PART 2 - EXPLANATORY REPORT

LOCAL STRUCTURE PLAN

LOTS 1001 and 1002 MARMION AVENUE ALKIMOS

NOVEMBER 2009

LWP beyond the plan

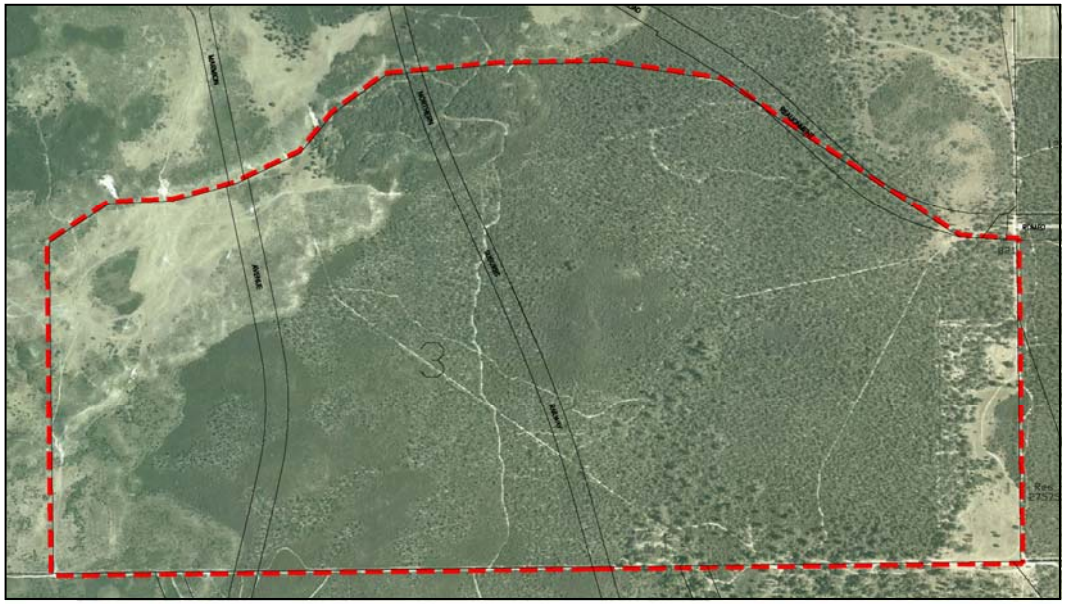
PREAMBLE

This Structure Plan has been prepared and lodged pursuant to Clause 9.8 of the City of Wanneroo District Planning Scheme No 2. The Part 1 Statutory Report has been prepared as a separate document.

This Part 2 Explanatory Report provides a background and establishes a context for the Structure Plan, outlining key statutory planning requirements, together with relevant community, environmental, recreation, commercial, education, traffic and servicing considerations, and a housing and density strategy.

This Report also addresses the objectives of the Local Housing Strategy through the Smart Growth Assessment Tool (SGAT), as applicable to the Structure Plan.

The Local Structure Plan has been prepared in consultation with a variety of stakeholders including representatives from the City of Wanneroo, Department for Planning and Infrastructure, Department of Environment, Department of Education and Training, Main Roads WA and others.



Aerial Photograph – Existing Lots 1001 and 1002 Marmion Avenue, Alkimos

LIST OF FIGURES

LIST OF APPENDIX

LIST OF TABLES

LIST OF GRAPHS

SECTION A

Background to the Local Structure Plan

1.0 INTRODUCTION

This Local Structure Plan has been prepared on behalf of the owner of Lots 1001 and 1002 Marmion, Alkimos - Northern Corridor Developments Ltd. The purpose is to provide a land use structure to guide the future subdivision and development over the property.

Lots 1001 and 1002 has an area of 226 hectares and is predominantly zoned Urban under the Metropolitan Region Scheme and Urban Development under the City of Wanneroo District Planning Scheme No. 2.

All service infrastructure can readily be extended to service the land and therefore subject to the completion of the statutory planning processes, the land is 'ripe' for development.

The Butler Jindalee District Structure Plan which sets out the broad landuse structure over Lots 7, 8, 11, 31, 32 and 33 Butler and Ridgewood, Lots 9, 10 and 12 Jindalee; and Lots 1001 and 1002 Alkimos (the subject property) has been adopted by the City of Wanneroo and the Western Australian Planning Commission.

The District Structure Plan provides the framework for more detailed local structure planning and incorporates general landuses, major roads, rail and other community infrastructure including schools sites and district open space.

In respect to Lots 1001 and Lot 1002, the Butler Jindalee District Structure Plan depicts the majority of the land as residential with a service industry corridor along the eastern boundary of the lot; two primary school sites; portion of a high school site (4ha) and district open space (5.5 ha); two local centres; the major road structure including Marmion Avenue; and the northern suburbs railway running north south through the property.

Prior to subdivision and development of the land a further more detailed level of planning is required – a Local Structure Plan.

The Local Structure Plan should define the road structure and landuses, urban form and residential densities, pedestrian network, public open space and community facilities, and also address Council's specific requirements in respect to community development, employment strategies, 'smart growth' objectives, landscaping; drainage, nutrient management and sustainability objectives.

This Local Structure Plan has been prepared for the whole of Lots 1001 and Lot 1002, except for the area adjacent to the Freeway which is subject to further investigation. The Plan generally complies with the broad land use structure defined in the Butler Jindalee District Structure Plan.

The Local Structure Plan has been prepared by Gray & Lewis under the direction of LWP Property Group Pty Ltd (Project Managers) drawing on the multi disciplinary skills and expertise of a range of consultants including:

- Simon Youngleson Architects and Urban Designers
- Plan E Landscape Architects
- GHD Civil Engineering Pty Ltd
- ATA Environmental
- Riley Consulting
- Australian Interaction Consultants
- Urbis JHD

2.0 LOCATION

Lots 1001 and 1002 Marmion Avenue, Alkimos is situated in the North West Corridor of the Perth Metropolitan area within the municipality of the City of Wanneroo. The property is located approximately 40 kilometres from the centre of Perth, 9 kilometres south of Yanchep and approximately 16 kilometres north of Joondalup. The regional location is shown in **Figure 1**.

Neerabup National Park is situated adjacent to the eastern boundary of Lots 1001 and 1002 separated by the Mitchell Freeway reservation. The western boundary of Lots 1001 and 1002 is approximately 1.6 kilometres from the coast.

The existing residential development front at Butler is now at the south eastern boundary of Lots 1001 and 1002. Refer **Figure 2 – Locality Plan**.

Photograph from western boundary of Lots 1001 and 1002

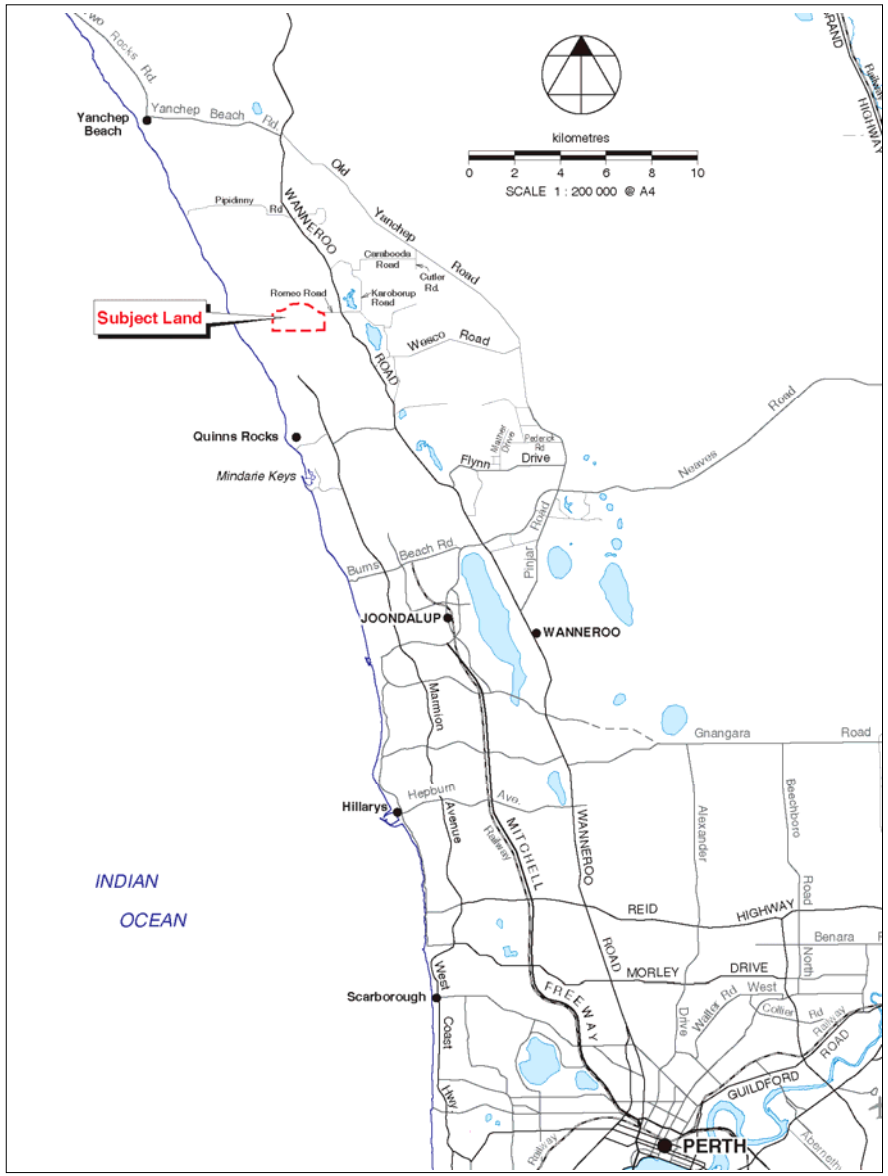


Figure 1 – Regional Location

2.1 Title Details and Ownership

The subject land comprising an area of 226.0397 hectares is described as Lots 1001 and 1002 of Swan Location 1370 contained within Certificate of Title Volume 1816 Folio 952 on Plan 9383.

The registered proprietor is Northern Corridor Developments Ltd.

2.2 Land Description (Overview)

The lot is rectangular in shape with an irregular northern boundary that follows the line of the coastal dune formation. The land comprises elevated coastal landforms rising to almost 60m AHD with good quality vegetation extending across most of the property. There are no wetlands or other physical or environmental constraints on the property.

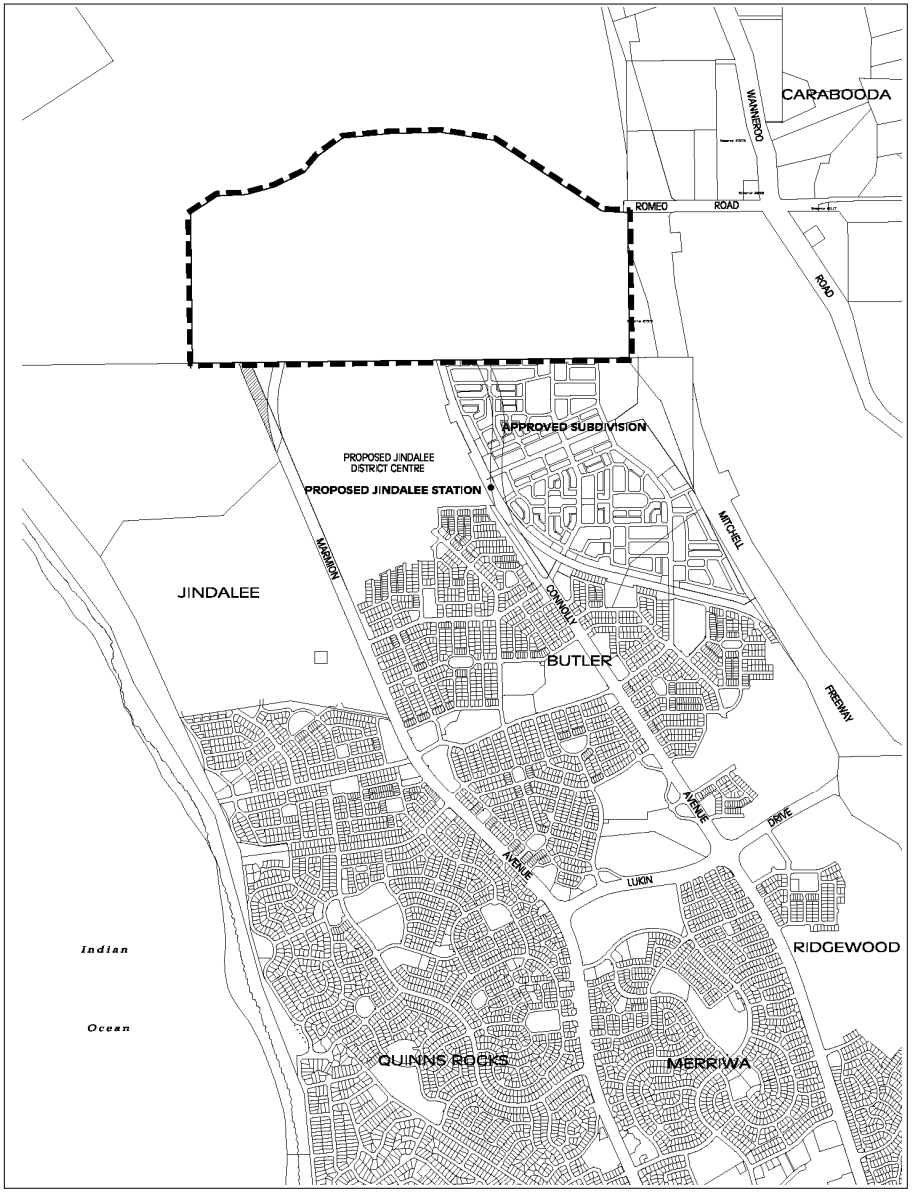


Figure 2 – Locality Plan

3.0 DEMOGRAPHICS

3.1 Growth Trends, Population and Housing

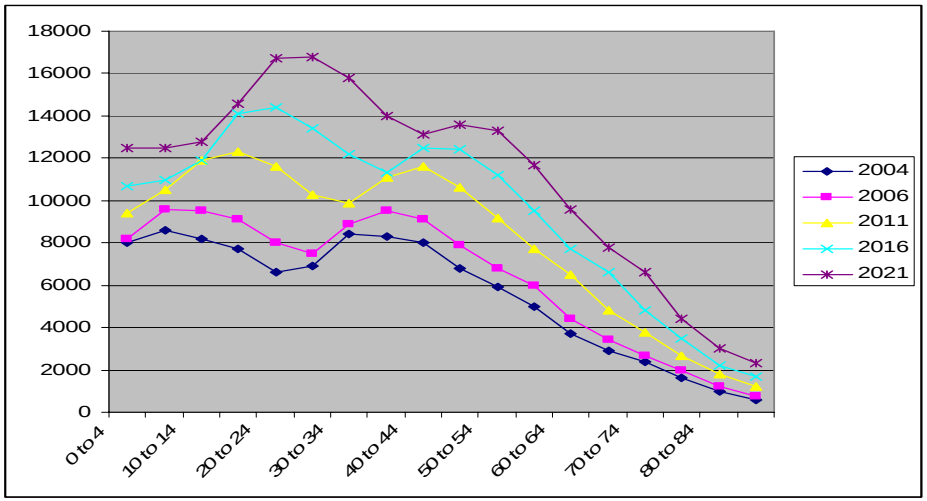
Population forecasts show that substantial population growth is expected to continue for the City of Wanneroo. **Table 1** below shows the anticipated population growth to 2021.

1991	1996	2001	2006	2011	2016	2021
46,600	65,000	84,100	114,600	146,800	171,000	201,200

Table 1 – Anticipated Population Growth
Source: WA Tomorrow (WAPC, 2005)

There is a significant difference between the forecast for 2021 predicted to be 201,200 under WA Tomorrow compared to 217,472 under the ID Forecast. This illustrates that there is some uncertainty as to how quickly the population will grow in the City of Wanneroo.

Graph 1 shows the forecast increase in population by age to 2021 and demonstrates that the population of persons aged between 20 – and 29 age is expected to almost double from 15, 500 in 2006 to 33, 500 persons in 2021. Similarly, the population of persons aged 60 plus is anticipated to almost double in the same time period.



Graph 1– Population by Age
Source: WA Tomorrow (WAPC, 2005)

Table 2 shows how household types in the City of Wanneroo are anticipated to change.

The City of Wanneroo predicts that there will be a small increase in lone parent households and a significant increase in lone person households.

Household Types Households (occupied private dwellings)	Forecast Year		
	2001	2006	2011
Couple families with dependents	12 183	16 716	21 770
Couples without dependents	7348	10676	14227
Lone parent families with dependents	3599	4645	5773
Other families	476	629	798
Lone person households	4193	5810	7537
Group households	578	751	949
Total Households	28, 376	39, 226	51, 054

Table 2– Anticipated Change in Household Type
Source: Community Development Strategy (City of Wanneroo)

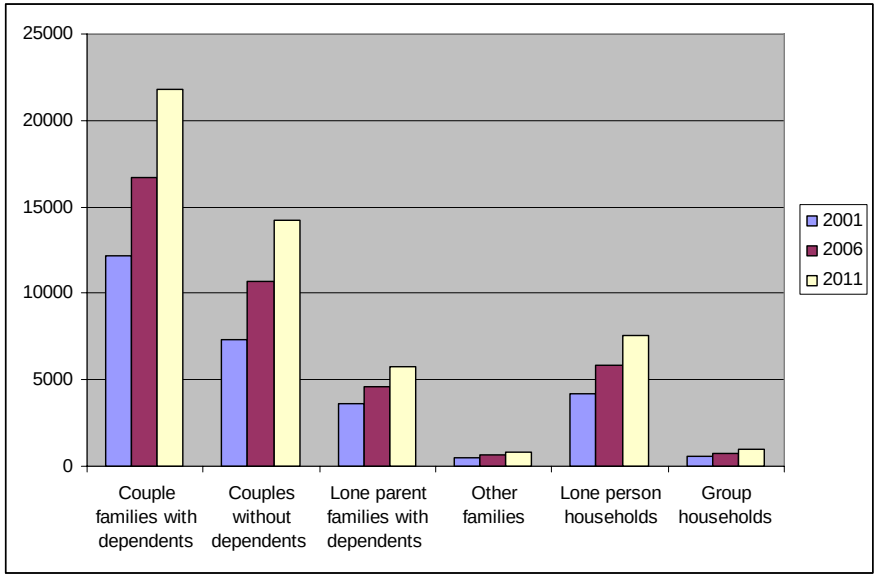
It is predicted that between 2001 and 2011 the number of couples with dependents will almost double. There will also be a significant increase in couples without dependents. This is better demonstrated pictorially in **Graph 2**.

As a result of shifts in household structure, it is anticipated that the average size of households by 2021 will be 2.79 persons.

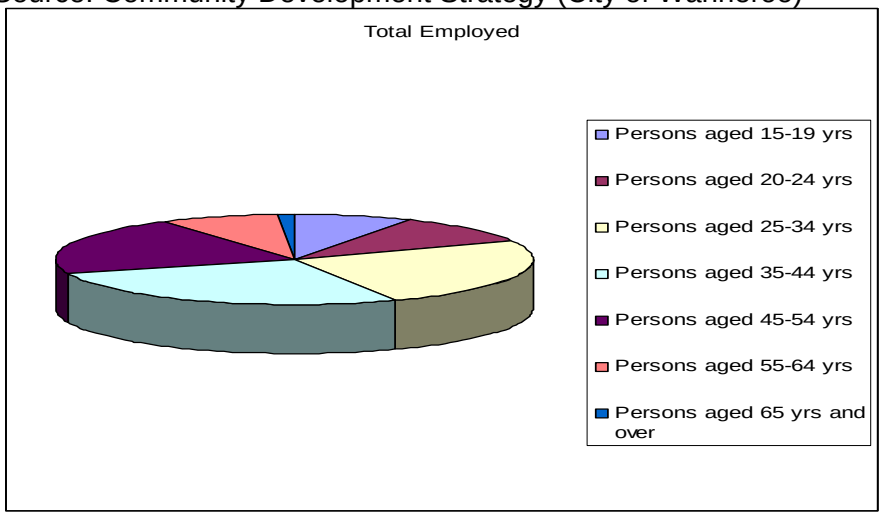
3.2 Employment and Income

Graph 3 shows the resident working population in the City of Wanneroo for 2001, and breaks it into number and proportion by age.

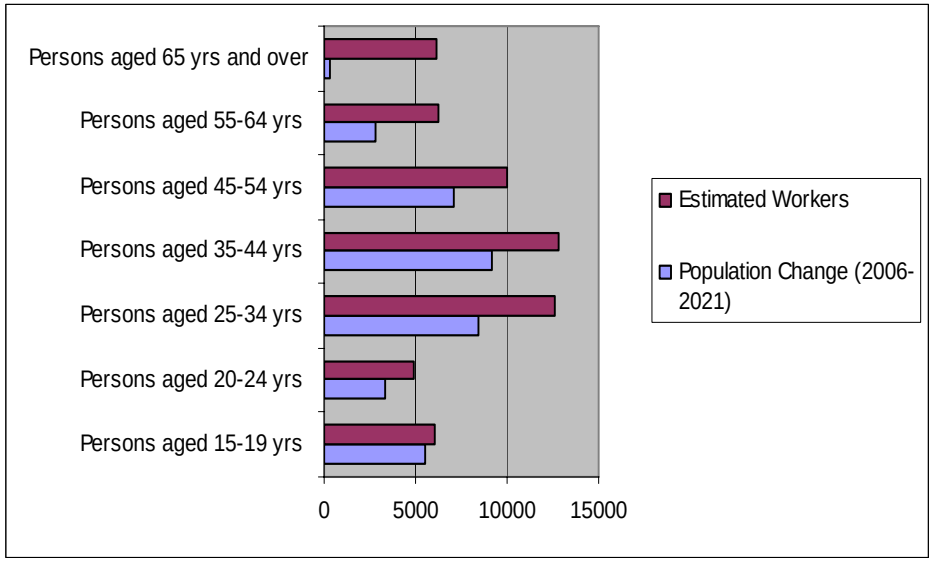
Graph 4 shows the estimated working population by age, based on 2001 proportions by age.



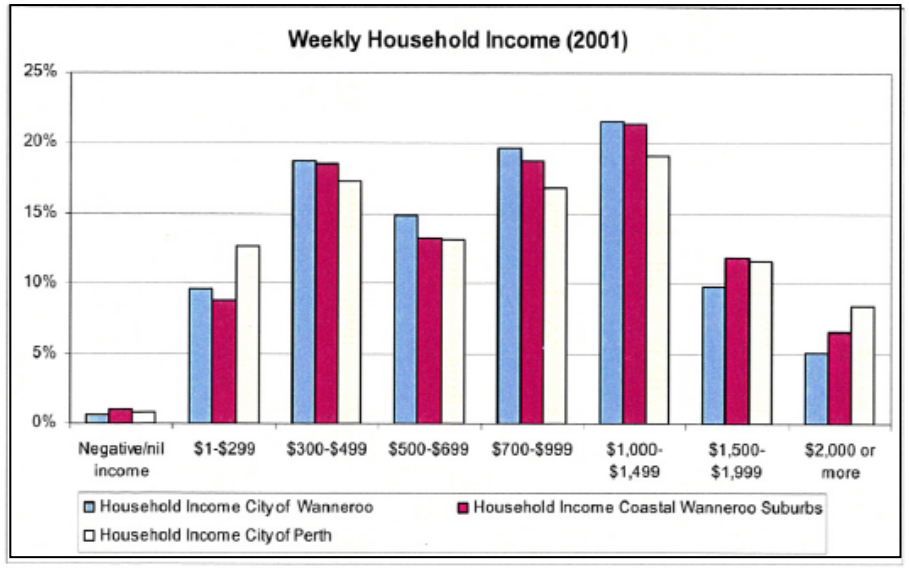
Graph 2– Comparison of Household Type 2001 to 2011
Source: Community Development Strategy (City of Wanneroo)



Graph 3 – Employed Persons by Age
Source : Alkimos Eglinton District Structure Plan Report



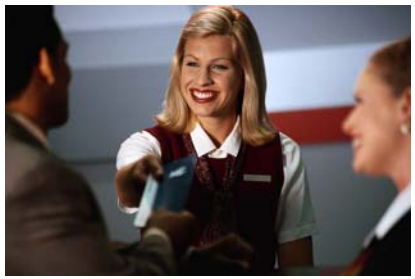
Graph 4– Estimated Employed Persons by Age
Source: Based on data from the Draft Alkimos Eglinton District Structure Plan Report



Graph 5– Weekly Incomes
Source: ABS Census 2001

Graph 5 compares 2001 weekly household incomes with the costal suburbs of the City of Wanneroo and the Perth Metropolitan Area.

It is anticipated that Alkimos will be attractive for some higher income workers.



4.0 STATUTORY PLANNING BACKGROUND

4.1 Existing Zoning

4.1.1 Metropolitan Region Scheme

- ***Amendment 932/33***

The whole of the Alkimos-Eglinton area was previously the subject of a major amendment to the Metropolitan Region Scheme – Amendment No. 932/33 to identify land for urban development. The amendment was finalised in October 1994.

The amendment re-zoned Lots 1001 and 1002 from 'Rural' to 'Urban' and 'Central City Area' zone (north of Romeo Road). It also included 'Important Regional Road' reservations for Marmion Avenue, Connolly Drive and Romeo Road.

- ***Amendment 1029/33***

In July 2006 a subsequent omnibus amendment (No. 1029/33) was finalised. The impact of this amendment in respect to Lots 1001 and 1002 was to re-align Marmion Avenue further to the east. The amendment also resulted in the relocation of the Alkimos Wastewater Treatment Plant further inland and refinement to the regional road structure and regional open space (north of Lots 1001 and 1002) – Refer **Figure 3**.

- ***Future MRS Amendments***

An MRS Amendment has been initiated to remove the Connolly Drive 'Other Regional Road' reservation from within Lots 1001 and 1002 in accordance with the Butler Jindalee District Structure Plan.

A further MRS amendment will be required to re-align the Romeo Road 'Other Regional Road' reservation further to the north in accordance with the Alkimos Eglinton District Structure Plan (draft).

The Northern Suburbs Railway proposed to extend through Lots 1001 and 1002 will also need to be reserved under the future MRS amendment. The preliminary engineering design and land requirement for this reservation to Romeo Road has been defined by Department for Planning and Infrastructure.

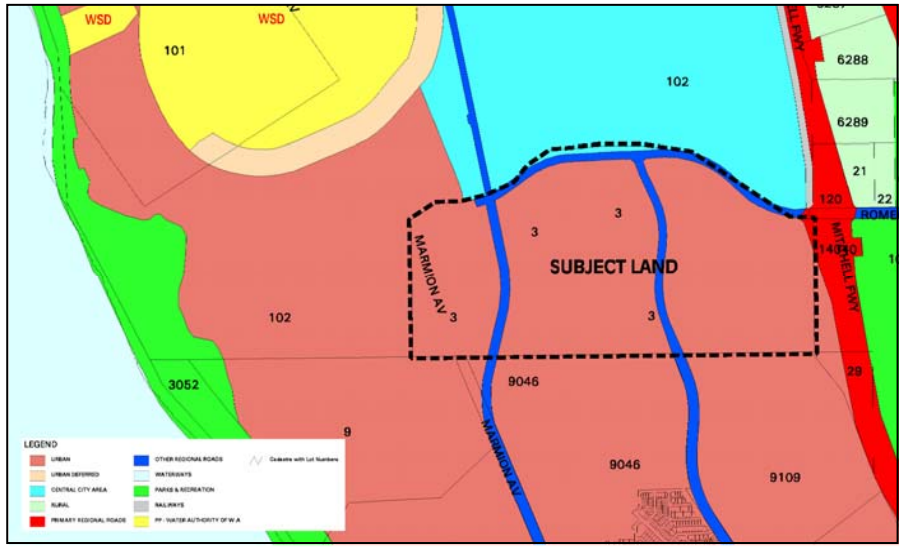


Figure 3 – Existing Zoning Metropolitan Region Scheme

4.1.2 City of Wanneroo District Planning Scheme No 2

Under the City of Wanneroo District Planning Scheme No 2, the land within Lots 1001 and 1002 north of Romeo Road, is zoned 'Centre'.

The remainder of Lots 1001 and 1002 is zoned 'Urban Development', apart from the regional road reservations – refer **Figure 4**.

An amendment to the City of Wanneroo District Planning Scheme No 2 will be required in respect to realignment / removal of the Romeo Road and Connolly Drive regional road reservations.

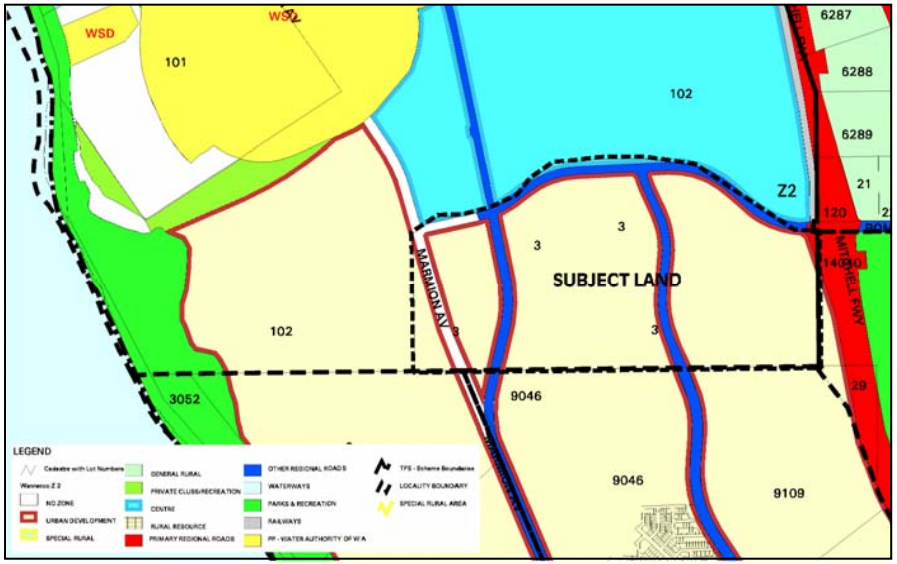


Figure 4 – Existing zoning City of Wanneroo Town Planning Scheme

4.2 District Structure Planning

4.2.1 North West Corridor Structure Plan (1992)

The North West Corridor Structure Plan (1992) compiled at a regional planning level, is set within the framework of Metropolitan and supersedes the 1977 North West Corridor Structure Plan. The Plan designates future urban areas (including Lots 1001 and 1002) and provides a rationale for ongoing MRS amendments. It proposed the future rail alignment in the Mitchell Freeway and provided Freeway access points to Romeo Road.

