

PART TWO EXPLANATORY SECTION

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1.0 INTRODUCTION

The North Alkimos Local Structure Plan (the LSP) and accompanying report have been prepared to guide the subdivision and development of approximately 241 ha of undeveloped land in Alkimos in accordance with the requirements of the City of Wanneroo District Planning Scheme No. 2.

The LSP has been formulated on behalf of Peet Alkimos Pty Ltd by Taylor Burrell Barnett in collaboration with a team of specialist consultants, who have provided inputs in relation to a range of matters as follows:

Peet Limited	Property Consultants
MP Rogers & Associates	Coastal Processes
ENV Australia	Environment
TABEC	Engineering
Bruce Aulabaugh	Transport
Arid	Sustainability
Sharni Howe Architects	Architect and Urban Designer
Overman Zuideveld	Built Form Architect
Taylor Robinson	Retail Architect
Creating Communities	Community
MacroPlan	Economy
EPCAD	Landscape
Whelans	Surveyor

The LSP has been developed in consultation with adjoining landowners within the Alkimos Eglinton District Structure Plan, and the consultants responsible for the preparation of the District Structure Plan.

The LSP is supported by a range of technical reports including traffic, servicing and environmental studies.

1.1 PURPOSE












A Structure Plan is a forward-planning document which provides an overarching framework to guide the development of land for urban purposes. It provides for the coordinated and integrated provision of land uses and infrastructure, and is a precursor to more detailed planning phases such as subdivision.

This Structure Plan has been prepared in accordance with the provisions of Part 9 of the City of Wanneroo District Planning Scheme No. 2 (DPS2) as required by clause 3.14.3 of DPS2.

The Structure Plan has been submitted for endorsement by both the City of Wanneroo and the Western Australian Planning Commission.

1.2 PROJECT OBJECTIVES

A pre-design workshop was held in early 2008 at which time the project team received a detailed analysis of the site and its context, and where a range of potential design/planning outcomes were discussed. One of the outcomes of this workshop was the establishment of some core project outcomes to, along with the DSP, inform design principles moving forward:

-  Unique identity which differentiates Alkimos substantially from neighbouring developments;
-  Diversity of lot product offering buyer choices;
-  Connectivity and legibility from the Coastal Village Precinct to centre and east;
-  Leverage coastal location and provide strong relationship to ocean;
-  An activity hub with energy and life;
-  Provide a destination point and recreation facilities;
-  Early development of high density to establish character;
-  Legibility across Marmion Avenue, so not separated from western precincts;
-  Connectivity to the coast and Coastal Village facilities;
-  Provide a product offering 'affordable' product; and
-  Utilise the railway line to build a transit-oriented hub.

The project objectives have been developed via the DSP to ensure that the DSP's guiding principles flow through to subsequent layers of the planning and development process (including Local Structure Plans) and are effectively implemented. These are further outlined in **Table 1**.

2.0 SITE OVERVIEW

2.1 SITE DESCRIPTION

This Structure Plan relates to approximately 241 ha of undeveloped land in Alkimos. It may be legally described as follows:

TABLE 1: LAND DETAILS

Lot	Description	Vol/Folio	Registered Proprietor	Area
1005	Marmion Avenue, Alkimos	Volume 2700/Folio 294	Peet Alkimos Pty Ltd	63.4979 ha
1006	Marmion Avenue, Alkimos	Volume 2700/Folio 295	Peet Alkimos Pty Ltd	177.7366 ha
Total Land Area				241.2345 ha

2.2 LOCATION

The subject land is located approximately 43 km north of the Perth Central Business District. It is situated within the City of Wanneroo. The closest existing regional centre is Joondalup, which is situated 18 km to the south, refer **Figure 1**.

An unconstructed road reserve exists to Wanneroo Road. Marmion Avenue runs through the property on a north-south alignment and has recently been opened to the public. The land will ultimately be further connected north-south by the extension of the northern metropolitan railway line from Clarkson and the extended Mitchell Freeway.

Figure 2 provides an outline of the various parcels of land and associated landownership details surrounding the subject land.



LOCATION PLAN

NORTH ALKIMOS LOCAL STRUCTURE PLAN | LOTS 1005 & 1006 MARMION AVENUE, ALKIMOS

TAYLOR BURRELL BARNETT | TABEC | EPCAD
 SHARNI HOWE | CREATING COMMUNITIES
 MACROPLAN | MP ROGERS & ASSOCIATES
 SUSTAINABLE SOLUTIONS | WHELANS | ENV
 OVERMAN ZUIDVELD | TAYLOR ROBINSON

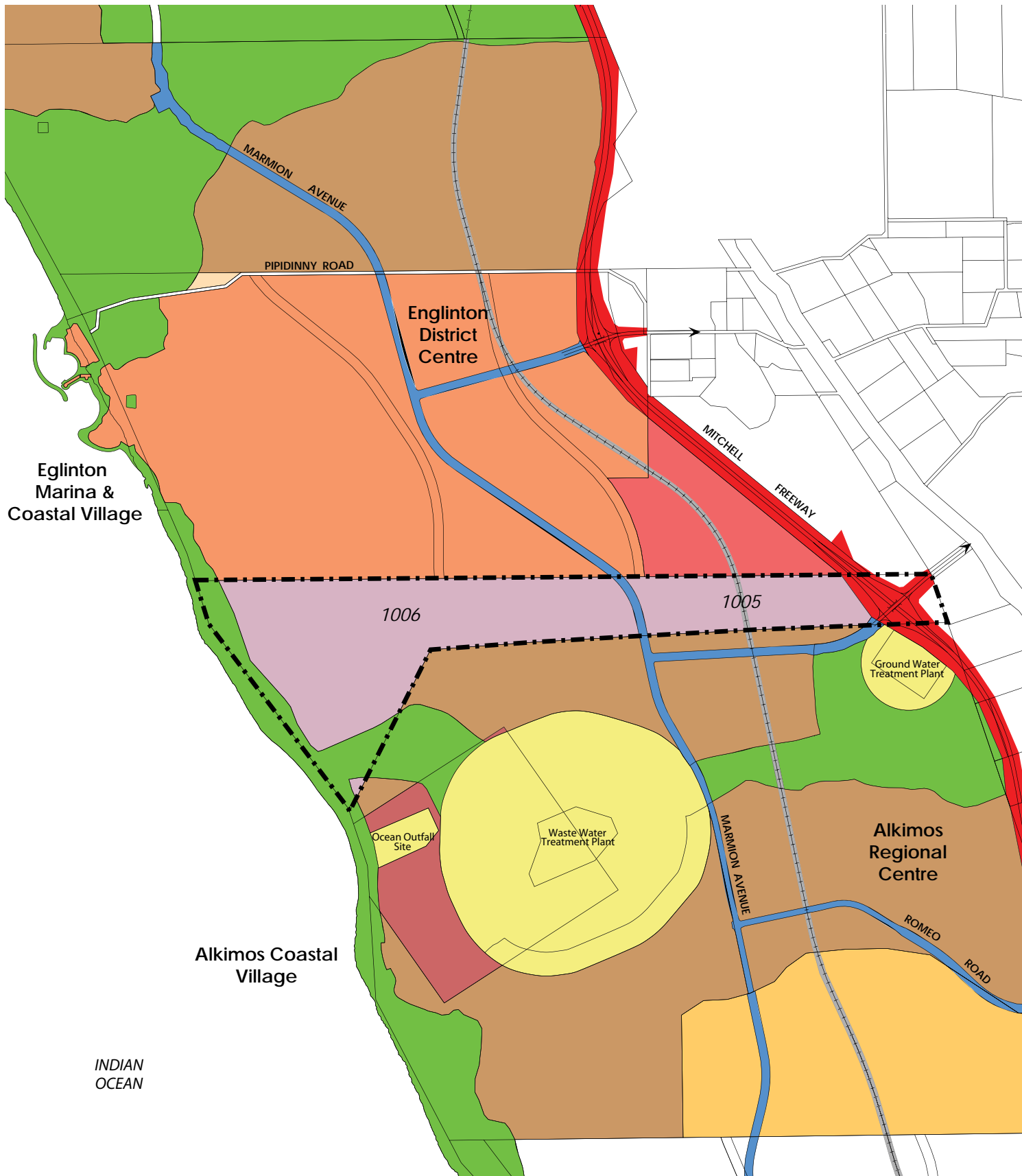
FIGURE 01

PEET

0km 2km 4km



PLAN - 07/085
 DATE - MAY 2009



LEGEND

LAND OWNERSHIP

- Landcorp
- Water Corporation
- Peet Alkimos Pty Limited
- WAPC

- Englinton Estates
- Northern Corridor Developments
- Spiers

ZONES

- Regional Open Space
- Railway
- Primary Regional Road
- Other Regional Road

OTHER

- Subject Land

LAND OWNERSHIP

NORTH ALKIMOS LOCAL STRUCTURE PLAN | LOTS 1005 & 1006 MARMION AVENUE, ALKIMOS

TAYLOR BURRELL BARNETT | TABEC | EPCAD
 SHARNI HOWE | CREATING COMMUNITIES
 MACROPLAN | MP ROGERS & ASSOCIATES
 SUSTAINABLE SOLUTIONS | WHELANS | ENV
 OVERMAN ZUIDVELD | TAYLOR ROBINSON

FIGURE 02
PEET

0m 300m 600m



PLAN - 07/055
 DATE - MAY 2009

3.0 PLANNING CONTEXT

3.1 LOCATIONAL CONTEXT

3.1.1 REGIONAL CONTEXT

The subject land is situated in the north-west corridor of the Perth Metropolitan Region, refer **Figure 1**.

The closest regional centre to the site is Joondalup, which is situated some 18 km to the south.

Over time however, Joondalup will be superseded by the Alkimos Regional Centre. The Alkimos Regional Centre is designated approximately 1 km to the south and the St Andrew's city centre located approximately 10 km north of the Structure Plan area. Both of these centres will provide regional-level employment, retail, recreation and other opportunities. Other regional recreation opportunities will be provided by the adjacent coastline and nearby Yanchep and Neerabup National Parks.

The Structure Plan area will be well serviced by regional-level transport infrastructure including extensions to the Mitchell Freeway, Marmion Avenue, Wanneroo Road (via an unconstructed road) and the proposed rail network.

3.1.2 DISTRICT AND LOCAL CONTEXT

The closest urban development to the subject land is Butler, situated some 5 km to the south.

Until the centres of the Structure Plan area mature, district-level shopping and other services would be most likely met in existing suburbs to the south.

Ultimately, Eglinton District Centre (approximately 1.2 km north) will be the primary district level node.

At full development district-level transport infrastructure will include Alkimos Drive, which will link the future Alkimos North Coastal Village in the west to the Mitchell Freeway in the east. A secondary transit route (mode to be determined) is also proposed along the western edge of the subject land, linking the coastal centres of the area.

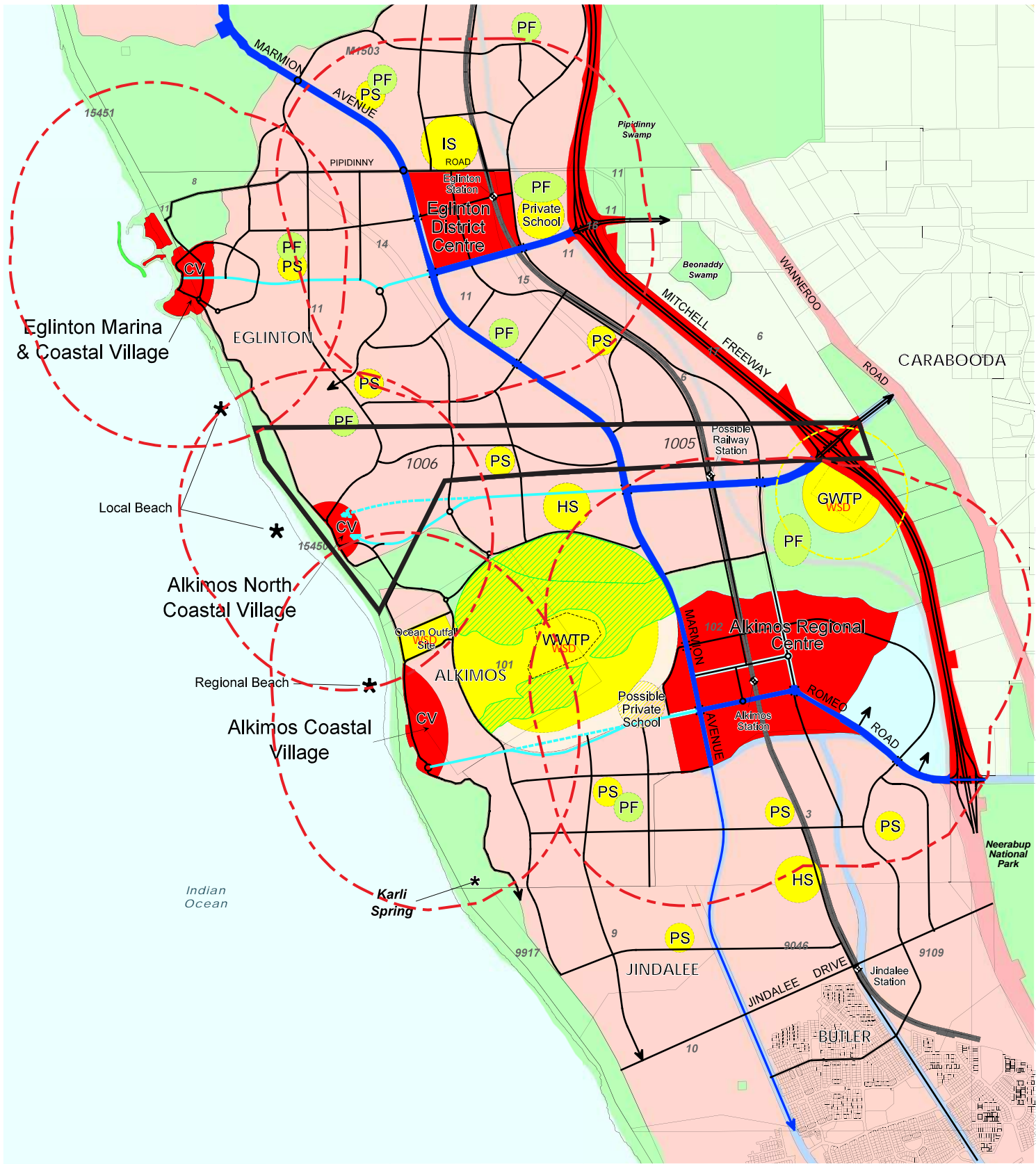
Figure 3 provides an indication of the subject land's district and local context.

3.1.3 LAND USE CONTEXT

The subject land is currently bounded on all sides by undeveloped land. However, the Metropolitan Region Scheme designates the majority of adjoining land as urban, reflecting the strategic and statutory planning framework of the area as outlined in sections 3.2 and 3.4 of this report.

Exceptions to an urban land use pattern in the locality include a groundwater treatment plant to the south-east of the Structure Plan area. The buffer of this treatment plant impacts on the south-eastern corner of the Structure Plan area and residential uses are not permitted within the affected portion of land, though it has been identified for service commercial development in the prevailing planning framework outlined further in this report.

Furthermore, a Parks and Recreation Reserve linkage is proposed taking in a wastewater treatment plant to the south of the subject land at Jindalee and extending across the south-west corner of the Structure Plan area.



LEGEND

- | | | | |
|--------------------------------------|----------------------------------|----------------------------|----------------------------------------------|
| Parks And Recreation | Urban | Train Stations | Neighbourhood Connector |
| Waterways | Urban Deferred | Railway | Ground Water Treatment Plant 500m Buffer |
| Conservation | Central City Area | Primary Regional Roads | Local Open Space (Linkages to be determined) |
| Public Purposes | Rural | Other Regional Roads | 1km Radius |
| Community Facilities | Coastal Village Activity Centres | Integrator Arterial B | Subject Land |
| Regional & District Activity Centres | | Alternative Road Alignment | |

DISTRICT CONTEXT PLAN

NORTH ALKIMOS LOCAL STRUCTURE PLAN | LOTS 1005 & 1006 MARMION AVENUE, ALKIMOS

TAYLOR BURRELL BARNETT | TABEC | EPCAD SHARNI HOWE | CREATING COMMUNITIES MACROPLAN | MP ROGERS & ASSOCIATES SUSTAINABLE SOLUTIONS | WHELANS | ENV OVERMAN ZUIDVELD | TAYLOR ROBINSON

FIGURE **03** PEET





0m 300m 600m PLAN - 07/055 DATE - MAY 2009

The western portion of the site also forms part of a wider coastal reserve, the usage of which in the Structure Plan area is associated with recreation and access.

3.1.4 ADJACENT LOCAL STRUCTURE PLANS

The DSP comprises a number of landholdings and landowners. As part of the LSP preparation process the team of consultants have engaged with the adjoining landowners and their team of consultants in relation to the expectations of the DSP, and their individual LSP intentions.

The following elements have formed the basis of these discussions:

-  Primary school and shared oval distribution;
-  An appropriate route for the secondary public transport route;
-  North-south road connection points; and
-  Boundary interface/edges.

3.2 STATUTORY PLANNING CONTEXT

3.2.1 METROPOLITAN REGION SCHEME

The land is predominantly zoned Urban under the Metropolitan Region Scheme (MRS), which is reflected in the MRS extract at **Figure 4**.

Under the MRS, the western-most portion of the land, along with its south-western corner, is reserved as Parks and Recreation.

A regional road reserve, being Marmion Avenue, runs centrally through the property in a north-south direction.

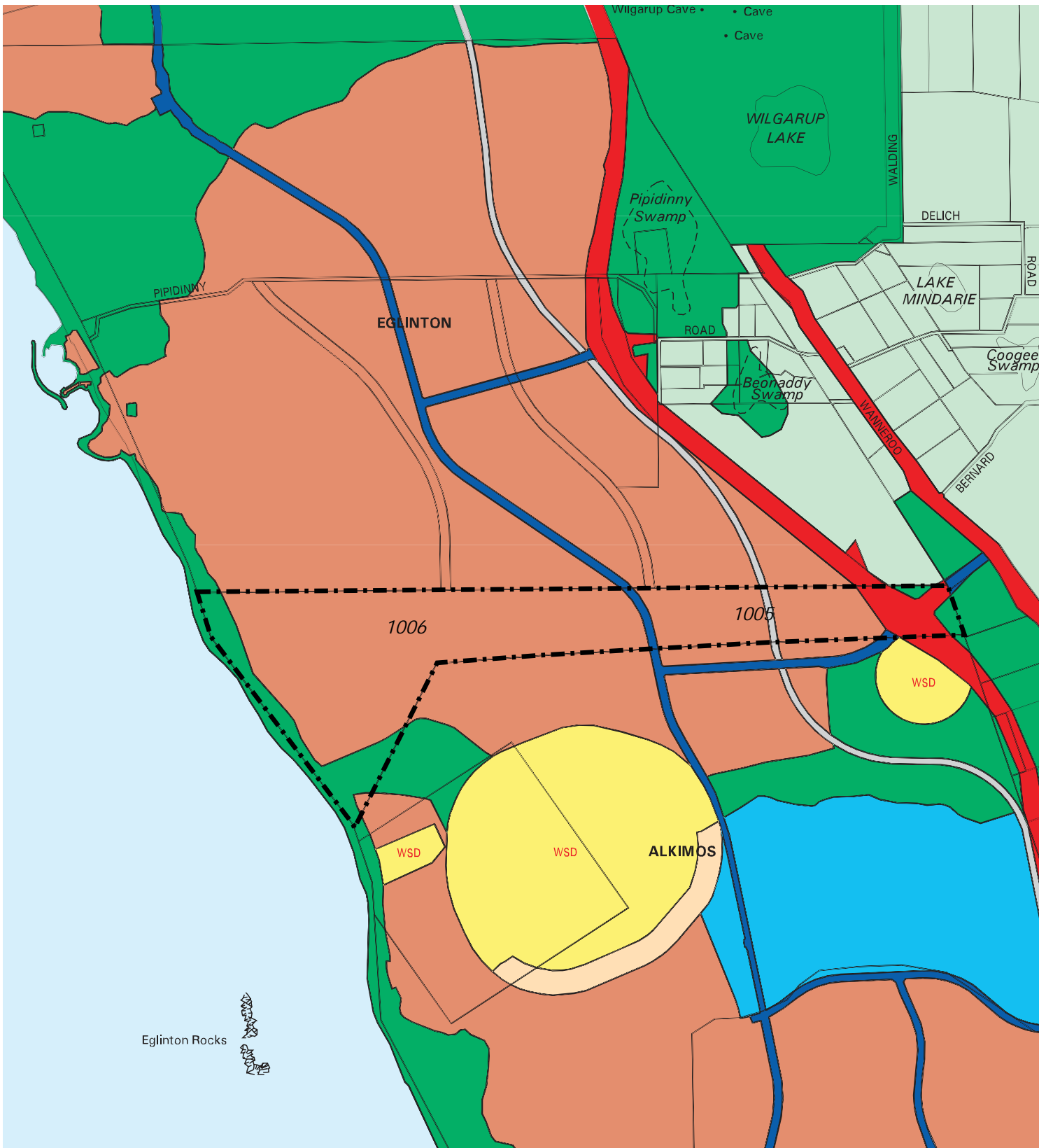
Towards the eastern end of the property there is provision for a railway extension and Primary Regional Roads reserve for the extension of the northern suburbs railway system and Mitchell Freeway.

The most eastern portion of the land adjacent to the Freeway Reserve is reserved for Parks and Recreation.

The current zoning of the land under the MRS was put in place via Amendment No. 1029/33 (to the MRS), which was gazetted in 2006. Prior to gazettal the Amendment received approval from the Minister for the Environment and was assessed by the Environmental Protection Authority. The areas identified by the Authority as having environmental significance have been reserved in the Metropolitan Region Scheme as Parks and Recreation Reserve.

As the detailed planning for the locality occurs, including the preparation of environmental management plans and a closer consideration of road and rail requirements, it may be necessary to undertake limited amendments to the MRS in order to reflect minor changes to reserve boundaries.

The current alignment of the rail line through the subject land per the MRS differs from that shown in the DSP. This anomaly will need to be addressed via an amendment to the MRS (currently with the Department for Planning and Infrastructure) to bring it into line with the DSP. Due to the proposed staging pattern for the development (refer section 14.5) this is a process that could occur simultaneous with the construction of earlier stages.



LEGEND

RESERVED LANDS

- Parks and Recreation
- Railways
- Waterways
- Primary Regional Roads
- Other Regional Roads
- Public Purposes
- WSD Water Authority Of WA

ZONES

- Urban
- Urban Deferred
- Central City Area
- Rural

OTHER

- Subject Land

EXTRACT OF METROPOLITAN REGION SCHEME

NORTH ALKIMOS LOCAL STRUCTURE PLAN | LOTS 1005 & 1006 MARMION AVENUE, ALKIMOS

TAYLOR BURRELL BARNETT | TABEC | EPCAD
 SHARNI HOWE | CREATING COMMUNITIES
 MACROPLAN | MP ROGERS & ASSOCIATES
 SUSTAINABLE SOLUTIONS | WHELANS | ENV
 OVERMAN ZUIDEVELD | TAYLOR ROBINSON

FIGURE 04
PEET



PLAN - 07/055
 DATE - MAY 2009

3.2.2 CITY OF WANNEROO DISTRICT PLANNING SCHEME NO. 2

Under the City of Wanneroo District Planning Scheme No. 2 (DPS2) the land is predominantly zoned Urban Development with a small portion along the eastern and western borders reserved for Parks and Recreation (reflecting the MRS), refer **Figure 5**. DPS2 also reflects the regional road and railway reservations of the MRS.

Under Part 9 of the Scheme, DPS2 requires a Local Structure Plan to be in place prior to the subdivision and development of land zoned Urban Development. This Structure Plan and report have been prepared in a manner that reflects this requirement, including the matters to be addressed in structure plans as identified at clause 9.3 of DPS2.

As with the MRS, DPS2 may need to be amended to reflect minor alterations to transport and/or PARKS AND RECREATION Reserve boundaries identified in detailed design/assessment phases of the DSP and/or LSP processes.

3.3 STATUTORY ENVIRONMENTAL CONTEXT

3.3.1 ENVIRONMENTAL APPROVALS

The zoning of the land that underpins the Alkimos Eglinton District Structure Plan has been subject to a formal environmental assessment.

MRS Amendment 1029/33 was referred to the Environmental Protection Authority ('EPA') and an environmental review was prepared (Bulletin 1207) in response.

Following the gazettal of MRS Amendment 1029/33, the areas of environmental significance identified by the EPA as part of its Bulletin were reserved for Parks and Recreation and Public Purposes (part of the Public Purposes reserve associated with the development of a wastewater treatment plant has been identified for conservation, landscape and complementary purposes).

The total area reserved for conservation purposes occupies approximately 500 ha, or 20% of the Alkimos Eglinton area.

The Minister for the Environment set environmental management conditions (Minister's Statement 722), which must be met for these areas as follows:

Prior to approving subdivision or development applications (whichever is sooner) for infrastructure proposals, the Western Australian Planning Commission or Local Government, as the case requires, may require an Environmental Management Plan to be prepared and implemented to achieve the objective of managing the potential impacts of the proposed subdivision development or infrastructure on the following:

- Land reserved as Parks and Recreation Reserve; and
- Bushland or land that may be part of an ecological linkage.

The environmental management plans shall include:

1. *A description of existing environmental values and the identification of the environmental outcome to be achieved through the implementation of the EMP;*
2. *Clear delineation of boundaries or significant areas to be protected;*



LEGEND

METROPOLITAN REGION SCHEME

- Parks and Recreation
- Railways
- Waterways
- Primary Regional Roads
- Other Regional Roads
- Public Purposes
- WSD Water Authority Of WA

ZONES

- Urban Development
- Centre
- General Rural
- Rural Resource

OTHER

- AL Additional Uses
- Scheme Boundary
- Local Government Authority
- Locality Boundary
- Subject Land







3. *Management of construction, access and rehabilitation;*
4. *Vegetation mitigation strategies;*
5. *Allocation of responsibilities and identification of timing and duration of implementation;*
6. *Provision for routine monitoring and environmental values; and*
7. *Provision of details of contingency plans in the event that the monitoring surveys indicate that the development is having or has had an adverse impact on environmental values.*

The DSP has been through formal environmental consideration and carried forward these conditions of Ministerial Statement 722 to the LSP stage.

3.3.2 ENVIRONMENTAL MANAGEMENT PLANS

As per Ministerial Statement 722, a number of environmental management plans (EMPs) are required to be undertaken for the land as detailed below.

The following broad principles have been established by the DSP to guide the management of the Alkimos Eglinton Parks and Recreation Reserve and are also relevant to the proposed management of the POS containing native vegetation as described by the Environmental Management Plan:

-  Provide adequate and appropriate public access to Parks and Recreation Reserve for sustainable passive recreation and protect the values of the Parks and Recreation Reserve from uncontrolled pedestrian access by providing shared pathways that connect to the shared pathway network in the adjacent areas.
-  Erect appropriate fencing to discourage uncontrolled access.
-  Provide beach access paths to guide and facilitate pedestrian transit and prevent dune degradation from uncontrolled access.
-  Create a clear boundary between the Parks and Recreation Reserve and private land to minimise disturbance to the ecological values.
-  The interface of the urban development and the Parks and Recreation Reserve is to be physically separated by a road, by a shared path or by POS.
-  Protect the linkage values and biodiversity values of the Parks and Recreation Reserve.

The EMP will also prescribe construction stage environmental management responses, including the identification and relocation of fauna species at the point of clearing. The EMP is being developed in a form articulating principles and objectives at the LSP stage and will be developed in detail at subdivision stage and in accordance with Department of Environment and Conservation and City of Wanneroo requirements.

3.3.2.1 NORTH-SOUTH COASTAL ROAD

A north-south coastal road passes through the southern Parks and Recreation Reserve corridor on the subject land. The location of significant vegetation and topography has been taken into consideration in determining the alignment of this road in the DSP. A specific EMP will be required for this aspect at subdivision stage. Issues to be addressed in the EMP for the proposed coastal road include:

- 🖼️ revegetation using only endemic plant species; and
- 🖼️ fauna crossing points (such as appropriately-designed culverts) under the coastal road will be provided to allow the movement of ground-dwelling species between the coastal and east-west corridor Parks and Recreation Reserve.

3.3.2.2 COASTAL FORESHORE RESERVE

The subject land comprises 1.7 km of coastline reserved as Parks and Recreation in the MRS.

The purpose of the foreshore reserve is to provide a setback for physical coastal processes, protection of ecological values, landscape, visual amenity, indigenous and cultural heritage, public access, recreation, and safety. The foreshore reserve area is approximately 250 m wide with the portion located in the subject land ranging from approximately 50 to 200 m wide along the western edge of the site. A specific EMP (i.e. a Foreshore Management Plan) will be developed for the foreshore reserve at subdivision stage, with a relevant condition on subdivision approval anticipated.

3.3.3 SUMMARY OF ENVIRONMENTAL CONDITION RESPONSES

The various environmental matters and the relevant conditions imposed by the Minister have been outlined below in **Table 3**, along with an indication of their status.

TABLE 2: RESPONSE TO MINISTERIAL ENVIRONMENTAL CONDITIONS (FOR LAND IDENTIFIED AS PARKS AND RECREATION RESERVE OR AN IMPORTANT ECOLOGICAL LINKAGE)			
Item	Environmental Issue to be Addressed in EMP	Environmental Condition	Status
1	Identification of values and outcomes	A description of existing environmental values, and the identification of the environmental outcomes to be achieved through the implementation of the EMP.	Values in terms of vegetation communities and condition, coastal dune land form described in LSP. Objectives to retain values and environmental outcomes will be further detailed in the EMPs.
2	Areas of significance	Clear delineation of boundaries or significant areas to be protected.	The Parks and Recreation Reserve areas are delineated by the DSP. Other areas of environmental significance (Suspected Threatened Ecological Communities) are to be retained in POS (subject to confirmation by the DEC).
3	Management	Management of construction, access and rehabilitation.	The coastal road and development interface with Parks and Recreation Reserve will be covered in the EMPs to be developed prior to the appropriate stage of subdivision/ development in accordance with DEC and Local Government requirements.

**TABLE 2: RESPONSE TO MINISTERIAL ENVIRONMENTAL CONDITIONS
(FOR LAND IDENTIFIED AS PARKS AND RECREATION RESERVE OR AN IMPORTANT ECOLOGICAL LINKAGE)**

Item	Environmental Issue to be Addressed in EMP	Environmental Condition	Status
4	Vegetation	Vegetation mitigation strategies.	To be detailed in the EMPs to be developed prior to subdivision/ development in accordance with DEC and Local Government requirements.
5	Implementation	Allocation of responsibilities and identification of timing and duration of implementation.	To be detailed in the EMPs to be developed prior to subdivision/ development in accordance with DEC and Local Government requirements.
6	Monitoring	Provision for routine monitoring and environmental values.	To be detailed in the EMPs to be developed prior to subdivision/ development in accordance with DEC and Local Government requirements.
7	Contingency	Provision of details of contingency plans in the event that the monitoring surveys indicate that the development is having or has had an adverse impact on environmental values.	To be detailed in the EMPs to be developed prior to subdivision/ development in accordance with DEC and Local Government requirements.

3.4 STRATEGIC PLANNING CONTEXT

3.4.1 ALKIMOS EGLINTON DISTRICT STRUCTURE PLAN



A District Structure Plan (DSP) is a strategic forward planning document that is endorsed by both the Local Government (in this case the City of Wanneroo) and the Western Australian Planning Commission to guide the more detailed planning of a given geographic area (in this case the localities of Alkimos and Eglinton). DSPs identify a broad structure for district level infrastructure including major road and transport networks, schools, centres and major open space.

DSPs provide guidance as to broad land use distributions, including residential densities, to be implemented by way of local structure planning and subdivision.



They also provide guidance as to the range of more detailed reporting requirements to be prepared as planning for individual landholdings progresses within the DSP, including proponent contributions agreements and EMPs.

In July 2008 the City of Wanneroo adopted the DSP for the Alkimos Eglinton area subject to modifications. The Western Australian Planning Commission adoption is anticipated in early 2009.

The modifications to the DSP sought by the City of Wanneroo and considered to impact on the Structure Plan for the subject land are as follows:

-  All land east of the Freeway, incorporating a Bush Forever site, is to be excluded from the DSP.
-  Opportunities for mixed business and transit-supportive uses are proposed to be identified around the proposed future railway station identified indicatively 50-100 m south of the subject land.

North Alkimos Local Structure Plan

-  The land located between the rail line and the Freeway is proposed to be designated Service Commercial in order to achieve employment self-sufficiency targets set by the DSP. *Note: It is considered however, that sufficient flexibility has been built into the DSP and its supporting reports to provide for potential alternatives to achieve the necessary employment self sufficiency. These alternatives include mixed use development, home business and transit supportive uses.*
-  Coastal Activity Centres are to be indicatively depicted to include adjacent Parks and Recreation Reserve. This requires no change to Parks and Recreation Reserve boundaries.

Finalisation of the DSP is expected mid 2009. In the meanwhile, the formulation of a local structure plan for the subject land may be advanced to coincide with the approval timeframes for the DSP.

3.4.2 MAJOR LAND USE COMPONENTS OF THE DSP

The DSP indicates that the subject land will form part of a coastal community accommodating more than 57,000 residents with self sustainability at the core of its design and development.

The DSP allows for the urban development of the majority of the subject land, predominantly for residential purposes, refer **Figure 6**.

It further provides for a mixed use coastal village adjacent to the Indian Ocean, service commercial land use at the eastern extent of the property and neighbourhood centres to be distributed across the Structure Plan area.

The DSP also makes provision for Mitchell Freeway and Marmion Avenue extensions through the Structure Plan area as well as an extended rail network (inclusive of a potential new station a short distance south of the subject land). The primary east-west transport linkage is Alkimos Drive, which intersects the south-western extent of the property and links the Coastal Village to the Mitchell Freeway. A secondary transit route is identified for the western extent of the subject land being a potential (and yet to be determined form of) high-frequency public transport route.

A 4 ha primary school site is identified for the Structure Plan area.

A portion (2 ha) of district playing field is identified along the northern boundary of the Structure Plan area along with Parks and Recreation Reserve linkages at the coast and in the southwest corner of the site. Alkimos Beach is identified as a Local Beach.

The south-east portion of the subject land is affected by a buffer to a nearby groundwater treatment plant.

The DSP requires the provision of green linkages to connect the inner urban areas with locations such as schools, centres and the coast.

3.4.3 RESIDENTIAL

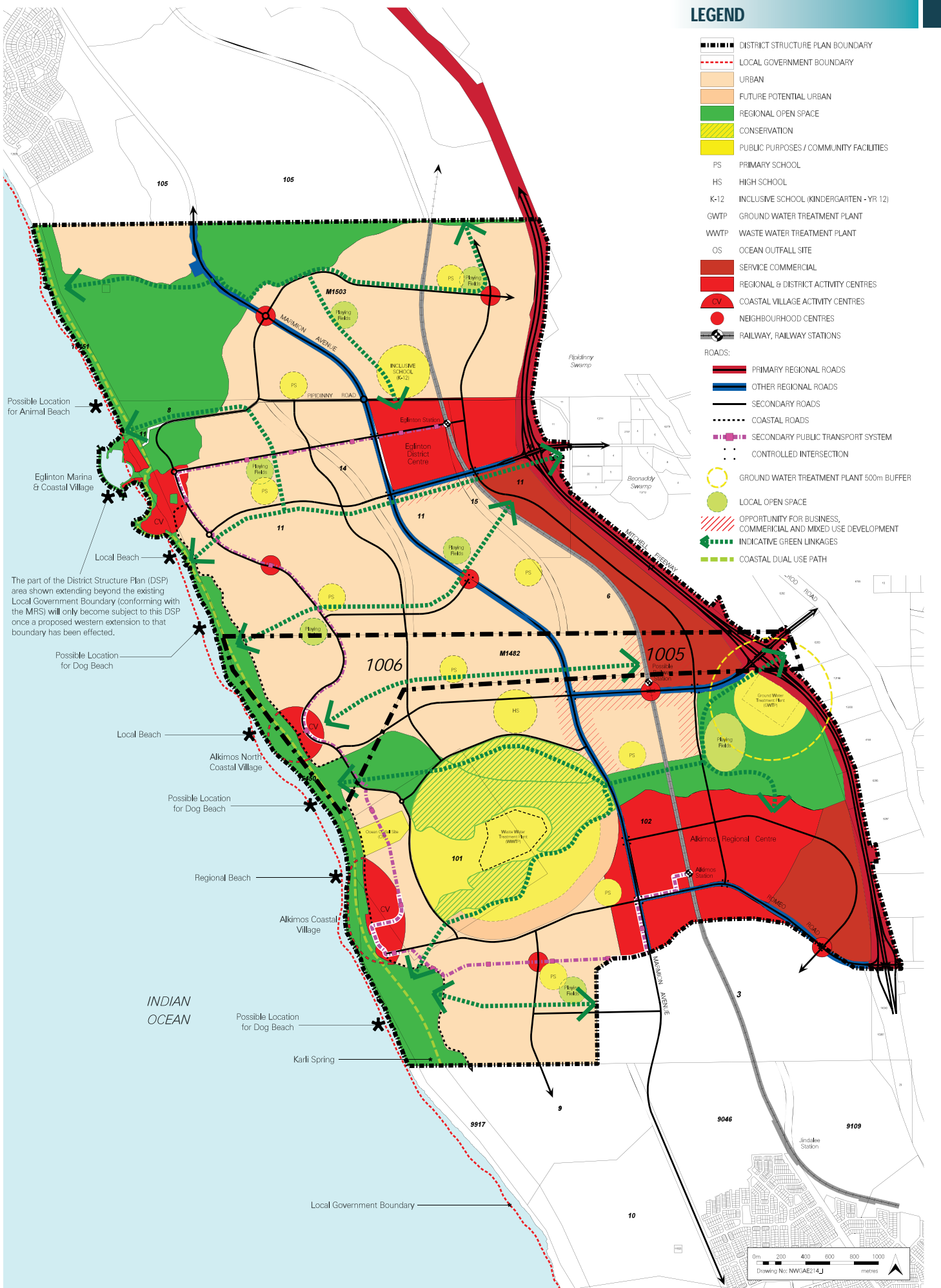
The projected population of the Alkimos Eglinton DSP is in the order of 57,000.

The DSP anticipates higher densities surrounding the proposed Alkimos North Coastal Village and within walkable catchments to public transport. As per the DSP, the ultimate range and location of residential densities is subject to local structure planning.

3.4.4 COMMERCIAL & RETAIL

The Alkimos Eglinton Economic and Employment Strategy, prepared by Syme Marmion, provides an outline of floorspace and employment in each identified centre in the Alkimos Eglinton DSP at residential build-out. These numbers have been updated and analysed over time through the development of an Economic Development and Centre Plan for the DSP.

The results of dynamic modelling work supporting the Alkimos Eglinton Economic Development and Centre Plan are outlined on the following page.



ALKIMOS/ EGLINGTON DISTRICT STRUCTURE PLAN

NORTH ALKIMOS LOCAL STRUCTURE PLAN | LOTS 1005 & 1006 MARMION AVENUE, ALKIMOS

TAYLOR BURRELL BARNETT | TABEC | EPCAD
 SHARNI HOWE | CREATING COMMUNITIES
 MACROPLAN | MP ROGERS & ASSOCIATES
 SUSTAINABLE SOLUTIONS | WHELANS | ENV
 OVERMAN ZUIDVELD | TAYLOR ROBINSON

FIGURE **06**
PEET

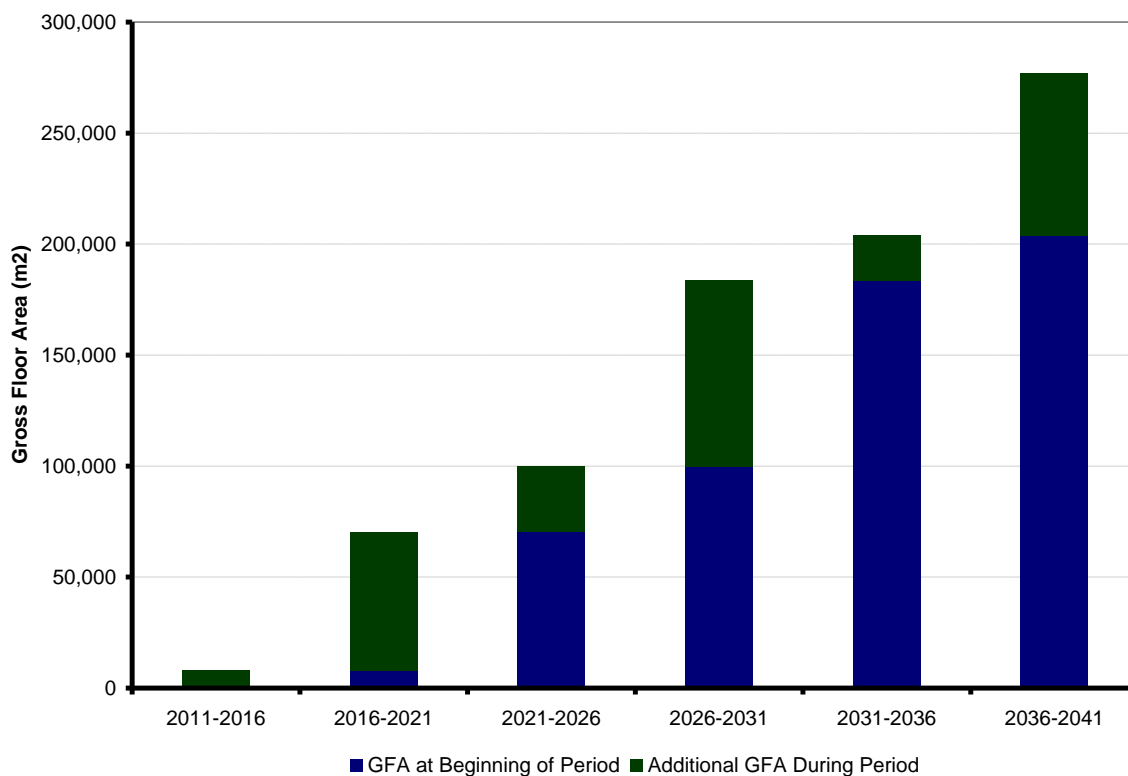
0m 300m 600m



PLAN - 07/055
 DATE - MAY 2009

3.4.4.1 ALKIMOS EGLINTON DSP CENTRE FLOORSPACE

In terms of staging, **Graph 1** below demonstrates that while floorspace in the DSP centres grows over time, it does not grow evenly.



Graph 1: Cumulative Floorspace (GFA m²), New and Existing at Each 5 Year Period, Alkimos Eglinton DSP
Source: MacroPlan Australia, Alkimos Eglinton District Structure Plan

This is a critical point as the timing of economic development is contingent on a range of factors including, but not limited to:

- 📄 infrastructure delivery;
- 📄 population and labour force size, stability, income and skills profile;
- 📄 market forces;
- 📄 competition/interrelationships with other centres in the North West Corridor; and
- 📄 regional and global economic circumstances.

In terms of industry, retail trade is projected to account for the largest amount of floorspace with over 76,000 m² located in the DSP area. This exceeds 100,000 m² when cafes and restaurants are added (refer **Table 4**).

As part of its analysis, the Economic Development and Centre Plan outlined indicative floorspace by proposed centre in Alkimos Eglinton. This is outlined in **Table 5**.

North Alkimos Local Structure Plan

TABLE 3: CUMULATIVE FLOORSPACE (GFA M²) BY DETAILED INDUSTRY GROUP, ALKIMOS EGLINTON DSP

Cumulative GFA by Stage (m ²)	2011-2016	2016-2021	2021-2026	2026-2031	2031-2036	2036-2041
Agriculture Forestry and Fishing	-	-	-	-	-	-
Mining	-	-	-	-	-	-
Manufacturing	-	5,676	8,766	12,153	13,134	14,062
Electricity Gas and Water Supply	-	-	-	-	-	-
Construction	-	-	-	-	-	-
Wholesale Trade	-	3,542	4,151	4,740	5,407	6,094
Retail Trade	6,232	33,065	35,662	56,374	59,505	76,450
Accommodation Cafes and Restaurants	1,411	8,077	9,378	15,928	21,640	26,913
Transport and Storage	-	6,976	9,619	10,373	11,210	12,001
Communication Services	-	-	600	647	1,399	1,497
Finance and Insurance	-	-	1,405	1,420	1,432	1,424
Property and Business Services	-	1,141	6,465	14,309	15,860	17,405
Government Administration and Defence	-	-	3,316	7,947	9,448	11,035
Education	-	-	-	15,257	16,253	32,537
Health and Community Services	-	11,831	12,482	25,697	26,448	40,351
Cultural and Recreational Services	-	-	3,044	7,163	8,386	14,504
Personal and Other Services	-	-	5,007	11,290	12,731	21,298
Total	7,643	70,309	99,896	183,299	202,853	275,570

Source: MacroPlan Australia, Alkimos Eglinton District Structure Plan

TABLE 4: SHARE OF TOTAL CENTRE CUMULATIVE FLOORSPACE (GFA M²) BY CENTRE, ALKIMOS EGLINTON DSP

Floorspace by Centre	2011-2016	2016-2021	2021-2026	2026-2031	2031-2036	2036-2041
RC	3,057	42,638	61,875	116,575	127,500	186,840
DC	-	-	-	20,652	25,803	32,430
CV1&Nbhd Centre	1,911	4,234	5,559	8,094	8,595	9,935
CV2&Nbhd Centre	1,146	3,413	4,985	4,985	5,472	7,095
CV3&Nbhd Centre	1,529	3,829	4,941	6,135	6,736	8,456
SC	-	16,195	22,536	27,266	29,750	32,156
Alkimos Eglinton DSP Centres	7,643	70,309	99,896	183,299	202,853	275,570
Share of Total Floorspace by Centre	2011-2016	2016-2021	2021-2026	2026-2031	2031-2036	2036-2041
RC	40%	61%	62%	63%	63%	67%
DC	0%	0%	0%	11%	13%	12%
CV1&Nbhd Centre	25%	6%	6%	4%	4%	4%
CV2&Nbhd Centre	15%	5%	5%	3%	3%	3%
CV3&Nbhd Centre	20%	5%	5%	3%	3%	3%
SC	0%	23%	23%	15%	15%	12%
Alkimos Eglinton DSP Centres	100%	100%	100%	100%	100%	100%

Source: MacroPlan Australia, Alkimos Eglinton District Structure Plan


The three centres of relevance to the North Alkimos project in the table above are Coastal Village 2 and Neighbourhood Centre and service commercial land. Approximately 7,100 m² of floorspace is projected for the Alkimos North Coastal Village and Neighbourhood Centre. This reflects the likely population and visitor catchment, based on an assumed share of DSP population. Similarly, in the absence of specific population and development staging information for the Peet Alkimos land, the Economic Development and Centre Plan assumed a population roll out in line with broader DSP population growth.

Any variations to either the size or the staging of population within the subject land to that applied in the Economic Development and Centre Plan will result in a change in floorspace numbers from that identified in the DSP. The economic modelling carried out in support of this LSP reflects the anticipated yields and population resulting from this more detailed planning.


3.4.5 EMPLOYMENT

The Economic and Employment Strategy provides a framework and strategies to ensure that the development of Alkimos Eglinton provides the necessary economic elements to succeed. The report also provides floor area estimates of land uses by type and the resulting number of jobs which are likely to be generated.


The report outlines that the Alkimos Eglinton DSP aligns to the City of Wanneroo Economic Strategy by:

 **Key Action 1** – Redressing the balance so that Wanneroo has desirable centres of employment


The Alkimos Eglinton DSP creates centres of a scale aligned with state policy and considers surrounding areas. The employment centres will allow Alkimos Eglinton to attain an employment self-sufficiency ratio within the structure plan area of 47%, which exceeds the City of Wanneroo Smart Growth target of 40%.

 **Key Action 2** – Investing for the future – increased collaboration with the State Government and other key stakeholders is needed to map the strategic activities for the north west metropolitan economic region.

The Alkimos Eglinton centres are both recognised in the Western Australian Planning Commission's Metropolitan Centres Policy Statement for the Perth Metropolitan Region

 **Key Action 3** – Generating wealth through jobs to create new economic base, which integrates the community into the wider regional economy.

The Alkimos Eglinton Project is expected to complement other regional scale projects, such as the Neerabup Industrial area and the St Andrews project, through provision of a range of regional and district orientated activities.

 **Key Action 4** – Basic infrastructure has to be in place to allow businesses to prosper and grow.

The Alkimos Eglinton Structure Plan ensures that the appropriate level of infrastructure is in place in a timely manner to support the economic and community objectives of the plan. This includes provision of broadband infrastructure.

3.4.5.1 CENTRE EMPLOYMENT

According to the DSP, centres in Alkimos Eglinton have the capacity to supply a total of 9,810 jobs by the residential build out in 2041. As with floorspace, the generation of jobs will be highly concentrated. According to **Table 6** below, almost three in every four centre based jobs in the DSP area at residential build-out will be located in the Alkimos Regional Centre. It is estimated that the Alkimos North Coastal Village and neighbourhood centres (located on the subject land) could supply approximately 3% of this total centre employment at residential build-out.

In terms of industry of employment, retail trade, health and community services, and accommodation cafes and restaurants will employ the largest share of workers in the DSP (34.5%, 13.0% and 10.5% of workers, respectively). This reflects the strong population growth projected for the district (refer **Table 7**).

TABLE 5: SHARE OF TOTAL CENTRE EMPLOYMENT, BY CENTRE BY 5 YEAR PERIOD, ALKIMOS EGLINTON DSP, 2011 TO 2026

Centre	2011-2016	2016-2021	2021-2026	2026-2031	2031-2036	2036-2041
RC	132	1,731	2,585	4,657	5,108	7,235
DC	-	-	-	826	1,009	1,274
CV1&Nbhd	82	176	235	348	370	424
CV2&Nbhd	49	140	204	204	224	288
CV3&Nbhd	66	159	206	260	285	355
SC	-	119	165	199	217	235
Total Centre Jobs	330	2,324	3,395	6,496	7,213	9,810
RC	40%	74%	76%	72%	71%	74%
DC	0%	0%	0%	13%	14%	13%
CV1&Nbhd	25%	8%	7%	5%	5%	4%
CV2&Nbhd	15%	6%	6%	3%	3%	3%
CV3&Nbhd	20%	7%	6%	4%	4%	4%
SC	0%	5%	5%	3%	3%	2%
Total Centre Jobs	100%	100%	100%	100%	100%	100%

Source: MacroPlan Australia

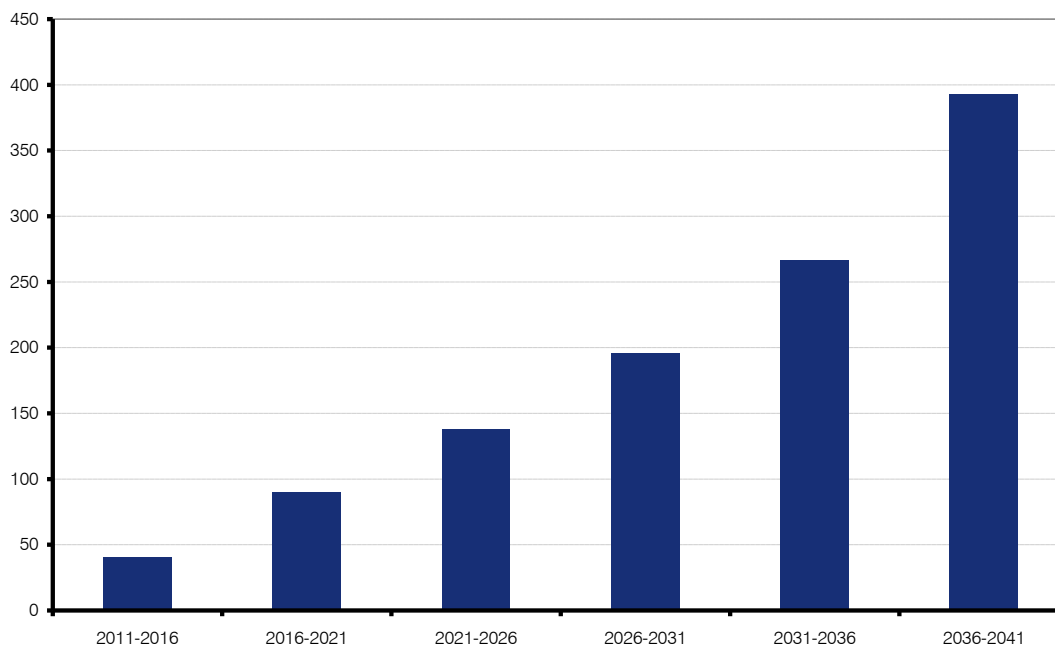
TABLE 6: EMPLOYMENT BY DETAILED INDUSTRY BY 5 YEAR PERIOD, ALKIMOS EGLINTON DSP, 2011-2041

Jobs	2011-2016	2016-2021	2021-2026	2026-2031	2031-2036	2036-2041
Agriculture Forestry and Fishing	-	-	-	-	-	-
Mining	-	-	-	-	-	-
Manufacturing	-	41	63	87	94	101
Electricity Gas and Water Supply	-	-	-	-	-	-
Construction	-	-	-	-	-	-
Wholesale Trade	-	26	30	35	40	45
Retail Trade	276	1,463	1,578	2,494	2,633	3,382
Accommodation Cafes and Restaurants	54	309	359	609	827	1,029
Transport and Storage	-	52	72	77	84	89
Communication Services	-	-	30	32	69	74
Finance and Insurance	-	-	72	73	73	73
Property and Business Services	-	60	341	754	836	917
Government Administration and Defence	-	-	161	387	460	537
Education	-	-	-	459	489	979
Health and Community Services	-	374	394	812	836	1,275
Cultural and Recreational Services	-	-	99	232	272	470
Personal and Other Services	-	-	197	445	501	839
Total	330	2,324	3,395	6,496	7,213	9,810

Source: MacroPlan Australia




3.4.5.2 NON-CENTRE EMPLOYMENT

The Economic Development and Centre Plan estimates that by 2041, there will be approximately 400 education jobs created by primary and secondary schools located in the Alkimos Eglinton DSP but not in the identified activity centres. This is broadly in line with Syme Marmion calculations, following the factoring in of the reduced build-out population (refer **Graph 2**).






Graph 2: Education Employment, Alkimos Eglinton DSP, 2011-2041 [Source: MacroPlan Australia]

In terms of home-based employment, the Economic Development and Centre Plan identified three primary forms of such employment:

-  Home-based business;
-  Telecommuting; and
-  Mobile trades.

Based on the applications of home-based business and employment shares of employed residents calculated, MacroPlan estimates that by 2041, there will be:

-  502 people working at home in home-based businesses;
-  301 people telecommuting on average per business day; and
-  1,003 mobile trade workers using their home as a base.

These numbers vary across the period given the growth of the local population. This is evident from **Table 8** below.

TABLE 7: INDUSTRY STRUCTURE OF HOME-BASED EMPLOYMENT, ALKIMOS EGLINTON DSP, 2011-2041						
Employment Type	2011-2016	2016-2021	2021-2026	2026-2031	2031-2036	2046-2041
Home-Based Businesses	55	122	184	258	347	502
Telecommuting	33	73	110	155	208	301

TABLE 7: INDUSTRY STRUCTURE OF HOME-BASED EMPLOYMENT, ALKIMOS EGLINTON DSP, 2011-2041

Employment Type	2011-2016	2016-2021	2021-2026	2026-2031	2031-2036	2046-2041
Mobile Trades	110	243	368	515	693	1,003
Total	198	438	662	927	1,248	1,806

Source: MacroPlan Australia

MacroPlan has analysed these numbers and estimated both centre and non-centre employment for the North Alkimos Structure Plan area (refer section 12.3).

3.4.6 MOVEMENT NETWORK

The DSP provides for the following regional/district movement network across the subject land.

3.4.6.1 PROPOSED DSP ROAD NETWORK

Figure 7 Alkimos Eglinton Road Network defines the district road network as follows:

1. WESTERN EXTENSION OF ALKIMOS DRIVE

This road is expected to be constructed as an Integrator Arterial Type B (two-lane boulevard with 6 m median). It will provide east-west road access at the south of the subject land.

2. NS CONNECTOR (WEST END)

This road is intended to be a two-lane Neighbourhood Connector to provide north-south connectivity along the western side of the corridor.

3. NS CONNECTOR (EAST END)

This road is shown in the DSP on the east side of the rail line, to provide north-south connectivity in the narrow strip of land between Marmion Avenue and the Mitchell Freeway. It connects Alkimos Drive to Eglinton Avenue. It is intended to function as a two-lane Neighbourhood Connector.

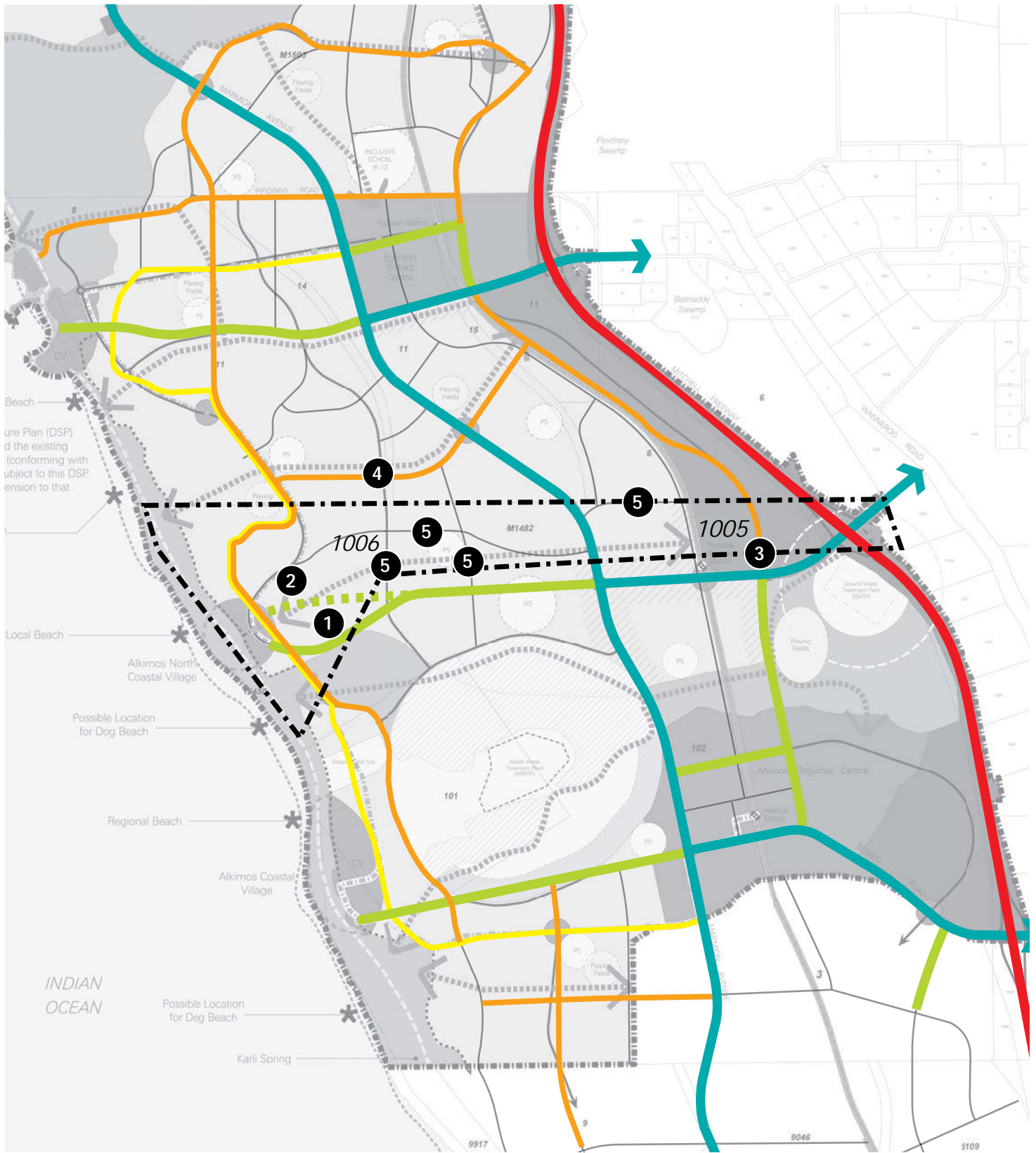
4. EW CONNECTOR (TO NORTH OF THE SUBJECT LAND)

This road is an east-west Neighbourhood Connector that links the NS Connector (west) to the NS Connector (east). It crosses Marmion Avenue at a four-way intersection, thus implying a high capacity signalised or roundabout controlled intersection.

