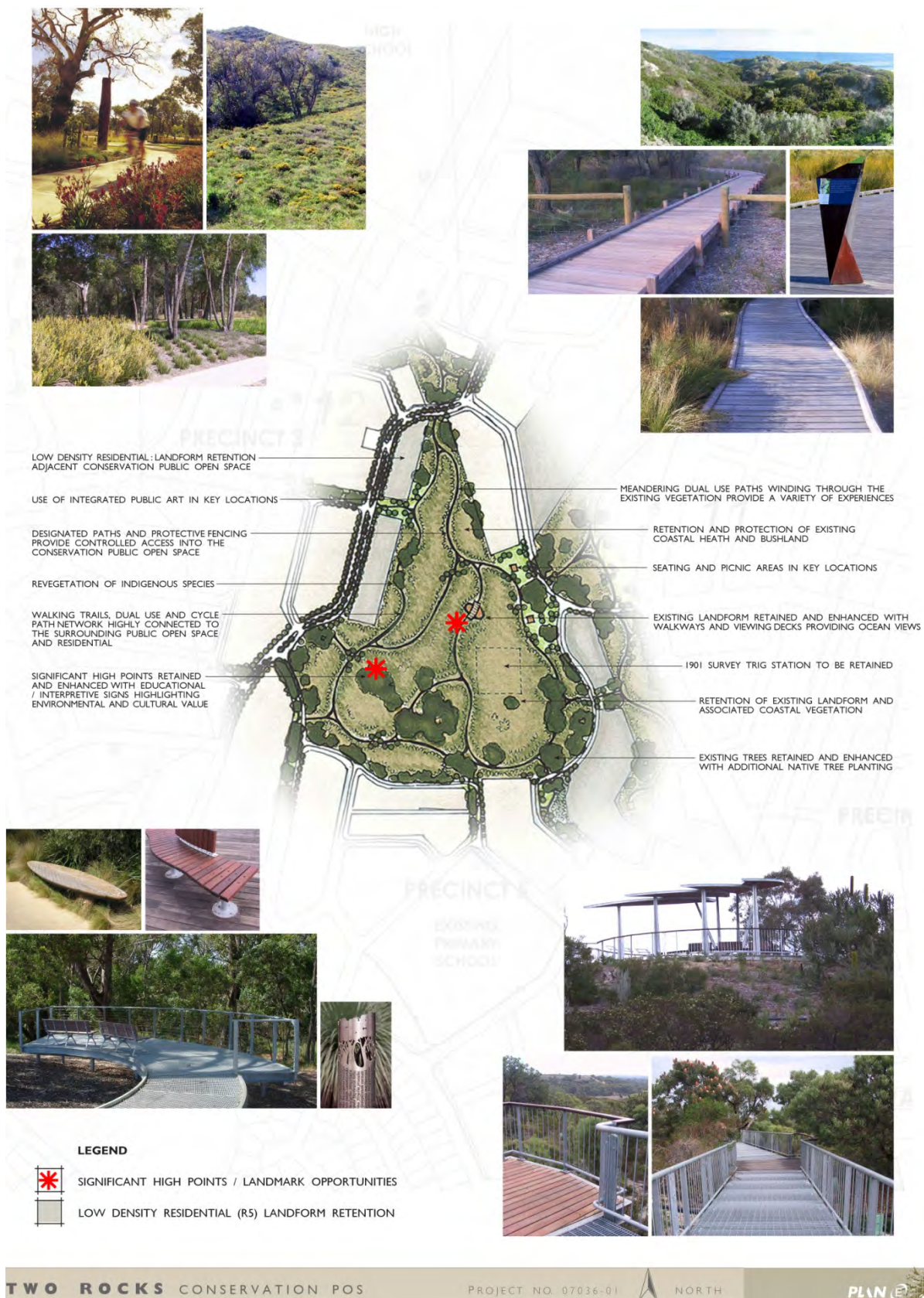


FIGURE 5.6 PASSIVE OPEN SPACE [SOURCE: PLAN E]

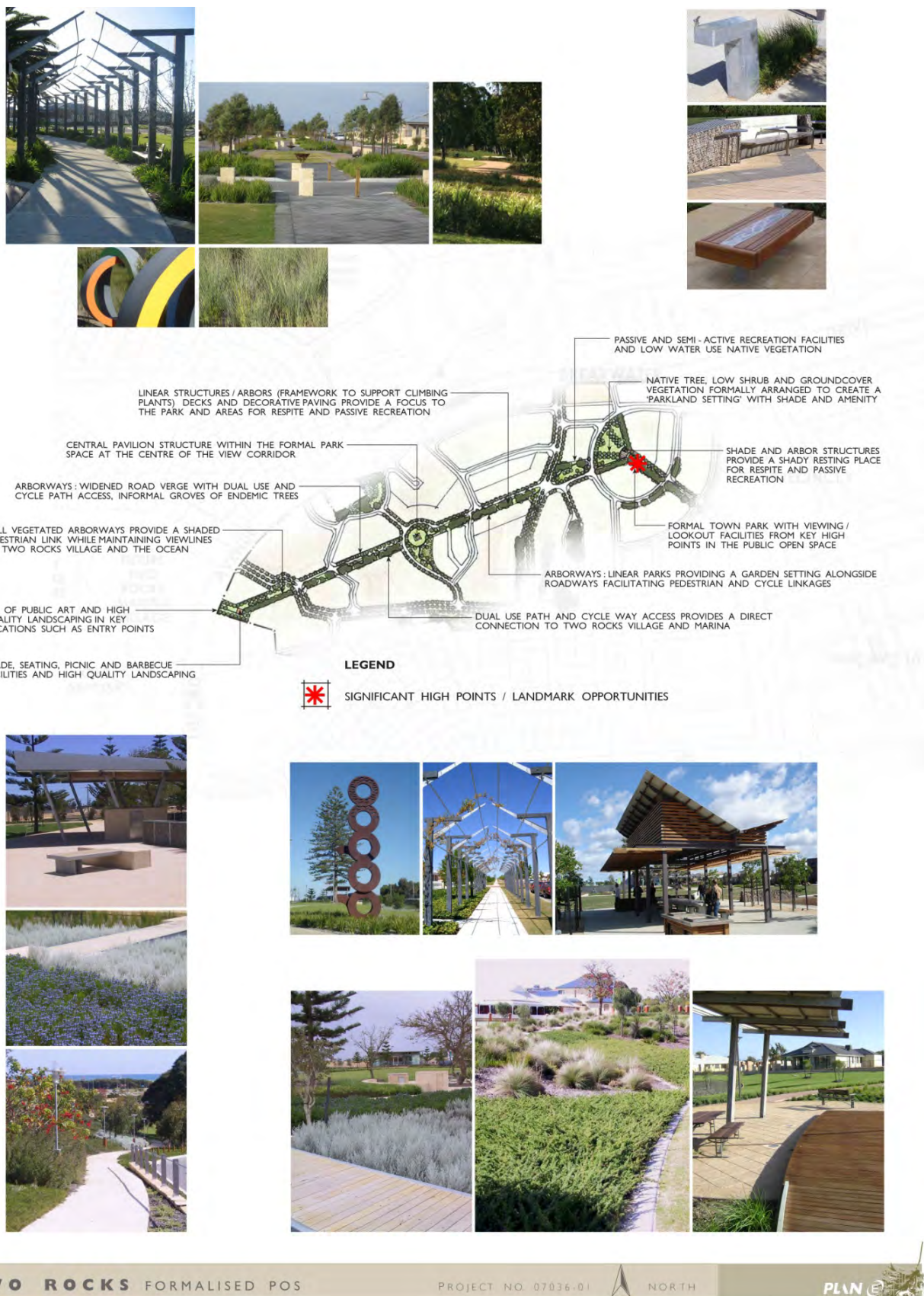


FIGURE 5.7 FORMALISED PUBLIC OPEN SPACE [SOURCE: PLAN E]



FIGURE 5.8 **FORMALISED PUBLIC OPEN SPACE [SOURCE: PLAN E]**

NEIGHBOURHOOD PARKS

There are numerous smaller parks scattered through the development, ensuring open space amenity is readily available to all residents. These parks will provide more intimate spaces for passive recreation and possibly incorporate play facilities and open lawn areas for informal active recreation. Dual use and cycle path networks will ensure these parks are well connected to the larger open space areas and movement systems within the LSP.

PARKS IN HIGHER DENSITY PRECINCTS

Parks adjacent higher density and/or commercial/mixed-use areas will have a higher level of treatment to reflect their status as key urban spaces. These parks will be designed to accommodate more intensive usage, and will incorporate more hard landscape elements featuring seating areas, shade structures, play areas, public artworks and possibly other community facilities. Their treatment will be more formal to reflect their urban context.

5.2.3.3 ARBORWAYS

A key feature of the development is an extensive network of ‘arborways’ that will provide green linkages incorporated into the street system (refer **Figure 5.9**). These will be streets offset to one side within a wide road reserve, so that the wider portion of the road verge becomes an attractive landscaped green spine adjacent the road that will facilitate pedestrian and cycle linkages through the development.

5.2.3.4 MAJOR BOULEVARDS

The major north-south and east-west streets through the LSP will be developed as tree-lined boulevards, signifying their importance in the road hierarchy and also promoting their use as the primary pedestrian and cycle routes through the development (refer **Figure 5.10**). The network of boulevards combined with the arborways and open space linkages will provide a diversity of legible and attractive walking and cycle circuits within the development. Amenities will be provided for pedestrians and cyclists at strategic locations along these routes, including bike racks, drinking fountains, seating and viewing areas, shade structures, interpretive information and so on.

5.2.4 PUBLIC ART

Public art will be an important and integral component of the landscape design within this development. Artworks will provide numerous benefits to the community, including the following:

- Enrich the built environment;
- Contribute to the creation of a local identity;
- Develop community pride;
- Interpret and express in a creative way the unique characteristics of this area (including natural, cultural and social characteristics);
- Provide landmarks as points of reference and orientation; and
- Contribute to the safety of a place and reduce vandalism.

A public art strategy and program will be developed to ensure the implementation of meaningful and relevant artworks throughout the development. Opportunities will be explored to involve local artists in specific projects.



FIGURE 5.9 ARBORWAYS [SOURCE: PLAN E]

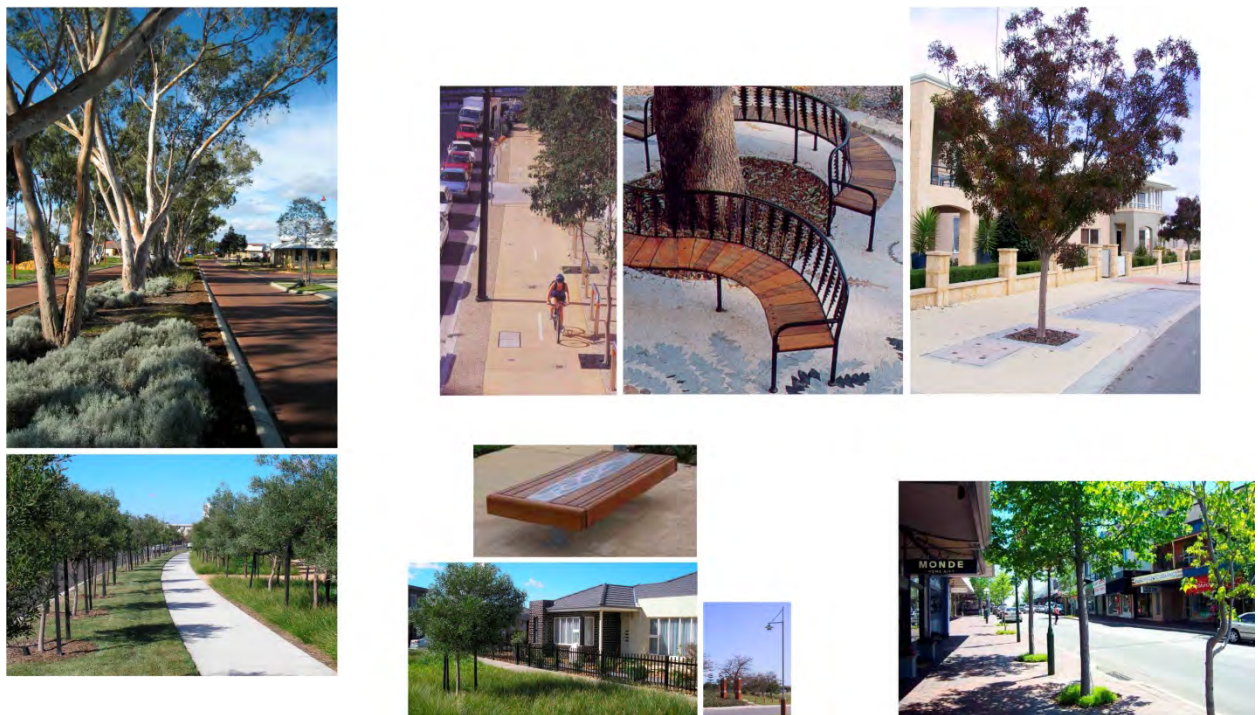


FIGURE 5.10 STREETSCAPES [SOURCE: PLAN E]

5.3 MOVEMENT NETWORK

5.3.1 PROPOSED ROAD NETWORK AND STAGING

The proposed internal road network is illustrated in **Figure 5.1**. The road hierarchy is shown in **Figure 5.11**.

The road network is likely to develop in stages, driven by the sequence in which the land area is to be developed. A possible staging plan is outlined below and is illustrated in **Figure 5.12 through Figure 5.15**.

Part 1 of the LSP sets out the requirement for Breakwater Drive to be upgraded in two stages, prior to the development of 1,029 lots and 4,832 lots respectively.

Traffic modelling has been undertaken to forecast when these staged road upgrades will be required. In the case of Stage 1 (a length of 1,198m as depicted in Figure 5.13), the modelling determined that this section of road upgrade would be required generally at some point during the development of Lot 500, when road traffic numbers warrant it. In terms of lot numbers, this means that Stage 1 of the upgrade of Breakwater Drive could be required any time after the development of 1,028 lots within the LSP area but before the development of 3,045 lots.

The reason for this large lot number range is that the timing for the road upgrade will be triggered by the number of vehicles actually using Breakwater Drive, not the number of lots developed. At this early predevelopment stage, it is not possible to predict to any greater degree of accuracy the actual time when traffic numbers on Breakwater Drive will reach the threshold that will necessitate that the road be upgraded.

Therefore, it should be noted that the requirement in Part 1 of this LSP for Stage 1 of Breakwater Drive to be upgraded before the development of 1,029 lots is the very earliest that the road upgrade may be required, and that it may transpire that it is not actually required until a later time. Therefore, a Traffic Assessment may be undertaken by the subdivider prior to the creation of the 1,029th lot in order to demonstrate whether the traffic volumes on Breakwater Drive warrant the upgrading of Stage 1 of this road at that time. If the traffic numbers do not warrant it, then the subdivider may apply to the City of Wanneroo and the Western Australian Planning Commission to amend the lot threshold of 1,028 lots in Part 1 of the LSP.

STAGE A:

Precincts 4, 5 and 6 are planned for development in the first stage. This will likely necessitate construction of the two north-south local distributor roads bounding this area. In addition, the main north-south district distributor would be required, as would a portion of the local distributor at the very northern edge of the site to connect the three roads back to Breakwater Drive (**Figure 5.12**).

STAGE B:

Precincts 8 to 11 are planned for the second stage of development. To ensure access to the new dwellings, as well as connectivity to the existing development, several key roads will require construction (refer **Figure 5.13**). Two of these connections will create four way intersections with Breakwater Drive and roads recently constructed as part of Stage A and one will create a four-way intersection with Sovereign Drive. The remaining streets are access streets and connect into existing residential streets in Two Rocks. Upgrade of the portion of Breakwater Drive from the intersection of Damepattie Drive and extending east is also planned for Stage B, with the remaining portion to be upgraded in Stage D.

STAGE C:

Roads constructed under this stage will serve the coastal development in precincts 1, 2 and 3 (refer **Figure 5.14**). The main north-south road in this area is planned to connect into the existing Sovereign Drive and Damepattie Drive. The main east-west road is an extension of the local distributor constructed under Stage A.

STAGE D:

The final stage includes the regional road connection (district distributor B) that becomes necessary when Two Rocks reaches its development potential and the remaining length of Breakwater Drive within the LSP area (refer **Figure 5.15**).