The 1992 Structure Plan is based on 60% self sufficiency in employment. The Corridor is expected to ultimately accommodate a resident population of 420, 000 with a resident workforce of 210, 000. These forecasts are substantially higher than those of the 1977 plan.

This Structure Plan is largely out of date. The Department for Planning and Infrastructure has established a working group to prepare a revised North-West Corridor Structure Plan.

4.2.2 The Jindalee Enquiry by Design Workshop (1996)

The Department for Planning and Infrastructure conducted the Jindalee Enquiry by Design Workshop in 1996 and this formed the fundamentals of the Butler / Brighton Charrette.

At the time the workshop was used to test and measure the Liveable Neighbourhoods design code which was still being developed. The exercise was used to develop a range of design options focusing on the clustering of neighbourhoods around a town centre, anchored by a rail station at one end and a major arterial road at the other end.

Many of the principles identified from the workshop were included in Edition 1 of Liveable Neighbourhoods.

4.2.3 Butler Charrette (August 2001)

The Butler Charrette consisted of two week long workshops held with various stakeholders. The Charrette was used to test different Liveable Neighbourhood Designs and measure their performance in terms of social, economic and environmental criteria.

As a result of the workshops a preferred Sub Regional Landuse Plan was produced and then it was refined into a more Detailed Plan. At a second series of workshops the Detailed Plan was re-evaluated to provide the basis for the Butler Jindalee District Structure Plan – refer **Figure 5**.

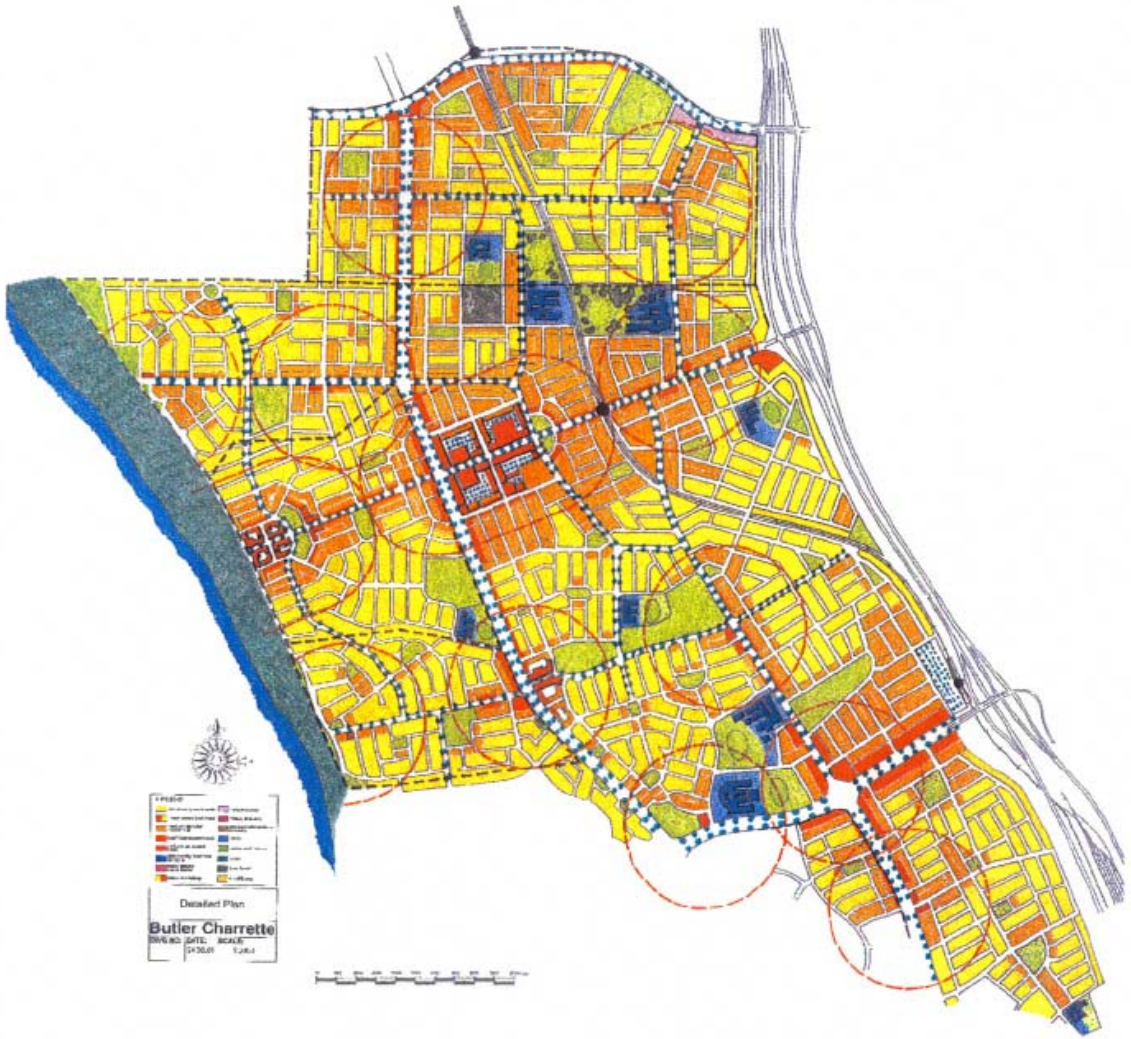


Figure 5 – Butler Charrette Plan

4.2.4 Butler-Jindalee District Structure Plan

The Butler Jindalee District Structure Plan was prepared by Chappell & Lambert Town Planners in April 2003 and finally adopted by the Western Australian Planning Commission in October 2006 – **Figure 6**.

The Structure Plan incorporated Lots 7, 8, 11, 31, 32 and 33 Butler and Ridgewood, Lots 1001 and 1002 Alkimos and Lots 9, 10 and 12 in Jindalee. The Structure Plan provides the broad district level planning framework for development in the Structure Plan area. It incorporates landuse, major roads, rail and other community infrastructure.

The District Structure Plan does not depict zonings, residential density codes and detailed development standards and requirements. It identifies general density principles and framework, and lists matters to be considered in preparation of Local Structure Plans.

In respect to Lots 1001 and 1002, the Butler Jindalee District Structure Plan depicts the majority of the land as residential with a service industry corridor along the eastern boundary of the lot; two primary school sites; portion of a high school site (4ha) and district open space (5.5 ha); two local centres; the major road structure including Marmion Avenue and the northern suburbs railway running north south through the property.

Some elements of the Butler Jindalee District Structure Plan in relation to Lots 1001 and 1002 have been superseded by subsequent planning, in particular, the removal of the Romeo Road railway station and relocation of Romeo Road north in accordance with the Draft Alkimos Eglinton District Structure Plan.

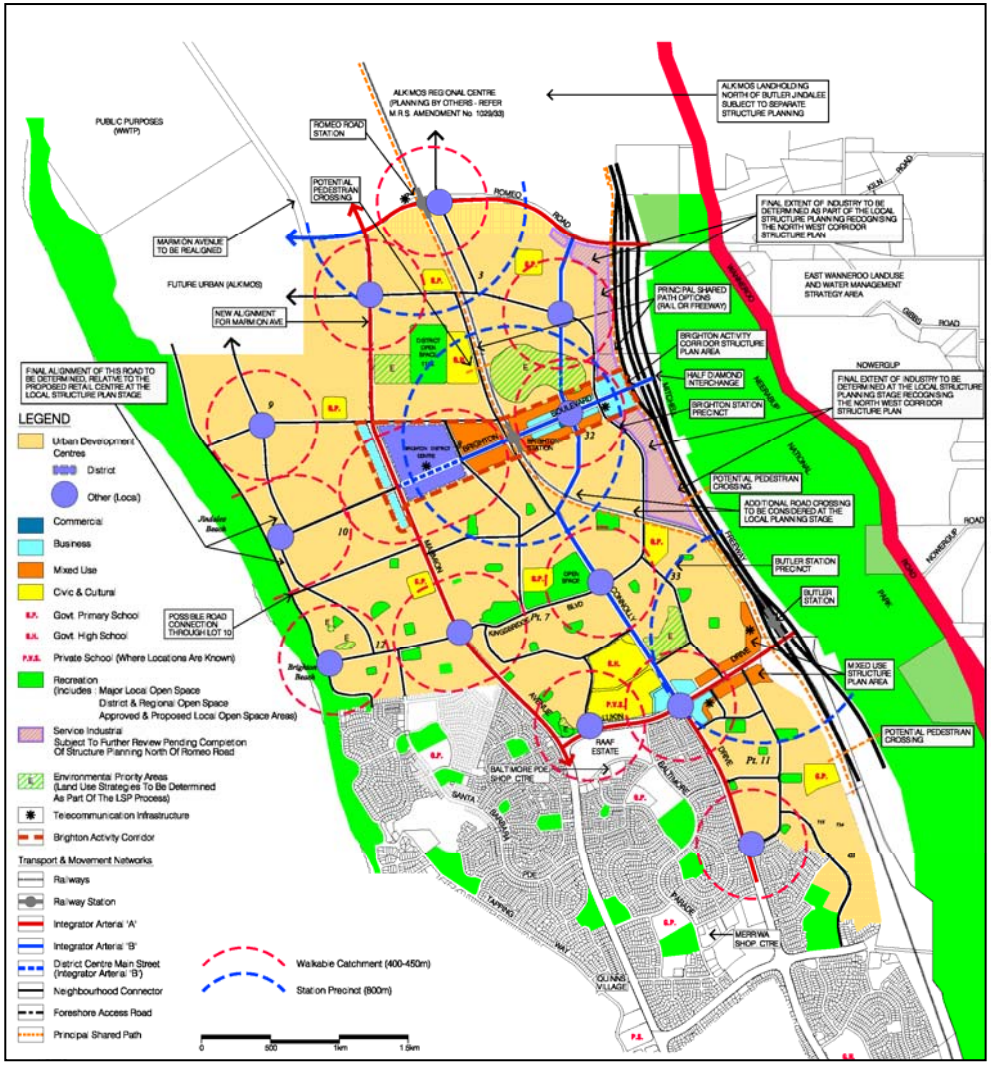


Figure 6 – Butler Jindalee District Structure Plan

It is recognised that the District Structure Plan will form the general basis for subsequent preparation of Local Structure Plans over portions or precincts of the area.

The report identifies that the following matters should be considered at local structure planning stage;

- Incorporation of design requirements relating to rail noise impact for dwellings near the proposed rail line;
- Detailed vegetation surveys to identify the significance of vegetation and retention value;
- Preparation of ethnographic and archaeological surveys;
- Provision of railway station precincts in accordance with the Western Australian Planning Commission's Policies.

Local Structure Plans would incorporate more detailed planning comprising of zonings, density codes, planning for community infrastructure, development standards etc.

4.2.5 Alkimos-Eglinton District Structure Plan

A Draft Alkimos-Eglinton District Structure Plan (**Figure 7**) has been prepared on behalf of the combined landowners north of Lots 1001 and 1002 Marmion Avenue and extending through to Yanchep to provide an overall district framework extension to the Butler Jindalee District Structure Plan. The Plan covers an area of approximately 2,606 hectares with 7.5 kilometres of coastal frontage, located to the north of Lots 1001 and 1002.

The major road structure includes Marmion Avenue and the east west connection to the Freeway. The alignment of the northern suburbs railway (and stations) is also identified.

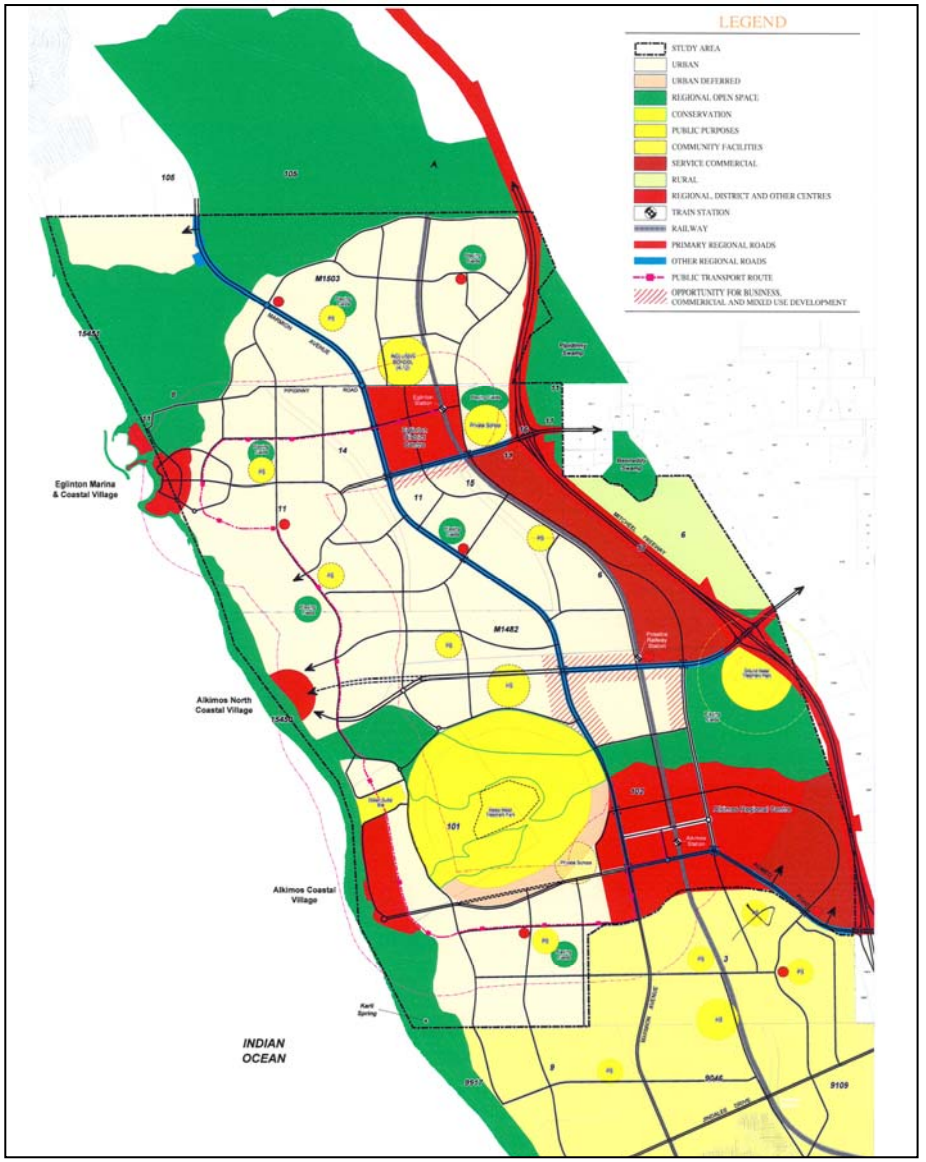


Figure 7 – Draft Alkimos Eglinton District Structure Plan

The majority of the land is depicted as residential. The approximate number of dwellings under the draft Plan is 22, 104 and the total projected population is 53, 049 (based on 2.4 persons per dwelling). Densities range from R30 with pockets of R40, R60 and up to R160 near the railway stations.

Alkimos Eglinton will include two major mixed use town centres. The Alkimos Regional Centre is proposed directly to the north of Lots 1001 and 1002 with an indicated potential GLA of 65, 000m2. The Eglinton District Centre is identified on Marmion Avenue approximately 6 kilometres north of Lots 1001 and 1002. It has an indicated potential of 15, 000m2 to 20, 000m2 NLA.

Scattered service commercial areas are proposed at Eglinton Marina & Coastal Village, Alkimos North Coastal Village and Alkimos Coastal Village. A larger service commercial area is located in the eastern portion of the study area adjacent to Mitchell Freeway.

Extensive Regional Open Space reserves are depicted along the coast with a linear corridor extending east to Mitchell Freeway. A large proportion of open space is concentrated in the northern portion of the District Structure Plan area. The west – east open space corridor extending from the coast to the Mitchell Freeway is dissected by a public purpose reserve which will accommodate a Ground Water Treatment Plant and Waste Water Treatment Plant with an ocean outfall pipeline.

The District Structure Plan provides for seven primary schools (3.5ha to 4 ha), 2 high schools and potentially a tertiary education facility within the Town Centre.

5.0 STRATEGIC PLANNING AND POLICIES

5.1 State Government Policies and Strategies

5.1.1 Metroplan (1990)

Metroplan is the current operational planning strategy for the Perth Metropolitan Region and was released in 1990. *Metroplan* provides a broad planning framework for urban development over the next 30 years, accommodating a population projection increase of approximately one million people, and an additional 400,000 households and jobs.

Metroplan promotes more efficient use of land with easier access to services and employment for new communities. Importantly, the plan recognises that the suburban rail extension to the northern suburbs provides an opportunity for a strong urbanised spine in the north-west corridor.

5.1.2 Liveable Neighbourhoods (1997)

Liveable Neighbourhoods was prepared to implement the objectives of the State Planning Strategy, which aims to guide the sustainable development of Western Australia to 2029. The original draft Liveable Neighbourhoods was released in 1997, with a refined Edition 2 released in June 2000.

It provides an integrated planning code examining strategic and operational issues to facilitate sustainable development and communities.

In October 2004, Edition 3 of Liveable Neighbourhoods was released with further refinements. The Policy is an important assessment tool for major development areas.

5.1.3 Metropolitan Centres Policy (2000)

The purpose of the policy is to provide a broad regional planning framework to co-ordinate the location and development of retail and commercial activities in the metropolitan region.

It is mainly concerned with the location, distribution and broad design criteria for the development of commercial activities at the regional and district level.

The policy provides a general guide for centre development, however local planning strategies provide more detailed guidance for planning and development control at the local level.

5.1.4 Network City (2004)

In September 2004 the State Government launched Network City after widespread consultation. The community plan that was produced outlines a change in direction for planning in Perth. The Dialogue process has identified a number of key liveability factors valued by Perth people.

Network City incorporates a number of relevant key Strategies that impact on structure plan design including:

- Foster landuse and transport integration to form a Network City;

- Promote and facilitate housing diversity to match the changing housing needs of the Perth population, in locations which provide equitable access and lifestyle opportunities;
- Encourage the local mixing of uses to reduce the overall need for people to travel between their places of residence, employment and recreation;
- Build new and revitalise existing employment centres;
- Refocus planning decision making on sustainability principles.

5.1.5 Transit Orientated Development (2006)

Development Control Policy 1.6 – Planning to support Transit Use and Transit Orientated Development was released in January 2006 detailing the integration of public transport and landuse.

As the public transport system is further refined and extended, there are emerging opportunities for new developments that focus on and maximise the benefits of transit infrastructure. The Policy promotes the benefits of integrating land use and transit facilities.

5.1.6 Bush Forever

Bush Forever outlines strategies for implementation to provide appropriate protection and management of areas of regionally significant bushland on the Swan Coastal Plain portion of the Perth Metropolitan Region.

As an endorsed government policy it is used as a basis for decision-making and provides a broad framework for the protection and management of Bush Forever Sites.

5.2 Local Government Policies & Strategies

5.2.1 Smart Growth Strategy (2005) & Assessment Tool

The City of Wanneroo has developed a strategic plan with four goals;

- Environmental sustainability;
- Healthy communities;
- Economic development; and
- Corporate management and development.

The Smart Growth Strategy is closely linked to the City of Wanneroo's Strategic Plan - Our People Our Future 2002-2005. Common themes exist between the Smart Growth Strategy's Principles and the Strategic Plan's strategic vision and goals.

There are several main Smart Growth principles as outlined below;

- *Lifestyle and Housing Choice* - Smart Growth encourages the provision of a variety of housing types and the enhancement of lifestyle options.
- *Effective use of Land and Infrastructure* - Smart Growth supports the effective use and development of land and buildings for the benefit of the local area.
- *Long term health of the environment* - Smart Growth promotes development that minimises environmental impact, together with practices that conserve and enhance natural areas.
- *Identity, Equity and Inclusiveness* - Smart Growth is creating opportunities to enhance and develop the identity of places and people, and to improve equity and inclusiveness within the community.
- *Long Term Economic Health* - Smart growth supports opportunities that enhance industry growth and promote job creation within the region.
- *People and Government* - Smart Growth encourages citizen and stakeholder participation in governance and development decisions.

The overall targets of the Local Housing Strategy have been aligned with the Smart Growth Assessment Tool (SGAT) to determine housing targets for specific locations.

The SGAT uses six geographic location types and the SGAT requires the target proportions of dwellings in each of these locations. The 2021 dwelling forecasts and the total dwelling forecast by suburb were used and given an estimated distribution based on geographic location type.

The resultant proportions were then totalled to give the estimated total dwellings for each location type in SGAT as shown in **Table 3** below;

Geographic Type	Proportion
Standard	30%
Within 400m of a coastal node	6%
Within 800m of a train/bus station or town centre with a transport hub	21%
Within 800m of a town centre (no transport hub)	21%
Within 400m of a neighbourhood centre	20%
Rural	2%

Table 3 – Geographic Type
Source: Syme Marmion – City of Wanneroo Housing Strategy

The SGAT includes three housing types:

- Single Residential (low density);
- Semi Detached/Townhouse/Flat in 1-2 storey (medium density); and
- Apartments/Other/Flat in 3 storey (high density).

Using the Macroplan Local Housing Strategy 2021 dwelling forecasts, SGAT sets proportions for each of the dwelling types – **Table 4**.

Dwelling Type	Proportion
Single Separate House on lot less than 440m2	26.7%
Single Separate House on lot greater than 440m2	49.5%
Semi detached / Townhouse	14.4%
Flats/Units/Apartments/Other	9.4%

Table 4 – Dwelling Type
Source: Syme Marmion – City of Wanneroo Housing Strategy

The Strategy recognises that the categories suit this high level of analysis of likely future development, but increased densities can also be achieved by alternative urban forms (eg single residential is classed as low density, however small lot and zero lot line houses can significantly increase density without being categorised as medium density).

Table 5 sets out the forecast dwelling types by geographical location for use in SGAT.

Geographic Types	Standard	Within 400m of Coastal Node	Within 800m of train station / bus station/ or TC with transport hub	Within 800m of town centre – no hub	Within 400m of Commercial Neighbourhood Centre	Rural	Overall Target
Gross density (dwellings per hectare)	10 %	20 %	25 %	25 %	20 %	5 %	
CoW Proportion of dwellings per location type (2021)	30 %	6 %	21 %	21 %	20 %	2 %	100 %
DIVERSITY HOUSING TYPES							
Single Separate House on Lot less than 400m2	21 %	23 %	28 %	28 %	36 %	4 %	26.7 %
Single Separate House on Lot greater than 400m2	66 %	52 %	37 %	37 %	46 %	90 %	49.5 %
Semi detached town house	10 %	15 %	20 %	20 %	10 %	5 %	14.4 %
Flats units apartments other	3 %	10 %	15 %	15 %	8 %	1 %	9.4 %
TOTAL	100 %	100 %	100%	100%	100 %	100%	100%

Table 5 – Forecast Dwelling Types by Geographical Location (for use in SGAT)

Liveable Neighbourhood Version 3 specifies:

- 12-20 dwelling units / site hectare general residential neighbourhoods
- 20-30 dwelling units / site hectare within 250 metres of main bus routes and 400 metres of neighbourhood centres
- 30-40 dwelling units / site hectare within 400 metres of town centres and railway stations.

Recent planning for transit oriented development for rail stations in Perth suggests that even more density may be achievable – up to R60. The Housing Strategy maintains that the housing types in the table above are broadly consistent with Liveable neighbourhoods. It also recognises that the same house type can achieve different net residential densities depending on the site layout and design.

5.2.2 Community Development Strategy 2005-2008

The City of Wanneroo has developed a Community Development Strategy that examines lifestyles for existing and new communities. The Strategy is based around three guiding principles;

- *People* - The City of Wanneroo will strive to support and empower the people in the community.
- *Place* - The City will strive to develop distinctive, attractive communities with a strong sense of place.
- *Purpose* - the City of Wanneroo will strive to provide services and facilities that meet the needs of the community.

Each guiding principle represents an important focus for the City and its role in nurturing a healthy community. The guiding principles are further supported by a collection of key objectives that identify the goals that the City would like to achieve in relation to people, place and purpose.

The action component of these objectives will be reflected in the area specific plans that are delivered at a more hands on level.

5.2.3 Local Housing Strategy

The Local Housing Strategy encompasses the whole of the City of Wanneroo. It focuses on those urban and rural parts of the City where housing is possible. The purpose of the Housing Strategy is to guide the future form and types of housing within the City of Wanneroo.

The principal objectives of the strategy are to:

a) Ensure that a wide range and choice of housing is provided to meet the changing social and economic needs of the community, and to understand the community's attitude to housing choice.
b) Ensure that an adequate supply of affordable housing is provided particularly for first home buyers.
c) Promote innovative, cost-effective and well-designed forms of housing which incorporate environmentally beneficial features.
d) Promote appropriate forms of housing close to existing and proposed community facilities and services (eg. Employment centres, transport hubs) to enable more efficient and effective use of those facilities and services.
e) Ensure an overall density, which will improve the viability and range of transport alternatives.
f) Ensure that residential areas are designed for all people of all ages and abilities and that these areas are protected from inappropriate development.
g) Provide a greater degree of certainty to developers and the community in the development of new housing areas and the redevelopment of existing housing areas.
h) Provide the City for an improved basis for decision making in relation to Development applications and rezoning proposals; and
i) Provide a component of a future Local Planning Strategy to support a future review of the City's district town planning scheme.
j) Promote universal design1 principles to ensure that all housing has a core of accessible features to the main living areas of the house.

The Strategy contains a number of recommendations. In terms of development for Greenfield sites, it recommends the use of specific tools (eg. Mixture of housing types, sustainable urban design, connectivity, creation of residential neighbourhoods).

5.2.4 Local Centres Strategy 2005

The City of Wanneroo Centres Strategy seeks to take a fresh approach to the distribution, size and nature of centres in the City of Wanneroo.

The Strategy promotes retailing and commercial development throughout the City of Wanneroo, and particularly encourages more diverse centres based on 'main street' planning principles.

The Strategy seeks to promote the future regional centres of Alkimos and Yanchep in the longer term as significant regional nodes offering a mixture of landuses including retail, offices, leisure, entertainment, recreation and community facilities. The Centres Strategy recognises that Alkimos has been identified and planned as an important regional centre since 1992 in the North West Corridor Structure Plan.

5.2.5 Economic Development Strategy & Employment Strategy 2004-2007

The City of Wanneroo developed its own Economic Development Strategy and complementary Employment Policy to provide sufficient local employment to support the high level of population growth.

The Strategy examines economic development activity over the next five years. It has a strong focus on trying to attract investment to the Wanneroo region and generating employment opportunities, particularly in growing commercial and industrial areas.

The Strategy recognises the current and future residential areas as an important source of employment. As a result it identifies home-based business as an area of strategic importance. The strategy extends economic development within the regional context where there is an interdependence of people, resources, institutions and business in the northern region.

The Strategy aim is to bring economic prosperity to suburbs currently experiencing high unemployment rates, creating better local job opportunities and subsequently increasing household earnings.

Ultimately the Economic Development Strategy is designed to build upon the project initiatives already initiated by the City of Wanneroo, and introduce new initiatives in line with the City's Strategic Plan and Smart Growth Strategy.

The Employment Policy is one of the main implementation tools for the Economic Development Strategy. The Policy requires proponents of any large-scale residential development within the City of Wanneroo to prepare a strategy to encourage employment capacity and subsequent retention within the local area. The City applies the Policy at all levels of the structure planning process.

6.0 EXISTING ENVIRONMENT

6.1 Landform and Soils

Lots 1001 and 1002 consists of two major landforms that are common on the western side of the Swan Coastal Plain; the Spearwood Dune system and the Quindalup Dune system. The majority of the site is comprised of the Spearwood Dune System which consists of low hilly to undulating terrain with a core of sandy limestone capped by secondary calcite, overlain by siliceous sand. The western portion of Lots 1001 and 1002 intersects the Quindalup Dune system, which consists of parabolic calcareous sand dunes of variable age. Refer **Figure 8 – Landform.**

Relief is generally undulating across the site although there is some variation with several high points up to 59m AHD (Australian Height Datum) in the north and a low point of 27m AHD in the south-western corner. Refer **Figure 9 – Topography Contour Plan.**

6.1.1 Quindalup Dunes

The soils of the Quindalup Dunes are comprised of Safety Bay Sands. These are white to grey, unconsolidated calcareous sands that are part of an extensive parabolic dune that has migrated almost 4km from the coast. They would have been deposited on the coast by wave action and blown inland to form part of the dunes. These dunes have been stabilised by native vegetation.

6.1.2 Spearwood Dunes

The Spearwood Dunes are the older of the two dune systems and consists of Tamala Limestone and residual sandy soils.

The dominant soil type on the Spearwood Dunes in Lots 1001 and 1002 is Karrakatta sand (yellow phase), which typically exhibits a grey-brown sandy surface passing into bright yellow sand (often several metres deep over the limestone). Some areas have shallow brown sandy soils over limestone with some visible occurrences of limestone at the surface.