5. OTHER NEIGHBOURHOOD CONNECTORS (OF LOCAL SIGNIFICANCE)

The DSP notionally shows additional Neighbourhood Connectors that serve to collect/distribute local traffic to the district and regional roads.

For the subject land, there is an east-west Neighbourhood Connector (with staggered junctions at Marmion Avenue) and a couple of north-south Neighbourhood Connectors that connect to the EW Connectors shown in the DSP.



LEGEND

- █ Primary Distributor
- █ Integrator Arterial (A)
- █ Integrator Arterial (B)
- █ Neighbourhood Connector (A)
- █ Neighbourhood Connector with AE-CAT route
- Subject Land

1 Refer Report

ALKIMOS/EGLINTON DISTRICT ROAD NETWORK

NORTH ALKIMOS LOCAL STRUCTURE PLAN | LOTS 1005 & 1006 MARMION AVENUE, ALKIMOS

TAYLOR BURRELL BARNETT | TABEC | EPCAD
 SHARNI HOWE | CREATING COMMUNITIES
 MACROPLAN | MP ROGERS & ASSOCIATES
 SUSTAINABLE SOLUTIONS | WHELANS | ENV
 OVERMAN ZUIDEVELD | TAYLOR ROBINSON

FIGURE 07

0m 300m 600m





PLAN - 07/055
 DATE - MAY 2009

PEET

3.4.6.2 PUBLIC TRANSPORT

The public transport network will incorporate the following components:

-  A rail line located approximately equidistant between the Freeway and Marmion Avenue; and
-  A secondary public transit network, based most likely on high frequency busses linking the coastal villages of the DSP to the rail line.







The DSP transport report shows a CAT type bus route running north-south along the NS Distributor (west side). It also shows several Transperth bus routes serving the corridor, with northern terminus at Eglinton Station and southern terminus at Alkimos Station. None of the routes are shown to link to Alkimos North Station (which is located just to the south of the subject land and to the north of Alkimos Drive).

3.4.6.3 PEDESTRIAN AND CYCLE

The DSP shows a Principal Shared Path (PSP) along the Mitchell Freeway and rail line. It is also expected that a shared path along the coast will be constructed. In addition, all District Distributor Roads are expected to have shared paths along both sides through urban areas. Neighbourhood Connector roads generally have a shared path on one side and footpath on the other side. Local Access Streets would generally have a footpath on both sides except for those with very low traffic and low pedestrian demand. Those low order streets would have a footpath on one side only.

3.4.7 ENVIRONMENT









The DSP provides a broad description of the environmental attributes of the locality. Of particular significance to the subject land from a planning and design perspective is:

-  **Climate:** Hot/dry summers and cool/wet winters. Easterly, south-easterly and south-westerly winds in summer, and north-westerly to south-westerly winds in winter.
-  **Geomorphology and Landscape:** A 1 km wide strip of discontinued dunes adjacent to the coast and a long ridge running parallel to the coast approximately 2.5 km inland.
-  **Groundwater:** Priority 3 Source Protection Area, within which Urban development must be connected to reticulated sewer.
-  **Marine/Coastal Environment:** Reviewed and tested, protection via the MRS coastal reserve.
-  **Vegetation:** No Declared Rare or Priority 1 Flora on site. Suspected Threatened Ecological Communities and significant vegetation have been retained in Parks and Recreation Reserves as per the MRS.
-  **Fauna:** A total of five species were identified that were either endangered, specially protected or priority fauna. Fauna habitat is to be largely protected through the conservation areas set aside in (MRS) Parks and Recreation Reserves, however, further assessment and consideration is also to occur at LSP stage.

3.4.8 COMMUNITY & EDUCATION

The Community Development Strategy outlined in the DSP requires a Community and Economic Development Plan to be developed at local structure planning stage addressing issues such as the creation of sense of place, the provision of community infrastructure (including the 4 hectare primary school) and the development of community-fostering strategies.

Key elements of the Community and Economic Development Plan include:

-  Walk Trails – A series of adventurous walk trails reflecting the existing parabolic dunal system along the coast and ridge line and connecting to the parks and recreation reserves, including the Vigo Trail, through the coastal node.
-  Community and Public Art – The creation of community and public art will be used as a process for developing emerging artists from the region and involves community in the development of their neighbourhood. The art will be included in many different spaces and linked to the activation of the coastal village and education precinct.
-  Coastal Village - A ‘funky’ coastal village will be designed as a community hub. It will have a unique cultural focus to draw people to the area and will house civic/community facilities and services. The village will be cleverly designed to act as an interface with the beach and coast.
-  Education Precinct – A centrally located education precinct and associated active open space will become another community hub. The precinct will include a primary school and senior and junior ovals, with the possibility of a community/sporting pavilion, childcare facilities and medical centre.
-  Major Attraction –An innovative, distinctive and iconic major attraction will be developed within the estate. The type of attraction is still under investigation; current possibilities include an ocean pool or an iconic play space. This major attractor will play an important function as a community hub and has the potential to include public art.
-  Public Open Space Network – There will be a range of spaces for different groups, with links to the walk trails and playgrounds.
-  Beach/Coastal Interface - This area will be the coastal heath-land that will transition from formal, urban spaces to more informal spaces closer to the ocean. It will provide opportunities for community events and activities as well as the possibility of establishing a coast care group.
-  Interface with Surrounding Communities – To ensure connectivity to surrounding communities the following will be undertaken:
 - North-south linkages to main centres in the Alkimos DSP will be established;
 - The Peet Alkimos section of the coastal leisure network connecting the northern coastal suburbs will be developed; and
 - A variety of programs and activities designed to support existing communities of interest.

The community development and economic development approach will build upon these focal points as key drivers that will create the Peet Alkimos community. A Taskforce has been established between the City of Wanneroo staff, Peet and their project team to jointly develop concepts and strategies to ensure that North Alkimos breaks new ground in the areas of community infrastructure provision (both hard and soft), governance of the coastal node and employment generation. A sub-group has been established in each of these areas.

3.4.9 LANDSCAPE

The DSP includes a Landscaping Strategy that is founded on the following core principles:

- Creation of a liveable place;
- Creation of a sustainable landscape;
- Creation of new diverse and urban landscapes that reflect the subject land's unique characteristics;
- Conservation of the representative landscapes of the area;
- Retention of vegetation where practical; and
- Promotion of native, low water demanding plants.

The LSP identifies detailed landscaping strategies that reflect the above-mentioned principles and are discussed at section 8.4.

3.4.10 SUSTAINABILITY

In 2006, a Sustainability Strategy to support the Alkimos Eglinton DSP was prepared by GHD. The Strategy identified sustainability objectives and key priorities, using the City of Wanneroo's Smart Growth Assessment Tool and the State Sustainability Strategy for guidance.

The DSP Sustainability Strategy identified the following priority sustainability objectives:

COMMUNITY DEVELOPMENT

- Promote investment consistent with (the City's) strategic vision
- Advocate provision of communications infrastructure
- Encourage diversity of housing
- Ensure affordable housing
- Encourage social cohesiveness and civic participation
- Promote the provision of community facilities and services that meet the needs of the community

WATER




- Promote more efficient use of water
- Develop integrated water management strategies to increase water efficiency

ENERGY AND GREENHOUSE

- Reduce private transport emissions
- Reduce materials intensity/embodied energy
- Reduce operational energy consumption
- Increase renewable energy

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ECOSYSTEM HEALTH

-  Conserve and enhance local biodiversity
-  Encourage community participation in local bush care efforts
-  Encourage sustainable waste management options and improve resource recovery






These will be addressed further in section 13.0.





3.4.11 MANAGEMENT PLANS, STRATEGIES AND OTHER REPORTING REQUIREMENTS OF THE DSP

The DSP identifies a series of over-arching principles for the development of Alkimos Eglinton that relate to liveability, sustainability, affordability and community creation. In order to implement these principles, the DSP is supported by a number of management plans that specify objectives and measures that must be reflected in local structure plans. It is further supported by a range of strategies and assessments relating to matters such as coastal management, sustainability and environment.

The suite of management plans, strategies and assessments identify a range of additional reporting requirements, to be undertaken at local structure plan stage as a means of demonstrating compliance with the aims and objectives of the DSP. These requirements are identified at section 1.2 and include the various EMPs discussed earlier in this report.

A number of the reporting requirements are additional to those referred to in the advertised version of the DSP and have been adopted as modifications through Council's consideration of the proposal at its meeting in July 2008. These additional requirements are as follows:

-  The issue of Unexploded Ordnance must be addressed – the DSP confirms that post endorsement of a local structure plan all subdivision applications shall be referred to the Department of Fire and Emergency Services for comment.
-  The precise nature and location of green linkages across the DSP area require further investigation by the City. This allows for the extent of Parks and Recreation Reserve to be fully tested by way of detailed environmental reporting at local structure plan stage.
-  Preparation of supporting reports addressing employment, economy and community development by the landowner and agreed to by approval agencies. The employment plan is to include employment self-sufficiency targets as a basis for monitoring performance.
-  An Alkimos Eglinton Development Contributions Plan (DCP) must be prepared in support of a Local Structure Plan. For the purposes of local structure planning, this requirement may be satisfied by way of a letter of intent, prepared by the proponents (note: submitted to the Department for Planning and Infrastructure in July 2008), which outlines the process for the preparation of the DCP. The DCP shall be signed by the proponent and approval agencies. A draft version of the DCP must accompany the letter of intent. Local Structure Plans are required to demonstrate how funding arrangements including the agreed DCP are to be implemented in order to provide for the efficient and equitable delivery of services.
-  A District Staging Strategy must be prepared by the landowner and agreed to by approval agencies. The District Staging Strategy must identify linkages between employment provision and residential development and is to be submitted in support of a Local Structure Plan.

-  The Economic, Employment and Community Development Plan shall further address retail floorspace allocation with particular regard to local and neighbourhood centres. The amount of land allocated for employment and services and the classification of centres is to be reviewed following the finalisation of the strategic transportation and employment work commissioned by the Department of Planning & Infrastructure, the City of Wanneroo's Centres Strategy and the Western Australian Planning Commission's Metropolitan Centres Policy.
-  Upon the finalisation and release of the strategic transportation and employment work commissioned by the Department of Planning & Infrastructure, the Employment, Economic and Community Development Plan and the District Staging Strategy the road network may be reviewed.
-  A Local Water Management Strategy shall be prepared at local structure planning stage.
-  This range of items has been significantly advanced with copies of the necessary reporting provided as appendices to this Local Structure Plan.

3.5 POLICIES OF THE WESTERN AUSTRALIAN PLANNING COMMISSION

The following section summarises the policies of the WAPC relevant to the subject land and the preparation of the LSP.

Under clause 32 of the Planning and Development Act 2005 the Western Australian Planning Commission may, in relation to the western most portion of the land (the coastal reserve) apply State Planning Policies as if the Commission were a Local Government and the policy (including amendments thereof) were a Town Planning Scheme.

3.5.1 THE WESTERN AUSTRALIAN STATE SUSTAINABILITY STRATEGY

In September 2003, the State Government adopted and published The Western Australian State Sustainability Strategy (SSS).

The key principle of the SSS is:

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

The Strategy also states that:






"to be sustainable, settlements require the integration of environmental, social and economic dimensions".

The development of the subject land represents a planned and logical extension of existing settlement. It will provide for new and expanded business and employment opportunities in line with the Alkimos Eglinton DSP, along with new and diverse recreational and housing alternatives.

A specialist sustainability consultant has been appointed from the early stages of the project to guide and document sustainability measures adopted in the Local Structure Plan. These measures are discussed at section 13.0.

3.5.2 NETWORK CITY

Network City is the overarching strategy for the Perth Metropolitan Region. The North Alkimos LSP is located on a site that has been identified as a location for “*future communities to be designed around networks and centres*”. The continuation of Marmion Avenue has been identified as an activity corridor with public transport. The main objectives outlined in Network City which relate to this local structure plan are:





-  Direct residential development and urban expansion into the designated growth areas;
-  Locating higher residential densities in regional and district centres, activity corridors and in selected areas of high amenity on the coast and river foreshores;
-  Develop an integrated land use and transport network which reduces car dependence and broadens travel options;
-  Protect biodiversity and areas of environmental significance, and promote the concept of an interlinked system of regional and local open space; and
-  Protect water resources, and reduce the use of non-renewable resources and waste generation.

The subject land is zoned for urban development and is within a designated growth area within which environmental linkages and areas of significance have been identified and set aside, higher densities are facilitated closer to the coast, proposed future rail station and an integrated transport system offering alternatives to the private motor vehicle have been developed.

3.5.3 STATEMENT OF PLANNING POLICY 2.6 - STATE COASTAL PLANNING POLICY

The policy is of relevance by virtue of the subject land’s location adjacent to the Indian Ocean. The policy identifies a requirement for coastal foreshore reserves, which should be determined by detailed and site specific assessments that calculate storm surges, 1:100 year flood line, topography, erosion/accretion, and climate change/sea level impacts. Development in coastal areas should not exceed five stories (or 21 m) in height except where it can be demonstrated that there is broad community support, local character is respected and the visual quality and amenity of the area would not be diminished.

The objectives of the policy are to:

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

A coastal engineer has been appointed to advise on coastal processes and setbacks, review and refine previous (District level) reporting and guide development such that it occurs in a manner that is consistent with the State Coastal Planning Policy. Coastal processes pertaining to the site are discussed in detail at section 5.5.

3.5.4 DRAFT PERTH COASTAL PLANNING STRATEGY

The draft Policy was released for public comment in December 2008, with the submissions period closing in March 2009.

The draft Policy is intended to provide a framework for sustainable planning of metropolitan coastal areas in a manner that appropriately provides for conservation, recreation, infrastructure and development. It builds on the principles of Network City and represents a means to implement SPP 2.6 outlined above.

The draft Policy recognises Alkimos and Eglinton as Network City Activity Centres and makes provision for coastal nodes in the areas identified in the DSP.

The draft Policy makes reference to the Alkimos North node, identifying it as a precinct that will consist primarily of marine-based passive recreation – snorkelling, diving etc – associated with the Alkimos wreck. Designated beach access and dome conservation related activities are recommended. Measures to control dune erosion are also recognised as being desirable.

In its current form it is considered that the draft Policy does not fully or appropriately reflect the urbanisation of the Peet Alkimos land as designated by its current zoning and the DSP. As consideration of the draft Policy progresses, a greater reflection of urban outcomes in the Policy will be sought.

3.5.5 BUSH FOREVER

Bush Forever is a State Government Policy which aims to identify, preserve and protect representative areas of native vegetation on the Swan Coastal Plain.

The subject land accommodates two areas that have been identified as regionally significant vegetation for retention. Both areas are located within existing Parks and Recreation reserves and would not represent an impediment to development beyond what is already provided for by existing zoning/reservation patterns.

Bush Forever site 397 is incorporated in the coastal reserve and Parks and Recreation Reserve corridor in the southwest of the site. That area of the foreshore adjacent to the Coastal Village is not affected by Bush Forever. Bush Forever site 130 lies east of the Mitchell Freeway Reserve, outside the DSP area.

Management of the Parks and Recreation Reserve would be subject to EMPs prepared at subdivision stage.

3.5.6 STATEMENT OF PLANNING POLICY NO. 3 – URBAN GROWTH & SETTLEMENT






This policy (SPP3) outlines the principles and considerations which apply to planning for urban growth and settlement around the State. There is particular pressure for the development of settlements along the coast, as is the case with the subject land.

The policy outlines the manner in which planning may ensure that the natural environment is protected and to provide essential infrastructure, employment, services and public transport.









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

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The objectives of SPP3 are:

-  *“To promote a sustainable and well planned pattern of settlement across the State, with sufficient and suitable land to provide for a wide variety of housing, employment, recreation facilities and open space.*
-  *To build on existing communities and established local and regional economies, concentrate investment in the improvement of services and infrastructure, and enhance the quality of life in those communities.*
-  *To manage the growth and development of urban areas in response to the social and economic needs of the community and in recognition of relevant climatic, environmental, heritage and community values and constraints.*
-  *To promote the development of a sustainable and liveable neighbourhood form which reduces energy, water and travel demand whilst ensuring safe and convenient access to employment and services by all modes, provides choice and affordability of housing and creates an identifiable sense of place for each community.*
-  *To coordinate new development with the efficient, economic and timely provision of infrastructure and services.”*

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

-  A strong, diversified and sustainable economic base with assured access to jobs and employment;
-  Sufficient and suitable serviced land in the right locations for housing, employment, commercial, recreational and other purposes, coordinated with the efficient and economic provision of transport, essential infrastructure and human services;
-  A variety of choice in the size, type and affordability of housing to support a range of household sizes, ages and incomes;
-  Urban expansion directed into designated growth areas which will be well serviced by employment and public transport;
-  Higher densities in the most accessible locations, i.e. around town and neighbourhood centres, high frequency public transport nodes and adjacent to high amenity areas such as parks and foreshores;
-  Good urban design which creates and enhances community identity, sense of place, liveability and social interaction;
-  Proper consideration of the environment, recognising the need to restore and enhance as well as protect biodiversity and to minimise development impacts on land, water, energy and other natural resources; and
-  A positive planning framework which is not overly focussed on regulation and control and includes community involvement.

The DSP prepared for the Alkimos Eglinton area outlines a range of sustainability measures for the subject land including regional ecological linkages, a holistic approach to employment generation, and an integrated transport system that offers alternatives to the private motor vehicle. It also identifies a range of objectives and strategies that must be reflected in local structure planning in order to facilitate sustainable planning and development outcomes.

The range of measures to achieve sustainability via this Structure Plan is outlined at section 13.0.

3.5.7 NORTH WEST CORRIDOR STRUCTURE PLAN (NWCSP) & INTERIM POLICY STATEMENT FOR THE NORTHWEST GROWTH CORRIDOR OF THE PERTH METROPOLITAN REGION (IPS)

The NWCSP was prepared by the Western Australian Planning Commission in 1992 and establishes the principles for the integrated and detailed planning of local areas within the North West Metropolitan Corridor. Currently in the form of an Interim Policy Statement (IPS), it sets a framework and guides the preparation of DSPs for the comprehensive development of the corridor.

The subject land is predominantly identified as 'Category B – Future Urban' with portions of Parks and Recreation and Tourist/Recreational Development. The road and rail network transecting the property is also reflected in the Structure Plan. The Structure Plan designations support the urbanisation of the land.




While the NWCSP remains current it has been largely superseded by the DSP, which provides a more detailed (District level) planning framework for the land and its locality.

In addition the WAPC has commenced (in 2007) an IPS as a complimentary framework to the NWCSP and as an interim guide to planning until the finalisation of a full review of the NWCSP. The IPS provides a framework to allow the WAPC to consider DSPs and ensure that sound planning and development principles are met. The IPS is based on Liveable Neighbourhoods objectives and measures, which have been carried forward into the DSP and this LSP.

The IPS identifies the subject land as primarily Urban with a coastal Activity Centre and a manufacturing/service Activity Centre at its western end. A regional road and rail network is identified including Marmion Avenue and Alkimos Drive.

3.5.8 DC POLICY 1.6 PLANNING TO SUPPORT TRANSIT USE & TRANSIT ORIENTED DEVELOPMENT

This Development Control Policy outlines the requirements for developing transit oriented centres and promoting transit use. The objectives outlined in the policy include:

-  promote public transport use;
-  encourage the creation of destinations in parallel with the location of public transport facilities; and
-  to promote walking and cycling.

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This policy is relevant to the Structure Plan area as its eastern extent is located within a walkable catchment of a potential future rail station to the south though the timing of this station is uncertain and this will impact on the ability to deliver early density and a diversity of transit supportive land use. Urban form must be robust enough, therefore, to cater for land use change over time.

3.5.9 REGIONAL TRANSPORT STUDY

The Department for Planning and Infrastructure, in conjunction with the City of Wanneroo, is undertaking a strategic planning study to consider the regional transport network of the North West Corridor.







A condition of DSP approval (by the City of Wanneroo) requires that the final DSP take into account the final results of this study. The results of the study were due to be released by the DPI mid-2008 but at time of writing this was yet to occur.

Discussions with the City of Wanneroo have indicated that the results of the study are unlikely to impact on the Structure Plan area and that the status of the study is not an impediment to structure planning being progressed at this time.

3.6 POLICIES & STRATEGIES OF THE CITY OF WANNEROO

3.6.1 CITY OF WANNEROO SMART GROWTH STRATEGY

In 2005, the City of Wanneroo developed the Smart Growth Strategy, with an accompanying Smart Growth Planning Policy, to guide the application of sustainability principles and strategies to the planning for the City. The strategy sets out six sustainability principles, 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 our places and our people.
-  **Long Term Economic Health:** Smart Growth supports opportunities that enhance industry growth and promote job creation within our region.
-  **People and Government:** Smart Growth encourages citizen and stakeholder participation in governance and development decisions.

A range of associated Strategies have also been developed to support the application of these principles. To assist proponents to assess their performance against the Smart Growth principles and strategies, the Smart Growth Assessment Tool (SGAT) has been developed.









SGAT is currently in a trial phase, during which time assessment (using the tool) is voluntary. The North Alkimos Local Structure Plan has been assessed using the Smart Growth Assessment Tool, and the results can be found in section 13.0.

3.6.2 CITY OF WANNEROO LOCAL HOUSING STRATEGY

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

The Strategy recognises the dominant role the City plays in Perth's housing growth, contributing the highest number and growing proportion of new dwelling approvals, and the dominance of single detached housing (some 83% in the City of Wanneroo) when compared to other regions. It also recognises that new housing activity in the City, dominated by large single detached dwellings, is contributing to Perth's changing housing stock.

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
















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

The North Alkimos LSP strives to achieve the mix of housing types, densities and dwelling yields in the Local Housing Strategy. In seeking to achieve the desired mix of housing for the City of Wanneroo by 2021. Consideration has been given to achieving higher densities, encouraging product diversity and the introduction of new housing types which will be a key feature of the Peet Alkimos project.

3.6.3 CITY OF WANNEROO EMPLOYMENT STRATEGY

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

The ES outlines several local employment strategy components which the DSP supports, such as:

-  Broadband infrastructure: To attract business and residents to the area;
-  Employment support designs: Universal design of buildings to encourage flexible mixed use and houses that are able to be converted into commercial use. Location of rail stations at the centres will facilitate TOD principles;
-  Employment supporting land uses: The land use is designed to allow for a wide range of employment types, maximising employment generation;
-  Adhere to the principles of the City's Smart Growth Strategy: A good score has been achieved in the Smart Growth Assessment Tool;
-  Business Attraction: Utilising a business outreach officer and incentives such as subsidised rental periods, the business incubator and support for home based businesses;
-  Training development: Partnerships to support the local economy with the required supply of skilled workers;
-  Local job network: Supported by the Business Outreach Officer and the Community Development Workers;
-  Electronic Commerce Initiatives: Broadband is a key attractor of businesses to the area;
-  Regional employment plan: Alkimos Eglinton will be a significant contributor to regional employment;
-  Direct funding: Partnerships with groups to assist in delivering some of the existing economic initiatives of the City of Wanneroo;
-  Local business awards: Sponsorship of Wanneroo local small business awards to assist and encourage small business in the area;
-  Introduce learning areas: Ensure that all residents have access to basic services on arrival;
-  Contribution toward hosting international delegations: The plan will support initiatives to attract international investment into the region;
-  Sponsorship of Wanneroo business expo; and
-  Tourism centres: The three coastal villages and marina will be tourist icons.





The Economic Development and Centre Plan also estimated centre and non-centre employment in Alkimos Eglinton over time with self-sufficiency for the DSP area in the order of 60%.

A Local Employment Strategy is required to be prepared as part of the local structure planning process, outlining the initiatives and programs that the proponent will implement, in partnership with the City, in order to promote local employment in the Structure Plan and surrounding area. A Local Employment Strategy for the North Alkimos LSP has been prepared and has been submitted for concurrent consideration with this Structure Plan Report.

3.6.4 ECONOMIC DEVELOPMENT STRATEGY

The Economic Development Strategy forms a four year plan outlining key goals and future directions for generating a sustainable economy within the LSP area. The Strategy builds upon the City's Smart Growth vision in relation to employment and investment attraction and ultimately outlines a framework for balancing long term economic, social and environmental priorities for the City and for the broader region.

The strategy outlines a strategic action plan based on four key themes, summarised below:


-  **Employment** – providing a range of desirable centres of employment and key employment opportunities and attractors and a key focus on commercial/industrial and home based business.
-  **Investment** – encouraging investment in the north west corridor noting the Wanneroo Central Townsite as a key catalyst for commercial development – with a key focus on innovation, entrepreneurship and tourism development.
-  **Wealth & Prosperity** – through the creation of a new economic base, that is integrated with the community and wider regional economy and builds upon local skills and business base.
-  **Infrastructure** – investment in infrastructure will drive future development and business investment throughout the north west corridor. It should focus on strategic population intensive areas as well as new development areas such as Alkimos/Eglinton – a key focus on broadband technology.

3.6.5 DRAFT BIODIVERSITY STRATEGY


The City of Wanneroo Draft Local Biodiversity Strategy was released for public comment in October 2008 and sets targets for biodiversity conservation across planning precincts. As specified in the Draft Strategy the target for retention of both Cottesloe Central and South, and Quindalup vegetation complexes in the Alkimos Eglinton Precinct is 3% of the total development area. This figure includes POS for conservation/passive recreation outside of Parks and Recreation Reserves.

The City requires consideration of the targets in the configuration of POS in the LSP for flora and vegetation conservation and passive recreation, as opposed to being for active recreation such as playing fields. Conservation areas may be considered for passive recreational areas, given controlled access. The City has also expressed a desire to see biodiversity enhanced through non-contiguous green linkages between natural areas (Colleen Murphy, pers. comm.). This has been achieved through the location of POS and augmented by native plantings in streetscaping.

The City of Wanneroo has confirmed that the total native vegetation retained on site meets their Biodiversity targets. Excluding ROS and the Viggo Trail, the areas to be retained or rehabilitated include:

-  Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*) Habitat:
 - POS areas 28 and 27 will have 9290m² of bushland retained;




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- POS area 29 will have 2220m² of bushland retained and 935m² will be rehabilitated;
 - POS area 21 will have 5357m² rehabilitated;
 - Bush Forever Site 130, indicated by D2 on the LSP.
-  Threatened Ecological Community:
- POS area 23 will have 4106m² retained, representing entire TEC area.

The site supports foraging habitat for Carnaby’s Black Cockatoo (*Calyptorhynchus latirostris*). Through the assessment of the project by the Commonwealth Department of Environment, Heritage, Water and the Arts under the *Environment Protection and Biodiversity Conservation Act (1999)* it has been determined that areas of habitat will be retained on site in POS and in the Bush Forever area.

It has been confirmed by the DEC that the site supports a small probable occurrences of the TEC 26a – *Melaleuca huegleii* – *Melaleuca systena* shrublands on limestone ridges and one possible Priority species (P3/4), and a Bush Forever site. The Bush Forever site lies within the Parks and Recreation Reserve. The possible TEC will be protected and will be managed as POS.

The following recommendations are made for significant flora at the site in accordance with biodiversity principles:

-  Area identified as TEC outside of the Parks and Recreation Reserve is retained within POS and protected during the development phase, and from public disturbance in the future;
-  The City of Draft Wanneroo Local Biodiversity Strategy sets targets of 3% of the total development for Cottesloe South and Central and Quindalup vegetation complexes which has been considered in POS configuration; and
-  Biodiversity will be enhanced through green linkages of POS, augmented by native plantings in streetscaping.

The protection of the TECs and the Black Cockatoo habitat will be discussed in more detail in the environmental management plans to be developed before subdivision for the Parks and Recreation Reserve and POS areas on the site.

Details on POS in the Structure Plan are provided at section 8.0.

In a biodiversity strategy context the Structure Plan is in compliance with the City’s Biodiversity targets as demonstrated by **Table 9** below.

TABLE 8: NORTH ALKIMOS EGLINTON - POS COMPARED TO CITY OF WANNEROO BIODIVERSITY STRATEGY TARGETS

	Total Area (on Lot)	ROS (on Lot)	TECs in POS	Bush Forever	POS 35, 36 and 37 (vegetation retained)	TOTAL Retained on Site	CoW Biodiversity Target (3% of development)
Quindalup	141 ha	25.5 ha	0.79 ha	N/A	N/A	25.5 ha	4.23 ha
Cottesloe South and Central	103 ha	N/A	0.41 ha	3.7 ha	1.15 ha	4.85 ha	3.09 ha

Where earth working has required the existing coastal heath to be disturbed such as areas of the dunal walk trail, comprehensive rehabilitation and replanting will be an integral part of the landscape design response in these areas.

The areas of Quindalup Complex in Parks & Recreation Reserve in private ownership (25.5 ha) is substantially above the Draft Biodiversity target of 4.23 ha. (Note whilst some of this is not vegetated e.g. blowout, the majority of the area is vegetated) Advice from the City of Wanneroo (Nicola Hoey) indicates that this should be acceptable.

The area of Cottesloe South and Central complex retained in POS (which is also identified as potential cockatoo foraging habitat) is limited to the TEC and potentially a proportion of a few other POS areas estimated at less than 0.5 ha in total. The Biodiversity target of 3% however is more than adequately compensated by the reservation of Bush Forever area of 4.11 ha to the east of the proposed Mitchell Freeway (note that although this is on the lot it is not currently included in the LSP area).









3.6.6 TOURISM STRATEGY

The City of Wanneroo Tourism Strategy addresses the sustainability of tourism in Wanneroo through inclusiveness of the community in all planning and development issues. It expresses a need to be more innovative with regulations so as to foster investment and adopt an inter-regional view for tourism activities and products that extend beyond the boundaries of Wanneroo.

The development of tourism within Wanneroo is addressed through six objectives:

1. Development of new and existing tourism products;
2. Provide a broader visitor experience;
3. Increase year round appeal;
4. Develop higher yield markets;
5. Establish tourism as a major industry of the region; and
6. Encourage industry participation in development of tourism.

Actions identified to achieve the objectives were:

-  Branding promotion and marketing;
-  Leadership, management and organisation;
-  Attractions and experiences;
-  Infrastructure;
-  Finance and statistics;
-  Social capital;
-  Heritage; and
-  Culture and environment.

The Alkimos North Coastal Village identified in the DSP for the subject land is anticipated to have a tourist function. However, in this context the work carried out by MacroPlan indicates that due to the absence of intrinsic tourist features (such as a marina) the village is likely to have a population-centric role. Notwithstanding, opportunities to maximise the function and market recognition of the Coastal Village as a tourist destination will be fully explored.

4.0 DEMOGRAPHIC CONTEXT

4.1 POPULATION

The subject land and its surroundings are currently unpopulated. There are residences along Wanneroo Road to the east, however they are sparsely located and semi-rural in nature (associated with market gardens and the like). Accordingly they are of little value in signalling future urban demand patterns.

Table 10 below shows 2006 population by age in the City of Wanneroo compared to the Perth Metropolitan Area.

The table shows that the proportion of persons aged between 25 and 44 in Wanneroo is slightly higher than in the Perth Metropolitan Area. This suggests a higher proportion of younger families, which is further supported by the higher than metropolitan average of persons aged between 5 and 14. It indicates that there will be strong demand for housing types and facilities catering to young families in the City.

TABLE 9: POPULATION BY AGE, 2006

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

Source: ABS (2006) Census of Population & Housing

This is further supported by the higher proportion of ‘family households’ in the City of Wanneroo compared to the Metropolitan Area identified in **Table 11**.

While this would suggest strong demand for ‘conventional’ subdivision and housing, the proportion of couples without children is also marginally higher in the City compared to the Perth Metropolitan average, which also indicates that there would be strong demand for smaller dwelling types and associated lifestyle amenities.

TABLE 10: HOUSEHOLD TYPES, 2006

	City of Wanneroo		Perth Metro	
	Households	%	Households	%
Family Households	29,679	81.1%	376,112	71.2%
Couple with Children	15,278	41.7%	173,915	32.9%
Couple without Children	9,665	26.4%	138,117	26.1%
One Parent	4,367	11.9%	56,720	10.7%
Other	369	1.0%	7,360	1.4%
Lone Person Household	6,175	16.9%	132,174	25.0%
Group Household	742	2.0%	20,249	3.8%
Total	36,596	100.0%	528,535	100.0%

Source: ABS (2006) Census of Population & Housing

In addition to the more general population analysis provided above, the Alkimos Eglinton Economic Development and Centre Plan builds upon population projections/estimates developed by Geografia.

Geografia has previously produced headline population estimates for Alkimos Eglinton. Lower and upper plausible estimates are outlined in **Table 12**:

TABLE 11: OVERALL POPULATION ESTIMATES ALKIMOS EGLINTON

	2011	2016	2021	2026	2031	2036	2041
Lower Estimate	225	4,383	9,742	14,875	21,149	29,045	43,042
Upper Estimate	249	4,913	10,951	16,734	23,744	32,390	47,734

Source: Geografia, Community Wellbeing and Facilities Plan

Separate population estimates for the Structure Plan area were not developed as part of the DSP. However, supporting metrics indicate Geografia assumed that the North Alkimos Local Structure Plan would yield approximately 2,431 dwellings at residential build-out.

4.2 HOUSING

Notwithstanding the apparent demand for smaller dwelling types, **Table 13** shows that single dwellings dominate the housing supply within the City and at a higher rate than for the remainder of the metropolitan area. Conversely, there are a far lesser proportion of smaller dwelling types such as townhouses and apartments.

This infers that smaller household types (singles and couples without children for example) are being insufficiently catered for by the current housing supply within the City. It further infers there would be opportunities to satisfy this as-yet unmet demand via apartment living (capitalising on high amenity areas such as the coast) and through the provision of cottage lots and attached dwellings across the Structure Plan area.

TABLE 12: DWELLING TYPES, 2006

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

Source: ABS (2006) Census of Population & Housing

4.3 INCOME AND EMPLOYMENT

Table 14 indicates that median incomes within the City are generally consistent with the Metropolitan average. This suggest that the North Alkimos Local Structure Plan could support a range of housing forms and affordability from entry-level through to higher-end product and that such diversity would be supported by the demographic of the City.

TABLE 13: MEDIAN WEEKLY INCOME, 2006

Median Income	City of Wanneroo	Perth Metro
Individual Income	\$491	\$513
Household Income	\$1,094	\$1,086
Family Income	\$1,184	\$1,298

Source: ABS (2006) Census of Population & Housing

Table 15 below shows the comparative occupations of the labour force in the City of Wanneroo and Perth Metropolitan Area. The City has a higher proportion of trade workers, machinery operators and labourers and a lower proportion of professional and management workers compared with the overall Metropolitan Area.

North Alkimos Local Structure Plan

TABLE 14: OCCUPATIONS, 2006

	City of Wanneroo		Perth Metro	
	Persons	%	Persons	%
Technicians & Trades Workers	10,296	20.5%	112,972	16.3%
Labourers	6,477	12.9%	68,596	9.9%
Machinery Operators & Drivers	3,819	7.6%	44,646	6.4%
Clerical & Administrative Workers	8,176	16.3%	110,539	15.9%
Professionals	6,424	12.8%	144,972	20.9%
Sales Workers	5,265	10.5%	69,348	10.0%
Community & Personal Service Workers	4,741	9.4%	64,002	9.2%
Managers	5,042	10.0%	79,202	11.4%
Total	50,240	100.0%	694,277	100.0%

Source: ABS (2006) Census of Population & Housing

The main industries of employment for residents within the City of Wanneroo, as shown in **Table 16**, are manufacturing, construction, retail trade, and health care/social assistance.

TABLE 15: EMPLOYMENT BY INDUSTRY, 2006

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

Source: ABS (2006) Census of Population & Housing

North Alkimos Local Structure Plan

Labour force participation rates vary significantly between suburbs and Local Government areas in the Perth Metropolitan Area. The following **Table 17** gives an illustration of this and the variation in the total labour force on site that could be expected if the various participation rates are applied to the anticipated site population at ultimate development.

TABLE 16: LABOUR FORCE PARTICIPATION COMPARISON

Labour Force Participation Comparison	Two Rocks (suburb)	Mindarie (suburb)	City of Wanneroo	City of Rockingham	Perth Metro Area
Persons: 15-19 yrs	34.4%	57.6%	56.5%	52.7%	50.9%
Persons: 20-24 yrs	62.7%	79.6%	78.2%	72.7%	71.8%
Persons: 25-34 yrs	52.3%	70.8%	75.2%	69.1%	73.7%
Persons: 35-44 yrs	65.1%	78.2%	77.2%	72.8%	75.3%
Persons: 45-54 yrs	59.0%	79.2%	77.2%	74.2%	77.5%
Persons: 55-64 yrs	42.3%	58.9%	55.8%	45.9%	58.1%
Persons: 65 & over	4.8%	11.2%	7.0%	4.3%	8.2%
Persons: Total	41.5%	66.9%	64.0%	56.1%	60.6%
Potential Site Labour Force	4,179	5,643	5,534	5,054	5,455

Source: ABS Census 2006

Future residents of the proposed new development at the subject land are likely to have employment and demographic characteristics similar to those for the City of Wanneroo as a whole.

5.0 SITE ANALYSIS

The proponent's environmental consultant undertook an Environmental Assessment, attached as **Appendix 2**.

5.1 CURRENT LAND USE

The land is vacant and undeveloped, refer **Figure 8**.

5.2 LANDFORM/TOPOGRAPHY

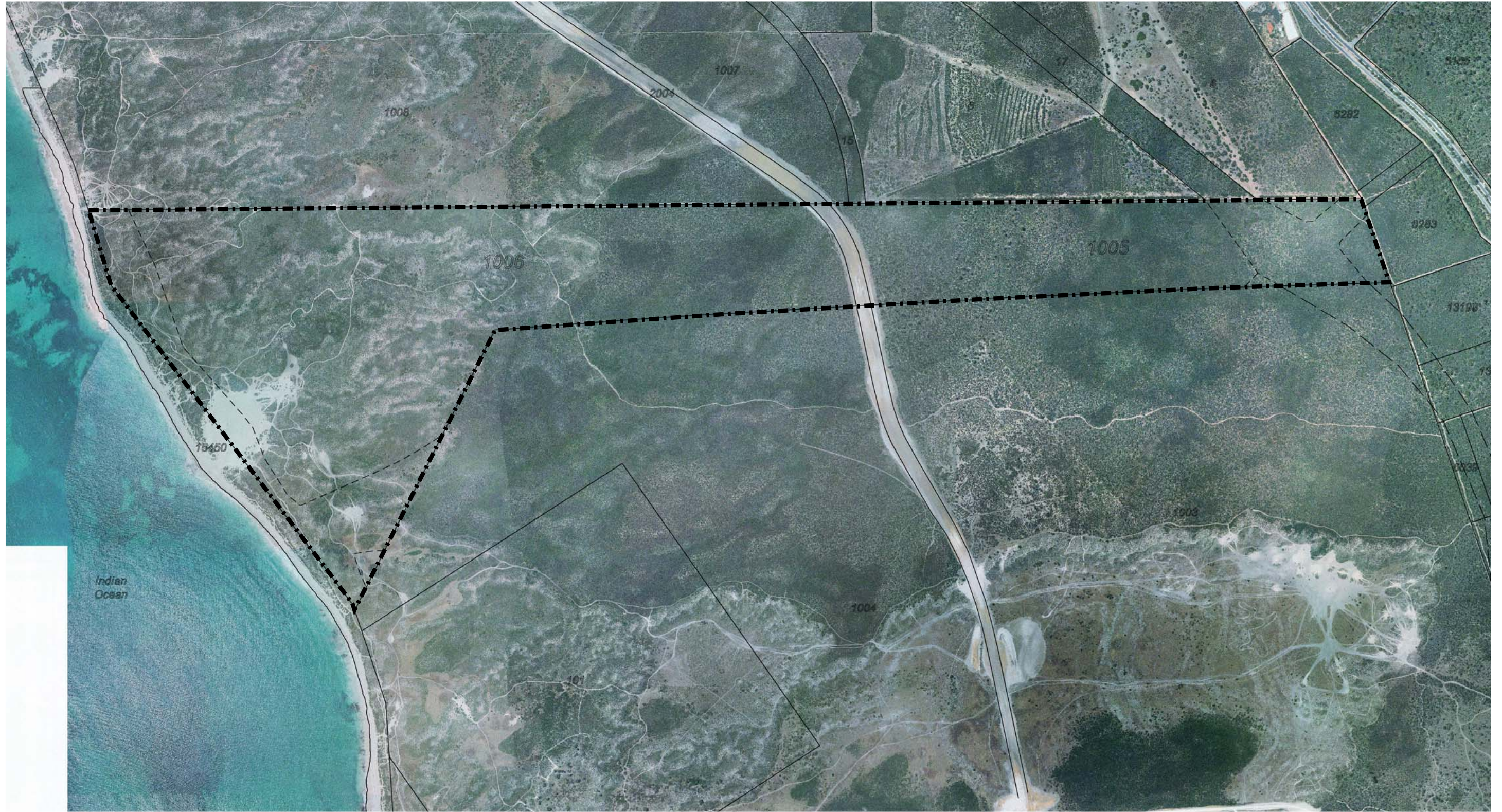
The site's topography is undulating and comprises a predominantly dunal landscape with occasional limestone outcrops. The dunes are located close to the coast with less undulating land to the east.

The coastal topography comprises a parabolic Quindalup sand dune with elevations up to RL45-50 m. In general, the Quindalup dune is steep, undulating, and irregular shaped with narrow ridges and varying side slopes up to 45%, with approximately 95% of the coastal topography consisting of existing slopes in excess of 10%.

Central to the site is a large blowout which is denuded of vegetation and highly unstable due to the effects of wind erosion.

Further inland the topography of the site is composed of underlying and some outcropping Tamala Limestone and gentler dunal ridges. The ridges generally run north-south through the site up to RL45 meters in elevation. The inland ridges are more regular and broader in shape with uniform slopes east and west of up to 15%.

The existing landform topography is demonstrated on **Figures 9 and 10** and **Photoplate 1** overleaf.

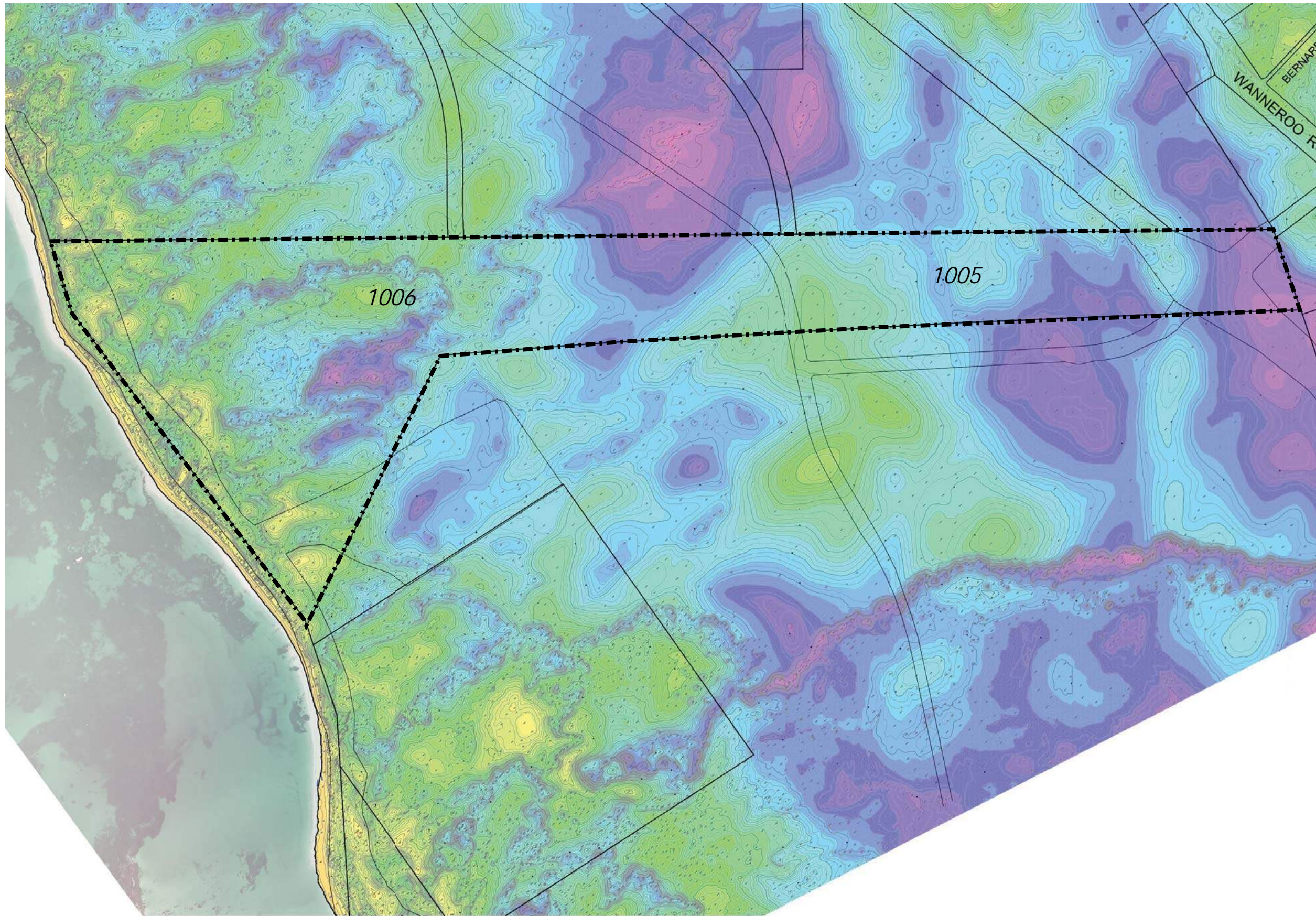


LEGEND

--- Subject Land

LEGEND

- 60m (highest)
 - 57m
 - 54m
 - 51m
 - 48m
 - 45m
 - 42m
 - 39m
 - 36m
 - 33m
 - 30m
 - 27m
 - 24m
 - 21m
 - 18m
 - 15m
 - 12m
 - 9m
 - 6m
 - 3m
 - 0m (lowest)
- Subject Land



SITE LEVELS

NORTH ALKIMOS LOCAL STRUCTURE PLAN | LOTS 1005 & 1006
MARMION AVENUE, ALKIMOS

TAYLOR BURRELL BARNETT | TABEC | EPCAD
SHARMI HOWE | CREATING COMMUNITIES
MACROPLAN | MP ROGERS & ASSOCIATES
SUSTAINABLE SOLUTIONS | WHELAN'S | ENV
OVERMAN ZUIDVELD | TAYLOR ROBINSON

FIGURE 09

0m 100m 200m

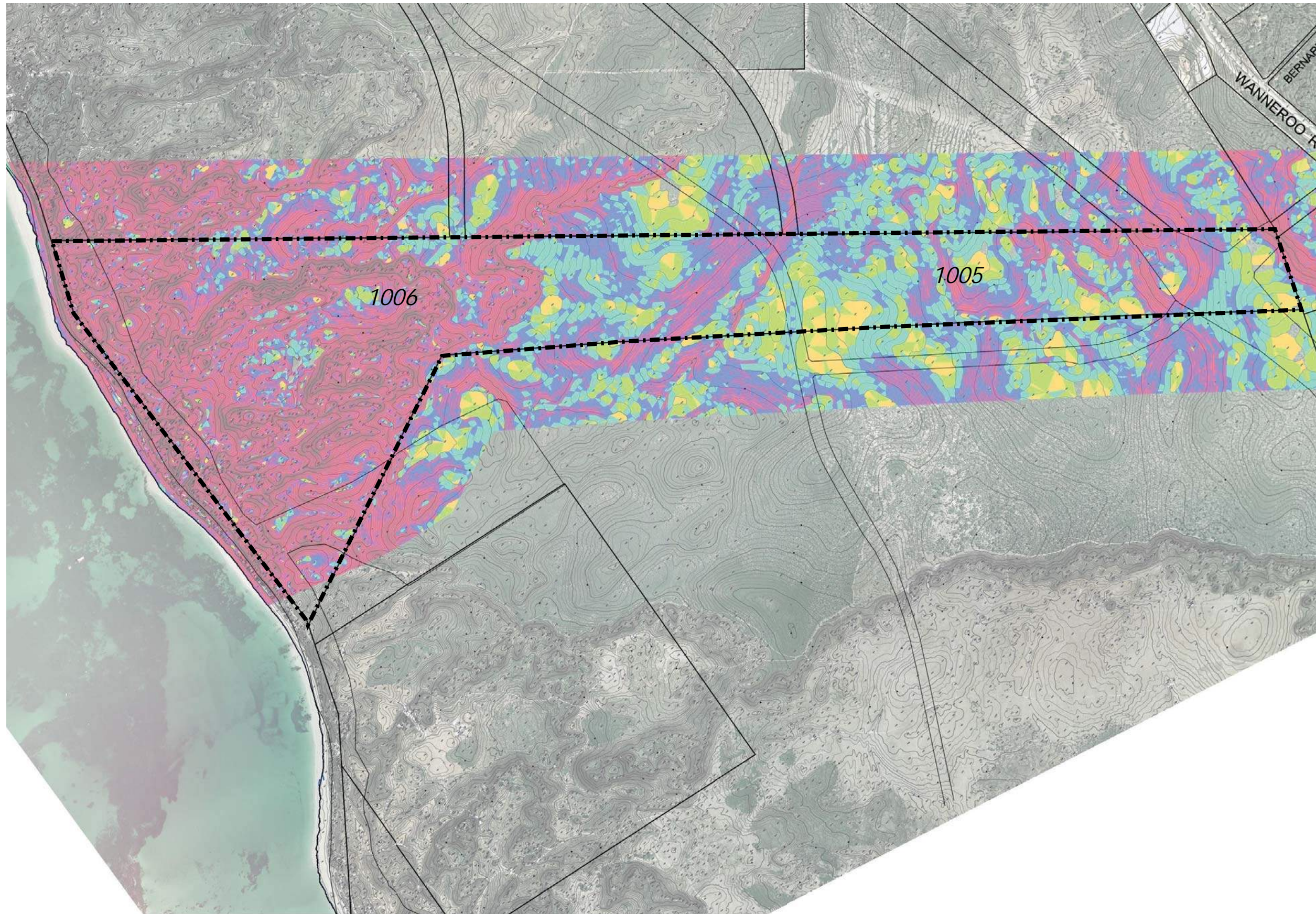


PLAN: 07/05
DATE: MAY 2009

PEET

LEGEND

- Over 10%
- 7.0 - 10%
- 5.0 - 7.0%
- 3.0 - 5.0%
- 1.5 - 3.0%
- 0 - 1.5%
- Subject Land



EXISTING SLOPES ANALYSIS

NORTH ALKIMOS LOCAL STRUCTURE PLAN | LOTS 1005 & 1006
MARMION AVENUE, ALKIMOS

TAYLOR BURRELL BARNETT | TABEC | EPCAD
SHARMI HOWE | CREATING COMMUNITIES
MACROPLAN | MP ROGERS & ASSOCIATES
SUSTAINABLE SOLUTIONS | WHELAN'S | ENV
OVERMAN ZUIDVELD | TAYLOR ROBINSON

FIGURE 10

0m 100m 200m



PLAN: 07/05
DATE: MAY 2009

North Alkimos Local Structure Plan



Inland, the landform is more gently undulating with well defined ridges and hollows.



Coastal landform: wind-formed parabolic dunes centred on a coastal blowout offering extensive views of the ocean.



Well defined break in blowout offering direct links with the beach.



View west from parabolic dune towards blowout.



View north-west from south arm of parabolic dune showing inter-dunal valley and dominant ridge.



View north of ridge showing coastal heath vegetation.

Photoplate 1 Landform and Topography

5.3 SOILS




The Quindalup Dune system is characterised by a series of parabolic dunes, as well as small beach ridges and blowouts. One major dune blowout is located on the subject land. The underlying Spearwood Dune system comprises ridges of limestone and quartz sand running parallel to the shore.



Photoplate 2 Major dune blowout

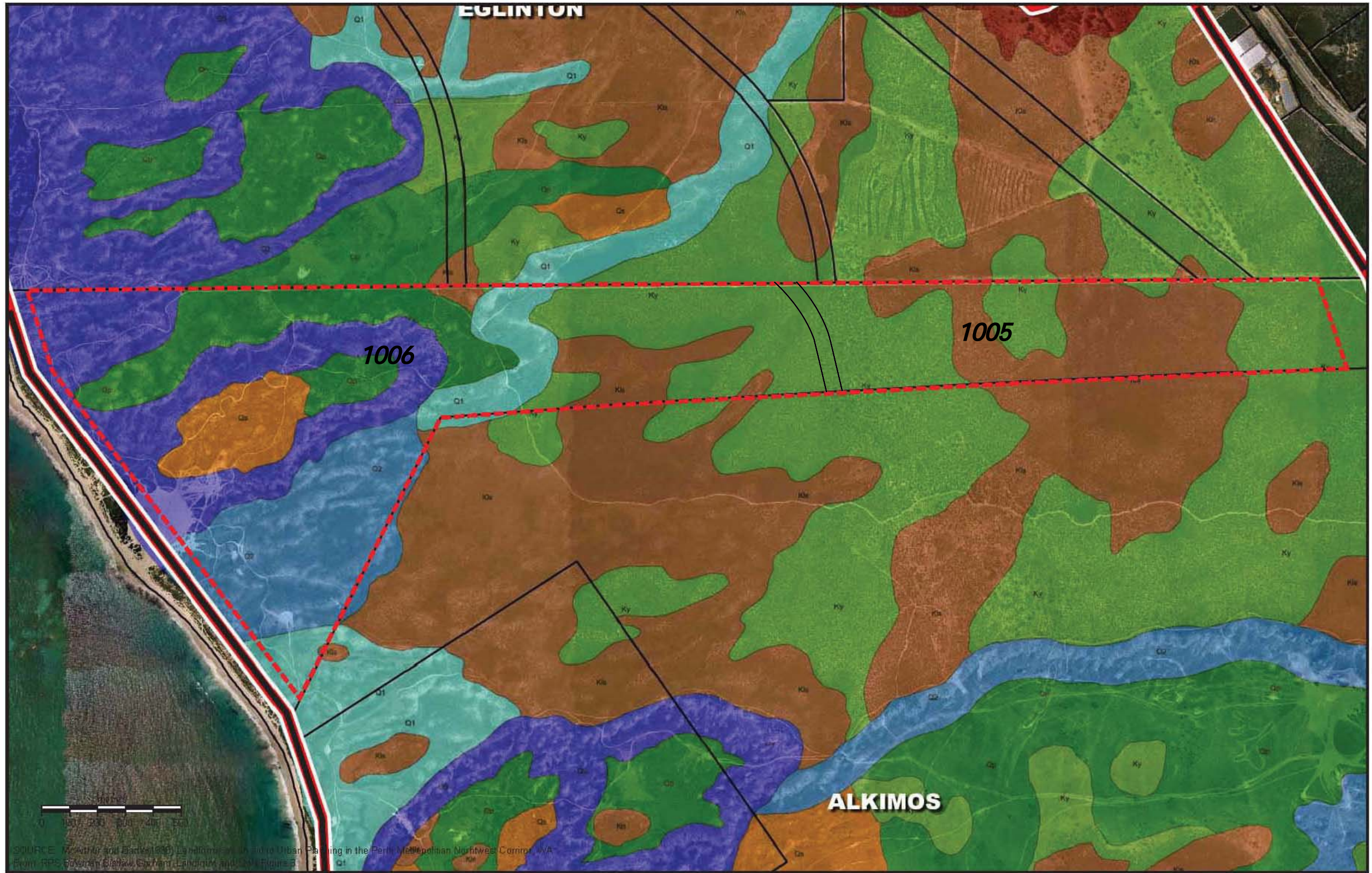
Tamala Limestone forms the dominant surface geology from 1-1.5 km inland from the coast to beyond the eastern boundaries of the property. The site comprises sands overlying limestone.

The soils of the site have been mapped by the Geological Survey of Western Australia (GSWA), refer **Figure 11**. GSWA (1986) maps three main soils on the site. The dominant soil types associated with the Quindalup and Spearwood Dune system are as follows:

-  (S₂) Calcareous Sand – white, fine- to medium-grained, sub-rounded quartz and shell debris, of eolian origin;
-  (S₇) Sand – pale and olive yellow, medium- to coarse-grained, sub-angular quartz with traces of feldspar, moderately sorted, of residual origin; and
-  (LS₁) Light yellowish-brown, fine- to coarse-grained, sub-angular to well-rounded, quartz, trace feldspar, shell debris, variable lithified, surface kankar of eolian origin.

The soil on the eastern half of the site consists of a grey-brown surface which passes into bright yellow sand, and limestone usually occurs within 2 m of the surface.






The dominant landform/soil types associated with the Quindalup Dune system are as follows:



LEGEND

- Alkimos - Eglinton DSP Boundary
- Kla** KARRAKATTA SHALLOW SOILS PHASE
Bare Rock, Yellow/brown shallow sands and stony soils
- Ky** KARRAKATTA SAND YELLOW PHASE
Yellow deep sands
- Q1** QUINDALUP OLDEST DUNE PHASE
Calcareous sands with organic staining to about 30cm, overlying pale brown sand with definite cementation below 1m.
- Q2** QUINDALUP SECOND DUNE PHASE
Calcareous sands with organic staining to about 20cm, passing into pale brown sand: some cementation below 1m.
- Q3** QUINDALUP THIRD DUNE PHASE
Loose calcareous sand with little surface organic staining and incipient cementation at depth.
- Q4** QUINDALUP YOUNGEST DUNE PHASE
Loose pale brown calcareous sand with no soil profile development
- Qp** QUINDALUP DEEP SAND FLAT PHASE
Dark grey-brown sand to about 50cm and then pale brown sand.
- Qs** QUINDALUP SHALLOW SAND FLAT PHASE
Shallow calcareous sands over limestone
- Qu** QUINDALUP UNSTABLE SAND PHASE
Calcareous sand.
- Sp** SPEARWOOD SYSTEM
Brown deep sands and yellow deep sands.
- Subject Land

North Alkimos Local Structure Plan




-  Quindalup Oldest Dune Phase (Q1) – this unit occurs as a wall of sand with low relief, a smooth outline and a symmetrical cross-section. It can occur up to 6 km inland. The soil profile is calcareous throughout, has organic matter to at least 30 cm, and white sand below, which shows cementation at about a metre below the surface.
-  Quindalup Second Dune Phase (Q2) – Similar to Q1 with slightly higher relief and slightly less organic matter.
-  Quindalup Third Dune Phase (Q3) – this unit has steeper slopes and greater relief than Q1 and Q2, with an irregular outline. Organic matter to 10 cm, cementation minimal.
-  Quindalup Youngest Dune Phase (Q4) – Generally, dunes are asymmetric with gentle inner slopes and steep outer faces. The outline is very jagged with many deep scallops and irregularities. The soils show very little humus content other than slight organic accumulation at the surface.
-  Quindalup Deep Sand Flat Phase (Qp) – nearly flat or gently undulating plains enclosed in parabolic dunes. Soils are dark in colour, with organic matter accumulation to 50 cm, then pale sand, sometimes weakly-cemented, overlying older limestone. These soil types occur predominantly in the western half of the site (RPS BBG, 2006).

Acid Sulphate Soil (ASS) risk mapping for the northern Perth region (WAPC 2003) indicates that the site is mapped as low to no risk of ASS at greater than 3 m depth. Therefore no ASS investigation is considered necessary for the Structure Plan area.

5.3.1 GEOTECHNICAL

Coffey Geosciences undertook a desktop geotechnical assessment in March 2006 as part of the Alkimos Eglinton District Structure Plan. From the desktop assessment the site is within an area of coastal sand dunes and calcarenite (Tamala Limestone).

Key geotechnical aspects within the Alkimos Eglinton District Structure Plan area are outlined below:

-  Surface rock is present in some parts of the site. Excavation conditions within the areas of rock are highly variable and are largely affected by the thickness of the limestone cap rock development.
-  Ground surface levels are generally significantly higher than the water levels and therefore high water tables are unlikely to impact on development.
-  The dune sands within the study area are predominantly free draining and the limestone is predominantly of moderate permeability (extreme permeabilities are possible in karstic limestone). The majority of the site is therefore likely to be suitable for disposal of stormwater via soakage. Exceptions to this could be within localised areas where water can perch on top of cemented limestone cap rock layers. Soakage can often be improved in these areas by deep ripping the limestone cap rock to increase permeability.