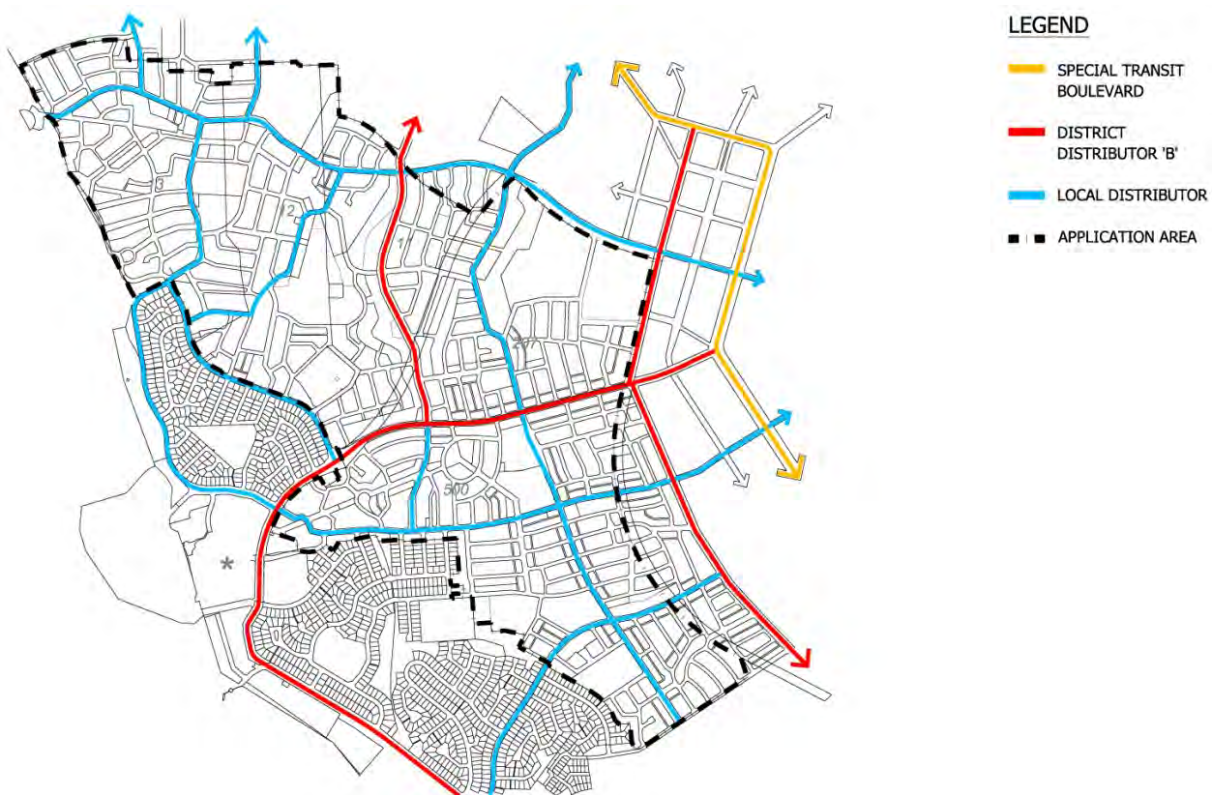


FIGURE 5.11 ROAD HIERARCHY [SOURCE: SKM]

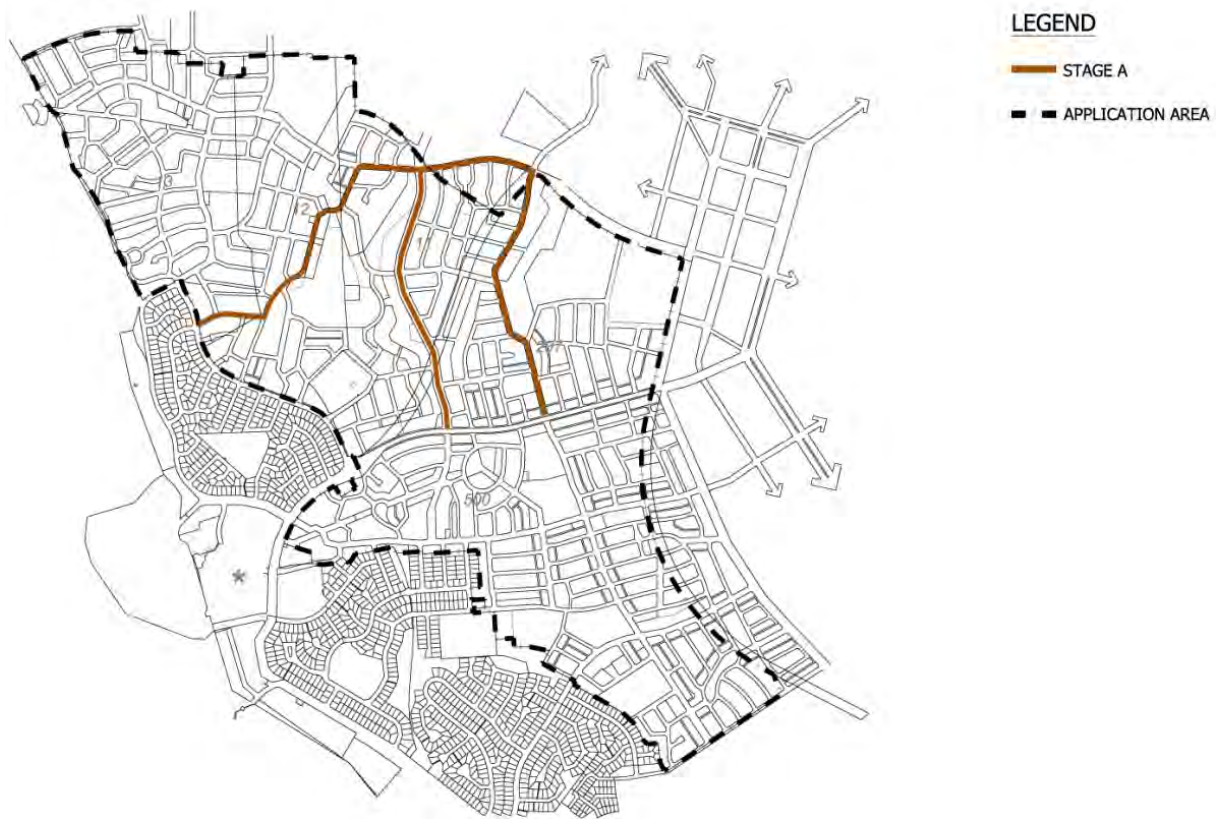
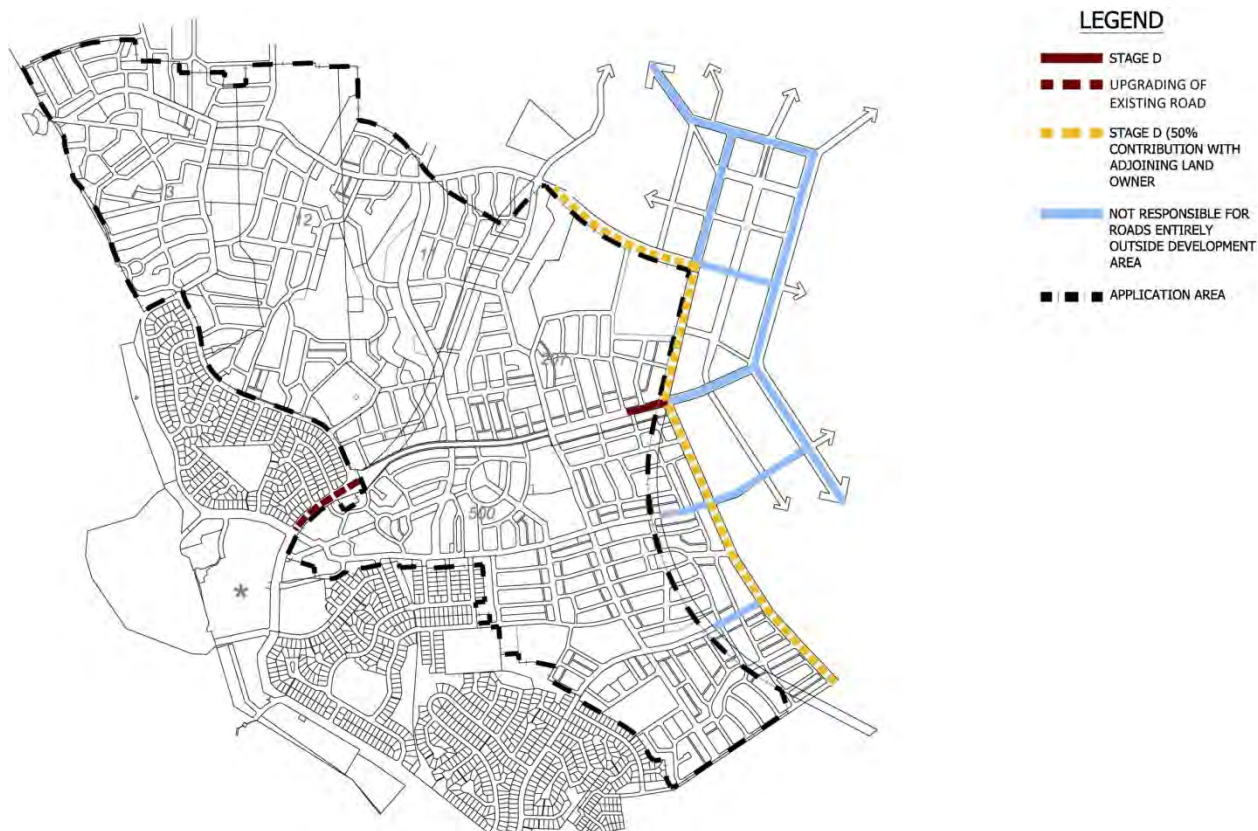
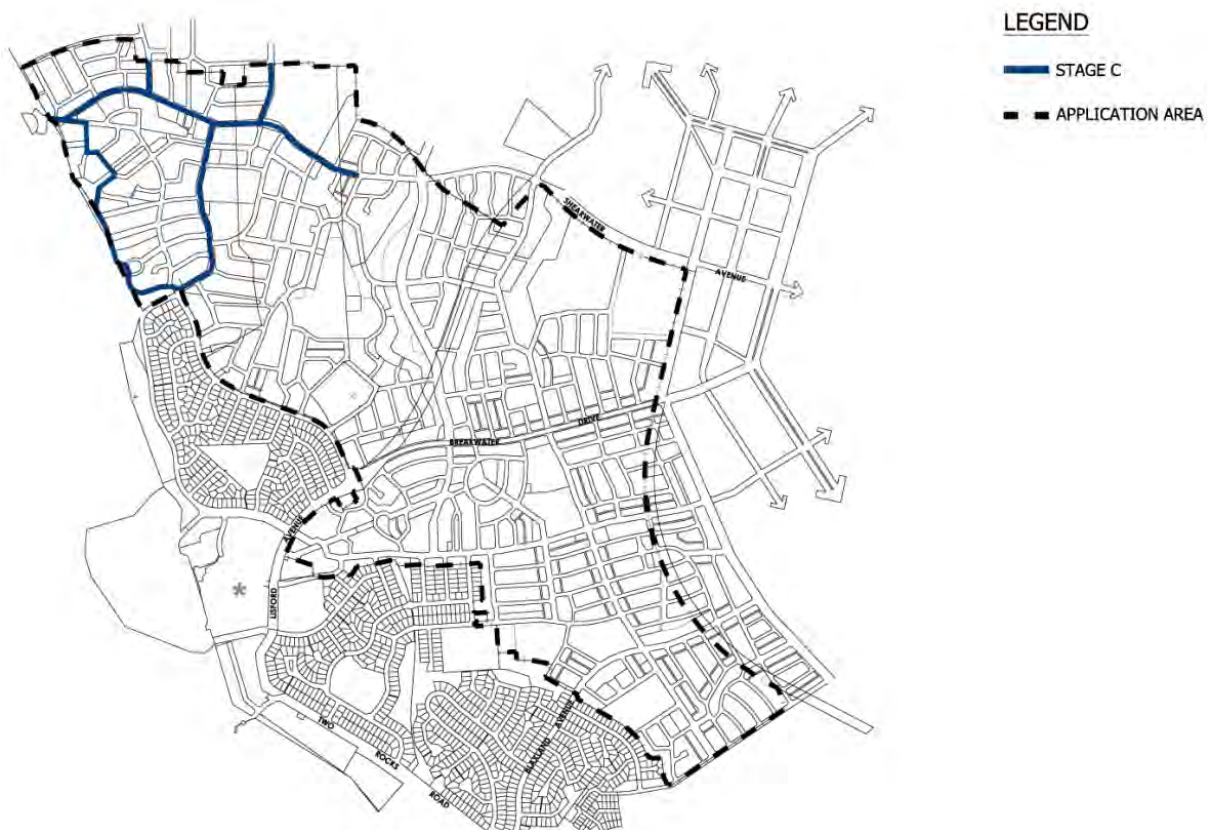


FIGURE 5.12 STAGE A MAJOR ROAD CONSTRUCTION [SOURCE: SKM]



FIGURE 5.13 STAGE B MAJOR ROAD CONSTRUCTION [SOURCE: SKM]



5.3.1.1 INTERNAL CROSS SECTIONS AND RESERVATIONS

The internal Two Rocks road network is proposed to consist of three key street types. These are discussed in more detail below along with indicative cross sections.

The cross section plan in Figure 5.22 is indicative only and it is expected that application of the cross sections will remain flexible to ensure that the provision of parking (the key difference between option 1 and option 2 for local distributors) is responsive to the abutting land uses and can be provided on both sides of the street, one side or not at all where land uses generate sufficient demand and where it is appropriate for the traffic environment in the area.

DISTRICT DISTRIBUTORS

Lisford Avenue is currently classified as a district distributor (B) in the MRWA functional road hierarchy and is a single carriageway through the Two Rocks area. The St Andrews district plan shows Lisford Avenue changing to a district distributor (A) through the existing Two Rocks town centre. However, after further analysis of future modelled traffic volumes, it is suggested that Lisford Avenue should function as a single carriageway district distributor (B) through the existing Two Rocks town centre to prevent segregation and to reinforce the slower speed traffic environment of a town centre.

DISTRICT DISTRIBUTOR B

There are several proposed new roads through the Two Rocks Structure Plan that would function as district distributor Bs. The St Andrews District Planning process proposed a generic cross section for a district distributor B, illustrated in **Figure 5.16**. Whilst parking is permitted on both sides, the need for parking will be determined by frontage and access to uses abutting the road, as well as community expectations.

- Description – Dual carriageway two lane boulevard (one lane in each direction).
- Operating Speed – 50-60 kph.
- Parking – Permitted both sides.
- Bus Priority – Not generally required.
- Road Reservation – 30.0 metres.
- Median – 6 metres
- Verge – 4.5 metres. Trees may be located on nibs in the parking bays

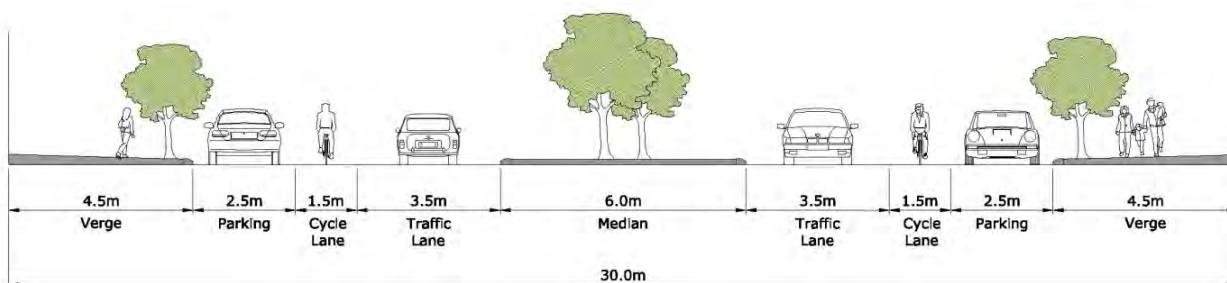


FIGURE 5.16 DISTRICT DISTRIBUTOR B

LOCAL DISTRIBUTORS AND SPECIAL DUNAL ROAD

Three generic cross sections have been developed (**Figure 5.17**, **Figure 5.18** and **Figure 5.19**). It is recommended that these streets feature a shared-use path along one side and a footpath within the remaining verge.

Option 1 is based on a liveable neighbourhoods' boulevard neighbourhood connector and has been developed to suit streets abutting cottage lot product.

In front of cottage lots 22.4 m reservation:

- Road Reservation – 22.4 m
- Operating Speed – 50 kph
- Parking permitted one or both sides
- Lane width 3.5 m
- Bus route allowed
- Median- 3.0 m (depending on tree species)
- Verge- 2.5 m
- Footpath one side, shared path other

Option 2 provides a slightly less formal street layout and is tailored to suit streets abutting traditional lots.

In front of traditional lots 22 m reservation:

- Operating Speed – 50 kph
- 1.5 m cycle lane
- 3.5 m traffic lane
- Bus route permitted
- Road Reservation 22 m
- Verge - 4.5 m

Special Dunal Road (Option 3) shows a reduced reservation width where the road is to extend between existing dunal systems and will therefore feature passive open space on either side. In order to maintain a character of road that reflects the natural landscape, the cross section through the portion of road that features dune on both sides has been kept to a minimum.