The soil types are freely draining and suitable for managing stormwater by infiltration methods.

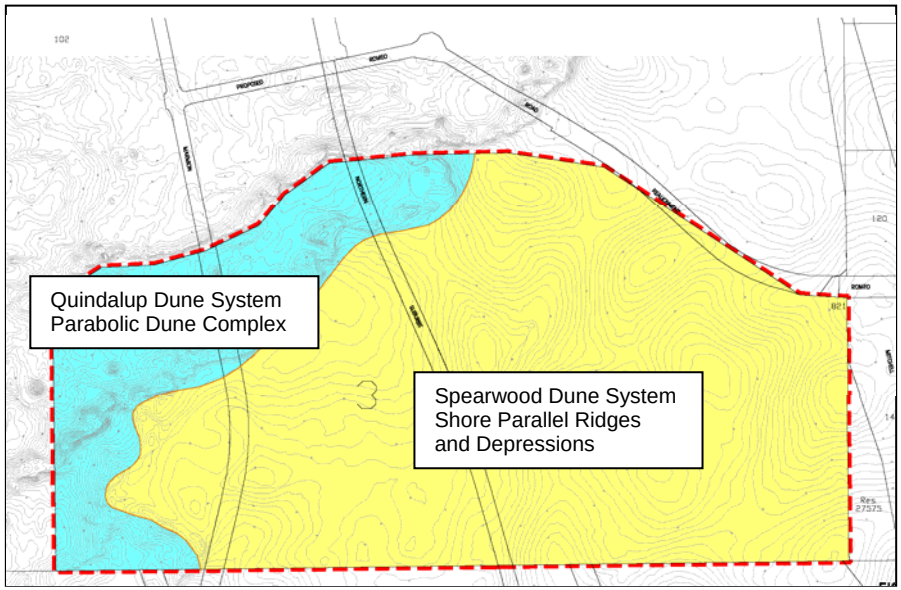
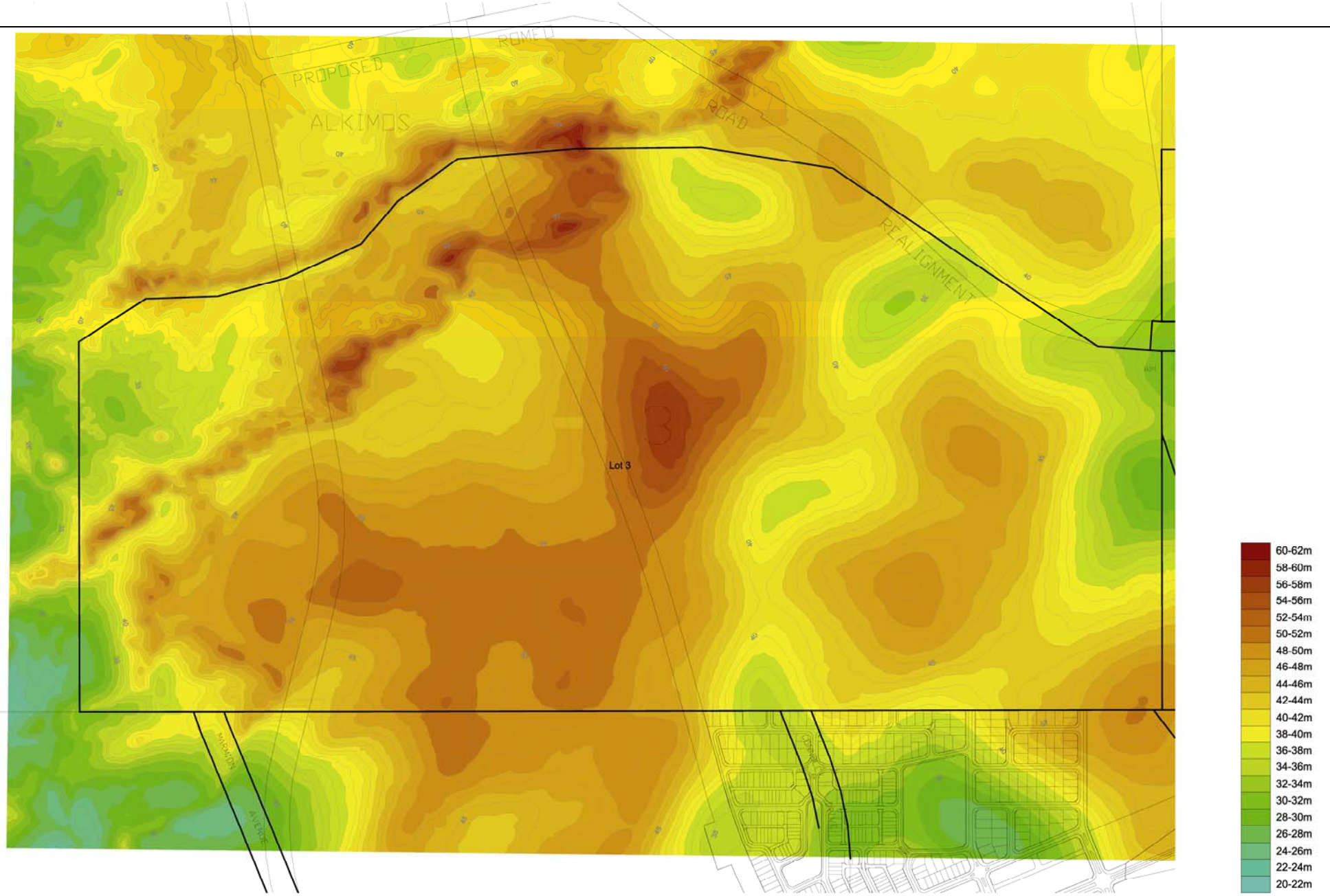


Figure 8 – Landforms



GRAY & LEWIS
LAND USE PLANNERS

Suite 5, 2 Hardy Street
South Perth, WA 6151
T (08) 9474 1722
F (08) 9474 1172
perth@graylewis.com.au

TOPOGRAPHY CONTOUR PLAN
LOT 3 ROMEO ROAD, ALKIMOS

FIGURE 9

6.1.3 Karstic Features

Karstic topography is typically characterised by sinkholes, caves and underground drainage. The potential for karst exists wherever limestone intersects with groundwater. Available data suggests that there is a very low possibility of Karstic features being located on this lot. No obvious signs of karst were observed by GHD Engineers as part of the geotechnical investigations – **Appendix 1 Geotechnical Report.**

Most known karst features in the region are located on the eastern side of Wanneroo Road with some minor karstic features observed to the west.

6.1.4 Acid Sulphate Soils

The Western Australian Planning Commission Bulletin No. 64 identifies this site as a 'Class 3' in its risk mapping, which essentially means it has a low to no risk rating of Acid Sulphate Soils occurring at depths less than 3 metres.

6.2 Ground Water

The highest estimated average groundwater level in the locality is less than 2m AHD according to the Perth Groundwater Atlas.

Groundwater levels are therefore expected to be greater than 25 metres below ground level across the site. Generally groundwater movement occurs in a south - westerly direction towards the coast.

Given past land uses of Lots 1001 and 1002, depth to water table and the presence of limestone it is anticipated that groundwater quality will be suitable for non-potable uses (e.g.watering open space).

However, water quality analysis should be undertaken to verify groundwater suitability for irrigation and other non-potable uses.

6.3 Surface Water

There are no surface water features on Lots 1001 and 1002. To the east of Wanneroo Road is Carabooda Lake. Future development of Lots 1001 and 1002 is unlikely to have any impact on the surface water of this feature.

6.4 Flora

A comprehensive flora and vegetation survey was undertaken by ATA Environmental in 2006 – refer **Appendix 2**.

The flora and vegetation survey provides the following;

1. Identifies and lists all native and non native plant species within the lot,
2. Identifies any significant plant species;
3. Describes the vegetation association and floristic community type;
4. Assesses the significance of the vegetation in terms of Threatened Ecological Communities and other criteria listed in Bush Forever.

The survey was carried out in accordance with EPA's (2004a) *Guidance Statement No. 51: Terrestrial Flora Surveys for Environmental Impact Assessment in Western Australia*.

6.4.1 Vegetation Complexes

At the broad level of mapping there are two main vegetation complexes.

- ***Cottesloe Complex***

The vegetation on the Spearwood Dune portion of Lots 1001 and 1002 belongs to the Cottesloe Complex – Central and South. This is a broad unit which comprises many different vegetation types including Eucalypt woodlands, *Banksia* woodlands and heathlands on limestone soils.

- ***Quindalup Complex***

Vegetation on the western Quindalup Dune area belongs to the Quindalup Complex (Heddle *et al*., 1980).

This vegetation complex is distributed on Spearwood soils on the western side of the Swan Coastal Plain between Yanchep and Lake Clifton south of Mandurah.

6.4.2 Vegetation Types

The vegetation association is a finer level of mapping the different types of vegetation that occur in an area.

6.4.2.1 Vegetation of the Spearwood Dune System

The vegetation of the Spearwood Dune System is listed below;

- *Eucalyptus gomphocephala* (Tuart) Woodland
- *Eucalyptus marginata* (Jarrah) Woodland
- *Banksia attenuata/Banksia menziesii* Low Woodland
- *Banksia attenuate* Low Open Woodland over *Calothamnus quadrifidus* Heath
- *Calothamnus quadrifidus* mixed Heath
- *Dryandra sessilis (Parrot Bush) Closed Scrub*
- *Melaleuca huegelii* Low Open Shrubland
- *Eucalyptus decipiens* Low Woodland

Banksia attenuate /
Banksia Menziedsii Woodland

Dryandra sessilis Closed Scrub

6.4.2.2 Vegetation of the Quindalup Dune System

The Vegetation of the Quindalup Dune System is listed below;

- *Melaleuca systena* Low Open Shrubland over *Lomandra maritima* Herbland
- *Acacia cochlearis/ Melaleuca systena* Low Shrubland
- *Acacia rostellifera* Closed Heath to Closed Scrub
- *Acacia saligna/Xanthorrhoea preissii* Open Shrubland

6.4.3 Vegetation Condition

The condition of the vegetation has been assessed according to the rating scale of Bush Forever and Lots 1001 and 1002 includes some vegetation in excellent condition. Lots 1001 and 1002 has not been identified in Bush Forever as being of regional significance requiring protection.

Lots 1001 and 1002 also contains some significant areas of disturbance including;

- The southern Tuart woodland which is in good to very good condition with partially cleared and weedy understorey as a result of grazing and vehicle movement;
- A portion of Lots 1001 and 1002 which has been partially cleared of native vegetation (adjacent to the eastern boundary). This area is rated as being predominantly in a degraded to completely degraded condition;
- The north western bowl of the parabolic Quindalup dune which is in Degraded to Completely Degraded condition as a result of clearing for grazing purposes.

6.4.4 Flora

A total of 185 plant species were recorded on the property consisting of 149 native species and 36 introduced species. This is comparable to the results of other surveys conducted in bushland near Lots 1001 and 1002.

The flora and vegetation survey uses the main criteria in Bush Forever to examine the regional significance of all vegetation and flora on Lots 1001 and 1002. The main criteria are representation of ecological communities and rarity.

Vegetation contained on Lots 1001 and 1002 is well represented in other areas including the Swan Coastal Plain portion of the Perth Metropolitan Region, Neerabup National Park which abuts the eastern side of the site, Ningana Regional Open Space about 6km to the north of the lot, and site 322 Burns Beach Bushland about 7km to the south-west of the site.

6.4.5 Rarity

All but one of the eight species listed as significant either in Bush Forever or Keighery *et al*. (1997) have been recorded in Neerabup National Park. The remaining species, *Conostylis pauciflora* ssp *euryhipis* has been recorded as widespread in Quindalup dunes in the Alkimos-Eglinton area including the Ningana Regional Open Space. Therefore, Lots 1001 and 1002 does not have any particular species of significance that only occurs in that location.

The lot contains *Eucalyptus decipens* which is not a rare plan although it is not found commonly in the Perth Metropolitan Region. The location of this woodland is suitable for open space as it is located in an elevated portion of Lots 1001 and 1002 with vistas to the north and east.

Lots 1001 and 1002 contains two main areas of Tuart dominated vegetation. Tuart is endemic to the Swan Coastal Plan, growing near the coast in a 400km band from Jurien Bay on the Plains north to Sabina River, east of Busselton. Tuart Woodlands are under increasing pressure as many woodlands have been cleared for agriculture and urban development.

The Local Structure Plan therefore proposes to retain a portion of the two Tuart Woodland areas in two linear Public Open Space areas.

6.5 Fauna

A comprehensive Vertebrate Fauna Assessment has been compiled by ATA Environmental – refer **Appendix 3**.

The investigation targeted significant fauna potentially found in the Yanchep area including (but not limited to) the following species:

- Baudin's Black Cockatoo (*Calyptorhynchus baudinii*)
- Brush-tailed Phascogale *(Phascogale tapoatafa)*
- Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*)
- Carpet Python (*Morelia spilota imbricata*)
- Chuditch or Western Quoll *(Dasyurus geoffroii)*
- Peregrine Falcon (*Falco peregrinus*)
- Rainbow Bee-eater (*Merops ornatus)*
- Southern Brown Bandicoot (*Isoodon obesulus fusciventer*)
- Western Brush Wallaby (*Macropus irma*)
- Black-striped Snake (*Neelaps calonotus*)
- Quenda or Southern Brown Bandicoot *(Isoodon obesulus fusciventer)*

The significant fauna assessment included:

- A review of all trees and habitat contained within the site to determine significance of the habitat for breeding and feeding potential for significant species;
- Verification, as far as possible, if any hollows are currently being used for nesting by avifauna; and
- Identification of any other significant habitat for important species, including feeding areas.

6.5.1 Habitat Types

Four broad habitat types are present on Lots 1001 and 1002 including *Acacia* Shrubland; *Banksia sp* woodland; *Eucalyptus sp.* and *Banksia sp.*woodland; and *Dryandra sessilis* Heath.

6.5.2 Habitat Condition

From a fauna perspective, the vegetation on Lots 1001 and 1002 is in very good condition, with the exception of the degraded area in the northwestern portion of Lots 1001 and 1002.

6.5.3 Vertebrate Fauna Survey Results

The survey results are as follows;

- 23 species of reptiles and 4 species of mammals (including 2 introduced species) were trapped over the course of the spring survey;
- Spot lighting at night was undertaken to observe larger mammal species (such as Western Grey Kangaroos and rabbits);
- 39 species of birds were observed;
- 2 amphibian species were caught;
- 11 trees containing hollows potentially suitable for breeding Carnaby's Black Cockatoo were recorded and their location is restricted to areas of Tuart Woodland. No Carnaby's Black Cockatoos were observed utilising the hollows during survey.

Of the species identified, the most significant is the Carnaby's Cockatoo *(Calyptorhynchus latirostris*).

Carnaby's Cockatoo is a schedule 1 species under the *Wildlife Conservation Act 1950* and listed as Endangered under the *Environmental Protection Bioversity Conservation (EPBC) Act 1999*.

It is unlikely that the *EPBC Act 1999* listed species on Lots 1001 and 1002 would rely on the vegetation present for their survival.

Nevertheless any clearing which significantly impacts on feeding habitat for Carnaby's Black Cockatoo is likely to require referral to the Commonwealth under the Environmental Protection and Biodiversity Conservation Act 1999.

In a regional context, the habitat types present on Lots 1001 and 1002 are well reserved, mainly in the nearby Neerabup National Park.

Notwithstanding the above, ATA Environmental recommends that representative habitats be retained in future open space within the Local Structure Plan to retain some of the fauna values of the site.

For the areas of native vegetation that would be cleared in the future development, there is an opportunity to undertake a trapping and relocation program for common vertebrate fauna that would be affected by clearing operations. The fauna could be relocated in adjacent Neerabup National Park, subject to DEC approval.

7.0 SOCIAL ENVIRONMENT

7.1 Aboriginal Heritage

A desktop survey of registered aboriginal sites prepared by Australian Interaction Consultants - refer **Appendix 4** revealed no archaeological or ethnographic sites on Lots 1001 and 1002. Within a 4 kilometre radius there are 11 eleven identified sites however these do not impact on the subject land – refer **Figure 10.**

The research indicates that the surrounding area has been used by Aboriginal people in antiquity. Previous heritage surveys of the general area have regularly identified new sites of ethnographic importance to Aboriginal people. However they consistently report that the general area exhibits a low potential for archaeological sites and that no archaeological barriers are present to prevent the proposed developments from proceeding.

The majority of DIA sites recorded in the general area are ethnographic and relate to natural features and mythological stories. The Alkimos, Two Rocks and Yanchep areas are part of an Aboriginal Dreaming story related to a fight between a shark and a crocodile that explains the formation of the surrounding landscape and offshore islands. The high number of ethnographic sites highlights the significance of this Dreaming story and the Alkimos area to Aboriginal people.

Preliminary archaeological assessment identifies that the potential for physical material within Lots 1001 and 1002 is minimal.

Monitoring should take place during earthworks for any subsurface material.

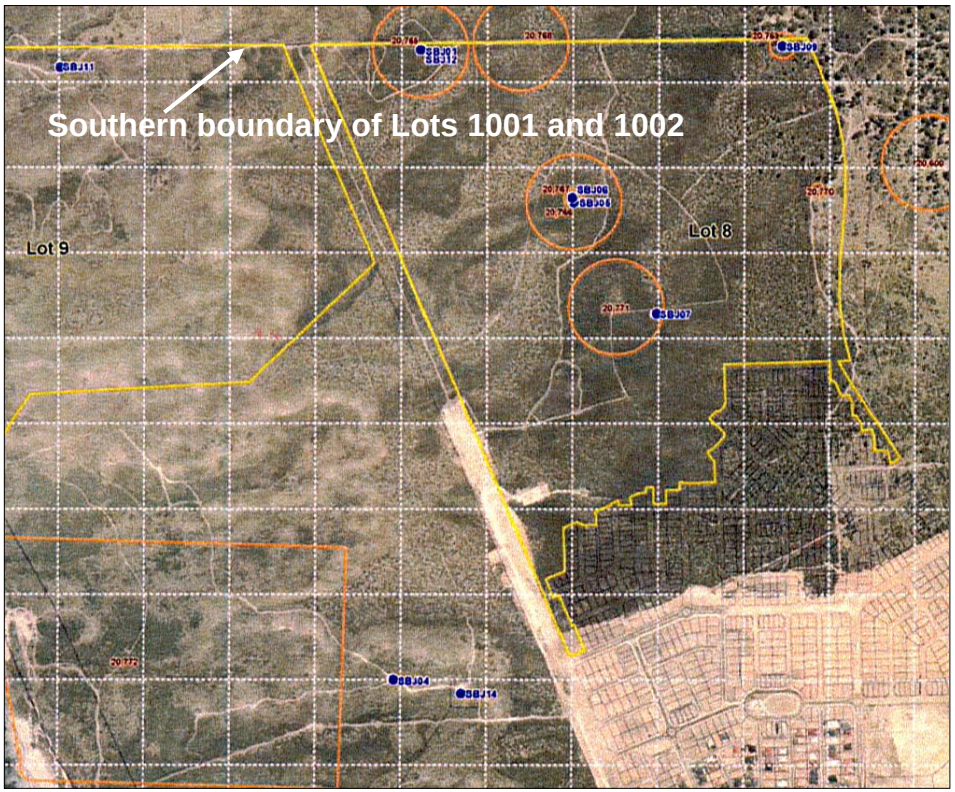


Figure 10 – Identified Sites south of Lots 1001 and 1002

7.2 European Heritage

There is no other historic use of the site other than it was partly used for grazing.

SECTION B

The Local Structure Plan

8.0 LOCAL STRUCTURE PLAN

8.1 Development Philosophy

8.1.1 Vision

Lots 1001 and 1002 Marmion, Alkimos is located at the leading of edge of development in Perth's north western corridor. It is proposed to create a contemporary urban residential community situated within a coastal bush setting.

The development will provide an intimate residential lifestyle development that capitalises on its proximity to major retail and employment nodes at Alkimos Regional Centre and Brighton District Centre.

A terrain-responsive urban design will incorporate sustainability initiatives and the built form and streetscaping will reflect coastal and vegetation themes. A diversity of housing product will be encouraged through contemporary design guidelines and opportunities pursued to innovate with housing design materials and lot types.

A recreational lifestyle focus will pervade the urban design and built form outcomes.

8.1.2 Context

Lots 1001 and 1002 Marmion Avenue, Alkimos is positioned adjoining Brighton, one of the fastest growing residential areas of Perth, with the emerging employment node at Neerabup 10km to the south east.

The site is neatly placed between the proposed Brighton District Centre and the Alkimos Regional Centre.

This location will result in a lesser emphasis on employment and shopping reliance on the CBD, and a heightened focus on living and working more locally.

There is substantial private and public infrastructure investment occurring now in the immediate vicinity of Lots 1001 and 1002, including:

- the extension of Marmion Avenue to Yanchep,
- the imminent extension of the Northern Suburbs Railway to Brighton and Alkimos;
- the construction of the Alkimos Waste Water Treatment Plant and Carabooda Water Supply Reservoir.

All of these infrastructure projects will help provide impetus for continued strong development and growth, with the opportunity for residents to become the pioneering population in the new vision for coastal development in the north-western corridor.

8.1.3 Opportunities and Constraints

Some of the attributes of, and opportunities for, Lots 1001 and 1002 include:

- Proximity to the natural attractions of the coast and the Neerabup and Yanchep National Parks.

- The site is strategically important in this Corridor and is ripe for urban development. The infrastructure investment in Lots 1001 and 1002 will trigger extensions of roads and service infrastructure, which in turn, will encourage adjacent development.

- The elevation of the land above the surrounding land provides unique vistas in all directions.

- The land is serviced by the future northern suburbs railway, with stations within walking distance of the majority of the landholding.

  Alkimos railway station will be positioned 400m north of the northern boundary, and just north of the relocated Romeo Road. The Jindalee (Brighton) station is some 700 m south of the southern boundary.

- There will be an opportunity to develop two vibrant local centres, complementing the major centres at Alkimos and Brighton, with flexibility for residential growth to support continued expansion in local employment.

- Development of Lots 1001 and 1002 will also complement the expansion of designated service commercial and industrial areas in the adjacent developments. The preservation of the strongly urban nature of Lots 1001 and 1002 will result in a quality residential enclave as a lifestyle retreat between the activities of the adjacent centres.

- The development will support the provision of two public primary schools and a half contribution to the Butler North High School. It will also contribute of a half share of the Butler North District Open Space which could be developed within a 3-5 year timeframe.

- The preservation of the landform of the parabolic dunes will be combined with the development of linear recreational walk and cycle routes, safe walk routes to school and transport nodes to reduce car dependency.

- The land will be accessible from Marmion Avenue which will be constructed by late 2008 as part of an agreement with the Capricorn Village JV to prefund 13km of Marmion Avenue to Yanchep.

- The Alkimos Waste Water Treatment Plant is intended to be commissioned by 2010 and is required to support the intended development.

- The Carabooda water main will extend through Lots 1001 and 1002 and is due for completion in 2008.

- The extension of the Northern Suburbs Railway is not committed, however a first stage to Jindalee (Brighton) is being earth worked to facilitate opening by 2012 and possibly to Alkimos by 2014.

- Mitchell Freeway – no committed timeframe for extension to Romeo Road, however Wanneroo Road intersects Romeo Road 700 metres east the landholding.

- Other than the extension of service infrastructure there are no constraints in respect to the development of Lots 1001 and 1002.

8.1.4 Development Themes and Objectives

The following themes will be elaborated upon to provide precinct-specific objectives and content for the development of more specific design and Detailed Area Plans.

- Create an urban, not suburban residential lifestyle with a strong civic focus and social fabric.
- A focus on sustainable local living.
- A concentration on higher density housing, smaller dwellings and mixed uses focused around key nodes, including the local centres.
- Emphasise and enrich the natural topographical and vegetation attributes of the location, by optimising retention of natural landforms in the public and private domain.
- Create several distinct village themes throughout the development with signature built form and continued innovation in sustainable housing product.
- Potential to pursue innovative limited footprint or coastal light weight housing in areas where terrain retention is advantageous.
- Highlight and encourage interaction with the coastal setting through terrain responsive streetscape orientation, circuits or linked recreational pedestrian cycle networks, and themed architectural responses supported by design guidelines and colour palettes to accentuate the locational attributes.
- Incorporate intimate, local centres in the eastern and western sides of the development incorporating main street style retail, and mixed use product. There is flexibility to accommodate future commercial development along Marmion Avenue and Romeo Road.
- Mandate (where practical) innovative and ecologically sustainable design initiatives, supported by self-sustaining guidelines and minimal covenants.

8.1.5 Strategies

Development strategies have been prepared by a multidisciplinary team following a critical review of development opportunities. Strategies are grouped under the following headings:

Leading sustainable urban design

Designed to reflect key principles of genuine sustainability and urban design.

- Realistic and implementable standards of energy efficiency, water conservation and recycling through the design, construction and built form stages of development.
- Creation of intimate local centres with early development of traditional land uses and built form supporting development of social infrastructure.
- Walkable local centres developed early and designed as the community heart and focus; strip shops, not to compete with the adjacent higher level centres.
- Use of colour, texture and material guidelines to ensure fresh contemporary and high quality neighbourhoods.
- Built form responses to facilitate an open and intimate community atmosphere.

Physical Infrastructure

- Road networks which reduce car dependence and maximise opportunities for alternative modes.
- Foster partnerships with adjacent developers to optimise walk and cycle access to bush forever areas, National Park, recreational beaches, dune structures and viewpoints, walkways to enable interaction with environment.
- Long walkways to give easy drop-in, drop-out access to civic and urban hubs.
- Minimisation of road widths through a practical hierarchy based on Liveable Neighbourhoods principles.
- Optimise access to existing and future public transport opportunities.
- Optimise opportunities to support the early development of the Alkimos Groundwater treatment plant as a means to supplement the Carabooda reservoir system supplying Lots 1001 and 1002.
- Flexibility to introduce third pipe systems when viable.
- Use of drainage systems, surface features and design details to optimise groundwater recharge and water quality.
- Continued support and innovation in the treatment and reuse of water at all levels.
- Prefunding of Marmion Avenue and service infrastructure connections.
- Smart community communications infrastructure.

Enhanced natural sustainable environment

- Development built in sympathy with the inherent beauty and validity of the non-coastal natural environment (dunes, scrub and or woodlands).
- Terrain responsive urban design and landscape approach is to optimise the opportunities to relate to the existing landscape, to ensure a more distinctive character.

- Retention of large trees and reinstatement and reinforcement of retained bushland vegetation in open space.
- Implementation of an urban water management strategy with flexibility to engage with district and regional level water saving and recycling initiatives.

Social infrastructure and life balance

- Provision of a development that enables people to have a better life balance and be a part of the latest thinking.
- Provision of a range of affordable housing opportunities suitable across demographic segments.
- Innovative housing development to cater for changing demographics.
- Urban design of streets, recreational linkages, and social network interactions contributing to a sense of attachment and validity of the locality as a residential and employment location.
- Community management opportunities to encompass aspects of social responsibility & empowerment.
- Recognition and interaction with urban living beyond the front door and a sharing of the vision.

8.2 Statutory Planning Compliance

8.2.1 Butler Jindalee District Structure Plan

The Local Structure Plan has been designed having regard for the major infrastructure and landuse elements depicted in the Butler Jindalee District Structure Plan; including:

- District Road Structure – Integrator Arterial 'A' (Marmion Avenue); Integrator Arterial 'B' (realigned Connolly Drive) and Neighbourhood Connectors.

  Note: Romeo Road has been realigned further to the north to provide a more direct access to the proposed Alkimos Regional Centre. (This realignment is in accordance with the draft Alkimos Eglinton District Structure Plan.)

- The Northern Suburbs Railway land requirement has been identified.

  Note: the station at Romeo Road has been relocated north 400m to coincide with the Alkimos Regional Centre.

- Two local centres. One in the eastern portion and the other in the western portion of Lots 1001 and 1002.

  Note: A third local centre shown on the District Structure Plan adjacent to Romeo Road has not been included due to the relocation of Romeo Road and the Romeo station further to the north.

- A government primary school east of the railway.

- Portion (50%) of a public high school site and portion (50%) of the district open space adjacent to the southern boundary of Lots 1001 and 1002 west of the proposed railway line.

- A second government primary school west of the Northern Suburbs Railway.

  Note: This site has been co-located with the high school site and district open space through consultation and agreement with the City of Wanneroo and Department of Education and Training. Refer Section 8.10.

- A service industrial area adjacent to the Freeway.

Note: The Service Industrial use adjacent to the freeway along the eastern boundary of Lots 1001 and 1002 has not been included in the Local Structure Plan at this time pending further investigation. This matter is further addressed under section 8.10.

8.3 Design Concept

The Local Structure Plan is shown in **Figure 11.** The location of proposed major transport corridors (the railway and Marmion Avenue) together with the existing landform and environmental attributes of the site have strongly influenced the structure plan design.

8.3.1 Precincts

Three separate although interrelated precincts have been formed by the physical barriers created by Marmion Avenue and the Northern suburb railway – the western, central and eastern precincts.