Douglas Partners have been engaged by Peet Alkimos to undertake a geotechnical investigation within the LSP area.

5.4 HYDROLOGY

5.4.1 SURFACE WATER

There are no surface water bodies in the site. The nearest wetlands are Coogee Swamp (1.2 km to the north), Beonoddy Swamp (1 km to the north), Carabooda Lake (1.1 km to the south-east) and Karli Springs (2.2 km to the south). There are no drainage lines in the site, because of the high infiltration capacity of the deep sands and the dense vegetation.

5.4.2 GROUNDWATER

There are three Department of Water (DoW) groundwater monitoring wells within the site, and one monitoring well installed by the proponent's environmental consultant. The Perth Groundwater Atlas indicates that groundwater flows from east to west (8 m AHD to less than 1 m AHD) (**Figure 12**). Groundwater fluctuates seasonally by approximately 1 m, according to the groundwater atlases.

5.4.2.1 DEPTH TO GROUNDWATER




The shallowest depth to groundwater from the natural surface is 24 m from the highest groundwater level. The base of the superficial formation is approximately -30 m AHD beneath the site. The superficial formation consists of sand over karstic Tamala Limestone across the site.

5.4.2.2 GROUNDWATER QUALITY

Groundwater salinity increases towards the coast (3000-7000 mg/L total dissolved solids (TDS)), and is lower in the east of the site (0-500 mg/L TDS).

5.4.3 IMPLICATIONS FOR WATER MANAGEMENT

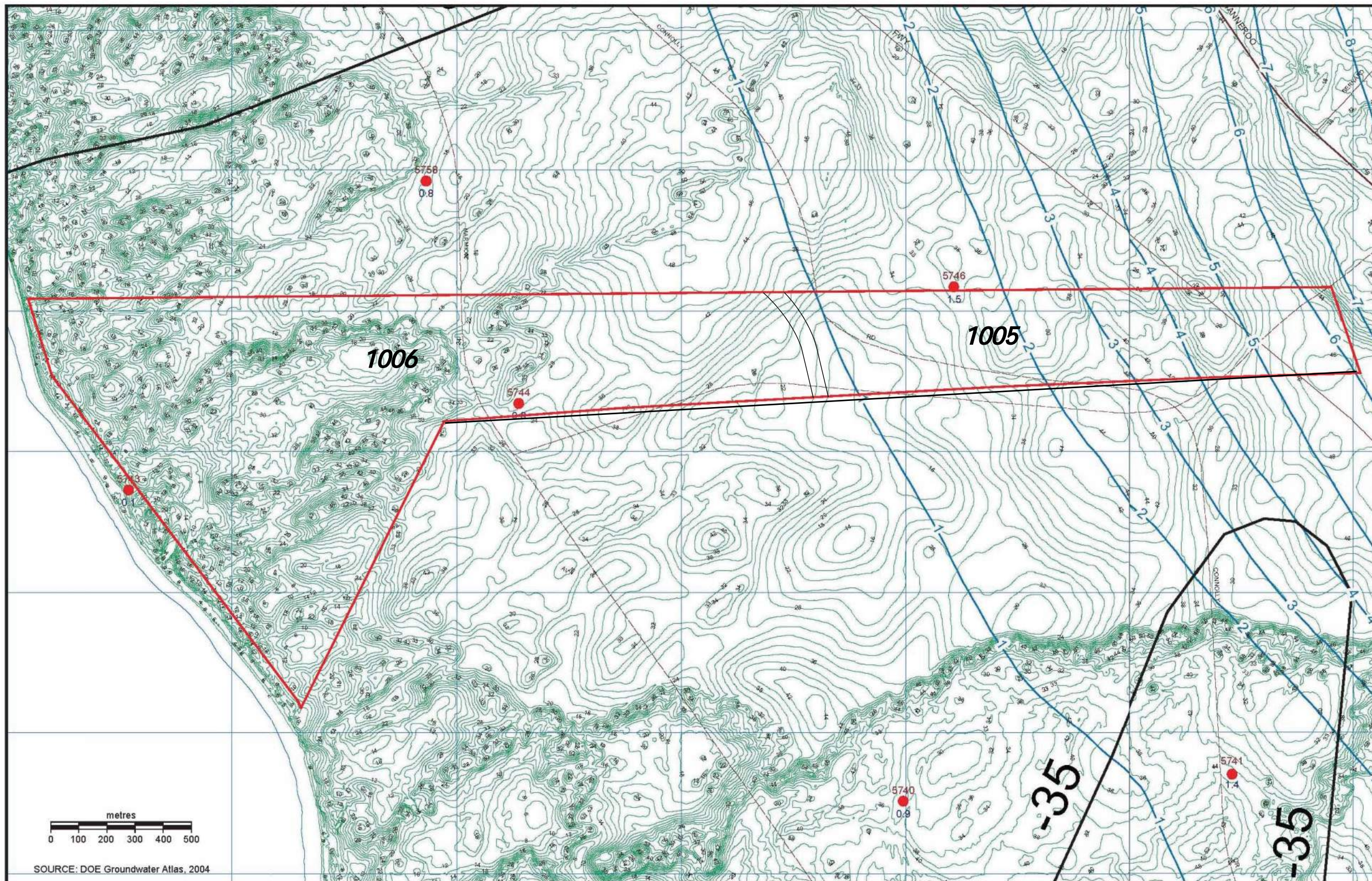
Development, including roads, roofs and other impermeable areas, will increase stormwater runoff on the site. Because of the soil types, topography and the lack of surface water of the site, disposal of stormwater from development is expected to be relatively uncomplicated. The following strategies are identified for the site:

-  All stormwater runoff from the development should be locally infiltrated in road reserves, medians or multiple-use POS.
-  Drainage in the area should be based on a water-sensitive design approach to maintain the quantity and quality and the longer-term sustainability of the underlying groundwater resource.
-  Water-sensitive design should incorporate the maximisation of stormwater recharge through diversion of run-off into roadside swales, infiltration trenches and basins, and the maximisation of water quality through retention and planting of vegetation in recharge areas.

A Local Water Management Strategy (LWMS) provides detailed water-related design objectives for the site, including water quality and conservation, refer **Appendix 3**.

LEGEND

-  Natural surface contours in metres AHD
-  Waterable contours (May 2003) in metres AHD
-  -10 Contours on base of superficial formaton in metres AHD
-  Bore Hole / Site ID
-  0.8 Water Level (May 2003) in metres AHD
-  Subject Land



GROUNDWATER

NORTH ALKIMOS LOCAL STRUCTURE PLAN | LOTS 1005 & 1006
MARMION AVENUE, ALKIMOS

TAYLOR BURRELL BARNETT | TABEC | EPCAD
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MACROPLAN | MP ROGERS & ASSOCIATES
SUSTAINABLE SOLUTIONS | WHELAN'S | ENV
OVERMAN ZUIDVELD | TAYLOR ROBINSON

FIGURE **12**

0m 100m 200m



PLAN: 07085
DATE: MAY 2009

PEET

5.5 COASTAL SYSTEMS




The subject land has approximately 1.7 km of coastal frontage. An offshore reef system parallel to the shore typically lowers waves to less than 1 m, creating a moderately steep reflective beach face. Wave conditions and beach safety are similar to those at City Beach and Scarborough. In general, the wider sections of beach are suitable for swimming, fishing and other recreational pursuits.



Photoplate 3 Offshore Reef System




Most of the beach is backed by a significant dune system with a 10-20 m high foredune and rear dunes in the order of 20-30 m. The majority of the dune system appears stable; however, a large dune blowout is located in the centre of the lot.

In terms of coastal stability, the subject land exhibits regions that have previously experienced periods of erosion, stability and accretion. These are summarised below:

-  The northern 600 m of shoreline has a 20-30 m wide beach and has had a constant recession rate.
-  A point exists approximately 600 m to the south of the northern boundary. The beach at this point is stable and is 20-30 m wide.
-  The beach is slightly narrower to the south of the point having a width of 15-25 m. This beach is currently stable to eroding but it has undergone accretion in the past, highlighting the natural variability of the coastal processes.

The overall variability of the shoreline has been examined in detail in the physical coastal processes setback report.

The width of the coastal foreshore reserve is typically dependant on the physical processes setback, calculated in accordance with Schedule One of SPP 2.6 – State Coastal Planning Policy. The physical processes setback should provide a low level of risk for future residential development from coastal erosion. This setback takes into account:





-  the erosion potential associated with a 1 in 100 year storm event;
-  the historical shoreline movement trend; and
-  the possible recession of the shoreline as a result of climate change induced sea level rise in the coming 100 years.

The width of the zoned coastal foreshore reserve (Parks and Recreation Reserve) along the coastline of the subject land is in excess of the physical processes setback in all locations. The width of this reserve is typically in the order of 200-250 m.

5.6 LANDSCAPE

The landscape character of the subject land is determined primarily by the combination of dominant vegetation type and topographic features (refer **Figure 13**). The experience of the viewer is of an expansive natural landscape with little effects of human intervention, apart from the increased erosion of the large dune blowout from human activities such as four-wheel-driving, and a strong line of mature planted trees along the eastern portion of the northern boundary of the site.

The area comprises a broad landscape made up of a number of primary landscape characters:





-  The parabolic dune is the primary topographic feature and is largely covered in coastal heath. It encloses and provides shelter to a lower area inside its limits;
-  The foredunes and foreshore represent a separate landscape character and are typical young unstable dunes forming a chaotic landscape with occasional blowouts and low dunes vegetation;
-  A blowout large enough to be classified as an independent landscape feature dominates the central area of coastline at the site, and is completely denuded; and
-  The broad undulating low Banksia woodland forms the inner area to the east, and includes a zone containing some slightly larger Tuart trees.

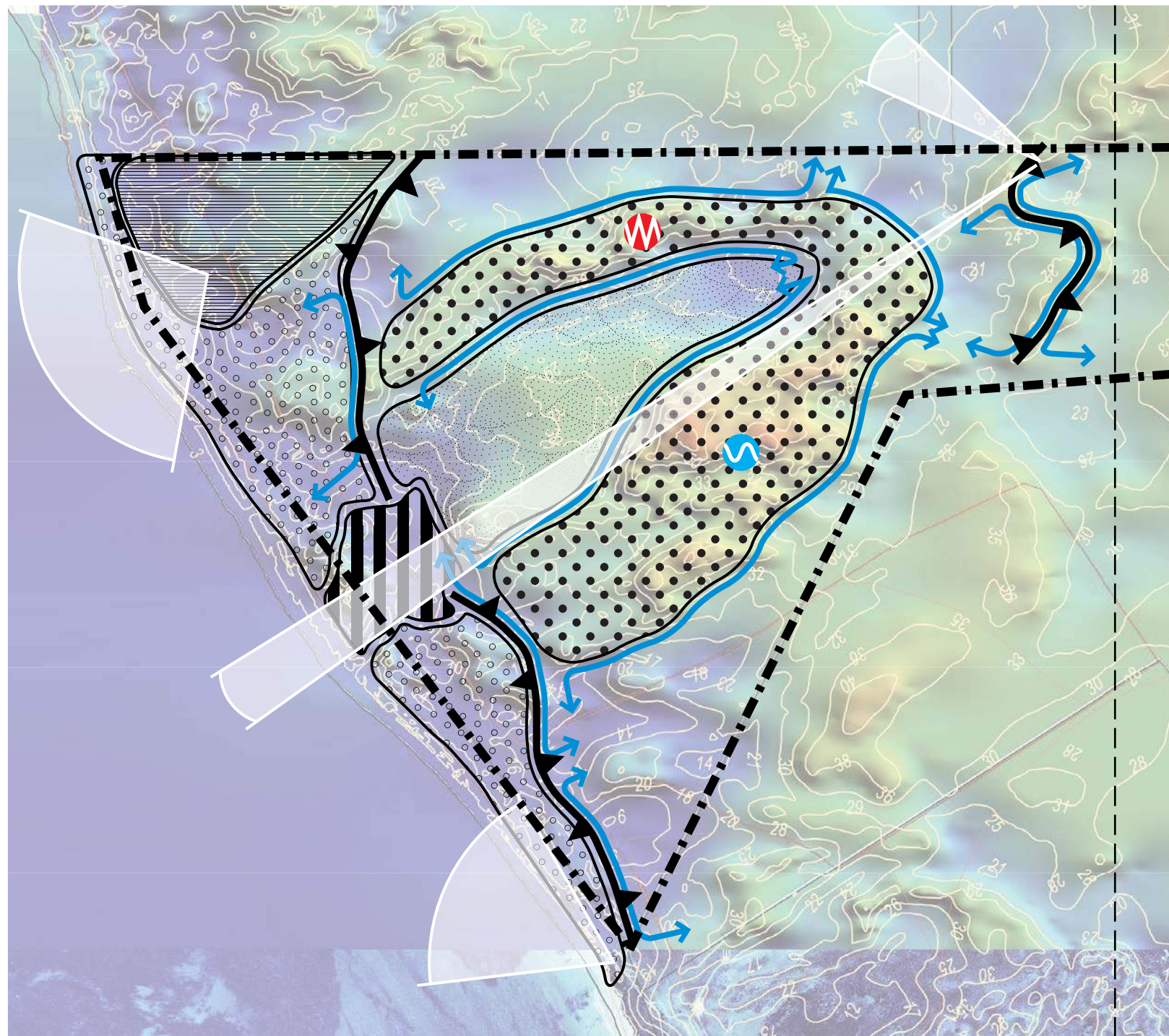
The subject land has previously been grazed extensively and has recently suffered an uncontrolled fire and many areas remain denuded as a result of the fire. An area of grass trees in the north east of the area sheltered by the parabolic dune has become a stronger element in the landscape, since the fire, due to all the vegetation surrounding them having been burned.

Limestone rocks and rubble lie at the surface on much of the site, and contribute to its character. Limestone rocks are intended to be harvested and re-used in the landscaping of the development.

5.7 VIEWSCAPES

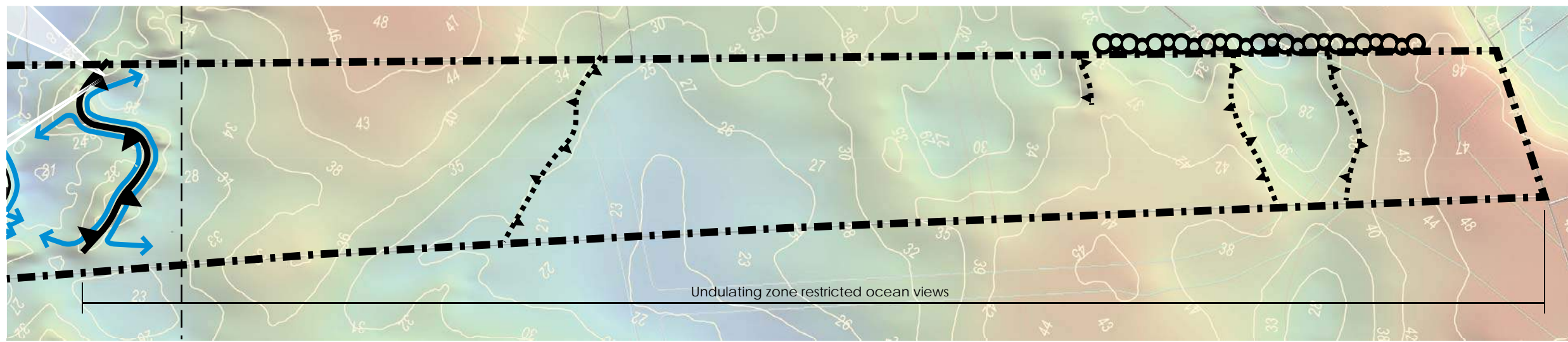
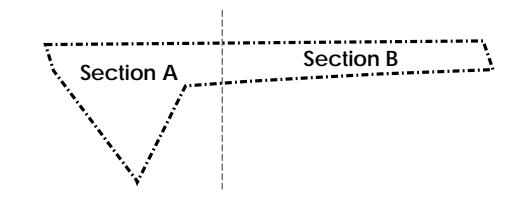
Views within the development are patchy due to the highly variable topography of the site and are illustrated at **Figure 13**. The main viewlines are as follows:

-  A plateau to the north provides opportunities for views of the ocean and down the foreshore reserve;
-  The ridge running along the back of the band of chaotic dunes offers ocean views and views inland;
-  The parabolic dune offers views into the sheltered area of its interior, and outwards into the surrounding area;
-  The ridgeline east of the parabolic dune offer long views to the north-west over an adjacent low area; and



- ### LEGEND
- Primary/Key Views
Predominantly panoramic
 - Secondary Views
Predominantly internal
 - Plateau
Opportunities for views
 - Major Ridgeline
Opportunities for views
 - Minor Ridgeline
 - Parabolic Dune
 - Inner Parabolic Dune Area
Low sheltered area
 - Chaotic Dunes
 - Blow Out
Stabilisation required
 - Treeline
 - Acute Topography
Unique requirements
 - Less Acute Topography
Easier to preserve in development
 - Contour Levels
50m
0m
 - Subject Land

LOCATION PLAN



LANDFORM ANALYSIS

NORTH ALKIMOS LOCAL STRUCTURE PLAN | LOTS 1005 & 1006 MARMION AVENUE, ALKIMOS


TAYLOR BURRELL BARNETT | TABEC | EPCAD
SHARNI HOWE | CREATING COMMUNITIES
MACROPLAN | MP ROGERS & ASSOCIATES
SUSTAINABLE SOLUTIONS | WHEELERS | ENV
OVERMAN ZUIDEVELD | TAYLOR ROBINSON

FIGURE 13

0m 75m 150m



PLAN: 07/05
DATE: MAY 2009

 Views from inside the dune blow out and further up the interior of the parabolic dune are restricted to a narrow corridor through a low point at the front face of the chaotic dune strip.

5.7.1 OCEAN VIEWS

Views to the ocean from within the site are relatively restricted under the current landform regime. Even after earthworking for development access, ocean views on land closest to the Foreshore Reserve would be limited by the chaotic dunes in the Foreshore Reserve.

The landform of the site does, however, provide for aspect and view corridors to the Indian Ocean from a number of high points extending eastwards across the site.

5.7.2 VIEWS OF THE DEVELOPMENT

The presence of the parabolic dune (even in its reduced form post-development) at the site results in much of the coastal development being only visible from other areas between the dune and the ocean.

Views into the area sheltered by the dune formation from the inner slopes of the dune are particularly important, as without regulation they could consist of a sea of unmatched roof colours, and present in an aesthetically unpleasing way. The key view in this context is from where the distributor road crosses the ridgeline of the parabolic dunal formation.

Development along the outer slopes of the parabolic dune will be visible from areas to the east, both within the development and from neighbouring areas.

Although there is currently no existing development adjacent to the proposed development, the zoning of adjoining land as Urban under the MRS there is significant likelihood that there will be urban development on adjacent land at some point in the future. Following the development of this land, parts of the proposed development will be visible to the residents of these areas, particularly development located on the outer slopes of the parabolic dune.

5.8 VEGETATION

Vegetation and flora surveys were carried out over parts of the Alkimos Eglinton locality in 1990, 1996, 2002 and 2004. The results of the various surveys and information regarding the flora and vegetation located within the subject land are summarised below.

5.8.1 VEGETATION COMPLEX

The patterning of plant and animal distributions on the Swan Coastal Plain is closely related to the geology, geomorphology and soils of the plain. The site is located partially on the Quindalup Dunes, which are characterised by vegetation of the Quindalup Complex (west portion of the site close to the coast) and the Spearwood Dunes, characterised by Cottesloe Complex - Central-South (east portion of the site).








The Quindalup Vegetation Complex has 48% of its pre-clearing extent remaining on the Swan Coastal Plain, with 20% proposed for protection through Bush Forever. The Quindalup Complex is the dune complex consisting mainly of two alliances – the stand and foredune alliance, and the mobile and stable dune alliance. Local variations include the low closed forest of *Melaleuca lanceolata-Callitris preissii* and the closed scrub of *Acacia rostellifera*.

The Cottesloe Complex-Central-South has 36% of its pre-clearing extent remaining, with 18% proposed for protection through Bush Forever. This complex consists of mosaics of woodland of *Eucalyptus gomphocephala* and open forest of *Eucalyptus gomphocephala*- *Eucalyptus marginata*-*Corymbia calophylla*; closed heath on the limestone outcrops.

An extensive survey of the bushland on the site in 2004 identified 41 vegetation communities. Many of the vegetation communities are very similar, but comprise different tree species combinations and different dominant understorey species.

5.8.2 VEGETATION COMMUNITIES




The 41 vegetation communities identified in the survey (**Figure 14**) were compared against the Floristic Community Types ('FCTs'), described in Bush Forever, to determine what FCTs are in the subject land. These are listed below:

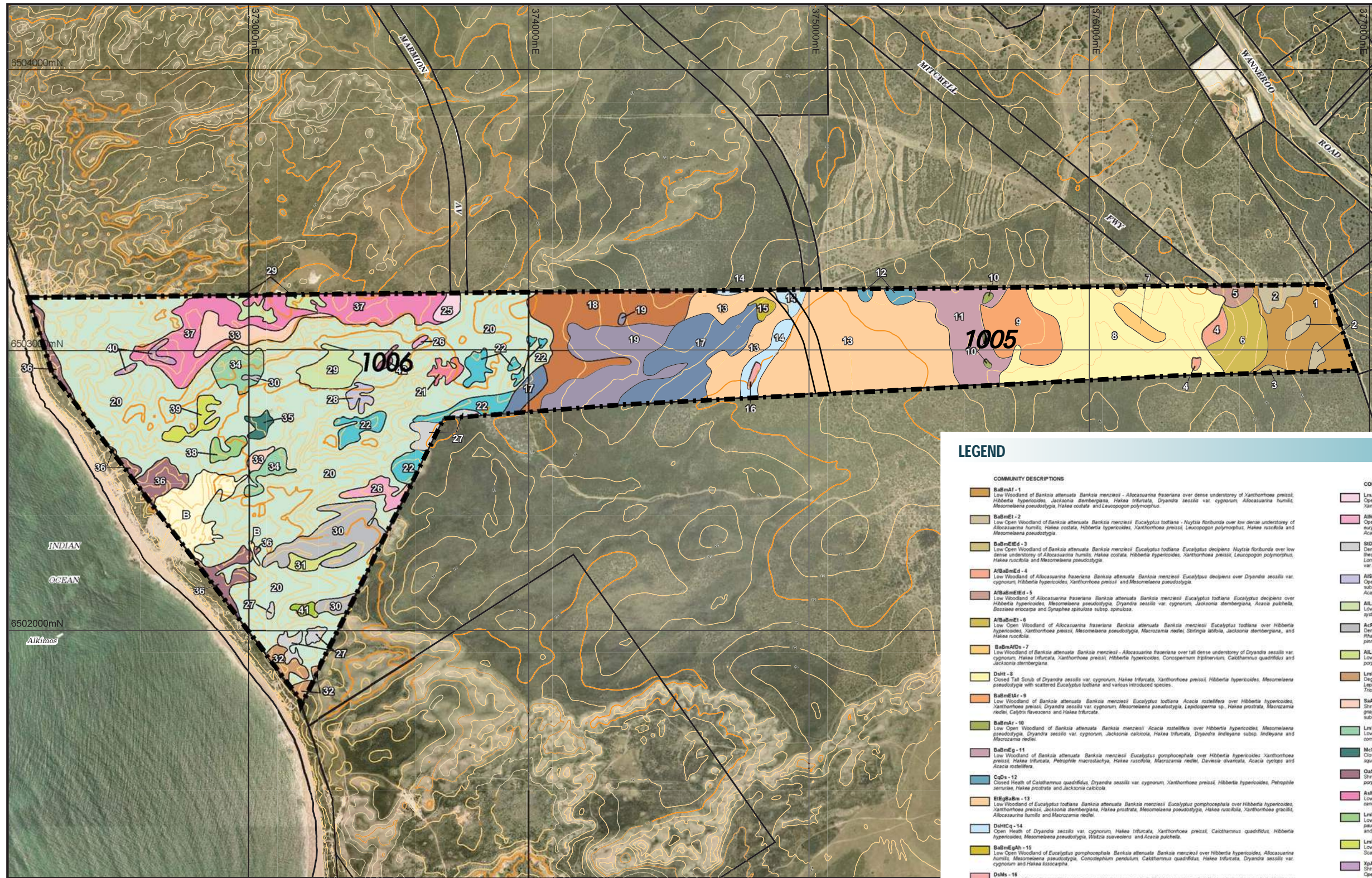
-  **FCT 24** Northern Spearwood shrublands and woodlands;
-  **FCT 26a** *Melaleuca huegelii* – *M. systema* shrublands of limestone ridges;
-  **FCT 28** Spearwood *Banksia attenuata* or *Banksia attenuata* – *Eucalyptus* woodlands;
-  **FCT 29a** Coastal shrublands on shallow sands;
-  **FCT 29b** *Acacia* shrublands on taller dunes;
-  **FCT S13** Northern *Olearia axillaris* – *Scaevola crassifolia* shrublands; and
-  **FCT S15** Weed group.

5.8.3 SIGNIFICANT VEGETATION

Bush Forever site 397 is incorporated in the coastal reserve and Parks and Recreation Reserve corridor in the south of the site. Bush Forever site 130 lies east of the Mitchell Freeway Reserve, outside the DSP area, however has been identified on the Structure Plan. Management of the Bush Forever site is discussed under Parks and Recreation Reserve in section 8.1.

The database search undertaken before field work identified FCT 26a as occurring in the area. FCT 26a is listed as a Threatened Ecological Community ('TEC'). It is listed as:


-  Limestone ridges (SCP 26a)- *Melaleuca huegelii* – *Melaleuca systema* (formerly *acerosa*) shrublands on limestone ridges (Gibson *et al.* 1994 type 26a). The threat and criteria that FCT 26a is categorised under in Western Australia is: **ENDANGERED (EN)**. SCP 26a is not a Commonwealth-listed TEC.
-  From the data collected during the 2004 vegetation survey, the project environmental consultant inferred two vegetation communities as being that of FCT 26a:
-  **DsMs – 16** Shrubland of *Dryandra sessilis* var. *cygnorum*, *Xanthorrhoea preissii*, *Melaleuca systema*, *Grevillea preissii* subsp. *preissii*, *Melaleuca huegelii* subsp. *huegelii*, *Lomandra maritima*, *Kennedia prostrata*, *Desmodcladus asper* and *Brachyscome iberidifolia* on limestone outcropping; and



LEGEND

- COMMUNITY DESCRIPTIONS**
- BaBaM1-1** Low Woodland of *Banksia attenuata* - *Banksia menziesii* - *Allocasuarina fraseriana* over dense understorey of *Xanthorrhoea preissii*, *Hibbertia hypericoides*, *Jacksonia stembergia*, *Hakea trifurcata*, *Dryandra sessilis* var. *cygnorum*, *Allocasuarina humilis*, *Mesomelaena pseudostygia*, *Hakea costata* and *Leucopogon polymorphus*.
 - BaBaM1-2** Low Open Woodland of *Banksia attenuata* - *Banksia menziesii* - *Eucalyptus todtiana* - *Nyctia forsteri* over low dense understorey of *Allocasuarina humilis*, *Hakea costata*, *Hibbertia hypericoides*, *Xanthorrhoea preissii*, *Leucopogon polymorphus*, *Hakea ruscifolia* and *Mesomelaena pseudostygia*.
 - BaBaM1-3** Low Open Woodland of *Banksia attenuata* - *Banksia menziesii* - *Eucalyptus todtiana* - *Eucalyptus decipiens* - *Nyctia forsteri* over low dense understorey of *Allocasuarina humilis*, *Hakea costata*, *Hibbertia hypericoides*, *Xanthorrhoea preissii*, *Leucopogon polymorphus*, *Hakea ruscifolia* and *Mesomelaena pseudostygia*.
 - ARaBaM1-4** Low Woodland of *Allocasuarina fraseriana* - *Banksia attenuata* - *Banksia menziesii* - *Eucalyptus decipiens* over *Dryandra sessilis* var. *cygnorum*, *Hibbertia hypericoides*, *Xanthorrhoea preissii* and *Mesomelaena pseudostygia*.
 - ARaBaM1-5** Low Woodland of *Allocasuarina fraseriana* - *Banksia attenuata* - *Banksia menziesii* - *Eucalyptus todtiana* - *Eucalyptus decipiens* over *Hibbertia hypericoides*, *Mesomelaena pseudostygia*, *Dryandra sessilis* var. *cygnorum*, *Jacksonia stembergia*, *Acacia pulchella*, *Bossea erocarpa* and *Synagphe spinulosa* subsp. *spinulosa*.
 - ARaBaM1-6** Low Open Woodland of *Allocasuarina fraseriana* - *Banksia attenuata* - *Banksia menziesii* - *Eucalyptus todtiana* over *Hibbertia hypericoides*, *Xanthorrhoea preissii*, *Mesomelaena pseudostygia*, *Macrozamia reidi*, *Stringa bobila*, *Jacksonia stembergia*, and *Hakea ruscifolia*.
 - BaBaM1-7** Low Woodland of *Banksia attenuata* - *Banksia menziesii* - *Allocasuarina fraseriana* over tall dense understorey of *Dryandra sessilis* var. *cygnorum*, *Hakea trifurcata*, *Xanthorrhoea preissii*, *Hibbertia hypericoides*, *Conopseum bipinnatum*, *Calothamnus quadrifidus* and *Jacksonia stembergia*.
 - DdM1-8** Closed Tall Scrub of *Dryandra sessilis* var. *cygnorum*, *Hakea trifurcata*, *Xanthorrhoea preissii*, *Hibbertia hypericoides*, *Mesomelaena pseudostygia* with scattered *Eucalyptus todtiana* and various introduced species.
 - BaBaM1-9** Low Woodland of *Banksia attenuata* - *Banksia menziesii* - *Eucalyptus todtiana* - *Acacia reticulata* over *Hibbertia hypericoides*, *Xanthorrhoea preissii*, *Dryandra sessilis* var. *cygnorum*, *Mesomelaena pseudostygia*, *Lepidosperma* sp., *Hakea prostrata*, *Macrozamia reidi*, *Calymn flavescens* and *Hakea trifurcata*.
 - BaBaM1-10** Low Open Woodland of *Banksia attenuata* - *Banksia menziesii* - *Acacia reticulata* over *Hibbertia hypericoides*, *Mesomelaena pseudostygia*, *Dryandra sessilis* var. *cygnorum*, *Jacksonia calceola*, *Hakea trifurcata*, *Dryandra indlyana* subsp. *indlyana* and *Macrozamia reidi*.
 - BaBaM1-11** Low Woodland of *Banksia attenuata* - *Banksia menziesii* - *Eucalyptus gomphocephala* over *Hibbertia hypericoides*, *Xanthorrhoea preissii*, *Hakea trifurcata*, *Petrophile macrostachya*, *Hakea ruscifolia*, *Macrozamia reidi*, *Daviesia divanata*, *Acacia cyclops* and *Acacia reticulata*.
 - CdM1-12** Closed Heath of *Calothamnus quadrifidus*, *Dryandra sessilis* var. *cygnorum*, *Xanthorrhoea preissii*, *Hibbertia hypericoides*, *Petrophile senaria*, *Hakea prostrata* and *Jacksonia calceola*.
 - ERaBaM1-13** Low Woodland of *Eucalyptus todtiana* - *Banksia attenuata* - *Banksia menziesii* - *Eucalyptus gomphocephala* over *Hibbertia hypericoides*, *Xanthorrhoea preissii*, *Jacksonia stembergia*, *Hakea prostrata*, *Mesomelaena pseudostygia*, *Hakea ruscifolia*, *Xanthorrhoea gracilis*, *Allocasuarina humilis* and *Macrozamia reidi*.
 - DdM1-14** Open Heath of *Dryandra sessilis* var. *cygnorum*, *Hakea trifurcata*, *Xanthorrhoea preissii*, *Calothamnus quadrifidus*, *Hibbertia hypericoides*, *Mesomelaena pseudostygia*, *Waxia suaveolens* and *Acacia pulchella*.
 - BaBaM1-15** Low Open Woodland of *Eucalyptus gomphocephala* - *Banksia attenuata* - *Banksia menziesii* over *Hibbertia hypericoides*, *Allocasuarina humilis*, *Mesomelaena pseudostygia*, *Conostephus pendulum*, *Calothamnus quadrifidus*, *Hakea trifurcata*, *Dryandra sessilis* var. *cygnorum* and *Hakea lasiocarpa*.
 - DdM1-16** Shrubland of *Dryandra sessilis* var. *cygnorum*, *Xanthorrhoea preissii*, *Melaleuca systema*, *Grevillea preissii* subsp. *preissii*, *Melaleuca huegelii* subsp. *huegelii*, *Lomandra maritima*, *Kennedia prostrata*, *Desmodium asper* and *Brachycome ibertifolia* on limestone outcropping.
 - DdM1-17** Closed Heath of *Dryandra sessilis* var. *cygnorum*, *Hakea trifurcata*, *Calothamnus quadrifidus*, *Hakea prostrata*, *Xanthorrhoea preissii*, *Hibbertia hypericoides*, *Leucopogon polymorphus*, *Jacksonia calceola*, *Conopseum bipinnatum*, and *Xanthorrhoea gracilis*.
 - BaBaM1-18** Low Woodland of *Banksia attenuata* - *Banksia menziesii* over *Allocasuarina humilis*, *Hibbertia hypericoides*, *Xanthorrhoea preissii*, *Lysinema ciliatum*, *Mesomelaena pseudostygia*, *Conostephus pendulum*, *Hakea costata* and *Xanthorrhoea gracilis*.
 - DdM1-19** Closed Tall Shrub of *Dryandra sessilis* var. *cygnorum*, *Hibbertia hypericoides*, *Hakea costata*, *Xanthorrhoea preissii*, *Allocasuarina humilis*, *Mesomelaena pseudostygia*, *Calothamnus quadrifidus* and *Hakea trifurcata*.
 - LmM1-20** Low Open Shrubland of *Lomandra maritima*, *Melaleuca systema*, *Conostylis pauciflora* subsp. *euryniphi* subsp. *pauciflora*/candicans, *Acanthocarpus preissii*, *Acacia cochlearis*, *Desmodium asper*, *Leucopogon parviflorus*, *Hemandra pungens* and *Acacia lasiocarpa* var. *lasiocarpa*.
 - LmM1-21** Low Shrubland of *Melaleuca systema*, *Lomandra maritima*, *Acacia cochlearis*, *Desmodium asper*, *Conostylis pauciflora* subsp. *euryniphi* subsp. *pauciflora*/candicans, *Leucopogon parviflorus*, *Acanthocarpus preissii*, *Hemandra pungens*, *Acacia cochlearis* and *Acacia lasiocarpa* var. *lasiocarpa*.
 - XpLmM1-22** Open Low Heath of *Xanthorrhoea preissii*, *Melaleuca systema*, *Lomandra maritima*, *Desmodium asper*, *Conostylis pauciflora* subsp. *euryniphi* subsp. *pauciflora*/candicans, *Leucopogon parviflorus*, *Acanthocarpus preissii*, *Acacia cochlearis*, *Hemandra pungens* and *Acacia lasiocarpa* var. *lasiocarpa*.
 - LmM1-23** Open Shrubland of *Lomandra maritima*, *Acacia pulchella*, *Acacia saligna*, *Melaleuca systema*, *Hakea prostrata*, *Lomandra maritima*, *Xanthorrhoea preissii*, *Poa porphyrocladus*, *Dryandra indlyana* var. *indlyana* and *Desmodium asper*.
 - AM1-24** Open Shrubland of *Anthoecia illorea*, *Melaleuca systema*, *Lomandra maritima*, *Desmodium asper*, *Conostylis pauciflora* subsp. *euryniphi* subsp. *pauciflora*/candicans, *Leucopogon parviflorus*, *Acanthocarpus preissii*, *Acacia cochlearis*, *Hemandra pungens* and *Acacia lasiocarpa* var. *lasiocarpa*.
 - SD1-27** Dense Tall Scrub of *Dryandra sessilis* var. *cygnorum* that has been burnt and now consists of Low Open Shrubland of *Scaevola thesioides* subsp. *thesioides*, *Acacia truncata*, *Grevillea preissii* subsp. *preissii*, *Melaleuca systema*, *Melaleuca huegelii* subsp. *huegelii*, *Lomandra maritima*, *Poa porphyrocladus*, *Leucopogon parviflorus*, *Xanthorrhoea preissii*, *Opertularia vaginata* and *Dryandra sessilis* var. *cygnorum* with limestone outcropping.
 - AM1-28** Open Shrubland of *Anthoecia illorea*, *Scaevola repens* var. *repens*, *Melaleuca systema*, *Poa porphyrocladus*, *Rhagodia baccata* subsp. *baccata*, *Acacia saligna*, *Desmodium asper*, *Conostylis pauciflora* subsp. *euryniphi* subsp. *pauciflora*/candicans and *Acanthocarpus preissii*.
 - ALM1-29** Low Open Shrubland of *Anthoecia illorea*, *Lomandra maritima*, *Poa porphyrocladus*, *Scaevola repens* var. *repens*, *Melaleuca systema*, *Acacia cochlearis*, *Opertularia vaginata*, *Xanthorrhoea preissii*, *Rhagodia baccata* subsp. *baccata* and *Trochne elator*.
 - AM1-30** Dense Tall Scrub of *Dryandra sessilis* var. *cygnorum* that has been burnt and now consists of Shrubland of *Acacia cochlearis*, *Rhagodia baccata* subsp. *baccata*, *Poa porphyrocladus*, *Dryandra sessilis* var. *cygnorum*, *Hemandra pungens* and *Senecio pinnatifidus*.
 - ALM1-31** Low Open Shrubland of *Anthoecia illorea*, *Lomandra maritima*, *Melaleuca systema*, *Scaevola thesioides* subsp. *thesioides*, *Poa porphyrocladus*, *Acanthocarpus preissii*, *Hibbertia racemosa* and *Trochne elator*.
 - LmM1-32** Open Heath of *Lomandra maritima*, *Poa porphyrocladus*, *Conostylis pauciflora* subsp. *euryniphi* subsp. *pauciflora*/candicans, *Lepidosperma aff. squamatum*, *Acanthocarpus preissii*, *Melaleuca systema*, *Podtheca graphaloides*, *Hibbertia racemosa* and *Trochne elator*.
 - AM1-33** Shrubland of *Santalum acuminatum*, *Anthoecia illorea*, *Melaleuca systema*, *Poa porphyrocladus*, *Acanthocarpus preissii*, *Podtheca graphaloides*, *Lepidosperma aff. squamatum*, *Hemandra pungens*, *Lomandra maritima* and *Conostylis pauciflora* subsp. *euryniphi* subsp. *pauciflora*/candicans.
 - LmM1-34** Low Open Shrubland of *Lomandra maritima*, *Santalum acuminatum*, *Melaleuca systema*, *Poa porphyrocladus*, *Hemandra pungens* and *Hibbertia racemosa*.
 - M1-35** Closed Heath of *Melaleuca cardiophylla*, *Scaevola nitida*, *Melaleuca huegelii* subsp. *huegelii*, *Acacia truncata*, *Lepidosperma aff. squamatum*, *Rhagodia baccata* subsp. *baccata* and *Leptomeria gladiatum*.
 - OM1-36** Shrubland of *Cleistanthus alvianus*, *Lomandra maritima*, *Spyridium gibbulosum*, *Santalum acuminatum*, *Lepidosperma gladiatum*, *Poa porphyrocladus*, *Desmodium asper* and *Vulpia bromoides*.
 - AM1-37** Low Shrubland of *Acacia saligna*, *Melaleuca systema*, *Lomandra maritima*, *Conostylis pauciflora* subsp. *euryniphi* subsp. *pauciflora*/candicans, *Podtheca graphaloides*, *Opertularia vaginata*, *Leucopogon parviflorus* and *Hemandra pungens*.
 - LmM1-38** Low Open Shrubland of *Melaleuca systema*, *Lomandra maritima*, *Desmodium asper*, *Conostylis pauciflora* subsp. *euryniphi* subsp. *pauciflora*/candicans, *Leucopogon parviflorus*, *Acanthocarpus preissii*, *Acacia cochlearis*, *Hemandra pungens*, *Anthoecia illorea* and *Acacia lasiocarpa* var. *lasiocarpa*.
 - LmM1-39** Low Open Shrubland of *Lomandra maritima*, *Melaleuca systema*, *Santalum acuminatum*, *Acanthocarpus preissii*, *Poa porphyrocladus*, *Scaevola repens* var. *repens*, *Senecio pinnatifidus* and *Lepidosperma aff. squamatum*.
 - AM1-40** Shrubland of *Xanthorrhoea preissii*, *Acacia saligna*, *Lomandra maritima*, *Melaleuca systema*, *Kennedia prostrata*, *Hybanthus calycifolius*, *Opertularia vaginata* and *Conostylis pauciflora* subsp. *euryniphi* subsp. *pauciflora*/candicans.
 - LmM1-41** Shrubland of introduced species *Avena barbata*, *Lagurus ovatus*, *Trachypogon divaricatus*, and *Euphorbia terricida*.
 - AM1-42** Shrubland of *Xanthorrhoea preissii*, *Anthoecia illorea*, *Melaleuca systema*, *Lomandra maritima*, *Desmodium asper*, *Conostylis pauciflora* subsp. *euryniphi* subsp. *pauciflora*/candicans, *Leucopogon parviflorus*, *Acanthocarpus preissii*, *Acacia cochlearis*, *Hemandra pungens* and *Acacia lasiocarpa* var. *lasiocarpa*.
 - B** Broun
- Subject Land

North Alkimos Local Structure Plan

 **StDsAt – 27** Dense Tall Scrub of *Dryandra sessilis* var. *cygnorum* that has been burnt and now consists of Low Open Shrubland of *Scaevola thesioides* subsp. *thesioides*, *Acacia truncata*, *Grevillea preissii* subsp. *preissii*, *Melaleuca systema*, *Melaleuca huegelii* subsp. *huegelii*, *Lomandra maritima*, *Poa porphyroclados*, *Leucopogon parviflorus*, *Xanthorrhoea preissii*, *Opercularia vaginata* and *Dryandra sessilis* var. *cygnorum* with limestone outcropping.

These communities are predominantly located in the south and west of the site, in the Quindalup vegetation community. However, one is further east, in the Cottesloe Central and South vegetation community.

The database search also identified FCTs 29a (coastal shrublands on shallow sands) and 29b (Acacia shrublands on taller dunes) as classified by Gibson *et al.* (1994) and English & Blyth (1997) as possibly occurring in the area. These two communities are not currently listed as TECs at the State or national level, but they are recommended for listing by the Department of Environment and Conservation (DEC) and are currently known as Priority Ecological Communities (PECs).

The 2004 field survey identified 17 vegetation communities that have been inferred as PECs 29a and 29b as outlined in **Table 18**:

TABLE 17: PRIORITY ECOLOGICAL COMMUNITIES

Vegetation Community	FCT	Vegetation Community	FCT
LmMs- 20	29b	LmPp(D) - 32	29a
LmMsAc- 21	29b	SaAl - 33	29a
XpLmMs- 22	29b	LmSa - 34	29a
LmApAs- 25	29b	OaSg - 36	29a
AlMs- 26	29b	AlSr- 28	29a
LmMsAl - 38	29b	LmMsSa- 39	29a
XpAl - 42	29b	AllmPp- 29	29a/29b
AsMs - 37	29a/29b	AcRb- 30	24/29b
		AllmMs- 31	29a/29b

5.8.4 VEGETATION CONDITION

In 2004 vegetation condition on the site was mapped as pristine to very good on the eastern half of the site and as very good to good on the western half. The exception is the large blow-out on the coast (western boundary), which is mapped as completely degraded, as there is no vegetation remaining due to severe wind erosion. On the basis of surveys undertaken in 2004 and 2008 a vegetation condition map is provided in **Figure 15A**. The condition of the vegetation on site was affected significantly by way of a destructive fire in 2008. The condition map represents knowledge of the site both pre and post fire in recognition of the site's general ability to recover from fire.

The main areas that are degraded due to weeds are the edges of tracks, which act as a medium for introducing these weeds into the bushland. This has caused the edges to become dominated by weeds, which are gradually moving further into the bushland. There is a very degraded area, described as vegetation community LoAv- 41 (see **Figure 14**) that is nearly devoid of native species. A large proportion of the vegetation of the site was subject to bushfire in summer 2008.

The condition of the vegetation has been severely impacted by the recent fire which has completely removed the former dense understorey of shrubs leaving only the larger Banksia and Eucalypt overstorey. While some of these trees may recover, it will take a substantial length of time for the site to recover fully. During this period the site will be subject to weed invasion, uncontrolled access and increased fire frequency, not to mention urbanisation.

The site is located in a coastal area and such locations are particularly vulnerable to degradation following fires. The typically sparse nature of coastal vegetation, negligible nutrient storage in the soil, the low moisture content of coastal sands and strong on-shore winds make plant establishment following fires difficult.

5.8.5 FLORA

Forty-four families, 112 genera and 169 taxa were recorded in the survey area.

Previous surveys in the area (DEC, formerly CALM) have identified ten priority species that could occur in the Alkimos Eglinton area.

Of these, only *Conostylis pauciflora* subsp. *euryhipis/pauciflora* was located in the subject land. There was difficulty in differentiating between several *Conostylis* species in the area, and the *Conostylis* specimens collected in the field were taken to the Western Australian Herbarium for identification. It was found that the specimens shared attributes of three *Conostylis* species: *Conostylis pauciflora* subsp. *euryhipis* (P3), *Conostylis pauciflora* subsp. *pauciflora* (P4) and *Conostylis candicans*, and therefore they could not be identified further. Because of this finding, it should be assumed that the Priority species *Conostylis pauciflora* subsp. *euryhipis* and *Conostylis pauciflora* subsp. *pauciflora* occur in all of the vegetation communities from which the specimens were collected.

From the surveys undertaken, seven species that are considered significant were located on site. Significant flora species are of particular interest, as they are rare, poorly known, restricted in distribution or have some other distinctive feature.

The following significant species found by the surveys in the site are listed in **Table 19**, together with the reasons they are considered significant.

Taxa	Comments
Conospermum triplinervium	Considered poorly reserved, as well as belonging to taxa containing significant populations (p and s taxa) (Government of Western Australia 2000).
Lechenaultia linarioides	Considered poorly reserved (p taxa) (Government of Western Australia 2000).
Melaleuca cardiophylla	(Status unknown). Representative of a species that contains significant populations at the northern or southern limit of its geographic range (r and s taxa) (Government of Western Australia 2000). According to DEC distribution mapping (www.florabase.com), however, this species extends from Perth to Karratha. The precise conservation status of this species is unknown.

LEGEND

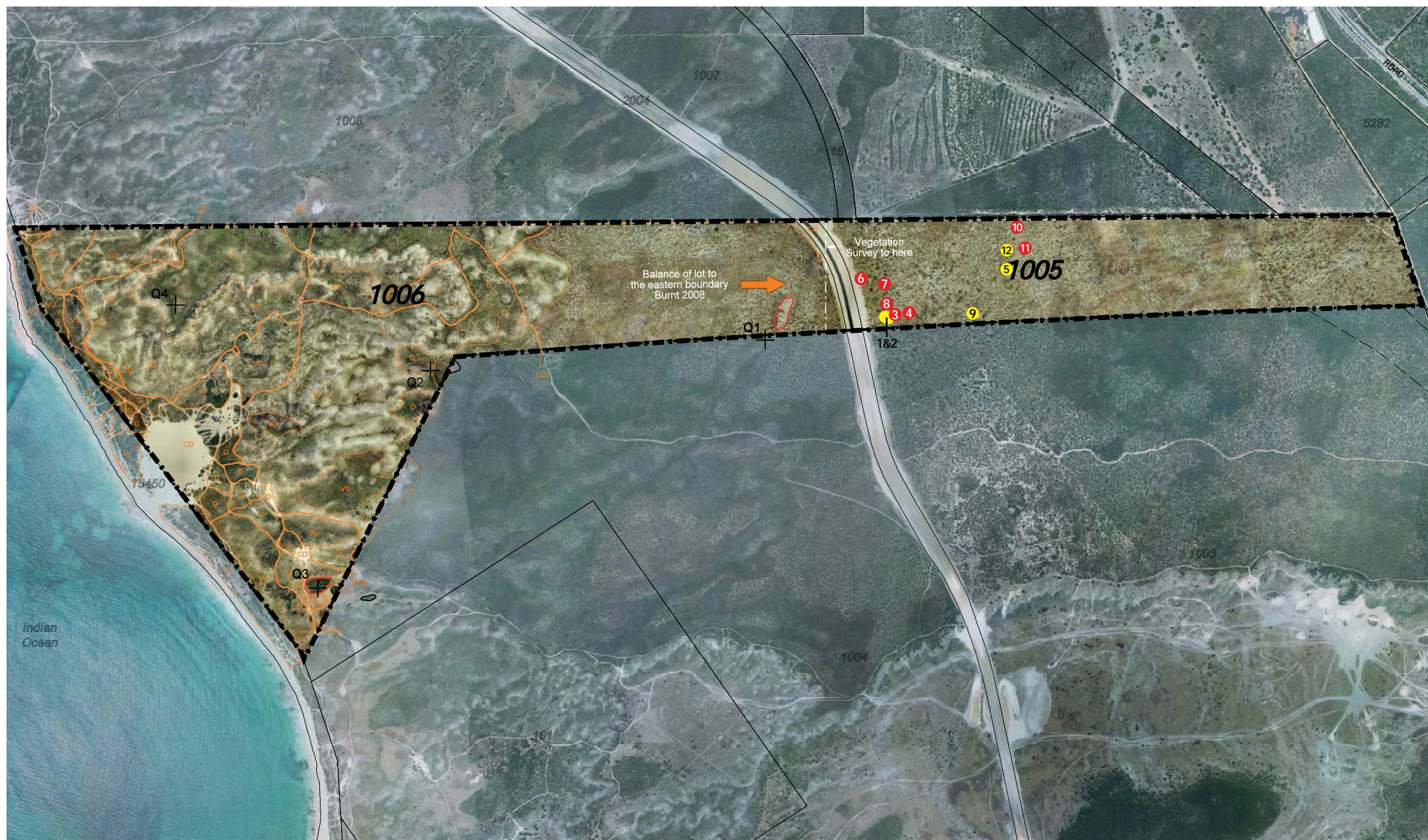
- + Quadrat Location
- Threatened Ecological Communities
- 9 Location of Habitat Trees (subject to earthwork requirements)
- 4 Location of Habitat Trees suitable for retention (subject to earthwork requirements)

Vegetation Condition
(Legend Source: BUSH FOREVER Govt. of W.A.)

- P Pristine (Not Applicable)
- Ex Excellent (NA)
- VG Very Good
- G Good
- D Degraded
- CD Completely Degraded

■ ■ ■ Subject Land



Trees 9, 10 and 11 are positioned close to or within road reservations and have the potential to be retained, subject to detailed design, final accurate survey and finished level of the tree base against finished earthwork levels. Trees 1, 2, 3, 4, 6, 7 and 8 – are all located within the area where fill is likely to be required adjacent Marmion Avenue – and therefore are unlikely to be retained. Trees 12 and 5 located within POS aren't identified as worthy for retention given their poor condition



TEC/VEGETATION CONDITION/SIGNIFICANT TREE PLAN

NORTH ALKIMOS LOCAL STRUCTURE PLAN | LOTS 1005 & 1006 MARMION AVENUE, ALKIMOS

LEGEND

-  Threatened Ecological Communities
-  Subject Land



p: considered to be poorly reserved

s: significant populations







r: populations at the northern or southern limit of their known geographic range

The condition of the flora is identified at **Figure 15A**.

5.8.6 THREATENED ECOLOGICAL COMMUNITIES

In Spring 2008, ENV carried out a flora and vegetation survey to attempt to confirm the presence of the suspected Threatened Ecological Communities (TECs) identified in the 2004 survey using quadrats and data analysis, refer **Figure 15B**. Four quadrates were established in the communities suspected of being TEC 26a across the site.





The data collected from these quadrates was run through statistical data analysis (Primer) to confirm the Floristic Community Type (FCT). The result of the analysis was inconclusive with the four quadrats having a low (~13%) similarity to six Floristic Community Types. These are as follows (in no particular order):

-  27 – Species poor mallees and Shrublands on limestone
-  26b – Woodlands and mallees on limestone
-  26a – *Melaleuca huegelii* – *M. systema* Shrublands of limestone ridges
-  29b – Acacia Shrublands on taller dunes
-  24 – Northern Spearwood Shrublands and Woodlands
-  30b – Quindalup Eucalyptus gomphocephala and/or Agonis flexuosa Woodlands

All but one quadrat have been affected by fire as recently as March 2008 with the majority of the species being burnt beyond recognition. At the time of the survey the three affected quadrats were dominated by annuals and the regrowth of previously existing shrubs. Due to the degraded condition of three of the sites, attributed to the 2008 fire, species diversity was lower than expected. This is likely to have had a major influence on the outcome of the data analysis.

It is very unlikely that the vegetation communities in question are that of FCTs 26b, 29b or 30b due to species and structural composition. This leaves the possibility of the communities being FCTs 27, 24 and 26a (which is the TEC in question).

The following conclusions are supported by the DEC:

-  Of the four suspected TEC occurrences, the most likely the most likely representative of FCT 26a is the most easterly occurrence, indicated by Quadrat 1 Figure 15B;
-  The DEC is supportive of the occurrence indicated by Quadrat 1 being retained in POS as in indicated by the LSP;
-  The other three occurrences are in the Quindalup complex and therefore are unlikely to be representative of FCT 26a.; and
-  The DEC notes, however, that the occurrence indicated by Quadrat 3 resides in the ROS and therefore the DEC is supportive of this communities retention in this area.

5.8.7 INTRODUCED SPECIES

Of the 169 species recorded on the subject land, 19 were introduced. The dominant weed families were Poaceae (5 taxa), Asteraceae (3 taxa) and Iridaceae (3 taxa).

One of the recorded species, *Moraea flaccida* (P1) is listed as a Declared Plant by the Department of Agriculture and Food WA.




Declared Plants (DP) are listed with a code definition of the requirements for control (P1, P2, P3, P4 or P5). Details of the standard meaning of these codes are presented in the environmental report prepared by ENV in support of the Structure Plan.

Moraea flaccida is listed as P1, which means the movement of these plants or their seeds is prohibited within the State, and this includes the movement of contaminated machinery and produce, including livestock and fodder. Landholders with declared plants on their property are obliged to control them.

5.9 FAUNA

The fauna habitats in the subject land can be broadly separated into three major types that dominate the area. These are based primarily on the broad vegetation units that strongly reflect the underlying soil types and geomorphic features.

The main fauna habitat types comprise:

-  Quindalup Heath;
-  Limestone Heath; and
-  Banksia Woodland.

Other habitats constituting only a minor portion of the area include heath on the younger Quindalup Dunes, Tuart Woodland, and cleared grassland or pasture.

A vertebrate fauna survey of the subject land was undertaken in October 1996. This survey included a trapping program using Elliott, pitfall and cage traps, as well as bird transect surveys, active searching and opportunistic recordings.

The survey recorded one amphibian species, 18 species of reptiles, 49 bird species, and three native and three introduced mammal species. From known distribution and habitat usage, more species may be present in the subject land. The Alkimos Eglinton area is expected to support relatively high species diversity because of its extent, its range of habitats and the general quality of the habitats, combined with the connectivity of the area to other extensive vegetated areas to the north, south and east.

The list of recorded and expected species includes 35 species identified as having special conservation significance, as they are listed under provisions of The Commonwealth Environment Protection and Biodiversity Act 1999 and the Wildlife Conservation Act 1950, on the DEC's Priority Fauna list or identified as Significant Bird Species in Bush Forever. Species of special significance are summarised in **Table 20**.

Five species of conservation significance at State or Commonwealth level are listed.

TABLE 19: SPECIES OF SPECIAL SIGNIFICANCE

Species	Wildlife Conservation Act	EPBC Act	DEC Priority List	Preferred Habitat	Observed on site?
Carnaby's Black Cockatoo (<i>Calyptorhynchus latirostris</i>)	Schedule 1	Endangered		Banksia Woodland	Yes
Peregrine Falcon (<i>Falco peregrinus</i>)	Schedule 4			Tuart Woodland	Yes
Southern Carpet Python (<i>Morelia spilota</i>)	Schedule 4		Priority 4	Limestone Heath Banksia and Tuart Woodland areas	No
Southern Brown Bandicoot or Quenda (<i>Isodon obesulus</i>)			Priority 4	Favour low (<1 m) dense vegetation	No
Western Brush Wallaby (<i>Macropus irma</i>)			Priority 4	Woodland habitats	No

See Environmental Report for Fauna Conservation Code definitions.

5.9.1 CARNABY'S BLACK COCKATOO

The potential for development of the whole Alkimos-Eglinton site and its likely anticipated impact on the amount of foraging habitat available for Carnaby's Black Cockatoo, was considered by the EPA in its assessment of MRS Amendment 1029/33. This was a contributing factor to the EPA's recommendation that an area designated and zoned for conservation purposes in the MRS be increased from 146 ha to 523 ha (Environmental Protection Authority 2005).

Approximately 42% of the site (103 ha) is Cottesloe South and Central vegetation complex which is potential cockatoo foraging habitat (**Figure 16**).


ENV was commissioned by Peet Alkimos to undertake a habitat survey and assessment of the significance of the site for Carnaby's Cockatoo. The fauna habitat survey found no evidence of nesting or roosting on the site. Nesting is unlikely to occur on the site due to a low number of suitable trees and the presence of many much more suitable locations north of the site (i.e. Yanchep National Park), and due to their being few trees which were noted as being isolated and exposed.


Foraging evidence in the form of bitten off Eucalypt flowers, Banksia fruit or new growth, was found, however, the bird species responsible for the foraging could not be identified. Other parrots observed in the area such as Galahs and Ring-Necked Parrots would cause such damage to vegetation and were possibly responsible for the foraging evidence observed at the study site.

Carnaby's Black Cockatoos are listed as Threatened under the State Wildlife Protection Act and as Endangered under the Federal Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act). The EPBC Act is administered by the Commonwealth Department of Environment, Water, Heritage and the Arts (DEWHA). It provides a framework under which matters of national environmental significance are protected.

A formal referral was lodged by Peet Alkimos with DEWHA on 8 December 2008. The project was deemed a Controlled action and the level of assessment was set at Preliminary Documentation. Additional information was provided to DEWHA regarding on site and off site mitigation measures. DEWHA have issued a Draft Approval for the project, confirming the adequacy of the mitigative measures proposed by Peet.

The management measures relevant to the LSP include:

-  Retention of White tailed Black Cockatoo Habitat –
 - POS areas 28 and 27 will have 9290m² of bushland retained;
 - POS area 29 will have 2220m² of bushland retained and 935m² will be rehabilitated;
 - POS area 21 will have 5357m² rehabilitated;
 - Bush Forever Site 130, indicated by D2 on the LSP.

-  The planting of 7315 Carnaby’s Black Cockatoo food plants throughout the development, which equates to 13.43 ha of bushland, based on the existing vegetation density on the eastern part of the site which currently contains an estimated 500 foraging trees per hectare.


The following areas will be subject to Conservation Agreements and the management of the areas will be prescribed by the Environment Management Plan which is being prepared for the development. These measures are designed for the long term protection and improvement of the natural areas.


5.9.2 IMPLICATIONS OF FAUNA HABITAT FOR THE STRUCTURE PLAN


North-south and east-west fauna corridors of Parks and Recreation Reserve are provided for by the DSP, and therefore no additional corridors are incorporated into the design of the LSP. Biodiversity will be encouraged through non-contiguous green linkages between natural areas, achieved through the placement of POS and native species landscaping. There will be opportunities for ground-dwelling fauna to move between the coastal reserve and the east-west Parks and Recreation Reserve linkage via appropriately-designed underpasses.


The retention of the TEC and some vegetation in POS and revegetation of streetscapes (where possible) will also provide fauna habitat on the site, with a particular emphasis on providing foraging habitat for Carnaby’s Cockatoo..

The LSP seeks to maintain the integrity of the coastal foreshore reserve outside the blowout area and the southern east-west Parks and Recreation Reserve corridor on the site.

-  Fauna crossing points (such as appropriately-designed culverts) under the coastal road will be provided to allow the movement of ground-dwelling species between the coastal and east-west Parks and Recreation Reserves.




-  Detailed management measures for the protection and maintenance of ecological function will be provided in site-specific EMPs for the Parks and Recreation Reserve corridors and POS.

-  Biodiversity will be enhanced through green linkages of POS, augmented by native plantings in streetscaping.