These cross sections may be appropriate for either local distributor or district distributor B roads for short sections, depending on abutting land form.

Between dunes 16 m reservation

- Dunes abutting on both sides (relatively short sections of road)
- Road Reservation – 16 m
- Operating Speed – 50 kph
- No parking permitted
- Lane width 3.5 m
- Bus route
- 1.5 m cycle lane and buffer zone
- Median - 3.0 m (depending on tree species)
- Verge - 1.5 m assuming services can be accommodated outside the road reserve and City of Wanneroo approval.

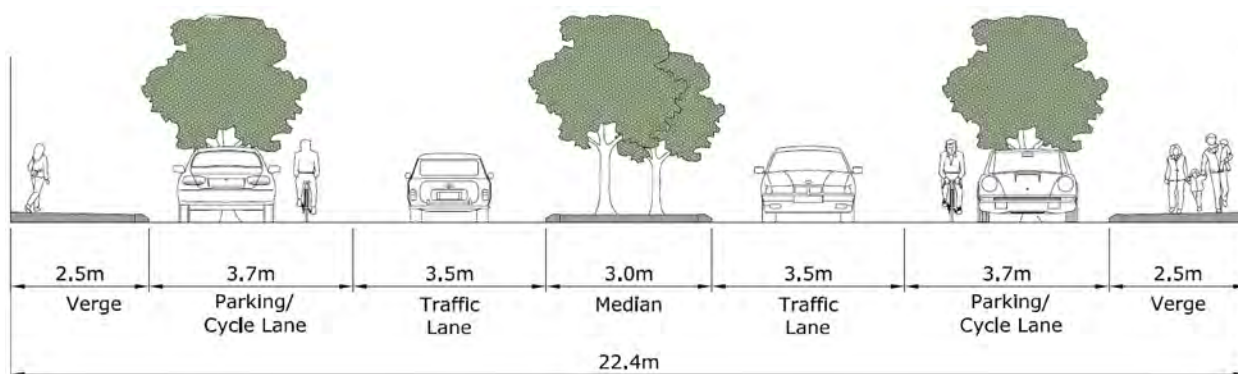


FIGURE 5.17 LOCAL DISTRIBUTOR (OPTION 1)

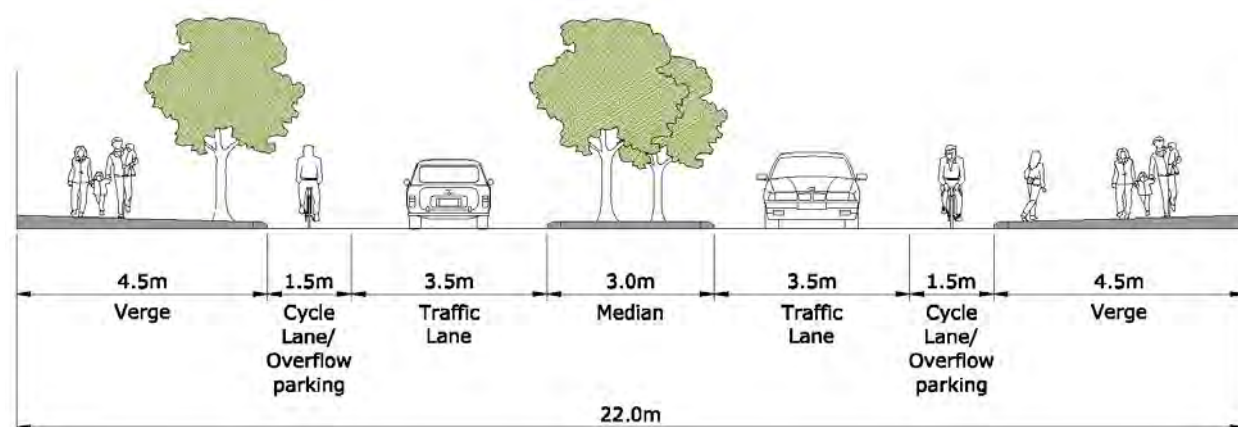


FIGURE 5.18 LOCAL DISTRIBUTOR (OPTION 2)

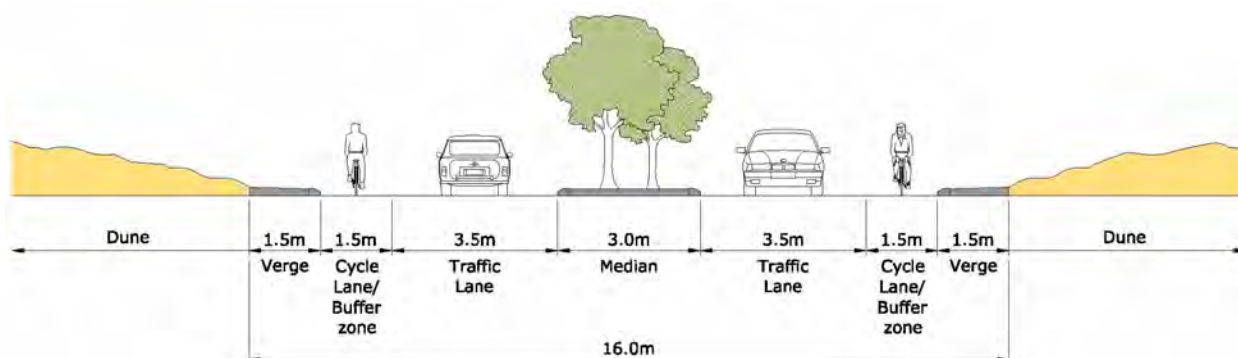


FIGURE 5.19 SPECIAL DUNAL ROAD (OPTION 3)

LOCAL ACCESS STREETS

The majority of streets within the Two Rocks Structure Plan area will function as access streets, primarily providing access to residential dwellings and daily uses. There are two indicative cross sections provided for this type of street (**Figure 5.20 and Figure 5.21**), one allows for informal on-street parking and the other provides for more formal indented parking. It is recommended that a mix of these be provided within Two Rocks.

Cross Section - informal on street parking

- Reduced road pavement and therefore encourages lower speeds.
- Less 'cluttered' streetscape and helps create an intimate, informal street.
- Can cause confusion and result in drivers parking on the verge. If most or all parking occurs on the verge this results in a wider road pavement than is necessary.

Cross Section – formal on-street parking

- Provides obvious parking bays and discourages verge parking.
- Appropriate with cottage lots.
- Parking bays often coloured asphalt or brick paved and can include trees in nibs.
- Narrower formal road pavement for traffic flow.
- Requires a higher level of planning to determine appropriate level of parking.

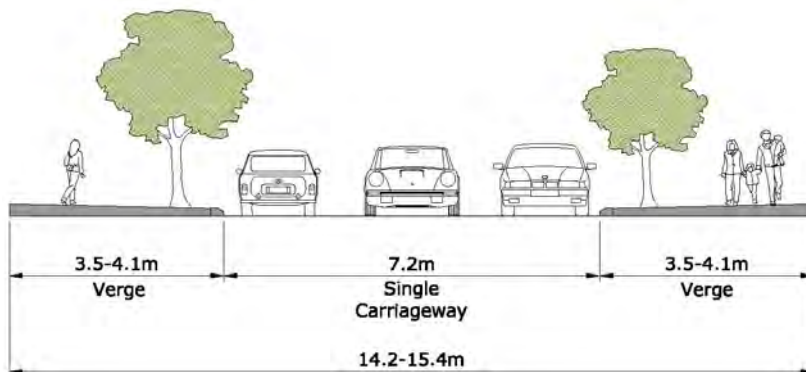


FIGURE 5.20 INDICATIVE CROSS-SECTION FOR RESIDENTIAL STREETS (INFORMAL PARKING)

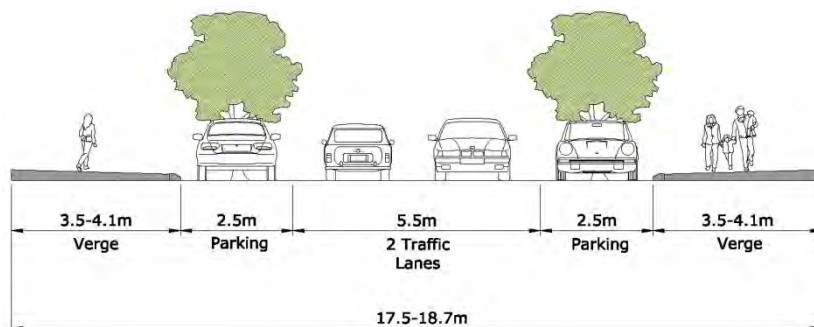


FIGURE 5.21 INDICATIVE CROSS-SECTION FOR RESIDENTIAL STREETS (FORMAL PARKING)



FIGURE 5.22 CROSS SECTION PLAN [SOURCE: SKM]

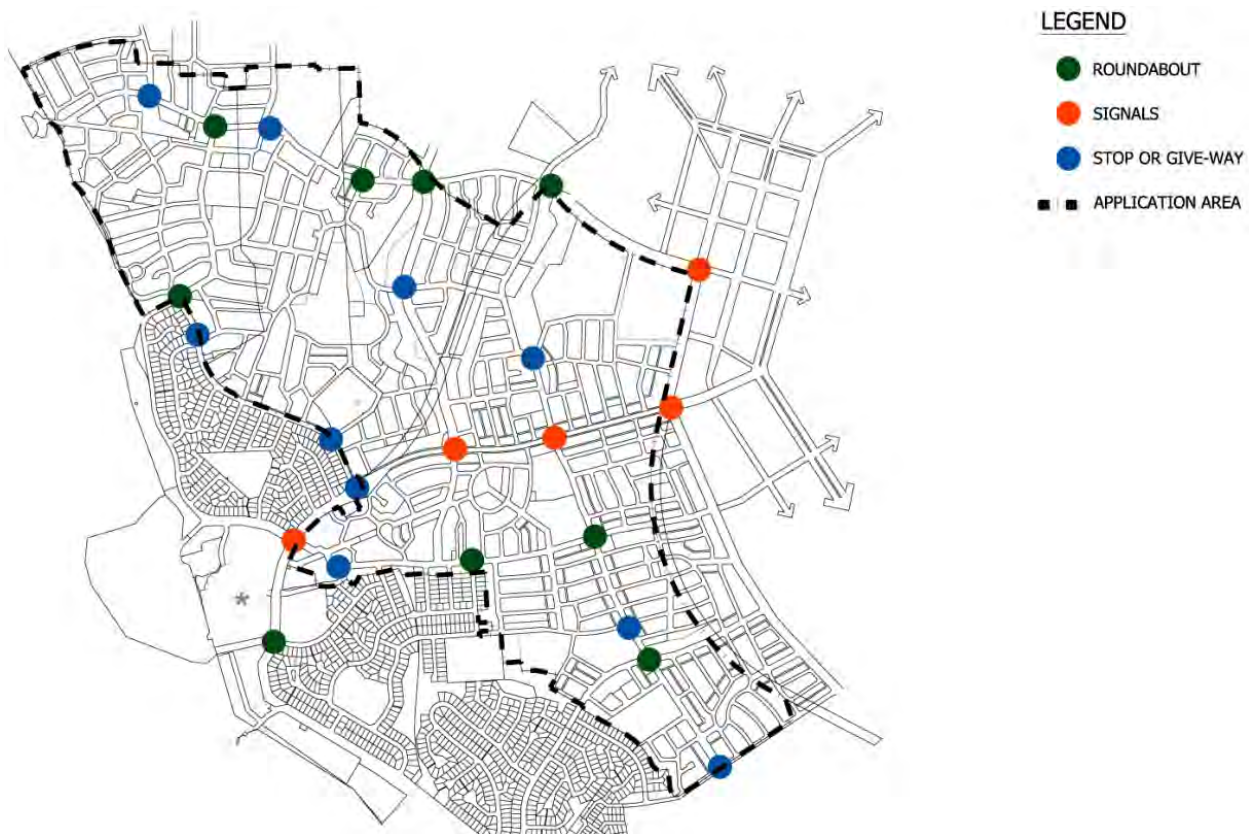


FIGURE 5.23 PROPOSED INTERSECTION TREATMENTS [SOURCE: SKM]

5.3.1.2 INTERSECTION CONTROL

At this stage, it is proposed that three-way intersections would operate safely with Stop Sign or Give Way control on the minor approach. In general, four way intersections would be roundabout or traffic signal controlled, depending on traffic volumes, pedestrian movement and the demand for turning movements. Stop sign control can be appropriate for four-way intersections between low order access streets. A proposed plan for treatments at key intersections is provided in **Figure 5.23**.

Intersections will be assessed further at detailed planning phase for subdivision approval. Particularly, school sites will need to be considered further at this stage, including assessment of the appropriateness of intersection treatments such as roundabouts, requirements for vehicle turn-around, pedestrian crossing points and any appropriate extensions to the shared path network to service access points/entrances to school sites.

5.3.1.3 PROPOSED EXTENSION/MODIFICATION TO EXISTING ROAD NETWORK

Lisford Avenue will require upgrade in the future. The future character and function of this road is discussed under section 5.3.1.1.

Over the years significant planning has been undertaken on development of the road network servicing the Two Rocks area from a district level. The road network developed as part of the St Andrews District Structure Plan in 2007 (refer to **Figure 3.5**) supersedes previous planning. The District Structure Plan is currently under consideration and MRS amendments may be required to bring previous planning in line with the District Structure Plan.

5.3.2 ROAD NETWORK

5.3.2.1 ANALYSIS OF INTERNAL ROAD NETWORK

Assessment of the road network for the Two Rocks development involved the development of an EMME/2 traffic model. This model represents a road network as a series of links (roads) and nodes (intersections). The traffic generating land uses are represented as a number of zones connected to the network.

For this application, a 24-hour average weekday model was developed. The average weekday was selected as it represents the typical activity on the area's roads.

The modelled road network comprises all the key routes proposed within the area (the majority of the proposed access roads, neighbourhood connectors and district distributors). Some minor access roads have not been included as they have little influence on the traffic operation of the network.

The road network coding was based on an estimate of the road hierarchy. Different road categories have been allocated different traffic capacities through the use of a volume-delay function. These functions change the travel time based on the amount of traffic using each section of road.

Higher-order roads with more lanes are allocated a higher capacity and hence their travel times will not be affected as significantly by large volumes of traffic as a lower-order road would be. The model seeks to minimise journey times and hence traffic tends to concentrate on higher-order roads which have higher capacities.

The traffic model uses the traditional four-stage model processes which includes the following stages:

- Trip generation;
- Mode split;
- Trip distribution; and
- Trip assignment.

The trip generation within this model considered only private vehicle trips and therefore the mode split process was not required. This stage was taken into account when generating the trip production rates within the trip generation stage.

The technical traffic modelling report is included in **Appendix 15** of this report. Traffic volumes from the model are provided in **Figure 5.24** and represent combined 2-way, 24 hour flows.

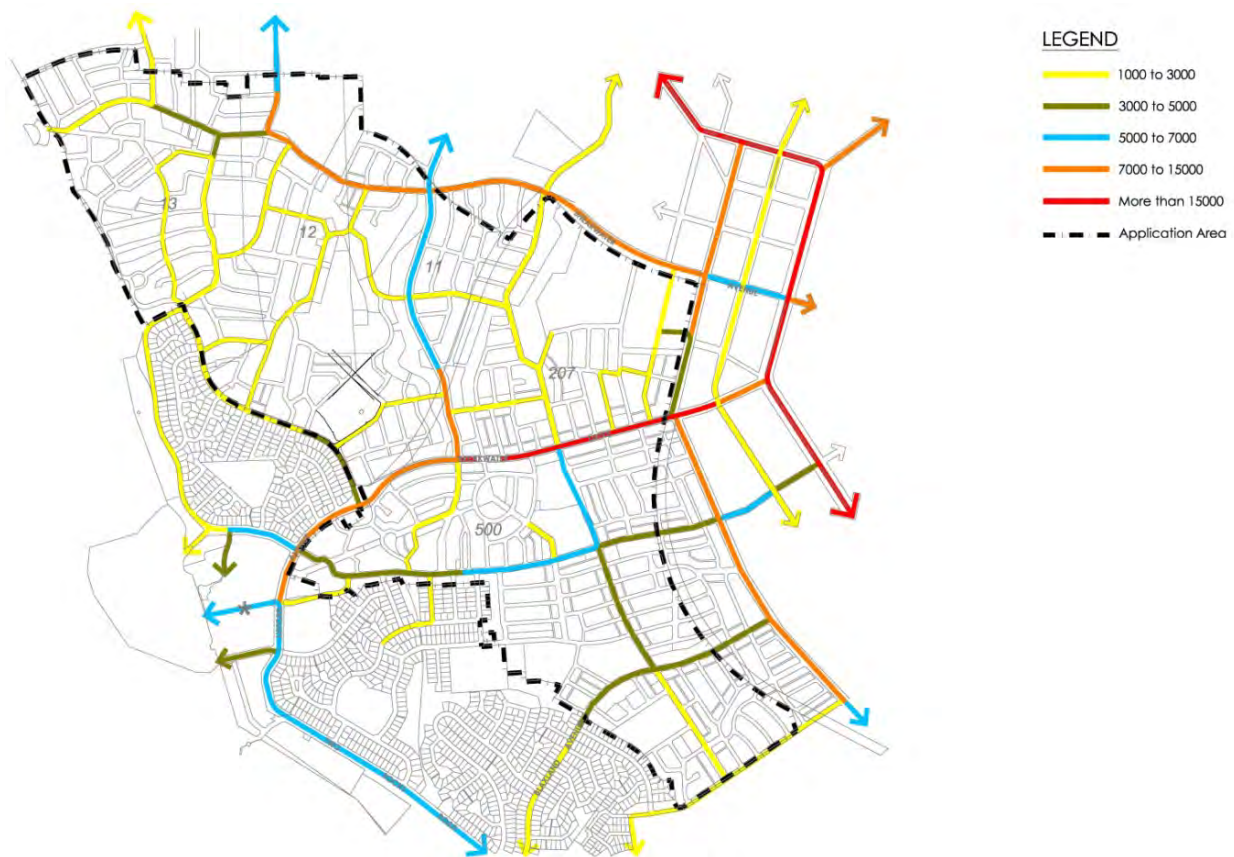


FIGURE 5.24 ESTIMATED TRAFFIC VOLUMES [SOURCE: SKM]

5.3.3 PARKING

On local access streets a mix of informal on-street and formal embayed parking is considered the most efficient and appropriate method for provision of parking. The location of each parking type would be determined by the road function and parking need. For example, unmarked staggered parking is generally appropriate on minor residential streets, whereas higher order roads or roads abutting community uses may require formalised parking and embayment. The previous cross sections show the type of parking catered for by different road classifications.