LEGEND

LAND WITHIN PART 1 STRUCTURE PLAN BOUNDARIES

PRECINCTS

1. ACTIVITY CENTRES (Commercial, Retail, Mixed Use & Higher Density Residential)
2. RESIDENTIAL (Low to Medium Density)
3. ENVIRONMENT RESPONSE HOUSING
4. EDUCATIONAL AND DISTRICT OPEN SPACE

Note: All areas not denoted as Precincts 1, 3 or 4 are Precinct 2

LAND USE

- TRH — TERRAIN RESPONSIVE HOUSING (R10)
- VRH — VEGETATION RESPONSIVE HOUSING (R10)
- RESIDENTIAL R20
- RESIDENTIAL R30 - R60
- RESIDENTIAL R60 - R100
- GH — GROUP HOUSING
- CENTRE
- MIXED USE

RESERVES

- SCHOOL SITES
- PUBLIC OPEN SPACE/ DISTRICT OPEN SPACE
- * DRAINAGE

SITE AREA	226.04ha
AREA OF NORTHERN CENTRE ZONE AND EASTERN AREA DENOTED AS 'SUBJECT TO FURTHER PLANNING'	40.26ha
BALANCE AREA	185.78ha
DEDUCTIONS	
HIGH SCHOOL	4.50
PRIMARY SCHOOLS (2)	7.50
COMMERCIAL	3.20
FREEWAY	0.51
MARMION AVE	5.10
RAILWAY	4.66
ROMEO ROAD	1.28
DRAINAGE	2.04
TOTAL DEDUCTIONS	28.78ha
NET AREA	157.00ha
10% POS REQUIRED	15.70ha
GROSS PUBLIC OPEN SPACE PROVIDED	17.95ha
DEDUCT 1:1 ARI SWALE AREAS WITHIN POS (2.0411ha) *	
NET PUBLIC OPEN SPACE PROVIDED	15.90ha

OVER PROVISION OF POS 0.2ha. - TO BE ADJUSTED IN SUBDIVISION OF BALANCE AREA.

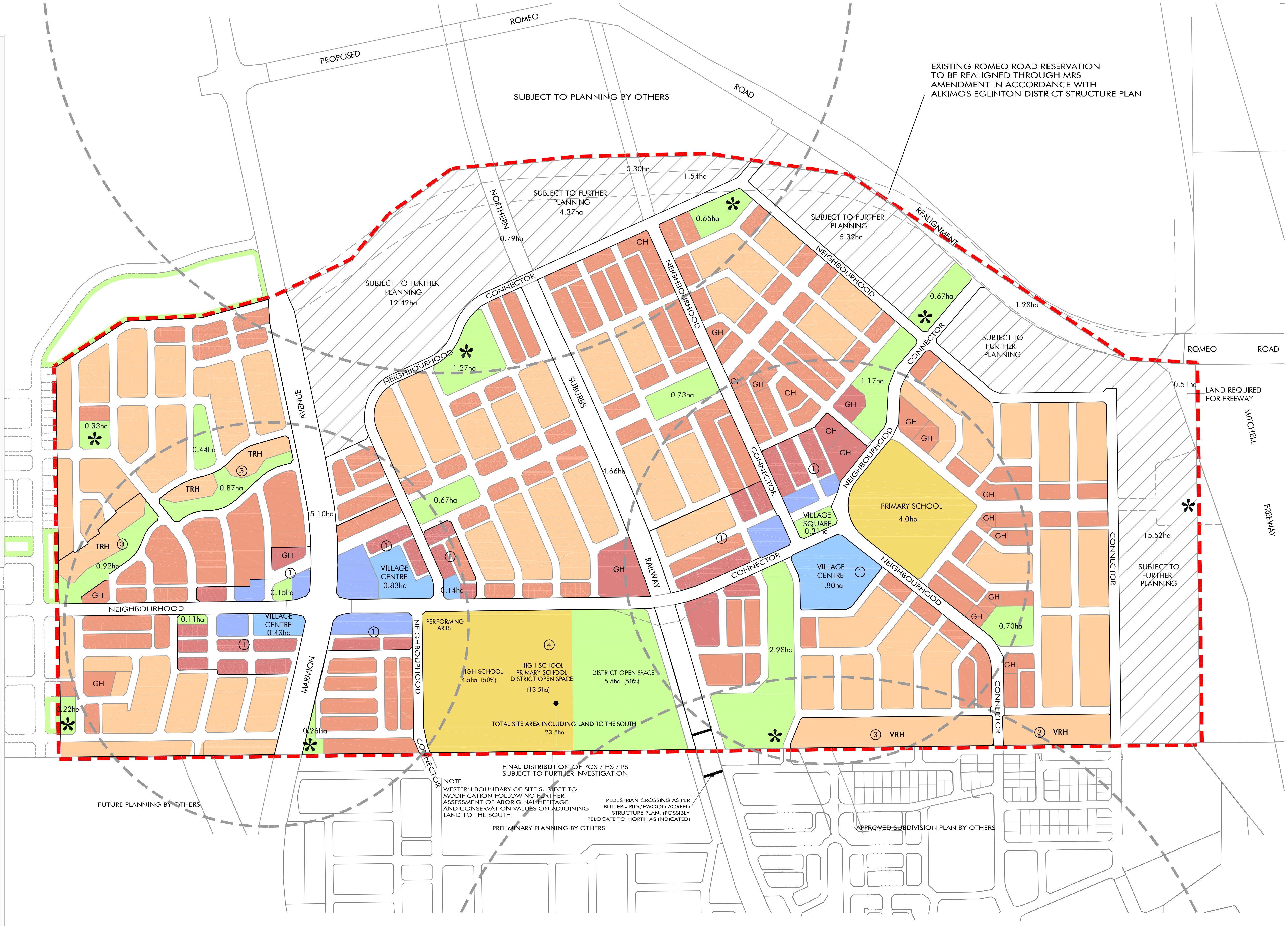


FIGURE 11

GRAY & LEWIS
LAND USE PLANNERS
Suite 5, 2 Hardy Street
South Perth, WA 6151
T (08) 9474 1722
F (08) 9474 1172
perth@graylewis.com.au

* Note: Drainage details will need to be in accordance with the Western Australian Planning Commission's Development Control Policy 2.3 'Public Open Space in Residential Areas' and Liveable Neighbourhoods policy. The POS Schedule identifying the drainage details is to be submitted at the subdivision application stage.

SCALE 1:7500 @ A3

DEVELOPMENT CONCEPT PLAN
LOTS 1001 & 1002 MARMION AVENUE, ALKIMOS

28 OCTOBER 2009

- ***Eastern Precinct***

In the portion of the site east of the proposed Northern Suburbs Railway, a linear valley containing stands of Tuarts extends in a north south direction.

A fundamental design objective has been to retain this valley as a pedestrian spine and to focus the eastern village centre adjacent to this open space system. The eastern primary school site has been located to integrate with the Village Centre and Village Green.

It is proposed through negotiation with the adjoining landowner to the south to extend the open space / pedestrian link towards the Jindalee Station and also to connect with the proposed pedestrian crossing over the railway. East of the primary school site a pedestrian linkage to the Neerabup National Park is proposed within the wider (35 metre wide) road reserve which will incorporate a central landscape corridor.

The eastern cell design is also influenced by the desire to protect a small stand of eucalypt trees near the top of the highest point on the property north of the eastern village centre. This hilltop park will provide a vantage point with views in all directions. A linear pedestrian spine and view corridor projects to the west at 90 degrees to the railway.

Medium density (R30) housing radiates out form the eastern village centre along the neighbourhood connectors and adjacent to the linear spines of public open space. Higher density housing (R50) is concentrated around the village centre and in conjunction with mixed use activities. The balance of the eastern precinct provides for more traditional lower density residential housing.

The projection of the roads on both sides of the railway has been provided to give the appearance of a seamless transition to lessen the impact of the railway.

- ***Central Precinct***

The central precinct between Marmion Avenue and the railway will provide more of a community / civic focus based around the district open space facility.

The educational central village and mixed use activities will be focused adjacent to the north eastern corner of the district high school and recreational facilities. Higher density housing will be provided adjacent to the commercial/civic facilities and extending generally north and south of the neighbourhood connector adjacent to Marmion Avenue. Public open space wedges fronting Marmion Avenue will provide a visual and public amenity buffer to Marmion Avenue. The balance of the precinct north of the neighbourhood connector will provide for more conventional lower density residential housing.

- ***Western Precinct***

In the area west of Marmion Avenue a more traditional north south / east west grid is proposed. The focal point is the hilltop village centre which has been carefully located adjacent to the western gateway into the estate off Marmion Avenue. The east west connector crosses Marmion Avenue at the crest of the plateau which rises some 20 metres above the Brighton development. The hilltop public open space opposite the western village centre is located at the end of the visual corridor leading back to the open space on the eastern side of the railway.

In respect to the parabolic dune landform it is proposed to retain the most significant portion of this feature as public open space.

Over the balance area the ridgeline is less well defined and is poorly vegetated.

It is proposed that this area not form part of the public open space provision however it is desirable to retain the landform where possible. This area has therefore been included on the Local Structure Plan as terrain responsive housing – light weight design.

- ***Northern Precinct***

The northern precinct generally north of the parabolic dune is located within the 800 metre catchment to the Alkimos station.

Detailed structure planning over the adjoining Lot 102 has not yet been prepared and it is therefore difficult to depict a road or landuse structure over this northern precinct at this time.

This area has been identified as 'Centre' zone to enable more detailed planning at a future stage over the steeper portions of the dunal ridge within the Northern Precinct terrain. Responsive housing is also likely to be incorporated.

8.3.2 Village Centres

One of the themes of the development is that of an intimate residential lifestyle development as a retreat between the activity of the Alkimos Regional Centre and Brighton District Centres. Consistent with that theme, the eastern and western local centres will be intimate strip shopping developments, intended to operate at a local, convenience level, with a focus on local accessibility and intimacy, as a return to a traditional "local shop" feel.

The terrain-responsive urban design principles have been carefully considered to ensure that the Local centres are correctly sited and oriented. Detailed design guidelines will be pursued to optimise pavement and awning dimensions, street cross sections, planting and street furniture locations to optimise the appearance and feel of each centre.

At this stage, design is substantially advanced on the Eastern Local Centre, and similar principles will be employed to design the Western Local Centre.

The Eastern Village will operate as a traditional strip with a defined centre, rather than trying to compete with adjacent centres, for the following reasons:

- The centre will have a unique sense of place, allowing residents and visitors to assimilate with the identity of the centre.
- It will provide a focus for social and community interaction, with opportunities for events in the town square.
- It provides a focus for the development of higher density mixed use and residential uses around the centre, at a point approximately equidistant between the two 800m walk radius catchments of Alkimos and Brighton railway stations.
- It allows the strip to interface with a town square and school oval, to create a traditional "village green" concept.
- It provides opportunity for extension of the mixed use zones as the centre develops, with the flexibility to revert to medium density residential if extension of the local centre is not attractive in future.

Car parking is provided on street and within each development site, affording opportunities for streetscape activation, but also for management of larger parking demands on a site by site basis within the centre. This approach will provide for the parking requirements whilst minimising impact on the public domain.

The scale of the retail component recognises the location of the centre on neighbourhood connector and integrator arterial roads and the adjacent mixed use zones are intended to supplement the centre, to provide opportunity for the extension of a broader employment base in the local centre as the residential population within Lots 1001 and 1002 and the adjacent areas increases.

8.3.2.1 Detailed Design – Eastern Village Concept Plan

The Eastern Local Centre is focused at the intersection of the east-west neighbourhood connector and the northerly extension of the north-south neighbourhood connector (formerly labelled as the Connolly Drive extension).

Figure 12 shows an indicative concept for the eastern local centre. Key elements include:

- **Site 1** – Positioning of the eastern primary school (Site 1) to create a distinct education precinct east of Connolly Drive. The main school building orientation at the south eastern end of the site allow pick ups/drop off to occur in the local streets on the perimeter of the primary school, rather than on the busier Connolly Drive. The siting of the school east of Connolly Drive helps facilitate safe walk routes to school for the eastern part of its catchment and provides an urban design focus for this part of the development.

- **Site 2 and 3** – this site is nominated to incorporate a day care facility and before/after school care facilities for school children. The before/after school care is sited so that children do not need to cross roads to access the facility, thereby reducing the need for escorts between the school and the facility. The flexibility of the before/after school care facility is intended to be able to accommodate other community functions such as infant welfare during school hours.

- **Site 4** – the school oval has been sited so as to maximise its use and surveillance at all times of the day and the week. The developer may prefund the construction of the oval, to create the village green concept as part of the eastern centre.

  The oval can be used by the school during school hours, by the before/after care at the start and end of the school days, and possibly by community groups and residents at other times. A pavilion has been notionally located at the south west corner, to provide amenity, function for the oval and provide a visual termination and highlighting with built form of the adjacent road junction.

LEGEND

1. Public primary school
2. Child care centre
3. Community uses (before/after school, infant welfare)
4. School oval with pavillion (possible prefunding and construction by Developer)
5. Village centre (retail strip shopping centre)
6. Village centre (retail strip shopping centre)
7. Mixed use (longer term timeframe for development - potential premium residential apartments)
8. Mixed use (medium term timeframe for development - premium residential apartments)
9. Mixed use (short term timeframe for development - potential medical suites, apartments, serviced offices)
10. Mixed use (longer term timeframe for development - potential Medium density residential, encouraging home based business)
11. Mixed use (short term timeframe for development - strong mixed use residential opportunity, encouraging home based business)
12. Mixed use (medium term timeframe for development - potential premium residential apartments)
13. Village Square and piazza with pavilion and community focal point with strong links to school oval

NORTH

INDICATIVE EASTERN VILLAGE CONCEPT

FIGURE 12

LOT 3 ROMEO ROAD, ALKIMOS

MASTERPLAN

Scale 1:1000 0m 10 25 50 75

January 2007

SIMON YOUNGLESON
ARCHITECTS AND URBAN DESIGNERS

- **Site 5 and 6** – these are the retail sites proposed as the village centre. The actual footprints of the buildings will be subjected to detailed design reviews and architectural studies to optimise their appeal as a retail local centre and as a community destination and meeting place.

  The siting has been carefully planned to enable retention of tuarts in the town square opposite, to orientate the shopfronts to maximise solar orientation opportunities and to site the retail on the homebound end of residents' motor car journeys, to pick up on the convenience nature of most trip destinations. It is anticipated that the developer will lead the creation of the retail by establishing a permanent building to be operated initially as a development project office and land sales office, reverting later to retail. Other retail components may include a convenience store, cafes, pharmacy, hairdresser, etc, the demand for which will be subject of more detailed assessment, marketing and management by the developer.

- **Sites 7 to 12** – these are designated as mixed use sites. These sites are part of the flexibility inbuilt into this centre for possible future development, and would be marketed later in the programme.

Whilst they present tremendous opportunities for development of medium density residential, they may be developed to capitalise on the success of the centre and maximise employment opportunities, by way of the establishment of offices in a mixed use development.

Sites 9 and 11 are considered to have a high potential for establishment of street level office or medical suites, complemented by the retail across the square and residential above.

- **Site 13** – this town square is intended to include a range of facilities and will serve a range of functions:

  - retention of mature native tuart trees in the local centre;
  - provides a central green link in the north-south green spine and linear walk path network;
  - provides an urban design focus by way of a pavilion structure, possibly incorporating vertical elements such as a spire or clock tower to help foster an identity for local centre. Structures either here, or at the terminations of the linear open space near the local centre will be able to be used for weddings, community concerts, weekend markets or other gatherings, to engage the community and foster a sense of attachment between the community and the open space;
  - provides a break out space for local employees at lunch time, and a meeting place for residents for social exchange;
  - provides a focal point for public and community art, and performances.

8.3.2.2 Western/Central Village Precinct

The western/central village precinct **(Figure 12A)** straddles Marmion Avenue with each centre having its own distinct character.

The western centre provides a civic square at the termination of the diagonal pedestrian link extending through from the eastern residential precinct. The commercial/retail centre (limited to approximately 1000m^2 NLA) will extend along the southern side of the neighbourhood connector west of Marmion Avenue. A number of mixed use sites with 2 storeys of apartments are proposed around the commercial/retail areas both north south of the neighbourhood connector.

The central village will be focused around the village square adjacent to the intersection of the two neighbourhood connectors. The square will be framed by mainstreet retail; mixed use commercial/retail with apartments over.

The early development of the performing arts complex part of the district high school facility will assist in the activation of this village centre. At the eastern gateway off Marmion Avenue a landmark building is proposed initially providing the sales office and café but for later conversion into a potential community use building in association with private health club and community recreation facilities.

LEGEND

1. Entry Park with a future Civic Building addressing a Civic Square
2. Village Square with Civic function. (weekend markets, weddings etc.)
3. Mixed-Use with two storeys of Apartments over.
4. Commercial Units over two levels. Long-Term Timeframe.
5. Mixed-Use Retail with Apartments over.
6. Mixed-Use Retail with Apartments over.
7. Small Neighbourhood Park. Defines transition to Residential
8. Sales Office with Cafe. Later to be converted into a Community-Use building.
9. Commercial. Long-Term Timeframe.
10. Mixed-Use Retail with Apartments over. Long-Term Timeframe
11. Mixed-Use Retail with Apartments over. Long-Term Timeframe
12. Retail Main Street. Medium-Term Timeframe
13. Mixed-Use Commercial Ground Floor with Apartments Over.
14. Performing Arts Centre connected to High School and Village Centre.
15. Village Square
16. Boulevarded Main Street connects the villages
17. Local Park with Community Structures
18. Proposed Health Club with Community Facilities.
19. Possible Dual-Use Underpass
20. Public Parking

Indicative Concept: Western and Central Villages | FIGURE 12A
ALKIMOS | March 2008

SIMON YOUNGLESON
ARCHITECTS AND URBAN DESIGNERS

FIGURE 12A

8.4 Access / Movement Network

A traffic assessment has been prepared by Riley Consulting – **Appendix 5.**

8.4.1 The Site and Surrounding Road Network

Appropriate regional planning of the road network has been undertaken as it is a new urban area on the northern fringe of Perth. The Butler-Jindalee District Structure Plan (DSP) includes regional level traffic modelling to provide future flow forecasts for major roads.

The district road network and forecast traffic volumes indicated in the DSP are summarised below;

- ***Mitchell Freeway***

The Mitchell and Kwinana Freeways provide a major north south connection through the Perth Metropolitan Region.

The Mitchell Freeway extends north from Perth to Joondalup and planned extensions will result in the freeway linking to Alkimos and eventually Yanchep.

The DSP forecast volumes show 52,000 vehicles per day (vpd) south of Romeo Road and 51,000 vpd north of Romeo Road.

- ***Marmion Avenue***

Marmion Avenue is a primary regional road providing a secondary north south link between the freeway and ocean. It has a four lane divided carriageway with roundabout or signal controls at intersections.

Marmion Avenue extends through the western cell of the subject land and a four way intersection is proposed. The forecast volumes in the DSP show 40,000 vpd south of Romeo Road and 34,000 vpd north of Jindalee Drive.

- ***Romeo Road***

Romeo Road is an arterial road classified as other regional road in the Metropolitan Region Scheme. It will have a four lane divided carriageway between Mitchell Freeway and Marmion Avenue. The DSP indicates a forecast flow of 24,000 vpd and it is expected that an 80kph speed limit will apply.

- ***Connolly Drive***

Connolly Drive provides a third level north south connection and is identified as an arterial road to the south of Jindalee Drive. It has been downgraded to a neighbourhood connector north of Jindalee Drive and links to Romeo Road west of the Mitchell Freeway.

8.4.2 Traffic Generation and Distribution

The metropolitan average for residential properties is 7.6 trips per lot. A daily trip rate of 8 trips per residential lot has been applied to the structure plan to ensure that the road network assessment is robust and future changes to the development are not compromised.

Based on the estimated lot yield of 2835 dwellings and a trip rate of 8 trips per day, the estimated traffic generated from the structure plan is 22, 680 trips per day.

- ***Local Centres***

The structure plan shows two local centres which combined are expected to accommodate approximately 4100m2 of commercial floor space.

A trip attraction of 60 trips per 100m2 is appropriate, assuming that each centre will contain a mixture of commercial and retail landuses. Based on 2000m2, a daily attraction of 1,200 vehicle movements can be expected at each centre from adjacent residential areas.

A total of 3,500 residential lots has been used in the traffic model to ensure that adjacent developments that will impact the movement network of Lots 1001 and 1002 are considered.

- ***Distribution***

Traffic generated by the development in the northern suburbs is expected to access local work, education, shopping and entertainment opportunities.

Through regional planning these facilities are provided throughout the Alkimos Eglinton District therefore it is anticipated that the traffic volumes to Perth will be lower than existing suburbs to the south.

Table 6 shows the split of residential trips based on purpose.

Purpose	Percentage (%)	Trips
Work	26%	2.08
Education	7%	0.56
HB other	30%	2.4
Non HB	22%	1.76
HB Evening	15%	1.2
	100%	8

Table 6 – Metropolitan Average Household Trips
Source: 1986 Household Surveys

The distribution assumptions are derived from the traffic modelling undertaken for the Butler Jindalee District Structure Plan – **Table 7.**

Direction	Percentage (%)
North on Marmion Avenue	8%
Alkimos District Centre	15%
North on Mitchell Freeway	4%
South on Mitchell Freeway	16%
South on Wanneroo Road	2%
South on Connolly Drive and Jindalee District centre	22%
Rail attraction	5%
South on Marmion Avenue	23%
West on local connections	5%
Total	100%

Table 7 – Distribution Assumptions
Source: Derived from the traffic modelling undertaken by ERM for the Butler Jindalee District Structure Plan

The tables have been used to determine the expected trips on the internal road network. Education trips are assigned to the nearest school and local centre trips are attracted equally from residents.

8.4.3 Traffic Impact

New roads have been planned to cater for ultimate traffic volumes due to the extensive regional planning for the Alkimos Eglinton District. The forecast future volumes for the regional and district road work included Lots 1001 and 1002.

Initially access into Lots 1001 and 1002 will be from Marmion Avenue, so there will be some interim traffic impact whilst the surrounding road network is being developed.

8.4.4 Access

Marmion Avenue and Romeo Road will provide the major access into the Local Structure Plan area. The road hierarchy is shown in **Figure 13.**

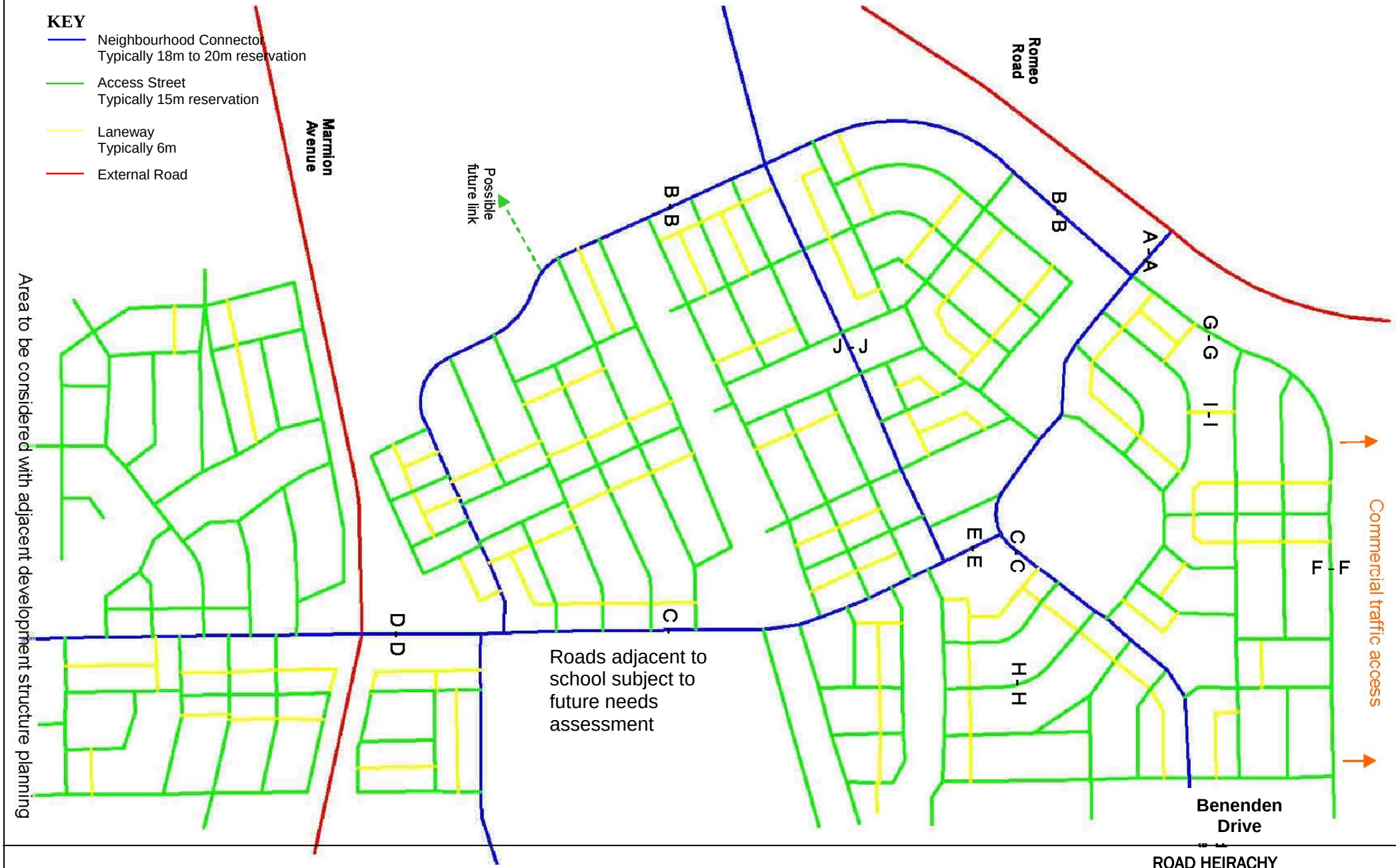
- ***Marmion Avenue***

Marmion Avenue is classified as an arterial road and another regional road in the Metropolitan Region Scheme. As a four lane arterial road an 80kph posted speed would be appropriate.

Based on *Liveable Neighbourhoods* a spacing of 230 metres for left / right and 150 metres for right / left intersections would be appropriate

The main access to Marmion Avenue will ultimately form a four-way intersection and traffic signals would be expected. The intersection will be flanked by commercial land uses and a pedestrian crossing facility of Marmion Avenue is expected. In the interim years it is understood that a roundabout will provide access at this location.

It is noted that the current road reservation indicated for Marmion Avenue is 53 metres adjacent to Lots 1001 and 1002 and reduces to 37 metres north of Lots 1001 and 1002. It is considered that a 37 metre reservation should apply adjacent to Lots 1001 and 1002 subject to earthworks analysis.



ROAD HEIRACHY
LOT 3 ROMEO ROAD, ALKIMOS

FIGURE 13

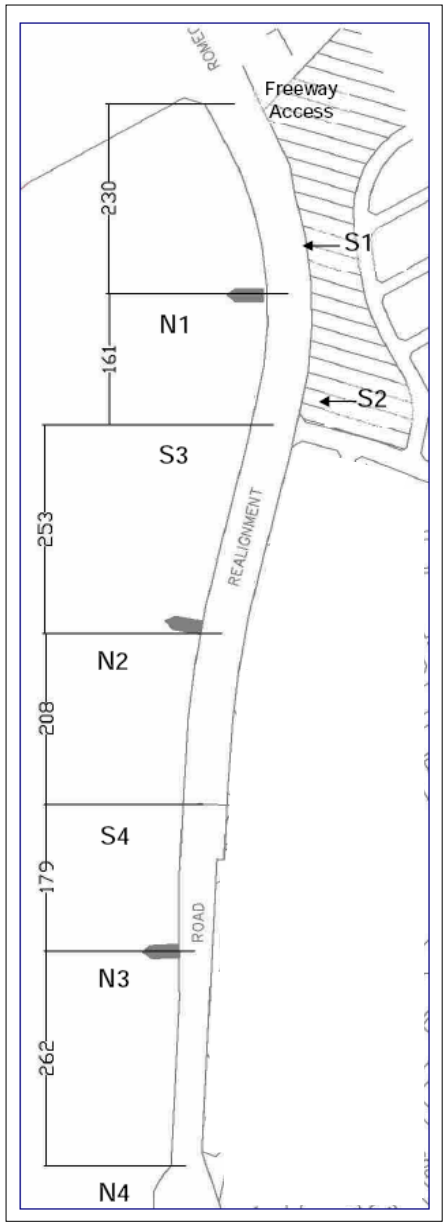


Figure 14 – Romeo Road Access Strategy

- ***Romeo Road***

Both Marmion and Romeo Road are other regional roads, therefore the same intersection spacing applies. The access strategy is shown in **Figure 14.**

- Access S1 is shown to provide left-in / left-out access for possible commercial / industrial land uses fronting Romeo Road.
- Access N1 is a full movement priority controlled intersection for the northern commercial development.
- Access S2 is shown to provide left-in / left-out access for possible commercial / industrial land uses fronting Romeo Road.
- Access S3 is suggested as a full movement access for the southern residential development and is spaced to allow future control by traffic signals.
- Access N2 is a full movement priority intersection for the northern commercial development.
- Access S4 provides the opportunity to develop a left-in / left-out access. Current planning has not utilised this access.
- Access N3 is a full movement priority intersection for the northern commercial development.
- Access N4 is the location of the fourway intersection leading to Alkimos town centre shown in the DSP. It is expected to be a roundabout.

8.4.5 Internal Road Network

The internal road hierarchy is based on the guidelines set out in Liveable Neighbourhoods (Edition 3). The residential cells contained within the regional road structure are served by an internal road network comprising of neighbourhood connectors and access roads.

- ***Neighbourhood Connectors***

The neighbourhood connectors form the link between arterial routes and the local access roads.

Liveable Neighbourhoods identifies road reserve widths between 17 to 25 metres for neighbourhood connectors, depending on the nature of adjacent land uses. They are generally two lane (undivided).

The local structure plan includes three neighbourhood connectors which have been designed to integrate with adjoining subdivisions to north, west, and south.

The main north south connector is the extension of Connolly Drive however it is not anticipated that this will act as a through road.

An east west connector links the north south neighbourhood connector to Marmion Avenue. A secondary north south connection provides a link from the village centre to Romeo Road.

The minimum carriageway width is 7 metres however this should be widened to 7.4 metres for streets accommodating bus routes. A minimum verge width of 4.1 metres is to be provided at intersections. A verge width up to 5.5 metres may be required to provide turning pockets and pedestrian crossings.