-  Referral of the LSP for consideration of the project’s impact on Carnaby’s Black Cockatoos under the EPBC Act.

North-south and east-west fauna corridors of Parks and Recreation Reserve are provided for by the DSP, and therefore none have been seen to be necessary within the LSP area. Biodiversity will be encouraged through non-contiguous green linkages between natural areas, achieved through the placement of POS and native species landscaping. There will be opportunities for ground-dwelling fauna to move between the coastal reserve and the east-west Parks and Recreation Reserve linkage via appropriately-designed underpasses.

LEGEND

-  Cockatoo Foraging Habitat
-  Threatened Ecological Communities
-  Subject Land



5.10 CLIMATE

The Alkimos Eglinton area experiences a warm Mediterranean-type climate that produces hot, dry summers and mild, wet winters. The mean daily maximum temperatures are approximately 30°C in summer and 17°C in winter, and mean daily minimum temperatures of approximately 18°C in summer and 9°C in winter. Average annual rainfall is approximately 870 mm, of which most falls in June-September, and the average annual evaporation rate is more than 2000 mm (ATA Environmental 2003).

5.11 HERITAGE

The DSP report states that one of the purposes of the foreshore reserve is to provide protection of indigenous cultural heritage.

The EPA in its report and recommendations (Bulletin 1207) on the MRS Amendment 1029/33 advises that Aboriginal heritage was an environmental factor requiring evaluation but the matter was deferred and that further detailed Aboriginal site survey should be conducted as part of the detailed planning for the area and any recommendations required as subdivision or development condition:

“(b) the environmental factor of Aboriginal heritage should be deferred until the subdivision or development stages, whichever comes first, so that a more detailed consideration of the potential environmental impacts of urban development can be undertaken by the EPA pursuant to section 38 of the Environmental Protection Act 1986.”

A heritage survey of the land was carried out in 2006 and did not identify any sites of significance. Discussions are ongoing with the Department of Indigenous Affairs as to whether any further clearance (Section 18) is required.

Attached as **Appendix 9** is a desktop analysis undertaken by Ethnoscience and the Aboriginal Heritage Management Plan which will be implemented prior to and during earthworks commencing on site.

In accordance with the requirements of the Aboriginal Heritage Act, any unregistered Aboriginal Heritage sites will be protected/reported in accordance with the requirements of Section 18.

5.12 KARST FORMATIONS

Douglas Partners have been engaged by Peet Alkimos to provide geotechnical advice, including the likelihood of karst formations occurring, within the local structure plan area.

Acidic precipitation and groundwater flows can result in dissolution of the Tamala Limestone, forming caves, sinkholes and dolines. Sinkholes and dolines are underground voids whose roof has collapsed and form depressions at ground surface.

The process can be accelerated or sometimes triggered by increased surface water infiltration due to factors such as high rainfall events and the clearing of vegetation. Urban factors include the concentration of stormwater runoff from roads, paved areas and roofs, and prolonged dewatering inducing accelerated groundwater flow through karstic voids which can accelerate the formation of sink holes/karstic collapse.

The 1:50 000 Environmental Geology map indicates that limestone presenting a karstic risk occurs to the east of the site but does not occur within the Local Structure Plan area.

The Perth Groundwater Atlas indicates that groundwater level is at least 20 m below ground surface. Therefore, effects of possible karstification from groundwater are unlikely to be transferred to the ground surface.

During the onsite geotechnical investigation being undertaken by Douglas Partners the potential of karst formations within the site will be further examined (due mid 2009).

5.13 CONTAMINATED SITES

The subject land is almost completely vegetated other than areas affected by tracks made by four wheel drives vehicles, wind erosion and fire. The sites previous rural land use is not considered to pose a risk of contamination. The groundwater investigation by ENV did not find any evidences of contamination. Groundwater quality is consistent with regional water quality data. The old dumped car bodies will be removed from the site by Peet Alkimos.

5.14 UNEXPLODED ORDNANCE

FESA's Unexploded Ordnance Unit (UXO) has advised that the western part of the Alkimos site has been identified as being highly likely to contain unexploded ordnance.

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

Milsearch, on behalf of Douglas Partners, have undertaken a limited UXO survey (90 sites – 5 m x 5 m) as part of the initial geotechnical investigation. Whilst no UXOs or evidence of ordnance-related activity was found, these searches only covered a limited area, which is under sampled by the FESA criteria, and therefore further investigation is required. Such investigation shall occur prior to, or as a condition of subdivision.

5.15 MOVEMENT NETWORK

5.15.1 ROAD NETWORK

Wanneroo Road: A rural road with a speed limit of 90-100 km/hr depending on road geometry. It has been the subject of recent upgrading by Main Roads WA due to a history of serious crashes (including fatalities) on some sections. Wanneroo Road is classed as a Primary Regional Road in the MRS.

The road is constructed as a two-lane facility over much of its length, but upgrades have established four-lane dual carriageway standard at several key locations. These upgrades provided not only higher capacity but much safer passing opportunities. The sections from Quinns Road to Nowergup Road and from Karoborup Road (north) to Bernhard Road (south) have been upgraded in the past few years.

Mitchell Freeway: Extension to Burns Beach Road (from Hodges Drive) has just been opened to traffic (as of November 1, 2008), it is constructed as a four-lane freeway. This brings the freeway to within approximately 12 km of Romeo Road (the southern end of the Alkimos DSP area). The Mitchell Freeway is classed as a Primary Regional Road in the MRS.



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Marmion Avenue: Extension to Yanchep Beach Road (from Kingsbridge Boulevard in Butler) has recently opened to traffic, it is constructed as a two-lane rural road. Marmion Avenue is classed as an Other Regional Road in the MRS.

Pipidinny Road: This is a two-lane rural road linking Wanneroo Road to Marmion Avenue. Pipidinny Road is not reserved in the MRS.

5.15.2 PUBLIC TRANSPORT

There are regular bus linkages between Two Rocks/Yanchep to the north and Joondalup to the south. However these existing services are not intended to cater for the ongoing development of Alkimos Eglinton and an upgrading of services will be required.

5.15.3 PEDESTRIAN AND CYCLIST

There are no existing pedestrian or cycle facilities due to the land being undeveloped.

5.16 SERVICE INFRASTRUCTURE

5.16.1 SEWERAGE

There is no existing sewerage service to or in the vicinity of the Structure Plan area.

Construction of the Alkimos Wastewater Treatment Plant (AWWTP) has commenced, with completion and commissioning programmed for August 2010, or shortly thereafter.

5.16.2 WATER SUPPLY

Currently there is no potable water supply to or in the vicinity of the Structure Plan area.

The Water Corporation is due to commence the first stage of the construction of Carabooda Reservoir and distribution main to Romeo Road which is located approximately 4.5 km south-east of the Structure Plan area. Construction timing for the first stage of the Carabooda Reservoir and distribution main to Romeo Road is by the end of 2010.

5.16.3 ELECTRICITY

No existing power services are available in the vicinity of the Structure Plan area.

5.16.4 TELECOMMUNICATIONS

There is no existing telecommunications infrastructure to the Structure Plan area. The closest telecommunications is located approximately 5 km south of the Local Structure Plan area at Butler.

5.16.5 GAS

The nearest available natural gas infrastructure to the Structure Plan area is approximately 5 km to the south at Butler.

6.0 OPPORTUNITIES, ISSUES AND CONSTRAINTS

The following sections outline the range of opportunities, issues, and constraints by topic affecting the subject land. They are summarised at **Figure 17**.

6.1 LOCATION

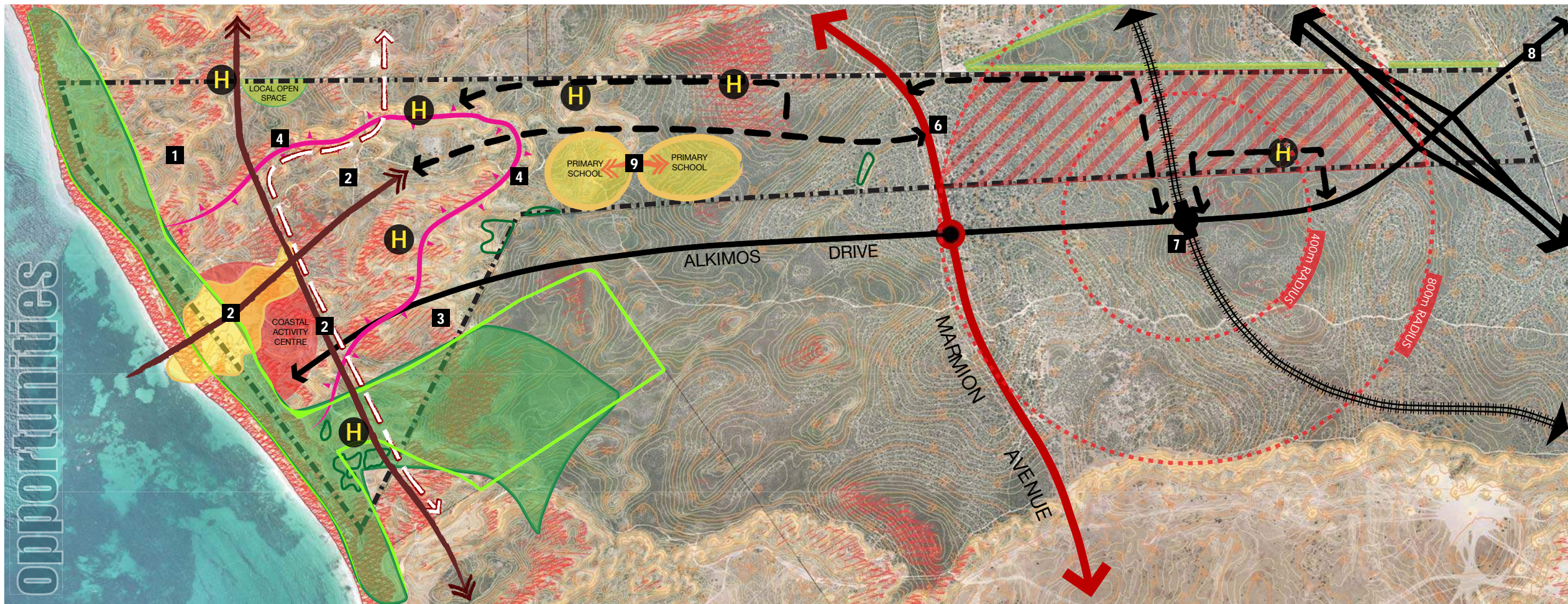
- Development of commercial and tourist nodes to provide facilities for the coastal user and to create a prominent coastal destination.
- Non-frontal development isolated in distance from current development front.
- Recently opened Marmion Avenue now connects subject land to development front.
- Necessity to extend urban services to the Structure Plan area.

6.2 LAND USE

- Integration with adjacent development.
- The timing and provision of the nearby rail station is uncertain, which will impact on the ability to deliver early density and transit supportive mixed use. Necessitates robust built form.
- Buffer to groundwater treatment plant sterilises southeast portion of site for residential development.
- Opportunities for a mix of uses and higher residential densities in higher amenity areas including along the coast and within/adjacent to the Coastal Village.
- Need to reflect land use designations of the DSP re service commercial.

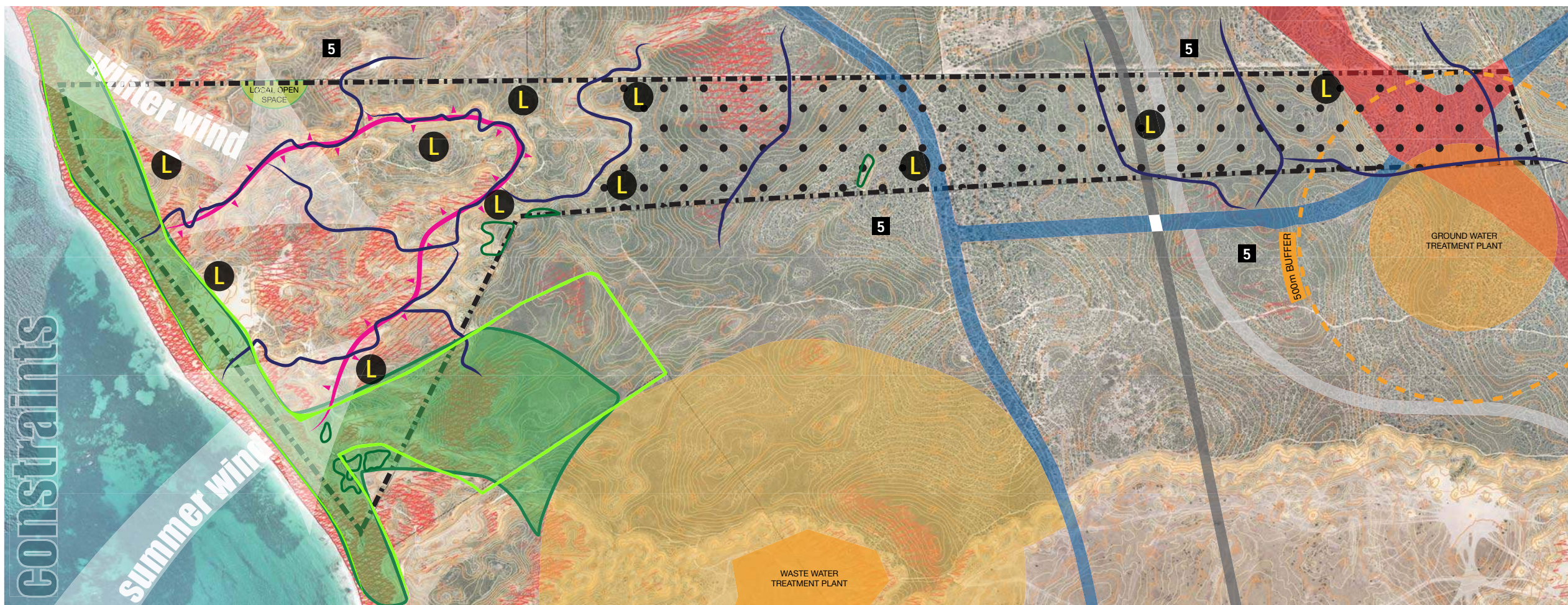
6.3 LANDFORM

- Preserve as much of the dune structure as possible, retaining the broader structure of the landform of the parabolic dunes.
- Stabilise the dune blowout through developing the coastal node whilst also utilising the amphitheatre effect of the existing topography.
- The height of the existing dune system and the width of the foreshore reserve will make linkages with the coast difficult.
- Issues associated with extreme dune formations such as the parabolic dune and including slope stability and universal access requirements, will result in the parabolic dune being unable to be retained entirely in its current form. Techniques such as the positioning of earthworks and retaining walls towards the back of properties will allow the remnant landform to be read in the new urban context. Maintenance of the slope of the dune will dictate some housing types, as steeper areas are better suited to alternative housing types to cope with the slope of the blocks.



- ### LEGEND
- Parabolic Dune
 - Cockatoo Foraging Habitat
 - Possible Threatened Ecological Communities (subject to verification)
 - High Points
 - Low Points
 - Ocean Views
 - Drainage Catchments / Boundaries
 - Tree Planting
 - DSP - Railway
 - MRS - Parks & Recreation
 - MRS - Railways
 - MRS - Primary Regional Road
 - MRS - Other Regional Roads
 - Bush Forever Site Boundary
 - Blowout
 - 800m Walkable Catchment to Potential Rail Station
 - 'CAT' Type Bus Route
 - Subject Land











- ### NOTES
- 1** COASTAL NORTH PRECINCT
 - Foreshore activity and views
 - 2** COASTAL VILLAGE
 - Blow-out requires restoration and management
 - Time required for negotiated outcome
 - Opportunities for a mix of uses and higher residential densities
 - 3** COASTAL SOUTH PRECINCT
 - Views over coastal foreshore and Regional Open Space
 - 4** DOMINANT PARABOLIC DUNE LANDFORM
 - Provides views and backdrop to urbanism
 - Opportunity for landform sensitive buildings (celebration of height)
 - 5** CONSULT WITH ADJOINING LAND OWNERS
 - North-South connecting roads
 - School catchments
 - Location of east-west distributor road
 - District level planning required
 - 6** EAST-WEST CONNECTIONS
 - Need to link East and West side of Marmion Avenue for legibility and community interaction
 - Controlled access to Marmion Avenue
 - 7** POTENTIAL RAIL STATION
 - Location and timing not resolved
 - Provide robust street blocks
 - Provide interim land use(s)
 - Allow for future rail impacts (eg. noise, vibration)
 - 8** PUBLIC ROAD ACCESS TO WANNEROO ROAD
 - Early release of rail/freeway precinct
 - 9** PRIMARY SCHOOL
 - Potential relocation to reflect topographical conditions






OPPORTUNITIES AND CONSTRAINTS



















NORTH ALKIMOS LOCAL STRUCTURE PLAN | LOTS 1005 & 1006 MARMION AVENUE, ALKIMOS

North Alkimos Local Structure Plan


-  The built form approach within the parabolic dune precinct is of particular importance, and can generally fall into two responses – celebrating height through the location of higher density areas near the ridge, and celebrating landform through the location of lower density areas near the ridge. The site provides opportunities for both of these responses to be incorporated into detailed design.
-  The reflection of the dunal formation in the final development provides the opportunity for the development of a walking trail framing this landscape element. Access ways from the trail to the highpoints of the dunal ridge formation will provide a community asset and improve the legibility of the entire development and its sense of place.
-  Where a main east-west road connection crosses the parabolic dune there is an opportunity to take advantage of the engineering works associated with this crossing, through the construction of a pedestrian walkway and viewing platform with dramatic views of the whole area enclosed by the dune, and particularly the boulevard and sea.
-  The development of this area of ridge line is also an opportunity to create a vehicle gateway to the precinct closest to the ocean. Building up density and height on the eastern side of the ridge will echo the landform of the ridge and enforce its presence as a threshold.
-  The retention of the chaotic dunal landforms of the site throughout the area developed is not viable, due to the constraints of construction form and requirements. These dunal forms will be required to be maintained in the foreshore reserve, so the interface between the reserve and the developed area will need to be handled with great sensitivity to prevent large cuts from the reserve to the coastal road, which will result in a negative aesthetic expression along the roadside.
-  Some small areas of this landform may also be able to be preserved in POS areas. Due to the unstable nature of the small dunes, if areas are preserved, public access will need to be prevented or controlled through the construction of raised walkways.
-  The steepness of the slopes, particularly of the parabolic dune, present a development issue. Slopes of this angle are unable to be preserved in the new urban context, and require earthworks to be able to be used for development. When dealing with this issue, it is important to prevent removal of the dune completely, as it lends a sense of place and topographic interest to the site.
-  The incorporation of drainage basins and swales within passive POS areas wherever possible.
-  The site's proximity to the coast and the potential to gain beach access and maximise sea views and views to the Alkimos wreck from POS areas and lots, in particular from the ridge lines in the Coastal Village Precinct of the site.
-  Ensure safe road design, in particular adequate sighting distances at intersections both horizontally and vertically, which will often require the levelling of areas and loss of landform to reduce road grades and sudden changes in grades.

6.4 ENVIRONMENT





-  Sandy beach areas with mild wave climates which provide the potential for district beach development.
-  General opportunities for swimming, fishing and other recreational pursuits.
-  Offshore reefs and wrecks which present opportunities for diving and surfing.

-  Long shore and offshore rip currents may reduce the suitability of certain beaches for swimming during certain weather conditions.
-  Strong sea breezes will affect coastal activity and will need to be considered in determining the location and design of coastal paths, facilities and the coastal village.
-  Enhanced biodiversity should be sought through green linkages of POS augmented by native plantings in streetscaping.
-  Provision of TEC in Pos.
-  Fire management is required to minimise the risk of fire to the bushland and adjacent property.
-  Install interpretative signage communicating the importance of protecting remnant vegetation and the need to stay on designated pathways.
-  Provision of foraging habitat for Carnaby's Black Cockatoos.
-  Install fauna crossing points (such as appropriately-designed culverts) under the coastal road to allow the movement of ground-dwelling species between the coastal and east-west Parks and Recreation Reserves.
-  Clearing should be undertaken systematically, so that only the vegetation necessary for the establishment of service corridors, roads, fences, buildings and infrastructure is cleared, without comprising.
-  Some tracks in Parks and Recreation Reserve areas not required for access should be closed and rehabilitated to prevent their continued use.
-  To prevent informal access (particularly during the construction phase), paths should be positioned to avoid areas of vegetation.
-  Positioned pathways through areas where erosion risk is minimal and, where possible, through already degraded areas, to minimise disturbance of vegetation in good condition.
-  Revegetate degraded areas in POS and in conservation areas with locally endemic species and cockatoo foraging habitat, where possible, to restore soil stability and reduce the risk of erosion and ensure site-specific ecosystem values and functions are maintained.
-  Revegetate areas following weed removal to prevent weed re-establishment.
-  Weed control should be implemented to stem the spread and introduction of weeds in conservation areas during site works, and should be continued in the long term.
-  Provide buffer separation to vegetation retained in Parks and Recreation Reserve from urban development in the LSP design such as POS, roads, shared pathways or grade separation.
-  Install fencing to control access to environmentally-sensitive areas.
-  Manage the significant vegetation in Parks and Recreation Reserve and POS in accordance with Minister's Statement 722, including the development of site-specific EMPs before subdivision.






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-  The built form and structures of the development will produce an altered microclimate, which will be more conducive to plant growth in general, and to the health of a wider range of plant species. Reduction of wind affecting the plants, and the reduction of salt transport inland on the wind will allow selection of species from a wider palette than would otherwise have been available.

6.5 LANDSCAPE










-  There is an opportunity at the site to landscape streets in a more natural way than the traditional street tree planting concept. Grouped plantings of coastal natives would lend a more place-specific, natural feel to the area, as well as reducing the need for irrigation and providing for fauna habitat.
-  The eastern area of the site contains low woodland of Banksias, while the western area contains a great deal of coastal heath. Unfortunately, Banksias are a tree species that does not take kindly to urban surroundings, and nor does coastal heath. In addition, these species are not considered appropriate to the urban context in terms of height, form, or appearance. This will reduce the practicality of preservation of some areas of remnant vegetation on the site.
-  Exposure of large areas of the site to strong coastal winds, laden with salt, will limit the range of plant species that will survive the conditions. Plants will have to be carefully selected to ensure that the species planted are viable in the site conditions.
-  The restricted availability of groundwater for the irrigation of POS is also an issue at the site. Throughout the delivery of the project there will be a commitment to pursue any further opportunities for technological improvements in the delivery of alternative water sources for public irrigation.

6.6 MOVEMENT NETWORK


-  Local bus routes will connect Eglinton Station to Alkimos Station and thus provide good access to district and regional shopping, employment and education. One of the routes has been designated as a 'CAT type' route along which higher density development is seen as most appropriate.
-  Alkimos North Station – a longer term possible station with significant park n' ride (in order of 1000 bays). The subject land residents will be able to drive to station for kiss n' ride and park n' ride transfer to rail network. The service is highly valuable and the North Alkimos Station would take park n' ride pressure off the Alkimos Regional Centre station. The train service provides links to district and regional shopping, employment and education.
-  Marmion Avenue and Alkimos Drive provide high capacity, high speed vehicle connections to the regional road network (including future Mitchell Freeway) and will serve commuter and commercial vehicle movements generated from the subject land.
-  Freeway and rail line present opportunities for a principal shared path in north-south direction (as documented in DSP).
-  Marmion Avenue and Alkimos Drive (east of Marmion Avenue) are access controlled roads and thus the number and location of intersections are strictly regulated (especially signalised or roundabout controlled intersections). No direct property access on these roads and Main Roads have advised that CAP roads are not considered suitable on Marmion Avenue.

-  Marmion Avenue, Alkimos Drive and the Mitchell Freeway will all have noise mitigation issues/requirements. Marmion Avenue and Alkimos Drive pose severance issues for the communities on either side of these roads.
-  The rail line poses a physical barrier and grade separated vehicle/pedestrian crossings should be provided at no greater than 800 m spacing but ideally at no greater than 500 m spacing.
-  The subject land doesn't have an intersection with signal control on its Marmion Avenue frontage and relies on roads through other properties for access to signalised intersections on Marmion Avenue.
-  The Freeway is likely to be constructed after the rail line (thus is likely to be at least ten years away). With the service commercial land located to the east side of Alkimos Drive (near the freeway) it will not benefit from Freeway access for some time.

6.7 SERVICING

-  The implementation of Water Sensitive Urban Design (WSUD) where possible to reduce reliance on mains water and explore opportunities for the reuse of wastewater and stormwater.
-  Treatment and management of stormwater runoff via on site retention and infiltration and reducing impermeable surfaces. In principle the post development flows off the site should match any pre-development flow rates. Excess stormwater quantities should be detained and infiltrated at source.
-  Increase lighting to streets, POS and community facility areas to not only increase safety but also crime prevention.
-  Installation of a communications network(s) to aid long term economic health and growth.
-  Utilise local materials to balance cut and fill earthwork operations and examine the structural adequacy and bearing characteristics of limestone for use either as structural fill or road base course/sub-base material.
-  Maximise use of recycled/recyclable materials in infrastructure and building construction.
-  The programme for the construction of the Alkimos Wastewater Treatment Plant and Carabooda Reservoir to provide a sewerage outfall and water supply for the development respectively.
-  Typical commercial constraints of staging the development in a front from the Marmion Avenue development edge to minimise roads and services costs. Development could commence elsewhere but this would be at a cost for the lead in services and roads.
-  Typical constraints that result from the requirement for drainage retention basins, that is the requirement for POS areas at catchment trapped low points. All efforts will be made to ensure that retention basins wherever possible are passive POS areas in order to avoid unsightly fenced drainage sumps.

6.8 COMMUNITY

-  Build a strong and unique community; one that creates a distinctive competitive advantage to enable it to forge ahead strongly no matter the economic conditions.

North Alkimos Local Structure Plan

- Design a unique form of beach/coastal interface, a funky coastal village, some interesting public open spaces including an adventurous walk trail.
- The community will be involved in the development of their own community, leading to ownership of the estate.
- There will be several geographical communities as well as a variety of communities of interest and the potential to even cater for virtual communities as people become involved in development of the estate.
- The opportunities, issues and constraints will be further investigated in the Community and Economic Development Plan.

6.9 SUMMARY OF KEY CONSIDERATIONS

The preceding examination has given rise to a number of complex issues and opportunities to be addressed in the Structure Plan. A summary of the key elements is set out below.

6.9.1 LAND USE

- Provision of a diversity of land uses consistent with the DSP, including Parks and Recreation Reserve, Residential and Service Commercial, and Coastal Village.
- Respect buffers to treatment plants.
- Propose a mix of residential densities including higher densities in appropriate locations.
- Acknowledge the uncertainty of the railway line extension and Alkimos North railway station.

6.9.2 MOVEMENT

- Treatment/interface with Marmion Avenue, Wanneroo Road, railway line and the Mitchell Freeway.
- Consider extension of Alkimos Drive.
- Accommodate secondary public transport route.
- Reflect DSP north-south neighbourhood connectors.

6.9.3 ENVIRONMENT, LANDFORM AND LANDSCAPE

- Accommodate TEC and other appropriate vegetation types, including cockatoo foraging habitat as agreed with DEWHA and DEC.
- Revegetate and rehabilitate open space, conservation and denuded areas, in accordance with appropriate management plans.
- Reconfiguration and appropriate retention of parabolic dune and blowout where possible.
- Create a network of public spaces, open spaces and walk trails.

7.0 THE LOCAL STRUCTURE PLAN











7.1 OVERVIEW

The North Alkimos Local Structure Plan represents a design and land use response to the principles, objectives and intent of the DSP, as outlined in Part 1 of this report. These responses are reflected in a range of planning and design objectives and principles that have been applied to the Structure Plan. The LSP has been prepared utilising the diverse skills and experience of the project team and within the parameters by various state and local government policies.

Figure 18 North Alkimos Masterplan has been prepared as a supplementary presentation plan to articulate in more detail the intent of the LSP. The Masterplan should be read in conjunction with Plan 1 in Part 1 of this document. Figure 18 is indicative only and should be referred to as a guide. The plan will evolve as detailed design progresses. As such, the plan is subject to change within the framework provided by Plan No. 1.

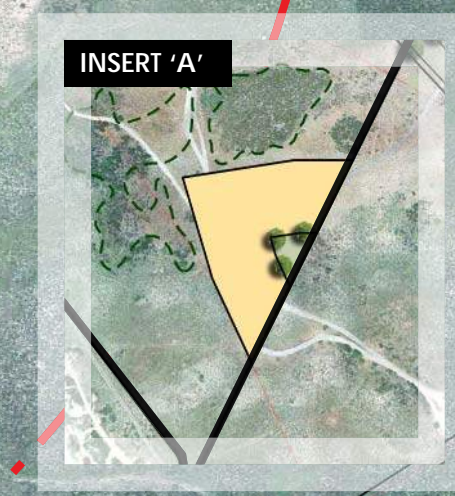
7.2 DESIGN PRINCIPLES

The planning and design principles that have informed the development of the Structure Plan include the following:

-  Planning and design to be progressed in the context of a wider sustainability strategy and other supporting documentation such as a Local Water Management Strategy, Community Development Plan and Economic and Employment Development Strategy.
-  Significant vegetation to be respected and retained in Parks and Recreation Reserve and POS, where possible, and within the constraints of the earthwork requirements for the site.
-  Reflect the geo-heritage of the site with particular regard to the parabolic dunal system through landform, alignment of the road network and built form.
-  Establishment of green (Parks and Recreation Reserve, POS, streetscape and landscape) linkages that are compatible with the existing local character.
-  Meeting the parameters of the City of Wanneroo's draft Biodiversity Strategy.
-  Provision of activity centres in accordance with the DSP.
-  A sustainable and dynamic Coastal Village incorporating a range of uses including employment and housing opportunities, generating a distinct sense of place and capitalising on the land's coastal setting.
-  Creation of public areas that have a high degree of surveillance and activity to minimise the potential for crime.
-  Incorporate sites for employment nodes and corridors to enable the satisfaction of DSP targets.
-  Provision of community facilities including school sites.



REFER INSERT 'A'



NOTES






















- 1 FORESHORE MANAGEMENT STRATEGY TO BE PREPARED
- 2 DUNAL STABILISATION / REHABILITATION TO BE COMPLETED IN ACCORDANCE WITH FORESHORE MANAGEMENT STRATEGY
- 3 MIXED USE COASTAL VILLAGE SUBJECT TO DETAILED DESIGN. REFER VILLAGE CORE INDICATIVE CONCEPT PLAN
- 4 NORTHERN COASTAL PARKLAND
- 5 DUNAL WALK TRAIL
- 6 EXTENSION OF ALKIMOS DRIVE TO SERVICE THE COASTAL VILLAGE
- 7 OVAL / PUBLIC OPEN SPACE CO-LOCATED WITH PRIMARY SCHOOL
- 8 PRIMARY SCHOOL
- 9 SHARED ROAD RESERVATION WITH ADJOINING LANDOWNERS - OPPORTUNITY FOR TREE RETENTION ON ADJOINING LAND (SUBJECT TO DETAILED DESIGN)
- 10 MIXED USE - GROUND FLOOR ACTIVATION WITH RESIDENTIAL ABOVE
- 11 LOCAL CENTRE - CONVENIENCE NEEDS AND POSSIBLE CHILD CARE
- 12 PARKS AND RECREATION RESERVE TO BE REHABILITATED, UTILISING APPROPRIATE COCKATOO FORAGING HABITAT

LEGEND

- RESIDENTIAL R12.5 - R20
- RESIDENTIAL R25 - R40
- RESIDENTIAL R50 - R100
- MIXED USE / COMMERCIAL R30 - R80
- VILLAGE CORE (INCLUDES RESIDENTIAL R100 COMPONENT). REFER INDICATIVE CONCEPT PLAN
- SERVICE COMMERCIAL/BUSINESS
- SCHOOLS
- DUNAL HOUSING - INDICATIVE HOUSING OPTIONS TO SENSITIVELY RESPOND TO PARABOLIC DUNE SYSTEM
- PUBLIC OPEN SPACE
- DUNAL WALK TRAIL
- THREATENED ECOLOGICAL COMMUNITIES
- INTEGRATED DRAINAGE SWALE
- SECONDARY PUBLIC TRANSPORT SYSTEM
- MASTERPLAN BOUNDARY



NOTE: FIGURE 18 IS INDICATIVE ONLY AND WILL EVOLVE AS DETAILED DESIGN PROGRESSES. AS SUCH, THE PLAN IS SUBJECT TO CHANGE WITHIN THE FRAMEWORK PROVIDED BY PLAN NO. 1

North Alkimos Local Structure Plan







-  Co-location of centres with POS and community infrastructure and to be well-supported by public transport and safe walking/cycling routes.
-  Provide a diverse mix of high, medium and low density residential development catering to a diverse population and ensuring the full range of demand for alternative housing types are met.
-  Meeting the dwelling type targets of the City of Wanneroo.
-  Highly connected road network with shared use pathways for pedestrians and cyclists.
-  High degree of inter-connectivity with surrounding Local Structure Plan areas.
-  Effective distribution of and access to active, passive and conservation open space.
-  Maximise access and use of foreshore areas in accordance with a FMP addressing its interface with the Coastal Village, facilities, conservation values and linkages.
-  Provide a hierarchy of spaces from local parkland to major foreshore areas.
-  Conservation of representative landscape and ecological types including TEC.
-  Maximise connections to the ocean.
-  Provide landmark views and relationships that assist in orientation and legibility.
-  Public realm to be based on an efficient, grid like road pattern to maximise legibility and permeability.
-  Configuration of street blocks to develop an efficient and legible layout that promotes walkability and minimises private motor vehicle journeys.
-  Street block layout to encourage passive solar lot orientation and flexibility of design.
-  Range of densities and dwelling types to enhance the opportunity for individuals to remain within the region throughout different life stages.
-  Integration of the four precincts comprising the Structure Plan area.
-  Transit oriented development and higher residential densities in proximity to the potential future rail station.
-  Appropriate buffering between major transport routes and residential areas.
-  Capitalise on the high exposure and high level of accessibility afforded by the district and regional transport networks.
-  Provide opportunities for higher residential densities and diversity of land use to support public transit systems including the secondary coastal transit route.
-  Enable the efficient provision of urban services and infrastructure.

7.3 PROPOSED LAND USES

The following section details the nature and location of the various land uses as proposed by the LSP:

-  Residential
-  Activity Centres
-  Mixed Use
-  Commercial
-  Business

In locating these uses specific consideration has been given to:

-  The District Structure Plan;
-  The location of the Coastal Village;
-  The proposed Transit Station and future railway line;
-  The location of the freeway and access via the Alkimos Drive interchange;
-  The location of the Alkimos Regional Centre and the Eglinton District Centre; and
-  The DSP Employment Strategy.

7.3.1 RESIDENTIAL





The majority of the Structure Plan is devoted to residential land uses.

The elongated shape of the land along with its key attributes such as transport infrastructure, coastal location and the DSP designation of a Coastal Village combine to facilitate the creation of a wide range of housing types and densities across the Structure Plan area.





At the same time, variations in the landform and landscape of the site (including a coastal blow-out, a parabolic dunal system and ocean views) allows for the application of higher densities (in higher amenity areas) and innovative built form responses to the attributes of the land.

The pattern of residential density distribution across the Structure Plan area is outlined at **Figure 19**.

Broadly, the pattern of housing type has been influenced by the 2021 targets of the City of Wanneroo's Housing Strategy as follows:

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

The Structure Plan has the capacity to achieve these overall targets. However these targets should be considered in the context of the minimum dwelling yield targets for each precinct as follows:

-  Precinct 1 - Coastal Village: 1600
-  Precinct 2 - Central: 330
-  Precinct 3 - Eastern: 200
-  Precinct 4 - Transit: 185



LEGEND

- Residential R12.5 - R20
- Residential R25 - R40
- Residential R50 - R100
- Mixed Use / Commercial R30 - R80
- Iconic Buildings
- Subject Land

NOTES

- Note 1: Indicative residential codings only, subject to change
- Note 2: Delivery of medium to higher densities within the Transit Precinct reliant on delivery/commitments to the Rail Infrastructure provision of the Railway Station

RESIDENTIAL LAND USE

NORTH ALKIMOS LOCAL STRUCTURE PLAN | LOTS 1005 & 1006 MARMION AVENUE, ALKIMOS

TAYLOR BURRELL BARNETT | TABEC | EPCAD
 SHARIN HOWE | CREATING COMMUNITIES
 MACROPLAN | MP ROGERS & ASSOCIATES
 SUSTAINABLE SOLUTIONS | WHELAN'S ENVY
 OVERMAN ZUIDVELD | TAYLOR ROBINSON

0m 100m 200m



PLAN: 072015
 DATE: MAY 2009

North Alkimos Local Structure Plan



Photoplate 4 Examples of dress circle, single residential, grouped and multiple dwellings

North Alkimos
Local Structure Plan



Photoplate 4 (cont) Examples of dress circle, single residential, grouped and multiple dwellings










North Alkimos Local Structure Plan

The approach of the Structure Plan is to designate R-Code density ranges for each precinct (R12.5-R20, R25-R40, R50-R100, Mixed Use/Commercial R30-R50) with specific dwelling yield targets applied per street block by way of LDPs to be submitted and determined concurrent with subdivision applications. These LDPs shall be limited to demonstrating the delivery of the minimum density targets for each precinct within the context of the specified R-Code range. Built form matters are to be addressed by way of separate LDPs.




It will be necessary for the 'dwelling target' LDPs to not only demonstrate the manner in which each subdivision stage will contribute to the targets being met, but also to demonstrate that the ability to reach the overall target in future stages remains intact.

Within this context, which is intended to maximise housing choice and diversity as well as the responsiveness of the Structure Plan to changes (including demand) over time, it may be necessary to implement variations to the ratios specified per housing type in the Housing Strategy.








The distribution of housing types has also been influenced by the following factors:

-  The highest densities are provided in those areas with the greatest degree of access to services and amenity, such as within and immediately surrounding the Coastal Village and the transit station.
-  Higher densities within the Coastal Village will support the viability of the village, demand a diversity of land use, maximise street life/activity, capitalise on the public transit system and facilitate innovative built form commensurate with a village setting and function.
-  A combination of higher and lower densities on and adjacent to the parabolic dunal system to encourage innovative built form responses to terrain in a manner that is reflective of and sensitive to the geoheritage of the site.
-  Promotion of residential development that optimises the coastal views, solar orientation and capture coastal breezes.
-  Pockets of medium-high density to take advantage of key locational attributes such as ocean views or to allow innovative built form solutions to challenging landform.
-  Medium density development on important access routes and in high amenity areas such as surrounding schools and open space.
-  Higher densities in proximity to the potential rail station and to reflect the built form requirements of transit supportive land use and the capability to change use over time from residential to non-residential within a mixed use/transit oriented environment.
-  A gradation of residential densities from the village centre to outerlying areas.
-  Lower densities on flatter, more central portions of the site where more conventional development forms can be supported in a manner that minimises earthworking.

At detailed design stage and for higher density sites, landmark sites and grouped/multiple dwelling sites LDPs and/or design guidelines will be employed to address matters such as:

-  Achieving dwelling yield targets;
-  Side, rear and front setbacks;
-  Building Height;

North Alkimos Local Structure Plan

-  Solar orientation;
-  Site coverage/plot ratio;
-  Parking/Crossover;
-  Private Open Space;
-  Building detail including frontage, roof form, building materials and colours;
-  Fencing material, height, location; and
-  Typologies.

In addition, consideration will be given to built form that is capable of adapting over time (such as from residential to commercial or mixed use) within the village core.

The overall dwelling yield for the project is in the order of 3,000.

7.3.1.1 INDICATIVE DWELLING ANALYSIS

Table 21 below provides an estimated dwelling unit yield analysis for the subject land. This analysis is indicative only and will be the subject of detailed design and density allocation and refinement as development progresses and subdivision design unfolds.

Table 22 also demonstrates that the Structure Plan would have the capacity to satisfy the minimum household type targets of the City of Wanneroo’s Housing Strategy. A greater amount of higher density housing types (semi detached, flats, units and apartments) than the Housing Strategy has been indicatively identified and is the result of the higher densities in and around the Coastal Village and within the TOD area.

Within this context, however, the approach to densities applied in Part One of this report is intended to maximise flexibility with respect to housing choice and diversity. In order to be responsive to changes in demand over time, it may be necessary to depart from the housing type ratios of the Housing Strategy at LDP/subdivision stage provided that the minimum density targets identified in Part 1 are satisfied.

TABLE 20: INDICATIVE DWELLING UNIT YIELD TABLE					
Density Range (per the Masterplan)	Housing Type	Ave Lot Size (m ²)	Split	Dwellings Provided	Percentage Provided
COASTAL VILLAGE PRECINCT					
R 12.5 – R 20	Separate Housing	450 - 800	100%	240	10.32%
Sub Total				240	10.32 %
R 25 – R 40	Separate Housing	240 - 350	90%	679.5	3.24 %
	Semi Detached		10%	75.5	29.2 %
Sub Total				755	32.4 %
R 50 – R 100	Separate Housing	100 – 180	20 %	243.6	10.48%
	Semi Detached		40 %	487.2	20.96 %
	Flats, Units, Apartments		40 %	487.2	20.96 %
Sub Total				1218	52.4 %
Mixed Use R80	Semi Detached	125	30 %	33.3	1.43
	Flats, Units, Apartments		70 %	77.7	3.34
Sub Total				111	4.77

North Alkimos Local Structure Plan

TABLE 20: INDICATIVE DWELLING UNIT YIELD TABLE

Density Range (per the Masterplan)	Housing Type	Ave Lot Size (m ²)	Split	Dwellings Provided	Percentage Provided
Total				2324	
CENTRAL PRECINCT					
R 12.5 – R 20	Separate Housing	450 - 800	100 %	247	56.26 %
Sub Total				247	56.26 %
R 25 – R 40	Separate Housing	240 - 350	90 %	140.4	31.98 %
	Semi Detached		10 %	15.6	3.55 %
Sub Total				156	35.53 %
Mixed Use R30 – R50	Separate Housing	125 - 350	70 %	25.2	5.74
	Semi Detached		30 %	10.8	2.46
Sub Total				36	8.2%
Total				439	
EASTERN PRECINCT					
R 12.5 – R 20	Separate Housing	450 - 800	100%	114	38.25 %
Sub Total				114	38.25 %
R 25 – R 40	Separate Housing	240 - 350	90%	165.6	55.57 %
	Semi Detached		10%	18.4	6.17 %
Sub Total				184	61.74 %
Total				298	
TRANSIT PRECINCT					
Mixed Use R30 – R50	Separate Housing	125 - 350	70 %	186.2	69.99 %
	Semi Detached		30 %	79.8	29.99 %
Sub Total				266	
Total				266	

TABLE 21: WHOLE OF THE SUBJECT LAND – HOUSING TYPES

Housing Type	Dwellings Provided	Percentage Provided	Percentage Required	% Balance
Separate Housing	2041.5	61.336	76.2	-14.84
Semi Detached	720.6	21.66	14.4	+7.26
Flats, Units, Apartments	564.9	16.98	9.4	+7.58
TOTAL	3327			

Notes:

** These yields are subject to a -10% variation.

~ R60 – R30 yield has been reduced by 15% to represent actual achievable yield.

All yields rounded down the decimal to a whole number.

These yields are subject to detailed subdivision design and are indicative only.

In terms of non-residential yield, two super lots have been assumed in the village core, two lots of 3,000 m² and 11,000 m² in the Central Precinct and 25 lots (average 2,700 m²) in the service commercial area.

7.3.2 POPULATION

The Australian Bureau of Statistics (ABS) indicates that there is an average of 2.5 persons per household in Western Australia. However, given the degree of land designated in the LSP for medium-high density housing, the household size across the land may be a lesser amount than the State average. As an estimate it could be anticipated that the subject land could therefore yield an ultimate population of between approximately 6000-8000 people.

7.3.3 SOLAR LOT ORIENTATION







In keeping with the requirements of Liveable Neighbourhoods to maximise passive solar design opportunities, the following solar analysis is provided.

Out of the total area designated for residential or mixed use purposes, some 60% is oriented to within 20° of either east-west or north-south. Roughly 18% are designated as Special Development Sites where the lots are of such size that resultant development could be located to take full advantage of solar access or where development will be subject to special controls (e.g. LDPs) to ensure climate-sensitive design imperatives are met.

Approximately 22% of lots would be non-compliant.

Of the residential areas that are not subject to special controls, some 67.5% would be within 20° of north-south or east-west.

The main influences on the primary road (and hence street block) layout, are as follows:

-  The curved alignment of Marmion Avenue;
-  The alignment of the coastal road and associated secondary transit system;
-  The parabolic dune that frames the Coastal Village;
-  The alignment of Alkimos Drive through the southwest section of the subject land;
-  The presence and shape of TEC area retained within POS;
-  The alignment of the primary east-west distributor running centrally through the site in a manner that is the most direct route possible into the Coastal Village taking into account topographical features.

The above influences result in a Structure Plan that is site responsive and sensitive to site conditions, minimises site works and reflects the prevailing planning framework.

However, the alignments/boundaries of these elements are, by nature, non-uniform. This, consequently, results in a road and street block pattern that departs from a cardinal alignment. This is most evident in the core of the Coastal Village Precinct, where street blocks are on an approximate angle of 45° from north-south in response to the alignment of the central east-west distributor road.

The resultant reductions in solar access will be countered by the need for LDPs or design guidelines over affected lots to ensure built form outcomes that maximise climate responsiveness.

7.3.4 ACTIVITY CENTRES



Figure 20 identifies the location and type of retail land uses and centres across the Structure Plan, which may be summarised as follows.

7.3.4.1 CENTRE ONE – ALKIMOS NORTH COASTAL VILLAGE

CHARACTER

Successful village centres are organised and generally develop over time, starting with the establishment of uses that support the core functions of everyday living such as daily food shopping, news pharmacy etc. Higher order uses are incrementally added as the population catchment grows and matures and the demand for the retail function increases and expands as a wider range and offer becomes feasible within the centre. Eventually the centre will support not just everyday uses but also uses that are more discretionary in nature.

With its unique and man-made character, the subject land's coastal location provides the added dimension of an attractor to the village, further supporting its retail function. The challenge for the village is to provide the retail function while maintaining the 'grain' and vibrancy of centres that have developed organically and incrementally over time. With this in mind, the process of developing the village will be as follows:

-  Create an environment that will attract a catchment population to support the retail function. This population will be a mix of permanent residents and those drawn to the location due to its unique character; and
-  Plan the centre so that the retail uses can be supported and will function in conjunction with other facilities in the area. This should be done so as to create an environment that is not purely functional but one that creates an identity and unique character for the centre

The core of the Coastal Village extends over two street blocks, separated by a main street on an approximate east-west alignment. Main Street will be appropriately landscaped and treated to achieve the necessary balance of pedestrian and vehicular traffic. Main Street will be supported by specialist retail/commercial that will be tourist supportive and geared towards an active street life that extends beyond 'regular' working hours of 9 to 5 (i.e. it will be a vibrant environment on weekends and evenings). Associated uses will include restaurants, a tavern and cafes.




Main Street and built form will be design/oriented to achieve an appropriate interface with the coastal reserve and capitalise on views/access to the Indian Ocean to take advantage of the subject land's natural setting advantages and to develop a strong sense of place for the development.

The final suite of uses and configuration of built form is subject to detailed design and discussions with approval agencies. The ultimate outcome may require rationalisation of the current MRS reserve. While an indicative structure has been provided for treatment of the coastal reserve, the Structure Plan identifies this area of coastal reserve, along with the wider Coastal Village as 'subject to further planning and design.

The level of information contained within the Structure Plan is sufficient to inform the LSP in relation to how it would be structured, its broad attributes and how it would unfold over time. Finalisation of footprints for built form, use, transport, access and so forth is occurring at time of writing and will be submitted for approval either by way of a modification to this Structure Plan or through a separate local structure plan for the centres.

ROLE AND FUNCTION

According to the City of Wanneroo Draft Centres Strategy, Coastal Tourist Villages should be characterised by the following:

-  Capable of providing a mix of uses including retail, educational, entertainment, leisure, and/or community services geared to the tourist market.
-  Suitable for medium density development within and around the centre.
-  Capable of providing at least ten speciality retail outlets including cafes and restaurants.

The North Alkimos Coastal Village is not collocated with a regional or local marina, or a beach of regional significance. The absence of these tourist attractors in the North Alkimos Coastal Village will have implications for its role, functionality, sizing, staging and relationships with other centres with particular regard to its ability to support tourist uses.

The North Alkimos Local Structure Plan will therefore, at least initially, primarily evolve as a population-centric centre with secondary tourist support functionality. There is a possibility of significant population-serving floorspace to be achieved at the Neighbourhood Centre adjacent Marmion Avenue, although this is dependent on population growth and Coastal Village viability.

PHYSICAL INFRASTRUCTURE

In the early stages, the road network will be critical to development in North Alkimos. This will be particularly the case for the connection from the Coastal Village through the Neighbourhood Centre to Marmion Avenue.

The Coastal Village interconnection will be important for the North Alkimos Coastal Village to allow visitor movement along the coast. Walkability for the local population and tourists to the Coastal Village and Neighbourhood Centre is another factor critical to development, allowing locals and visitors to easily engage in a 'Coastal Village lifestyle'.

SIZING AND EMPLOYMENT

MacroPlan has forecast floorspace to total 4,123 m² in the North Alkimos Coastal Village by post residential build-out in 2041. In the earlier stages, the Coastal Village will have a relatively higher population serving component (85.7%), although this is anticipated to decline somewhat (to 65.2% in 2041), as tourism strengthens in the Coastal Village.

The floorspace in the Coastal Village will be primarily population serving, with the tourism serving component accounting for 34.8% of total floorspace in 2041. In terms of floorspace type, MacroPlan has forecast retail to account for 65.1%, café and restaurant to account for 21.7% and health, community and personal services to account for 13.2% of total floorspace in the Coastal Village in 2041.



- LEGEND**
- ① Centre 1 - North Alkimos Coastal Centre
 - ② Centre 2 - Local Centre
 - ③ Centre 3 - Neighbourhood Centre
 - ④ Centre 4 - Transit Oriented Development
 - Subject Land

CENTRES AND RETAIL LANDUSE

NORTH ALKIMOS LOCAL STRUCTURE PLAN | LOTS 1005 & 1006 MARMION AVENUE, ALKIMOS

TAYLOR BURRELL BARNETT | TABEC | EPCAD
 SHARMI HOWE | CREATING COMMUNITIES
 MACROPLAN | MP ROGERS & ASSOCIATES
 SUSTAINABLE SOLUTIONS | WHELAN'S | ENV
 OVERMAN ZUIDVELD | TAYLOR ROBINSON

0m 100m 200m



FIGURE

20

PLAN: 072015
 DATE: MAY 2009

PEET

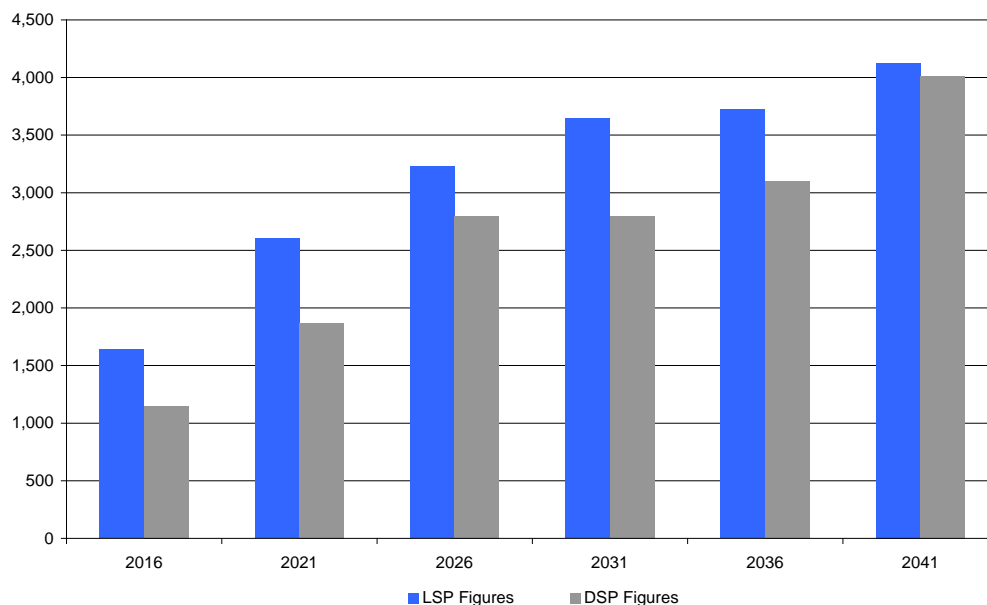
North Alkimos Local Structure Plan

TABLE 22: TOTAL FLOORSPACE, NORTH ALKIMOS COASTAL VILLAGE

NLA/GFA (m ²)	2011	2016	2021	2026	2031	2036	2041
Population Serving Retail	-	714	1,145	1,432	1,718	1,718	1,718
Population Serving Cafes and Restaurants	-	236	340	369	425	425	425
Tourism Serving Retail	-	234	569	764	764	795	965
Tourism Serving Cafes and Restaurants	-	-	-	116	190	238	469
Health, Community and Personal Services	141	454	546	546	546	546	546
Total Floorspace	141	1,637	2,601	3,226	3,643	3,723	4,123

Source: MacroPlan Australia

When compared with floorspace forecasts from the Alkimos-Eglinton DSP, the North Alkimos LSP anticipates floorspace coming online earlier before reaching a 2041 sizing broadly in line with previous estimates. This reflects a larger and more rapid growth in local population under the North Alkimos dwelling estimates.



Graph 3: North Alkimos Coastal Village Floorspace, LSP and DSP Figures [Source: MacroPlan Australia]

Based on estimated floorspace outlined above, the Coastal Village will employ 129 people by 2041. As with the floorspace estimates above employment is projected to focus primarily on retail jobs, accounting for almost seven out of ten jobs in the Coastal Village. This is comprised of both local population serving and tourist visitor supporting retail, cafes and restaurants.

TABLE 23: TOTAL EMPLOYMENT, NORTH ALKIMOS COASTAL VILLAGE

NLA/GFA (m ²)	2011	2016	2021	2026	2031	2036	2041
Population Serving Retail	-	24	38	48	57	57	57
Population Serving Cafes & Restaurants	-	7	10	11	12	12	12
Tourism Retail	-	8	19	25	25	27	32
Tourism C&R	-	-	-	3	5	7	13
Health, Community and Personal Services	4	11	14	14	14	14	14
Total Jobs	4	50	81	101	114	116	129

Source: MacroPlan Australia

7.3.4.2 CENTRE TWO – NEIGHBOURHOOD CENTRE

CHARACTER

A local centre of 1,051m² is proposed to the east of the proposed primary school.

Anticipated land uses include local convenience retail, child care, medical and lower-order commercial tenancies. The aim of this centre is to respond to the convenience needs of residents within the Central Precinct.



The centre would add to the vibrancy and diversity of land use within the Central Precinct, which also includes a primary school and open space. This range of uses will combine to create a high-amenity and sought after lifestyle, which in turn allows medium density to be blended with more conventional housing forms.

There would be strong synergies between the location of a centre close to a school, allowing trips associated with child pick-up and shopping for example, to be combined.

Built form within the centre will be controlled in detailed design phases through LDPs or similar.

ROLE AND FUNCTION

According to the City of Wanneroo Draft Centres Strategy, prepared by Peter McNabb and Associates, local centres should be characterised by the following:

-  Convenience retail for residents within a 400 m catchment; and
-  Very small scale commercial, health services and/or leisure services.

The local centre located near the centre of the parabolic dune system in North Alkimos will solely providing convenience retail to residents in the hinterland section of the North Alkimos landholding. While the Centres Strategy provides capacity for the provision of commercial, health and leisure services in the centre, the proximity of the local centre to the Coastal Village, Neighbourhood Centre and TOD/service commercial area make such a diversity of activity unlikely.

North Alkimos Local Structure Plan

SIZING AND EMPLOYMENT

It is estimated that, by 2031, the Central Neighbourhood Centre will have 1,051 m² floorspace with 35 employees. It is anticipated that the floorspace will be entirely population serving retail.

TABLE 24: TOTAL FLOORSPACE, NORTH ALKIMOS NEIGHBOURHOOD CENTRE (CENTRAL)

NLA/GFA (m2)	2011	2016	2021	2026	2031	2036	2041
Population Serving Retail	125	271	873	1,051	1,051	1,051	1,051
Total Floorspace	125	271	873	1,051	1,051	1,051	1,051

Source: MacroPlan Australia

TABLE 25: TOTAL JOBS, NORTH ALKIMOS NEIGHBOURHOOD CENTRE (CENTRAL)

NLA/GFA (m2)	2011	2016	2021	2026	2031	2036	2041
Population Serving Retail	4	9	29	35	35	35	35
Total Floorspace	4	9	29	35	35	35	35

Source: MacroPlan Australia

7.3.4.3 CENTRE THREE – NEIGHBOURHOOD/LOCAL CENTRE

CHARACTER





A Neighbourhood Centre of 3,439 m² NFA is proposed adjacent Marmion Avenue.

While this centre would provide convenience retail, potentially some local offices and such like, its high exposure location on Marmion Avenue means that this centre is more likely to capitalise and focus on meeting demand generated by passing trade. Therefore, other uses may include petrol filling stations and fast food restaurants.

Built form will be controlled at detailed design stage via LDPs or similar, ensuring appropriate and high quality development outcomes.

ROLE AND FUNCTION

According to the City of Wanneroo Draft Centres Strategy, prepared by Peter McNabb and Associates, Neighbourhood Centres should be characterised by the following:

-  Capable of providing a mix of uses to meet the needs of the local neighbourhood;
-  Capable of providing smaller scale convenience retail, commercial, health and/or community facilities and cafés/restaurants;
-  Suitable for residential development within and around the centre; and
-  Located on the public transport network.

The North Alkimos Neighbourhood Centre will provide convenience retail and amenity to the local population. Its development is strongly interdependent on the development of the North Alkimos Coastal Village, the Alkimos Regional Centre and the Eglinton District Centre, as outlined in the *Alkimos Eglinton Economic Development and Centre Plan*.

North Alkimos Local Structure Plan

The centre will also perform a role of providing community services to the local population. Its visibility to traffic on Marmion Avenue, also provides the opportunity for the Neighbourhood Centre to act as a gateway to the North Alkimos area, through the location of community facilities, higher density residential development and other concentrations of activity.

The location of the centre on Marmion Avenue presents the opportunity for the Neighbourhood Centre to be a highly visible gateway to North Alkimos. This is critical given the geographical layout of the Peet Alkimos landholding.

PHYSICAL INFRASTRUCTURE

The development of the Neighbourhood Centre adjacent to Marmion Avenue highlights the importance of the arterial road to the development of the centre. It will therefore have the capacity to not only serve the local population, residing in close proximity to the centre, but also capture some activity from passing traffic, offering a more boutique alternative to the Alkimos Regional Centre and the Eglinton District Centre. Therefore, the interface between Marmion Ave and the Neighbourhood Centre is critical to its successful establishment and development.

A loose relationship with the possible Alkimos North Rail Station also exists, though, unlike the TOD/service commercial area, it is unlikely that the non-delivery of this infrastructure would significantly impact the sizing and staging of the Neighbourhood Centre.

SIZING AND EMPLOYMENT

It is estimated that by 2041, the North Alkimos neighbourhood centre will have approximately 3,439 m² floorspace. This will be one of the largest neighbourhood centres in Alkimos Eglinton, given the relationship between the Coastal Village and the Neighbourhood Centre, its central north-south positioning within Alkimos Eglinton along Marmion Avenue. Of total floorspace in 2041, it is estimated that 61.1% will be for retail, 23.8% will be for health, community and personal services and 15.1% will be for cafés and restaurants. This is outlined in the **Table 27** below.