It is anticipated that parking for non-residential uses, such as commercial and retail, would be provided for on-site with due regard for opportunities for reciprocal parking rates where appropriate.

5.3.4 PEDESTRIANS AND CYCLISTS

It is the intention of the Two Rocks Structure Plan to provide enjoyable, safe and legible connections to encourage residents and visitors to use walking and cycling for trips as well as leisure.

The following general principles would be used to guide planning for pedestrians and cyclists in Two Rocks:

- Footpaths are proposed on at least one side of all streets, with the possible exception of very short streets, cul-de-sacs and rear-lot access laneways.
- Footpaths are typically constructed at a width of 1.5 m.
- Footpaths should be provided on both sides of streets that may serve greater numbers of pedestrians, such as long direct streets connecting to shops, recreation areas, bus stops or other major attractors and pathways.
- Consideration would be given to the side of the road paths are to be provided on, particularly where integrating with existing streets that feature a path on one side.
- Recreation paths around POS should be included into pedestrian planning for street sections (they can contribute a path on one side of a street abutting POS). A footpath that would normally be required as part of the road reservation can be substituted with a path within POS, provided the path's location and route allow it to serve the same function.
- Pedestrian routes should service all bus stops.
- Shared use paths should be provided on at least one side of local distributors and should be considered for some higher demand streets, such as those leading to major activity generators, such as local shops, offices, schools or major recreation uses.
- Shared use paths should be provided on both sides of higher function roads, such as district distributors.
- Shared use paths are typically constructed at a width of 2.5 m.
- Cycle lanes should be provided on higher order roads where there is expected to be higher numbers of cyclist traffic (such as routes to major destinations) and where traffic volumes and the speed differential between vehicles and cyclists make it unsafe or undesirable for cyclists to share the roadway with vehicles.
- On-street cycle lanes are recommended for all district distributor roads.
- Cycle lanes should be constructed at a width of 1.2 m where there is indented parking, or 1.5 m without. This is to provide a buffer between cyclists and passing vehicles.

On local access roads it is envisaged that cyclists will share the roadway with motorists due to the low traffic volumes (less than 3,000 vpd) and small speed differential, assisted by the introduction of the 50 kph speed limit in built up areas.

Provision has been made for cyclists on each of the road types in line with the principles described above and as determined by Liveable Neighbourhoods and forecast traffic volumes. Provision has been made within the cross sections for a shared use path along at least one side of local distributor roads.

A regional recreational path (suggested width 3.5) has been proposed as part of the St Andrews District Structure Planning process. This path would extend along the coast for the entire length of the St Andrews development and through the existing Two Rocks town centre.

The proposed network of pedestrian and cycle routes is outlined in **Figure 5.25**. This network will also be enhanced by the network of arborways and open space linkages that are proposed.

5.3.5 PUBLIC TRANSPORT AND STAGING

The ultimate public transport routes through the Two Rocks Structure Plan area have been developed through the St Andrews planning process and are illustrated in **Figure 5.26**. However, this represents the long term service to the area and it is likely that much reduced service coverage will occur in the interim. A potential staging plan for public transport has been discussed with the PTA and the indicative bus routes in the interim are illustrated in **Figure 5.27**.

Two of the ultimate bus routes are planned to connect to the rail head at the southern town centre. In the interim, at least one of these would connect to the Clarkson Station or Butler Station via Marmion Avenue.

The bus routes are able to sufficiently service the planned density and mixed use along Breakwater Drive, however it should be noted that it is particularly difficult to service the residential density along the coast by bus. This is due to the route and function of this road and because a bus route along the coastal road would reduce the potential catchment by half (i.e. half the catchment is beach/ocean).

Proposed cross sections for roads planned as bus routes feature lane widths sufficient for bus movement. The main north-south district distributor, although not planned as a bus route at this time, should also be designed to accommodate bus movement.

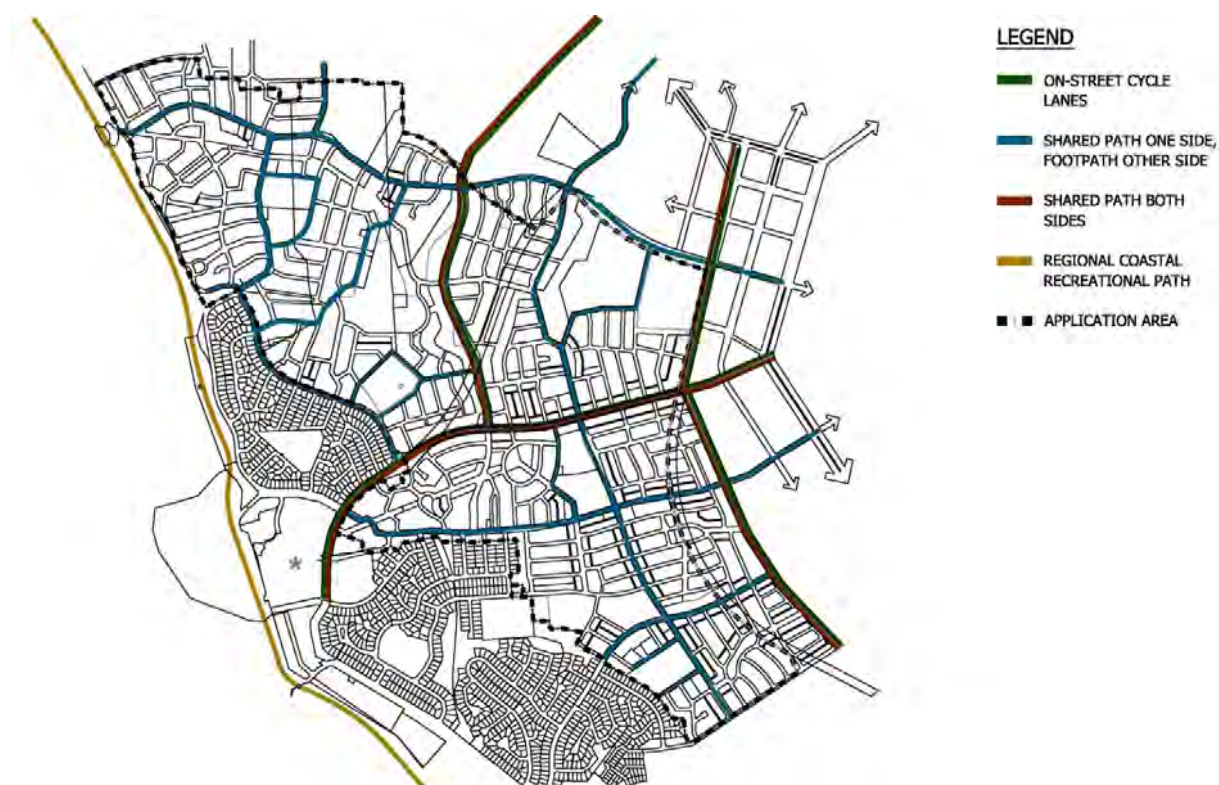


FIGURE 5.25 PEDESTRIAN/CYCLE PATHS ON KEY ROADS [SOURCE: SKM]

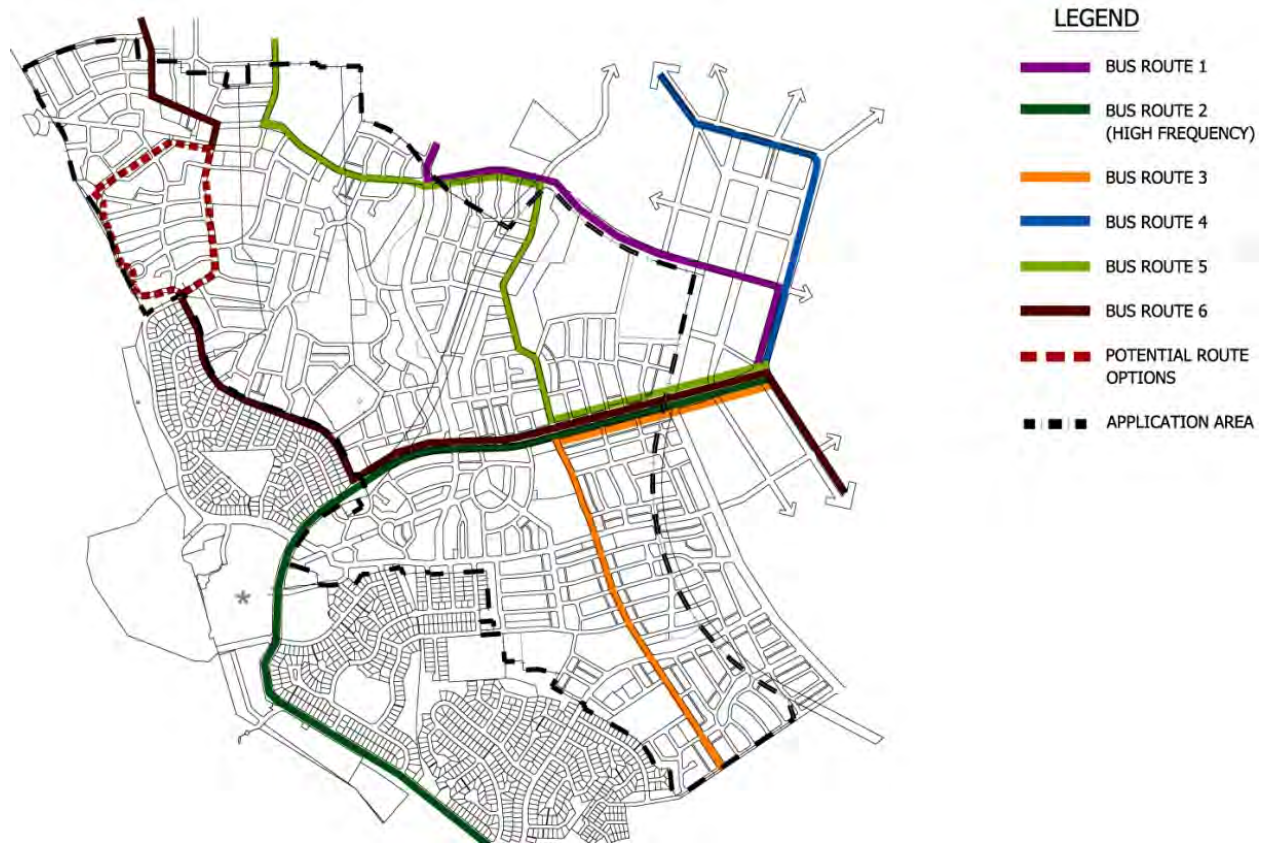


FIGURE 5.26 ULTIMATE PLANNED PUBLIC TRANSPORT SERVICE TO THE TWO ROCKS AREA [SOURCE: SKM]

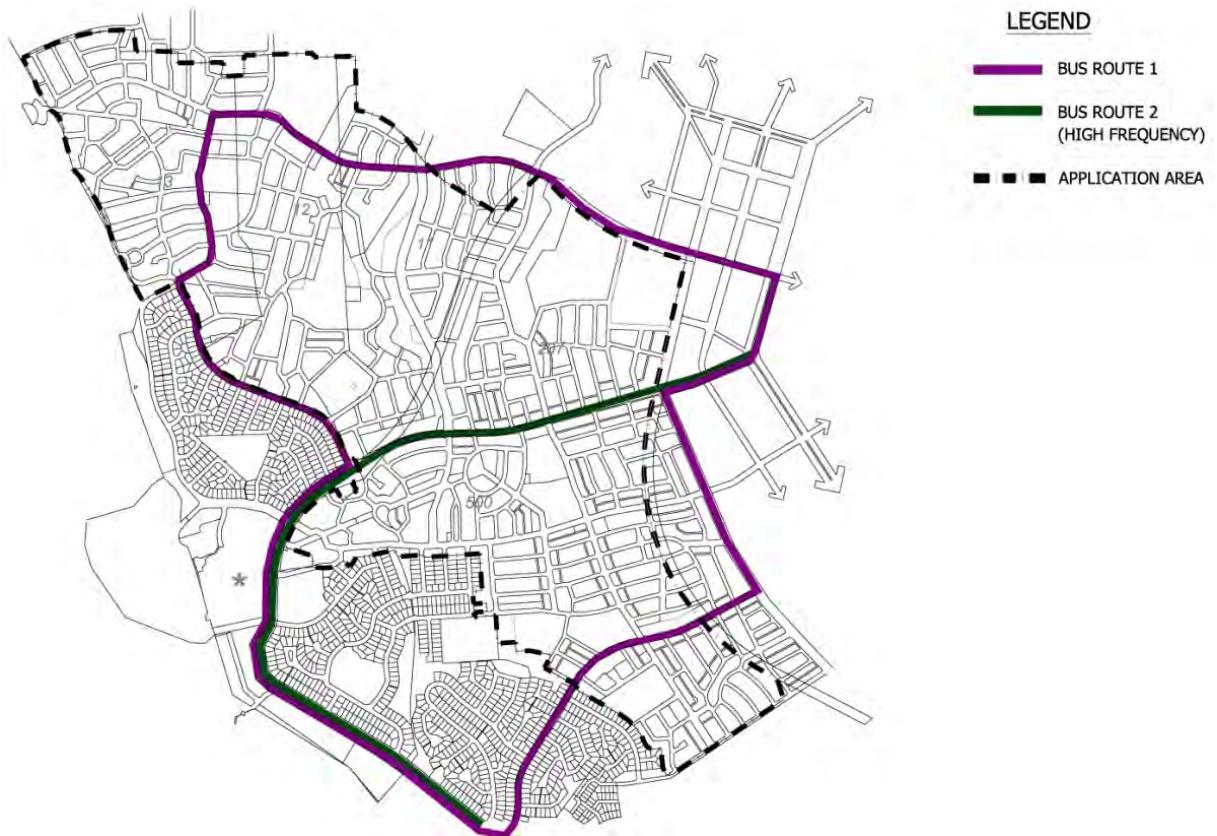


FIGURE 5.27 PROPOSED INTERIM BUS ROUTES [SOURCE: SKM]

5.4 ENGINEERING

This section summarises the infrastructure requirements for the future residential population of the Two Rocks Local Structure Plan area.

5.4.1 EARTHWORKS

The site generally consists of limestone overlain by calcareous sands.

Due to the steeply undulating ground the site will require substantial earthworks. However, in certain locations where the undulating nature of the land has the opportunity to create a unique sense of place and character, efforts will be made to minimise the earthworks and maximise the retention of the existing landform. There is a chance that loose sands may be present in some locations requiring additional expensive site preparation works.

Limestone will be encountered close to the ground surface for much of the site and will need to be broken up by bulldozers. The rock will need to be relocated and compacted in deeper fill areas. Pending testing, there will be potential to use this material as structural fill and / or for road pavement sub-base and base courses.

Heavy compaction, especially in the northwest, may be necessary due to the high void ratio and subsequent low bearing capacity of the soil and over-excavation may be required to provide suitable foundations for development if compaction cannot be achieved from the surface. Where suitable borrow pits for cut to fill across the subject site cannot be utilised, imported structural fill may be required. This will be ascertained at preliminary design phase, however, wherever possible, the use of imported fill will be minimised.