A minimum road reserve width of 18 metres is appropriate for these neighbourhood connectors.

- ***Higher Order Access Roads (1,000 vpd to 3,000 vpd)***

Access streets are the main residential streets within the development and provide direct lot access. A standard carriageway of 7.0 metres can accommodate parking on-street without the need for parking embayments.

When there is no parking traffic speeds can become higher than desirable for a residential environment. 7.0 metre wide carriageways are therefore only recommended for streets with high density dwellings. In lower densities (<R40) a 6.0 metre carriageway is appropriate and can still provide occasional on-street parking without disruption to the through traffic flow.

Where abutting high density development a 6.5 metre wide carriageway with 2.3 metre parking embayments to both sides is suitable. A 2.5 metre verge will cater for footpaths and a minimum road reserve of 17 metres can be applied.

A 7 metre wide carriageway in a 16 metre wide road reservation is more appropriate for medium density development.

- ***Access Roads (less than 1,000 vpd)***

Access roads with less than 1,000 vehicles per day form quiet residential streets. A narrow road pavement is desirable to provide a visual constraint to the road and encourage a slower speed environment.

A road reserve of 14.2 metres is shown as suitable for these roads under Liveable Neighbourhoods, however many local governments favour a 15 metre minimum reservation.

- ***Streets adjacent to schools***

A wider road reservation should be provided for local streets adjacent to schools to cater for higher parking demands. Local intersections need special consideration and roundabouts providing u-turn opportunities may need to be provided. Local street intersections should include reduced corner radii of 6 metres to limit opportunities for high traffic speeds. A nib kerb should be provided at pedestrian crossing points to ensure stopping sight distances can be achieved. A 20 metre road reservation has been recommended for all school frontage roads.

- ***Streets adjacent to Public Open Space***

Where the road reservation abuts public open space there is a limited need to provide a verge. Where parking and/ or services are not required the verge width can be reduced.

A minimum width of 0.75 is required to accommodate street furniture under current road planning standards, however this issue should be considered as part of the detailed subdivision design.

Footpaths do not necessarily need to be provided adjacent to the road as long as their location maximises safety.

- ***Traffic Management***

Some internal streets will benefit from intersection control and traffic calming features. Full sight distances must meet the current standards and the use of give way control is appropriate.

All streets are relatively short and high traffic volumes are not anticipated.

The narrower carriageway widths in low traffic residential streets will assist in reducing the attraction for speeding to create a safer environment for residents, pedestrians and children. The four way intersections with less than 2000 vpd are not considered to be a road hazard.

8.4.6 Pedestrians, cyclists and public transport

Pedestrian and cycle network systems – **Figure 15** need to be integrated into neighbourhood designs to provide linkages between residences, open space, community facilities and neighbourhood connectors.

The lower order category access roads will form the basis of a safe and attractive pedestrian and cyclist system, with links through open space corridors. A standard footpath of 1.5 metres should be provided to every residential street. A width of 2 metres may be more suitable for roads near schools and local centres.

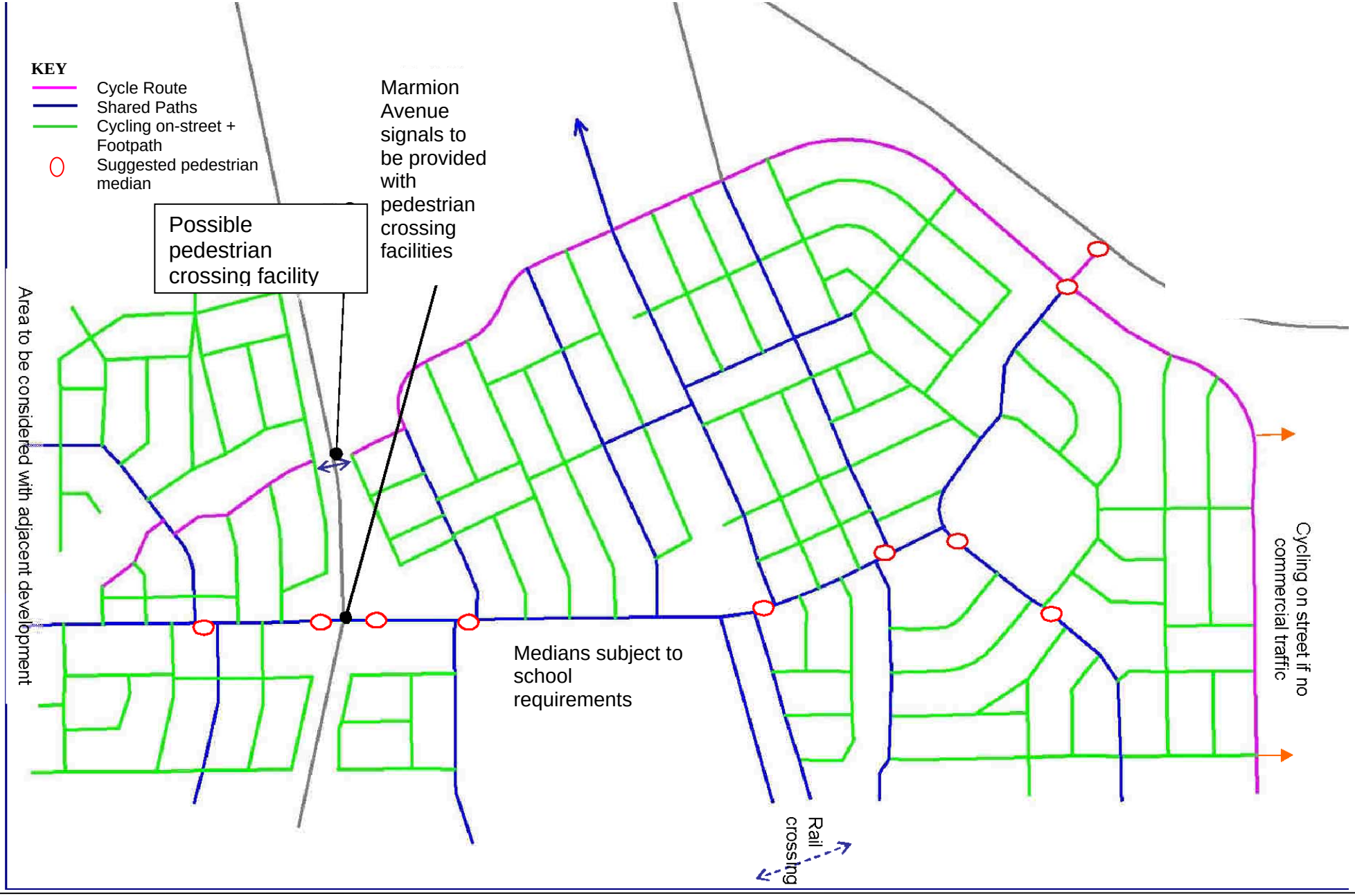
Most streets are suitable to cater for on street cycling. On street cycling is appropriate where the daily flow is less than 3,000 vehicles.

- ***Public Transport***

Public Transport Planning has been undertaken in the District Structure Plan. The proposed public transport bus routes are shown in **Figure 16**.

The majority of Lots 1001 and 1002 is within 500 metres of a bus service. It is anticipated that services will also use Marmion Avenue increasing the accessibility for Lots 1001 and 1002.

The opportunity for a CAT type system has been raised and will potentially link through Lots 1001 and 1002 between the Alkimos Railway Station and Jindalee Station to the south. A circular two way system is desirable to provide access to the northern or southern station. In the short term the service could utilise Romeo Road / Connolly Drive through the village centre.



PEDESTRIAN AND CYCLE NETWORK SYSTEMS
LOT 3 ROMEO ROAD, ALKIMOS
FIGURE 15

BUS ROUTES
LOT 3 ROMEO ROAD, ALKIMOS

FIGURE 16

8.5 Landuses

8.5.1 Residential

8.5.1.1 Residential Densities

In accordance with the Local Housing Strategy objectives the Local Structure Plan provides for a range of dwelling types with densities from R20 through to R50 catering for different household and lifestyle needs.

The Local Structure Plan predominantly caters for families by creating a more traditional suburban village with increased densities around the Village Centres and along the main traffic routes. It is proposed that various forms of housing be provided within the higher density urban cores including more conventional single house lots with rear laneway access and group housing including apartment buildings in strategic locations.

The range of housing and densities is reflected in the preliminary detailed design around the eastern village.

The northern and southern parts of the site also fall within the 800 metres catchment to the proposed Alkimos and Jindalee railway station. There may be an opportunity to increase the residential densities within these two areas.

The density graduates from R20 to R30 along main road spines as the distance from the main village centre increases. A number of R30 areas are focused on open space corridors and local parks providing casual surveillance of these public community recreation areas.

Higher density (R50) areas are focused around the main activity centres (village and mixed use areas).

8.5.1.2 Population Estimates

In the southern part the design and density has been largely influenced by the need to integrate with the approved Local Structure Plan to the south.

In the northern part there is currently no information available from Landcorp in respect to the detailed design of the Alkimos Regional Centre on the portion of Lot 102 abutting the northern boundary of Lots 1001 and 1002. This area has been depicted on the Local Structure Plan as 'Centre zone subject to further detailed planning' to retain maximum flexibility. The detailed design will be subject to future planning in conjunction with Landcorp.

Lot sizes and housing forms within the area denoted as terrain responsive housing will be determined at the detailed subdivision design stage. A base coding of R20 has been shown however lot sizes may be larger in some cases.

The total anticipated lot / dwelling yield is 2835 dwellings based upon the following estimates;

Dwelling type	No.	Percentage of Total%
Traditional lots R20	1000	35%
Cottage lots R30	1195	43%
Cottage / group housing / apartments R60	640	22%
Total	2835	100%

Table 8 – Estimated Dwelling Yield

8.6 Commercial / Retail

Urbis JHD have prepare a retail and employment analysis of Lots 1001 and 1002 to determine the level of retail that can be justified – **Appendix 6.**

8.6.1 Retail Potential

Based on the total retail needs of residents of Lots 1001 and 1002 adopting average floorspace per capita provisions (2.1 sq m person) some 13,650m^2 retail floorspace is supportable.

The Wanneroo Centres Strategy identifies two neighbourhood centres on Lots 1001 and 1002 – Table 11. The nominated retail floor area for the neighbourhood centres is 2600m2 and 1500m2 respectively. There is also provision for a 500m2 local centre.

The local structure plan for Lots 1001 and 1002 has been prepared in accordance with the City of Wanneroo Centres Strategy.

The western Village Centre which straddles Marmion Avenue is expected to have the capacity to expand to the maximum retail area of 2,600m^2 NLA and the eastern Village Centre 1,500m^2 NLA.

The current allocation of retail floor space therefore represents just 26% of that needed to satisfy resident needs, the balance being provided from larger retail centres adjacent to Lots 1001 and 1002.

Centre number	Type of Centre	Maximum retail Floor Space
29	Neighbourhood	2600m2
30	Neighbourhood	1500m2
N/A - Brown Star	Local	500m2

Table 9 – Local Commercial Strategy Requirements
Source: City of Wanneroo Local Commercial Strategy

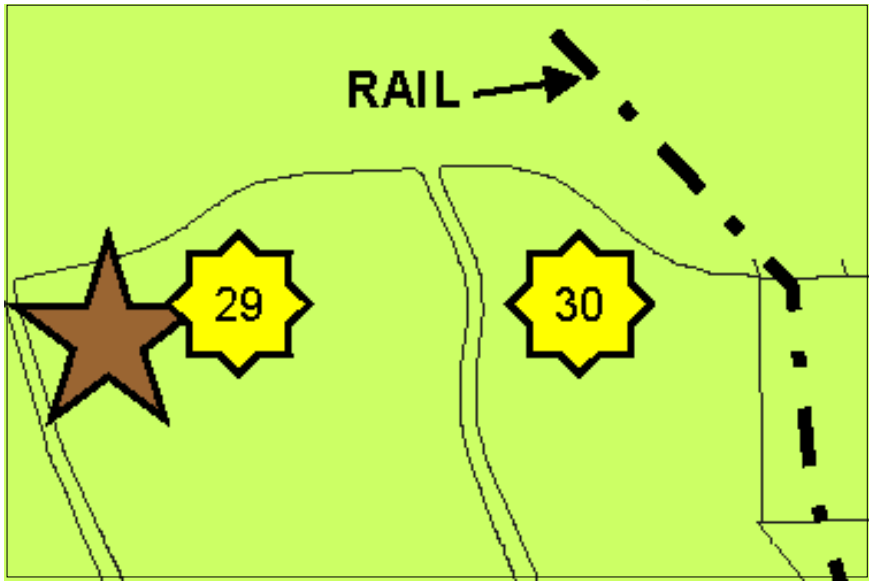


Figure 17 - Extract of City of Wanneroo Local Commercial Strategy Map

8.6.2 Centre Zone

The village centre retail areas are defined on the Local Structure Plan as 'centre'. The eastern centre is consolidated into a site of approximately 1 hectare in area. The western centre zone comprises one site of 4500m^2. The central centre zone comprises 2 sites of approximately 9000m^2 and 1500m^2 respectively.

The northern 'centre' precinct (north of parabolic dune system) is located within the 800 metre catchment to the Alkimos Railway Station.

Whilst identified as 'centre' on the Local Structure Plan to round off the Town Planning Scheme No 2 zoning, the landuse will primarily be higher density proposed residential (R.30-R60). This northern centre precinct will be subject to further detailed planning.

8.7 Mixed Use

Mixed Use areas have been shown on the Local Structure Plan in close proximity to the two local centres.

The mixed use areas will complement the commercial/ retail areas and provide a transition to adjacent medium density housing areas.

In the western area, the Mixed Use zone extends as a series of individual sites along the Neighbourhood Connector both to the east and west of Marmion Avenue. There is an opportunity to develop a landmark Civic/Mixed Use centre as a gateway to the estate east of Marmion Avenue.

In the eastern area, the Mixed Use zone covers a larger area surrounding the Village Centre.

It is acknowledged that the Mixed Use areas are more extensive than depicted in the Butler Jindalee District Structure Plan and that much of these areas may ultimately be developed for medium density housing at R50 density.

The more extensive areas have been shown on the Local Structure Plan to retain the flexibility to provide such uses should they be desirable and viable in the future.

8.8 Service Industry

8.8.1 Background

The Butler Charrette identified a narrow band of Service Industrial use within Lots 1001 and 1002 extending along the southern side of Romeo Road for a distance of approximately 400m from the eastern boundary of the property.

The Butler Jindalee District Structure Plan depicted a much more extensive area of Service Industrial use over a band 200m-300m wide adjacent to the eastern boundary of Lots 1001 and 1002 and the 'Brighton' land holdings extending from Romeo Road south to a point approximately 1200m of Jindalee Boulevard.

The notation on the Butler Jindalee District Structure Plan stated *"Final extent of Industry to be determined as part of the Local Structure Planning recognising the North-West Corridor Structure Plan*".

The Draft Alkimos Eglinton District Structure Plan depicts an area comprising approximately 100 ha of land directly north of Romeo Road adjacent to the Freeway as a Service Commercial.

8.8.2 Definition of Extent of Service Industry

Within the 'Brighton' landholding, the Service Industrial Area south of Jindalee Boulevard has been replaced with residential use in the approved Local Structure Plan and subdivision plan for the area.

In recognition of the limited accessibility adjacent to the Freeway and the expansive area of Service Commercial/Industry land north of Romeo Road, it is proposed to review the requirement for narrow band Service Industrial use adjacent to the eastern boundary of Lots 1001 and 1002.

It is considered unlikely that the development of this land for Service Industrial activity will be viable given the relatively poor accessibility and competition from the significantly larger Commercial Industrial estate to the north. Furthermore the encroachment of the Service Industrial use into the residential area is not considered desirable in terms of residential amenity.

The service industrial landuse over the eastern part of the Local Structure Plan has therefore not been shown and this area will be subject to further planning investigation.

8.9 Education

The Butler Jindalee District Structure Plan identifies two government primary school sites and 50% of a public high school site within Lots 1001 and 1002.

- ***Eastern Primary School Site***

The eastern primary school site is proposed to form a focal part of the Village Centre and is adjacent to the linear public open space spine. The site is reasonably regular in shape and has good accessibility from the surrounding street network.

It is proposed to co-locate other community facilities such as a private child care facility and possibly infant health centre within the primary school precinct but on a separate land area of 0.4 hectares. Should the Department of Education and Training (DET) not support such a facility within the primary school 'block' it may be relocated to the northern side of the perimeter road and the school site area adjusted accordingly.

The DET has previously advised that there may be a need to provide for additional facilities for Special Education needs within one of the 2 primary school sites on Lots 1001 and 1002. This additional area has been allowed for by the increased size of the eastern primary school site. More recent advice from DET suggests it is now more likely that such facilities be incorporated within the western primary school site.

This matter is the subject of ongoing negotiation with Department of Education and Training and a further review of the school site land requirements will be made prior to finalisation of the Local Structure Plan.

- ***Western Primary School Site***

The western primary school site was identified on the Butler Jindalee District Structure Plan as a stand alone site located adjacent to the railway and on the northern side of the east west neighbourhood connector road.

Due to the proximity of the Alkimos Regional Centre on the northern boundary of Lots 1001 and 1002, the primary school catchment is unbalanced. By shifting the site to the south, the primary school can be located more centrally to the catchment area and co-located with the proposed high school and Butler North District Open Space.

Apart from a more central location there are advantages such as shared facilities and land efficiencies that can be achieved through co-location. The Department of Education and Training and City of Wanneroo have indicated support for such a co-located facility.

- ***High School Site***

The proposed high school site is located generally in the position as depicted on the Butler Jindalee District Structure Plan although the final layout is yet to be agreed.

With careful planning the land requirements for the co-located school facilities can result in economies in the land take. In consultation with DET and City of Wanneroo the land areas for the co-located site are as follows:

- Primary school 3.5 hectares*****
- High school 9 hectares (50% on Lots 1001 and 1002)
- District open space 11 hectares (50% on Lots 1001 and 1002)

TOTAL 23.5 hectares

The land requirement from Lots 1001 and 1002 for the 50% contribution towards the high school and full primary school contribution is therefore 4.5 plus 3.5 (8.0 hectares).

During previous consultation between DET and City of Wanneroo there was some concern in respect to the impact of 2 Aboriginal Heritage sites (situated south of Lots 1001 and 1002) on the shape of the co-located high school/ district open space facility. Local Structure planning for land to the south of Lots 1001 and 1002 is well advanced and it is understood that a Section 18 Clearance will be sought by the landowners in respect to the two registered sites.

***** Should DET require additional land area for Special Education needs, the area of the western primary school site may be increased by 0.75 hectares.

8.10 Public Open Space

Western Australian Planning Commission policy requires 10% of the net developable area to be provided as public open space as per the calculations in **Table 10.**

The main component of open space is contained within the Butler North District Open Space 5.5 ha (50% of the 11 ha site). The City of Wanneroo is currently undertaking a design study to identify the facilities to be incorporated within the District Open Space and co-located Butler North High School and Primary School sites.

The balance of the Public Open Space provision is made up by the linear spines and by way of a series of smaller parks located with specific landform or vegetation protection objectives. The landscape strategy for the areas of public open space is addressed in section 8.11.

Drainage, including identification of swale areas to be excluded from the POS calculations, will be in accordance with the Western Australian Planning Commission's Policy 2.3 'Public Open Space in Residential Areas' and Liveable Neighbourhood policy. The POS Schedule identifying the drainage details is to be submitted at the subdivision application stage.

The provision of public open space is slightly in excess of the 10% required within the developable area. Adjustments can be made to the provision of public open space in the northern centre zone during later detailed planning to maintain the required 10% provision of public open space.

TOTAL SITE AREA OF LOTS 1001 AND 1002	226.04ha
AREA NORTHERN CENTRE ZONE AND EASTERN AREA DENOTED AS 'SUBJECT TO FURTHER PLANNING	40.26ha
BALANCE AREA	185.78ha
DEDUCTIONS	
High School	4.5ha
Primary Schools (2)	7.50ha
Commercial	3.20ha
Freeway	0.51ha
Marmion Avenue	5.10ha
Railway	4.66ha
Romeo Road	1.28ha
Drainage	2.04 ha
TOTAL DEDUCTIONS	28.78ha
NET AREA	157.00ha
10% POS required	15.70ha
GROSS PUBLIC OPEN SPACE PROVIDED	17.95ha
DEDUCT FOR DRAINAGE WITHIN POS (2.0411ha)	
NET PUBLIC OPEN SPACE PROVIDED	15.90 ha
OVER PROVISION OF POS 0.2ha. - TO BE ADJUSTED IN SUBDIVISION OF BALANCE AREA.	

Table 10 – Public Open Space

***** *10% provision of POS within eastern precinct and northern 'centre' zone to be provided when landuse and structure plan over these areas is finalised.*

8.11 Landscape Strategy

This section of the Local Structure Plan Report examines the open space areas and summarises the specific landscape initiatives to be undertaken;

- Landscape design principles and theming
- Facilitates and playing spaces
- Pedestrian requirements
- Integration of spaces
- Habitat and conservation areas
- Landscape Vision and Concept Plans
- Maintenance and management

The Landscape Strategy includes broad Concept Plans for different stages of subdivision which will in turn establish the criteria for landscape construction drawings to be lodged at a later date with the City of Wanneroo.

8.11.1 Site Analysis

The landscape strategy has been carefully developed taking into consideration the context of the site and its key elements and features.

The site is strongly defined by two distinct character zones that roughly divide the site into the eastern sector and the western sector – refer **Figure 18**. This division is reinforced by a north-south ridgeline and major highpoint located in the centre of the site:

- ***Western Sector***

This sector is typified by the following:

  - chaotic dune formations within broad flat valleys;
  - cleared and degraded areas in the north-western corner; and
  - good quality coastal heath to the west blending into good quality low banksia woodland to the east of this sector.

As a result of the dune formations and the generally low vegetation in this sector, there are many good view opportunities to the ocean. This, combined with the coastal character of the landform and vegetation, creates a distinctive seaside feeling.

- ***Eastern Sector***

This sector is typified by the following:

- more gently undulating terrain;
- good quality vegetation ranging from low banksia woodland to medium to tall woodland of predominantly tuart and some jarrah; and
- a small area of partially cleared and degraded land along the eastern boundary.

Because of the above characteristics, and because it lies in the lee of the central north-south ridgeline, the eastern sector has a softer, more protected feel than the western sector, with much less coastal influence.

VEGETATION

CLEARED POOR QUALITY VEGETATION
- Acacia saligna/Xanthorroea preissii open shrubland

GOOD QUALITY - HEATH AND LOW SHRUBLAND
Cq - Calothamnus quadrifidus mixed heath
Ds - Dryandra sessillis closed scrub
Mh - Melaleuca heugelli low open shrubland
MaLm - Melaleuca systena low open shrubland over Lomandra maritima herbland
AcMa - Acacia rostelifera closed heath
Ar - Acacia rostelifera closed heath

GOOD QUALITY - LOW WOODLAND
BaBm - Banksia attenuata / banksia menziessii low woodland
Ba Cq - Banksia attenuatat low woodland over Caothamnus quadrifidus heath

GOOD QUALITY - MEDIUM / TALL WOODLAND
Eg - Eucalyptus gomphocephala (tuart) woodland
Em - Eucalyptus marginata (jarrah) woodland
Ed - Eucalyptus decipiens low woodland

PARABOLIC DUNES

- Significant topographic features in the landscape, covered in low coastal heath.

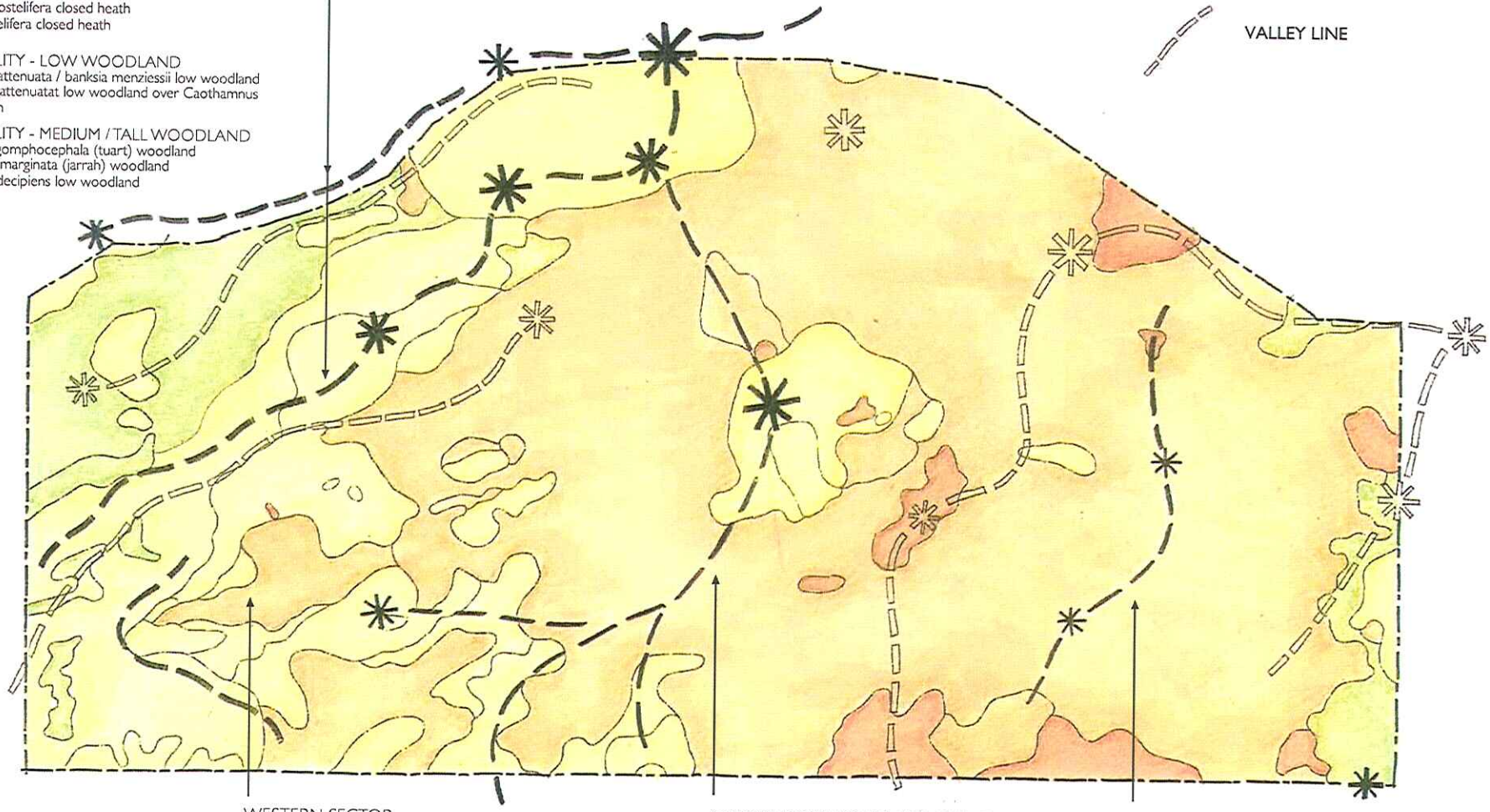
LANDFORM

HIGH POINT

RIDGE LINE

LOW POINT

VALLEY LINE



WESTERN SECTOR

- Chaotic dune formations within broad flat valleys
- Cleared and degraded areas in N-W corner
- Good quality coastal heath to the West blending into good quality low banksia woodland to the east of this sector.

MAJOR NORTH-SOUTH RIDGELINE

- Divides the site into Eastern and Western sector
- Major high point in the centre of the site offers 360 degree views

EASTERN SECTOR

- More gently undulating terrain
- Good quality vegetation ranging from low banksia woodland to medium to tall woodland of predominantly tuart and some jarrah.
- Small area of partially cleared and degraded land along the eastern boundary

SITE ANALYSIS

VEGETATION CHARACTER
& TOPOGRAPHIC FEATURES

FIGURE 18

The most distinctive features of the site is the undulating topography and the way it transitions from chaotic dunal in the west to gently undulating in the east, and also the good quality vegetation that covers most of the site, transitioning from low coastal heath in the west to taller banksia and tuart woodland in the east – refer **Figure 19.**

A unique stand of Eucalyptus decipiens occupies the major high point on the site. East-west open space areas transect through the site therefore captures a good representative sample of habitats and vegetation communities typical of coastal areas.

8.11.2 Landscape Theming

The inspiration for Landscape Theming is derived from the existing site character and environment including the following key elements:

- the strongly coastal influence, particularly in the western sector;
- the diverse 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 complimentary 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 may be considered in key areas for amenity and / or effect.

These elements will be combined in a contemporary style to reflect a modern look.

8.11.3 Landscape Vision

The vision for Lots 1001 and 1002 is to create a development with a strong sense of place and identity that is compatible and seamless with the surrounding environment.

The incorporation of sustainable design principles is an over-riding objective, with tree retention in public open spaces a key priority.