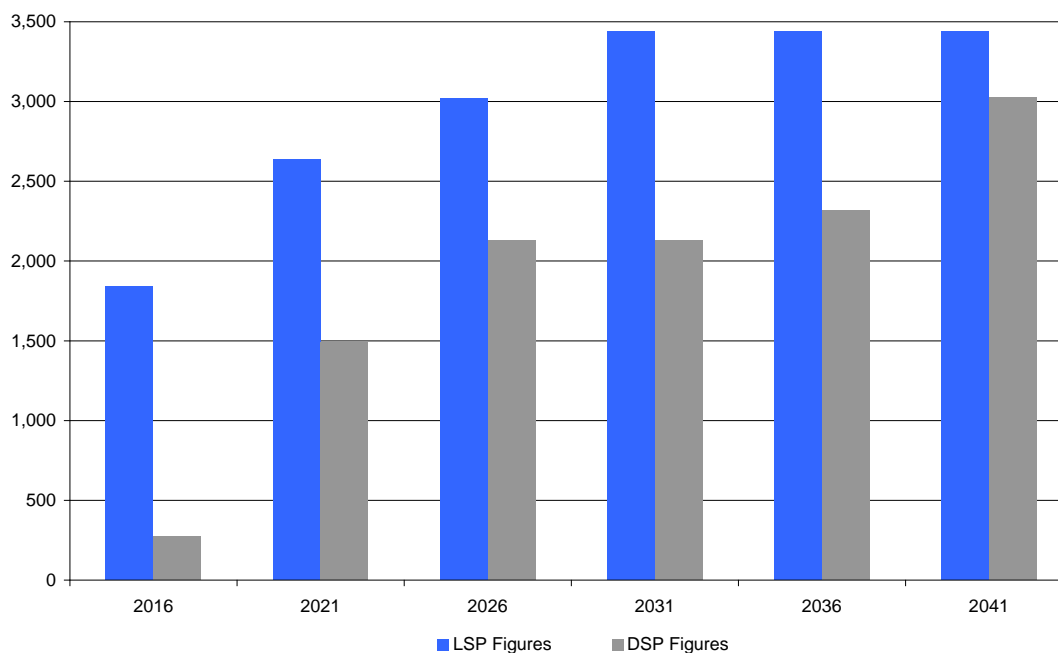
TABLE 26: TOTAL FLOORSPACE, NORTH ALKIMOS NEIGHBOURHOOD CENTRE

NLA/GFA (m ²)	2011	2016	2021	2026	2031	2036	2041
Pop Retail	-	872	1,400	1,750	2,100	2,100	2,100
Pop C&R	-	288	416	451	520	520	520
Health, Community and Personal Services	211	681	819	819	819	819	819
Total Floorspace	211	1,841	2,635	3,019	3,439	3,439	3,439

Source: MacroPlan Australia

When compared with floorspace forecasts from the Alkimos-Eglinton DSP, the North Alkimos LSP anticipates floorspace coming online earlier and remaining higher throughout the forecast period than in the DSP area. This is in response to larger and more rapid population growth in North Alkimos than estimated by Geografia in the *Community Wellbeing and Facilities Plan*.

North Alkimos Local Structure Plan



Graph 4: North Alkimos Neighbourhood Centre Floorspace, LSP and DSP Figures [Source: MacroPlan Australia]

In terms of employment, it is estimated that the Neighbourhood Centre will employ 105 people by 2031. This is smaller than the Coastal Village, reflecting less diversity of employment and a greater focus on serving the local population. This is reflected in the fact that, the Neighbourhood Centre will primarily provide retail employment, accounting for 66.5% of total employment.

TABLE 27: TOTAL EMPLOYMENT, NORTH ALKIMOS NEIGHBOURHOOD CENTRE

Jobs	2011	2016	2021	2026	2031	2036	2041
Population Serving Retail	-	29	47	58	70	70	70
Population Serving Cafes & Restaurants	-	8	12	13	15	15	15
Health, Community and Personal Services	5	17	20	20	20	20	20
Total Jobs	5	54	79	92	105	105	105

Source: MacroPlan Australia

7.3.4.4 CENTRE FOUR – TRANSIT ORIENTED DEVELOPMENT

CHARACTER

Adjacent to the proposed rail station, provision has been made for transit-based retail catering to passing trade generated by pedestrian/cycle traffic associated with the rail station, which will comprise 2,500 m² of retail floorspace and a further 3,700 m² of commercial/office, refer **Figure 20**.

Approximately 7.35 ha of service commercial land is proposed by the Structure Plan, compared to the approximately 15 ha anticipated by the DSP (refer **Figure 21**).

North Alkimos Local Structure Plan

A lesser amount of service commercial is proposed to allow the creation of a TOD area (incorporating medium density residential and transit supportive mixed use) in proximity to the potential future rail station to the south of the subject land.

The location of service commercial at the eastern edge of the Structure Plan area capitalises on exposure to and access from the extended Mitchell Freeway situated to the east (and earmarked for completion past the subject land up to 2021).

This area of the Structure Plan is also affected by a buffer to a groundwater treatment plant located to the south-east of the subject land. Residential development is not available within this portion of the Structure Plan.

While development standards shall be per the requirements of DPS2, there may be a requirement for design guidelines or LDPs to address specific site issues such as parking, access, landscaping and built form particularly in those areas opposite the TOD area (and potential residences).




ROLE AND FUNCTION

The North Alkimos TOD/service commercial area has the potential to provide a combination of office commercial, retail and service commercial based-employment in line with TOD principles. The exact composition of floorspace in the area is dependent on a range of factors, particularly the delivery of the possible Alkimos North rail station (see scenario testing below).

PHYSICAL INFRASTRUCTURE

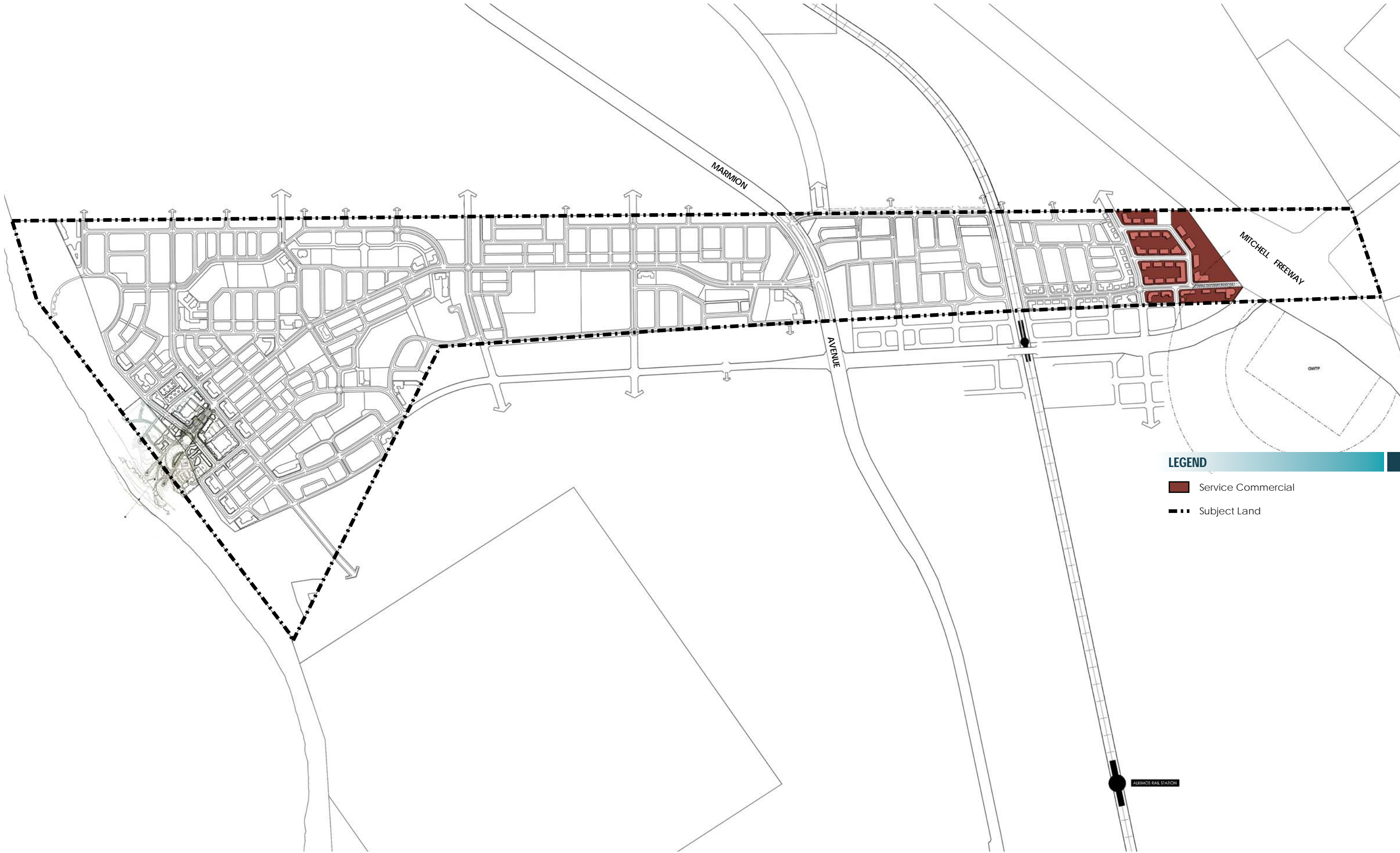
The North Alkimos TOD/service commercial area has the potential to provide a combination of office commercial, retail and service commercial based-employment in line with TOD principles. The exact composition of floorspace in the area is dependent on a range of factors, particularly the delivery of the possible Alkimos North rail station (see scenario testing below).

There are three critical pieces of enabling infrastructure that determine the level of economic success of the TOD/service commercial area. They are:

-  Marmion Avenue
-  Possible Alkimos North Rail Station
-  Mitchell Freeway

Marmion Avenue is the primary arterial road through the Alkimos DSP. Prior to the delivery of the Mitchell Freeway it will act as the primary north-south freight route. Freight activity generated in the central service commercial strip including that located in the North Alkimos LSP will be dependent on the infrastructure in the short to medium term.

The delivery of the possible Alkimos North Rail Station has not been confirmed. This will have important implications on the level of residential and commercial density that can be supported in the North Alkimos LSP land east of Marmion Avenue. This will in turn impact on the level of employment generated by the North Alkimos LSP and its contribution to DSP wide employment figures. MacroPlan has examined this issue has been examined in further detail below through the development of two scenarios.



SERVICE COMMERCIAL LAND USE

NORTH ALKIMOS LOCAL STRUCTURE PLAN | LOTS 1005 & 1006
MARMION AVENUE, ALKIMOS

TAYLOR BURRELL BARNETT | TABEC | EPCAD
SHARMI HOWE | CREATING COMMUNITIES
MACROPLAN | MP ROGERS & ASSOCIATES
SUSTAINABLE SOLUTIONS | WHELANS | ENV
OVERMAN ZUIDVELD | TAYLOR ROBINSON

0m 100m 200m



PLAN: 072015
DATE: MAY 2009




North Alkimos Local Structure Plan


The timing and staging of delivery of the Mitchell Freeway will have significant implications for the regional role and function of service commercial land in the Alkimos Eglinton DSP, including that located in the North Alkimos LSP. One of the three primary interchanges connecting the Mitchell Freeway to the local Alkimos Eglinton road network is located just south of the North Alkimos service commercial land and forms the primary southern exit for all vehicle traffic generated by the essential service commercial strip.

MacroPlan has considered these infrastructure issues in development of floorspace and employment numbers for the TOD/service commercial area.

SIZING AND EMPLOYMENT

As there is currently no certainty as to whether the Alkimos North Rail Station will be developed, the sizing of the floorspace and employment in the TOD/service commercial area required the development of two scenarios. These are:

 **Development including Alkimos North Rail Station:** This scenario assumes that the possible Alkimos North Rail Station identified in the Alkimos Eglinton DSP will be delivered. The implications of this include the development of a TOD with office commercial and retail frontage.

 **Development with no Alkimos North Rail Station:** This scenario assumes that the possible Alkimos North Rail Station identified in the Alkimos Eglinton DSP will not be delivered. The implications of this include the whole portion of the land being developed as service commercial.

These scenarios are examined below.

SCENARIO 1: WITH THE RAIL STATION

The development of the Alkimos North Rail Station will encourage a higher density of development within a walkable catchment. This includes land area located within the Peet Alkimos holding east of Marmion Avenue. Such development would likely be in line with TOD principles and include a mix of built-forms including higher density residential development, along with mixed use retail/office developments. The proximity to Marmion Avenue and the Rail Station supports the development of a neighbourhood centre

Similarly, the dedicated service commercial land will likely include development of a higher than standard density (up to 50 m² per employee) in light of its proximity to a major public transport node.

MacroPlan has forecast that the TOD/service commercial area will have 12,641 m² of floorspace by post residential build-out in 2041. Of this floorspace, 50.9% will be service commercial, 28.7% will be service commercial and 20.4% will be retail frontage.

Of the total floorspace, approximately 6,200 m² would be located within the TOD area with approximately 2,500 m² being devoted to retail frontage. The remainder would be office/commercial floorspace.

TABLE 28: TOTAL FLOORSPACE, NORTH ALKIMOS TOD / SERVICE COMMERCIAL WITH RAIL STATION

NLA/GFA (m ²)	2011	2016	2021	2026	2031	2036	2041
Retail Frontage	307	665	2,144	2,579	2,579	2,579	2,579
Office Commercial	432	936	3,017	3,630	3,630	3,630	3,630
Service Commercial	600	1,600	3,239	4,507	5,453	5,950	6,431
Total Floorspace	1,339	3,200	8,399	10,717	11,663	12,160	12,641

Source: MacroPlan Australia

Employment is estimated to total 367 in the TOD/service commercial area in 2041, if the possible rail station proceeds. Office commercial will account for the largest share of employment, accounting for 44.9% of total employment in 2041, with service commercial and retail frontage accounting for 35.0% and 20.1% of total employment, respectively.

TABLE 29: TOTAL EMPLOYMENT, NORTH ALKIMOS TOD / SERVICE COMMERCIAL WITH RAIL STATION

Jobs	2011	2016	2021	2026	2031	2036	2041
Retail Frontage	9	19	61	74	74	74	74
Office Commercial	20	43	137	165	165	165	165
Service Commercial	12	32	65	90	109	119	129
Total Jobs	40	94	263	329	348	358	367

Source: MacroPlan Australia

This reflects the possibility for the TOD/service commercial area to act as an office-based service node for light industry, logistics and storage businesses located in the rest of the central service commercial strip. Such activities may include engineering and design, labour hire, equipment leasing and other services, along with some show room and other non-standard retail offerings (such as trade supplies stores).

Such office commercial floorspace may also act as a transition area for home-based businesses that are seeking a more commercial location but do not wish to locate in the Alkimos Regional Centre.

SCENARIO 2: WITHOUT THE RAIL STATION

Under Scenario 2, the TOD/service commercial area would contain little to no retail or office floorspace, replaced by a more expansive area of lower density floor space (75 m² floorspace per worker) dedicated to service commercial. This reflects the limited capacity for the location to support higher density mixed use development in the absence of a rail station. As such infrastructure is a critical component to the adoption of TOD principles.

As a consequence, MacroPlan estimates that under this scenario, the total floorspace in the TOD/service commercial land will total 11,255 m² by 2041. This is actually higher than the floorspace identified under Scenario 1 of 12,641 m². However, unlike Scenario 1, this is entirely accounted for by service commercial developments.

TABLE 30: TOTAL FLOORSPACE, NORTH ALKIMOS TOD / SERVICE COMMERCIAL WITHOUT RAIL STATION

NLA/GFA (m ²)	2011	2016	2021	2026	2031	2036	2041
Service Commercial	1,200	2,800	5,668	7,888	9,543	10,413	11,255
Total Floorspace	1,200	2,800	5,668	7,888	9,543	10,413	11,255

Source: MacroPlan Australia

Despite the higher floorspace numbers, the lower density of development under Scenario 2 results in a significantly lower level of employment in the TOD/service commercial area, of 150 jobs in 2041. This is more than 60% less than the employment generated under Scenario 1, due to the loss of higher employment yielding retail and office floorspace.

TABLE 31: EMPLOYMENT, NORTH ALKIMOS TOD / SERVICE COMMERCIAL WITHOUT RAIL STATION

Jobs	2011	2016	2021	2026	2031	2036	2041
Service Commercial	16	37	76	105	127	139	150
Total Jobs	16	37	76	105	127	139	150

Source: MacroPlan Australia

Under Scenario 2, development in the Transit Precinct will be closer to the density likely to be experienced in the remainder of the central service commercial strip. While development density will likely be slightly higher towards each end of the strip, due to improved accessibility factors (closer to Mitchell Freeway and Marmion Avenue), such activity will invariably remain focused on more land intensive uses.

The Transit Precinct has the capacity to contribute significantly to North Alkimos LSP employment generation and support Alkimos Eglinton employment self-sufficiency. However, such employment is almost entirely contingent on the delivery of enabling infrastructure, namely the possible Alkimos North Rail Station. Should the station not be developed, the capacity for the North Alkimos LSP area to contribute to DSP wide employment numbers would be significantly reduced.

7.3.5 OTHER

MacroPlan has estimated potential employment yields from the North Alkimos Coastal Tourist Village, Neighbourhood Centre and TOD/service commercial areas. While these centres will form the predominant source of employment generating economic activity in the North Alkimos LSP, other non-centre activities will also generate employment in the LSP area. These include education and home-based employment.

7.3.5.1 EDUCATION

In the Alkimos Eglinton DSP it was estimated that 400 jobs (outside of centres) will be created by primary and secondary schools in the DSP area. The North Alkimos LSP area will contain one primary school, providing 24 jobs or 6.0% of total DSP education employment located outside of centres. MacroPlan has assumed that the primary school will come online during the early stages of North Alkimos, as timing expectations are not known at this stage.

7.3.5.2 HOME-BASED EMPLOYMENT

Applying estimated home-based business, telecommuting and mobile trade shares of employed residents, outlined in the *Economic Development and Centre Plan*, MacroPlan estimates that by 2041, North Alkimos will be home to:




-  78 people working at home in home-based businesses;
-  47 people telecommuting on average per business day; and,
-  156 mobile trades workers using their home as a base.

TABLE 32: INDUSTRY STRUCTURE OF HOME-BASED EMPLOYMENT, NORTH ALKIMOS LSP, 2011-2041

Jobs	2011	2016	2021	2026	2031	2036	2041
Home-Based Businesses	21	68	81	81	81	80	78
Telecommuting	13	41	49	49	49	48	47
Mobile Trades	42	135	163	163	163	160	156
Total Jobs	76	244	293	293	293	287	281

Source: MacroPlan Australia

This will account for approximately 15.6% of total home based employment in the Alkimos Eglinton DSP, highlighting the important role the North Alkimos LSP area will play in supporting home-based employment.

7.4 SCHOOLS

Provision for a primary school has been made in the general location identified in the DSP.

It is proposed to share the primary school’s play areas with a district recreation facility. This allows the size of the primary school to be reduced to 3.5 ha in accordance with the WAPC’s DC Policy 2.4 and LN4.

The school/recreation site would be bounded on the majority of sides by the road network and overlooked by adjacent residences.

Direct interface between the north-western portion of the district recreation area and a residential development site is proposed. Development on this site would be subject to a LDP or design guidelines to ensure appropriate interfacing outcomes.









7.5 COMMUNITY PURPOSE SITES & STRATEGIES

The Peet Alkimos Economic Development Strategy (Macroplan) has forecast an employment self sufficiency of 32.9%. To ensure this level of employment self sufficiency is achieved as a minimum, a Community and Economic Development Plan is being developed.




The planned land uses in Peet Alkimos will deliver a large proportion of the employment self sufficiency but it will be necessary to have active programs to manage the growth of employment generators. One of the more important programs will be the establishment of a governance mechanism for the coastal node, which will ensure provision of the services that apply to the collective tenants of the village.

North Alkimos Local Structure Plan

Other potential economic activation elements that will be investigated include:

-  Boutique/demonstration businesses;
-  Tourism – tourism components are likely to be themed around the Alkimos wreck located directly offshore from the Peet LSP area;
-  Arts based businesses;
-  Flexible use development with interim community and business activation uses during early development stages, such as local business incubator/services delivery hub/community centre;
-  Business attraction – incentives for businesses to locate in the area;
-  Business events;
-  Provision of broadband and other information and communication technology; and
-  Youth training.

The process of economic development will require:




-  Ongoing engagement and collaboration with the City of Wanneroo;
-  Community and stakeholder engagement; and
-  Identification of opportunities.

To progress the above, a Taskforce has been established between the City of Wanneroo staff and Peet and their project team to jointly develop concepts and strategies to ensure that North Alkimos breaks new ground in the areas of community infrastructure provision (both hard and soft), governance of the coastal node and employment generation. A sub-group has been established in each of these areas. A comprehensive strategy is being prepared to evoke employment creation through engaging with communities of interest throughout Wanneroo that particularly relate to the North Alkimos area. The potential to create clusters of employment in the “funky coastal village” through a focus, inter alia, on creative industries particularly the arts, on reproducing the award winning Ngalla nursery model in the eastern area for a number of years to provide mature trees as well as engage long term unemployed youth in training, are but two of the many concepts that will be jointly explored and instigated in the early stages of development.




The above gives a general overview of the economic development elements that are anticipated to be included as part of the Community and Economic Development Plan and the process envisaged for its development. Since the process will be collaborative, it is expected that additional potential economic activation elements may be added during the course of developing the plan.

The key aspects identified by Creating Communities for the establishment of a vibrant, functional and sustainable community at North Alkimos are as follows:

The Walk Trail

-  Coastal
-  Ridge line
-  Adventure




Community and Public Art

-  Process for developing emerging artists from the region
-  To be included in many different places
-  Link to activation of coastal village and education precinct






North Alkimos

Local Structure Plan









Coastal Village

-  Site for civic/community facilities and services
-  Activated
-  Build a unique culture




Education Precinct

-  Pavilion
-  Oval
-  Events and activities
-  School
-  Day care



Public Open Space Network

-  Range of spaces for different groups
-  Link to walk trails
-  Link to play grounds
-  Activate at various times
-  Friends of parks program
-  Play Ground
-  Large attractor
-  Network of smaller options

Interface with Surrounding Communities

-  North- south linkages to main centres
-  Variety of activities in different coastal nodes
-  Add to existing communities of interest

Beach/Coastal Interface









-  Coast Care Group
-  Events and Activities

In addition to the above strategies the proponents will also work with the WAPC, City of Wanneroo and the other landowners in the Alkimos/Eglinton District Structure Plan to prepare a Developer Contributions Plan that will assist in delivering key infrastructure to support local employment creation.








8.0 PUBLIC OPEN SPACE

The Alkimos Masterplan provides for a total of 23.6 open space which includes a walk trail (4.19 ha) and a total of 18.5 ha of credited public open space dispersed throughout the site to ensure the majority of residents are located within 200 m (refer **Figure 22**). In addition to the public open space provision, areas have been identified for conservation purposes.

The distribution and location of open space of the Structure Plan has been influenced by:







-  The reserves of the MRS;
-  Geo-heritage/landform;
-  Local ecology (including TEC, Bush Forever sites, cockatoo foraging habitat and significant vegetation);
-  The desire for landscape connectivity/linkages extending across the site from east to west;
-  An appropriate balance between active and passive open space requirements;
-  The need for an appropriate level of buffering between major transport routes and residential areas;
-  Walkability/access to open space areas; and
-  Drainage requirements.

The overall principles for the open space areas include:

-  Provide connections to the ocean from areas of residential development;
-  Expression of the parabolic dune walk trail as a major place-defining element;
-  Provide landmark views and relationships that assist in orientation and legibility;
-  Create highly utilised and valued open spaces;
-  Integrate urban water drainage to create passively irrigated open spaces;
-  Provide a hierarchy of spaces from incidental local places to major foreshore parkland; and
-  Provide diverse space from highly naturalistic to more formal urban spaces.

Conservation of representative landscape types present at the site is already provided for in Parks and Recreation Reserve as part of the DSP; however conservation and interpretation of some areas of smaller dunal forms within POS will contribute to the sense of place of the development. The use of native plant species in the POS will also contribute to this and reduce the need for irrigation.




A strongly linked open space network of passive and active recreation spaces will be provided to facilitate community use as:

-  Informal kick-about areas;
-  Picnic areas;
-  Play areas;
-  Walking tracks;
-  Formal oval; and
-  Beach access.

The two primary open space features of the Structure Plan are outlined in **Figure 22** and detailed below.

Foreshore Reserves/Parks and Recreation Reserve (Parks and Recreation): Associated with the coastal foreshore and an east-west ecological linkage impacting on the south-west portion of the site. Parks and Recreation was determined via the omnibus amendment process that put in place the Urban designation of the land. Parks and Recreation takes into account Bush Forever sites, TEC and coastal setback requirements. Environmental Management Plans (EMPs) will be required for Parks and Recreation reserve at subdivision stage. The DSP has required that the portion of Parks and Recreation adjacent to the Coastal Village is indicatively identified as part of this centre. This reflects that the management of Parks and Recreation reserve in this location is intended to reflect access and recreation rather than conservation. The ultimate treatment of Parks and Recreation reserve as part of the Coastal Village is subject to detailed design and may result in a rationalisation of Parks and Recreation (MRS) boundaries.

Active and Passive Open Space Areas: Public open space areas shall incorporate features and facilities to both encourage residential growth and to provide amenities to residents. The key public open space areas will consist of the following:






-  Neighbourhood Parks – ranging in size from 3,000 m² to 5,000 m² and will provide a mix of active and passive recreation opportunities and is likely to also include a drainage function.
-  Local Parks up to 3,000 m² – smaller more intimate passive spaces that may include kick-about areas.
-  Walk Trails – continuous walk trails have been designed into the landform and will facilitate movement throughout the Coastal Village Precinct, through to the network of open space areas east to the Mitchell Freeway.

8.1 PARKS & RECREATION FORESHORE RESERVES

8.1.1 FORESHORE RESERVE

Public access to the foreshore area will be carefully managed, limiting access to designated routes and providing interpretive material to ensure that it is valued by the community for passive recreation, and avoids being degraded by uncontrolled access. Walking tracks through the reserve will utilise informal trails that are already present in order to avoid clearing of new tracks, and to provide a network that is already proven as preferred routes by users of the area.

Management of public access through the area will be achieved utilising:

-  Signage (both informative and interpretive);
-  Fencing preventing uncontrolled access (post and wire);
-  Boardwalks and chain-linked plank paths;
-  Stabilised footpaths; and
-  Brushing of areas of dune requiring rehabilitation.

The area of the dune blowout will require stabilisation and revegetation on a large scale. A management plan will be put in place to guide this process, and ensure other areas of the reserve remain in a close-to-natural state, refer **Figure 23**.



LEGEND

- Regional Open Space/ Foreshore Reserve
- Public Open Space - Active and Passive
- Dunal Walk Trail (credited) (R3)
- Dunal Walk Trail (uncredited)
- Public Purposes
- 13 Public Open Space Number (credited)
- Threatened Ecological Community (R1)
- D6 Deduction Number
- 200m Walkable catchment
- Subject Land

R2 (on Public Open Space Schedule) not shown on this plan. Refer to Figure 52 (Drainage Catchment Plan) for further information.

PUBLIC OPEN SPACE PROVISION

PEET ALKIMOS LOCAL STRUCTURE PLAN | LOTS 1005 & 1006 MARMION AVENUE, ALKIMOS

TAYLOR BURRELL BARNETT | TABEC | EPCAD
 SHARIN HOWE | CREATING COMMUNITIES
 MACROPLAN | MP ROGERS & ASSOCIATES
 SUSTAINABLE SOLUTIONS | WHEELERS | ENV
 OVERMAN ZUIDVELD | TAYLOR ROBINSON

0m 100m 200m



North Alkimos Local Structure Plan



Photoplate 5 Examples of Foreshore Access Paths /Treatments to form part of Management Plan



Dual Use Path

Northern Parkland

Coastal Heath

Foreshore Paths

Rehabilitation Area

The Esplanade

Leading Lights

The Alkimos

FORESHORE RESERVE

NORTH ALKIMOS LOCAL STRUCTURE PLAN | LOTS 1005 & 1006 MARMION AVENUE, ALKIMOS

TAYLOR BURRELL BARNETT | TABEC | EPCAD
 SHARNI HOWE | CREATING COMMUNITIES
 MACROPLAN | MP ROGERS & ASSOCIATES
 SUSTAINABLE SOLUTIONS | WHELANS | ENV
 OVERMAN ZUIDVELD | TAYLOR ROBINSON

0m 300m 600m









PLAN - 07/055
 DATE - MAY 2009

8.2 PASSIVE AND ACTIVE OPEN SPACE

8.2.1 PASSIVE OPEN SPACE

The passive recreation spaces of the development provides a diverse range of recreational opportunities, from natural areas such as the foreshore reserve through to manicured parkland areas. The main elements of the passive recreation system are:

-  The parabolic dune walk trail, following the parabolic dune form on the site;
-  The Northern Coastal Parkland;
-  The Esplanade;
-  Parks and Recreation Reserves;
-  A network of parks throughout the development; and
-  Green linkages through the site.

The overall recreation space design will encourage residents and visitors to contribute to their mental and physical health through the utilisation of these recreational opportunities. The spaces will be within easy walking distances of all areas of the development and provide places for enjoyable walking, reading, family gathering, and incidental child play.

The parabolic dune walk trail and the trails through the Foreshore Reserve and Northern Coastal Park will ultimately form continuous path/trail network of public spaces, refer **Figure 24**, which along with public accessways and wide, vegetated verges will provide circuits of differing lengths and characters for residents and visitors to enjoy.

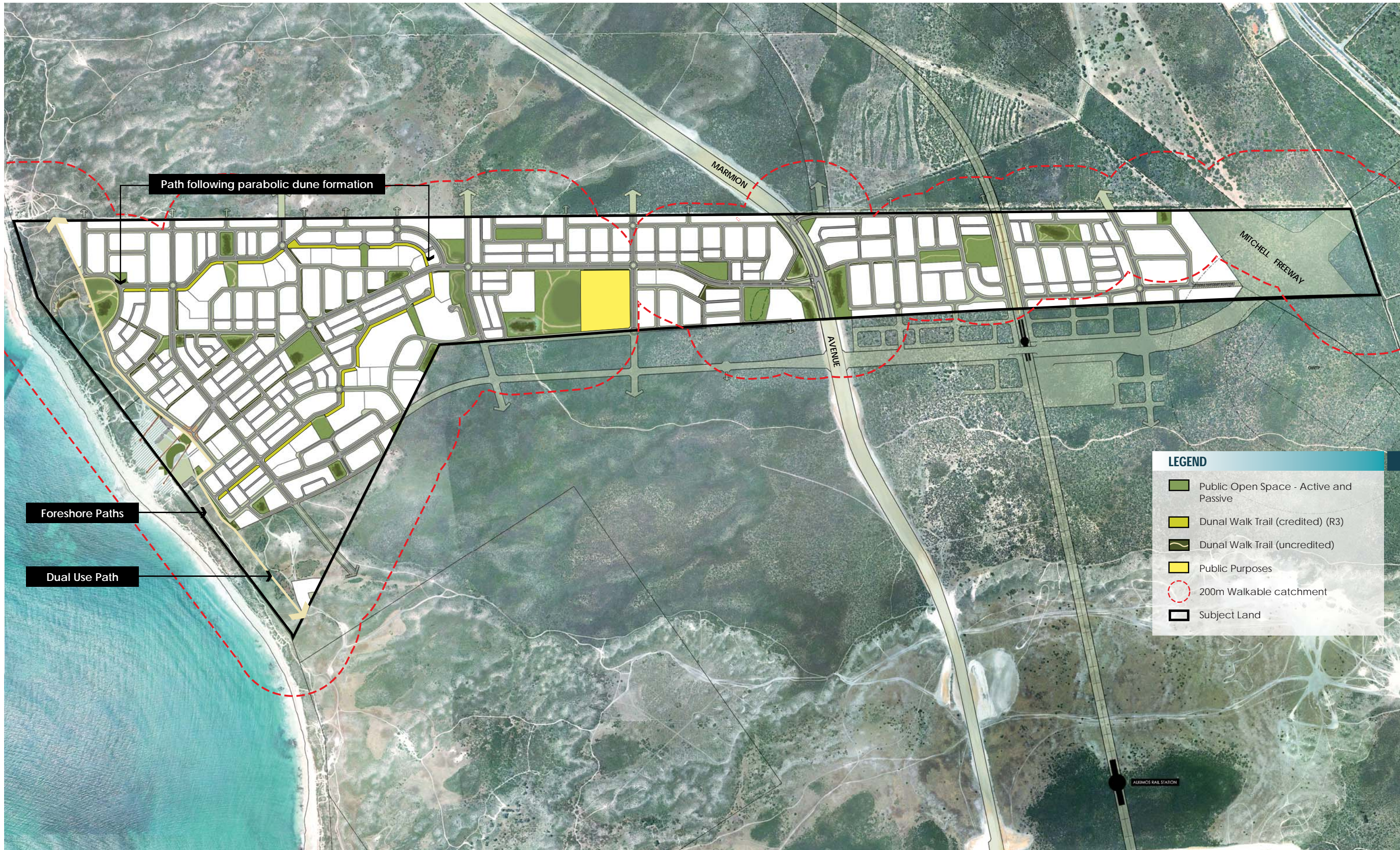
The provision of a diversity of recreational styles in the area will contribute to the whole-year appeal of the development. Areas for walking and bike riding that will be utilised throughout more of the year than beach-based activities, and this will assist in supporting tourism-based businesses and activity at the village core in all seasons.

8.2.1.1 THE DUNAL WALK TRAIL

The parabolic dunal walk trail is a walking trail following the landform of the parabolic dune, as it is reflected in the altered landscape. The walk trail would represent a continuous path characterised by endemic plantings and public art reflecting the geo and maritime heritage of the site. It would satisfy obligations to reflect the alignment of the parabolic dune in land form or development outcomes and would facilitate public access to coastal viewsapes while adding to the overall pedestrian connectivity of the development.

The dunal walk trail provides a unique passive recreation opportunity for residents and visitors to the site, facilitating continuous pedestrian access between open spaces and providing a direct pedestrian linkage to the foreshore and the Coastal Village.

The dunal walk trail assists in creating distinctive sense of place and in developing the culture of the Coastal Village and ultimately the Peet Alkimos development.



NETWORK OF OPEN SPACES/TRAILS

NORTH ALKIMOS LOCAL STRUCTURE PLAN | LOTS 1005 & 1006 MARMION AVENUE, ALKIMOS

TAYLOR BURRELL BARNETT | TABEC | EPCAD
 SHARNI HOWE | CREATING COMMUNITIES
 MACROPLAN | MP ROGERS & ASSOCIATES
 SUSTAINABLE SOLUTIONS | WHEELERS | ENV
 OVERMAN | ZUIDVELD | TAYLOR ROBINSON

FIGURE 24

0m 100m 200m



PLAN: 07/05
 DATE: MAY 2009

North Alkimos Local Structure Plan

It is located along the foot of the dune for the majority of its length, on the northern slope and has been extended east for the length of the development to provide a continuous east-west link in accordance with the DSP. Areas of the trail requiring earthworks will be planted with a suite of locally native plants representative of the various ecological communities present on the site and connected with areas of open space, as outlined in **Figure 25**. Interpretive signage will be installed at various points along the Trail to inform users of the environmental features of the area.

A high concentration of flowering plants will be included in the vegetation of the trail (refer **Photoplate 3**), providing a changing experience through the seasons. This will tell the story of the seasons in a strong visual manner, and provide interest for regular users of the trail in the changing sights and colours it will provide.

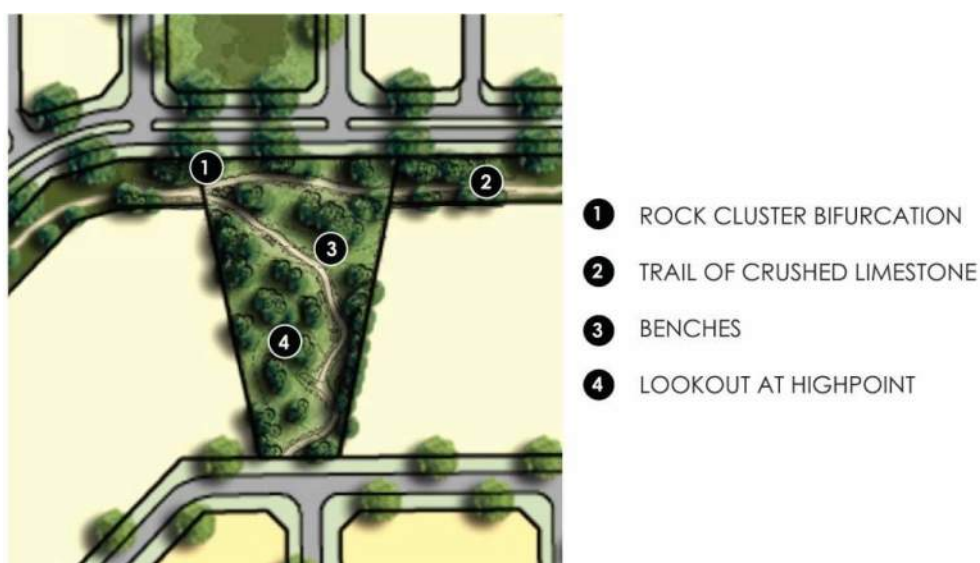


Figure 25: Walk Trail integrated with POS

The continuous walk trail will assist in the integration and inclusiveness of all precincts within the Structure Plan area. The walk trail will also perform a drainage function through stripping of nutrients. It will make an important contribution to the character and legibility of the Structure Plan, and will encourage pedestrian/cycle trips over the private motor vehicle. The length of the trail tells a changing story through differing conditions, and is linked to the Northern Coastal Parkland and then the Foreshore Reserve to the north, and to the Parks and Recreation Reserve and Foreshore Reserve to the south.

Public accessways (PAWs) will form linkages across the reflected ridge form to the southern side of the dune from the trail. These will allow access to high points and lookout areas. This will allow a sense of legibility to the development, and allow the revelation of dunal formation. The southern-most of these PAWs extends south towards the Parks and Recreation, and road verge treatments will be used to connect the PAW through to the Parks and Recreation Reserve. This will create a connection between walking and hiking trails through to the Foreshore Reserve as well, providing a diversity of terrains and environments for recreation.

North Alkimos Local Structure Plan



Photoplate 6 Flowering plants to be utilised through the walk trail

8.2.1.2 NORTHERN COASTAL PARK

This is a very large park (**Figure 26**) providing opportunities in one location for both environmental interpretation and active play, as well as more formal urban spaces and drainage integration.

A natural depression in the park provides an opportunity for passive irrigation of turf through drainage, and it is intended that the area will be terraced, and playground and barbecue facilities provided nearby. The areas of grass and modified environment will be separated from the indigenous landscape through change of level, pathways, or other structural devices to ensure management integrity of the coastal heath.

The natural high point of the park provides an opportunity for a lookout, and a focal point for the parabolic dune walk trail. A large sculptural element will be installed at this point to lead trail users into the park.

The formal area of this large space is actually located 250 m from the beach, and therefore needs to be connected to the beach through obvious walkways to allow community access to the ocean. There is also a need to provide closer vehicle access to the beach in order to allow access for people with surf boards, picnic equipment, children, and strollers. This is facilitated by the provision of a string of parking leading from the northern side of the park down towards the beach.



Figure 26: Northern Coastal Park

8.2.1.3 NEIGHBOURHOOD PARKS

Neighbourhood parks will be provided throughout the development, within easy access of all residential areas, and will accommodate active and passive recreational pursuits. These parks will provide areas for informal kick-about and spontaneous play. Play facilities will also be provided for toddler, junior, and youth age groups.

These parks will form part of the public open space network, along with the linkages through the development. They will provide destinations along the walk trails, and respond to the character of the theme area they are in through plantings, structure, and detailing.

Structured planting in parks will be indigenous species, and the use of irrigated turf areas will be minimised.

8.2.1.4 THE ESPLANADE

The beach node, The Esplanade (**Figure 27**), will provide the connection between the Coastal Village and the Indian Ocean. The Coastal Village is oriented to take advantage of a view of the ocean through a low point in the dunes. This open space extends the Coastal Village alignment as open space to form a strong link with the coast. It will be an urban space close to the village core, with gradual loss of formality closer to the beach itself.

The Esplanade consists of a turfed area near the development which will be passively irrigated by drainage water from the village. This area will be at a lower level, and a small boardwalk will be elevated along the western edge to provide interest in changing levels. A lookout over the rest of The Esplanade towards the beach will give expansive views of the park and the ocean. A large kick-about area will be provided on the ocean side of the lookout area.

Strong paths will lead to the highpoints on either side of the dip in the foredunes, and lookouts are to be located at both high points. Outside these paths, rehabilitated and stabilised dune vegetation will form the outside boundaries of The Esplanade.

A beach volleyball court is under consideration close to the beach, which is a multi-purpose open space venue as a site for plays, Christmas carols and the like when not in use. This will add to the diversity of recreational choices, and promote night time use and 'off-peak' use outside the summer months.

A series of picnic and barbecue spaces (**Photoplate 7**) along the southern path will be provided within sheltered nooks to protect from strong south-westerly winds. These areas will be lower than the pathway, and will be further protected from wind by mounded sand planted with coastal heath on their windward side. They will be small enclosures for family or friend groups, and will be equipped with barbecues, tables and seating. Structures for shade will also be provided, and the nooks will overlook activity in the body of The Esplanade.

North Alkimos Local Structure Plan



Figure 27: The Esplanade

North Alkimos Local Structure Plan



Photoplate 7 Picnic and BBQ areas of The Esplanade





8.2.2 ACTIVE RECREATION

The primary active space within the LSP is a full sized oval located adjacent to the primary school (**Figure 28**). Parking for the oval and the primary school is interconnected to allow for overflow use by either. Shady areas of native vegetation are provided outside the area of the oval, with walking trails though. Part of this space contains a drainage function, and will be planted with native plant species. This provides an opportunity for interpretation and education closely linked to the school.



Figure 28: Co-located Oval/Primary School

Secondary active spaces will include:

-  informal kick-about areas capable of use by small groups and families;
-  a beach volleyball court at the ocean end of The Esplanade, providing a specific active opportunity at the beach;
-  a fitness trail will be incorporated into the dune walk trail; and
-  formalised play facilities (**Photoplate 5**) will be distributed throughout the development, catering for toddler, to junior, to youth recreation. All play facilities will be provided with adjacent seating and shade, and located to optimise passive surveillance from adjacent development.

North Alkimos Local Structure Plan








Photoplate 8 Examples of Active Play Space

8.3 PUBLIC DOMAIN

The vision for the development is to create vibrant spaces for all to celebrate the coastal location and engage with the water. The intention is to deliver a series of well connected spaces that contribute to reinforcing the location as a community destination. A well designed public realm contributes to community pride and creates a unique identity for a place.

The key objectives in delivering the public realm include:

-  Creation of an interesting and vibrant public realm with a variety of connected public spaces supported by an appropriate mix of land uses to ensure that spaces are activated and safe at all times;
-  Creation of spaces that offer difference experiences of the public realm, from larger open spaces that are suitable for family activities and gatherings, places to picnic, places to promenade, occasional festival spaces or to simply sit and enjoy the view;
-  Creation of a comfortable pedestrian environment where pedestrians and cyclists are prioritised;
-  Provision of shade and shelter and from winds, and provide comfortable spaces that provide exceptional amenity; and
-  Incorporation of public art to interest and engage the community and visual appeal to the area.

8.4 LANDSCAPE DESIGN

The landscapes in the Structure Plan area will require careful treatment as the coastal environment is relatively harsh, and the sandy soils of the area have low water and nutrient retention properties.






Water conservation will be a primary consideration in landscape design, and heavily influence species selection and planting regimes.

8.4.1 LANDSCAPE OBJECTIVES AND STRATEGIES

The eastern area of the site contains low woodland of Banksias, while the western area contains a great deal of coastal heath. Unfortunately, Banksias are a tree species that does not take kindly to urban surroundings, and nor does coastal heath. In addition, these species are not considered appropriate to the urban context in terms of height, form, or appearance. This will reduce the practicality of preservation of some areas of remnant vegetation on the site.

The urban landscape will be designed to produce an urban setting that complies with the need to recreate foraging opportunities for the birds (as is currently being negotiated with DEHWA). The outcome of negotiations with DEHWA will result in sufficient foraging opportunities on site to support cockatoo population. Any other landscape revegetation will be additional to this minimum commitment.

However, the urban landscape will need to present a valued setting that is acceptable to the public as the primary user providing street trees, shade and amenity etc within an urban setting. This is a vital component of a successful new settlement and needs to be balanced against the requirements of local flora and fauna. The following species are proposed to be utilised in the development landscaping in the following densities (extract from the On-Site Mitigation Strategy):

-  Sheoak (*Allocasuarina fraseriana*)
-  Tuart (*Eucalyptus gomphocephala*)
-  Callistemon's (e.g. *Callistemon salignus/viminalis*)
-  Peppermint (*Agonis flexuosa*)
-  Marri (*Corymbia callophylla*)

Some streets will be set out with street tree planting that uses coastal heath vegetation as a ground cover and main roads will be planted with groups of native vegetation including extensive use of Grasstrees that are endemic in the area. Others will have groups of trees/large shrubs such as the Banksia and Grasstrees in informal groups rather than street tree planting. This will be done in association with integrated urban water management.







Exposure of large areas of the site to strong coastal winds, laden with salt, will limit the range of plant species that will survive the conditions. Plants will have to be carefully selected to ensure that the species planted are viable in the site conditions.

The restricted availability of groundwater for the irrigation of POS is also an issue at the site. Throughout the delivery of the project there will be a commitment to pursue any further opportunities for technological improvements in the delivery of alternative water sources for public irrigation.

8.4.2 LANDSCAPE THEMING

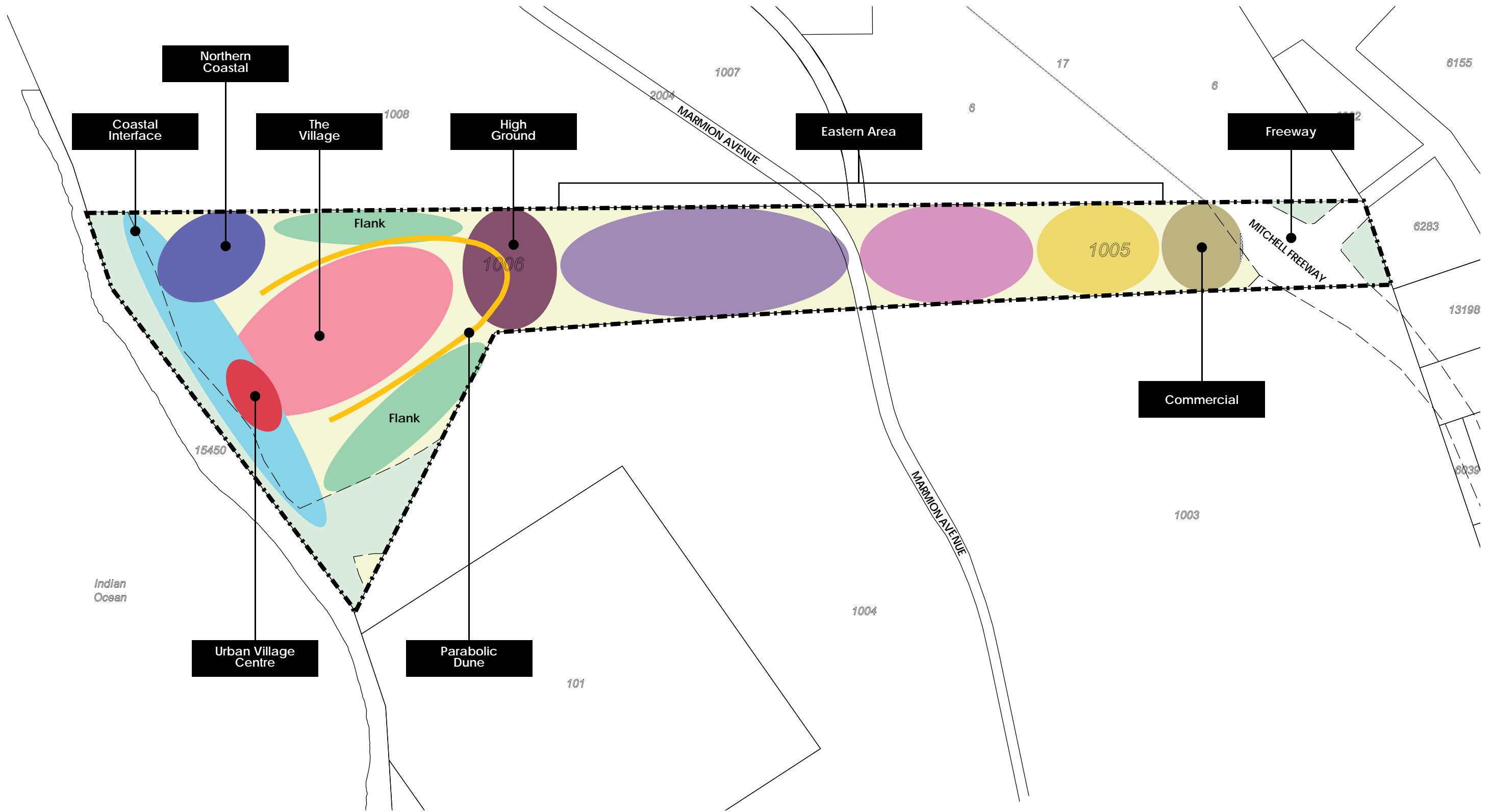
The landscape of the site will aid in delivering a diverse range of urban characters, reinforcing neighbourhood identity. The development will be separated into areas with different landscape themes. These themes will be expressed through planting, streetscaping and public open space treatment. Design guidelines for front garden treatments to ensure reinforcement of themes will be considered at a later stage in the design process and will also include vegetation types suitable to provide habitat for cockatoo foraging.

The major landscape theme areas (**Figure 29**) will include:

-  The coastal interface - the theme of this area will be the coastal heathland, and the area will transition from formal, urban spaces to more informal spaces closer to the ocean;
-  The northern coastal area, which will centre around the Northern Coastal Park;
-  The village, within the parabolic dune form - this area will have a coastal village theme;
-  The village centre - this will have an urbanised theme with more formalised plantings in streetscapes and public open space;
-  High ground at the ridge crossing; and
-  The commercial centre near the freeway extension.

The parabolic walk trail will be naturalistic along its entire length through both urban and naturalistic areas. This will transition to less formal, grouped, and naturalistic plantings in the less urban areas.

The outer flanks of the parabolic dune and the area between the high ground and the commercial section will be divided into smaller neighbourhood character areas. The eastern neighbourhoods will particularly include



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LANDSCAPE THEME AREAS

NORTH ALKIMOS LOCAL STRUCTURE PLAN | LOTS 1005 & 1006 MARMION AVENUE, ALKIMOS

TAYLOR BURRELL BARNETT | TABEC | EPCAD
 SHARMI HOWE | CREATING COMMUNITIES
 MACROPLAN | MP ROGERS & ASSOCIATES
 SUSTAINABLE SOLUTIONS | WHELANS | ENV
 OVERMAN ZUIDEVELD | TAYLOR ROBINSON

0m 100m 200m
 PLAN: 07/08/5
 DATE: MAY 2009

plantings of Tuarts and Banksias in public open space, appropriate native street trees, and may also include limited exotics such as *pinus maritima* as highlight trees.

8.4.3 LANDSCAPE VISION







The landscape vision for Alkimos is to create a highly valued landscape that contributes to community health, wellbeing, the environment and sense of place.

The major structuring of POS is provided by a network of linkages which offer a diverse range of experiences in both the linkages themselves and in the public open spaces they connect. These experiences will range from natural or highly naturalistic through to formal, urban spaces.

A hierarchy of spaces will be provided of differing character, from small incidental local spaces through to major parklands such as The Esplanade and the Northern Coastal Park. This will ensure that there are parks provided for all community needs.

8.4.4 BOULEVARDS AND GREEN LINKAGES

The network of linkages throughout the development area provides the major ordering element of the public open spaces. The linkages consist of:

-  The parabolic dune walk trail;
-  Public accessways over the top of the reflected dunal landform;
-  Major east-west green linkage;
-  Wide, vegetated verges throughout the site;
-  The coastal dual use path; and
-  Paths through the Northern Coastal Parkland.

These are complemented with linkages through the Parks and Recreation Reserve, particularly coastal walking trails through the foreshore reserve. Together these elements provide loops and circuits of greatly varying lengths, providing opportunities for enjoyable passive recreation to people of all ages and fitness levels.

Green linkages have been provided throughout the development, aligned with the pedestrian linkage network. These green links are varied in form, and include linkages planted solely with native vegetation, through to more manicured boulevards.

The most significant element of this linkage system is the parabolic dune walk trail. This trail is a major place-defining element and will assist in orientation and the legibility of the coastal half of the development.



Photoplate 9 Examples of Landscape Theming

8.4.4.1 STREETSCAPES

The approach to streetscapes aims to create interest and diversity in the development by providing a full range of streetscape outcomes, from the more naturalistic to the more urban. The streetscapes will respond to neighbourhood, use, and local character.

Traditional road verges containing trees and grassed areas will be unlikely to succeed in the conditions on the site. Residential streetscapes are recommended to transition from informal to more formal near the major urban roads. The informal verges are likely to be planted with grouped trees where width allows, and shrubs and groundcovers of native species to contribute to the natural, coastal feel of the area.

For the purposes of solar access some east-west and oblique roads will be planted with deciduous trees, while some north-south roads should be planted with native plant matter.

This will provide a strong matrix of streetscapes, within which focal points, such as the village core, will be planted with highlight plantings of low water use. These will be contracting species capable of withstanding coastal conditions, such as Norfolk Island Pines.

EAST-WEST ENTRY ROAD

An east-west distributor road will provide the main entrance street from Marmion Avenue to the village core. It will emphasise the existing environment though use of locally native species, and will be landscaped largely with grass trees and limestone rocks harvested from the site. This approach will create a sense of place and a unique character for the street (refer **Figure 30**).

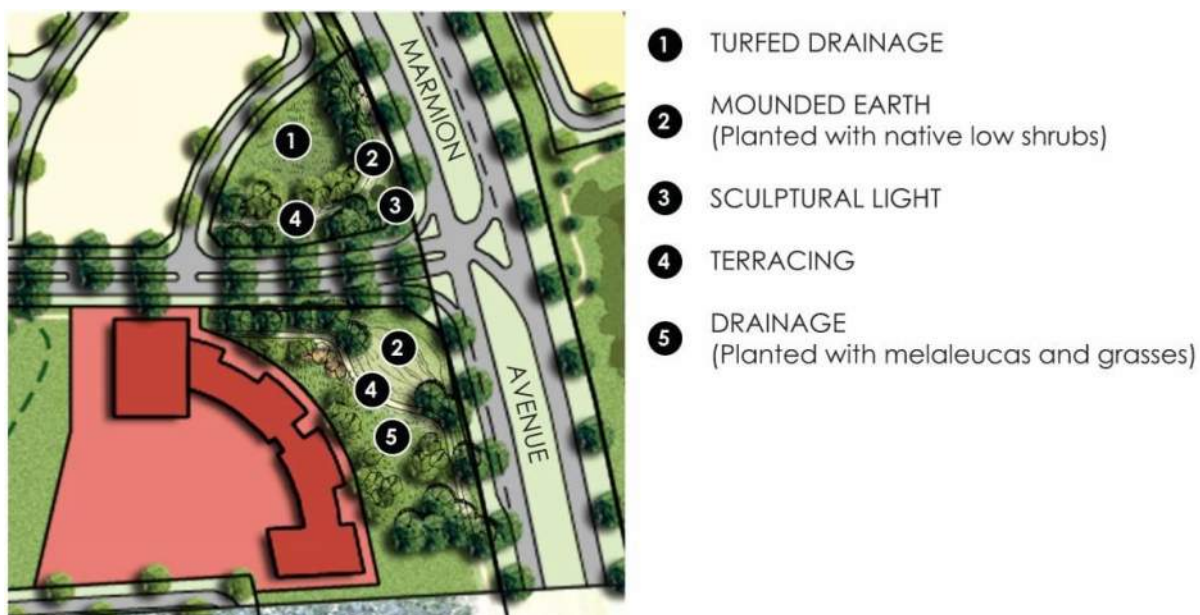


Figure 30: Marmion Avenue Entry - West

When the distributor road enters the Coastal Village, its lanes will bifurcate, opening the street up along viewlines through the break in the foredunes to the ocean. The lines of the shopfronts will continue through the foreshore park (The Esplanade), orienting the space and maximising views to the ocean.

The streetscape in the Coastal Village will be focussed on providing a pleasant environment for pedestrians, with car usage as a secondary function. Limited parking will be provided in chevron form to reduce the length of road space separated by parking. An area in the centre section of the street will not contain any parking, but rather provide a continuous space from one side to the other.

The paving will be designed to emphasise this area as a special place. The road surface between the village and The Esplanade to the west will be raised as an integral part of vehicle speed management, reinforcing pedestrian dominance. Street treatments will also emphasise and define the change in street hierarchy.

A large central median will provide public open space and large-scale plantings. The paved pathways will be planted with smaller shrubs and trees.

The main street in the village core is a pedestrian preference space, with the car as a secondary user. This will be reflected in all levels of detailing. The road will be raised and paved to indicate a point of difference for road users from the rest of the development. Wide pedestrian paths will also cultivate the relaxed feel of a coastal village centre.

A depression in the foredunes near the coastal village allows framed ocean views. To take advantage of this, the two traffic lanes are bifurcated to allow greater public access to the view. This viewline follows the line of The Esplanade down through the dunes to the ocean.

As a result of this arrangement, the median has a triangular shape and will provide an area for landscaping and as a pleasant and effective pedestrian refuge.

8.4.4.2 MARMION AVENUE

Marmion Avenue will primarily contain drainage functions on its margins, however the retention of a large line of mature trees near the northern boundary of the development site will provide a significant landscape feature for travellers. A large sculptural element is planned for the corner of Alkimos Drive and Marmion Avenue. This element will incorporate a light, and relate to the leading lights into the site.

8.4.5 PUBLIC ART

Public art will be incorporated within all public realm areas and is considered an integral component of civic design. All public art projects will be intimately related to the site and serve an interpretive function.

Public art will form part of the strategy of diversity in public open spaces. These public artworks will range from large-scale landmark works to small-scale interpretive pieces. A landmark piece is planned for the Northern Coastal Parkland as a focal point for the parabolic dune walk trail, and it is also likely that landmark pieces will be commissioned for other areas, such as the village centre and The Esplanade. Smaller scale interpretive works are intended to be associated with the parabolic dune walk trail, and small scale pieces are also likely to occur in other public open spaces.



Photoplate 10 Examples of Public Art

8.4.5.1 LEADING LIGHTS

A major initiative in the inclusion of public art in design is a series of beacons, or 'leading lights' planned along Alkimos Drive from Marmion Avenue to the village core, and out into the sea (refer **Figure 31**). The design of these lights will be a public art project. In the early stages of development these lights will function to encourage people to visit the area. The largest of these beacons will be located at the intersection of Alkimos Drive and Marmion Avenue to create a point of interest and announce the entrance to the development.

As the development progresses they will be major place-making and orientation devices. The beacons are intended to reference the Alkimos wreck, and the final beacon in the water will provide a point to swim around for local clubs and swimming enthusiasts.

8.4.6 DOMESTIC LANDSCAPING

Domestic landscapes are intended to also complement the coastal feel of the development. This will be encouraged through a landscaping package to be devised for development stages.