It may be difficult to retain vegetation in some areas of the subject site due to the magnitude of the earthworks. There are currently Bush Forever regions separating the development from the ocean and vegetation will also be retained wherever possible within the interconnected network of open spaces and green links.

Dust control measures will need to be assessed in detail. With summertime prevailing winds being north-easterly there is significant risk to the current Two Rocks developed area. Adequate control measures will be ensured, such as the use of water carts and soil stabilisation for dust suppression. Removal of topsoil presents a risk to both the maintenance of on-site vegetation and the promotion of future vegetation growth. Transportation of nutrient-rich topsoil also presents a risk to downstream environments where the nutrients are collected in drainage catchments and water-bodies.

Management guidelines for possible karst identification will be put in place for the earthworks stage of construction, notwithstanding the risk of karsts at or near the existing ground surface levels is low.

5.4.2 STORMWATER MANAGEMENT

Conventional methods of collecting storm water in road reserves and transferring it via piped drainage networks to downstream drainage infiltration basins will be utilised in the development. In addition to this, opportunities for incorporating more innovative methods of stormwater collection and management will be explored, such as the integration of drainage swales in arborways and linear parks to encourage infiltration at source and reduce the requirement for the conveyance of water off site. Where swales are proposed to be located within road reserves, widened road verges may be required.

Drainage design will incorporate Water Sensitive Urban Design techniques and 'best management practices' as outlined in the Manual for Managing Urban Stormwater Quality in Western Australia, published by the Department of Water. Wherever possible infiltration basins will be incorporated into and utilised as passive open space. These swales and infiltration basins will form part of the design to recharge the ground water and provide sufficient capacity for the 1 in 10 or 1 in 100 year storm events for the intermediate and trapped low points respectively.

Where swales are proposed to be located within road reserves, widened road verges may be required. Furthermore, the assumed infiltration rates will need to be listed prior to the commencement of drainage design.

Other water sensitive design principles that may form part of the engineering design include:

- The installation of flush kerbing wherever possible, but particularly adjacent to POS areas and large medians;
- The minimisation of road surface areas to reduce impervious areas;
- The installation of gross pollutant traps to minimise the risk of groundwater contamination. This will be important in the western area of the site given the expected rapid infiltration rates through the soil;
- Slotted pipes to maximise infiltration along the route of the pipe drainage system, subject to acceptance by the City of Wanneroo; and
- Proprietary brand 'drainage cells' and other below ground infiltration systems to achieve a "no flow" system of infiltration.

Figures 5.28 and 5.29 illustrate the preliminary drainage planning and earthworks design for the entire structure plan area. This includes the identification of all of the proposed drainage catchments and the resulting minimum areas required for drainage retention in the respective low points for each of the catchments. These drainage retention basin areas have been calculated based upon:

- The City of Wanneroo's Guidelines for the Development and Subdivision of Land;
- All retention basins being utilised as passive open space areas, wherever possible;
- No allowance has been made for infiltration in retention basins within areas that rock outcrops have been identified; and
- Conservative rates of infiltration (5m/day) have been allowed for within sand areas.

(NB: The assumed infiltration rates stated above will be tested on site prior to the commencement of detailed drainage design).

FIGURE 5.28 PRELIMINARY DRAINAGE PLANNING AND EARTHWORKS [SOURCE: TABEC]

5.4.3 WATER SUPPLY

The Two Rocks town site is currently serviced via an existing water scheme. The scheme consists of four bores, two ground mounted storage tanks, chlorination facilities and distribution mains, all of which produce water of adequate potable quality. The storage tanks provide a head of RL 62m.

The current capacity of the water treatment plant is adequate for the initial stages of development to proceed. The Water Corporation will install additional bores and expand the treatment facility in the future to cater for the increase in demand as this and other developments proceed.

The Water Corporation's Scheme Plan for the Yanchep/Two Rocks Water Supply is currently scheduled to be revised by the end of 2009. The implementation of the ultimate scheme has Yanchep and Two Rocks being served from one scheme with the construction of an extended borefield, water treatment facilities, a reservoir or ground storage tanks and a high level system. The ultimate conveyance system for the water, once finalised by the Water Corporation, will determine the routes for the major infrastructure required.

As shown on **Figure 4.18** there are several existing water mains that lie within Lots 207 and 500. These include approximately 1700 m of water mains in total ranging from 535 down to 225 mm in diameter. Due to earth working and general subdivision requirements these existing water mains will need to be replaced and possibly relocated. It will be a required condition of development that any costs associated with the removal or realignment of the mains is borne by the developer.

5.4.4 WASTE MANAGEMENT

As there is virtually no additional capacity available within the existing Interim Two Rocks Wastewater Treatment Plant additional infrastructure will be required to cater for any future development.

The Water Corporation is currently planning to replace the existing Interim Two Rocks WWTP with a major pumping station that will most likely be located within the POS at the intersection of Lisford and Charnwood Avenues. This pump station will have sufficient capacity for both the existing Two Rocks township as well as the entire structure plan area and is currently scheduled to be constructed by 2010/2011 by the Water Corporation, subject to funding being available.

Ultimately it is proposed that this will then pump the sewage via a pressure main along Two Rocks Road to Yanchep where it will discharge into the gravity system for conveyance to another proposed major wastewater pump station. This pump station is to be located in the vicinity of Marmion Avenue and Yanchep Beach Road and is also currently scheduled to be operational by 2010/2011, subject to funding being available. From there sewage will then be pumped around 8 kilometres via a pressure main to the proposed Alkimos Wastewater Treatment Plant, which is currently scheduled to be operational by mid to late 2010 by the Water Corporation.

There are also a number of possible temporary/interim options for the provision of wastewater treatment facilities to service the structure plan area. These may include short term tankering of effluent from the sewer reticulation to be installed within the early stages of the development, which would be trucked to the existing WWTP plant within Yanchep. This would be a contingency measure and require infrastructure approvals and bonding to be in place.

The structure plan area will be serviced by reticulated gravity sewers. It is anticipated that the subject site's piped network will feed into several proposed pumping stations located at low points within the structure plan area. These will all then discharge via pressure mains and the gravity reticulation system to the proposed major pump station to be located within the existing Two Rocks township, which will ultimately discharge to the Alkimos WWTP.

Figure 4.14 shows the Water Corporation's current sewer planning and catchments for the entire region which was completed in late 2008. **Figures 5.30 and 5.31** show the preliminary sewer design and catchments as proposed by TABEC for the structure plan area, which notably results in the deletion of two catchments and hence pump stations from within the structure plan area as compared to the Water Corporation's planning layout. Approval will need to be sought from the Water Corporation for the proposed changes to its planning layout.

All of the proposed sewerage pump stations within the structure plan area will require 30 m buffers as they are Type 180 Pump Stations or smaller.

5.4.5 POWER SUPPLY

Western Power has completed a feasibility study for the Two Rocks structure plan area based on the anticipated development rates and commencement date supplied by Capricorn Village Joint Venture.

Based upon an assumption of 5 kVA usage per dwelling, the Western Power study estimates that the total power requirement for the structure plan area, once completed, will be around 31 MVA.

The study has taken into consideration the load request for the proposed structure plan area coupled with load requests from other surrounding developments in the region. It has established that there is a restriction to available network capacity for new developments in the area, but there are some planned network reinforcements due for completion by the end of 2009 which will provide some incremental increase in capacity to the Two Rocks region.

The first reinforcement project is the installation of a voltage regulator on the Lacey Road feeder, which will boost the down stream voltage on this feeder.

The second project is a network backbone extension on the y-split of the Lacey Road feeder and the installation of another voltage regulator on the new backbone extension. Changing the open points will allow the new extension y-split to feed Yanchep town and offload the existing y-split that feeds Two Rocks town. The offload of the y-split, which feeds Two Rocks town, will provide limited additional capacity for growth at Two Rocks. As part of this project, some additional backbone will be installed at the Yanchep town site to accommodate the open point changes.

The third project is a new feeder from Yanchep zone substation connecting to the voltage regulator and y-split backbone extension that was created with the above second project. This new feeder will be known as the Romeo Road West feeder and is a dedicated supply to Yanchep town, offloading the Lacey Road feeder and enabling the Lacey Road feeder to primarily supply the Two Rocks region.

With the completion of these planned works, Western Power envisages that an extra 5 MVA of capacity for new developments will be created in the region of Two Rocks. This capacity cannot be reserved for the local structure plan area and will have to be shared among the various property developers in the area on a first come first serve basis.

Western Power has also advised that the capacity situation will most likely change over time as it is dependent on existing load growth and the type and completion timing of reinforcements to the area.

It is proposed to initially supply the Two Rocks structure plan area from the existing Lacey Road feeder, which is connected via the existing Yanchep substation. Based on the forecast development rates provided by the Capricorn Village Joint Venture for the Structure Plan area, Western Power forecast that the 5 MVA of capacity in the region will be utilised by the summer of 2012/2013, or sooner, depending on take up by other developers in the region. These forecasts indicate that additional reinforcements are required to supply new developments and growth in the region before the summer of 2012/2013.





At this stage Western Power has identified three potential options for long term reinforcements to the area:

- **Option 1:** The establishment of a new feeder from the existing Yanchep zone substation. One scenario is for this feeder to consist of at least 25 km length of 240mm² CU XLPE cable. Additional feeders of similar length or longer would be needed from the existing Yanchep zone substation to accommodate further future developments when the capacity of the new feeder described above reaches its capacity limit.
- **Option 2:** Advance the establishment of a zone substation at the Yanchep town site. The Lacey Road feeder can then be cut into the new zone substation, which will partially relieve the voltage constraint and allow additional load growth at Two Rocks. Subsequent to this, additional feeders to support development at the Two Rocks region will be required. These will be much shorter feeders out of the Yanchep Town zone substation. Depending upon the location of the Yanchep Town zone substation, Western Power anticipates the feeder length to be at a minimum of 10 km in length.
- **Option 3:** Advance the establishment of zone substations at both Yanchep town site and Two Rocks. The existing Lacey Road feeder will be cut into the new Two Rocks zone substation.

Depending upon the location of the Two Rocks zone substation, additional feeders to support the development load growth will be substantially shorter than Option 2.

The acquisition of suitable substation sites located in the areas, and the provision of 132 kV line routes are essential for Option 2 and 3 long term solutions to succeed. These issues are yet to be resolved.

To determine the optimal solution for the area, Western Power is developing spatial load forecasts for the North West corridor area, which will incorporate The Two Rocks Structure Plan area. From these forecasts they will be able to more accurately identify timing for reinforcements and analyse the economic viability of such reinforcements, in terms of whether they will meet the Economic Regulatory Authority's (ERA) regulatory test.

Western Power has also pointed out that the timing and type of reinforcements mentioned above might change and are dependent on load uptake and development in the region. If growth is higher than expected, then long term network reinforcements will have to be advanced.

Western Power and Capricorn Village Joint Venture have agreed to work closely to ensure future upgrades will be undertaken by Western Power in a timely manner in order to meet the rate of development based upon regular advice and updates of progress to be supplied by the developer.

5.4.6 TELECOMMUNICATIONS

There is Telstra network in the vicinity of the development area. Telstra may require the developer to trench external to the development for interconnection to the existing network and to upgrade/augment existing infrastructure such as switchgear.

The developer proposes to provide fibre to the home (Telstra 'Smart Community') including broadband, four phone lines per household, free to air TV and Foxtel. All required infrastructure will be provided by Telstra at the developers cost.

The suitability of any connections for extension into the subject site needs to be confirmed by Silcar Networks. This is usually completed after submission of the electrical drawings to Western Power as Telstra services are provided within the subdivision within the joint trench provided by the developer.

5.4.7 GAS SUPPLY

Currently gas supply to the North West Corridor extends as far as Butler. WestNet Energy has been approached by a number of landowners to extend these services to areas as far north as Yanchep, which has included requests to install infrastructure within the new Marmion Avenue road reserve.

Any future servicing of the Two Rocks site is dependent upon the infrastructure being extended to Yanchep and then subsequently from Yanchep to Two Rocks. If this infrastructure extension from Yanchep to Two Rocks were to be completed, it would possibly be at the developer's expense. This is something that will require consideration by the CVJV in the future, if the infrastructure extension becomes feasible. The cost could be shared by other potential developers in the area, by including them in the extension scheme.

It is intended that internal gas main infrastructure will be designed and constructed to the appropriate standards with the other service infrastructure on a stage by stage basis. The network will then be connected in the future if the gas main link is extended to Two Rocks. There may also be the opportunity for a temporary supply from a local point of supply with suitable buffers to residential development, (i.e. an installation maintained by a supplier such as Kleenheat).

5.5 SUSTAINABILITY APPRAISAL

Arup was commissioned by CVJV to undertake a sustainability appraisal of the Two Rocks Local Structure Plan and subsequent planning documents. A copy of the appraisal is included as **Appendix 16**.

The appraisal used the Sustainable Project Appraisal Routine (SPeAR®) tool developed by Arup.

In undertaking a SPeAR® assessment four key areas, environment, economic, social, and natural resources are addressed to determine the development's sustainability performance. This approach captures the need for environmental protection, social equality, economic vitality and efficient use of natural resources in every project.

The project's performance across each area is directed by the scored outcome of (four to six) indicator subsets. For example within environment; land use, air quality and water discharge are three of the six indicator subsets that are addressed. The performance of each indicator set is driven by the performance rating of 3 to 10 indicators per set. Each indicator set performs according to the average score of the separate indicators for that set. For example within the indicator set Land Use - site location, planning intent, diversity, flood plain, open space and contaminated land - are the indicators that drive performance.

The logic of the indicator scoring is as follows. A score of zero represents compliance with common industry practice (business as usual) or legislative requirements. A negative score indicates non-compliance and a positive score highlights performance that goes beyond compliance. There are three levels of positive scores, +1, +2 and +3. Starting with best practice, the scoring moves to excellent performance with +3 score marking leadership, demonstrating ultimate and leading levels of achievement.

SPeAR® has been designed to structure sustainability processes and facilitate discussion leading to an increased sustainability performance overall - not necessarily for each indicator.

A key aspect of the Two Rocks development will be to preserve the coastal character of the area while delivering a compact and diverse sustainable urban development with benefits for both the existing Two Rocks community as well as the new communities.

The SPeAR® appraisal below (**Figure 5.32**) was produced based on information gathered from the client and consultant team, reports and presentations, and was assessed by the project team members and independent Arup specialists. Compared to standard Australian practice the Two Rocks development demonstrated strong performances in the economic and social quadrants, which reflect its achievement of an excellence rating across a number of the indicators in these two quadrants. The SPeAR® assessment further indicates some areas of opportunity, particularly within the natural resource quadrant.

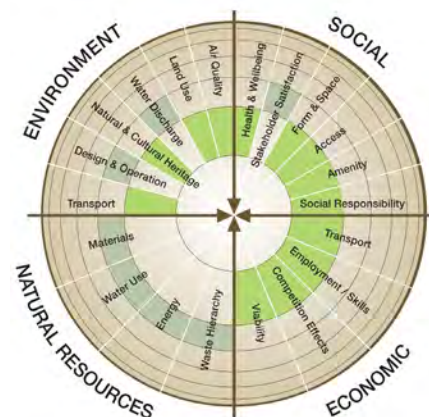


FIGURE 5.32 SUMMARY SPEAR® DIAGRAM FIRST APPRAISAL

Number	Colour	Score	Comment
- 3	Red	Worst case	Negligent bad practice
- 2	Orange	Bad practice	Bad practice
- 1	Yellow	Not considered	Deemed relevant but not considered
0	Light Green	Compliance/BAU	Business As Usual or Regulatory Compliance
+ 1	Light Green	Best practice	Higher professional and industrial standards
+ 2	Medium Green	Excellence	Targeted or Innovative or Holistic (or Awarded)
+ 3	Dark Green	Leadership	Targeted & Innovative &/or Holistic (&/or Awarded)

Table 5.5 provides a summary of performance represented in actual scores.

TABLE 5.5 PERFORMANCE SUMMARY

Environment	Score	Colour	Performance
Air Quality	2.2		Excellence
Land Use	1.9		Excellence
Water Discharge	1.3		Best Practice
Natural & Cultural Heritage	1.6		Excellence
Design & Operation	0.6		Best Practice
Transport	1.8		Excellence
Social	Score	Colour	Performance
Social responsibility	2.0		Excellence
Amenity	2.0		Excellence
Access	2.0		Excellence
Form and space	1.8		Excellence
Stakeholder satisfaction	1.3		Best practice
Health and wellbeing	1.8		Excellence
Economic	Score	Colour	Performance
Financial viability	2.0		Excellence
Competition effects	1.8		Excellence
Employment and skills	2.0		Excellence
Efficient Transport	2.0		Excellence
Natural Resources	Score	Colour	Performance
Materials	1.0		Best Practice
Water use	1.0		Best Practice
Energy	1.3		Best Practice
Waste	0.8		Best Practice

Highlights of the Two Rocks development that were identified through the sustainability appraisal are:

- A development that preserves the coastal character of the area with the conservation of major ridgelines and a coastal buffer zone including discriminating landform character areas. At the same time the Two Rocks development delivers a diversity and intensity of land uses integrating residential, retail and commercial. This compact development generates business and employment opportunities and brings vitality to the region resulting in an ultimate employment self sufficiency of more than 70% for the whole St Andrews district (49.6% for Two Rocks).