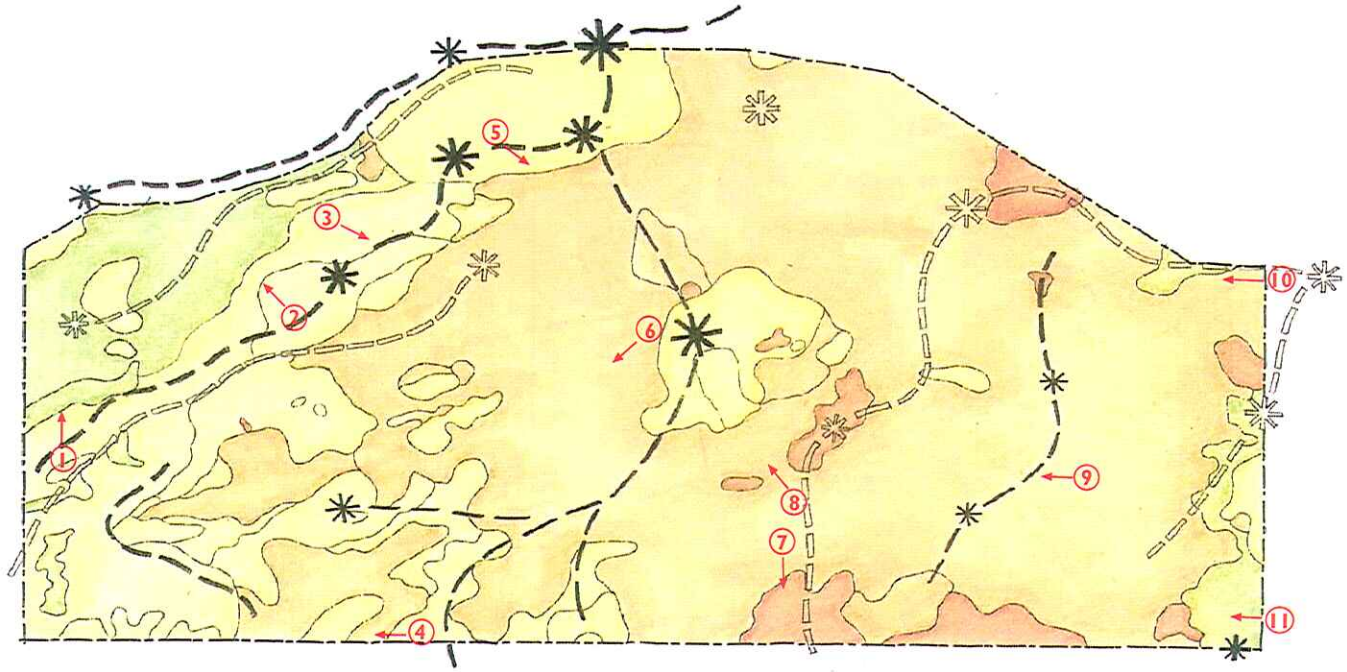
VEGETATION

CLEARED POOR QUALITY VEGETATION
- Acacia saligna/Xanthorroea preissii open shrubland

GOOD QUALITY - HEATH AND LOW SHRUBLAND
Cq - Calothamnus quadrifidus mixed heath
Ds - Dryandra sessillis closed scrub
Mh - Melaleuca heugelli low open shrubland
MaLm - Melaleuca systena low open shrubland over Lomandra maritima herbland
AcMa - Acacia rostelifera closed heath
Ar - Acacia rostelifera closed heath

GOOD QUALITY - LOW WOODLAND
BaBm - Banksia attenuata / banksia menziessii low woodland
Ba Cq - Banksia attenuatat low woodland over Caothamnus quadrifidus heath

GOOD QUALITY - MEDIUM / TALL WOODLAND
Eg - Eucalyptus gomphocephala (tuart) woodland
Em - Eucalyptus marginata (jarrah) woodland
Ed - Eucalyptus decipiens low woodland




1


2


3


4


5


6


7


8


9


10


11

SITE ANALYSIS

EXISTING SITE CHARACTER

R

FIGURE 19

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

- Establishes significant green-link corridors incorporating retention of landform, vegetation and habitat, and promoting walkability.
- Provides 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.
- Provides a diversity of visual and recreational opportunities and experiences.

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

8.11.4 Landscape Concept Plan

The key elements of the plan from a landscape planning perspective are significant north-south and east-west green spines that will provide a strong green-link effect, with a village square providing a focus for the eastern precinct. The landscape proposals are shown in **Figure 20.**

8.11.4.1 North-South Green Spine

The north-south green spine is located in the floor of the valley of the eastern precinct, forming a significant corridor of retained bushland that will include stands of tuarts and beautiful banksia woodland.

WESTERN PRECINCT

POS 14 & 15 – VILLAGE CENTRE

- Provides the focus and heart for the Western precinct.
- Intimate, urban feel, strongly defined by the surrounding built form on 3 sides.
- Formal design incorporating a series of interlinked paved and grassed spaces defined and contained by a grid of trees and formal garden beds, and containing shade structures, arbors and public art.

POS 16

- Small neighbourhood park, predominantly lawn and trees with some garden bed areas, incorporating paths, bench seating and possible shade structure and play facilities.
- A landscaped drainage basin will be incorporated into the park.

POS 17 & 18

- Major existing dune and coastal heath retained as open space corridor that (in combination with terrain responsive housing zone) forms a natural northern edge to the residential development, retaining some of the sites intrinsic coastal character, and providing a visual buffer to development in the north.
- The park will include walk trails and interpretive information about the significance of the retained natural landscape, providing an educational tool for the community.

POS 20

- Smaller neighbourhood parks comprising predominantly of lawn and trees with some garden bed areas, and incorporating paths, bench seats and possibly shade structures and play facilities.

CENTRAL PRECINCT

POS 10

- Large open space that will include open lawn areas for informal passive and active recreation, as well as reinstated bushland areas.
- Facilities will include paths, seats, picnic facilities, shade structure/s and possibly play facilities and artworks.
- A landscaped drainage basin will be incorporated into the park.

POS 11

- Important open space focus in the central precinct, forming part of the major east-west green spine that is a combination of landscaped boulevards and parks.
- The park will be more formal in character incorporating a series of interlinked paved and grassed spaces defined by grids of trees and formal garden beds.

POS 12

- This park provides a green space adjacent to Marmion Avenue located on the secondary east-west spine, providing a visual link to the focal urban open space on the western side of Marmion Avenue.

POS 13

- Small green space adjacent Marmion Avenue that will incorporate a landscaped drainage basin.

EASTERN PRECINCT

POS 1 – VILLAGE SQUARE

- Provides the focus and heart for the eastern precinct.
- Formal design incorporating a series of interlinked paved and grassed spaces defined and contained by a grid of trees and formal garden beds.

POS 2 & 6 – BUSHLAND GREEN – SPINE

- Major north-south green spine forming a significant corridor of retained pristine banksia woodland and tuart groves.
- Provides a direct connection for pedestrians and cyclists to the village centre along pathways and boardwalks through the retained bushland.
- Activity nodes of varying size (incorporating seats, tables and benches, barbecues, shade shelters, play facilities and public art) will be provided at key locations along the green-spine.
- A landscaped drainage basin will be incorporated into each park.

POS 4 & 5

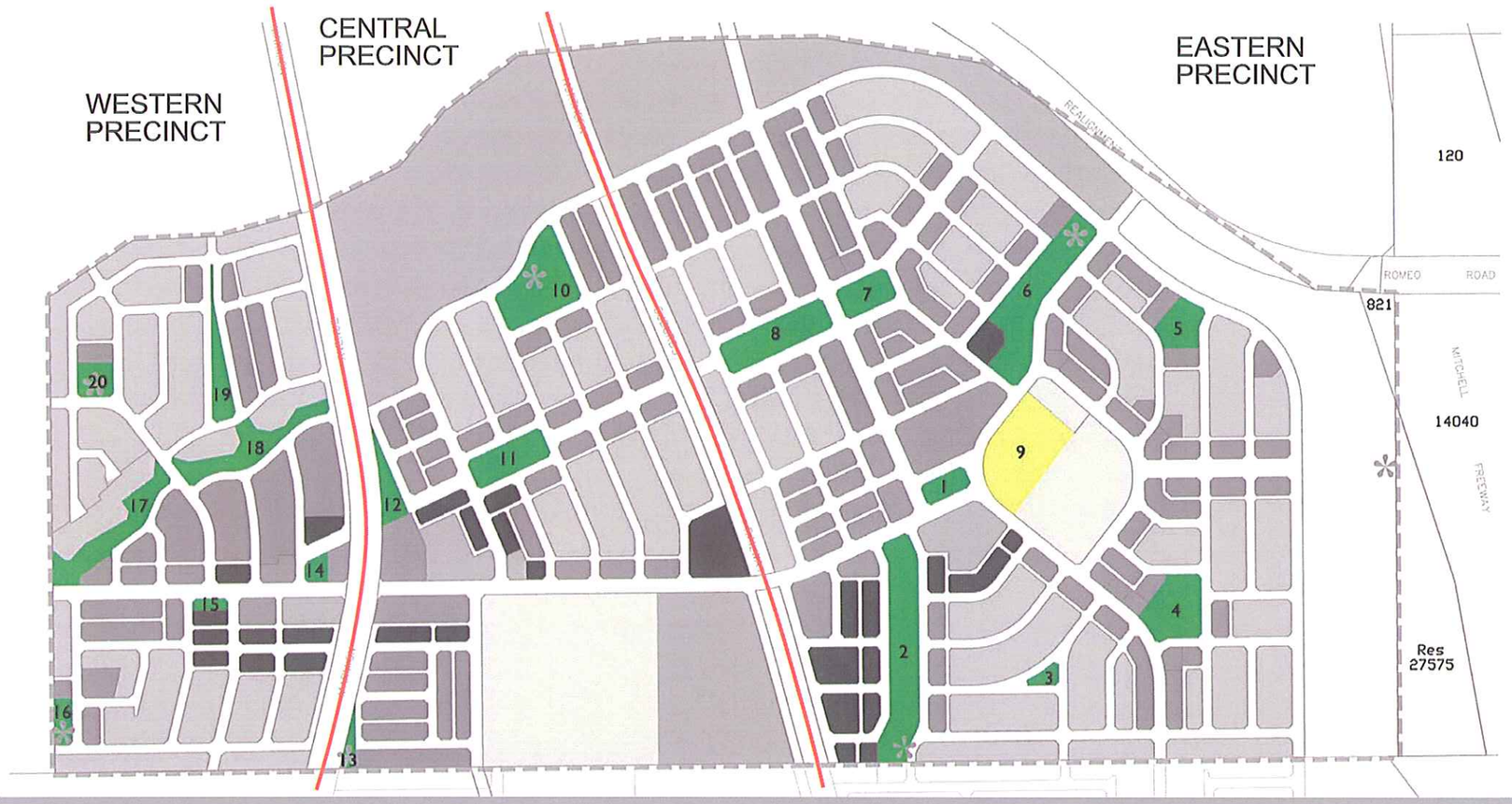
- Smaller neighbourhood parks comprising predominantly of lawn and trees with some garden bed areas, and incorporating paths, bench seats and possibly shade structures and play facilities.

POS 7 & 8

- Important open space focus in the north-western sector of the eastern precinct and forms part of the major east-west green spine that is a combination of landscaped boulevards and parks.
- The main focus of POS 8 is a retained hillock and associated grove of Eucalyptus decipiens on it's crest – this forms a natural landmark and highpoint within the development.
- The parks will include retained and reinstated bushland, paths, picnic and play facilities, lawn areas and public art, with a lookout structure located on top of the hill.

POS 9 – VILLAGE GREEN/OVAL

- Forms an important link in the north south open space network comprising the Village Square (POS 1) and the retained bushland corridors (POS 2 & 6), and located with the primary school.
- Provides a strong community focus as the traditional "Village Green" in the village centre of the eastern precinct, allowing for junior sporting events and larger community events such as fetes, fairs, market days, outdoor performances and concerts etc.



LOT 3 ROMEO ROAD
ALKIMOS

FIGURE 20 PUBLIC OPEN SPACE LANDSCAPE PROPOSALS

The green spine will provide a direct connection to the village centre for cyclists and pedestrians along pathways through the retained bushland.

Activity nodes will be developed at key locations along the green spine to provide points of interest and recreational opportunities. These activity nodes will vary in size and include amenities such as seats, tables and benches, barbecues, shade shelters, play facilities and public art.

In areas where the understorey is degraded there will be an opportunity to introduce some lawn areas (this generally occurs where there are stands of tuarts), while in other areas where the understorey is in good condition the activity nodes will be associated with small paved areas set into the bush.

As the bush areas proposed for retention comprise low shrubs / groundcovers and trees, views through the bush are generally unobstructed and therefore permit good surveillance, assisting safety and security for park users.

The green spine forms a focal element within the subdivision, flanked on both sides by cottage lots facing onto the park, with the road network designed to direct views and movement towards the parks.

8.11.4.2 Village Centre Precinct

The north-south green spine is punctuated by the village centre precinct that incorporates the major town square, providing the focus and heart for the development.

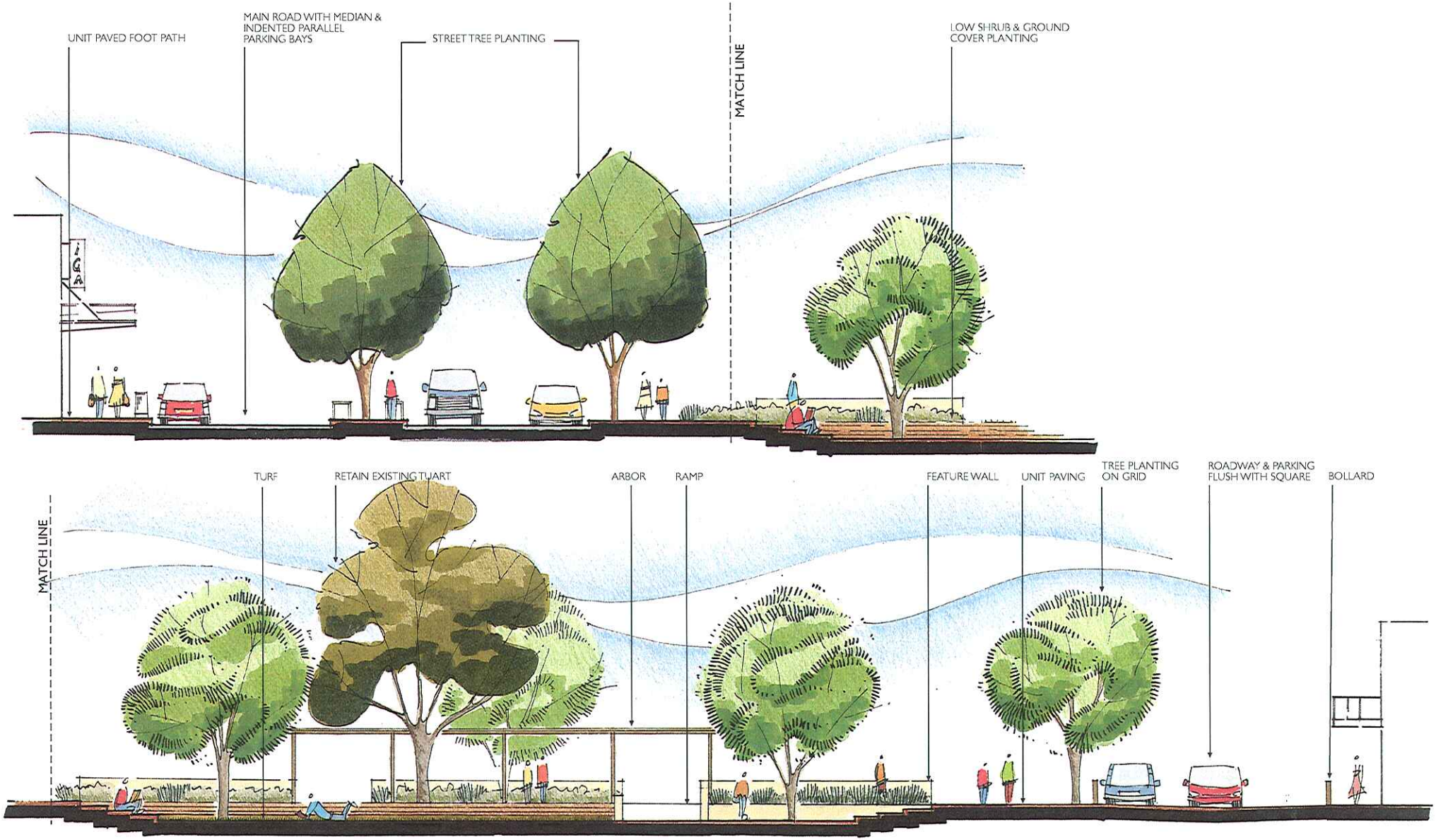
The village centre is intended to have an intimate, urban feel, with strongly defined built form containing the space on 3 sides and an urban streetscape characterised by narrow, paved verges with verandahs and/or awnings, street trees, street furniture and narrow roads – **Figure 21 and Figure 22.**

The village centre precinct will incorporate superior road and verge paving treatments to signify its status as the hub of the eastern precinct.

The Village Square is framed by a grid of trees and subtly divided into a series of linked spaces. It provides an immediate sense of place, scale and spatial definition to the square as well as offering shade and amenity.

VILLAGE CENTRE PRECINCT - LANDSCAPE CONCEPT PLAN (POS 1 & 2)

FIGURE 21



SECTION THROUGH VILLAGE SQUARE

FIGURE 22

It is intended that the square be quite formal in design, incorporating a focal pavilion / structure set within paving at its eastern end to allow for a variety of community uses, including community markets, events and functions, as well as more informal uses for individuals and small groups.

The space will also incorporate a sunken lawn to soften and cool the area and allow for informal recreational activities. To the west is a smaller lawn area at street level that provides for retention of an existing Tuart tree with an arbour framing up the western edge of this space. A series of formal planter beds and low walls will assist in defining the space, providing some sense of enclosure and intimacy.

A primary school site is proposed to the east of the square. The western edge of the primary school site (facing the square) will accommodate a sports oval, enhancing the civic function and feel of the village centre precinct – **Figure 23.**

The oval in effect would provide a "village green" quality to the village centre, further reinforcing the civic nature of this hub, and it is also located on the confluence of the north-south and one of the east-west green spines.

8.11.4.3 East - West Green Spines

There are two east-west green spines proposed that will encourage east-west pedestrian and cycle movement, facilitating links from the ocean in the west to the regional park in the east. These green spines will be quite different in character to the north-south green spine with its focus on remnant bushland; the east-west green spines will be a combination of landscaped boulevards and interlinked parks, ranging from linear urban parks to larger, more open parklands.

The major east-west green spine is located in the southern sector of the precinct and intersects with the north-south green spine, the village square and the school oval, and it also flanks the District Open Space to the west of the rail line. To the west of the village centre the green spine is in the form of a landscaped boulevard which provides the main link from the village centre to Marmion Avenue and ultimately on to the ocean.

To the east of the village centre the green spine flanks the school and oval and then leads into a special linear urban park before terminating in an open parkland at the eastern edge of the site, which will incorporate a stormwater drainage function.

A second east-west green spine in the northern sector of the precinct has a slightly diagonal orientation, extending from the future Romeo Road down to the proposed Village Centre west of Marmion Avenue, where it intersects with and terminates on the major east-west green spine described above. The main focus of this green spine will be a retained hillock and associated grove of Eucalyptus decipiens on its crest – refer **Figure 24.**

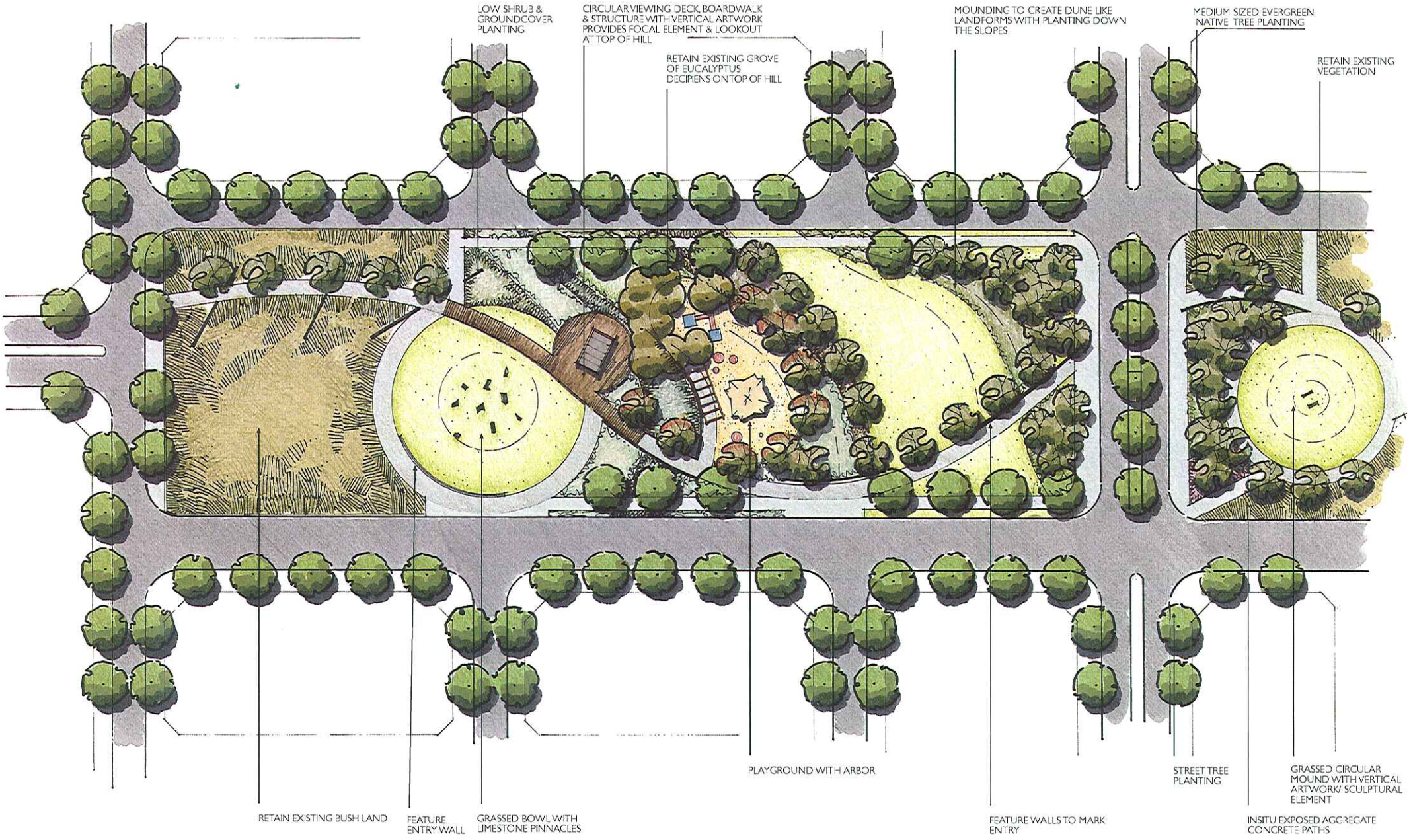
A formalised treatment at the end of the bushland corridor is proposed relating strongly to the village centre.

Along the main street is avenue tree planting and an arbour structure with walls providing a vertical built form edge to the street and defining the park entry. This end of the park is rectangular in form, reflecting a similar theme to the village square comprising formal lawn areas, paved seating/picnic areas, play facilities and formal planting – providing a strong contrast with the informality of the adjacent bush.

This will form a natural landmark and highpoint within the development, providing a point of orientation within the district as well as a destination for obtaining views over the surrounding area and particularly towards the ocean.

VILLAGE GREEN - LANDSCAPE CONCEPT PLAN
(POS 4 & 6)

FIGURE 23



HILLTOP PARK -
LANDSCAPE CONCEPT PLAN
(POS 9)

FIGURE 24

The landmark status of this hill will be further reinforced by the provision of a lookout structure on the summit.




8.11.4.4 Boulevards

All the major roads within the development will be landscaped boulevards, clearly defining their status as the primary roads and enhancing the visual and physical amenity for residents and road users, including cyclists and pedestrians.
The network of boulevards combined with the open space linkages will provide a diversity of legible and attractive walking and cycling circuits within the development.

8.11.4.5 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 at the outset of the project to ensure the implementation of meaningful and relevant artworks throughout the development. Opportunities will be explored to involve local artists in specific projects.


8.12 Employment

Lots 1001 and 1002 Marmion Avenue is excellently placed to provide a substantial contribution of local residents to work in the future employment centres of Alkimos Regional Centre and the Brighton (Jindalee) District Centre – **Figure 25**. Ultimately over 1100 jobs are expected to be contributed to the regional economy through the development of Lots 1001 and 1002 (taking into consideration areas subject to future planning).

8.12.1 Local Employment Catchment

Lots 1001 and 1002 Marmion Avenue is poised between the two major centres, with many residents likely to be within reasonable walking distance of employment destinations in each centre.

The Alkimos DSP is somewhat constrained to the north, as the major regional open space, ground water treatment plant, and Alkimos wastewater treatment plant limit the connectivity of the Alkimos Regional Centre with the northern residential catchments. Coupled with the limitations of the physical barrier presented by the future Mitchell Freeway to the east of the Alkimos Regional Centre, Neeralup National Park and rural land to the east of Wanneroo Road, the Alkimos Regional Centre will be reliant on a greater proportion of employees residing in the Lots 1001 and 1002 area. This is also the case for employment demands for the Brighton (Jindalee) District Centre, also constrained by the National Park and rural land to the east of Wanneroo Road.

The SGAT assessment for Lots 1001 and 1002 shows that in order to meet the 40% local job self sufficiency targets as specified in Smart Growth, the total number of jobs required within Lots 1001 and 1002 is around 1,315.

The land use activities expected to generate jobs include – retail; education, day care, industrial, and commercial employment. A summary of the estimated employment provision is summarised in **Table 11** below.

Retail	124 (based on SGAT)
Education	172
Health, Community and Day Care	120
Commercial	139
Home based employment	284 (based on SGAT)
Total under current allocation*	1140

Table 11 – Summary Employment Provision

Note: Employment within the northern centre zone and eastern area could add an additional 200-300 jobs, depending on the final mix of development. These areas are subject to future planning.

8.12.2 Employment Adequacy

Under the Smart Growth Assessment Tool, Lots 1001 and 1002 provides an estimated 1140 jobs, being more than 86% of the target employment rate at approximately 35% locally provided.

The fact that the Alkimos Regional Centre and Brighton District Centre are literally on the doorstep, and somewhat segregated from the residential areas which will provide employees, means that not only will the development of Lots 1001 and 1002 complement the plans for the adjacent centres, but the local centres and mixed uses proposed for Lots 1001 and 1002 will have room to prosper in line with the City's Employment Policy.

For these reasons, the 40% employment target is not strictly applicable to Lots 1001 and 1002 for a number of reasons:

- The requirement of 40% employment necessarily needs to be a region wide requirement, not a local area requirement. Where the boundaries for such a requirement are drawn is very important. Instead of looking at the Lots 1001 and 1002 site in isolation, if the boundary is extended to include either the Jindalee District Centre to the south, or the Alkimos Regional Centre to the north, the supply of local employment will be substantially higher. This is particularly the case for Lots 1001 and 1002 when one considers its location. Lots 1001 and 1002 is complemented by the close proximity of Alkimos (65,000 sq m of retail and 70- 80 hectares of service commercial) and the Brighton District Centre, both of which are located within a 2 kilometre radius (see Figure 25).

- Urbis maintains that while the requirement for employment might have appeal from a planning point of view, it does not necessarily result in commercial outcomes. Requiring all residential regions (such as Lots 1001 and 1002) to provide the full 40% employment is likely to result in a higher provision of office space (industrial uses do not appear viable). Commercial reality may be that this results in the local market being oversupplied with office space, resulting in undeveloped land, or high vacancy rates in any of the centres in Lots 1001 and 1002, Alkimos, or Brighton.

The developer will be undertaking further work as part of its development and management strategies to optimise local employment opportunities through a range of employment initiatives and strategies which will be launched throughout the life-cycle of the development in partnership with relevant agencies.

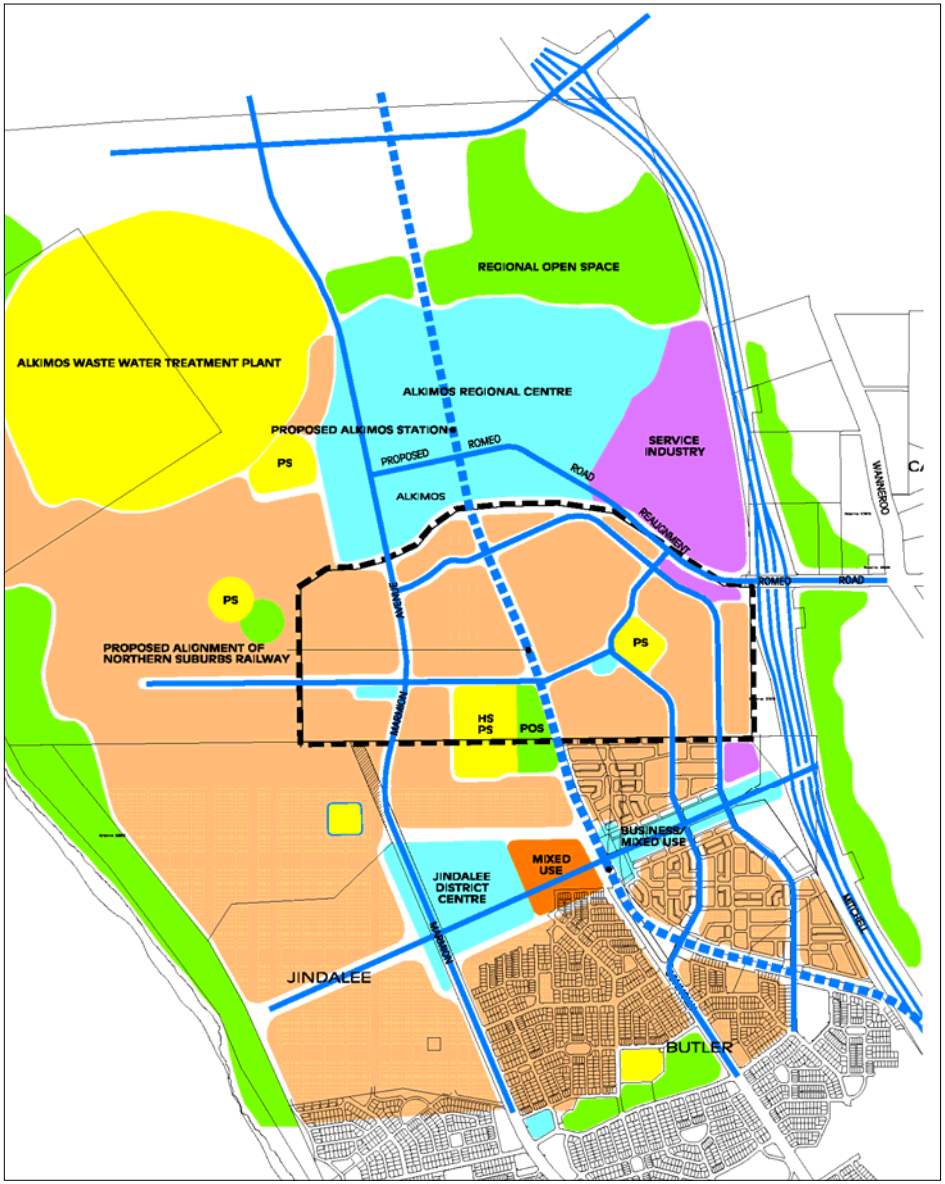


Figure 25 – Employment Context

8.13 Engineering and Infrastructure

8.13.1 Earthworks

The site is undulating and varies in elevation between RL 32 and RL 57, with a significant number of high ridges and dunes. Gradients across the site vary between 2 to 8%. The general topography of the site is such that the majority of the development is located on good free draining sands interspersed with limestone outcrops and is located well above the existing water table.