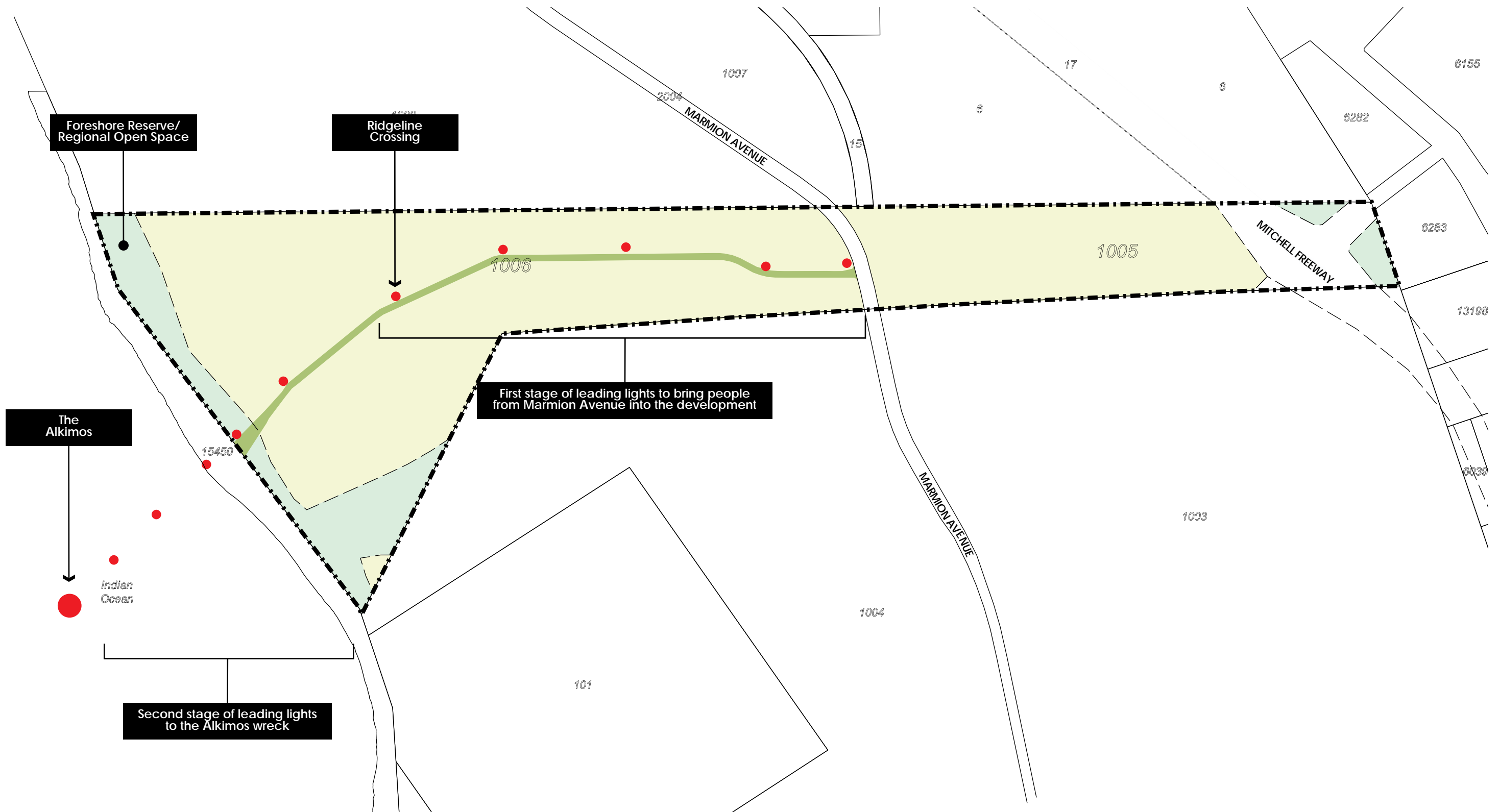
In order to pursue water wise development principles, landscaping guidelines for householders will be considered, and water wise garden packages will be provided as an integral part of sales. Information packages on water wise practices will be provided to purchasers.

Throughout the delivery of the project there will be a commitment to pursue any further opportunities for technological improvements in the delivery of alternative water sources for domestic irrigation.

8.5 OPEN SPACE PROVISION

The POS schedule at **Table 34** confirms that the Structure Plan complies with the WAPC’s DC Policy 2.3 – Public Open Space in Residential Areas requirement to provide a minimum 10% POS. **Table 35** identifies the public open space areas, and the drainage allocation for each.

Tables 34 and 35 should be read in conjunction with **Figure 22**.



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North Alkimos Local Structure Plan

TABLE 33: POS SCHEDULE (AS PER LIVEABLE NEIGHBOURHOODS 4)

	Gross Area (ha)	(ha)	(ha)
A	Lot 1005 Marmion Avenue	63.4979	
	Lot 1006 Marmion Avenue	177.7366	
	TOTAL		241.2345
	Less (environmental/ecological considerations)		
B	Foreshore Reserve – as per clause 42 (D1)	25.7579	
	Bush Forever – as per clause 42 (D2) (1.2564 + 2.3735)	3.6299	
	Open Space not include in POS Contribution	n/a	
	TOTAL		29.3878
	NET SITE AREA (A – B = C)		211.8467
	Deductions		
D	Freeway Reserve (D3) (12.1098 + 0.2808)	12.3906	
	Rail Reserve (D4)	1.2275	
	Primary School (D5)	3.50	
	Service Commercial (D6)	7.35	
	Retail (100%) (D7)	0.6092	
	Surface Area for <1:1 Year Storm Events in POS (total of 1:1 drainage as per attached plan)	3.6005	
	TOTAL		28.6778
E	Net Subdivisible Area (C – D = E)		183.1689
F	10% Requirement (10% of E = F)		18.31
	POS Requirement		
G	Minimum 80% Unrestricted Open Space (80% of F = G)	14.65	
H	Maximum 20% Restricted Open Space (20% of F = H)	3.66	
	TOTAL		18.31
	POS Provision		
I	Unrestricted Open Space (Minimum 80% or 14.65 ha)		
I	Active Space (larger than 1000 m ²) (A1 – A31 on attached plan) (Total POS area 20.0943 ha minus drainage 1:5 3.953 ha and TECs 0.4106 ha)	15.7307	
J	Subtotal		15.7307
	Restricted Open Space (maximum 20% or 3.66 ha)		
	Threatened Ecological Communities (R1)	0.4107	
J	Drainage Surface Area between 1:1 and 1:5 Year Storm Events [total of 1:1 drainage (3.6005 ha) subtracted from total 1:5 drainage (3.953 ha)] (R2)	0.3525	
	Dunal Walk Trail (R3)	2.1013	
	Subtotal		2.8645
	Allowance		3.64
	Balance (included at B)		n/a
K	Uncredited POS (less than 1,000 m² or linear)		
K	Walk trail (green hatched area)	2.1587	
	Uncredited POS (*)	0.1623	
	Subtotal		2.321
	TOTAL POS Provision (I + J + K)		20.9162
	TOTAL CREDITED POS		
L	TOTAL Credited POS (I+J allowance)		18.5952
M	POS Balance (F – L = M)		+0.2852
N	Percentage of POS Provided (% of E)		10.15%

This POS Schedule relates to plan "North Alkimos - Revised LSP Calculated Dwelling Unit Yield" 07/085/004E, dated 05/02/2009.

Assumptions:

-  Drainage inputs provided by TABEC engineers.
-  The areas identified within this table are based on the level of design applied at the LSP stage. As detailed design progresses and design refinement occurs, these areas may change and the calculations will therefore need to be adjusted as development progresses.

North Alkimos Local Structure Plan

TABLE 34: PUBLIC OPEN SPACE – DRAINAGE ALLOCATION


POS Number and DWT	Area of POS (m ²)	Drainage Catchment	Total POS within Drainage Catchment (m ²)	Area of Drainage (m ²) 1:5 year event	Percentage (%)
1	16,000	12	19,131	2,790	14.5
2	1,135				
DWT	1,996				
9	3,814	11	10,426	1,720	16.4
10	3,583				
DWT	3,029				
3	1,937	10 (remainder)	28,445	6,100	21.4
4	1,158				
8	4,262				
11	12,400				
12	4,251				
DWT	4,190				
U	247				
5	1,501	10 (coastal village)	2,877	1,250	43.4 *
U	1376				
6	2,362	9	8,871	2,640	29.7
7	2,088				
13	2,644				
DWT	1,777				
16	2,795	8	5,887	1,375	47.6
17	3,092				
14	2,051	7	35,701	6,745	18.8
15	2,277				
18	6,190				
19	8,960				
20	6,142				
DWT	10,081				
21	44,100	6	44,100	3,240	7.3
22	6,663	5	27,606	4,185	15.1
23	9,853				
24	3,835				
25	7,255				
26	1,590	4	29,155	5,080	17.4
27	11,300				
28	5,665				
29	10,600				
30	8,951	2	8,951	2,630	29.3
31	2,460	1	2,460	1,775	72.1 *
TOTAL			221,987	39,530	17.8


 Information derived from North Alkimos LSP Report Plan No. 22 and 54.

 DWT – Dunal Walk Trail

 U – Uncredited POS – not allocated POS #.





 * Underground storage being considered therefore intent is to ensure POS useable.

 Note: Areas have been indicatively calculated at LSP stage and will be subject to detailed design refinement and are therefore subject to change.

 Consideration to be given to the useability of POS affected by drainage through detailed design.

9.0 LOCAL STRUCTURE PLAN PRECINCTS

Based on the elongated shape of the Structure Plan area, the divisions created by the regional transport network and the intrinsic environmental attributes of the land (including topography and vegetation for example) the land may, for planning purposes, be divided into four logical precincts (refer **Figure 32**) being:

-  **Precinct 1** - The Coastal Village Precinct: a coastal node within the dunal formation bounded by the walk trail, and north-west coastal park. The village core will be focused around a 'Main Street.'
-  **Precinct 2** - The Central Precinct: The 'education and recreation' area.
-  **Precinct 3** - The Eastern Precinct: Low-medium density residential.
-  **Precinct 4** - The Transit Precinct: TOD and service commercial area.

In order to ensure the planning for each precinct occurs in a fully holistic and integrated manner, the North Alkimos Masterplan (**Figure 18**) has been developed for the entire Structure Plan to illustrate the relationship between each of the precincts. **Table 36** outlines the land uses across the Structure Plan area.

Land Use Type	Percentage (%)	Area (ha)
Residential	38.12	91.9614
Non Residential		
Primary School	1.45	3.51
Service Commercial	3.05	7.3569
Mixed Use (includes a residential R30-R80 component)	4.31	10.3999
Retail (Includes a residential R100 component)	0.7	1.7
Public Open Space		
Active Space (larger than 1000m ²)	6.52	15.7307
Dunal Walk Trail	0.87	2.1013
Drainage Surface Area (1:1)	1.98	4.7959
Threatened Ecological Communities	0.17	0.4107
Uncredited POS	0.925	2.2257
Conservation / Reserve	12.18	29.3879
Total LSP Area (including roads but excluding Marmion Avenue)		241.2345*

* Please note the areas provided in this table do not equate to the total LSP areas as this does not account for road reserves, etc.

The Master Plan seeks to provide a diversity of opportunity – housing, recreation, entertainment etc. - for visitors and the local community alike. The Structure Plan will support a robust and efficient community by offering a wide range of choices in housing and employment. The individual attributes of each precinct – character, land use and yield for example – are also outlined in this section.

9.1 PRECINCT 1 - THE COASTAL VILLAGE PRECINCT (REFER FIGURE 33)

9.1.1 GENERAL DESCRIPTION







The western most precinct of the subject land is characterised by a village centre in the natural harbour-like confines of the blow-out and parabolic dunal system, where the subject land meets the ocean. Its interface with the ocean will be integral to the success of the Coastal Village.

The dunal system will become an iconic element of the precinct, reflecting both the geographical and maritime history of the site. The dunal system will be celebrated by a range of innovative housing types that will sensitively respond to the characteristics of the landform.

A main-east west distributor road punches through the dunal system, connecting the more eastern precincts of the subject land within the coast from Marmion Avenue. This road will be strengthened by the presence of Norfolk Island Pines for the length of the road reserve.

9.1.2 OBJECTIVES

The following objectives characterise this precinct:

-  To promote development which complements the coastal setting and contributes a ‘strong sense of place’ to the North Alkimos project and the DSP area.
-  To celebrate the coastal location and parabolic dune formation with sensitive and innovative design responses.
-  Creation of a vibrant coastal node which is an integral part of, and a focus for, the broader community.
-  To provide efficient and safe access arrangements with pedestrian/cycle priority. The ‘dunal walk trail’ and the beachside foreshore path will be key recreational assets, within a legible hierarchy of ‘green linkages’ throughout the Masterplan.
-  To promote buildings with active street frontages, which properly address the public realm and mediate the climate.
-  To encourage high standards of built form and streetscape.

9.1.3 LAND USE ELEMENTS & DENSITY

This precinct can be categorised as predominantly residential in nature, with a strong emphasis on the coastal village centre. **Table 37** below outlines the breakdown of land uses within the precinct. These are discussed in further detail following.



PRECINCT PLAN

NORTH ALKIMOS LOCAL STRUCTURE PLAN | LOTS 1005 & 1006 MARMION AVENUE, ALKIMOS

TAYLOR BURRELL BARNETT | TABEC | EPCAD
 SHARNI HOWE | CREATING COMMUNITIES
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 SUSTAINABLE SOLUTIONS | WHEELERS | ENVY
 OVERMAN | ZUIDVELD | TAYLOR ROBINSON



PLAN: 07/09/15
 DATE: MAY 2009



LEGEND

- Residential R12.5 - R20
- Residential R25 - R40
- Residential R50 - R100
- Mixed Use / Commercial R30 - R80
- Village Core (includes Residential R100 component)
- Dunal Housing
Innovative housing options to sensitively respond to parabolic dune system.
- Public Open Space
- Dunal Walk Trail
- Threatened Ecological Communities
- Integrated Drainage Swale
- Secondary Public Transport System
- Walkable Catchments (400m/5minute & 800m/10minute)
- Precinct Boundary

NOTES

- 1** Village Core (refer to Village Concept Plan for detail)
Boutique village centre nestled in the parabolic dune at the opening to the foreshore.
- 2** Dunal Housing
Range of housing types/landform treatments to sensitively respond to the dunal system and reflect the dunal topography.
- 3** Village Centre and foreshore interface
The Village Core must engage with the foreshore to ensure integration of uses, maximum opportunities for recreation and to create sense of place and focus for the broader community.
- 4** Iconic Building Sites
Higher density residential development, medium to high rise.
- 5** Northern Coastal Park
A large coastal park offering a combination of conservation, environmental interpretation and active play, within the foreshore reserve.
- 6** Southern Development Precinct relies on the provision of access from the adjoining landowner to the south.
- 7** Agreed road alignment through Parks and Recreation Reserve.
- 8** Foreshore Management Plan to be prepared
- 9** Alkimos Drive

Note: Extract from overall Masterplan - subject to change through detailed design process.

PRECINCT 1 - COASTAL VILLAGE PRECINCT

NORTH ALKIMOS LOCAL STRUCTURE PLAN | LOTS 1005 & 1006 MARMION AVENUE, ALKIMOS

TAYLOR BURRELL BARNETT | TABEC | EPCAD
SHARON HOWE | CREATING COMMUNITIES
MACROPLAN | MP ROGERS & ASSOCIATES
SUSTAINABLE SOLUTIONS | WHEELERS | ENV
OVERMAN | ZUIDVELD | TAYLOR ROBINSON

FIGURE **33**

0m 50m 100m



PLAN: 07/05
DATE: MAY 2009

PEET

TABLE 36: COASTAL VILLAGE PRECINCT LAND USE

Land Use Type	Percentage	Area (ha)
Residential	43.71%	57.3429
Non Residential		
Primary School		Nil
Service Commercial		Nil
Mixed Use (includes a residential R30 – R80 component)	0.96%	1.2672
Retail (includes a residential R100 component)	1.29%	1.7
Public Open Space		
Credited POS	4.64%	6.0997
Drainage (1:1)	1.85%	2.4393
Threatened Ecological Communities		NIL
Uncredited POS	2.76%	3.622
Conservation / Reserve	19.62%	25.7579
Total Precinct Area (Including Roads)		131.18

9.1.3.1 RESIDENTIAL

The LSP allows for a wide variety of residential densities and dwelling types within this precinct, averaging at about R25 across the precinct. The LSP facilitates higher densities within and around the village centre, on the ridge top and at iconic locations throughout the precinct. The street pattern provided and street block depths will facilitate various forms of medium-high density development, varying from rear loaded laneway cottage product through to medium to high rise apartment sites.

Densities within this precinct will range from R12.5 to R100, providing a wide range of residential typologies including multiple/grouped dwellings, townhouses, apartments, live/work terraces, and semi detached homes.

9.1.3.2 ACTIVITY CENTRES

VILLAGE CENTRE (REFER FIGURE 34)

One of the primary intentions is to provide a Coastal Village that offers a robust, commercially sustainable and attractive place to live, work, shop and recreate. The village should trade and be activated at all times and not just for the seasonal and weekend trade. It should be seen as a desirable and viable alternative (to the major centres of the northern metropolitan coast) for convenience shopping, social interaction and leisure activities.

The village centre is the centrepiece of the Alkimos development. It is intended that the landuses within the centre will provide a diverse and sustainable mix of activities that will ensure activation of the place throughout the day and evening. To this end, a mixed use strategy is intended. Appropriate uses include community, retail, commercial, and residential. The centre should trade and be activated at all times and not just for the seasonal weekend trade.

Notwithstanding the location of the centre, the village is highly visible from the eastern approach, and is esoterically 'branded' by its proximity adjacent the Alkimos wreck, and the beach off which the wreck is located. It has the opportunity to attract a distinct 'sense of place'.

The aim is to create a vibrant and attractive destination that is accessible to visitors and residents of Alkimos. The creation of the centre has focussed on the achievement of a quality public domain including streets, boulevards, parks and importantly a foreshore connection to the water.

The village centre is located adjacent to the Indian Ocean in what is presently a blowout in the existing dunal system to take advantage of a visual connection to the ocean. This blowout, whilst representing challenging terrain, provides a natural containment of the centre and suggests a harbour-like shelter within which the village will develop over time. The parabolic dunal system surrounding the village will, along with innovative built form typologies and landscaping, provide a dramatic frame and backdrop to the village.

The village will comprise a small full-line supermarket with about 10-15 'daily needs' based retailers and other associated service retail and small commercial and service provide uses. The food and beverage offer would be anchored by a food based tavern, but might also include a number of café or quality take-away outlets.

The centre will be supported by mixed use within the village core. This strong residential component will lend the village a degree of autonomy, functionality and authenticity beyond that normally associated with a purely tourist destination. It is the authenticity of experience that will contribute to a distinctive sense of place and civic pride within the precinct, and help to set the Alkimos Coastal Village North apart from other destinations along the coast.







The centre abuts the regional coastal reserve, the management and usage of which relates to access and recreation. Associated uses under consideration for the reserve include tourist accommodation, active recreation (such as volley balls courts), play grounds, public access and restaurants and cafes.

The location and quantum of the parking, pedestrian routes from these areas to (and past) the retailers and the nature of the staging of the development relative to other (primarily residential) development will impact greatly on its success or otherwise. That is to say, the parking needs to be well distributed and preferably safe and convenient to use, and at grade where this can reasonably be integrated into the urban fabric. The scale of the buildings has not been fully contemplated at this time, but non-residential uses on the ground floor will be encouraged to activate the streets, with residential uses above.

These details will be addressed as part of a structure plan review for the activity centres.

9.1.3.3 PUBLIC OPEN SPACE

Within the Coastal Village, public open space comprises the following key elements:

-  Foreshore reserve along the coastal frontage of the precinct;
-  A Parks and Recreation Reserve along the southern boundary of the precinct;
-  Northern coastal parkland;
-  The walk trail and its various paths connecting the development to the coastline;
-  Various local and neighbourhood parks dispersed throughout;
-  The Esplanade village park which connects the coastal village through to the foreshore through an existing break in the dunes; and



LEGEND

- Mixed Use
- Residential
- Retail
- Short Stay / Tourist
- Dune Restoration
- Lead Marker
- Lead Marker (ponton)
- Possible Land Exchange Area
- Public Art
- Subject Land

NOTES

- 1** Dune Restoration as part of Foreshore Management Plan
- 2** Lookout
- 3** Mixed Use - activated (retail, commercial) ground floor with residential above.
- 4** Surf Lifesavers Club / Community / Cafe
- 5** Volley Ball
- 6** The Esplanade
- 7** Medium Rise (5 to 8 Storeys) Residential with activated (retail, commercial) street and undercroft parking.
- 8** Supermarket
- 9** Potential development in accordance with Foreshore Management Plan
- 10** Community integrated into Mixed Use building
- 11** Dunal Walk Trail Connections to Coast
- 12** Secondary Public Transport System

Note: Extract from overall Masterplan - subject to change through detailed design process.

VILLAGE CORE - INDICATIVE CONCEPT PLAN

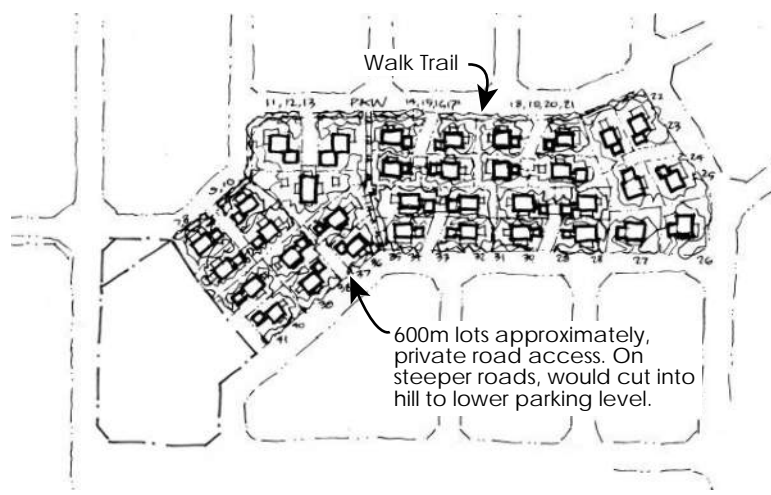
NORTH ALKIMOS LOCAL STRUCTURE PLAN | LOTS 1005 & 1006 MARMION AVENUE, ALKIMOS

TAYLOR BURRELL BARNETT | TABEC | EPCAD
 SHARNI HOWE | CREATING COMMUNITIES
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 SUSTAINABLE SOLUTIONS | WHELAN | ENV
 OVERMAN ZUIDVELD | TAYLOR ROBINSON

FIGURE 34
PEET

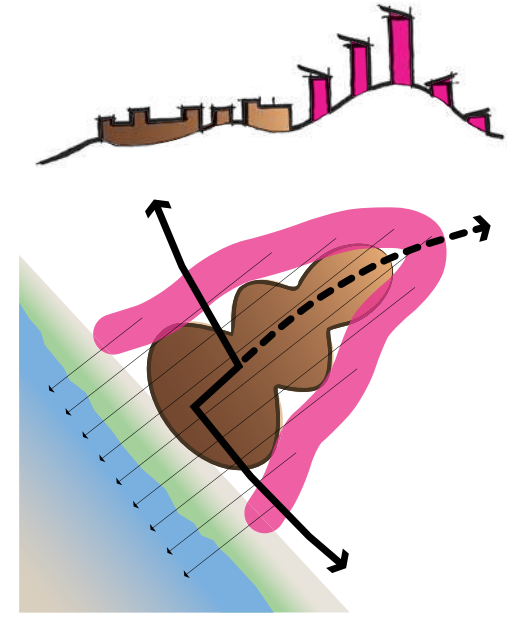
0m 10m 20m
 PLAN: 07/05 DATE: MAY 2009

A BUILT FORM: OPTION 4: ALKIMOS plan layout



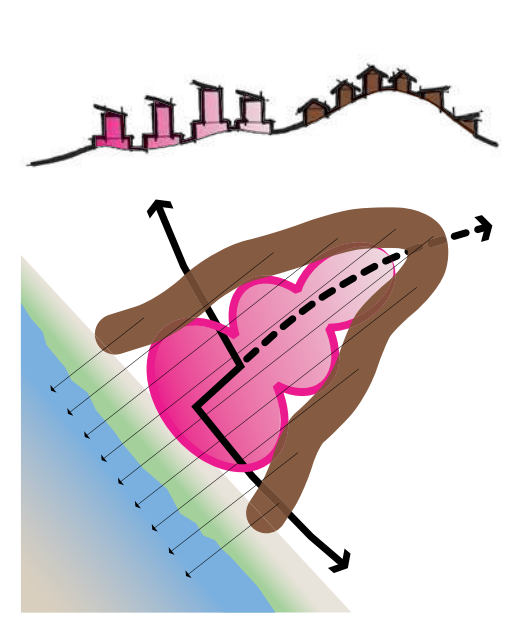
A LANDFORM PRINCIPLE 1

- CELEBRATE HEIGHT**
- High profile built form on parabolic dune structure
 - Lower height building on 'flats' - celebrates height
 - Maximise views and visual amenity



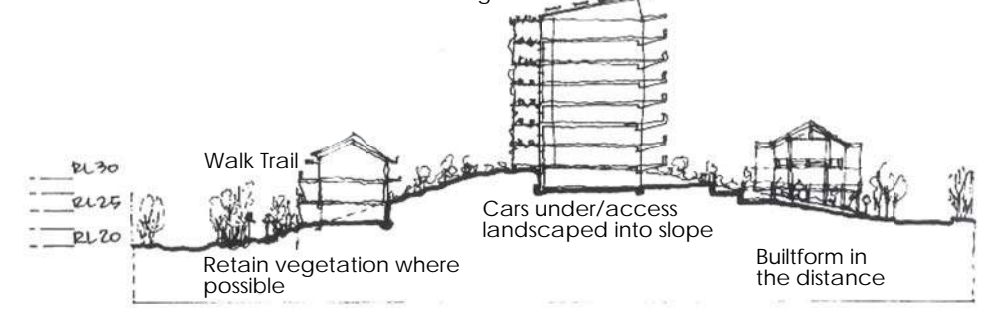
LANDFORM PRINCIPLE 2

- CELEBRATE LANDFORM**
- Lower density / height building on dune structure reflects landform
 - Increased density in village - promotes vibrancy

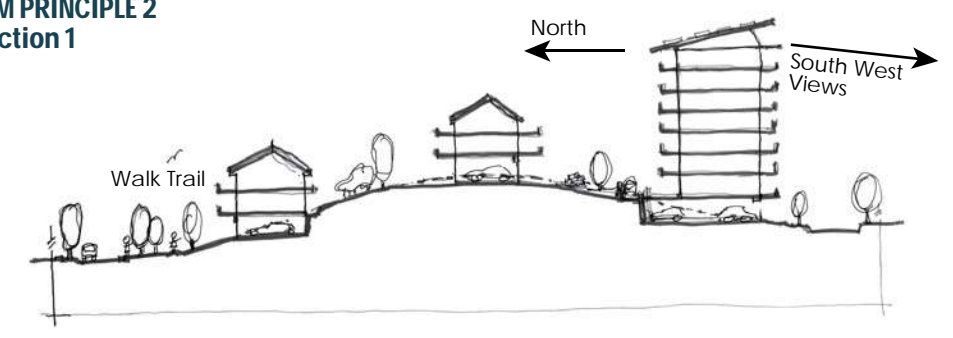


LANDFORM PRINCIPLE 1 Cross-section 1

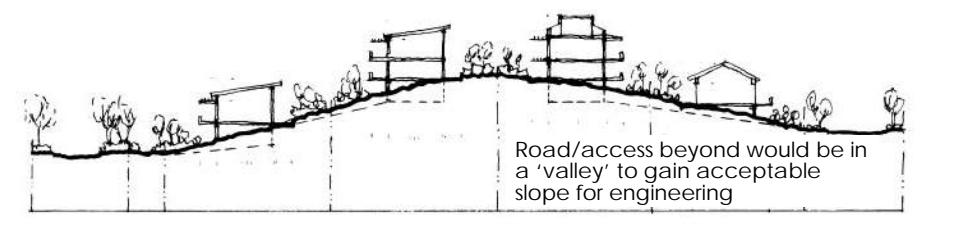
'Celebrate' height/direct at view and take advantage of north light




LANDFORM PRINCIPLE 2 Cross-section 1



Cross-section 2



 Ridge entry park at the eastern extent of the precinct which aids as a navigator in announcing the arrival to the Coastal Village Precinct.

9.1.4 SPECIAL FEATURES

9.1.4.1 DUNAL HOUSING

Both the base of the dunal system and the ridge top will accommodate a range of densities and innovative building types that will sensitively respond to the characteristics of the land, be it lower density grouped housing with shared access and carefully located building envelopes, and/or ridge top housing arrangements, single residential homes stepped to respond to topography or flagship density (R100) sites offering apartment living, refer **Figure 35**.

A range of construction approaches (e.g. framed techniques, part benching and terrace, private roads etc.) and building typologies will be utilised to ensure that the final outcome is well executed and that the existing topography is 'celebrated' within the community. Cross-overs through the walk trail will be reduced or eliminated in key locations, by the use of shared access and private road systems. Examples of how the challenges presented by the parabolic dunal system will be reflected in built form (apartments and laneway housing) is identified at **Figure 35**.

Due to the dunal system occurring across the site, and a resistance against levelling the site, the use of retaining walls and terracing will be required to achieve density targets as well as retaining as true to the natural landform as possible. To ensure that a holistic landscape character is achieved, stepped terraces and retaining walls will be integrated into the Built Form and Landscape Design and be subject to Local Development Plans as a condition of Subdivision Approval.

Building height shall generally range from two storeys through to eight storeys.

Examples of dunal housing are included overleaf, refer **Photoplate 11**.

North Alkimos Local Structure Plan



Photoplate 11 Examples of dunal housing including grouped housing

North Alkimos Local Structure Plan



Photoplate 12 Examples of coastal/foreshore/tourist built form, land use and interfacing including mixed use

North Alkimos Local Structure Plan



Photoplate 13 Examples of Main Street/Coastal Village Precinct

North Alkimos Local Structure Plan



Photoplate 13 (cont): Examples of Main Street/Coastal Village Precinct

North Alkimos Local Structure Plan



Photoplate 14 Example of coastal dress circle lots



Photoplate 15 Examples of natural POS references and ridge-top POS linkages

9.2 PRECINCT 2 - THE CENTRAL PRECINCT

9.2.1 GENERAL DESCRIPTION

The Central Precinct (**Figure 36**) is located between the north-south district distributor road to the east of the parabolic dunal system and Marmion Avenue. It will be a sought-after, high-amenity precinct with access to a primary school, district playing fields and local parkland.








The Central Precinct will be well connected via a distributor road, public transport and green linkages to the Coastal Village. The east-west distributor road running centrally through the precinct linking the Coastal Village with Marmion Avenue will allow energy and density from the Coastal Village to be injected eastwards into the Central Precinct.

The capacity to support residential density is further enhanced by the comparatively high proportion of street block edges overlooking and interfacing with open space.

Adding to the lifestyle opportunity and diversity of the precinct, a local centre is proposed opposite the primary school, potentially including a child care centre and allowing convenience shopping and family/drop off trips to be combined and a neighbourhood centre is proposed adjacent Marmion Avenue.

9.2.2 OBJECTIVES

The following objectives characterise this precinct:

-  Offer affordable housing choice within a range of low-medium residential densities.
-  Promote a high level of access to open space and amenity.
-  Facilitate a high level of connectivity with the nearby Coastal Village.
-  Create a precinct with a distinct sense of place, which capitalises on its key amenity (such as POS) attributes.
-  Promote high levels of walking and cycling in replacement of private motor vehicle journeys.
-  Offer a high level of access to local shops and services.
-  High-quality yet affordable built form outcomes that encourage potential visitors and residents to turn off Marmion Avenue and enter the North Alkimos development.

9.2.3 LAND USE ELEMENTS AND DENSITY

This precinct can be categorised as predominantly residential in nature, with a strong emphasis on education and community. **Table 38** below outlines the breakdown of land uses within the precinct. These are discussed in further detail following.

TABLE 37: CENTRAL PRECINCT LAND USE

Land Use Type	Percentage	Area (ha)
Residential	43.56 %	20.2937
Non Residential		
Primary School	7.51 %	3.5
Service Commercial		Nil
Mixed Use (includes a residential R30 – R80 component)	3.2%	1.4928
Retail (includes a residential component)		Nil
Public Open Space		
Credited POS	12.35%	5.7548
Drainage (1:1)	2.28%	1.0640
Threatened Ecological Communities	0.88%	0.4107
Uncredited POS	1.29%	0.6014
Total Precinct Area (Including Roads)		46.58

9.2.3.1 RESIDENTIAL

This precinct allows for the provision of low to medium residential densities throughout, with the average density just above R12.5. Densities will generally range from R12.5 through to R40. Building height shall range from single storey through to two-storey development predominantly and may increase to three to four storeys within special ridge top areas adjacent high amenity areas, i.e. the walk trail, school oval/open space areas.

Residential product types may include laneway/cottage lots and townhouses in addition to the standard lot product identified, which capitalises on the relatively flat terrain present throughout this precinct, which these product typologies are best suited too. More ‘suburban’ detached and semi detached housing types will be provided in support of the local primary school. Rear laneway product types are proposed along the main entry road boulevard to ensure the provision of a continuous green spine through the development.

9.2.3.2 ACTIVITY CENTRES

Two activity centres have been identified within the central precinct. It is intended that development controls will be applied to these centres to ensure a high standard of development, compatible with the adjacent residential uses and acknowledges the potential for both of these centres to be mixed use in nature, as outlined below:



LEGEND

- Residential R12.5 - R20
- Residential R25 - R40
- Mixed Use / Commercial R30 - R80
- Public Open Space
- Dunal Walk Trail
- Integrated Drainage Swale
- Walkable Catchment (400m/5minute)
- Precinct Boundary

- NOTES**
- 1** District Oval Facility
Located with primary school
 - 2** Primary School
 - 3** Main Entry Boulevard
 - 4** Public Road
Shared provision with adjacent landowner
 - 5** Access Opportunities to adjoining landholdings
 - 6** Local Centre
Comprising small convenience needs and child care
 - 7** Neighbourhood Centre
Comprising local convenience needs, passing trade mixed use. Building to address Marmion Avenue.

Note: Extract from overall Masterplan - subject to change through detailed design process.

North Alkimos Local Structure Plan

LOCAL CENTRE





One of the key focal points of this precinct is a proposed local centre, located immediately east of the proposed primary school. This local centre will serve a small convenience focus for the community and may include uses such as child care.

NEIGHBOURHOOD CENTRE

A neighbourhood centre is proposed adjacent Marmion Avenue on the main east-west entry road. It is proposed the neighbourhood centre provide convenience shopping facilities for the local residents and captures passing trade from Marmion Avenue. In retail terms, the neighbourhood centre may include a small supermarket and is intended not to compete with the more 'festival retail' based activity of the coastal node or the Transit precinct to the east. The neighbourhood centre may also include residential development above non-residential ground floor activity.

9.2.3.3 PUBLIC OPEN SPACE

Within the Central Precinct, public open space comprises the following key elements:

-  Local and neighbourhood parks, one of which includes a TEC.
-  Marmion Avenue landscape parks.
-  District oval facility, co-located with the primary school.
-  Continuation of the walk trail to connect the Coastal Village with the central and eastern precincts.

9.2.3.4 OTHER

PRIMARY SCHOOL

A primary school has been provided in accordance with the District Structure Plan. To maximise the benefit of this facility, and given topographical constraints with the district oval facility identified within the DSP, an oval facility has been co-located within the primary school as shown on the Masterplan. Whilst we understand the distribution and collocation of school and dual district oval facilities is the subject of continued discussion with the City, it is submitted that co-location of the dual district oval facility would be best served further north within the Eglinton landholding due to the elongated nature of the subject land and given the large land take requirements for the dual oval/primary school configuration and from a spatial catchment perspective. However, the primary school and a district oval facility within the subject land has been maintained in accordance with the requirements of the DSP.

North Alkimos Local Structure Plan



Photoplate 16 Examples of Small/Medium Lot/Laneway Development

North Alkimos Local Structure Plan



Photoplate 17 Examples of Conventional/Low Density Development



Photoplate 18 Examples of Neighbourhood/Local Centres

9.3 PRECINCT 3 - THE EASTERN PRECINCT

9.3.1 GENERAL DESCRIPTION






The Eastern Precinct is situated between the eastern edge of Marmion Avenue and the railway reserve for the extended northern metropolitan rail system, refer **Figure 37**.

Connectivity (physical and sense of place) to the remainder of the Structure Plan area will be achieved through a consistency of built form and landscaping themes, designs and finishes, to create a common thread linking all four precincts of the Masterplan.

The sequence of staging (i.e. release of an early stage within the precinct simultaneous with other development fronts in other precincts) will ensure that the Eastern Precinct has a 'front door' and an identity from early development phases.

9.3.2 OBJECTIVES

The following objectives characterise this precinct:

-  Facilitate the replacement of vehicular journeys with journeys by public transport or pedestrian/bike.
-  Creation of a high amenity precinct based on the provision of POS and housing choice.
-  A precinct that is well integrated into the wider urban framework including the Alkimos and Eglinton Centres, the Alkimos North Coastal Village and nearby TOD.
-  A strong sense of place and connection to the wider North Alkimos project.
-  Respond to TOD requirements with respect to land use and density when Alkimos North railway station is committed.

9.3.3 LAND USE ELEMENTS AND DENSITY

This precinct can be categorised as predominantly residential in nature. **Table 39** below outlines the breakdown of land uses within the precinct. These are discussed in further detail following.

Land Use Type	Percentage	Area (ha)
Residential	53.24 %	12.4113
Non Residential		
Primary School		Nil
Service Commercial		Nil
Mixed Use (includes a residential R30 – R80 component)		Nil
Retail (includes a residential component)		Nil
Public Open Space		
Credited POS	10.07%	2.3485
Drainage (1:1)	2.99 %	0.6978
Threatened Ecological Communities		Nil
Uncredited POS	0.44%	0.1036
Conservation / Reserve		Nil
Total Precinct Area (Including Roads)		23.31



- LEGEND**
- Residential R12.5 - R20
 - Residential R25 - R40
 - Residential R50 - R100
 - Public Open Space
 - Dunal Walk Trail
 - Integrated Drainage Swale
 - Walkable Catchments (400m/5minute & 800m/10minute)
 - Precinct Boundary

- NOTES**
- 1 Shared road with adjoining landowner
 - 2 Full intersection with Marmion Avenue
 - 3 Walk Trail/green link east west through development
 - 4 Potential for robust/adaptable builtform to accommodate change in use over time
 - 5 Indicative street layout identified to adjoining property for context only

Note: Extract from overall Masterplan - subject to change through detailed design process.

9.3.3.1 RESIDENTIAL





Residential development will be low-medium density housing (average approximately R12.5) on conventional, laneway, cottage and terrace lots.

Residential densities of R30 and R40 are proposed in addition to the more conventional suburban density of R20, which is facilitated by the relatively flat and sandy characteristics of this portion of the site. Areas of higher residential density have been centred around local parkland in order to ensure a high level of amenity for these residences and to provide for recreation needs. Dwelling site outcomes will be a combination of direct frontage (to POS), town houses and cottage lots in addition to the R20 single residences.

Building height shall range from one to two storeys through to a general maximum of four or five storeys. Although small zones of five to six storeys may be considered for the future in key sites within the railway catchment.

9.3.3.2 PUBLIC OPEN SPACE

Within the Eastern Precinct, public open space comprises the following key elements:

-  Marmion Avenue landscape.
-  Landscape
-  Continuation of the walk trail through widened street reservations and harbour ways.
-  Local and neighbourhood parks.

9.3.3.3 OTHER

TRANSIT STATION

Delivery of the Alkimos North railway station is unknown at this time, and impacts heavily on the ability to deliver transit oriented development within the catchment. Acknowledging the constraints to delivering residential densities within this precinct, Peet Limited is keen to provide a suitable planning framework that allows development to evolve over time and considers robust built form, and staged subdivision patterns, to ensure change of use and intensification of land uses and density can occur over time.

Local Development Plans, superlot subdivisions and inclusion of flexible land uses within Part 1 are considered essential in achieving these objectives.

9.4 PRECINCT 4 - THE TRANSIT PRECINCT (FIGURE 38)





9.4.1 GENERAL DESCRIPTION

The proposed Alkimos North railway station is indicatively proposed approximately 150 m south of the subject land. The Transit Precinct will be a strategic part of the north western corridor rapid transit system. It will also create the effect of primary activity and employment nodes at the west and eastern edges of the Structure Plan area with a well serviced catchment in between.

The proximity of Marmion Avenue, the rail line and the Freeway result in the precinct having an extremely high level of accessibility and connectivity. However, the nature of transport infrastructure is also such that they have the potential to act as a barrier that separates this area, along with the Eastern Precinct, from the rest of the Structure Plan area, prior to their construction, and once traffic flows and access restrictions create physical barriers.

The transport infrastructure of the precinct allows for the opportunity to provide higher residential densities and a diversity of land uses (the precinct is almost wholly within 800 m walkable catchment of the potential rail station).

In order to demonstrate consideration of the spatial requirements for the Transit Precinct, given it falls across LandCorp and Peet Limited's landholding, a concept plan has been prepared, refer **Figure 39** (TOD Concept Plan). This concept plan (which is for discussion only) demonstrates:

-  adequate set out distance from the southern boundary of Lot 1006 to Alkimos Drive for compatible development to occur;
-  Possible frontage treatment to Alkimos Drive;
-  Possible land use configuration to support transit uses; and
-  Possible platform and associated rail infrastructure configurations to support the rail operations.

A Structure Plan will be required to be prepared by LandCorp over their landholding in relation to this precinct.

It is important, therefore, to recognise that the Transit Precinct will likely have a strong relationship and gravitation to the Alkimos and Eglinton centres located within a few kilometres to the north and south. Notwithstanding, it will be critical to ensure that the precinct also develops as a high quality, high amenity precinct that references and contributes to the wider North Alkimos project.

While the ability to deliver transit supportive land use will be contingent on the delivery of the rail station, the street block pattern proposed is sufficiently robust to allow lesser or greater intensity of use depending on station outcomes.

A small section of retail/commercial is proposed, again, dependant on the delivery of the rail station.



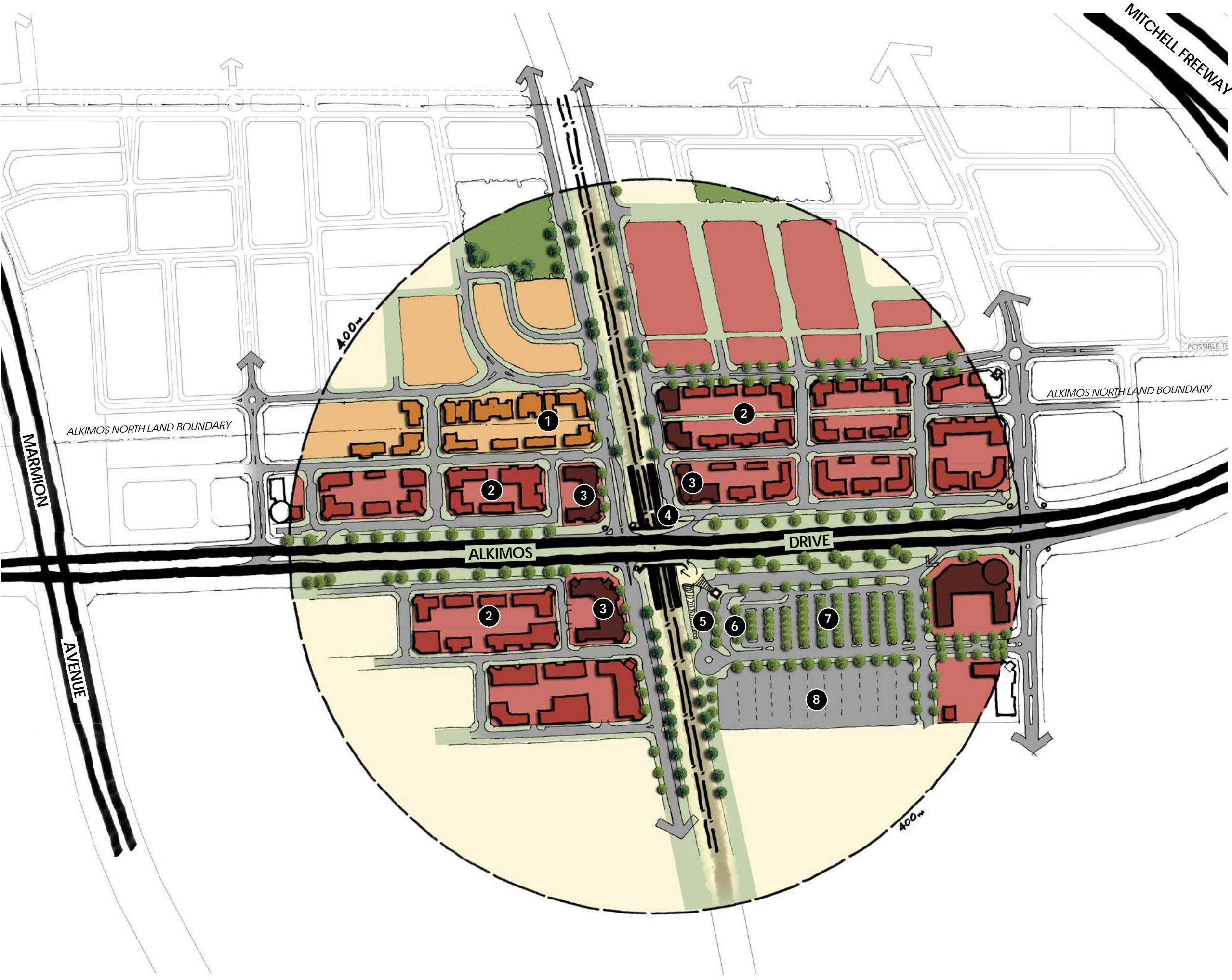
LEGEND

- Mixed Use / Commercial R30 - R50
- Service Commercial
- Transit Retail
- Public Open Space
- Integrated Drainage Swale
- Walkable Catchments (400m/5minute & 800m/10minute)
- Precinct Boundary

NOTES

- 1 Walk Trail/green link east-west through site
- 2 Future Connections to Alkimos Drive
- 3 Temporary Connection through to Wanneroo Road in the absence of Alkimos Drive and Mitchell Freeway
- 4 Infill development to Alkimos Drive outlined for context only
- 5 Transit Retail Centre

Note: Extract from overall Masterplan - subject to change through detailed design process.



LEGEND

- Residential R50 - R100
- Mixed Use / Commercial R30 - R80
- Retail opportunity with Residential above
- Public Open Space
- Walkable Catchment (400m/5 Minutes)

- NOTES**
- 1** Medium to high density residential within 400m walkable catchment to optimise walk on rider patronage
 - 2** Mixed use development - ground floor activation with residential above
 - 3** Potential retail area (refer note 1)
 - 4** North alkimos railway station margin platform rail line to be in cut - Alkimos Drive to bridge over
 - 5** Bus pick up and drop off area providing supplementary public transport support to rail
 - 6** 'Kiss n ride' provision to encourage rider patronage and facilitate ease of movement and access
 - 7** 'Park n ride' parking area approximately 450 bays
 - 8** 'Park n ride' parking expansion approximately 550 bays with the opportunity to expand further to the south

- FUTURE CONSIDERATIONS**
- Landcorp to prepare structure plan over land containing majority of TOD precinct
 - Detailed traffic movement assessment of morning peak flows and intersection designs to park and ride facility and ultimate location
 - Confirmation of final bus route information may alter bus through traffic to a stop location on Alkimos Drive only

ALKIMOS NORTH TOD PRECINCT - INDICATIVE CONCEPT PLAN FOR DISCUSSION ONLY

NORTH ALKIMOS LOCAL STRUCTURE PLAN | LOTS 1005 & 1006 MARMION AVENUE, ALKIMOS

TAYLOR BURRELL BARNETT | TABEC | EPCAD
 SHARNI HOWE | CREATING COMMUNITIES
 MACROPLAN | MP ROGERS & ASSOCIATES
 SUSTAINABLE SOLUTIONS | WHELAN'S | ENV
 OVERMAN ZUIDVELD | TAYLOR ROBINSON

FIGURE 39







0m 25m 50m

PLAN - 07/05
DATE - MAY 2009

PEET

9.4.2 OBJECTIVES

The following objectives characterise this precinct:

-  To create a precinct founded on a variety of transit-supportive land use including a range of residential densities.
-  Facilitate the replacement of vehicular journeys with journeys by public transport or pedestrian/bike.
-  Capitalise on the key locational advantage of the precinct, being a high level of accessibility.
-  A precinct that is well integrated into the wider urban framework including the Alkimos and Eglinton Centres and the Alkimos North Coastal Village.
-  A strong sense of place and connection to the wider North Alkimos project.
-  The establishment of viable and sustainable non-residential land uses including mixed use and service commercial.

9.4.3 LAND USE ATTRIBUTES AND DENSITY

This precinct can be categorised predominantly as a mixed use precinct that also includes a significant portion for service commercial activities. **Table 40** below outlines the breakdown of land uses within this precinct. These are described in further detail below.

Land Use Type	Percentage	Area (ha)
Residential		Nil
Non Residential		
Primary School		
Service Commercial	16.78 %	6.7401
Mixed Use (includes a residential R30 – R80 component)	20.43 %	8.2036
Retail (includes a residential component)		Nil
Public Open Space		
Credited POS	2.22 %	0.8938
Drainage (1:1)	0.87 %	0.5948
Threatened Ecological Communities		Nil
Uncredited POS		Nil
Conservation / Reserve	9.04 %	3.63
Total Precinct Area (Including Roads)		40.15

9.4.3.1 SERVICE COMMERCIAL

The DSP designated this portion of the Structure Plan area as service commercial, however, the TOD approach is proposed as an alternative to ensure that the DSP's employment targets are achieved while allowing for residential development in proximity to rail thereby adding to housing choice and diversity, supporting rail patronage and reducing vehicular kilometres travelled.

An area of service commercial land is proposed adjacent to the Mitchell Freeway in accordance with DSP designations. The exposure and access of this area ultimately lends itself to this form of land use and development. Consistent with this approach, this area is identified for inclusion within the Business zone. They would support a range of car-based commercial activities. LDPs or design guidelines may be required for those sites adjacent to the TOD area to ensure an appropriate standard of interface between mixed use and commercial development.

9.4.3.2 MIXED USE

In support of TOD principles the precinct will seek to maximise land use potential surrounding this potentially significant transport node. An affordable mixture of housing, commercial and retail uses in this area will be well serviced in the future by a rail station. The development will support and seek to establish clear patterns of public transport usage.

Areas of R30-R50 have been located adjacent to the rail reserve, to provide an effective transition between the more traditional residential areas of the Eastern Precinct and the TOD node. Long term planning flexibility and a local residential catchment, is essential for the long term economic and social health of this community.

Built form will consist of a combination of townhouses, apartments and cottage homes with the capability to convert to a variety of uses over time (such as from residential to office). This will be controlled through LDPs or design guidelines.

9.4.3.3 OTHER

TRANSIT STATION

Delivery of the Alkimos North railway station is unknown at this time, and impacts heavily on the ability to deliver transit oriented development within the catchment. Acknowledging the constraints to delivering residential densities within this precinct, Peet Limited is keen to provide a suitable planning framework that allows development to evolve over time and considers robust built form, and staged subdivision patterns, to ensure change of use and intensification of land uses and density can occur over time.

Local Development Plans, superlot subdivisions and inclusion of flexible land uses within Part 1 are considered essential in achieving these objectives.

North Alkimos
Local Structure Plan



Photoplate 19 Examples of Service Commercial

10.0 MOVEMENT NETWORK

10.1 PROPOSED ROAD NETWORK & STAGING

The internal road network within the development will be in accordance with current Liveable Neighbourhoods and City of Wanneroo subdivisional guidelines.

The majority of paving will be black asphalt with entry statements, intersections, traffic calming devices and designated car-parking areas in red asphalt or brick paving. Road reserve and pavement widths will be based on the Eglinton Alkimos DSP.

Mountable and semi-mountable kerbing will bind the roads with flush kerbing used where POS abuts the road reserve to allow runoff into grassed areas (with bollards provided to prevent vehicular access into the POS and anti-social behaviour).

The topography of the development will need to conform to the design criteria for the roads, and the vertical and horizontal displacements limited pending design speed criteria, sight distances and road hierarchy requirements as dictated by the modelled traffic volumes for vehicles per day (VPD) and peak hour flows.

Marmion Avenue runs north-south through the subject land and will initially provide the main access to the development. The site has access to Wanneroo Road at the north-eastern extent of the site via an un-constructed road reserve. It is intended that this un-constructed road will be the eastern portion of Alkimos Drive, an arterial road linking Wanneroo Road to the Mitchell Freeway, railway and eventually the Coastal Village.

10.1.1 REGIONAL ROAD NETWORK

The ultimate regional road network for the area was identified in section 5.15 of this report.

The Deposited Plan for lots adjacent to Marmion Avenue and the Mitchell Freeway shall include the following notification, *“This lot may be affected by noise associated with the operations of Marmion Avenue/Mitchell Freeway. Therefore residential amenity may be the subject of impacts with regard to noise and vibration. As a result there may be a need to incorporate appropriate features in the design and construction of residences to mitigate against any impacts and special consideration should be given to noise attenuation measures for two-storey dwellings.”*

10.1.2 LOCAL ROAD NETWORK

The Alkimos Eglinton DSP identifies a framework of local roads in the Alkimos area, the most important of which are discussed below, refer **Figure 7**.

1. Western extension of Alkimos Drive

This road is shown in the DSP as an Integrator Arterial Type B (two-lane boulevard with 6 m median). It will provide east-west road access at the south of the subject land.

2. NS Connector (west end)

This road is intended to be a two-lane Neighbourhood Connector to provide north-south connectivity along the western side of the corridor.

3. NS Connector (east end)

This road is shown in the DSP on the east side of the rail line, to provide north-south connectivity in the narrow strip of land between Marmion Avenue and the Mitchell Freeway. It connects Alkimos Drive to Eglinton Avenue. It is intended to function as a two-lane Neighbourhood Connector.

4. EW Connector (to north of Lots 1005 and 1006 northern boundary)

This road is an east-west Neighbourhood Connector that links the NS Connector (west) to the NS Connector (east). It crosses Marmion Avenue at a four-way intersection, thus implying a high capacity signalised or roundabout controlled intersection.

5. Other Neighbourhood Connectors (of local significance)

The DSP shows notionally a couple of additional Neighbourhood Connectors that serve to collect/distribute local traffic to the district and regional roads.

For the subject land, there is an east-west Neighbourhood Connector (with staggered junctions at Marmion Avenue) and a couple of north-south Neighbourhood Connectors that connect to the EW Connectors shown in the DSP.

10.2 THE ROAD HIERARCHY, INTERNAL CROSS SECTIONS AND RESERVATIONS

Figure 40 shows the road hierarchy in the Lots 1005 and 1006 Local Structure Plan area. **Figure 41** describes intersection control within the Structure Plan, as detailed below.

At four-way intersections, signal control or roundabout control is proposed. At three-way junctions where spacing allows, full access is shown (i.e. a median opening with full turning movements allowed). Where spacing between intersections is not adequate, the three-way intersections are designed without a median opening and thus will operate as 'left in/left out' accesses.

Access spacing has been established to comply with the requirements set out in Table 3, Table 3a and Table 3b of *Liveable Neighbourhoods Edition 3*.

Refer to **Figure 41** for detailed measurements of Marmion Avenue and Alkimos Drive intersection and signal spacing in the vicinity of the Local Structure Plan. Cross-sections for typical local streets are shown in **Figures 42-47**.

The internal cross-sections are in accordance with *Liveable Neighbourhoods Community Design Code Edition 3* (October 2004, DPI). The particular details and variations have been developed through a number of Liveable Neighbourhoods projects within the City of Wanneroo since 1999.

The proposed local streets are suited to the specific traffic, parking and pedestrian/cyclist needs of each location.

Narrow Access Streets – Figure 42 (15m reserve)

Narrow Access Streets provide a more limited travel/parking width and are effective in constraining vehicle speeds. Some of the residential streets in the Structure Plan will be Narrow Access Streets because parking demand will be moderate adjacent to low density residential uses and traffic volumes will be low.

Wide Access Streets – Figure 42 (16 m reserve)

Wide Access Streets are typically used where traffic and/or parking demand is expected to be higher and a wider street pavement is needed. Where laneway lots are constructed both sides and embayed parking is required, the standard 16 m reserve is adequate. If additional landscaping space is required, however, the reserve is sometimes widened to 17 m.

Special Access Streets – Figure 43 (18-20 m reserve)

Cross-sections have been developed for ‘special streets’ which are variations on the typical streets shown in Liveable Neighbourhoods. These cater for a range of cyclist requirements, bus route requirements and parking demands.

Neighbourhood Connectors – Figures 44 & 45

Neighbourhood Connector streets perform local traffic distribution roles and may serve as bus routes through the local street system. The Neighbourhood Connectors also provide the major connections to the regional road system (i.e. at Marmion Avenue and Alkimos Drive).

Neighbourhood Connectors often have a shared path on at least one side (and a footpath on the other side of the street). Embayed parking is generally provided adjacent to medium/high density residential development or commercial/retail sites. **Figure 44** shows the cross-section for undivided Neighbourhood Connectors and **Figure 45** shows the cross-section for boulevard types.

Residential Subdivision Cross Overs & Parking Embayments – Figure 46

The City of Wanneroo does not allow parking embayments to be constructed without driveway locations being fixed and the driveways made obviously distinct from the embayments.

To deal with this requirement, the developer will construct any kerbed median islands such that openings are located to suit driveways located at lot boundaries as shown in Figure 47.

Additionally, 0.1 m PAWs will be placed on title deeds to limit the location of driveways such that they suit the constructed median openings and parking embayments. For portions of these streets fronting laneway/cottage lots (generally less than 450 m²), there will be 0.1 m PAWs on the title deed to prohibit driveways altogether.

Service Industry and Business Enterprise Streets – Figure 47

Between the future northern suburbs rail line and the future Mitchell Freeway, the LSP street network will provide access to mixed use and service commercial development. **Figure 47** shows the street cross-sections proposed to serve this area.

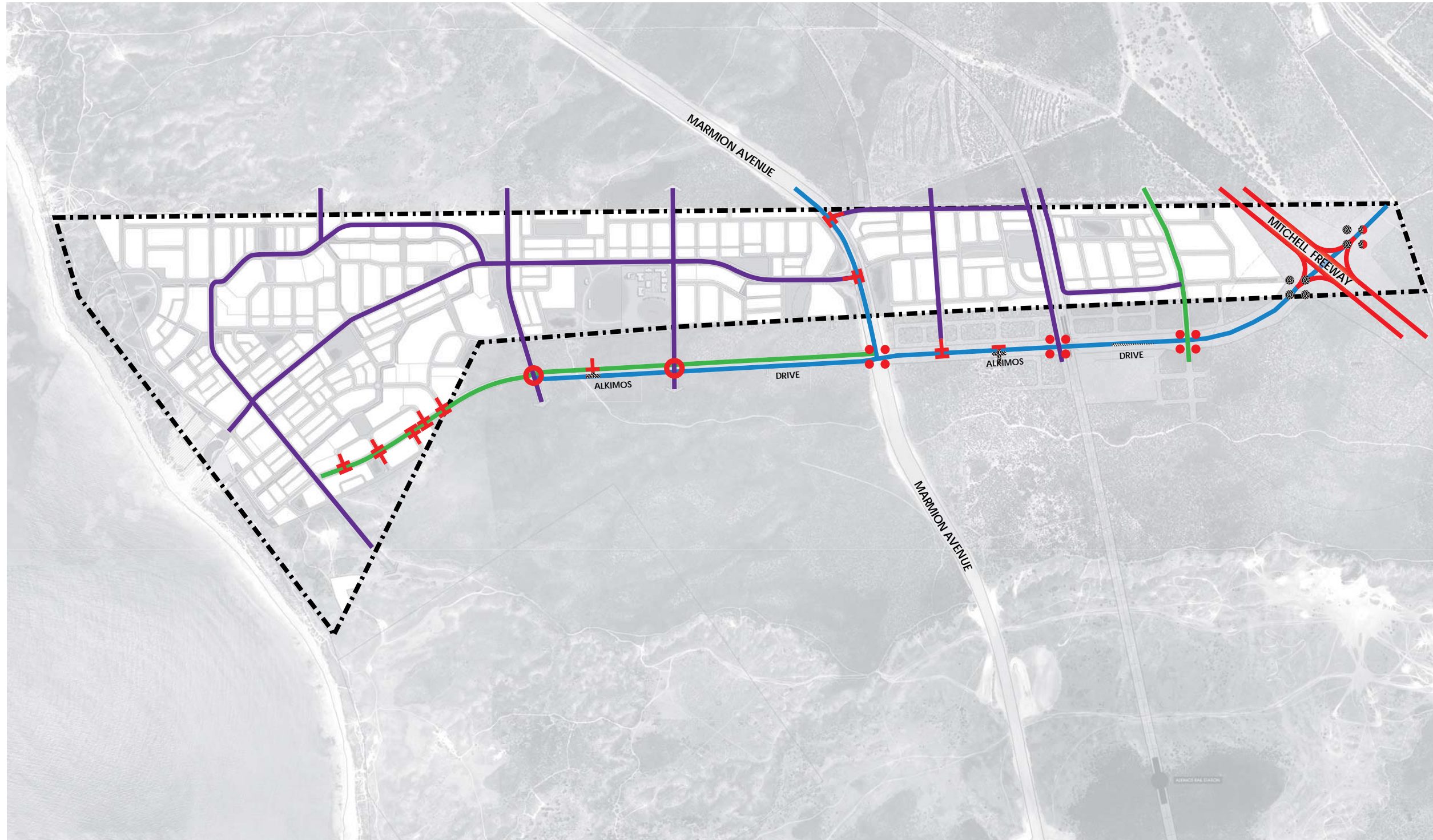
For those longer streets serving more of a traffic distribution function, a 7.4 m pavement width is indicated. For shorter streets serving a very local access function with little heavy vehicle traffic, a 6.6 m width is suggested. Parking is expected to be in strong demand in these areas of employment (much as in the service commercial sectors of Osborne Park).