- The Two Rocks development will further provide integrated accessible and affordable transport facilities and attractive, well lit and safe pedestrian and cyclist movement networks. Sufficient leisure facilities, broad coverage of key facilities and a green open space framework all reduce the estimated travel demand and car dependence.
- Strong community and stakeholder engagement and community sponsorship in the planning, design and development processes, including a strong focus on community learning and skills development, ensures a strong community engagement and community development focus.
- The development is further expected to generate financial benefits for all stakeholders involved (community, business and government) with a positive impact on the surrounding businesses and community.
- Proposed 'Eco Precincts' incorporated in the Two Rocks development aim to showcase Ecological Sensitive Design including stringent solar passive design principles in both building design guidelines and site layout. The Eco Precincts will demonstrate best practice in sustainable design, including a range of features that might include solar panels, gas assisted hot water systems, 'green' power, and double glazing and insulation. Water Sensitive drainage design features, rainwater harvesting on a lot basis and water efficient fixtures, fittings and appliances will showcase water wise design.
- The development will promote the use of HIA Green Smart accredited builders, will require its civil contractors to use AS/NZS 14001 or ISO14001 accredited EMS systems, will source regionally manufactured products and services and will endeavour to reuse or recycle most of the salvaged and construction waste materials. In addition the regular use of SPeAR® (as sustainability assessment framework) in further planning, design, construction and fit-out of the development will further ensure and monitor that sustainability principles are embedded in the development.
- The proponent will conduct regular reviews of the sustainability appraisal, through the life of the project, with a view to exploring opportunities for improving the sustainability performance of the development as it progresses.

5.6 IMPLICATIONS OF THE PLAN

5.6.1 ENVIRONMENTAL

5.6.1.1 CONSERVATION

The State Sustainability Strategy (2003) defines sustainability as “meeting the needs of current and future generations through and integration of environmental protection, social advancement, and economic prosperity”.

Western Australia is currently experiencing unprecedented economic growth and has a projected population increase of 52% over the 2001 population by 2031. In order to meet the increasing demand for housing, the State Sustainability Strategy (2003) sanctions the goal of planning settlements that reduce the ecological footprint and enhance our quality of life. One of the means of creating a sustainable development is through the protection of the existing environment.

Aerial photography and the recent vegetation and flora survey completed by RPS during 2007 show that some 40% of the site is cleared due to past agricultural land uses, with approximately 60% supporting remnant vegetation in condition ranging from Excellent to Completely Degraded.

As described in section 4.3.4 of this report, the vegetation that remains on the site is not considered to be regionally significant as the site does not include any Bush Forever areas, DRF or TECs. The site contains one Priority 1 flora species and three Priority 3 species as well as areas of *Melaleuca cardiophylla* which may be considered to be locally significant. There is an opportunity to preserve locally significant vegetation and flora through the Two Rocks LSP in order to contribute towards creating a sustainable development on the site.

The LSP and the associated Masterplan propose to maintain biodiversity and contribute towards the sustainability of future development on the site through the following design and management measures:

- 39 ha of passive open space areas have been included to retain locally significant vegetation and flora in POS.
- Linkages have been retained through the LSP area in POS in order to enable continued fauna movement and the long term continuance of local flora.
- Tuart trees have been retained in POS or in road reserves wherever possible.
- In addition to the passive open space areas, native vegetation will also be retained on large lots with building envelopes which have been strategically located in areas of high quality vegetation.
- Roads have been strategically located to provide a clear boundary between passive open space areas and private land in order to minimise edge effects and provide fire protection.
- Many of the dune ridges on the site will be preserved in their natural state in passive open space areas, active POS areas and in large lots with building envelopes to preserve the landscape amenity of the site and protect native vegetation, flora and fauna habitat.
- The retention of dune ridges will provide for the retention of one Priority 1 flora species that was identified on the site (*Leucopogon* sp. Perth Coastal (A.S. George 17305)), one Priority 3 species that was identified, being *Stylidium maritimum*, and large areas of *Conostylis* that may well contain the Priority 4 species that was identified, being *Conostylis pauciflora subsp. euryrhipis*.
- The major east-west green link in Lot 500 will provide for the retention of *Melaleuca cardiophylla*, which is considered to be locally significant vegetation.
- The LSP includes arbor ways through the development which will be created using native species wherever possible in order to minimise water use and to create additional fauna habitat.

- Provenance seed from locally indigenous species will be collected in order to propagate plants to be used in landscaping.
- Cleared vegetation (where weeds occurrence is low or nil) will be mulched and used in landscaping. Topsoil from cleared (weed free) areas will be collected and reused in the landscaping.

Further information on the implementation of the above proposed aspects of the LSP is provided in section 6.6 of this report.

The biodiversity protection proposed in the LSP is discussed in more detail below.

BIODIVERSITY PROTECTION

As mentioned in section 3.3.4 of this report Bush Forever has a target of the retention of at least 10 percent of the estimated pre-European extent of each vegetation complex (Government of Western Australia, 2000).

Hedde et al. (1980) maps the vegetation on the site as Quindalup Complex. As described in section 4.3.4 of this report and as shown in Table 4.8, according to Bush Forever there is currently 14% of the original extent of Quindalup Complex that has some form of protection and approximately 5% is protected in Bush Forever sites.

The Perth Biodiversity Project (PBP) has developed ecological criteria to identify locally significant natural areas (that are outside of Bush Forever sites, the CALM managed estate and Regional Parks). This criterion assists in identifying areas that are of greatest value for biodiversity conservation.

The City of Wanneroo is participating in a pilot project with the Perth Biodiversity Project to develop a Local Biodiversity Strategy. A draft Local Biodiversity Strategy has been developed using the Local Government Biodiversity Planning Guidelines for the Perth Metropolitan Region (PBP, 2004), however this draft strategy is not yet publicly available.

The City of Wanneroo advised that its draft Local Biodiversity Strategy aims to protect biodiversity through the protection of different areas of vegetation at a vegetation complex level (in accordance with the mapping of Hedde et al., 1980). There is currently 12% (1064 ha) of the original extent of Quindalup Complex protected within the City of Wanneroo, the draft Local Biodiversity Strategy aims to increase this amount to 16% of the original extent of Quindalup Complex, this represents an additional 331 ha to be reserved in the City of Wanneroo (Hoey, Nicola., Senior Environmental Planner, City of Wanneroo, pers. comm. 07.04.2008).

The LSP site is 423 ha in area, the Masterplan proposes to provide 62.5669 ha of POS (which equates to 16.4% of the LSP area). POS in the LSP is divided into three types:

- formalised POS;
- formalised POS and drainage; and
- passive open space.

The LSP proposes to reserve 39 ha of Quindalup Complex within the LSP area in passive open space. This represents 9% of the site and 15% of the vegetation that currently exists on the site. This represents 11.5% of the 331 ha the City of Wanneroo's draft Local Biodiversity Strategy aims to protect within the City of Wanneroo.

Wherever possible the passive open space areas have been located to protect, celebrate and enhance the best natural features of the site, based on their environmental values. Areas with the following environmental values have been included in passive open space:

- High quality vegetation (Excellent to Very Good).
- Areas of intact, well vegetated dune landforms.
- Areas with linkage values within the site that also extend outside the site.

- Areas supporting a range of vegetation units and habitats.
- Areas supporting locally significant vegetation.

An analysis of the vegetation units and the condition of the vegetation proposed to be protected in the 38 ha of passive open space in the LSP is provided in **Tables 5.6 and 5.7**.

Table 5.8 shows that 17% of existing vegetation on the site that is in Very Good or better condition is to be retained in passive open space.

EPA (2005) suggests that a level of 10% of the original extent of a vegetation community is the minimum required to maintain biodiversity. The size of bushland remnants and their connectivity are important considerations. Small remnants and vegetation on the edge of remnants or near cleared or disturbed land are prone to edge effects such as weed infestation, trampling, pests and diseases, increased exposure to weather and changed drainage and watertable regimes (EPA, 2005).

The LSP proposes to retain 39 ha in passive open space areas (this represents 9% of the site and 15% of the remnant vegetation on the site (254 ha)). The Masterplan proposes an additional 17 ha (or 4% of the site) will be retained through the areas of large blocks (1000 m² to 2000 m²) with covenants to prohibit clearing outside designated building envelopes that have been strategically located in the areas that currently support high quality vegetation. The Masterplan thus exceeds the EPA's target of the retention of 10% of the original vegetation. The retention of native vegetation on the site is summarised in **Table 5.8**.

It is noteworthy that an additional area of approximately 2ha of native vegetation will be introduced to the site through the creation of arbor ways which extend some 3.8km across the site linking POS areas, with additional opportunities identified for the planting of native vegetation within the 26.9 ha of formalised POS identified in the LSP.

The protection of the conservation areas that will remain in POS in the future urban setting is critical. The passive open space areas will be protected using an appropriate combination of the following measures:

- Design edges between passive open space and adjacent urban areas to minimise the potential disturbance to the ecological values of the POS.
- Provide hard edges to separate passive open space areas and private lots, such as a road, a dual use path or fence in order to decrease the potential for exotic species to become established in the POS and also to provide adequate fire breaks.
- Use appropriate fencing to discourage uncontrolled pedestrian or vehicular access to passive open space areas.
- Provide adequate and appropriate controlled public access for sustainable passive recreation and protect the ecological values of the POS by providing adequate and appropriate public access in and through the POS to connect to the pedestrian network in adjacent urban areas.
- Provide appropriate informative signage about the passive open space areas.
- Provide passive public surveillance through strategic placement of public areas such as dual use paths, active POS areas and roads adjacent to passive open space areas.

TABLE 5.6 VEGETATION UNITS (AREAS) ON THE SITE AND AREAS TO BE RETAINED IN PASSIVE OPEN SPACE IN THE LSP

Vegetation Unit	Area in LSP site (ha)	Area in Passive Open Space (ha)	% of current extent in Passive Open Space	Comment
Vegetated Supra-tidal zone (1a)	0	0	-	0.3 ha of this vegetation unit is located in the foreshore reserve (Bush Forever site 397), this vegetation unit does not occur in LSP area.
Coastal Limestone Headland (1b)	0	0	-	This vegetation unit is located in the foreshore reserve (Bush Forever site 397), this vegetation unit does not occur in LSP area.
Secondary Dunes (stabilised) (1c)	13.4	0	0%	None of this vegetation type is proposed to be retained in the LSP. 6.2ha of this vegetation unit occurs in the foreshore reserve (Bush Forever site 397) adjacent to the site.
Secondary Dunes (partially stabilised blowouts) (1d)	0.6	0	0%	None of this vegetation type is proposed to be retained in the LSP. 0.9ha of this vegetation unit occurs in the foreshore reserve (Bush Forever site 397) adjacent to the site.
Parabolic Dunes (1e)	136.5	23.84	17.5%	This is the largest vegetation type in the LSP area (other than cleared areas). This vegetation type is predominantly vegetated dune ridges and is suitable habitat for Priority 1 flora species <i>Leucopogon</i> sp. Perth Coastal (A.S. George 17305). The LSP has been designed to endeavour to preserve this vegetation type wherever possible.
Tuart groves in Parabolic Dunes (1f)	4	1.4	35%	The LSP has been designed to retain as many as possible of the existing Tuarts that are currently in good condition. Tuart groves that have not been retained in passive open space are proposed to be retained in formalised POS and/or road reserves wherever possible.
Shallow brown loamy sand with exposed Tamala limestone (few outcroppings) (2a)	44.5	3.3	7.4%	This vegetation unit contains <i>M. cardiophylla</i> (possibly locally significant vegetation). The 2.4ha area of <i>M. cardiophylla</i> that was recommended for retention in the DSP has been included in passive open space in the east-west linkage in Lot 500.
Tamala Limestone outcroppings with shallow Brown Loamy Sand (2b)	39.2	4.4	11.2%	
Shallow loamy sand over Tamala Limestone (few outcroppings) (2c)	7.8	0	0%	None of this vegetation type is proposed to be preserved in passive open space. This vegetation type occurs in the east of the LSP site and extends to the east, outside the site.
<i>Acacia rostellifera</i> and/or <i>A. xanthina</i> thickets (3a)	15.9	1	6%	This unit is likely to be a (transitional) colonising unit for adjoining vegetation types.
Completely degraded areas (4a)	163.6	4.9	3%	The LSP has been designed to include as little of this vegetation unit as possible, some tracks and disturbed areas have been retained inadvertently due to their location near areas of higher ecological value.
Total	425.5	38.84		

TABLE 5.7 VEGETATION CONDITION (AREAS) ON THE SITE AND AREAS TO BE RETAINED IN PASSIVE OPEN SPACE IN THE LSP

Vegetation Condition	Amount in LSP area (ha)	Amount reserved in POS (ha)	%	Comments
Excellent	44.2	1.1	2.2%	2.2% of the Excellent vegetation is being retained. This low percentage is due to the location of the Excellent vegetation near the coast on Lots 12 and 13 on some of the most valuable development land in the LSP area.
Very Good – Excellent	97.9	24.6	25.1%	25% of the Very Good – Excellent vegetation has been retained in passive open space.
Very Good	27.5	4.84	17.6%	
Very Good - Good	26.9	0.3	1.1%	
Good – Very Good	24.2	0.6	2.5%	
Good	38.3	2.4	6.3%	
Good - Degraded	2.7	0.6	22%	
Degraded	0.1	0.1	100%	Given there is only 0.1 ha of this vegetation condition on the site this percentage should be disregarded.
Degraded – Completely Degraded	163.6	4.9	3%	The LSP has been designed to include as little of vegetation in this condition as possible, some tracks and disturbed areas have been retained inadvertently due to their location near areas of higher ecological value.
Total	425.4	38.84		

TABLE 5.8 AREAS OF NATIVE VEGETATION PROPOSED TO BE RETAINED IN THE LSP

	POS	Large Blocks	Total
Area	39 ha	17 ha	56 ha
Percentage of site (423 ha)	9%	4%	13%
Percentage of Remnant Vegetation on site (254 ha)	15%	7%	22%

5.6.2 SOCIAL (COMMUNITY FORMATION AND INTEGRATION)

The development of the Masterplan area will be instrumental in the evolution of the Two Rocks community. The Masterplan has been designed to ensure the new development is well integrated with the existing townsite, which will ultimately assist in fostering a strong sense of community within Two Rocks.

The integration of the Masterplan with the existing Two Rocks townsite has been achieved through various design elements. By extending the linkages within the existing townsite into the Masterplan area and designing development to address the existing townsite, with no development 'backing on', the new development is effectively an extension of the existing townsite. Low density residential development has been included on the eastern side of Damepattie Drive to provide an appropriate transition from the low density residential built form within the existing townsite to the new development.

Existing green linkages within Two Rocks have been acknowledged in the Masterplan, particularly the east/west corridor south of Breakwater Drive. This corridor, formed by Cassilda and Whitfield Park, has been extended through the Masterplan area in the form of a prominent passive open space link. Furthermore, one of the key dunal ridgelines north of Breakwater Drive which has been retained within the Masterplan, links in with Shamrock Park through an arborway and formalised public open space.

An arbor way connecting directly with the Two Rocks town centre has also been incorporated into the design. These green linkages create high amenity pedestrian connections from the Masterplan area, through the existing townsite, to the coast.

The range of densities proposed in the Masterplan area will result in a variety of built form and offer a more diverse range of lifestyle options in Two Rocks. The proposed local centres, community purpose sites and public open space areas proposed will also be of benefit to the existing community, by providing additional services and facilities to the area. Furthermore, the construction of the new development and ultimately the commercial/mixed use corridor along Breakwater Drive will provide much needed employment opportunities. The school sites identified in the Masterplan, particularly the high schools sites, will also serve to integrate the existing community with the proposed development by providing an opportunity for secondary students to continue their schooling in Two Rocks. The future development will also provide further support to the existing Two Rocks town centre which will result in a more viable and successful centre for the Two Rocks community.

These design features of the Masterplan will provide the foundation for developing a stronger community network within Two Rocks, with improved access to a greater range of services and facilities. To further enhance these strengths, a community development plan will be prepared by the developer within the first three years of development commencing.

The intent of the community development plan is outlined in the community development strategy that forms part of this LSP as **Appendix 17**.

5.6.3 ECONOMIC (EMPLOYMENT)

The current labour force participation rate in the Two Rocks suburb is significantly lower than the City of Wanneroo and Perth Metropolitan participation rates. It is likely that over the long term, the labour force participation rate in Two Rocks will increase toward the Perth Metropolitan average.