Site clearing, bulk earthworks and retaining walls will be required over the majority of the site to create flat building blocks. In some areas, such as the coastal dune interface zones (marked as "Subject to future planning"), the developer may pursue sloping blocks or areas of retained vegetation within larger blocks. This will be separately discussed with the City. Areas of significant vegetation have been identified and in the majority of instances have been located in POS areas, where earthworks will be minimized in order to minimize removal of the natural vegetation.

All earth worked areas will require dust management & soil stabilization via hydromulching as per Local Authority requirements. Separate management plans will be developed during the design and construction phases, to the satisfaction of the relevant agencies.

8.13.2 Road Works

The roads have been designed in accordance with Western Australian Planning Commission Policy DC2.6 – Residential Road Planning and Liveable Neighbourhoods principles.

Road reserve widths will sufficiently accommodate all utilities using standard cross sections and service alignments.

As all services are proposed to be located in the road reserves and on standard alignments it is not anticipated that any easements will be required.

8.13.3 Servicing

Services can easily be provided to service Lots 1001 and 1002.

8.13.3.1 Stormwater Drainage management

To address stormwater and flood management, the principles of the minor/major system of drainage will be employed.

The minor/major drainage system is defined as a system of underground pipes, swale, kerbs etc which are designed to carry runoff generated by low frequency (minor) ARI storms (5 year ARI) and a system of roads, drainage reserves, basins and open space designed to convey the major events (greater than the 5 year ARI).

The City of Wanneroo requires the stormwater management strategy to retain the 100-year ARI event within the Development Area. These objectives can be achieved through using the minor/major system incorporating the principles of water sensitive urban design (WSUD) and best management practices (BMPs).

Some of the BMP's outlined below fall outside the current City of Wanneroo standards / guidelines such as, use of open bottom drainage pits, underground storage etc.

These initiatives will need to be negotiated with the City during the preliminary engineering design phase of the work and criteria set for the final sizing of the drainage basin / swales. It is anticipated that there may be a reduction in the basin /swale sizing if these initiatives are applied.

8.13.3.2 Stormwater Management Network

The stormwater management network will comprise of the following components:

- The minor system will include an underground piped drainage network designed to carry the 5-year ARI storm event generated within the road reserves. Lot drainage will be contained on site by use of soak wells.

- As this site is generally located on good free draining sands and well above the existing water table, water sensitive design principles will include consideration to discharging water into the ground at the high end of the catchments by use of in line soakwells, open bottomed drainage pits and discharge to infiltration type swales / open basins in the POS area using current best management practices. Infiltration swales / open basins located in POS areas will be designed to accommodate the 10 year storm event with a water depth less than 900 mm and the 1 in 100 year storm event with a water depth less than 1200 mm. In locations where swale areas may be limited, consideration will be given to the use of underground storage / infiltration systems to cater for the 1 in 1 year storm event.

- The major system will include the design of overland flow paths to carry the 1 in 100 year storm event using the road system to direct flows to infiltration basins / swales.

8.13.3.3 Stormwater Quantity

The sizing of infiltration swales / open basins located in POS areas is based upon modelling performed using PC Sump. Stormwater quantity was modelled for both the 10-year and 100-year flood.

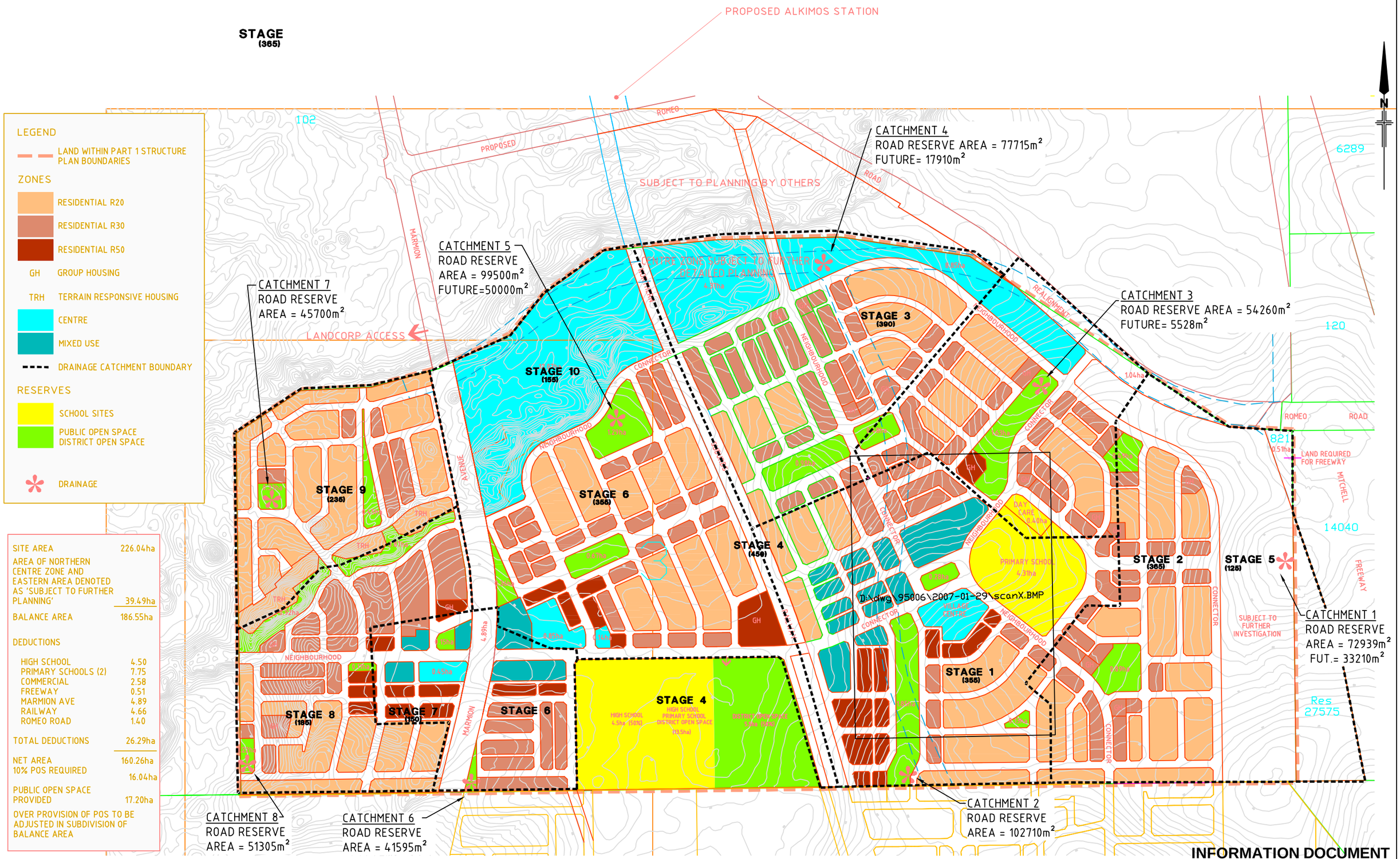
Post-development catchment boundaries were defined by delineating post-development topographic divides. Design storms were generated with AusIFD, referenced within Australian Rainfall and Runoff (1987). The post development loss model for the road and road reserve area of 10% was adopted (runoff coefficient of 0.9). All lot drainage will be contained on site by the use of soak wells.

As the site is predominantly free draining sand, a permeability of 5 m/day was adopted to assess the performance of the infiltration systems. It should be noted that free draining sands generally have permeability's in excess of 15 m/day.

Estimated storage requirements are summarized in **Table 12**. The infiltration swales have been designed to accommodate the 10-year storm event with a water depth less than 900 mm and the 1 in 100 year storm event with a water depth less than 1200 mm, with 300 mm freeboard and 1 in 6 side slope.

The locations of landscaped infiltration devices are shown in **Figure 26**.

These infiltration areas will be in the form of vegetated swales, but will be subject to further detailed design. Again final sizing will be dependent upon the design criteria applied and approved by the City of Wanneroo.



INFORMATION DOCUMENT

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Checked	Approved	Date
C	LOT 3 OPTION 27 ADDED		DWR			
B	STRUCTURE PLAN UPDATED		KS			
A	ISSUED FOR INFORMATION		KS			

GHD CLIENTS | PEOPLE | PERFORMANCE
GHD House, 239 Adelaide Tce Perth WA 6004
PO Box Y3106 Perth WA 6832 Australia
T 61 8 6222 8222 F 61 8 6222 8555
E permail@ghd.com.au W www.ghd.com.au

DO NOT SCALE

Drawn KS DEC 06 | Designed
Drafting Check | Design Check
Approved
Date
Scale 1:7500
This Drawing must not be used for Construction unless signed as Approved

Client NORTHERN CORRIDOR DEVELOPMENTS LTD C/O LWP PROPERTY GROUP
Project LOT 3 ROMEO ROAD, ALKIMOS
Title PRELIMINARY DRAINAGE CATCHMENT PLAN APPENDIX A

Original Size A3 | Drawing No: 6117935-100 | Rev: C

Plot Date: 8 February 2008 - 4:34 PM | Cad File No: G:\61\17935\CAD\6117935-100.dwg

Figure 26

Catchment	Road Reserve Area (m^2)	Effective Impervious Area (m^2)	Base Area Length Width (m)	Base Area (m^2)	10 year TWL Area 1 (m^2)	100 year TWL Area 2 (m^2)
1	106149	95534	65, 60	3900	5106	6474
2	102710	92439	62, 60	3720	4899	6240
3	59788	53809	50, 40	2000	2891	3944
4	95625	86063	60, 57	3420	4554	5850
5	149500	134550	75, 75	5625	7056	8649
6	41595	37436	40, 33	1320	2058	2958
7	45700	41130	40, 37	1480	2254	3190
8	51305	46175	45, 37	1665	2484	3465

Table 12 – Preliminary drainage calculations
Source : GHD

8.13.3.4 Stormwater Maintenance

The maintenance of the storm water management network will become the responsibility of the local authority when the works are handed over at the end of the 12-month defects liability period. Generally the types of systems proposed will be low maintenance, requiring periodic cleaning. Drainage swales will be dry in summer and will form an integral part of the POS areas and maintained by council as such.

The swales will be designed to resemble natural or stylised damplands, depending on the context of their location, and will be an integral part of the overall landscape design to provide aesthetic and recreational amenity.

Within the low-lying parts of the swales, indigenous dampland species will be used that are tolerant of regular seasonal inundation and summer dry conditions, while on the batters indigenous species tolerant of periodic inundation and summer dry conditions will be used. Where possible the appearance of the basins will be enhanced by varying the slopes of the batters (not exceeding a maximum slope of 1:5) to achieve a less engineered look, and creating localised depressions and mounds within the basins rather than giving them flat bases. In this way, islands will be formed during periods of inundation.

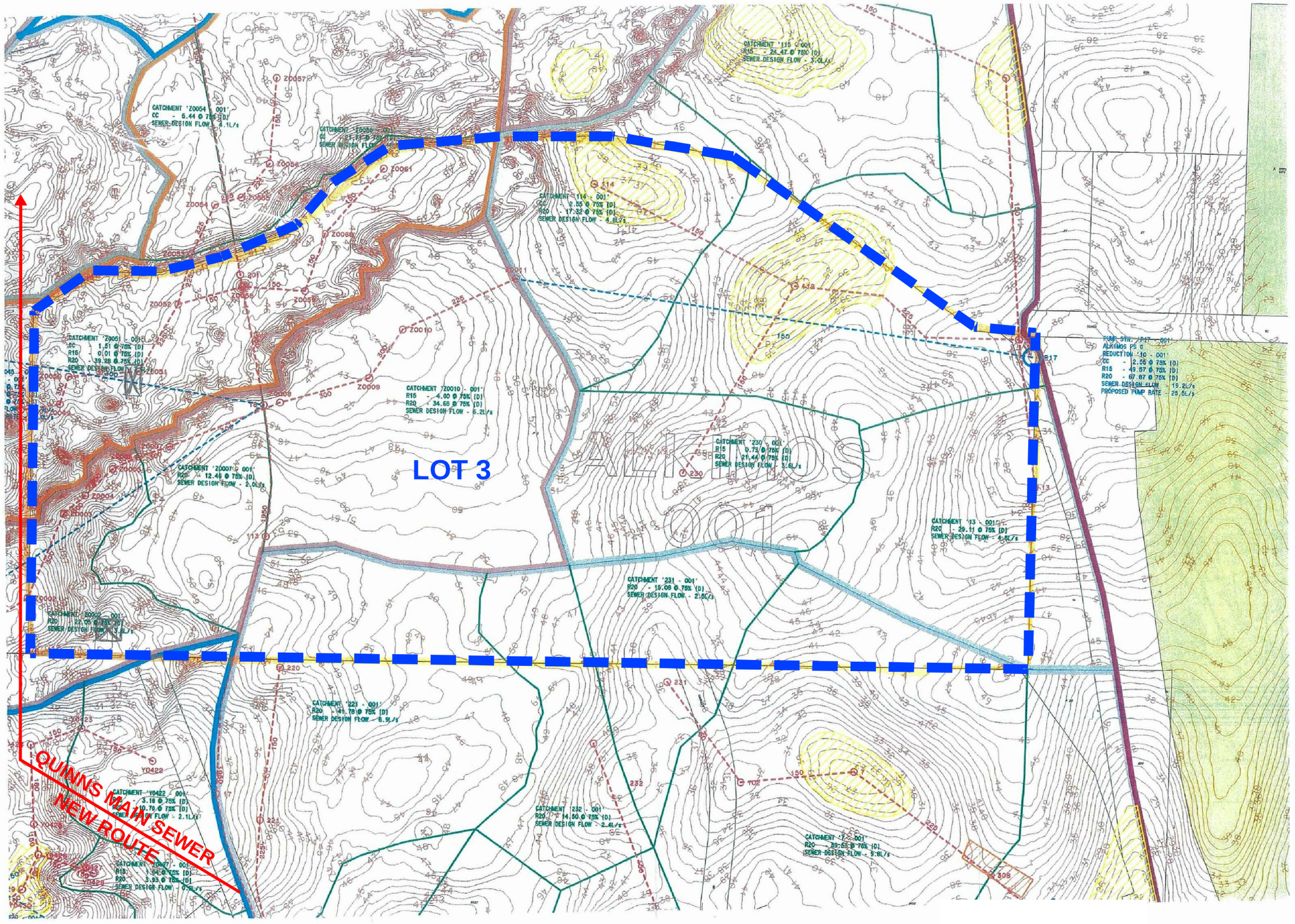
Where basins are located adjacent lawn areas, a well-defined management edge will be created with paths, low walls or mowing kerbs to separate surrounding lawn areas from the dampland vegetation. Basins will be located such that convenient access for periodic maintenance is possible.

8.13.3.5 Wastewater

All lots will be supplied with a sewer service to Water corporation standards from reticulation mains located in the proposed road reserves.

Water Corporation have advised that the development is located in the Alkimos sewer district and as such the development is planned to be serviced by the future Quinns main sewer which is to be located immediately to the western boundary of Lots 1001 and 1002 – refer **Figure 27 - Sewer Catchment**.

Construction of the Quinns main sewer and associated Alkimos waster water treatment plant is scheduled for completion in 2010. Water Corporation have advised that until these works are commissioned Lots 1001 and 1002 has no sewer outfall available.



INFORMATION DOCUMENT

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Checked	Approved	Date
A	ISSUED FOR INFORMATION		KS			

GHD CLIENTS | PEOPLE | PERFORMANCE
GHD House, 239 Adelaide Tce Perth WA 6004
PO Box Y3106 Perth WA 6832 Australia
T 61 8 6222 8222 F 61 8 6222 8555
E permail@ghd.com.au W www.ghd.com.au

Drawn KS DEC 06	Designed	
Drafting Check	Design Check	
Approved		
Date		
Scale NTS	This Drawing must not be used for Construction unless signed as Approved	

Client NORTHERN CORRIDOR DEVELOPMENTS LTD C/O LWP PROPERTY GROUP
Project LOT 3 ROMEO ROAD, ALKIMOS
Title SEWER CATCHMENT APPENDIX B

Original Size A3 **Drawing No: 6117935-C101** **Rev: A**

Plot Date: 8 February 2008 - 4:59 PM Cad File No: G:\61\17935\CAD\6117935-C101.dwg

Figure 27

Further negotiations will be required with Water Corporation to review options for a sewerage outfall point if lots are to be brought on stream prior to 2010.

The Water Corporation sewage catchment plan for the site is shown in **Figure 28.** The plan shows a portion of the southern section of the site draining into the Brighton development (approximately 20 ha).

The remainder of the eastern half of the development (generally east of the future rail extension) is to be serviced by a wastewater pump station to be located along the eastern boundary of the site near the end of the existing Romeo Road.

A permanent pump station will discharge to a gravity sewer located in the western catchment. The pump station and pressure main will be constructed under a Water Corporation Customer Constructed Works Agreement (CCWA) where the developer will have to prefund the full cost of extending the infrastructure for an agreed period.

The Western Catchment is serviced by a 300 mm dia trunk gravity sewer, which will connect into the Quinns main sewer.

In the early stages of development 2008 to 2010 & prior to the completion of the Quinns main sewer completion in 2010, we estimate that approximately 150 – 300 lots could be constructed and released. The developer is prepared to pre-fund temporary / permanent works as may be required through the Brighton land to connect to the existing reticulation system.

These details will need to be negotiated with the Water Corporation during the preliminary engineering design phase.

8.13.3.6 Water Reticulation

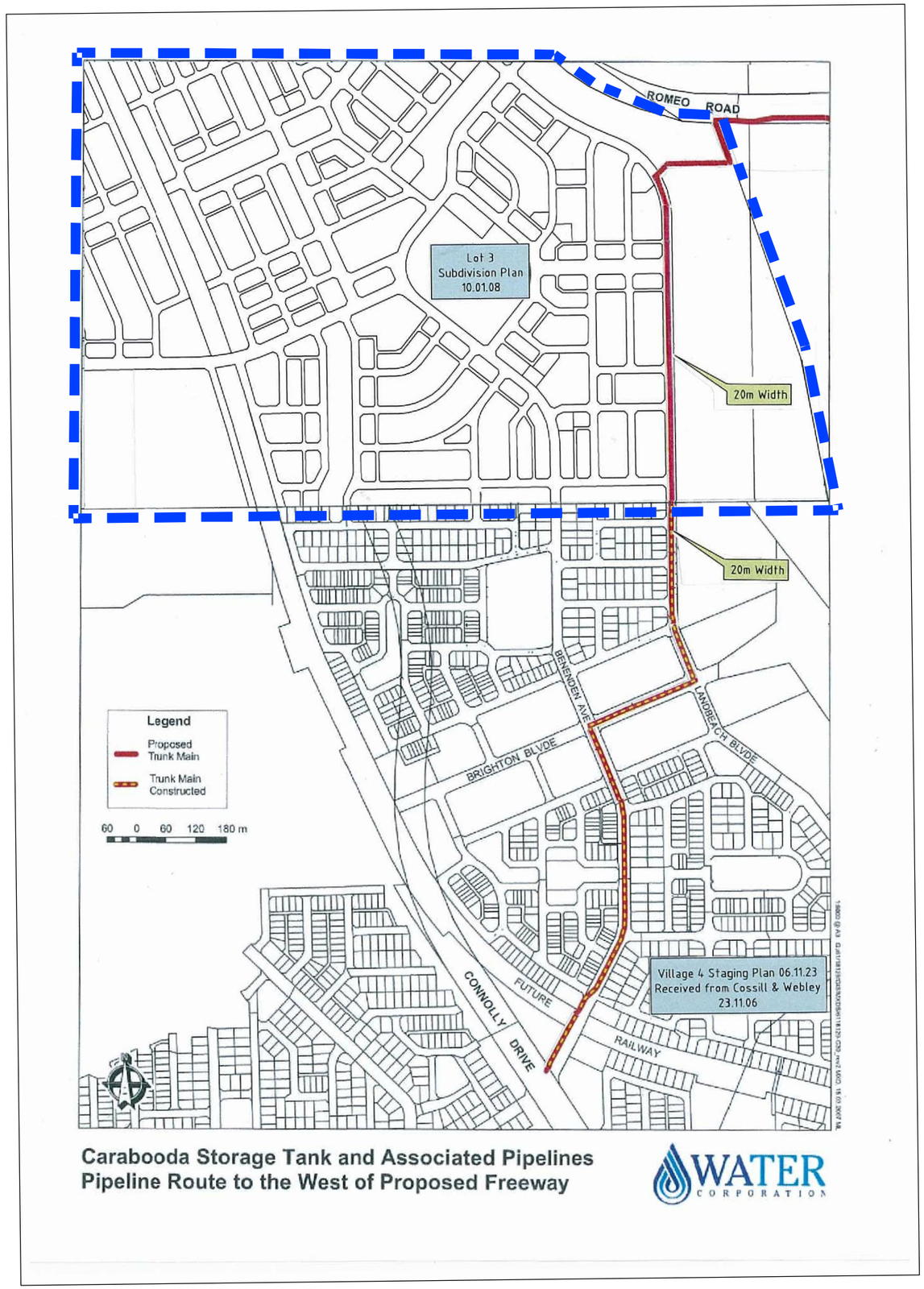
All lots will be supplied with a water service to Water corporation standards from reticulation mains located in the proposed road reserves.

GHD on behalf of Water Corporation is currently designing a 1200 mm supply main from the Brighton development to the future Carabooda 120Ml Reservoir. Construction of the pipeline is scheduled to commence in 2007, with the reservoir currently planned to be commissioned in 2008 /2009. Pipeline routes are currently being negotiated and it is likely that the 1200 mm trunk main will traverse the development as shown in **Figure 29**.

Water Corporation has advised that the preferred option to service the site is by the extension of the existing distribution network from the Brighton development. The preferred option is by extension of the existing 500 mm main in Connolly Drive through the Brighton development as generally outlined on the attached sketch in **Figure 29**, which generally follows the Carabooda main extension alignment.

Other Options considered include extending a 700 mm distribution mains in Marmion Ave however this is not a preferred option. Water Corp have advised that an alternative to this may be a distribution connection off the 1200 Carabooda trunk main, however if this was the case and the Carabooda Reservoir not commissioned prior to release of the first stage, a temporary booster pump station would be required to service Lots 1001 and 1002 until the tank is commissioned in 2008/2009.

Water distribution mains 300 mm and larger will generally be constructed under a Water Corporation Customer Constructed Works Agreement (CCWA) where the developer will have to prefund the full cost of extending the infrastructure for an agreed period.



N

No.	Revision	Drawn	Checked	Approved	Date
B	LOT 3 OPTION 27 ADDED	DWR			
A	ISSUED FOR INFORMATION	KS			

Drawing Revisions

Note: * indicates signatures on original issue of drawing or last revision of drawing

GHD CLIENTS | PEOPLE | PERFORMANCE

GHD House, 239 Adelaide Tce Perth WA 6004
PO Box Y3106 Perth WA 6832 Australia
T 61 8 6222 8222 F 61 8 6222 8555
E permail@ghd.com.au W www.ghd.com.au

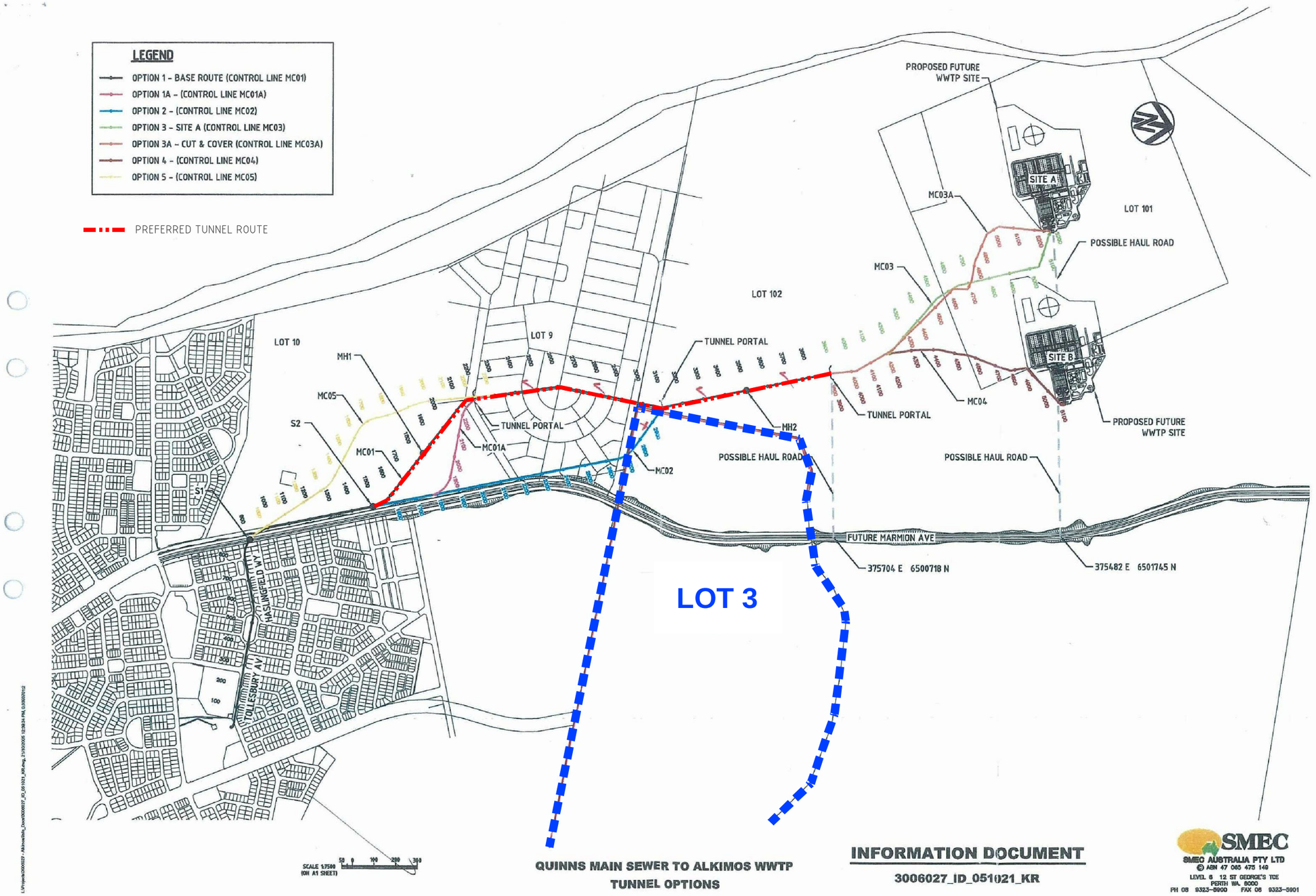
Client	NORTHERN CORRIDOR DEVLOPMENTS LTD
Project	C/O LWP PROPERTY GROUP
Project	LOT 3 ROMEO ROAD, ALKIMOS
Title	CARABOODA 1200DN PIPELINE ROUTE THRU LOT 3 APPENDIX C

Scale	AS SHOWN	DO NOT SCALE	
Drawn	KS DEC 06	Designed	
Drafting Check		Design Check	
Approved			
Date			

This Drawing must not be used for Construction unless signed as Approved

Drawing No.	Original Size
6117935-C102	A3
	Rev. B

INFORMATION DOCUMENT



INFORMATION DOCUMENT

No	Revision Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Checked	Approved	Date
A	ISSUED FOR INFORMATION	KS			

GHD CLIENTS | PEOPLE | PERFORMANCE
GHD House, 239 Adelaide Tce Perth WA 6004
PO Box Y3106 Perth WA 6832 Australia
T 61 8 8222 8222 F 61 8 8222 8555
E permail@ghd.com.au W www.ghd.com.au

DO NOT SCALE

Drawn	KS DEC 06	Designed	
Drafting Check		Design Check	
Approved			
Date			
Scale	NTS	This Drawing must not be used for Construction unless signed as Approved	

Client	NORTHERN CORRIDOR DEVELOPMENTS LTD C/O LWP PROPERTY GROUP
Project	LOT 3 ROMEO ROAD, ALKIMOS
Title	QUNNIS MAIN SEWER RO ALKIMOS WWTP APPENDIX D
Original Size	A3
Drawing No:	6117935-C103
Rev:	A

Plot Date: 8 February 2008 - 5:05 PM Cad File No: G:\61\17935\CAD\6117935-C103.dwg

Figure 29

Timing of the initial development stages in relation to the Brighton development front will dictate how main extensions connect into the Brighton development. If necessary the Lots 1001 and 1002 developer in consultation with Brighton Board will seek an early extension of water infrastructure through the Brighton development.