On-street parking is proposed as standard for the majority of these streets and 2.5 m wide parking bays are recommended. In those cases where traffic is expected to be high and parking demand strong, it may be necessary to create a combined cycle/parking space of 3.7 m (for 50 km/hr operating speed).

In order to make these streets flexible to meet significant variety of needs, it is recommended that trees be located behind the road kerb (i.e. not in kerb nibs). In the more ‘industrial’ streets, there need be no formal designation of the parking.

LEGEND

- Primary Distributor
- District Distributor A
- District Distributor B
- Neighbourhood Connector
- Traffic Signals
- Single Lane Roundabout
- + Full Access T-junction
- + Left in/Left out
- Subject Land



ROAD HIERARCHY AND ARTERIAL ACCESS PLAN

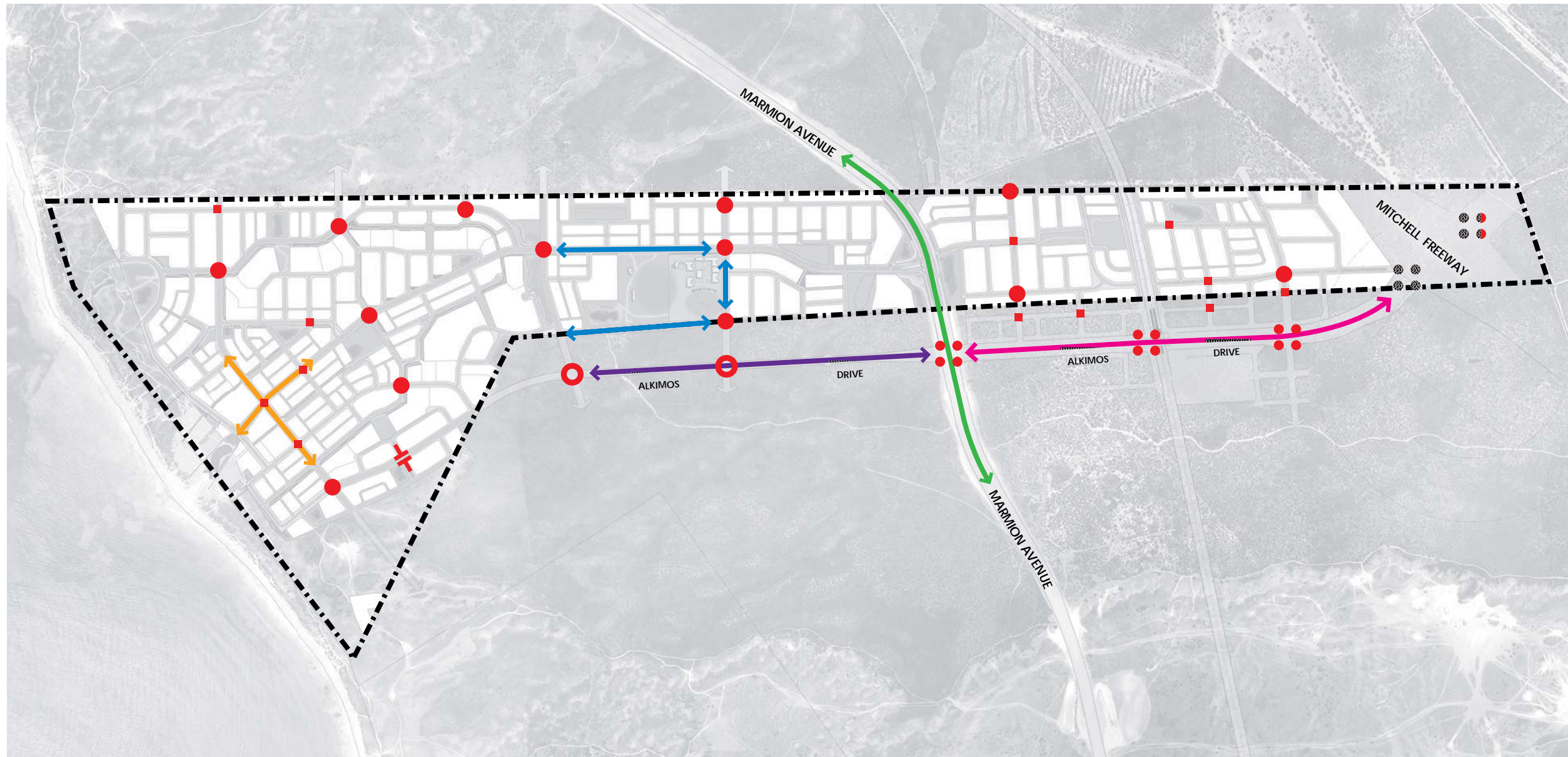
NORTH ALKIMOS LOCAL STRUCTURE PLAN | LOTS 1005 & 1006
MARMION AVENUE, ALKIMOS

TAYLOR BURRELL BARNETT | TABEC | EPCAD
SHARNI HOWE | CREATING COMMUNITIES
MACROPLAN | MP ROGERS & ASSOCIATES
SUSTAINABLE SOLUTIONS | WHELANS | ENV
OVERMAN ZUIDVELD | TAYLOR ROBINSON

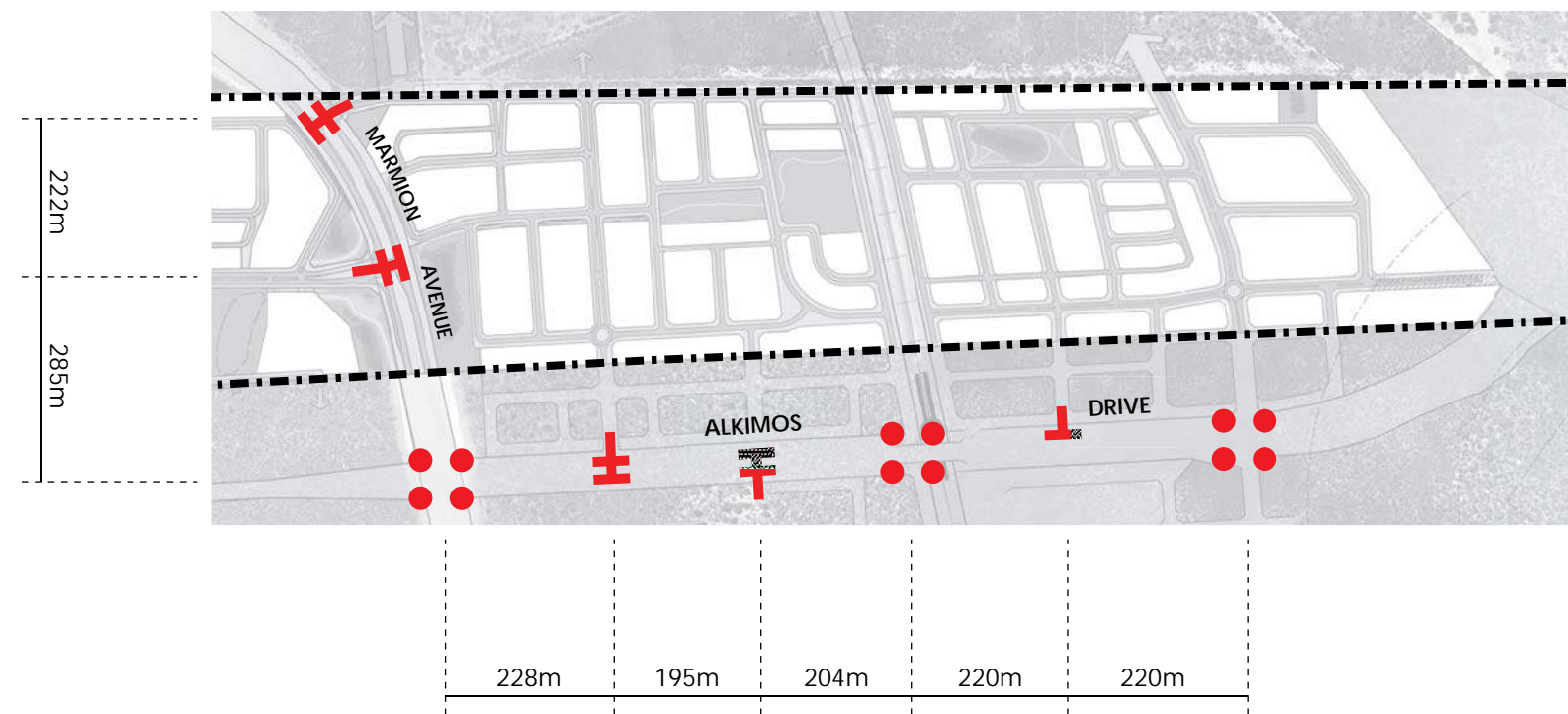
0m 100m 200m



PLAN: 072015
DATE: MAY 2009



- LEGEND**
- ⋯ Traffic Signals
 - Larger-High Capacity Roundabout
 - Local Street Single Land Roundabout
 - Special Treatment for Sign Controlled 4-way Intersection
 - ┌ Left in/Left out
 - ┼ Full Access T-Junction
 - Subject Land



ACCESS SPACING MARMION DRIVE AND ALKIMOS DRIVE

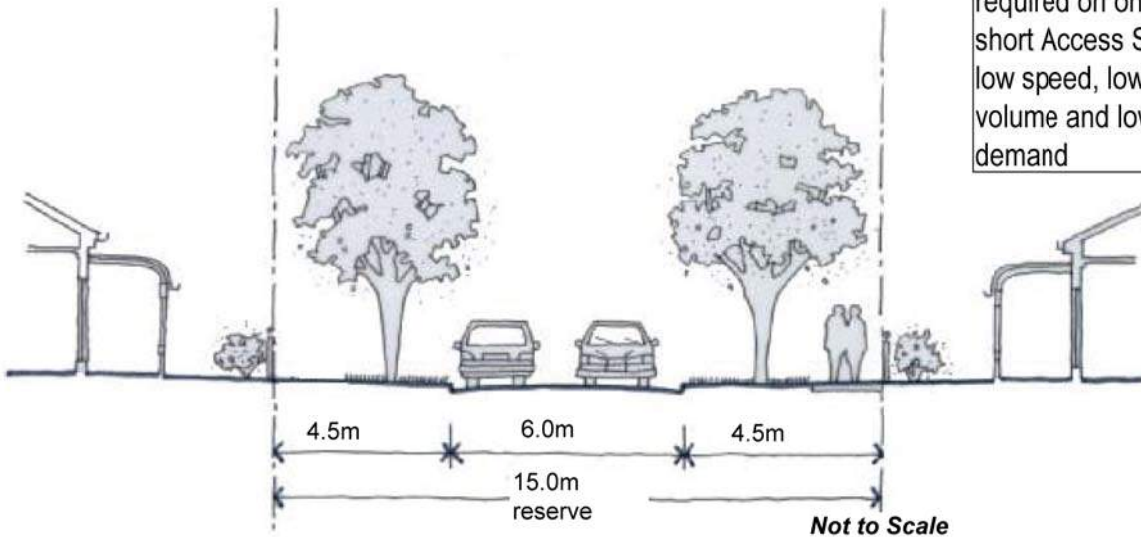
INTERSECTION CONTROL PLAN

NORTH ALKIMOS LOCAL STRUCTURE PLAN | LOTS 1005 & 1006 MARMION AVENUE, ALKIMOS

TAYLOR BURRELL BARNETT | TABEC | EPCAD
 SHARNI HOWE | CREATING COMMUNITIES
 MACROPLAN | MP ROGERS & ASSOCIATES
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 OVERMAN ZUIDVELD | TAYLOR ROBINSON

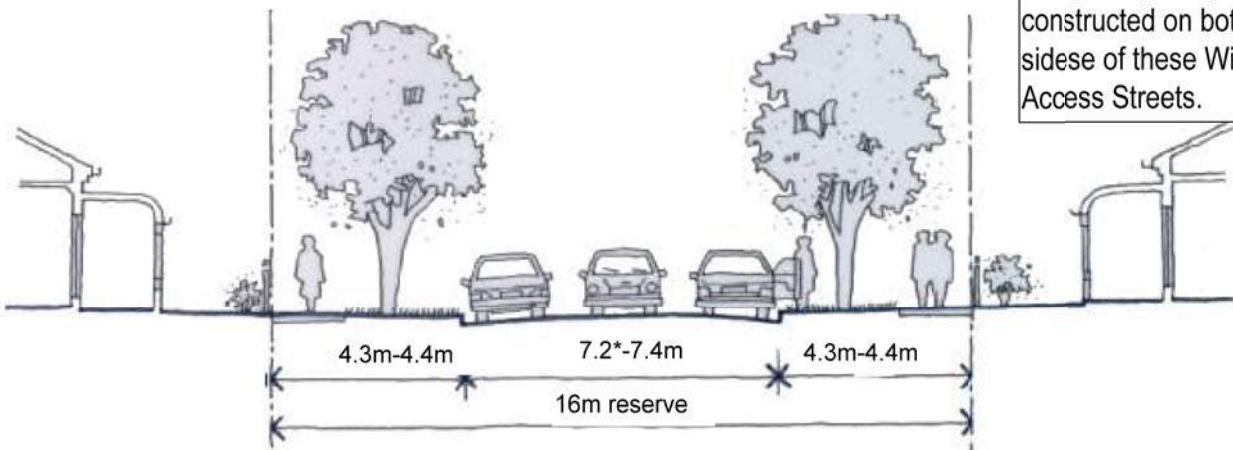
FIGURE 41

Footpath may only be required on one side of short Access Street with low speed, low traffic volume and low pedestrian demand



Narrower Access Street (6.0m pavement) in 15m Reserve.
Use with lower on-street parking requirement and/ or traffic volume below 1000 veh/day.

Footpath typically constructed on both sides of these Wider Access Streets.



Wider Access Street (7.2-7.4m pavement) in 16m Reserve.
Use with higher on-street parking demand and/or traffic volume below 3000 veh//day.

Not to Scale

*Liveable Neighbourhoods Edition 3 identifies 7.2m pavement width.

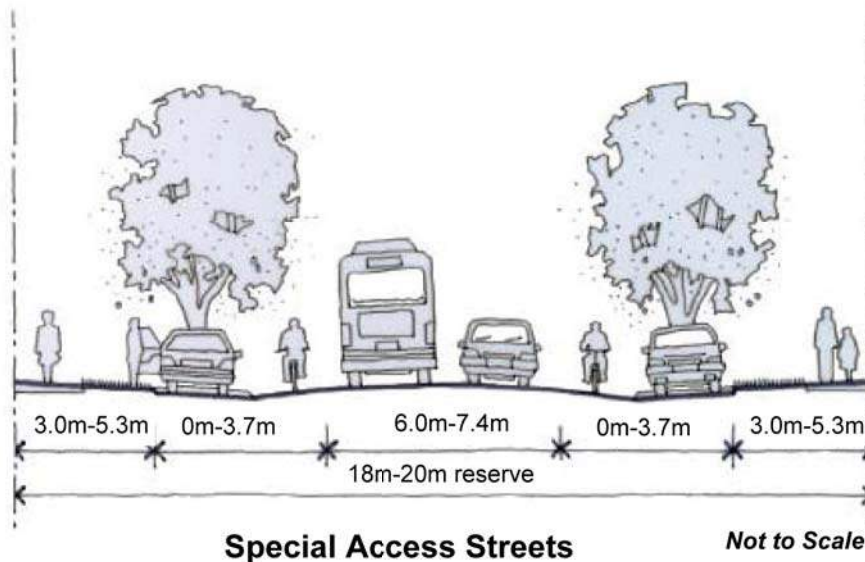
Wider Access Streets - Special Type Designations:

Type 1 (Standard): 16m = 4.3m + 7.4m + 4.3m

Type 2 (laneway lots on two sides): 16m = 2.95m + 2.3m (parking) + 5.5m + 2.3m (parking) + 2.95m

Type 3 (laneway lots on two sides + bus route): 18m = 3.4m+ 2.3m (parking)+ 6.6m*+ 2.3m (parking) + 3.4m

*If only a short section of street with standard 7.2-7.4m carriageway on either end, then consider retaining 7.4m width through this section that has the parking embayments.



Type 1 (traffic < 3000vpd without embayments): 18m= 5.3 + 7.4 +5.3

Type 2 (traffic < 3000vpd with embayments): 18m= 3.7 + 2.3 + 6.0 + 2.3 +3.7

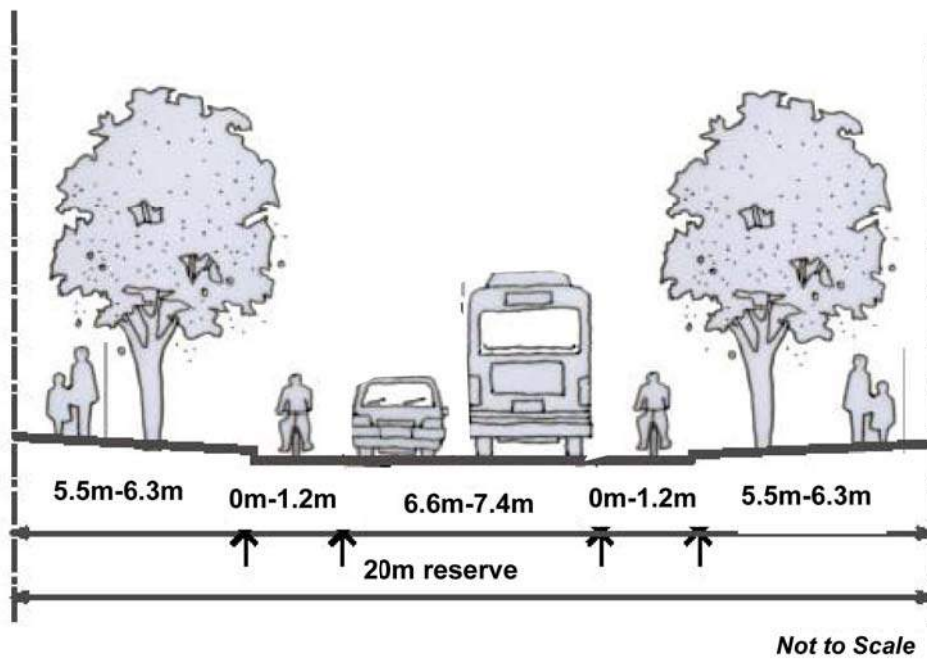
Type 3 (traffic < 3000vpd with embayments and bus route): 20m= 4.0 + 2.3 + 7.4 + 2.3 + 4.0

Type 4 (traffic > 3000vpd with embayments and cycle lanes): 20m= 3.3 + 3.7 + 6.0 + 3.7 + 3.3

Type 5 (traffic > 3000vpd with embayments, cycle lanes + bus routes): 20m= 3.0 + 3.7 + 6.6 + 3.7 + 3.0

Note: If a median is added to these Special Access Streets, the minimum 'kerb to kerb' dimension is typically 4.1m (when no cycle lane is provided) and is 4.5m (when cycle lane is provided). The reserve dimensions must be increased accordingly.

Note: Footpath typically constructed on two sides of these streets. Shared path may be required on one side where pedestrian demand is high.

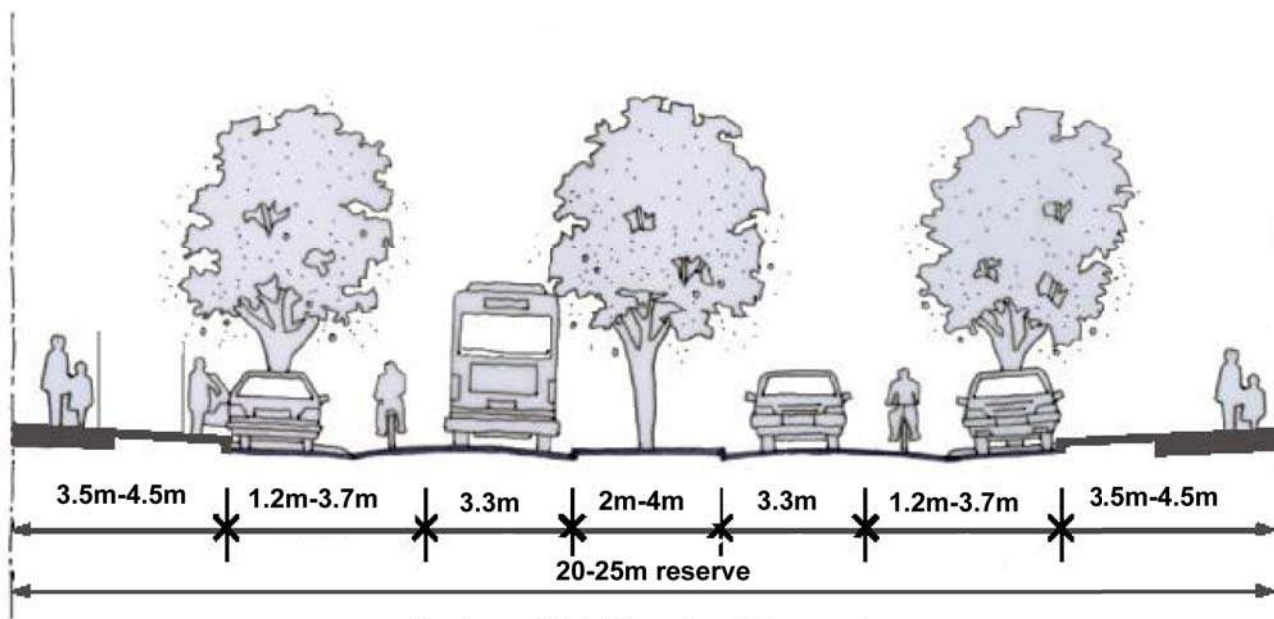


Undivided Neighbourhood Connectors

Type 1 (traffic < 3000vpd with no cycle lanes): $20\text{m} = 6.3\text{m} + 7.4\text{m} + 6.3\text{m}$

Type 2 (traffic > 3000vpd with cycle lanes): $20\text{m} = 5.5 + 1.2$ (cycle lane) $+ 6.6 + 1.2$ (cycle lane) $+ 5.5$

Note: Footpath to be constructed on one side and shared path on opposite side.



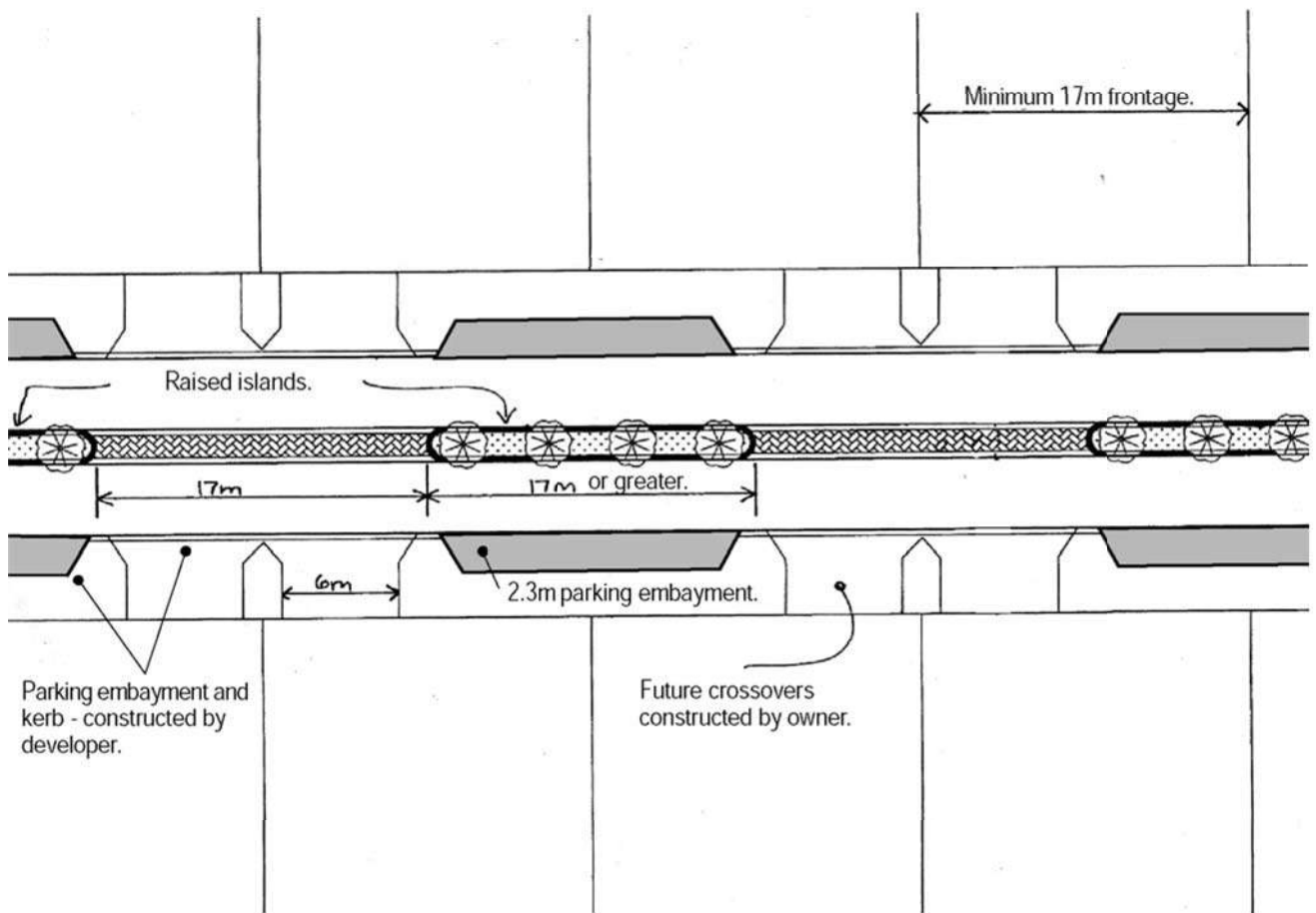
Boulevard Neighbourhood Connectors Not to Scale

Type 1 (with parking/cycle space): 23-25m = 3.5 verge + 3.7 parking/cycle + 3.3 lane + (2 - 4) median + 3.3 lane + 3.7 parking/cycle + 3.5 verge

Type 2 (with cycle space): 20 - 22m = 4.5 verge + 1.2 cycle lane + 3.3 lane + (2-4) median + 3.3 lane + 1.2 (cycle lane) + 4.5 verge

Notes:

1. Median width to suit tree species (e.g. 4.0m for large trees such as Norfolk Pines).
2. Footpath to be constructed on one side and shared path on opposite side.



CROSS SECTIONS - COORDINATED DRIVEWAYS AND MEDIAN BREAKS

NORTH ALKIMOS LOCAL STRUCTURE PLAN | LOTS 1005 & 1006 MARMION AVENUE, ALKIMOS

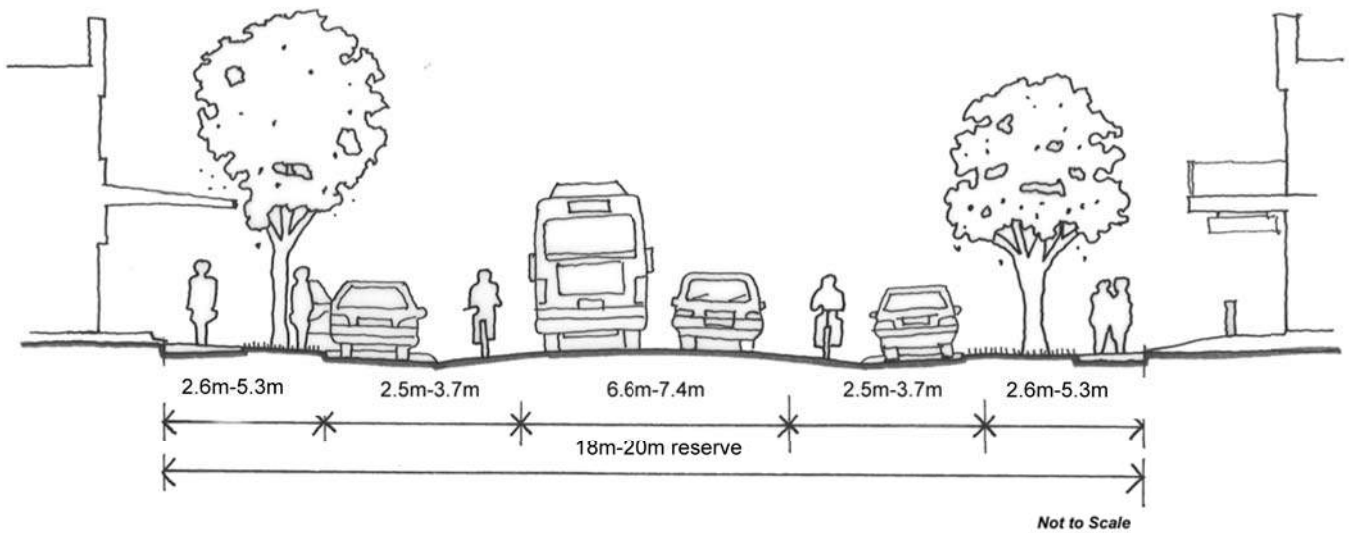
TAYLOR BURRELL BARNETT | TABEC | EPCAD
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 SUSTAINABLE SOLUTIONS | WHELANS | ENV
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FIGURE **46**

PEET



PLAN - 07/055
 DATE - MAY 2009



Service Industry and Business Enterprise Street

Type 1 (traffic < 3000vpd with embayments): 18m= 3.2 + 2.5 + 6.6 + 2.5 +3.2

Type 2 (traffic < 3000vpd with embayments and frequent trucks): 18m= 2.8m + 2.5 + 7.4 + 2.5 + 2.8

Type 3 (traffic < 3000vpd with embayments and frequent trucks): 20m= 3.8 + 2.5 + 7.4 + 2.5 + 3.8

Type 4 (traffic > 3000vpd with embayments and cycle lanes): 20m= 3.0 + 3.7 + 6.6 + 3.7 + 3.0

Type 5 (traffic > 3000vpd - embayments, cycle lanes & frequent trucks): 20m= 2.6 + 3.7 + 7.4 + 3.7+2.6

Note: If a median is added to this Service Industry Street, the minimum 'kerb to kerb' dimension is typically 4.1m at locations without embayments when no cycle lane is provided and is 4.5m when a cycle lane is provided. The minimum kerb to kerb dimension including parking is 6.0m and 7.0m for the case without and with cycle lanes, respectively. The reserve dimension may need to be increased accordingly.

Note: Footpath typically constructed on two sides of these streets. Shared path may be required on one side where pedestrian demand is high.

10.3 FRONTAGE ACCESS AND STAGED ACCESS TO ARTERIAL ROADS

10.3.1 DISTRICT DISTRIBUTOR TYPE A ROADS

There is no assumption of or provision for direct individual (private) property access from the District Distributor Type A roads.

10.3.2 DISTRICT DISTRIBUTOR TYPE B ROADS

There is a general presumption for direct individual (private) property access from those District Distributor Type B roads which meet the required combination of land use and access management design measures as set out in *Liveable Neighbourhoods* policy.

On roads which do not meet the design requirements, only indirect access via a public street (side street or CAP Road) is to be provided. Detailed investigations will be required at subdivision stage to establish the appropriate access design configuration.

10.3.3 LOCAL DISTRICT DISTRIBUTORS & ACCESS STREETS

All Local Distributors and Access Streets are presumed to be suitable to provide direct vehicle access to fronting properties. Those Local Distributors expected to carry traffic in excess of 5,000 veh/day will require special access management at subdivision stage.

At ultimate development stage, the arterial roads will be four-lane divided urban roads carrying high volumes of traffic. The intersections of these arterial roads will be controlled with traffic signals or large (high capacity) roundabouts, as illustrated in **Figure 40**. Intersections with local roads will feature full right and left turn lanes.

In the interim, however, Marmion Avenue and Alkimos Drive will function as two-lane undivided roads. At this initial stage of development it is typical for intersections with local roads to be constructed according to Main Road Type C intersection detail.

10.4 INTERSECTION CONTROL

MARMION AVENUE

The operating environment on Marmion Avenue is currently characterised by high operating speed (i.e. 90 km/hr speed limit) and relatively low traffic volumes. Due to the 'rural' type environment drivers do not expect intersections, turning vehicles, pedestrians, cyclists, etc.

As the subject land is developed it will be important to manage the 'rural to urban' road transition at the boundaries of development (i.e. at the southern and northern limits of the local road access points).

Main Roads WA has typically agreed that speed limits on arterial roads in urbanised areas can be reduced to 70 km/hr after the new junctions (complete with splitter islands, lighting, etc) have been constructed. This speed limit reflects the increased turning traffic and the general urbanisation of the area.

Typical treatments on Marmion Avenue to increase approaching driver awareness of urban operating conditions include:

- Reduced speed limit. 70 km/hr with initial development of Lots 1005 and 1006 and nearby properties.
- Entrance statement/signage with accompanying lighting; and
- Roadside and intersection lighting, roadside kerbing, and channelisation islands and right turn lane widening at T-junctions.

CORNER SETBACK ON LOCAL STREETS INTERSECTING WITH MARMION AVENUE

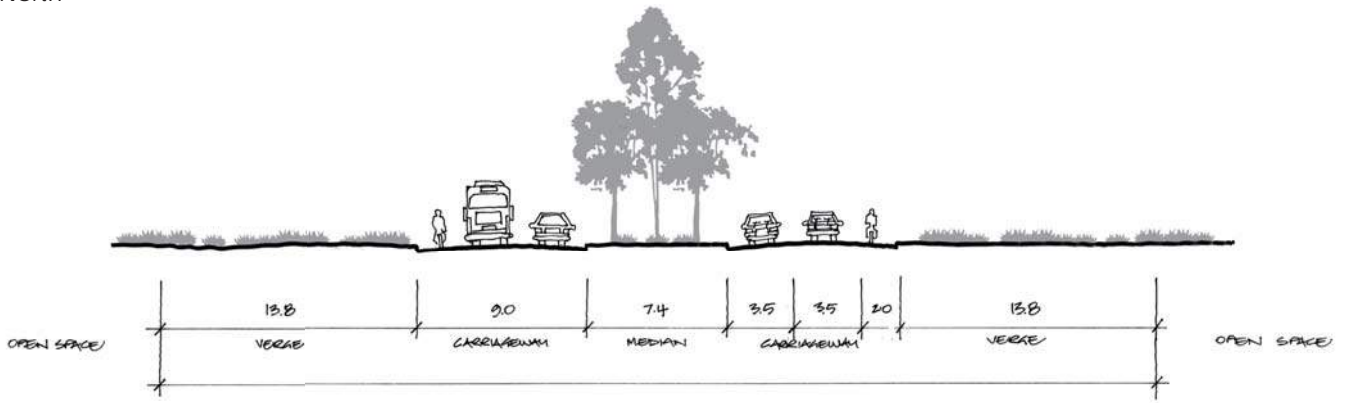
Properties located on the local roads which connect with Marmion Avenue (i.e. District Distributor Type A/ Integrator Arterial Type A) will require the standard City of Wanneroo corner setback of 30 m. This setback is measured from nearest edge of crossover to the Marmion Avenue reserve boundary.

The lower order Integrator Arterial Type B roads have lower traffic volumes, lower traffic speeds, and serve a higher 'access' function – thus they should not be subject to the 30 m access restriction. Further investigation and discussion with City of Wanneroo (at subdivision stage) will establish the appropriate access corner clearance for these streets.

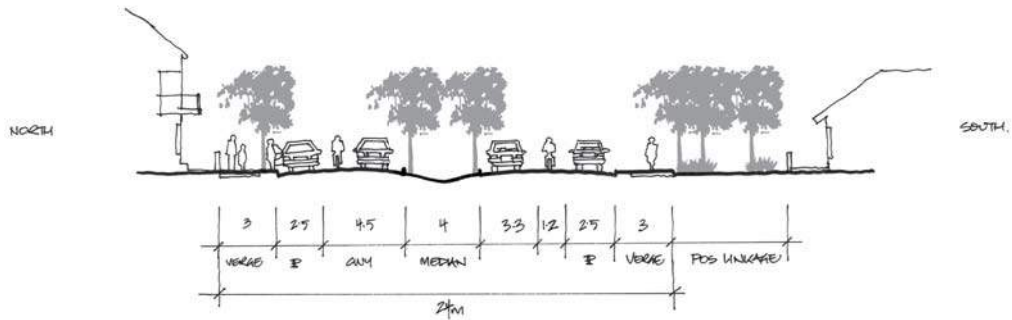
SPECIAL STREETS

Some streets in the LSP are considered important enough to warrant 'special' cross-sections showing landscape and built form details. Taylor Burrell Barnett, Epcad, TABEC and Bruce Aulabaugh developed the detailed cross sections shown in **Figures 48-50**. These special street cross-sections are subject to assessment and approval by the Department of Planning as part of its consideration of an applicable subdivision application.

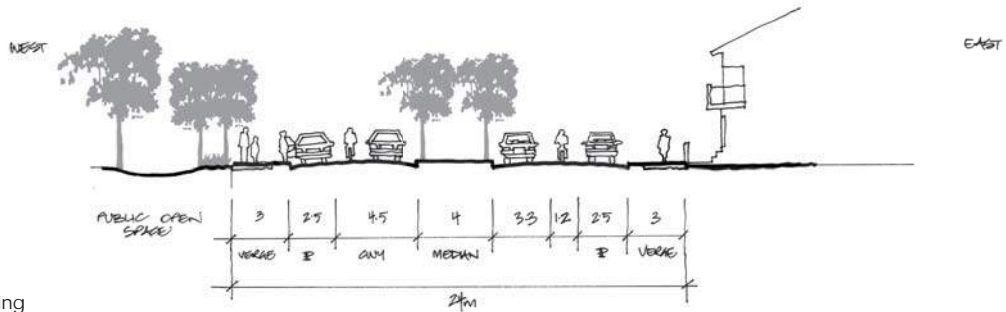
SECTION A-A: Marmion Avenue District Distributor Type A
View North



SECTION B-B: Main East-West Entry Boulevard - Neighbourhood Connector
View Eastwards



SECTION C-C: Neighbourhood Connector
View North



Note: Landscaping and building sections indicated on cross sections are for illustrative purposes only and subject to change.

LOCATION PLAN (N.T.S.)

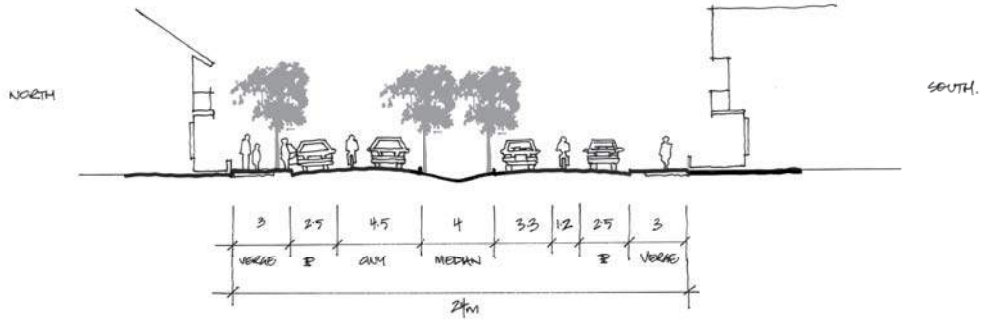


CROSS SECTIONS A-C

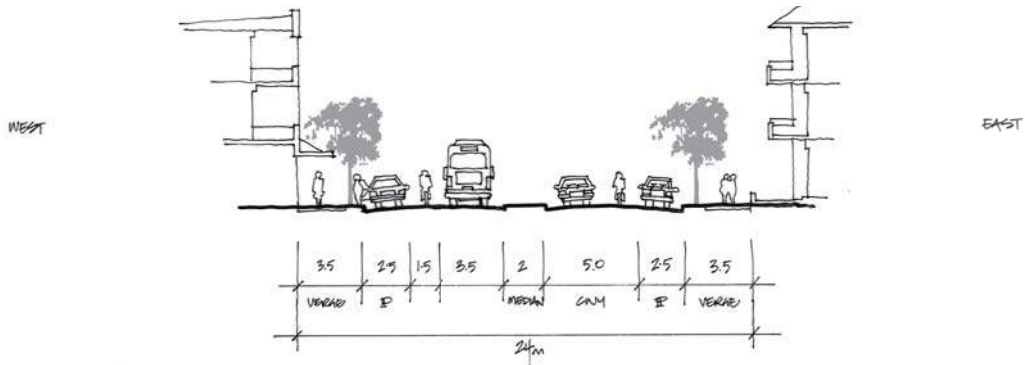
NORTH ALKIMOS LOCAL STRUCTURE PLAN | LOTS 1005 & 1006 MARMION AVENUE, ALKIMOS

TAYLOR BURRELL BARNETT | TABEC | EPCAD
SHARNI HOWE | CREATING COMMUNITIES
MACROPLAN | MP ROGERS & ASSOCIATES
SUSTAINABLE SOLUTIONS | WHELANS | ENV
OVERMAN ZUIDVELD | TAYLOR ROBINSON

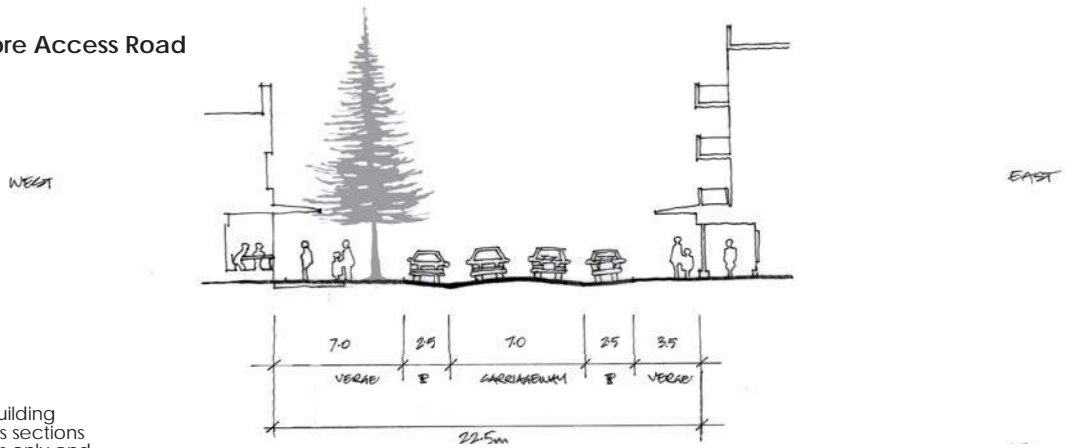
SECTION D-D: Main East-West Entry Boulevard - Neighbourhood Connector
View East



SECTION E-E: Neighbourhood Connector (Serving high frequency North-South bus route as specified in DSP)
View North



SECTION F-F: Foreshore Access Road
View North



Note: Landscaping and building sections indicated on cross sections are for illustrative purposes only and subject to change.

LOCATION PLAN (N.T.S.)



CROSS SECTIONS D-F

NORTH ALKIMOS LOCAL STRUCTURE PLAN | LOTS 1005 & 1006 MARMION AVENUE, ALKIMOS

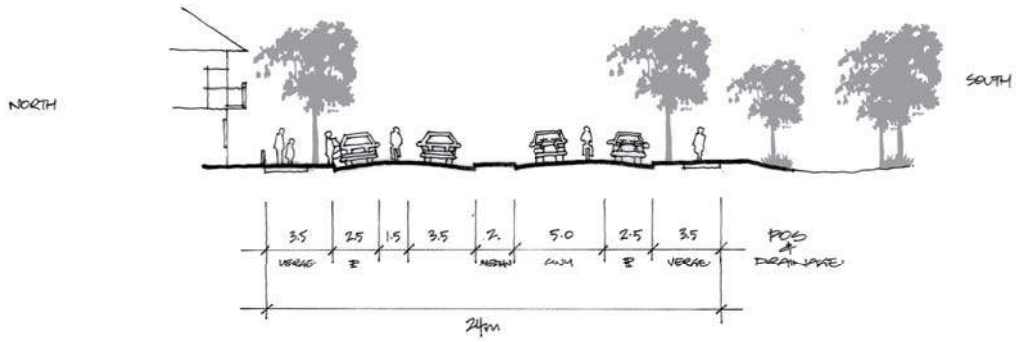
TAYLOR BURRELL BARNETT | TABEC | EPCAD
SHARNI HOWE | CREATING COMMUNITIES
MACROPLAN | MP ROGERS & ASSOCIATES
SUSTAINABLE SOLUTIONS | WHELANS | ENV
OVERMAN ZUIDVELD | TAYLOR ROBINSON

FIGURE **49**
PEET

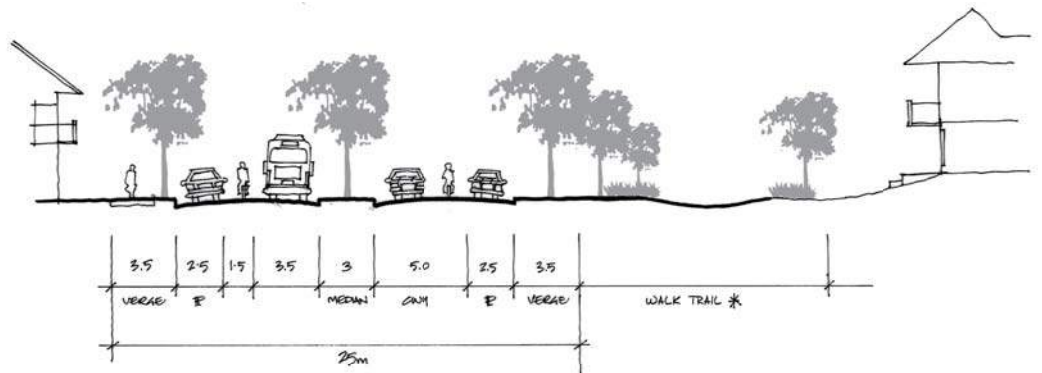


PLAN - 07/055
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SECTION G-G: Alkimos East-West Coastal Village Connector
View East

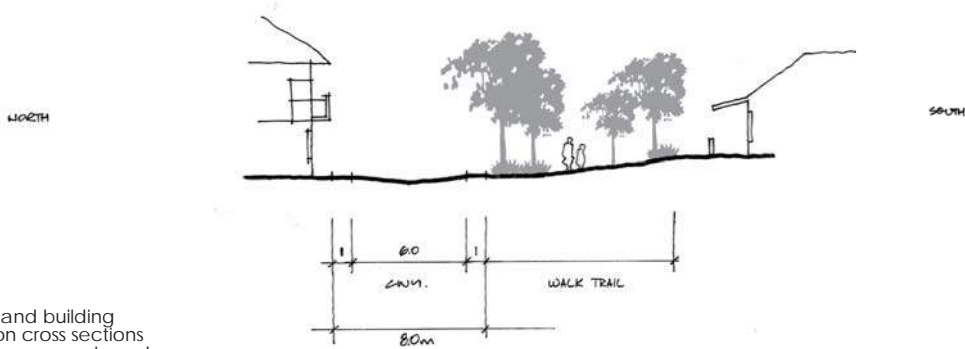


SECTION H-H: Neighbourhood Connector
View North



* WALK TRAIL ~ LONG DISTANCE RIDING & WALKING, DRAINAGE & ACCESS WHERE REQUIRED

SECTION I-I: Mews Access
View East



Note: Landscaping and building sections indicated on cross sections are for illustrative purposes only and subject to change.

LOCATION PLAN (N.T.S.)



CROSS SECTIONS G-H

NORTH ALKIMOS LOCAL STRUCTURE PLAN | LOTS 1005 & 1006 MARMION AVENUE, ALKIMOS

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MACROPLAN | MP ROGERS & ASSOCIATES
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PLAN - 07/055
DATE - MAY 2009

10.5 TRIP GENERATION MODELLING

A local traffic model has been developed for the purpose of forecasting the ultimate development PM peak hour traffic volumes on the road network in the LSP area. The modelling covers the subject land as well as nearby development zones to the north and south.

SKM Engineering Consultants were engaged by Peet Ltd to provide a 24-hour traffic forecast sub-area matrix covering zones 43-53, 76 and 175 (from the SKM District Traffic Model for Alkimos Eglinton).

This sub-area matrix provided the ‘internal/external’ traffic patterns for the local traffic model. A peak hour ‘through trips’ matrix was also developed from the 24-hour sub-area matrix by using peak hour factors and directional splits similar to those of existing arterial roads in the NW corridor.

Average vehicle trip production worked out at 6.35 veh-trip ends per day per dwelling across the 3930 dwellings. The 6.35 veh-trip-ends figure includes non-home based trips (both private and commercial).

Appendix 4 contains a table showing the range of veh-trip production rates for the various dwelling densities.

Vehicle trip attractions were calculated as follows:






-  Retail floorspace (NLA) at 70 veh-trips/day per 100 m². Cafés and restaurants are included in this category;
-  Bulk retail and Retail frontage/ highway commercial floorspace (GFA) at 50% of retail (i.e. 35 veh-trips/day per 100 m²);
-  Non-retail (office/ services commercial, etc) employment at four veh-trips/ day per employee.
-  Kiss n’ Ride and Park n’ Ride trips at the Alkimos North Rail Station are estimated at approximately 670 trips (in and +out) in the PM peak hour.
-  Beach node trips are estimated at approximately 70 trips (in and out) in the PM peak hour.

TABLE 40: PRODUCTIONS/ ATTRACTIONS BY TRIP PURPOSE

Productions		Attractions	
HBW (home based work):	1080	HBW (home based work):	542
HBS (home based shopping):	369	HBS (home based shopping):	367
HBO (home based other):	543	HBO (home based other):	621
NHB (non home based):	<u>756</u>	NHB (non home based):	<u>756</u>
TOTAL	2748	TOTAL	2286

10.6 TRAFFIC MODEL TRIP DISTRIBUTION (INTERNAL & EXTERNAL)

TABLE 41: LOCAL TRAFFIC MODEL PEAK HOUR PROD/ ATTRACTION TRIP DISTRIBUTION TABLE

Distribution Category	Vehicle Trips	Percentage
Internal - Internal	1246	32.9%
Internal – External/ External - Internal	2541	67.1%
Total	3787	100%

Note: Data in **Tables 41 and 42** are related. The sum of peak hour productions and attractions from Table 38 is 5034 (i.e. 2748 prod + 2286 attr). Subtracting 2 x internal-internal trips in Table 43 from 5034 gives the internal-external and external-internal trips (i.e. $5034 - 2 \times 1246 = 2541$).

The SKM Alkimos Eglinton 24-hour traffic model was used to produce a PM peak hour sub-area matrix for the ultimate development forecast. The external to external trips in the PM peak hour were estimated at approximately 7942 trips (predominantly traffic along Marmion Avenue and between Alkimos Drive/Mitchell Freeway and Marmion Avenue).




The SKM district traffic model sub-area output matrix was also used to establish the directional distribution of the internal-external and external-internal trips.

TABLE 42: EXTERNAL ORIGIN/ DESTINATION DISTRIBUTION

External Station Name/ Direction	External Attractions %	External Productions %
Marmion Avenue (north toward Eglinton)	11.6%	11.5%
Roads west of Marmion Avenue (north)	14.8%	14.6%
Roads east of Marmion Avenue (north)	6.6%	6.8%
Alkimos Drive (east to Freeway)	12.3%	12.3%
Marmion Avenue (south toward Town Cntr)	30.0%	24.4%
Roads west of Marmion Avenue (south)	7.6%	7.9%
Roads east of Marmion Avenue (south)	17.1%	17.5%
Totals	100%	100%

The Traffic Report at **Appendix 4** demonstrates that overall, the traffic modelling has shown that the proposed local road network and the corresponding local road reserves are adequate to cater for the forecast traffic.

Appendix 4 should be referred to with respect to:

-  Average weekday traffic forecasts (two direction totals);
-  PM Peak hour directional traffic (veh/hr per direction);
-  PM Peak hour volume to capacity ratios.

The peak hour 'volume to capacity' ratios on all roads except Marmion Avenue are expressed at the LOS C/D threshold and are within acceptable limits (i.e. below 1.0). The Marmion Avenue V/C ratios are expressed at the LOS D/E threshold which is more commensurate for high order urban arterial roads in peak hour traffic.

Marmion Avenue V/C ratios are as high as 1.0-1.3 for the northbound direction near the southern edge of the study area and there will be some peak hour congestion particularly at the Alkimos Drive intersection. This is not unexpected for such an important arterial road in an urban area with significant population, employment and through traffic.

To assist with the 'corridor' north-south traffic demand, the LSP has incorporated numerous local distributor roads with north-south orientation (as shown in the District Structure Plan). These cater for localised north-south movements and allow Marmion Avenue to better serve its longer distance traffic function.

10.7 PARKING

Parking for residential developments will be per the Residential Design Codes except where specified otherwise in LDPs or design guidelines.

Parking for non-residential areas shall be per LDPs, design guidelines or DPS2.

The parking within the Coastal Village has been afforded some discussion in this report but shall be subject to closer design and consideration as detailed design for the village continues.

10.8 PEDESTRIANS AND CYCLISTS

Dual use paths and footpaths will be provided in accordance with the City of Wanneroo's guidelines and additional footpath links may be provided in other areas as required.

10.9 SHARED PATHS

The shared path network for the LSP is shown in **Figure 51**. Shared paths are proposed for along all District Distributors and Local Distributors. In addition, shared paths are proposed along the foreshore and through/along linear green spaces.

The Alkimos Eglinton DSP shows a principal shared path along the Mitchell Freeway and along the rail line. It is also expected that there will be a shared path along the coast. In addition, all District Distributors are expected to have shared paths along both sides through urban areas. Neighbourhood Connectors generally have a shared path on one side and footpath on the other side. Local Access Streets would generally have a footpath on both sides except for those with very low traffic and low pedestrian demand. Those low order streets would have a footpath on one side only.

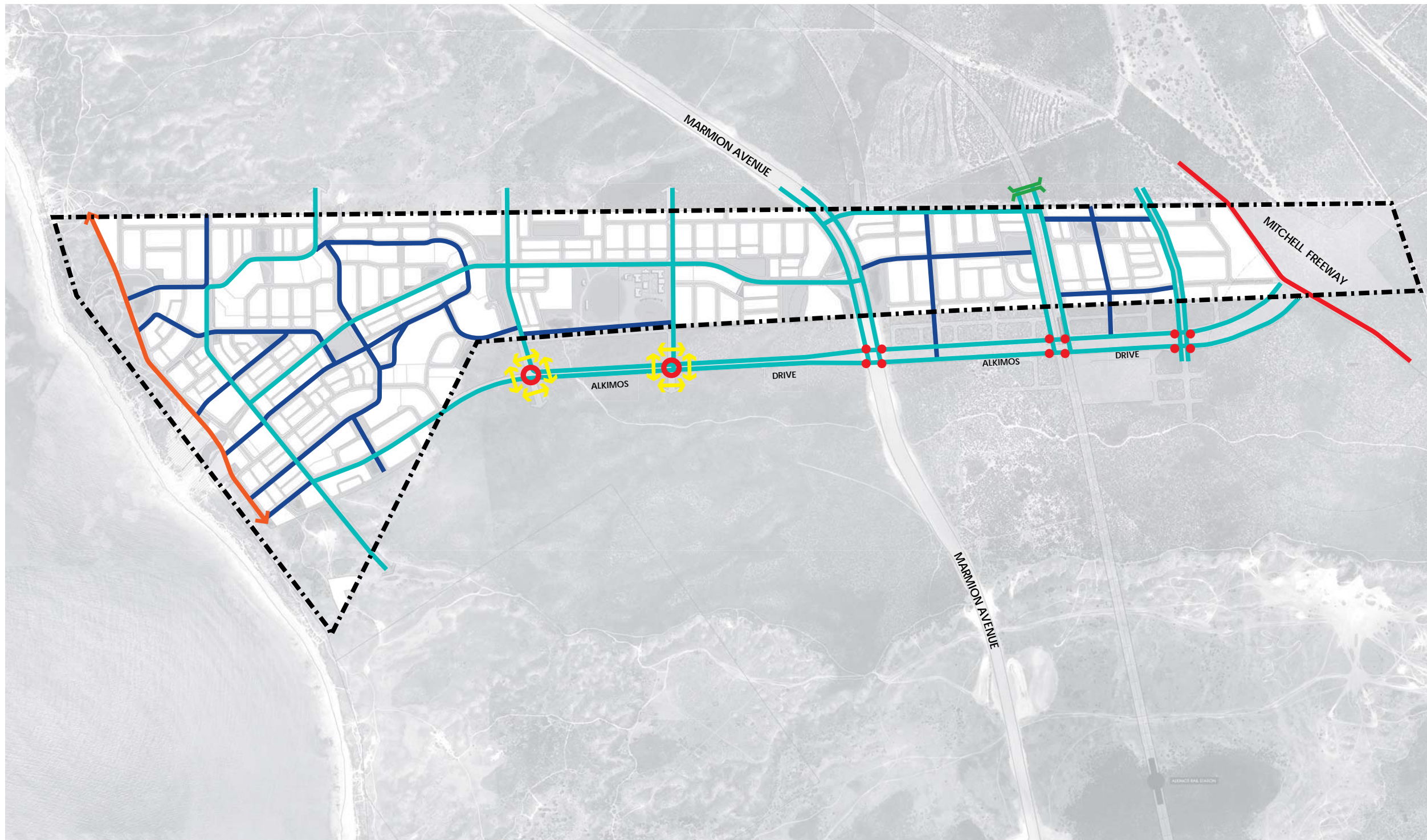
10.10 ROAD CROSSINGS: AT-GRADE AND GRADE-SEPARATED

The manner in which the pedestrian crossing of Marmion Avenue is to be addressed, will be addressed prior to subdivision of lots adjacent to Marmion Avenue.

LEGEND

- Principal Shared Path
- Shared Path and Paved Shoulder/Cycle Lane
- Shared Path
- ↔ Foreshore Path
- ⋯ Traffic Signals with Pedestrian activation
- ⊙ Single Lane Roundabout
- Grade Separated Vehicle and Pedestrian/Cyclist Rail (by others)
- - - Subject Land

Note: Streets shown with shared path on one side will generally have footpath on the opposite side.



PEDESTRIAN/CYCLIST NETWORK PLAN

NORTH ALKIMOS LOCAL STRUCTURE PLAN | LOTS 1005 & 1006 MARMION AVENUE, ALKIMOS

TAYLOR BURRELL BARNETT | TABEC | EPCAD
 SHARMI HOWE | CREATING COMMUNITIES
 MACROPLAN | MP ROGERS & ASSOCIATES
 SUSTAINABLE SOLUTIONS | WHELANS | ENV
 OVERMAN ZUIDVELD | TAYLOR ROBINSON

0m 100m 200m



PLAN: 072015
 DATE: MAY 2009

10.10.1 SIGNALISED AND UNSIGNALISED AT-GRADE CROSSINGS

Busier intersections with traffic signal controls will be fitted with pedestrian activation buttons. All at-grade road crossings (including unsignalised, unmarked crossings) are to have kerb ramps and median gaps or paths for use by pedestrians/cyclists. Note that each street intersection should be provided with kerb ramps and median gaps to facilitate access to paths on the opposite side of the intersecting road.



10.10.2 GRADE-SEPARATED ROAD CROSSINGS FOR PEDESTRIANS/ CYCLISTS

The future rail line will cross beneath Alkimos Drive and consistent with other road bridges over urban rail lines in Perth, the PSP should be constructed within the 'rail line cutting' and the bridge deck should span the PSP also. This is important not only for cyclists using the PSP but also for general pedestrian demand across Alkimos Drive. Alkimos Drive shared paths will need to be connected to the PSP by virtue of 'path ramps' on either side of the road.

In locations where school catchments span arterial roads, it may be necessary to establish an official 'Type A Guard Controlled School Crossing'. This type of crossing ensures safe access for primary school students crossing the road. General details on guard controlled crossings are provided below.

10.10.2.1 GUARD CONTROLLED SCHOOL CROSSINGS

Guard controlled crossing warrants are set by the Western Australian Police as follows:

-  Type A crossing is a facility controlled by a warden who is an employee of the WA Police Service. It requires a minimum of 20 student pedestrians and 200 vehicles through traffic per hour.
-  Type B crossing is a facility controlled by a warden who has volunteered for unpaid duty or has been engaged by the school's authorised parents association. These are offered where the Type A warrants are not met but there is strong anticipated future growth in population and/or traffic.