Table 5.9 shows the projected labour force likely to reside within the development based on the Perth Metropolitan participation rate by age at 2006 and the population projections for the new development in section 5.1.4 of this report. The table shows that the structure plan area at ultimate development will house approximately 5,322 workers.

Table 5.10 provides a summary of all on-site employment within the Two Rocks development area, based on the proposed Masterplan. Each employment generator is discussed in more detail in the following sections.

TABLE 5.9 LABOUR FORCE PROJECTION

	Perth Metropolitan Labour Force 2006*	Perth Metropolitan Population 2006*	Labour Force Participation Rate 2006	Site Population (working age) 2021	On Site Labour Force 2021
Persons: 15-19 yrs	54,227	106,460	50.9%	643	327
Persons: 20-24 yrs	77,433	107,901	71.8%	691	496
Persons: 25-34 yrs	145,032	196,786	73.7%	1716	1265
Persons: 35-44 yrs	164,265	218,066	75.3%	1524	1148
Persons: 45-54 yrs	158,727	204,923	77.5%	1442	1118
Persons: 55-64 yrs	90,189	155,177	58.1%	1406	817
Persons: 65 & over	14,243	173,548	8.2%	1847	151
Persons: Total	704,116	1,162,861	60.6%	9269	5322

Source: ABS Census 2006

TABLE 5.10 ON-SITE EMPLOYMENT SUMMARY

	Measure	Unit	Multipliers*	Jobs
Retail	1,900	m ²	29.4	64
Commercial	29,282	m ²	24.2	1210
Service Commercial	9,320	m ²	35.7	261
Primary Schools*	4	300 students	10.6	113
High Schools	1	875 students	8.75	100
K-12 Schools	1	1,200 students	9.8	122
Home Based	5,406	% dwellings	10%	541
Total On-Site Employment				2,411

*One of these primary schools already exists within the structure plan area

Note regarding sources for multipliers:

- Retail - Perth Metro average square metre per employee for Shop Retail (local and neighbourhood centres), DPI Commercial Land use Survey 2001;
- Commercial – Perth Metro average square metre per employee for Office, DPI Commercial Land Use Survey, 2001;
- Service Commercial – Average square metre per employee for Myaree Industrial Area DPI Industrial Land Use Survey 2001;
- Schools – Staff Student ratios (FTE including non-teaching) calculated from ABS Cat No. 4221.0 Schools Australia Tables 10 and 59 (WA); and
- Home Based – Proportion of dwellings with a home based business - Smart Growth Assessment Tool (City of Wanneroo).

RETAIL AND COMMERCIAL EMPLOYMENT

Table 5.11 shows the proposed provision of retail and commercial floorspace within the development site and at the redeveloped Two Rocks Town Centre (Centre K in the District Structure Plan).

Note that the existing centre at Two Rocks currently provides 3,226 m² of floorspace including 2,242 m² of retail. This total floor area currently generates 101 jobs. Expansion of Centre K as detailed in the St Andrews District Structure Plan will generate an additional 856 jobs.

EDUCATION EMPLOYMENT

The Two Rocks development is planning for four government primary schools, one government high school and one private school catering from K-12. This is consistent with Liveable Neighbourhoods edition three (October 2004) standards for schools provision. The employment generated by these schools is 335 jobs, as shown in **Table 5.12**.

HOME BASED EMPLOYMENT

Liveable Neighbourhoods (2004) states that up to 16% of dwellings now have a home based business. The City of Wanneroo Smart Growth Assessment Tool (SGAT) uses 10% of dwellings as the average for the City. Assuming that the Two Rocks area will have 10% of dwellings with a home based business employing one person, a total dwelling yield of 5,406 in the development area will result in approximately 541 people working from home.

EMPLOYMENT GENERATED DURING CONSTRUCTION

Table 5.13 summarises the employment likely to be generated during land development and construction with the site development area.

It is expected that the project will result in 215 construction related jobs in each year of development over a 20-year timeframe.

EMPLOYMENT SELF SUFFICIENCY AT FULL DEVELOPMENT

A primary objective in planning both at the State and local government levels is the provision of employment in close proximity to where people live. A measure of this is employment self-sufficiency, or the total jobs available in a particular area as a proportion of the number of people in the workforce living in that area. The higher the proportion, the more opportunity there is for people to work close to their home.

In the Two Rocks development area, the estimated 2,411 jobs within the structure plan area and the 5,322 resident workforce result in an employment self-sufficiency of 45.3%. This compares with the whole of the City of Wanneroo and the City of Joondalup, which had employment self-sufficiencies of 46.0% and 40.3% respectively based on ABS 2006 Census and Worker Population Profile data.

The onsite employment self-sufficiency of 45.3% does not reflect the overall contribution that the development makes to the employment self-sufficiency of the corridor over the development timeframe. To capture this requires, at the very least, the additional employment generated at Centre K (Two Rocks Town Centre) as a result of the population housed within the structure plan area. The current population at Two Rocks of 1,627 persons and the anticipated population of 11,900 persons within the structure plan area result in approximately 13,500 persons being served by Centre K. The structure plan population represents 88% of the total population and it is therefore reasonable to claim that 88% of the employment generated at Centre K will be a direct result of the Two Rocks Structure Plan. Therefore, of the 957 jobs anticipated at Centre K, 842 jobs can be attributed to the structure plan area.

The resulting overall employment self-sufficiency equation for the general Two Rocks Area is as shown in **Table 5.14**.

The anticipated employment self-sufficiency for the area of 55.6% is higher than the whole of City of Wanneroo at 2006 and is far better than could usually be expected for a predominantly residential urban area with one district level centre. The self sufficiency ratio is very dependent upon how the catchment of the centres is defined and really needs to be considered in the wider context of the St Andrews District Structure Plan which anticipates an ultimate employment self sufficiency of 76%. Given this very high employment self sufficiency anticipated for the wider area (note that the whole Perth Metropolitan area has an employment self-sufficiency of 88% at 2006), a 45.3% self-sufficiency for the Two Rocks Structure Plan area is consistent with the overall St Andrews DSP.

It should also be noted that whilst the development timeframe for the Two Rocks Local Structure Plan area is approximately 20 years and the development timeframe for the St Andrews DSP is significantly longer at approximately 50 years, the employment self-sufficiency of 76% for the St Andrews DSP will be achieved over this long timeframe.

A Local Employment Strategy also accompanies the Structure Plan and includes additional strategies to maximise local employment self sufficiency in Two Rocks and the surrounding locality.

In addition to the above strategies, the Capricorn Village Joint Venture will also work with the Western Australian Planning Commission, City of Wanneroo and other landowners in the Yanchep-Two Rocks District Structure Plan area to prepare a developer contribution arrangement, and will assist in delivering key employment-generating infrastructure to support local employment creation.

TABLE 5.11 ON SITE AND ADJACENT RETAIL & COMMERCIAL PROVISION AND EMPLOYMENT GENERATED

	Net Lettable Area (NLA) (m ²)	Employment Multiplier	Total Employment Generated
Shopping Retail (local centres)	1,900	1 job: 29.4 m ² floorspace	64
Other Commercial (offices etc)	29,282	1 job: 24.2 m ² floorspace	1210
Service Commercial	9,320	1 job: 35.7 m ² floorspace	261
Total On Site	40,502		1535
Centre K Retail	10,900	St Andrews DSP*	454
Centre K Other Commercial	15,751	St Andrews DSP*	503
Total Centre K	26,651		957

*Floorspace and Employment figures for Centre K quoted from St Andrews District Structure Plan

TABLE 5.12 EMPLOYMENT GENERATED THROUGH SCHOOLS PROVISION

Facility	Jobs per Facility*	On Site Provision	Employment Generated
Primary Schools	28.25	4	113
High Schools	100	1	100
K-12 Schools	122	1	122
Total Jobs			335

Note – Employment includes teaching and non-teaching staff

TABLE 5.13 EMPLOYMENT GENERATED DURING CONSTRUCTION

	Total Dwellings	Employment Ratio	Total Jobs
Land Development		1 job: 4.8 dwellings	1,126
Construction		1 job: 1.7 dwellings	3,180
Total	5,406		4,306 Or 215 jobs over a 20 year construction period

(Ratio Source: UDIA Economic Impact Study June 2007 – Syme Marmion & Co, Economic Research Associates)

TABLE 5.14 EMPLOYMENT SELF-SUFFICIENCY

Employment Self-Sufficiency	Population 2030	Workforce 2030	On Site Employment 2030	Employment Self Sufficiency
Two Rocks Existing Area	1,627	738*	957	129.7%
Two Rocks Structure Plan	11,900	5,322	2,411	45.3%
TOTAL	13,527	6,060	3,368	55.6%

*Note that the current resident workforce is lower at 535 persons.

5.7 RELATIONSHIP TO STRATEGIC PLANNING FRAMEWORK

5.7.1 NORTH WEST CORRIDOR STRUCTURE PLAN REVIEW

5.7.1.1 REGIONAL TRANSPORT STUDY

A regional transport study is being undertaken by the Department for Planning and Infrastructure in conjunction with the City of Wanneroo. The study is concerned with strategic issues such as the level of employment self sufficiency in the corridor and the capacity of the rail and road systems linking Yanchep to the remaining of the corridor to the south. A specific concern that has been raised is that the Mitchell Freeway through Balcatta and Osborne Park is currently operating at capacity during peak periods. Planning undertaken by SKM on this matter has indicated that, whilst the freeway does have a finite capacity, any lack of road capacity on the Mitchell Freeway will need to be accommodated by increased capacity on the rail system.

It is clear that the construction of the northern suburbs railway to Yanchep is the single most important issue in ensuring sufficient corridor travel capacity can be made available to serve the growing north west corridor. The local structure planning for Two Rocks will benefit from construction of the railway and the freeway. However the regional planning study will have no direct implications for the local structure planning of the Two Rocks development.

5.7.1.2 INTERIM POLICY STATEMENT FOR THE NORTH WEST GROWTH CORRIDOR

The Structure Plan and Masterplan are consistent with the WAPC's Draft Interim Policy Statement for the North West Growth Corridor. The indicative growth vectors in the Draft Interim Policy Statement provide for growth in the Two Rocks region to commence as a logical extension of the existing Two Rocks settlement. The CVJV landholdings immediately adjoin existing residential development in Two Rocks and, accordingly, the Two Rocks Local Structure Plan provides for a contiguous expansion of the townsite in a north, north-east, east and south-easterly direction, consistent with the vector of growth depicted in the Draft Interim Policy Statement.

5.7.1.3 ECONOMIC DEVELOPMENT STRATEGY

The Economic Development and Employment Workshop facilitated by the City of Wanneroo and DPI in March 2008 addressed issues relating to:

- ultimate employment targets for the region;
- the staging and timeframes for achieving employment targets;
- an agreed regional framework to achieve targets;
- State Government commitments; and
- developer commitments.

CVJV has made a commitment to continue its involvement in facilitating growth in local employment in the Yanchep and Two Rocks area. To this end, CVJV has prepared a Local Employment Strategy which accompanies this Structure Plan and collaborated with other land developers in the Alkimos-Eglinton and St Andrews District Structure Plan areas through the engagement of Syme Marmion & Co to provide information to further the regional economic strategy.

The work undertaken by Syme Marmion to date, on behalf of all of the land developers, confirms that the imperative to provide substantial employment at the northern end of the North West Corridor is reflected in the District Structure Plans for Alkimos Eglinton and St Andrews.

The Structure Plan for Two Rocks acknowledges the long term employment anchors for the St Andrews region, being the Northern Town Centre immediately adjacent to the Structure Plan Area, and the St Andrews Town Centre further south. The Structure Plan facilitates the high levels of employment self sufficiency sought in the DSP and regionwide by dedicating land for a mixed use corridor and service commercial area (which have been appropriately located and which can be appropriately serviced), as well as putting in place active employment programs for Two Rocks, as detailed in the Local Employment Strategy.

CVJV will continue its collaborative approach with other developers in the region to ensure employment targets are met, with support from local and state governments.

5.7.2 ST ANDREWS DISTRICT STRUCTURE PLAN

5.7.2.1 MOVEMENT NETWORK

The movement network proposed in the LSP reflects the intent of the regional road structure identified in the St Andrews DSP ensuring the Masterplan area is appropriately connected with the broader St Andrews region. All of the key linkages identified in the DSP have been incorporated into the Masterplan, including:

- an east/west connection extending from the Northern Town Centre to the Two Rocks Marina Village, which has been achieved by retaining Breakwater Drive;
- a key north/south connection that intersects with Breakwater Drive and is intended to replace a portion of the Lisford Avenue road reservation;
- two secondary roads, one north and one south of Breakwater Drive, both intersecting with Breakwater Drive; and
- a coastal road which has been designed in response to the landform and to ensure a low speed environment.

The St Andrews District Structure Plan identifies a ‘paired couplet’ street network for the future Northern Town Centre. Although the future Northern Town Centre is outside of the Two Rocks LSP area, the ‘paired couplet’ appears to extend into the Structure Plan area, along a portion of Breakwater Drive. Following further assessment of the couplet system, it is not considered to align with the development principles or context in the Two Rocks area.

The couplet originated as a design solution to particular traffic movement problems most often experienced in America. These problems arise where high speed arterial roads are constructed to link towns and a high incidence of congestion and traffic accidents occur where these arterials meet town edges, particularly in town centres. An assessment of the success of couplets in the American context has revealed that while the system may have some benefits in the context of traffic dispersal and accident prevention, it limits the creation of a vibrant, high amenity town centre environment that is being sought at Two Rocks.

The traffic and accident management motivation behind the couplet is not considered to be relevant in a Western Australian context. Two Rocks in particular benefits from an integrated planning environment from a district scale that facilitates development of a well connected and efficient road network from the outset. In light of this, a city centre design based on more traditional interconnected street network principles has been favoured in preference to a couplet design.

The DSP has identified a network of distributor roads for the movement of traffic. The road hierarchy recommended in the District Structure Plan is illustrated in **Figure 3.5**. The plan shows Lisford Avenue as a District Distributor A as it passes through the existing town centre, however this is now proposed to function as a district distributor B to reflect further traffic modelling. The Local Structure Plan and District Structure Plan show the same general network of district distributor roads extending north and south from Breakwater Drive and the same local distributor roads along the coast and Shearwater Drive.

There are two key differences in road hierarchy and network between the district and local structure plans. Firstly, the local structure plan has an additional district distributor road extending north of Breakwater Drive to the west of the future town centre and, secondly, the local distributor that extends in a north/easterly direction from Breakwater Drive (see **Figure 3.5**) has been replaced in the local structure plan with north/south connections.

These changes do not impact the overall movement of traffic through the Two Rocks area and the local structure plan has simply refined, in more detail, the overall intentions of the district structure plan.

The new alignment for the north/south District Distributor B and local distributor roads have been designed to respond to the landform by avoiding major high points including the dunal ridge. The existing alignment of the unconstructed portion of Lisford Avenue and the proposed alignment of the local distributor extending north-east from Breakwater Drive in the DSP, are not sensitively located and their construction would result in unnecessary destruction of the natural landform.

The north-south District Distributor B east of the Two Rocks LSP area has also been aligned to be consistent with and integrate with an approved Local Structure Plan for land at Lot 501 Reef Break Drive (immediately south of Precinct 11 within the Two Rocks LSP).

The local structure plan road network is consistent with the district structure plan network and any minor differences between the two are a result of the varying level of detail required at local and district planning.

5.7.2.2 GREEN LINKS

The green links proposed in the Masterplan seek to promote the principles identified in the DSP of connecting regional parkland with the coast. In accordance with the DSP, prominent green links have been incorporated into the Masterplan design, in the form of a distinctive ridgeline, which extends from the north east of the site to Lisford Avenue and a prominent east/west green link in the southern portion of the Masterplan area which seeks to preserve existing vegetation. This green link connects with existing public open space areas within the Two Rocks townsite, forming a continuous green corridor to the coast.

The site's dunal landform, particularly north of Breakwater Drive, has allowed additional green linkages to be retained. Two distinctive north/south ridgelines have also been incorporated into the Masterplan, to ensure the landform character of the site is preserved.

In addition to these significant green linkages, the formalised public open space areas within the Masterplan, in conjunction with the arborways, have also been designed to provide public, high amenity connections to the coast.

5.7.2.3 SCHOOLS

A high school site has been incorporated into the northern portion of the Masterplan area, as identified in the DSP. A private K -12 school site has also been included in the Masterplan, in accordance with the Deed of Infrastructure requirements to provide a private high school site and Liveable Neighbourhoods' school site requirements in relation to the provision of non-government primary schools.

5.7.2.4 CENTRES

The Masterplan identifies commercial/mixed-use development along Breakwater Drive, forming a mixed use corridor, consistent with the DSP. Given the DSP's intent that the focus be on developing the key activity centres with the mixed use corridors subsequently unfolding over time, there needs to be flexibility in the uses which can be accommodated in the corridor.