- ***Third Pipe – Common Irrigation System***

Consideration will be given to the installation of a "3rd pipe" system to provide for common irrigation to POS and private lots, similar to what has occurred in the Brighton development. This is subject to further reviews and negotiations with the service providers.

8.13.3.7 Underground Power

All lots will be supplied with an underground power service to Western Power standards from reticulation mains located in the proposed road reserves.

Western Power have an existing 33Kv overhead HV line located in Romeo Rd which runs along the eastern boundary of the site and then along the northern boundary of the Brighton development. This line will eventually be replaced as part of the underground distribution network as development occurs. The site will be serviced with underground power by the extension of the Western Power infrastructure from the Brighton development to the south and from the existing network located at the end of Romeo Road.

Western Power is currently negotiating a 132 KV high voltage transmission main route along the Freeway past the development and along the north side of Romeo to feed a future sub-station location in the Alkimos area. Negotiations are in the preliminary stages and Western Power cannotnprovide any details at this time.

8.13.3.8 Telecommunications / Communications

The development will be serviced with underground Telstra underground network and probably a new optic fibre Telstra "Smart Community" network, providing community and residential communications features including telephony, high speed internet, digital and free to air television subscription service . Negotiations with Telstra may be required regarding developer contributions required as a result of any non-frontal development.

8.13.3.9 Gas

The development will be serviced with underground gas network by the extension of the existing network located in the Brighton development. Negotiations with Alinta gas may be required regarding developer contributions required as a result of any non-frontal development.

8.14 Environmental Issues

8.14.1 Local Water Management Strategy

A Local Water Management Strategy has been prepared by GHD as a separate supporting document – **Appendix 7**. The Water Management Strategy outlines the water management requirements consistent with existing guidelines and sets objectives based on the principles outlined in the following documents:

- Alkimos-Eglinton Water Resource Management Plan (Woodward-Clyde, 1996);
- Department of Water Urban Stormwater Management in Western Australia; and
- The Government of Western Australia's State Water Strategy.

The overall intention of Lots 1001 and 1002, Marmion Avenue LWMS is to achieve the sustainable management of all aspects of the water cycle within the local structure plan area. The objectives for integrated urban water management include;

- Minimise total water use in the Romeo Road Development area;
- Substitute drinking quality water with fit-for-purpose water for non drinking water uses;
- Protect infrastructure and assets from inundation and flooding;
- Manage groundwater levels to protect infrastructure and assets and protect groundwater as a resource.

The proposed water conservation strategy examines opportunities for reduction in scheme water use, opportunities for water conservation and efficiencies, and includes measures such the substitution of scheme water for a non potable water supply.

On a household level, the Strategy recommends that the benefits of water efficient appliances be promoted, and incentives be offered to residents for installation of water saving devices (fixtures, water tanks) and water wise landscaping.

Irrigation requirements for private gardens can be reduced by using subsurface irrigation, rain and soil moister sensors, soil conditioners, wetting agents, mulches and xeriscaping (using plants with very little or no irrigation demand).

Public Open Space (POS) areas have been designed to minimise irrigation requirements and incorporate combinations of native landscape retention. Harvesting of endemic seeds will be used for re-establishment, and exotic plantings will be incorporated wherever possible to minimise turf areas.

To address stormwater and flood management the principles of the minor/major system of drainage will be employed. The f\drainage will be designed based on water sensitive urban design principles (WSUD) and best management practices.

The Management Plan recommends that monitoring occur to determine that the management measures for stormwater quality are meeting the design objectives. Monitoring would occur during construction and post development for a two year period.

The developer will prepare an annual report to be submitted to the City of Wanneroo for review. The report will compare water quality related design objectives set for the Local Structure Plan Area with water quality data collected and an assessment if further actions are required.

8.14.2 Noise and Vibration

The Alkimos Railway Station (Romeo Station) is located approximately 400 metres north of Romeo Road and will incorporate a park and ride facility. The Local Structure Plan needs to have regard for the issue of noise and vibration associated with the railway.

A Study Report was commissioned by the Department for Planning and Infrastructure in 2003 to examine the extension of the northern suburbs railway (Clarkson to Romeo Road). The Study Report was used to define the railway alignment and station locations in sufficient detail to progress land requirements plans in preparation of an MRS Amendment.

It included an assessment of the noise and vibrations impacts associated with the extension of the northern suburbs railway, and in particular, the impacts to Brighton and Jindalee residential development sites. Modelling was conducted as part of the study however is considered to be conservative.

The results of the assessment are compared against the criteria stated in the *Noise and Vibration Management Plan for Northern Suburbs Railway Extension* prepared for the Department for Planning and Infrastructure.

8.14.2.1 Vibration Level Criteria & Prediction Methodology

The vibration level criteria in the *Noise and Vibration Management Plan for Northern Suburbs Railway Extension* is based on Australian Standard AS2670-1990. This standard contains a number of curves relating vibration levels to frequency, and are generally accepted by the Department of Environment (DoE).

The Study identifies that historically few complaints resulting from vibration issues with railways.

Significantly, the Study acknowledges that the new generation electric passenger railcars expected to operate on the northern railway line differ from the existing electric railcars in Perth.

The motors on the new railcars are to be mounted as part of the sprung mass which means that the weight of the railcar will be dampened before being transferred onto the rail. This essentially results in a reduction in the energy transmitted to the rail and therefore a reduction in the vibration levels at the receiver locations. Specific vibration testing of these trains had not been undertaken.

8.14.2.2 Noise Prediction

The noise predictions were carried out by Lloyd Acoustics using an internationally recognised computer model Soundplan (version 6).

The modelling takes into account meteorologic conditions; topography; transport design; ground types and sound power levels / height of noise. The Nordic Rail Prediction method was used as a basis and modified to better suit newer train technology available for the Northern Suburbs rail.

The Study includes predicted noise levels to receiver locations, and concludes that the daytime, night time and maximum noise levels are predicted to comply with the management plan.

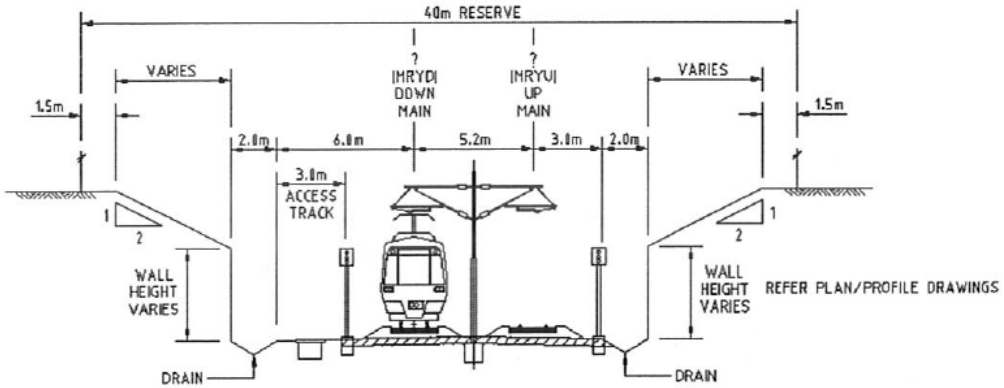
Accordingly additional noise barriers were not recommended in the Study.

8.14.2.3 Railway Design

In order to minimise noise and vibration nuisance, the railway will be largely in cut for the full distance between the Butler and Jindalee stations. Generally the depth of the cut will occur four to five metres below bulk earth work levels.

The cross section of the railway reserve will be dictated by a number of factors including horizontal alignment, track centres, provision for drainage and access, depth of cut or fill and batter slopes.

A typical cross section is shown below.



All practicable steps are being taken to avoid or minimise transport noise intrusion as part of the railway design. Constructing the railway line in a cut acts as a natural noise barrier, and also minimises the visual impact of any infrastructure.

8.14.2.4 Noise amelioration through building design

It is anticipated that noise and vibration impact will be minimised due to the new rail technology available and noise mitigation measures included in the railway design.

Where necessary, noise mitigation measures can also be achieved through building layout and design. Available measures include;

- Using materials to limit the potential entry of noise through glazing, ceiling insulation and sealing air gaps;
- Locating outdoor living areas and noise sensitive rooms (bedrooms/entertainment) as far as possible from the noise source;
- Locating service areas closer to the noise sources (such as garages, bathrooms, hallways, stairwells etc);
- Limiting the size and height of openings to habitable noise sensitive rooms; and
- Using walls designed to screen or partially screen a property.

It is generally the responsibility of the individual landowner to implement noise mitigation measures.

8.15 Preliminary Development Staging

The development intent is to create a distinctive, urban lifestyle residential development with substance and intimacy, as an asset for future development in the north-west corridor.

The developer's approach to this is to provide the vision for the development, and make early commitments to critical infrastructure such as the local centre, establishment of active and passive open space and key road systems, such that the developer takes on a role as the vision keeper for the development with a responsibility for the early guidance of community development.

Consistent with this, the developer has negotiated with other developers in the corridor to contribute to the prefunding of Marmion Avenue between Butler and Yanchep.

The extension of Marmion Avenue will mean that Lots 1001 and 1002 Marmion Avenue will be placed at the leading edge of development in the corridor. However, rather than cluster development along the Marmion Avenue interface, the developer intends to lead development to the east.

The development staging philosophy is that the developer will build the east-west neighbourhood connector between Marmion Avenue and the Eastern Local Centre as part of the first stage development. It is anticipated that the developer will also manage the construction of several elements of the built form early, in order to set the tone and scale of the local centre at the outset.

Development is intended to progress accordingly to the following sequence:

- Contribute to prefunding of Marmion Avenue.
- Construct the east-west neighbourhood connector, proceeding east from Marmion Avenue to the Eastern Local Centre.
- Construct the town square and the perimeter roads to the primary school, including bulk earthworks for the primary school site.
- Prefund the construction of the school oval, and construct the oval and pavilion facility early.
- Establish and landscape the oval and its perimeter, the town square and the north-south green spine.
- Commence landscape revegetation and revitalisation using endemic species in all future public open space areas.
- Commence subdivision stages for residential development to the south-east of the local centre, proceeding in an anti-clockwise direction around the local centre over perhaps five years, concluding development east of the railway line, before commencing west of the railway line.
- Commence subdivision between the railway line and Marmion Avenue.
- Commence establishment of the western local centre at the intersection of Marmion Avenue and the east-west neighbourhood connector.
- Commence subdivision west of Marmion Avenue.

At all stages, ongoing research and development will proceed in partnership with appropriate agencies into the design of the streetscapes, local centres and the pursuit of more sustainable, lightweight and affordable dwelling types for implementation in all parts of the Lots 1001 and 1002 development.

8.16 Sustainability Overview

The United Nation's World Commission on Environment and Development identified sustainable development as:

> *"Development which meets the needs of the present without compromising the ability of future generations to meet their own needs."*

The Local Structure Plan aims to create a thriving, vibrant, sustainable community with a high quality of life, access to services, education, employment opportunities and shops.

Table 13 summarises some of the main sustainable design principles achieved.

These values are further assessed under the Smart Growth Assessment Tool in Section 9.1.3 and will be further developed into a sustainability strategy for Lots 1001 and 1002, with targets and implementation strategies.

TABLE 13 – SUSTAINABILITY OBJECTIVES		
	Structure Plan Aim	Measures
1.	Build a community based upon traditional neighbourhood design principles to meet the health needs of contemporary lifestyles.	• Liveable Neighbourhoods is an implementation tool for the sustainability objectives of the State Planning Strategy. The Structure Plan design embraces the principles of Liveable Neighbourhoods. • The variety in density throughout the structure plan has been implemented in recognition of different demographic needs ranging from single persons living alone or in groups, families, single couples and aged persons. The medium densities provide for smaller dwelling types to suit the real needs of specific demographics. • The Structure Plan provides for a diverse range of affordable housing opportunities suitable across demographic segments.
2.	Maximise alternative transport opportunities to reduce car dependence and environmental impact of cars.	• Pedestrian and cyclist systems are integrated in the Local Structure Plan which provides linkages between residences, open space, community facilities and neighbourhood connectors. • Cycling and walking opportunities are promoted through linear park corridors. The lower order category access roads will form the basis of a safe and attractive pedestrian and cyclist system, with links through open space corridors. • Where possible landuses have been co-located to maximise residents access. • Parks, streets and footpaths will be designed with seating and shading to promote walking. • The road network layout facilitates efficient transportation and reduced car dependency. • Alternative public transport is promoted and residents have good access to the railway. • The northern bus routes will provide extensive coverage between the Brighton Station and Alkimos.
3.	Protect landscape and the environment.	• The landscaping design of public areas will reflect the sites unique characteristics. • Retention of large trees and reinstatement and reinforcement of retained bushland vegetation in open space. Significant vegetation has been identified and retained within open space. • Retain and enhance biodiversity.
4.	Promote water conservation and quality improvement.	• Implementation of an urban water management strategy with flexibility to engage with district and regional level water saving and recycling initiatives. • Water sensitive urban design principles will be implemented as part of the future development to maximise water efficiency. • Water sensitive design principles will include consideration to discharging water into the ground at the high end of the catchments by use of in line soakwells, open bottomed drainage pits and discharge to infiltration type swales / open basins in the public open space areas using current best management practices.

	Structure Plan	Measures
		• Continued support and innovation in the treatment and reuse of water at all levels. • Contribution to prefunding of Marmion Avenue and service infrastructure connections. • Smart community communications infrastructure.
5.	Provide broad economic benefits to the community.	• Commercial and Mixed Use floor space is maximised to assist with employment opportunities and provide the goods and services needed by the community. • There is increased economic viability of local businesses as mixed use opportunities for local business are provided.
6.	Provide Education and promote a 'sense of place'	• To achieve integrated community planning, community spirit and a strong sense of well being. • There is good provision of school facilities within the Structure Plan area integrated with public open space and the village centre. • Attractive open space areas with quality landscaping, cycling / walking facilities, good urban design and gathering places such as the Village Centre all increase community interaction thus decreases social isolation.
7.	Reduce non renewable energy and improve energy efficiency.	• Improve energy efficiency, recycling and use of renewable energy sources at all stages in planning, development and occupancy of the site and buildings.
8.	Corporate Governance	• A commitment by the developer to continuing improvement in sustainability values and implementation of practices among residents and businesses.

SECTION C

Smart Growth Assessment Tool (SGAT)

9.0 SMART GROWTH ASSESSMENT

The City of Wanneroo's Smart Growth Strategy aims at ensuring that the future growth of Wanneroo takes place in a balanced and sustained manner incorporating economic, social and environmental principles.

As part of the Proponent's goal to ensure an integrated approach to sustainability in consultation with key government agencies, discussions were entered into with the City of Wanneroo and Syme Marmion, applying the general Smart Growth Assessment Strategy principles to the initial draft Local Structure Plan – **Appendix 8.**

Since the first assessment, the Local Structure Plan has developed to better locate land uses within the estate to maximise built form efficiencies while also providing a more efficient and sustainable neighbourhood for the existing and future community. Specifically, the Local Structure Plan was revised to increase the lot mix density and improve internal employment generation.

The Smart Growth Strategy and subsequent Assessment tool (SGAT) centres on the following principles:

- Lifestyle & Housing Choice;
- Effective Use of Land & Infrastructure;
- Long Term Health of the Environment;
- Identity, Equity & Inclusiveness;
- Long Term Economic Health; and
- People & Government.

The preparation of the Local Structure Plan has taken into consideration all of the principles of the City of Wanneroo Smart Growth Strategy, resulting in a Structure Plan which reflects range of sustainability, best practice and urban form objectives.

9.1 Results

9.1.1 Lifestyle & Housing Choice

The Housing framework assessment within the SGAT was based on key objectives contained within the City of Wanneroo's Local Housing Strategy, aiming to promote and provide the following:

- A range of lot sizes to cater for different lifestyle choices;
- A range of housing types in appropriate locations to meet current and future market demands; and
- A variety of quality lifestyle options.

At the broad Structure Plan level yield estimates were undertaken and these were inputted into the SGAT. The Housing Framework separates the lot yields into geographic locations as follows:

- Within 800m of a Town Centre (no transport hub);
- Within 400m of Commercial Neighbourhood Centre; and
- Standard

The efficient urban design density and residential housing types proposed within the Structure Plan and specifically around the villages enable a maximum score of **83%** or a **'5 star'** rating to be achieved.

This score is considered outstanding given a high school, two primary schools and 5.5 hectares of District Recreation are located within the site.

9.1.2 Effective Use of Land & Infrastructure

The SGAT assessed the Local Structure Plan against the City of Wanneroo's objectives to support and effectively provide for the following:

- Commercial and residential developments that support community facilities, commercial facilities and public transport systems;
- Optimal use of infrastructure and assets;
- Revitalisation of existing areas to meet changing community needs;
- Development of future infrastructure; and
- Promoting urban design that is responsive to the needs of the community.

Due to the high level of walkability within the proposed design, utilisation of existing facilities within the surrounding community, efficient provision of local roads, cycle paths and pedestrian movement systems, a **'5 star'** rating was achieved in this category.

9.1.3 Long Term Health of the Environment

In reflecting the State Sustainability Strategy and the City's own Local Environmental Strategy, the SGAT assesses the following areas:

- Conserving and enhancing local biodiversity;
- Encouraging community participation in local bush care efforts;
- Promoting more efficient use of water, energy and other resources;
- Encouraging sustainable waste management options and improving resource recovery;
- Promoting a variety of alternative transport choices to reduce energy consumption; and
- Developing integrated water management strategies to increase water efficiency.

The Local Structure Plan proposes a number of design and development initiatives which, when implemented, will ensure that the development of Lots 1001 and 1002 is at the forefront of sustainable and environmentally sensitive urban design. A **'4 star'** rating was achieved in this category.

9.1.4 Identity, Equity and Inclusiveness

The City of Wanneroo's Community Development Strategy is reflected with the SGAT.

The CEDP identifies the requirements of 'Identity, Equity and Inclusiveness', detailing existing community facilities and amenities which already exist and offering opportunities for expansion, enhancement or simple recognition. The CEDP also addresses the following specific SGAT requirements:

- Social and cultural diversity;
- Social cohesiveness and civic participation;
- Encouraging interconnectedness between neighbourhoods;
- Promoting distinctive and attractive communities;
- Promoting community safety;
- Encouraging and supporting equity for all community members;
- Promoting the appreciation and conservation of heritage sites; and

- Promoting the provision of community facilities and services that meet the needs of the community.

Due to the efficient response to each of these SGAT requirements within the CEDP, a **'5 star'** rating has been achieved on this category.

9.1.5 Long Term Economic Health

Within the SGAT category of 'Long Term Economic Health', two key objectives are evident: the development of local employment opportunities; and the long term health of the local economy.

These objectives are drawn from the City's Economic Development Strategy.

Within the Local Structure Plan area, local employment targets have been substantially satisfied through the development of the following land uses:

- 2 Local Centres with 2,600m^2 NLA and 1,500m^2 NLA respectively;
- Industrial use approximately 20 ,000m^2 NLA;
- Educational Facilities – High School, and two Primary Schools;
- Health (Medical Centre) and Community Service Facilities (Day Care);
- Non Retail Office/Mixed Use areas.

In addition to these uses, housing types will be developed throughout the estate which allow for home business opportunities either in the primary residence or in rear garage-top studio apartments. This category represents up to 10% of the local job needs.

A key deficiency of the SGAT is the inability to include external employment opportunities within overall employment calculations. The Local Structure Plan local employment figures would be significantly bolstered if the Alkimos Regional centre, which abuts the northern boundary of Lots 1001 and 1002, was included. This Centre with over 65,000m^2 NLA Retail together with 100 ha of Industrial land has the potential to generate 10,000 new jobs. This will greatly benefit the future Lots 1001 and 1002 community providing easily accessible employment opportunities.

The development of Lots 1001 and 1002 will complement the plans for the adjacent Alkimos Regional Centre and Brighton District Centre. The local centres and mixed uses within Lots 1001 and 1002 have the capacity to thrive in line with the City's Employment Policy.

Under the Smart Growth Assessment Tool, Lots 1001 and 1002 provides an estimated 1140 jobs, being more than 86% of the target employment rate at approximately 34% locally provided.

9.1.6 People and Government

Within the SGAT, emphasis is placed on building relationships between the proponent and the City of Wanneroo. Within the Local Structure Plan it is proposed to ensure 'inclusive decision making' occurs with local government, establishment of one key contact point at the City of Wanneroo to maximise communication efficiencies and the establishment of a similar contact at the Department for Planning and Infrastructure to ensure a cohesive and transparent process.

Due to the developers commitment to the future of the region and development of these partnerships with both State and Local Government, a total of **'5 stars'** was achieved for this category.

9.1.7 Summary

The Smart Growth Assessment has been undertaken as a requirement of the City of Wanneroo's Structure Planning process.

Although some deficiencies in the SGAT were evident during the application of the Assessment (these will be outlined to the City of Wanneroo in a separate forum), an overall Smart Growth Score of **83%** was achieved resulting in a **'5 star'** rating for the Local Structure Plan.

The SGAT results are summarised in **Table 14** and **15.**

SMART GROWTH ASSESSMENT TOOL - SUMMARY SCORECARD		
Smart Growth Assessment	**% Achieved**	**Smart Growth Star Rating**
Overall Smart Growth Score	**83%**	
Overall Smart Growth Star Rating		
Lifestyle and Housing Choice	89.2%	5
Effective Use of Land and Infrastructure	89.4%	5
Long Term Health of the Environment	78.5%	4
Identity, Equity and Inclusiveness	86.6%	5
Long Term Economic Health	64.5%	
People and Government	87.6%	5

Table 14 – SGAT Summary Score Card

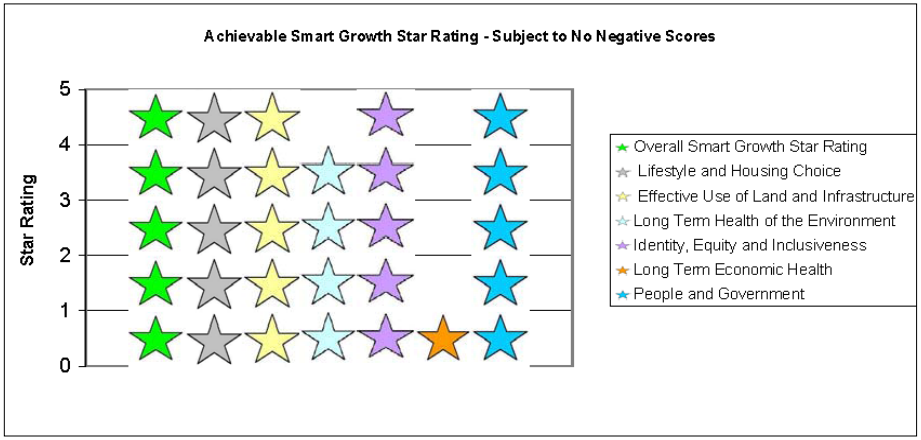


Table 15 – SGAT Star Rating

SECTION D

Implementation

10.0 IMPLEMENTATION

The statutory element of the Structure Plan will be given force and effect through the provisions of Part 9 of the City of Wanneroo Town Planning Scheme No 9.

The Local Structure Plan is comprehensive and provides a mechanism to guide future development and subdivision. The matters addressed in the Local Structure Plan include;

- Assignment of density codes;
- Local road network including access points to major roads;
- Allocation of street types and location of on street parking;
- Location and function of local open space, including the full provision of the 10% requirement over the local structure plan area;
- Identification of areas of vegetation to be preserved;
- Preliminary information on the disposal of drainage;
- Pedestrian network;
- Location and interface of schools;
- Location and function of local centres and villages.

The Local Structure Plan is similar to a zoning plan as it effectively guides residential densities, commercial development and nominates the location of community, schools uses and open space.

10.1 Draft Design Guidelines

The built form vision for Alkimos will be developed by following a well considered methodology in which the essence of the region and existing community is extracted and embedded into the design of the town to create a wonderful sense of place, purpose, community and integrity. These overriding principles will govern the formation of subsequent design guidelines.

- **A sense of place**: Maintain and extend the character of Alkimos and its coastal village atmosphere throughout the new precinct. Define and consistently use an identifiable local architecture to connect the different built forms within the development.
- **A sense of purpose**: A place in which people celebrate a coastal village lifestyle, where the streets are walkable and residents interact and develop social networks.
- **A sense of community**: Streetscapes that provide opportunities for people to interact from their front porches, in the street and about structures and public spaces.
- **A sense of integrity**: A development which reads as an extension of the community, inspired by successful local precedent and aiming to be permanent and timeless.

A long history of developments have demonstrated that specific New Urban principles, summarised below, will assist in creating a community that meets these objectives.

- **Provision of Parking**: By moving car garaging from the front of the house to garaging serviced by rear laneways, the front of the house can be given over entirely to the pedestrian, making for attractive and community focused streetscapes. Where this is not feasible, garages should be set back further than the façade of the house and the width of the crossover limited to prevent garages and vehicles dominating the streetscape.
- **Front Porches**: Porches provide a transition zone between private & public spaces and promote interaction within the community. It provides the passer-by with a glimpse of the private lives of the residents and to the resident; it provides selective engagement with the public realm.

- **Housing Diversity**: Two story housing will be encouraged as it not only increases density and land efficiency but it also generates a pleasing scale and variety in streetscapes. Individual houses, Townhouses, Maisonettes and Apartments will be considered as ways of achieving sustainable communities that cater for a range of lifestyle choices and incomes.
- **Density Transect**: Greater densities shall be provided in areas of greater amenity. Precinct centres shall be the focus of higher density living to support commercial and retail developments. Moving out along a typical transect, densities of housing should scale back.

In order to translate these principles into specific Design Guidelines for Alkimos, the unique local environment has to be studied to explore both the physical and social dynamics that make Alkimos unique.

The development of the built form vision for Alkimos will be characterised by:

- **Local Vernacular Architectural Typologies**: Built form that characterises the relaxed coastal lifestyle of the local area. The scale and proportion of beach cottages and village houses in the local area will inform the new built form typologies.
- **Variation in Lot typologies**: Lot sizes and arrangements dictate what housing types are developed and subsequently the sense of scale, proportion and density of a community.
- **Local Histories and Character**: It is important to identify and reinforce local histories and celebrate the unique character of each place in the planning and design of future developments.
- **The Local Community**: Particular places hold significant value for local residents. Day-to-day rituals and activities need to be preserved and reinforced in new developments.
- **Native Flora and Fauna**: Plants that are native to the local area will be used to create appropriate, water-efficient landscaping.
- **Limited Palette of Materials and Colours**: These will be selected from the local natural environment and appropriate built form precedent which characterises the area. An authentic regional response to colour and materials helps to characterise the local community. Materials and colour palettes are developed specifically for the separate categories of Walls, Openings, Roofs & Attachments of residential dwellings.
- **Rhythm and Regulating Lines:** Rhythms in the streetscape, such as consistency in ridgelines, eaves heights, opening proportions and front fences all help in creating a sense of balance and harmony through visual regulation.
- **Courtyards and Private Outdoor Spaces:** Design guidelines will ensure that each dwelling has a private outdoor space that relates to the location of living areas and is orientated to permit winter sun penetration into these areas for passive solar design.
- **Environmental Design:** To make Alkimos environmentally sustainable as well as socially sustainable, environmental technologies and design fundamentals will be included in the design guidelines. Simple attachments such as window awnings, solar pergolas, external sun-screens and rainwater storage tanks all have an affect in reducing energy use within a home.

Significant impacts are also able to be made in the design stages by orientating living areas to the North, arranging living spaces to create breezeways and achieve cross-ventilation, designing for rainwater storage tanks and using lighter coloured roofing colours that don't absorb heat energy from the sun. These issues will be addressed in more detail in the Design Guidelines.

10.2 Detailed Area Plans

The LSP provides the broad framework however it is proposed that design guidelines and variations to the Residential Design Codes will be incorporated into future Detailed Area Plans (DAPS) for all areas zoned Centre, Mixed Use and for the residential areas coded at a density for R30 and above.

The DAPS will provide the next crucial level of planning detail and will address the City of Wanneroo Policies and definitive design criteria.

The City of Wanneroo can consider DAPS without the need for advertising prior to a subdivision application being approved in the DAP area. The DAP will be used as an assessment tool by the City of Wanneroo in its consideration of any subdivision application.

In addition to the built form vision, other matters to be addressed where relevant and applicable to each DAP include the following;

- Allocation of on street parking;
- Pedestrian network (footpaths and dual use paths);
- Setbacks and variations proposed to the Residential Design Codes;
- Detail of any interface with schools, open space or commercial uses.

REFERENCES

Alkimos-Eglinton District Structure Plan

Bush Forever	The Government of Western Australia, (2000).
Butler Charrette	Department for Planning and Infrastructure, (2001)
Butler Jindalee District Structure Plan	Prepared by Chappell & Lambert Town Planners, (2003).
City of Wanneroo District Planning Scheme No 2	City of Wanneroo, (2006).
Community Development Strategy	City of Wanneroo, (2005).
Economic Development Strategy & Employment Strategy	City of Wanneroo, (2004).
Extension of Northern Suburbs Railway	GHD for Department for Planning and Infrastructure, (2003).
Local Centres Strategy	City of Wanneroo, (2005).
Local Housing Strategy	City of Wanneroo, (2005).
Liveable Neighbourhoods	Western Australian Planning Commission Department for Planning and Infrastructure, (1997)
MetroPlan	Department for Planning and Infrastructure, (1990)
Metropolitan Centres Policy	Western Australian Planning Commission, (2000).
Network City – Perths Planning Strategy 2004-2030	Department for Planning and Infrastructure, (2004)
North West Corridor Structure Plan	Department for Planning and Infrastructure, (1992)
Smart Growth Strategy & Assessment Tool	City of Wanneroo, (2005)
Statement of Planning Policy: Road and Rail Transport Noise	Western Australian Planning Commission, (2005).
The Jindalee Enquiry by Design Workshop	Department for Planning and Infrastructure, (1996)
Transit Oriented Development	Western Australian Planning Commission, (2006).