Commercial/mixed use development provides for a range of uses which can occur, with a stronger concentration of commercial/service commercial development likely to unfold in proximity to the centres, particularly the Northern Town Centre, and the areas further away likely to accommodate more mixed-use development. A local centre has also been included in the mixed-use corridor given the location of the site at a key intersection. The injection of retail development into the corridor will complement the other future commercial uses and serve as a catalyst to development unfolding along Breakwater Drive.

Seven local centres have been identified in the Masterplan, in accordance with the Urbis JHD Retail Hierarchy Assessment Report for the DSP. The centres have been strategically located at the centre of the neighbourhood catchments to promote walkability. The Assessment Report suggests 0.17 m² of retail floorspace per capita for local centres, and approximately 250m² of retail floorspace per centre. Based on the projected population of around 12,000 people for the Masterplan area, approximately 2,000 m² of retail floorspace should be provided. The seven centres proposed in the Masterplan allows on average, approximately 280m² of retail floorspace per centre. The land-uses intended for these centres, including retail, commercial and residential promotes flexibility and will allow the development of these centres to be responsive to market forces.

Further to the above, it should be noted that the Urbis JHD Retail Hierarchy Assessment Report is currently under review, and therefore the final number and size of local centres in the LSP area will be subject to more detailed planning, to ensure consistency with the outcomes of this review.

5.7.2.5 EMPLOYMENT

The uses identified in the Masterplan ensure the employment areas designated for the site by the DSP, in the form of the mixed use corridor and home-based businesses, can be achieved. In particular, the commercial/mixed use development along Breakwater Drive will provide the main employment opportunities within the Masterplan area.

In order to facilitate the establishment of local employment generating uses in the Mixed Use Corridor, provisions have been incorporated within Part 1 to mandate non-residential uses at ground floor level within the mixed use corridor east of the local centre on Breakwater Drive. Furthermore, additional provisions have been incorporated into the 'Residential' zone (refer Part 1) to further encourage the establishment of home-based businesses.

5.7.2.6 STAGING

The DSP identifies a large proportion of the Masterplan area adjacent to the Two Rocks townsite for development in Stage 1 (2015) given the proximity to an existing settlement. Therefore, the Masterplan area provides a logical extension to the existing Two Rocks township. The balance of the Masterplan area is earmarked for development in Stage 2 (2021).

Accordingly, progressing the planning for the Masterplan area is consistent with the staging strategy outlined in the DSP. Furthermore, the early stages for development of the Masterplan area identified by the landowner are within the Stage 1 area identified in the DSP.

5.7.2.7 DEVELOPER CONTRIBUTIONS

In relation to developer contributions for key infrastructure within the DSP area, the St Andrews DSP report states, "direct negotiation and agreement between adjacent landowners is the usual approach to cost sharing for engineering infrastructure" where there is a large development area which is controlled by only a small number of landowners.

This approach is supported as an effective mechanism to facilitate major infrastructure development in the Masterplan area. This approach has previously been employed through Deeds of Infrastructure, which the landholding is currently subject to. This formal agreement requires infrastructure contributions, road construction and land vestings.

The St Andrews DSP report also identifies funding responsibilities for specific infrastructure items. Essentially, the division of responsibility between the government service providers and developers identified in the DSP is generally consistent with the principles outlined in WAPC policy (Planning Bulletin 18).

However, there are issues that are subject to further discussion in the DSP which relate to community facilities, such as pedestrian/cycle paths, recreational facilities and public transport infrastructure. Developer contributions in relation to these facilities are already well established and it is believed the current approach to funding arrangements should be maintained.

6 IMPLEMENTATION

6.1 ADOPTION OF LOCAL STRUCTURE PLAN

This Structure Plan, comprising Part 1, Part 2 and Appendices (technical reports), has been prepared in accordance with the requirements of the Scheme and is submitted under clause 9.4 for a determination by Council that it be advertised.

The formal adoption of the Structure Plan by Council, following consideration of submissions, and then the Commission, will enable subdivision to proceed in accordance with the Structure Plan. The Structure Plan will guide Council and the Commission in its consideration of applications for subdivision lodged for part(s) of the Structure Plan area.

6.2 METROPOLITAN REGION SCHEME AMENDMENTS

In order to implement the Structure Plan, modifications are required to the Metropolitan Region Scheme as follows:

- Lifting the 'Urban Deferred' status over the remaining 'Urban Deferred' land, being Lots 207 and 500.
- Revising the regional road classifications in the area to match the proposed regional road hierarchy in the LSP. This requires the 'Other Regional Road' classification of Lisford Avenue, Two Rocks Road and Shearwater Avenue to be removed.
- Relocation of the existing railway reserve abutting the LSP area.

Each of the modifications discussed above are consistent with the modifications outlined in the District Structure Plan and are proposed to be initiated as part of the Council and the Commission's determination of the DSP. In order to ensure the timely implementation of the Structure Plan, it is respectfully requested that the Council and the Commission progress these minor amendments to the MRS as a matter of priority.

6.3 CITY OF WANNEROO DISTRICT STRUCTURE PLAN NO. 2

As a consequence of the minor amendments to the MRS, amendments to the City's Scheme are required in order to:

- Zone the reclassified portions of Lisford Avenue, Two Rocks Road, Shearwater Avenue and Railway Reserve 'Urban Development', in accordance with adjacent land.

6.4 CLOSURE OF ROAD AND RAIL RESERVES

The reclassification of Lisford Avenue under the District Structure Plan and the relocation of the northern extension of Lisford Avenue under the Local Structure Plan has resulted in a redundant road reserve. Accordingly, in order to implement the Local Structure Plan, it is respectfully requested that Council initiate procedures to close the portion of Lisford Avenue extending north from the intersection with Breakwater Drive. This process should be initiated concurrently with Council's consideration of the Structure Plan and initiation of the MRS and District Planning Scheme Amendments.

Although not integral to the implementation of the Structure Plan, it would be appropriate to also progress the closure of the rail reserve abutting the Local Structure Plan area to the east, consistent with the proposal in the District Structure Plan to relocate the rail reserve further east. This would enable the land to be offered for sale and development by the adjoining landowners.

6.5 VARIATIONS TO INFRASTRUCTURE DEEDS OF AGREEMENT

It is proposed to vary certain provisions contained in the Infrastructure Deeds of Covenant for Lots 11, 12 and 13, where they conflict with any provisions contained in this Structure Plan. The proposed variations are intended to reflect the Agreed Structure Plan for Lots 11, 12, 13, 207 and 500.

The variations will be progressed with the WAPC immediately following approval of this Structure Plan.

6.6 ENVIRONMENTAL MANAGEMENT PLANS

The DSP and the environmental conditions in Ministerial Statement 538 require the preparation of the following management plans at LSP stage:

- Vegetation, Flora and Fauna Management Plan;
- Open Space Management Plan;
- Foreshore Management Plan;
- Drainage, Nutrient and Water Management Plan (i.e. Local Water Management Strategy);
- Karst Management Plan (if relevant to the area);
- Stygofauna and/or Troglitic Fauna Management Plan (if relevant to the area), and
- Aboriginal Heritage Management Plan.

These are addressed in more detail below, as they relate to the implementation of the Two Rocks Structure Plan and Masterplan.

6.6.1 VEGETATION, FLORA AND FAUNA MANAGEMENT PLAN

The proponent proposes to amalgamate the proposed Open Space Management Plan and Vegetation, Flora and Fauna Management Plan into one plan, referred to as a Vegetation, Flora and Fauna Plan. The Vegetation, Flora and Fauna Management Plan will relate to the treatment of the passive open space areas on the site as well as clearing protocols. Further information relating to the POS areas will be provided to the City of Wanneroo through the detailed landscape designs that will be prepared at subdivision stage.

The Vegetation, Flora and Fauna Management Plan is to be endorsed by the City of Wanneroo prior to formal adoption of the LSP by the City and WAPC.

6.6.2 FORESHORE MANAGEMENT PLAN

A Foreshore Management Plan was prepared for the coastal foreshore reserve adjacent to Lot 13 by ATA Environmental in 2004. Another Foreshore Management Plan will be prepared prior to the first subdivision application for Lot 13.

6.6.3 DRAINAGE, NUTRIENT AND WATER MANAGEMENT PLAN

A Drainage, Nutrient and Water Management Plan, now known as a Local Water Management Strategy, has been prepared and forms part of the LSP and is included as **Appendix 5**.

The Local Water Management Strategy is to be endorsed by the City of Wanneroo prior to formal adoption of the LSP by the City and WAPC.

6.6.4 KARST MANAGEMENT GUIDELINES

Although the likelihood of karst features occurring at ground surface level at the Two Rocks site is low, Golder Associates have recommended that earthworks in building areas be inspected to assist in characterising areas that may be susceptible to karst features. In particular it is during the stages following the stripping of topsoil and during periods in which heavy machinery is used to carry out ground compaction that karst features are most likely to become apparent.

Accordingly, management guidelines will be developed by Golder Associates in conjunction with the Capricorn Village Joint Venture and the civil engineering consultant, to assist in the identification of karst features during the earthworks stage of construction.

Whilst it is not anticipated that karst features at ground surface level will be encountered, it is considered good practice that management guidelines are in place to ensure that the risks associated with potential collapse related features are minimised.

The full report by Golder Associates on karst features is at **Appendix 9**.

6.6.5 STYGOFAUNA AND/OR TROGLOBITIC FAUNA MANAGEMENT PLAN

An assessment of threats to subterranean fauna has been completed for the LSP area and is at **Appendix 8**. It concluded that the identified threats to subterranean fauna biodiversity from the development are expected to be inconsequential and therefore a management plan for subterranean fauna is not required.

6.6.6 ABORIGINAL HERITAGE MANAGEMENT PLAN

A desktop study of Aboriginal sites and a subsequent ethnographic survey by specialist consultant, Ethnoscience, confirmed there are no known ethnographic impediments to development within the LSP area. The Ethnographic Survey has been forwarded to DIA and an Aboriginal Heritage Management Plan has been prepared and forms part of this LSP.

6.7 UXO MANAGEMENT

Prior to the commencement of any works on site, reconnaissance must be completed by a UXO specialist to search the site for unexploded ordnance and undertake any remediation action as appropriate. This requirement would be imposed as a condition of subdivision approval for each stage of subdivision.

6.8 CONTAMINATED SITES ASSESSMENT

Under the *Contaminated Sites Act, 2003* any known or suspected contaminated site must be reported to the DEC for assessment to classify the site under Section 15 of the *Contaminated Sites Act, 2003*. A Form 1, Report of a Known or Suspected Contaminated Site will be submitted to the DEC along with the Environmental Site Assessment that has been prepared in respect to the portion of Lot 500 which was formerly a tip site.

Further investigative works at the site in full compliance with DEC guidance will be required to facilitate subdivision approval. This will also require the appointment of an independent Contaminated Sites Auditor for review of all environmental investigations and reports, and preparation of a Mandatory Auditors Report (MAR) for submission to the DEC in order to clear any planning conditions.

6.9 STAGING/SUBDIVISION

An indicative staging plan for the subdivision and development of land the subject of this LSP is included as **Figure 6.1**.

The staging of development provides for the first application for subdivision to be lodged immediately following approval of the LSP and encompassing land adjacent to Breakwater Drive at the intersection with the proposed Local Centre and extending north along the District Distributor B. This would provide for a mix of lots to be developed for a range of housing types with residential densities ranging from R5/R10 to R25/R40 and the opportunity for higher density development in conjunction with the Local Centre.

The Local Centre site would be able to be utilised for a sales office and café/community hub, offering an immediate benefit to the existing Two Rocks community.

Subsequent stages are proposed to proceed in a northerly and southerly direction with the land closest to the coast and the future Northern Town Centre likely to constitute the final stages of subdivision and development. The development of the Two Rocks Marina Village is also likely to serve as an impetus to the higher density residential development of land in the LSP area, adjacent to the Two Rocks Marina Village.

The commencement of subdivision and development of the CVJV Two Rocks landholdings, in the short term, is consistent with the Staging Plan in the DSP, which incorporates the majority of the land in Stage 1, abutting existing development in Two Rocks and the remaining land adjacent to the coast and abutting the future Northern Town Centre in Stage 2.

6.10 DESIGN GUIDELINES AND DETAILED AREA PLANS

In order to provide further guidance and impose specific controls on development, it is intended that Detailed Area Plans (DAPs) be prepared by the subdivider for approval by Council under section 9.14.3 of DPS 2 and implemented by Council through the development approval process.

In accordance with the Part 1 provisions of this LSP, DAPs will be required to be prepared and must accompany any subdivision application for:

- Residential development at a density greater than or equal to R30;
- Residential development at a density less than or equal to R10; and
- Commercial, mixed use and business zoned land.

The DAPs must demonstrate that dwelling yield targets in the LSP have been met and may also include residential density code variations and special building requirements. In respect to lots coded R5-R10, DAPs must specifically identify areas for retention of vegetation and special building requirements to ensure preservation of landform and vegetation, consistent with the intent of the LSP.

Design Guidelines may accompany DAPs, providing additional guidance on the design, layout and construction of buildings in all or parts of the LSP area. In accordance with established procedures, it is proposed that Design Guidelines be prepared and implemented by the subdivider and managed through the contract of sale of lots.

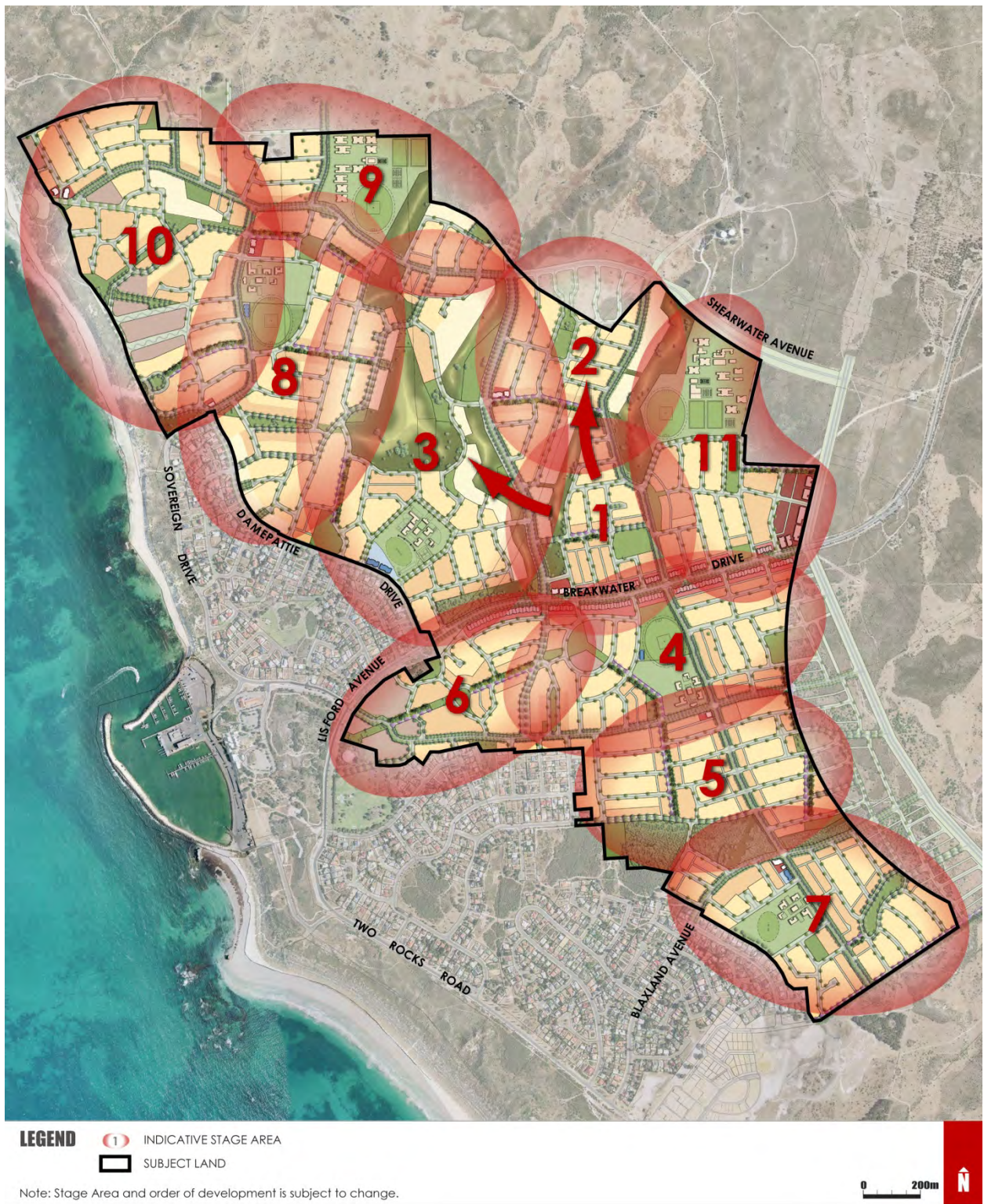


FIGURE 6.1 STAGING PLAN