Other forms of 'formalised' supervised pedestrian access include the Walking School Bus Program in which parents accompany a group of children to school. In this situation, although road crossing are not marked/signed as 'warden controlled' crossings and the parents aren't authorised to interrupt traffic to allow the children to cross, there is still adult supervision of the crossing manoeuvre.

10.11 RAILWAY CROSSINGS

It is recommended that the pedestrian/cyclist rail crossing intervals be approximately 500 m (with a maximum interval of 800 m). Two crossing locations are shown in **Figure 51**. One crossing is via the Alkimos Drive bridge over the rail line and the other is located north of the subject land by others. These will provide a combined grade-separated crossing for vehicles and pedestrian/cyclists.

10.12 PATH DEVELOPMENT WITH SUBDIVISION APPROVAL

Cossill & Webley (Engineers for Marmion Avenue northward extension to Yanchep Beach Road) have advised that shared paths have not been constructed as part of construction of Marmion Avenue Stage 1 and that such paths would be the responsibility of developers at the time their respective subdivisions are constructed.

When the first LSP subdivisions are developed adjacent to Marmion Avenue, it will thus be necessary to construct shared paths along Marmion Avenue so that the path network proceeds simultaneously with urbanisation in the Alkimos area.

10.13 CYCLE LANES/PAVED ROAD SHOULDER

In addition to the shared paths and consistent with current *Liveable Neighbourhoods* and *Austrroads Guide To Traffic Engineering: Part 14 Cyclists*, on-road cycle space (via cycle lane or paved shoulder) will be provided along arterial roads and along new local distributor roads carrying traffic above 3000 vehicles per day. **Figure 51** shows the roads on which separate space for cyclists will be required.

Consistent with urban centre design and traffic management in many Australian cities, separate cycle space is not provided on the narrower, slow speed access-circulation streets supporting significant parking and pedestrian activity.




The 'shared space' concept is well established and understood on these streets. In these situations, adding to road space for individual user class is counterproductive because it encourages higher vehicle speeds and removes the interactive decision making of the participants and their natural accommodation of conflicting movements. In short, additional road space puts vehicle operators into a relatively isolated, buffered mind set of 'high speed travel', inappropriate for the intended activity of these spaces.

10.14 PUBLIC TRANSPORT AND STAGING

The existing Northern Suburbs rail line runs to Clarkson. While the timing of any rail extension beyond Clarkson is uncertain at the time of this report, funding has been approved for the master planning of the rail line extension from Clarkson to Jindalee (i.e. 7.5 km extension).

There is some expectation within the development industry that the rail line extension to Alkimos might occur as early as 2015 and the further extension to St Andrews might occur by 2021. There is no formal State Government commitment to these dates.

The Alkimos Eglinton DSP shows three rail stations:

-  Alkimos Station is located in the Alkimos Regional Centre just to the north of Romeo Road.
-  Alkimos North Station is located just south of the subject land and just north of Alkimos Drive.
-  Eglinton Station is located between Eglinton Avenue and Pipidiny Road in the Eglinton District Centre.

Discussions with PTA's NewMetro Rail section indicate that the North Alkimos Station is not expected to be needed or constructed in the short-medium term. While the station is shown in the DSP, NewMetro Rail advise that the Northern Suburbs rail line could possibly function adequately without this station.

If needed, it would only be constructed in the longer term and would be designed with 1000+ car parking bays. It would serve a catchment from south of Eglinton Station to north of Alkimos Town Centre. If it wasn't constructed, the Alkimos Station and Eglinton Stations would need to cater for 1000+ more park n' ride bays.

The DSP transport report (by SKM Engineering Consultants) shows several Transperth bus routes serving the corridor, with northern terminus at Eglinton Station and southern terminus at Alkimos Station. Refer **Appendix 4** for further detail.



North Alkimos Local Structure Plan

None of the bus routes are shown to link to Alkimos North Station (which is located just to the south of Lots 1005 and 1006 near Alkimos Drive)

The DSP transport report also shows a secondary transport system running north-south along the NS Distributor (west side). This route from the DSP is shown on the North Alkimos LSP.

BUS ROUTES

Bus route information has been taken from the Alkimos Eglinton District Structure Plan Traffic and Transport report (SKM Consulting Engineers).

All bus routes run between Eglinton Station to the north of the subject land and Alkimos Town Centre Station to the south.

Two of the routes run north-south through the subject land in the area between Marmion Avenue and the coast. One of the routes runs along Marmion Avenue and one of the routes runs on the distributor road between the rail line and the Mitchell Freeway. This latter bus route, east side of the rail line, does not connect to the Alkimos North rail station.

Timed bus stops, bus transfers and layover facilities will therefore be provided at the Eglinton Station and the Alkimos Town Centre Station but will not be required at the Alkimos North Station.

Short and Medium term service will be restricted to Marmion Ave service (Route 490 Two Rocks to Clarkson). Due to already long travel time, it is not possible to take this service 'into' the development (and away from Marmion Ave). When the NW Suburbs train goes up to Brighton station, the Route 490 will be shorter and the saved veh-kms will be applied to improved frequency (still along Marmion Ave).

Longer term service will include the bus routes shown in the LSP report but only after the Alkimos Train Station is complete.

11.0 ENGINEERING

This section summarises the infrastructure requirements for the development of the North Alkimos Local Structure Plan area. A Servicing Report is provided at **Appendix 5**.

11.1 EARTHWORKS

Site works for urban development encompasses the clearing and earthworking of the existing vegetation and terrain to support development. Current expectations of potential lot purchasers are generally for the creation of flat residential lots.

The extent of site works is dependent on the density and layout of the development and the desired lot finish for building. Higher densities and decreasing lot sizes has led to the current practice of development areas to be fully earthworked with terraced retaining walls to create level lots.

Current practice enables lots to be terraced up natural slopes to maintain elevations and views. Additionally it rationalises retaining wall layouts and the designs are consistent with City of Wanneroo requirements. Construction costs for housing are also reduced.

However, current practice minimises the level of retention of existing vegetation and topography within the lot areas, particularly within the coastal areas where the topography comprises the irregular shapes and heights of Quindalup sand dunes.

Due to the steep undulating ground the majority of the site will require substantial earthworks. The anticipated extent of site works will limit the retention of existing vegetation and topography within the lot areas of the development. However, there is an increasing appreciation of the importance to retain existing significant vegetation and landmark topography to provide 'sense of place' within development areas and to meet sustainability objectives.

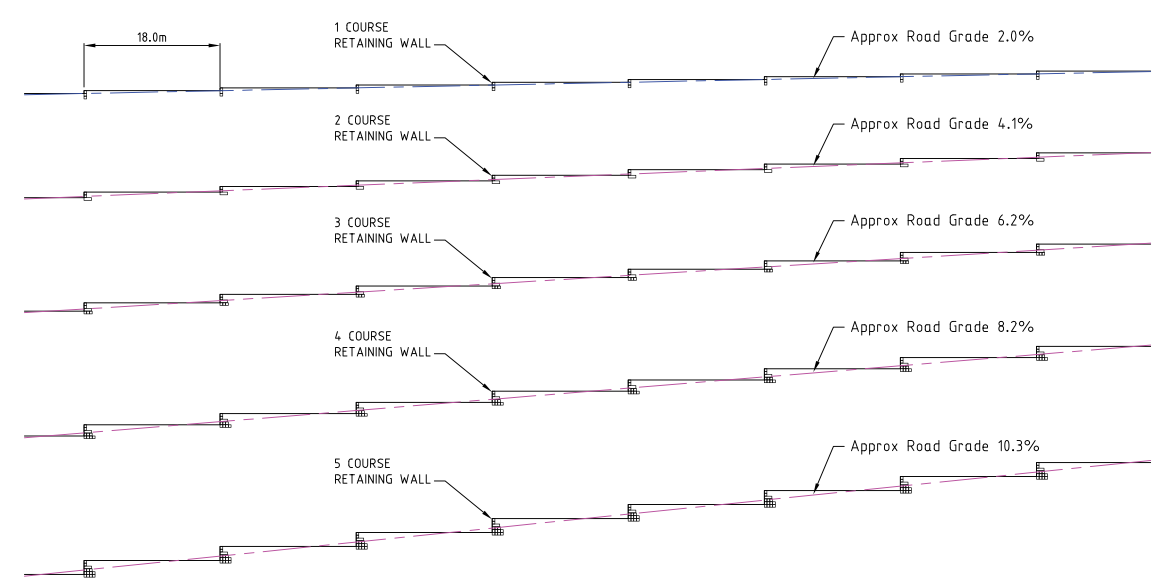
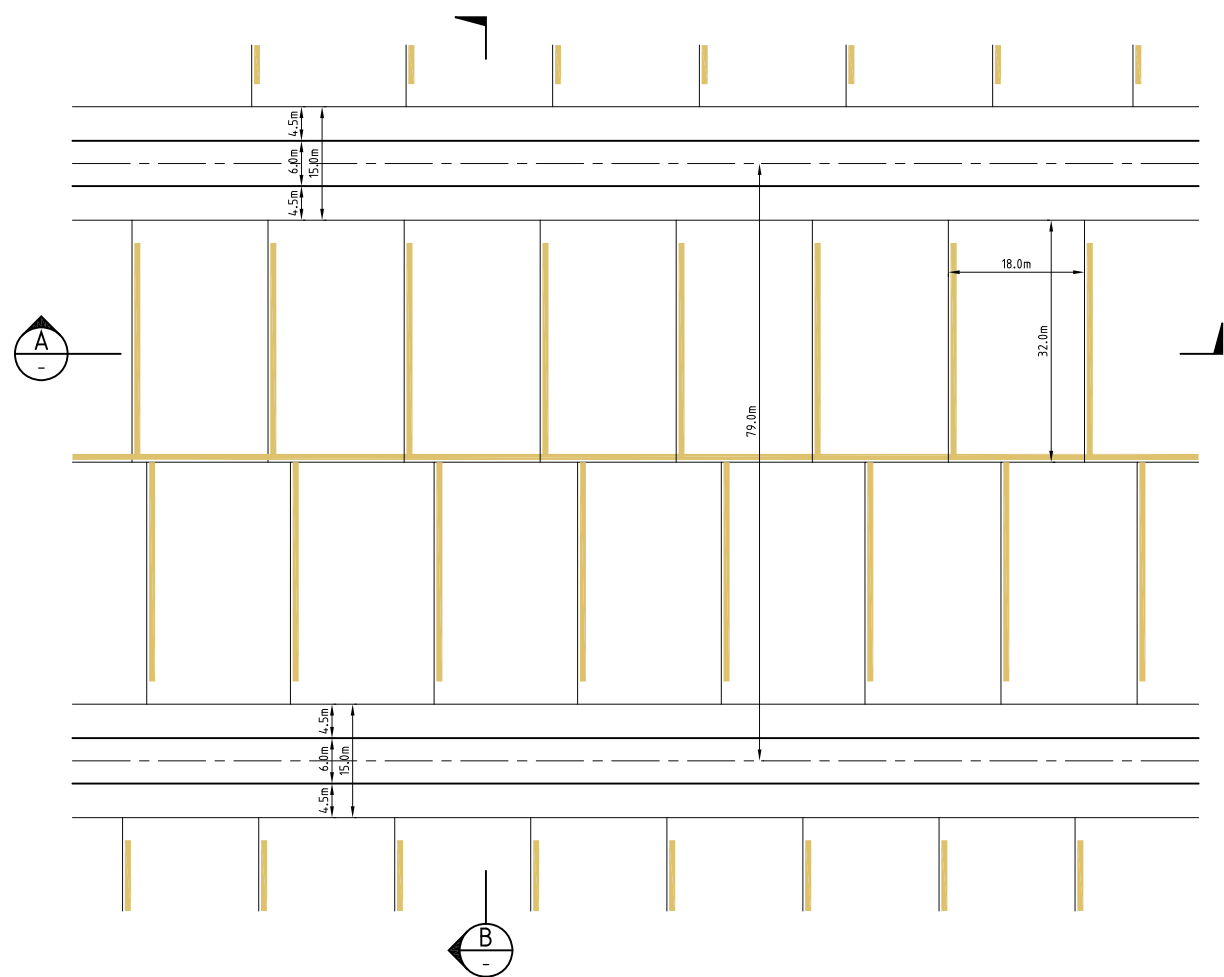
This has been the basis for the establishment of the Parks and Recreation reservation, public open space areas and the walk trail within the Structure Plan. Efforts will be made to minimise the earthworks and maximise retention of the existing landform within these areas. The location of significant vegetation has been taken into consideration and where possible will be retained within the network of open spaces, green links and road reserves.

Innovative built form responses will also be explored to respond to the challenges associated with the terrain.

Beyond these identified areas, the Local Structure Plan area will comprise the full range of development forms and densities necessary to meet the demands of a diverse community.

Current earthwork practices will apply to the large portion of this development. Given the natural irregular shape, unstable nature, height and steep topography within the Structure Plan area it is expected that substantial earthworks (cut to fill) and retaining walls will be required to create lots with minimal slope on them to facilitate residential construction as well as the desire to maximise lots and areas with access to ocean views (refer **Figure 52**).

Based on the preliminary earthworks design the likely wall heights expected across the site is shown in **Figure 53** (Tabec Figure 2237-00-SK17). Wall heights are conceptual only and will be subject to change during the detailed design stage.

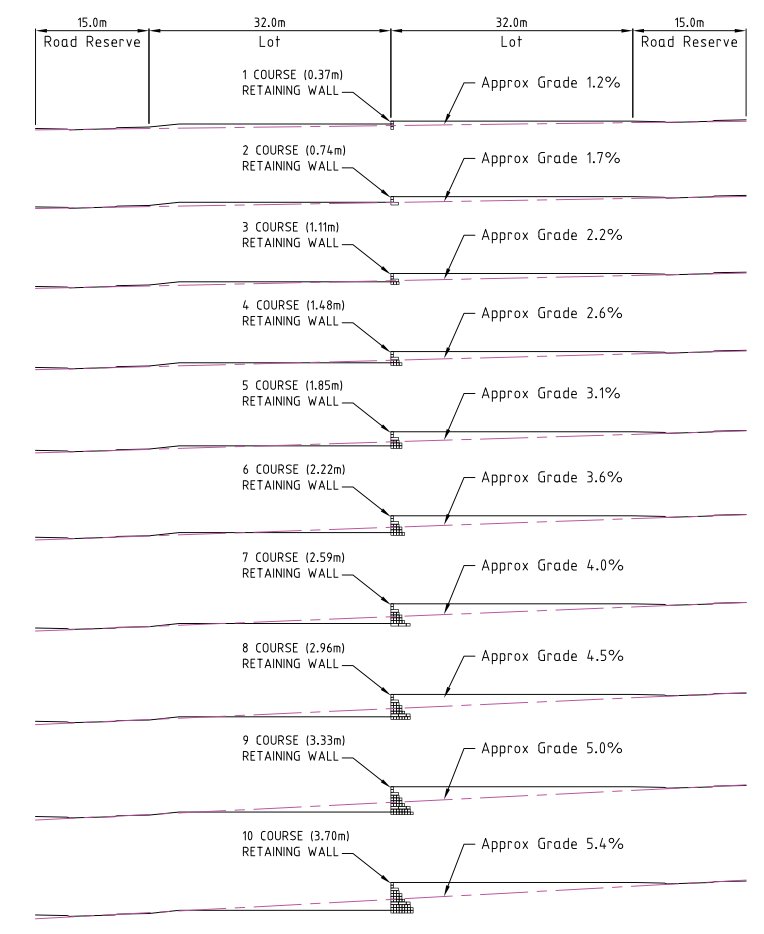


SECTION A
1:20

TYPICAL SECTION THROUGH SIDE RETAINING WALLS

Side Retaining Walls		Lot Width					
Wall Coursing	Wall Heights	15.0m	16.0m	17.0m	18.0m	19.0m	20.0m
1	0.37m	2.47%	2.31%	2.18%	2.06%	1.95%	1.85%
2	0.74m	4.93%	4.63%	4.35%	4.11%	3.89%	3.70%
3	1.11m	7.40%	6.94%	6.53%	6.17%	5.84%	5.55%
4	1.48m	9.87%	9.25%	8.71%	8.22%	7.79%	7.40%
5	1.85m	12.33%	11.56%	10.88%	10.28%	9.74%	9.25%

Rear Retaining Walls		Lot Height Above Road	Distance Between Road Centrelines				
Wall Coursing	Wall Heights		77.0m	78.0m	79.0m	80.0m	81.0m
1	0.37m	0.60m	1.26%	1.24%	1.23%	1.21%	1.20%
2	0.74m	0.60m	1.74%	1.72%	1.70%	1.68%	1.65%
3	1.11m	0.60m	2.22%	2.19%	2.16%	2.14%	2.11%
4	1.48m	0.60m	2.70%	2.67%	2.63%	2.60%	2.57%
5	1.85m	0.60m	3.18%	3.14%	3.10%	3.06%	3.02%
6	2.22m	0.60m	3.66%	3.62%	3.57%	3.53%	3.48%
7	2.59m	0.60m	4.14%	4.09%	4.04%	3.99%	3.94%
8	2.96m	0.60m	4.62%	4.56%	4.51%	4.45%	4.40%
9	3.33m	0.60m	5.10%	5.04%	4.97%	4.91%	4.85%
10	3.70m	0.60m	5.58%	5.51%	5.44%	5.38%	5.31%
11	4.07m	0.60m	6.06%	5.99%	5.91%	5.84%	5.77%
12	4.44m	0.60m	6.55%	6.46%	6.38%	6.30%	6.22%



SECTION B
1:20

TYPICAL SECTION THROUGH REAR RETAINING WALLS

LEGEND

Wall Heights

- Side 0-1m
- Side 0-1m, Rear 0-1m
- Side 0-1m, Rear 1-2m
- Side 0-1m, Rear 2-3m
- Side 0-1m, Rear 3+
- Side 1-2m
- Side 1-2m, Rear 0-1m
- Side 1-2m, Rear 1-2m
- Side 1-2m, Rear 2-3m
- Side 1-2m, Rear 3+
- Public Open Space
- Retail / Service / Commercial
- Subject Land

Note: Conceptual wall heights based on preliminary road centreline levels. Wall heights will be subject to change during detailed design.



Within the proposed Coastal Village, earthworks would be required to provide development sites with grades of less than 3% to accommodate the mixed land uses within the village. The Structure Plan also encourages alternative building forms including framed and split level housing to better suit existing slopes.

Limestone may be encountered close to the ground surface and will need to be broken up by bulldozers. The rock will need to be relocated and compacted in deeper fill areas. Pending testing, there may be potential to use this material in the road pavement.

Heavy compaction, potentially in the dunal areas where efforts will be made to retain significant vegetation and natural landform, may be necessary due to the high void ratio and subsequent low bearing capacity of the soil. Over-excavation may also be necessary to provide suitable foundations for development if compaction cannot be achieved from the surface.

Where suitable borrow pits for cut to fill across the subject site cannot be utilised, imported structural fill may be required. It is anticipated that there will not be a requirement for imported fill however this will be determined following the initial geotechnical investigation and at the preliminary design phase.

Dust control measures will need to be assessed prior to construction commencing. Adequate control measures will be ensured, such as the use of water carts and soil stabilisation for dust suppression. If required management guidelines for possible karst identification will be put in place for the earthworks stage of construction, notwithstanding the risk of karsts at the site is low.

11.2 STORMWATER MANAGEMENT

Stormwater Management within the development will be in accordance with the requirements of the City of Wanneroo, Water Sensitive Urban Design (WSUD) principles and techniques and the Local Water Management Strategy refer **Appendix 3**.

WSUD and Best Management Practice (BMP) strategies aim to minimise the impact of urban development whilst realising the potential for the use of stormwater as a resource. The Alkimos site is suited to the implementation of WSUD principles and techniques and these will be incorporated into the planning, design and construction of the development.

Water sensitive design principles will be integrated to reduce gross pollutants and nutrient content, subsequently reducing risk of polluting of the groundwater. This is especially important for the Alkimos site given the expected rapid infiltration rates through the soil in the area.

A stormwater drainage system will be constructed to serve all road pavements in the development. Stormwater runoff in the road reserves will be collected via conventional gullies or open swales depending on the nature of the adjacent land uses and extent of activity.

Taking into account the City of Wanneroo's maintenance requirements, soakage pits will be used where possible to dispose of smaller storm events at source and also increase infiltration through the drainage network, with the aim of minimising the volume of stormwater runoff that enters the public open spaces.

Stormwater runoff disposal will be via infiltration basins in the public open spaces of the development or through localised swales in the drainage catchments, refer **Photoplate 18**. Additionally, underground storage will be considered to reduce the inundated areas in public open spaces during smaller storm events. The infiltration basins will allow the stormwater to recharge the groundwater system.

North Alkimos Local Structure Plan



Photoplate 20

Examples of Swales

Within the coastal area the options for drainage disposal could include the utilisation of natural swales within the foreshore reserve to infiltrate stormwater from the adjacent development catchment. This would need to be the subject of detailed investigation, as a part of ongoing foreshore management planning, to assess the environmental impacts of such drainage disposals. Notwithstanding this, as a concept, it is consistent with WSUD principles and is an approach which has been successfully adopted elsewhere within the state.

The drainage system will be designed to cater for the runoff from storm events with up to a 1 in 5 year recurrence interval. Infiltration basins would be designed to store runoff from storm events up to an annual recurrence interval of 1 in 10 years or 1 in 100 years for the intermediate and trapped low points respectively.

Figure 54 identifies the proposed drainage catchments and a preliminary estimate of resulting minimum areas required for drainage retention in the respective low points. Drainage retention basin areas have been calculated utilising the computer software package 'PC Sump' and all retention basins being utilised as passive POS areas, wherever possible.

Road reserves and public open spaces will be designed to accommodate the surface overflow of major storm events. A freeboard of 0.3 m between peak 100 year ARI water level and house/building floor level is allowed for determining fill requirements with respect to stormwater management in accordance with Australian Rainfall and Runoff.

It has been assumed that lots will not require direct connections to the drainage network as the on-site soils are understood to have an adequate permeability to allow on-site retention of stormwater. Therefore it is expected that the stormwater runoff from lots will be contained on-site and disposed of via soakwells or other infiltration facilities that form a part of the building and private open space development.

11.3 WATER SUPPLY

The Water Corporation has advised that the development of the site is constrained until the first stage of the Carabooda Reservoir and distribution main is complete and commissioned.

The Water Corporation is about to commence the first stage of the Carabooda Reservoir and distribution main to Romeo Road. To provide a water supply, an ultimate extension of the 1200 mm diameter distribution main from Romeo Road, which is approximately 4.5 km south-east of the site, to the property boundary will be required. Due to the size of water mains (ranging from 800 mm diameter to 1200 mm diameter) and the extent of the works it is expected that the Water Corporation will carry out the extension of these mains to the site boundary. These works are not currently included on the Water Corporation's capital works programme. As an interim measure, staging of suitably sized mains will be investigated.

Construction timing for the first stage of the Carabooda Reservoir and distribution main to Romeo Road is by the end of 2010. The Water Corporation has advised that clearance of subdivision by the Water Corporation will only be achieved on completion and commissioning of these works. As the Water Corporation's proposed timing for the extension to the site boundary does not suit the timing of the commencement of works for the local structure plan area, the works or interim works, may need to be prefunded by the proponent.

Peet Alkimos is liaising with the Water Corporation to discuss water servicing options to enable lot clearance and dwelling construction prior to completion and commissioning of the proposed major works.

The current scheme planning also requires the extension of a distribution main (ranging from 300 mm diameter to 500 mm diameter) generally through the centre of the Structure Plan in an east-west direction and north-south along the coastal front of the development. These works would be extended in conjunction with the progression of the development front and would be subject to a prefunding agreement between Peet Alkimos and the Water Corporation.

An internal water reticulation network (mains under 300 mm) will also be constructed to provide a service to all lots in accordance with the Water Corporation requirements. No planning is currently available from the Water Corporation in regards to this reticulation network.

11.4 WASTEWATER

Currently there is no sewerage service in the vicinity of the subject land.

Construction of the Alkimos Wastewater Treatment Plant (AWWTP) has commenced, with completion and commissioning programmed for August 2010 or shortly thereafter. Areas to the north of the AWWTP, including the North Alkimos Local Structure Plan area, will connect to the future Yanchep Main Sewer.

Water Corporation planning, based on existing topography, indicates that the main sewer is planned to traverse the property in a north-south direction approximately 1.1 km west of Marmion Avenue and will discharge to the treatment plant. The Yanchep Main Sewer is expected to be a combination of open trench and tunnelling methods. The sewer is likely to follow the development front along its alignment. It is important therefore, that the sewer is located within road reserves, or public open space areas to ensure that the impact of its future construction, through urban development areas is minimised.

The timing of construction of the Yanchep Main Sewer will be dictated by the rate of development within the Alkimos Eglinton corridor and preliminary discussions with the Water Corporation indicate the sewer will be constructed in stages from the south heading north in conjunction with development in the area.

Due to the size of the Yanchep Main Sewer it is expected that the Water Corporation will undertake the works as part of its capital works programme. An interim pump station located on Marmion Avenue and near Yanchep Beach Road will be constructed in 2010/11. The pressure main will require a route along Marmion Avenue and possibly through the LSP area.

The Structure Plan area will be serviced by a reticulated gravity sewer providing a connection to all lots within the development. Water Corporation concept planning for the sewerage of the development and adjacent area comprises a series of pump stations and discharge points along the future Yanchep Main Sewer.

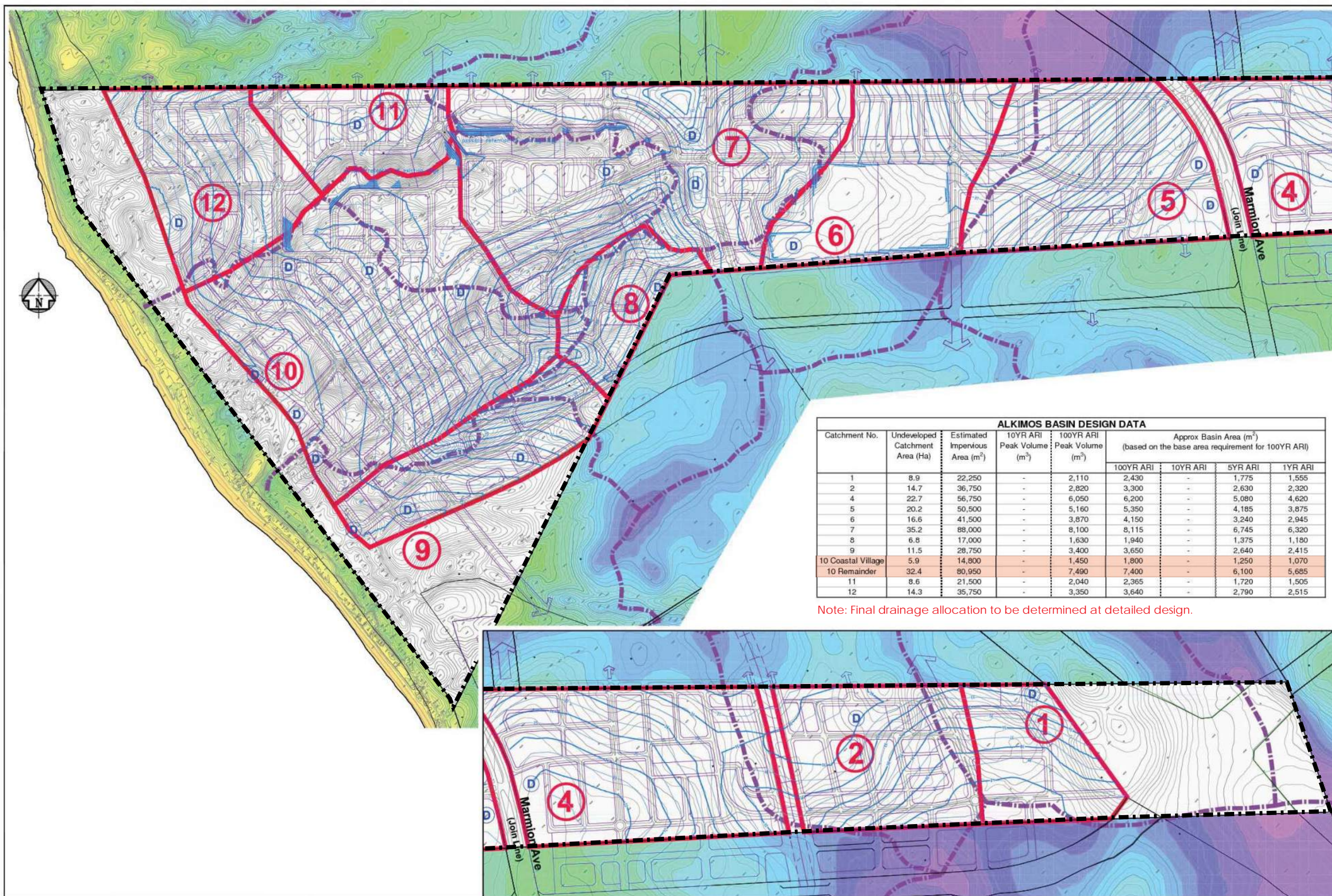
Preliminary Water Corporation wastewater planning also indicates a proposed pump station site in the Coastal Village Precinct of the Alkimos Local Structure Plan area, which will house a Type 40 pump station and 150 mm diameter pressure main to serve part of the proposed development.

A Type 6 pump station and pressure main in the south-west corner of the Local Structure Plan area is also shown on the preliminary wastewater planning. The pump station will be required to service adjoining lands as well as a small area within the North Alkimos Local Structure Plan.

Construction of the permanent pump stations is expected to be subject to a negotiated prefund agreement between the proponent and Water Corporation. Pump stations will require an odour buffer.

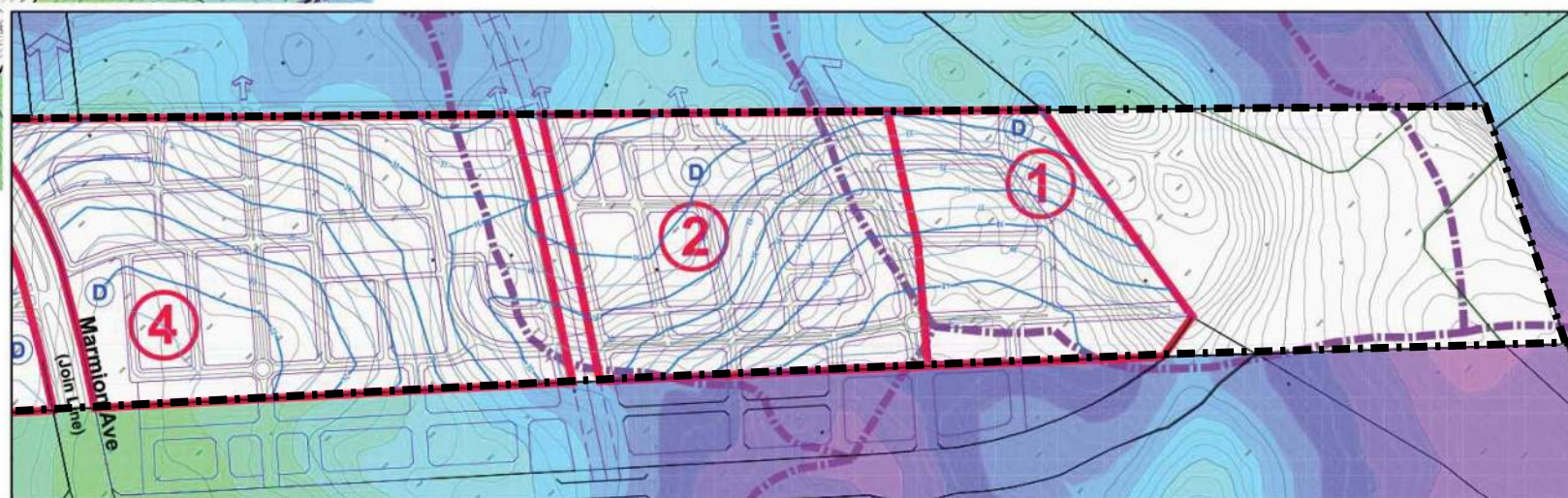
LEGEND

- Existing Topography Drainage Catchments
 - Proposed Drainage Catchments
 - 4 Catchment Number
 - D Approximate Drainage Location
-
- 60m (highest)
 - 57m
 - 54m
 - 51m
 - 48m
 - 45m
 - 42m
 - 39m
 - 36m
 - 33m
 - 30m
 - 27m
 - 24m
 - 21m
 - 18m
 - 15m
 - 12m
 - 9m
 - 6m
 - 3m
 - 0m (lowest)
-
- Subject Land



Catchment No.	Undeveloped Catchment Area (Ha)	Estimated Impervious Area (m ²)	10YR ARI Peak Volume (m ³)	100YR ARI Peak Volume (m ³)	Approx Basin Area (m ²) (based on the base area requirement for 100YR ARI)			
					100YR ARI	10YR ARI	5YR ARI	1YR ARI
					1	8.9	22,250	-
2	14.7	36,750	-	2,820	3,300	-	2,630	2,320
4	22.7	56,750	-	6,050	6,200	-	5,080	4,620
5	20.2	50,500	-	5,160	5,350	-	4,185	3,875
6	16.6	41,500	-	3,870	4,150	-	3,240	2,945
7	35.2	88,000	-	8,100	8,115	-	6,745	6,320
8	6.8	17,000	-	1,630	1,940	-	1,375	1,180
9	11.5	28,750	-	3,400	3,650	-	2,640	2,415
10 Coastal Village	5.9	14,800	-	1,450	1,800	-	1,250	1,070
10 Remainder	32.4	80,950	-	7,490	7,400	-	6,100	5,685
11	8.6	21,500	-	2,040	2,365	-	1,720	1,505
12	14.3	35,750	-	3,350	3,640	-	2,790	2,515

Note: Final drainage allocation to be determined at detailed design.



PRELIMINARY DRAINAGE CATCHMENTS PLAN

NORTH ALKIMOS LOCAL STRUCTURE PLAN | LOTS 1005 & 1006 MARMION AVENUE, ALKIMOS

TAYLOR BURRELL BARNETT | TABEC | EPCAD
 SHARNI HOWE | CREATING COMMUNITIES
 MACROPLAN | MP ROGERS & ASSOCIATES
 SUSTAINABLE SOLUTIONS | WHEELERS | ENV
 OVERMAN ZUIDEVELD | TAYLOR ROBINSON

FIGURE 54

0m 100m 200m

PLAN: 07/05 DATE: MAY 2009

PEET

It is expected that two temporary wastewater pump stations, one servicing the Coastal Village Precinct and the other the central and eastern precincts, together with associated pressure mains are likely to be required for the initial stages of the development.

Until the AWWTP is completed and commissioned there is no sewerage outfall available and the Water Corporation has advised that they will not approve the clearance of lots.

Previously at locations where there is no sewer outfall tankering has been accepted, however we understand that Water Corporation policy has recently changed in regards to tankering and long-term tankering (exceeding six months) is no longer acceptable. The developer is currently liaising with the Corporation to discuss sewer servicing options to enable lot clearance and dwelling construction prior to completion and commissioning of the AWWTP.

11.5 POWER SUPPLY

Western Power proposes a new 22 kV underground power line to extend from the substation at the corner of Wanneroo Road and Romeo Road along Romeo Road to Marmion Avenue and then north to the Yanchep–Two Rocks area. Commissioning of the new 22 kV power line is expected at the end of 2009.

In addition, there are two overhead power lines on Wanneroo Road but these lines have very little spare capacity available to supply the proposed development.

It is expected that Western Power will allow a connection to the proposed 22 kV powerline to serve the Alkimos Structure Plan area. However it is expected that initially the power supply will be limited and not capable of servicing the entire development.

Western Power is undertaking a feasibility study for Structure Plan area based on the anticipated development rates and timeframes proposed by the developer. The feasibility study will indicate the power requirements, initial power supply and timing of network reinforcements to serve the Structure Plan area and other surrounding developments.

An internal underground electrical distribution system will be provided in accordance with the requirements of Western Power to supply the allotments within Structure Plan area. This will consist of high voltage and low voltage cables and necessary substations/equipment to be installed throughout each subsequent stage. Street lighting in accordance with Western Power and Council guidelines will also be required as part of the development.

Western Power will need to be kept informed to ensure future upgrades will be undertaken in a timely manner in order to meet the rate of development based upon regular advice and updates of progress to be supplied by the proponent.

11.6 TELECOMMUNICATIONS

Presently there is no existing Telstra infrastructure adjacent to the Structure Plan area.

Yanchep Beach Joint Venture is negotiating the extension of the optic fibre from Butler along Marmion Avenue to its landholding in Yanchep. These works are expected to proceed and be completed prior to commencement of the development and contributions will be sought from proponents, including Alkimos, which will benefit from the extension.

Telstra are required to provide a telephone and basic data communication network under the Universal Service Obligation (USO) to new residences, unless there was another communications provider already contracted to provide communications services. Under the USO Telstra reserves the right to service the development.

Telstra has advised that the national broadband rollout will only provide for a copper service (basic data/low speed) and not optic fibre. Telstra or alternative communication providers can be contracted to provide optic fibre to the development at a cost to the proponent.

The normal Telstra arrangements provide that within the development Telstra places its telecommunication infrastructure into a trench provided by the proponent at the time of subdivision.

Provision for broadband will be made.

11.7 GAS SUPPLY

The nearest available natural gas infrastructure to the subject land is approximately 5 km to the south and an extension of the gas main along Marmion Avenue will be needed to supply the development.

Yanchep Beach Joint Venture, a major landowner to the north of the site, is negotiating the extension of the natural gas main from Butler along Marmion Avenue to its site in Yanchep. It is expected these works will proceed and be completed prior to commencement of the North Alkimos development. Contributions for the cost of the extension will be sought from proponents who will benefit from the extension.

Should the extension of the natural gas main not occur prior to the North Alkimos works, it would be necessary to construct part of this main from buffer. This extension would require a capital contribution from the developers of North Alkimos.

Within the development, for internal gas reticulation WestNet Energy lays its gas main into a trench provided by the proponent at the time of subdivision.

12.0 ECONOMY AND EMPLOYMENT

Through the creation of jobs in North Alkimos, namely those in and around the Coastal Village Precinct and the Transit Precinct, the LSP area will contribute positively to the long-term economic health of the North-West Corridor. It embraces mixed use and TOD principles, recognising, as with Network City, that the achievement of employment self-sufficiency and overall economic sustainability requires the integration of infrastructure and land use planning. North Alkimos will be a place for people to both live and work, and through its Coastal Village, will provide the area with economic vibrancy and prosperity.

An Economic and Employment Strategy is attached at **Appendix 6**.

12.1 RETAIL FLOORSPACE

The project economic consultant, MacroPlan, has forecast that, by post residential build-out in 2041, total floorspace demand in the North Alkimos LSP will equate to 21,254 m² with the TOD/service commercial land accounting for the largest share. This reflects the larger floor plate required for typical service commercial activities (refer **Table 44**).

	Floorspace (m2)	Employment
Coastal Village	4,123 m ²	129
Neighbourhood Centre	3,439 m ²	105
Local Centre	1,051 m ²	35
TOD/Service Commercial with Train Station	12,641 m ²	367
TOD/Service Commercial without Train Station	11,255 m ²	150
Home Based Employment	N/A	281
Primary School	N/A	24
Total - with Train Station	21,254 m²	941
Total - without Train Station	19,968 m²	724

Source: MacroPlan Australia

Such floorspace will generate approximately 941 jobs in the North Alkimos Local Structure Plan area. The bulk of these will likely be located in retail frontage and office commercial floorspace within the TOD mixed use developments north of the Alkimos North rail station.

12.2 TOTAL STRUCTURE PLAN EMPLOYMENT & CONTRIBUTION TO DSP EMPLOYMENT

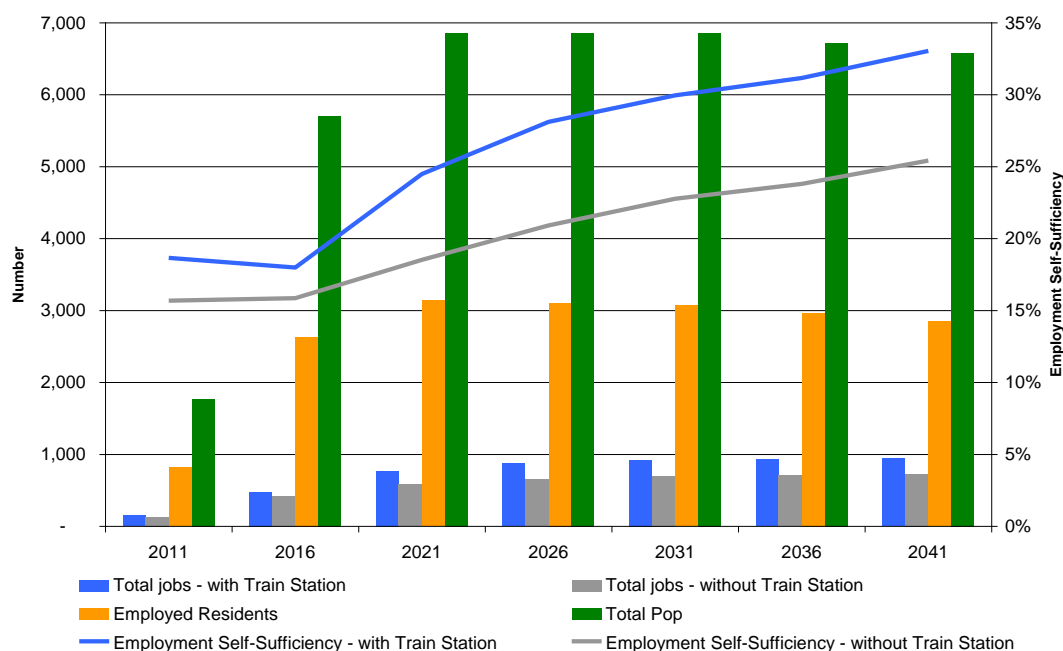
North Alkimos does not contain economic centres of regional or district significance. The development of the North Alkimos Coastal Village is constrained by a lack of a local or regional marina and a beach of regional significance. Similarly, the employment generating capacity of the TOD/service commercial is critically dependent on the delivery of a possible rail station. Without such transport infrastructure, and its capacity to encourage increased density of economic activity within a walkable catchment, North Alkimos' capacity to reach its employment generating potential is considerably limited.

Yet, despite the absence of economic centres of regional or district significance, between one in 20 and one in 13 jobs in Alkimos Eglinton in 2041 will be located in North Alkimos, highlighted the commitment of the area to contributing to overall DSP and corridor employment self-sufficiency.

12.2.1 OVERALL EMPLOYMENT ESTIMATES

MacroPlan has estimated that employment self-sufficiency in North Alkimos will increase from 18.6% in 2011 to 32.9% in 2041 if a rail station is delivered. Clearly, in the absence of such critical enabling infrastructure, such self-sufficiency rates will be lower (15.2% in 2011 and 24.2% in 2041). Nevertheless, these rates remain high for such a small geographical area, lack significant centres of economic activity, such as a regional or district centre.

These self-sufficiency rates are representative in Graph 5 below.



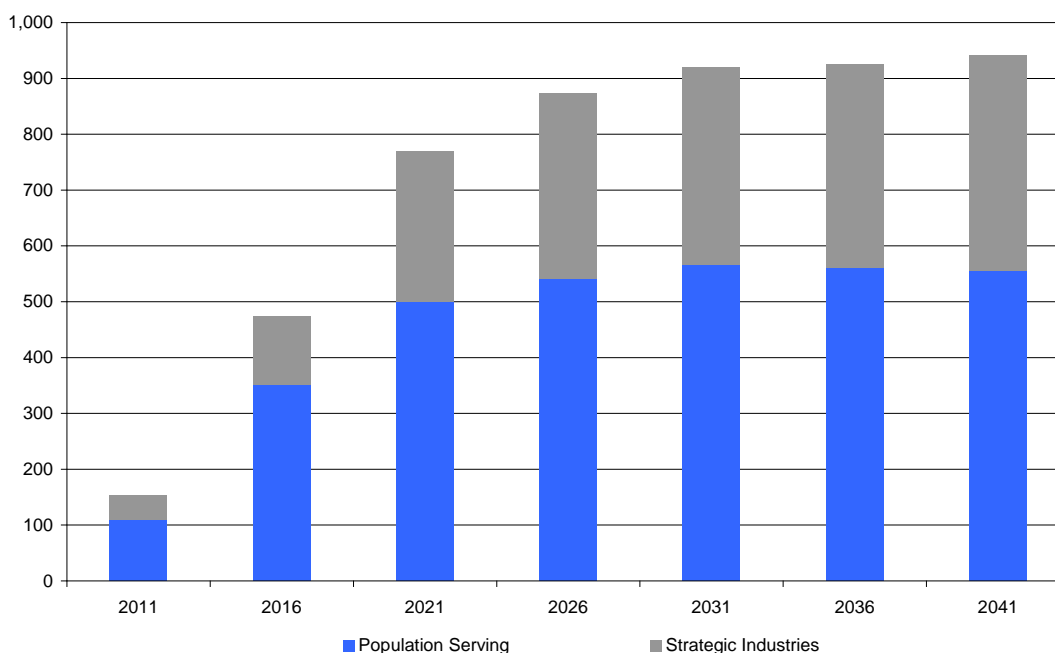
Graph 5: Number of Jobs and Employed Residents, North Alkimos LSP, 2011 to 2041 (Employment Self-Sufficiency on Right Axis) [Source: MacroPlan Australia]

Over the period, employment self-sufficiency rises under both scenarios. This is a reflection of two factors:

1. The resident population, broadly estimated by MacroPlan, declines slightly between residential build-out in 2021 and 2041. This reflects projected future declines in household size. This has the effect of marginally reducing the number of employed residents living in North Alkimos, while the number of jobs continues to grow.
2. While population supporting industries are not expected to experience significant growth after residential build-out, strategic industries such as tourism, office and service commercial employment will continue to grow. Such growth adds to jobs later in the time period, reinforcing employment self-sufficiency rates.

North Alkimos Local Structure Plan

The significance of strategic industries in contributing to jobs in the North Alkimos LSP is demonstrated in the two charts below, which show that strategic industry employment makes up 41.0% of total employment with the rail station, and 33.5% of total employment without the rail station in 2041. MacroPlan has classified tourism, service commercial and telecommuting jobs as strategic industry employment.



Graph 6: Employment in Population-Serving and Strategic Industries, by Five Year Period, North Alkimos LSP, with the Rail station, 2011-2041 [Source: MacroPlan Australia]

It appears that the absence of rail station infrastructure has a more significant impact on strategic industry employment than population-serving employment. This is in part due to more intensive development in the TOD/service commercial area including higher density light industry and logistics businesses and the presence of office commercial activity.

Strategic industry employment is critical to the long-term economic sustainability of North Alkimos centres, as such employment is not directly linked to population growth and can continue growing within the centres after residential build-out. This increases the attractiveness of North Alkimos by increasing the diversity of activity located within the area while providing increased support and justification for rail infrastructure.

12.2.2 EMPLOYMENT SELF-SUFFICIENCY AND STRATEGIC INDUSTRY EMPLOYMENT

Employment self-sufficiency levels are a less accurate measure of the level of economic prosperity and dynamism in a Local Structure Plan area than a District Structure Plan area due to a number of reasons.

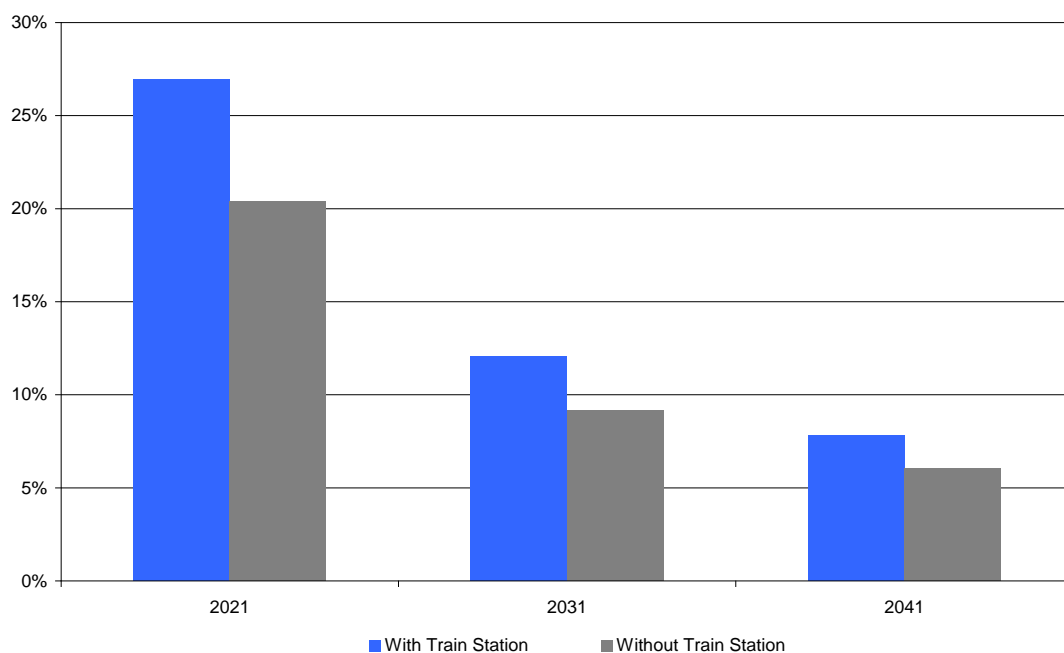
Firstly, the North Alkimos area is comparatively small geographically. Employment self-sufficiency levels are only relevant for larger geographies that have the capacity to contain not only population, but also significant concentrations of retail, community facilities, and employment generating activity.

North Alkimos Local Structure Plan

Secondly, North Alkimos lacks designated economic areas of substantial size. Strategic industries, such as those that occupy office commercial floorspace cluster to achieve economies of agglomeration. However, such factors only occur in locations where a critical mass of economic activity has occurred. North Alkimos lacks the capacity to support such a critical mass.

From the LSP perspective, the more relevant measure of economic prosperity and dynamism is North Alkimos' share of Alkimos Eglinton employment. Based on employment figures for the Alkimos Eglinton DSP, North Alkimos will provide 7.8% of total DSP employment with the rail station or 6.0% without the rail station by post residential build out in 2041. This share is particularly high given the lack of areas of significant economic activity in the North Alkimos LSP.

Nevertheless, the real contribution from the North Alkimos LSP in terms of Alkimos Eglinton employment is in the early stages of development. The strong dwelling settlement and population growth projected for the area in the early years, supports the development of the Coastal Village, neighbourhood centre and the TOD/service commercial land, generating jobs for local residents.

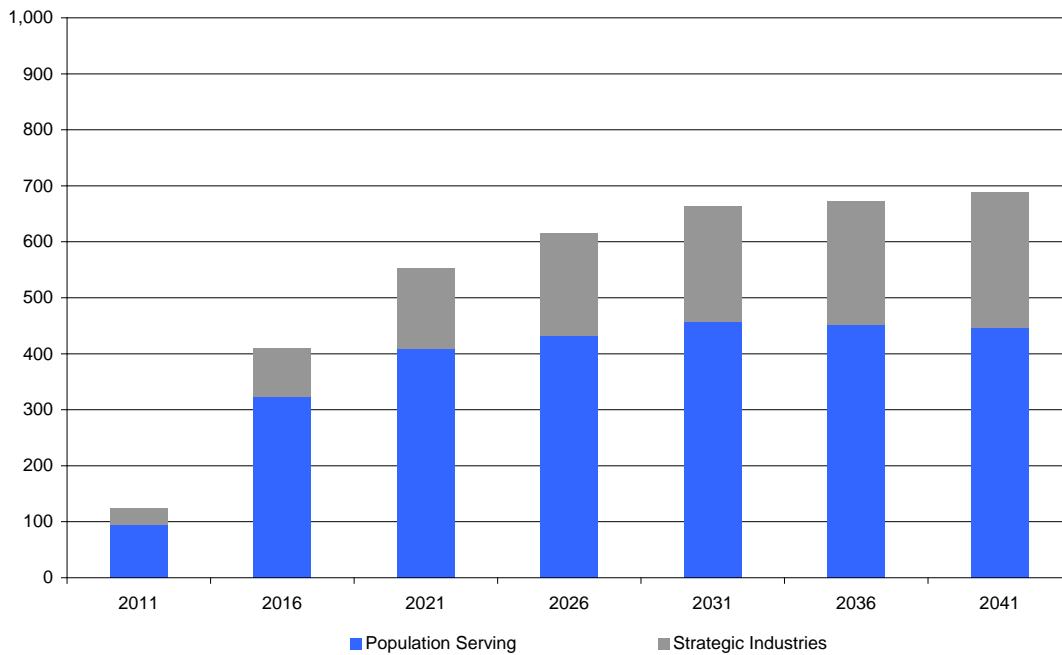


Graph 7: North Alkimos Contribution to Total DSP Employment [Source: MacroPlan Australia]

As can be seen in the chart above, North Alkimos has the potential to provide over 25% of the jobs created in Alkimos Eglinton in the first ten years of development. This precedes the full establishment and development of the Alkimos Regional Centre and Eglinton District Centre, which the *Economic Development and Centre Plan* projects will account for over 80% of total DSP employment in 2041.

The decline in the share of Alkimos Eglinton Employment accounted for by North Alkimos over time, is therefore more a reflection of the establishment of the regional and district centres, and not a reflection of declining economic activity in North Alkimos.

North Alkimos Local Structure Plan



Graph 8: Employment in Population-Serving and Strategic Industries, by Five Year Period, North Alkimos LSP, without the rail station, 2011-2041 [Source: MacroPlan Australia]

As can be seen in the chart above, North Alkimos has the potential to provide over 25% of the jobs created in Alkimos Eglinton in the first ten years of development. This precedes the full establishment and development of the Alkimos Regional Centre and Eglinton District Centre, which the *Economic Development and Centre Plan* projects will account for over 80% of total DSP employment in 2041.




The decline in the share of Alkimos Eglinton Employment accounted for by North Alkimos over time, is therefore more a reflection of the establishment of the regional and district centres, and not a reflection of declining economic activity in North Alkimos.

12.3 EMPLOYMENT IMPLEMENTATION

12.3.1 PLANNING AND GOVERNANCE

Reporting undertaken for the DSP identified a range of implementation initiatives and activities that will support the creation of significant strategic employment opportunities in the Alkimos Eglinton area. The key issues that will influence the implementation of the economic components of the North Alkimos Local Structure Plan and support the achievement of economic and employment goals for the district are outlined at **Table 45** below.

TABLE 44: IMPLEMENTATION ISSUES AND INITIATIVES, NORTH ALKIMOS EGLINTON LSP

Issues/Initiative	Description/Outline
Development of Lifestyle Attractors in North Alkimos Coastal Village	In the absence of a marina or regional beach, the success of the North Alkimos Coastal Tourist Village will be dependent on the development and/or attraction of key lifestyle tourist activities. Examples include: <ul style="list-style-type: none">  Tavern Style restaurants  Restaurant strip  Festival markets
Connectivity of Coastal Villages	The success of the Coastal Tourist Villages in the DSP will also depend on the establishment of a high level of interconnection between the three nodes, the district centre and regional centre. Increased ease of movement within the Alkimos Eglinton DSP will support visitation to the Coastal Villages and the establishment of Alkimos Eglinton as a single economic and tourism location in the market.
Infrastructure Requirements for service commercial	Service commercial land users are critically dependent on road based transport infrastructure and connectivity. This includes population serving as well as storage and distribution activities. As such, the delivery of the highway will significantly influence the role and function of service commercial land within Alkimos Eglinton overtime.
Traffic Generating Activity of service commercial	There are potential transport and congestion related issues associated with the development of service commercial land in Alkimos Eglinton. This is particularly the case for the central strip, which has only two access points (from the north and south), both of which are primary highway interchanges. Issues include interactions between private motor vehicles, boat towing vehicles and trailers, trucks and other commercial vehicles. This matter must be considered during the implementation of transport network infrastructure in the DSP.
Relationship between service commercial land and Neerabup	The North West Corridor is characterised by a below average quantum of industrial land. This has had implication for the level of employment self-sufficiency in the corridor as both blue and white collar workers are regularly forced to travel from the Corridor to their place of work. The release of industrial land at Neerabup will partly address this shortfall and will therefore have implications for Alkimos Eglinton in terms of both the skills profile of the local population, as well as the role and function of service commercial land in the Corridor.

These are broadly supported by MacroPlan in the development of the Centre Sizing and Staging Plan.

12.3.2 LAND DISPOSAL

The achievement of key economic development goal in North Alkimos is contingent on the effective assembly, release and governance of land within centres. Such land assembly and governance will vary from centre to centre in light of the different role/function, sizing and staging and floorspace composition characteristics.

North Alkimos Local Structure Plan

To support the implementation of this economic development strategy, MacroPlan has outlined a series of key land assembly and governance principles and recommendations for each centre in North Alkimos. These are outlined below:

COASTAL VILLAGE

- Core of Coastal Village be developed a single lot to support integration of public space with retail and tourism-supporting services offering.
- Land surrounding Coastal Village core be released in line with market demand. Likely later in development timeline.
- Planning emphasis on mixed use residential/retail.

NEIGHBOURHOOD CENTRE

- Mains Street development principles be adopted in development of centre.
- Size supports development as single lot.
- Integration with Marmion Ave critical to support centre viability - ready access and parking critical.

LOCAL CENTRE

- Local Centre size supports development as single lot.
- Delivery as traditional convenience retail centre (not 'Main St')
- Need to be mindful of primary school proximity and traffic and parking conflicts.

TOD/SERVICE COMMERCIAL

With Rail Station:





- Zoning for mixed use development, particularly in close proximity to rail station.
- Street scaping support retail frontage and rail passenger pedestrian movements.
- Alignment of delivery with rail station infrastructure provision critical for creation of TOD resulting in activity diversity, public transport usage and employment yield benefits.
- Service commercial land zoned for light industry, non-centre retail (trade suppliers, electrical and lighting, recreation boating sales etc) and services (motor mechanics etc) and some small office development (no more than 3-4 stories).
- Higher development and employment density due to TOD benefits and intensity of surrounding land.
- Service commercial land release in line with market.
- Be mindful of relationship between service commercial land and Neerabup land in terms of preferred uses and release timing.

Without Rail Station:

- Service commercial land zoned for light industry, non-centre retail (trade suppliers, electrical and lighting, recreational boating sales etc) and services (motor mechanics etc) and transport and storage.
- Moderate development and employment density due to accessibility (Marmion Avenue, Mitchell Freeway).
- Service commercial land released in line with market.
- Be mindful of relationship between service commercial land and Neerabup land in terms of preferred uses and release timing.

12.3.3 ENABLING INFRASTRUCTURE

The population and floorspace forecasts provided by the consultant economist are dependent on the provision of key enabling infrastructure. These enabling infrastructure include:

-  The road network and the highway.
-  The railway station (TOD).
-  Access to service commercial land.
-  Broadband internet.

The road network, in particular connections from the Coastal Village to the Neighbourhood Centre, will be a key attractor for locals and visitors to the area as it will help support the coastal village lifestyle. The TOD and connections to the highway will also be critical in providing transport options for locals who commute to work.

Access to service commercial land will be critical due the fact that the service commercial land is anticipated to provide up to 941 jobs (assuming rail station) to locals in the Structure Plan area. This will not only make North Alkimos a more attractive place to live but it will also support employment self sufficiency in the LSP.

Broadband infrastructure is a key enabler in supporting employment self sufficiency in North Alkimos. The availability of high speed internet access will support business in the area (in particular home based business), supporting jobs and reducing pressure on the local transport infrastructure.

12.3.4 NON-INCLUSION OF ADDITIONAL EMPLOYMENT LAND AS REQUIRED IN THE DSP

The DSP approval requires an additional 48 ha of employment land to be provided across the whole of the DSP area. This additional amount was reduced from the original increase of 107 ha in the first DSP schedule of modifications. As discussed previously, the spatial distribution of employment land within the DSP is located between the Railways reserve and the Mitchell Freeway Primary Regional Road reserve. The applicable land within the LSP is shown is identified as employment land in accordance with the DSP and as such, there is no opportunity to increase the provision of employment land within this area. In addition, an Economic and Employment Strategy has been prepared in support of this LSP and the provision of employment land has been carefully considered in the district context.







13.0 ADDRESSING SMART GROWTH

ARID sustainability consultant has been engaged to guide sustainability measures both for the local structure plan stage and to be carried forward into future (detailed design and development) phases.

The development of the North Alkimos LSP has been guided by the City of Wanneroo's Smart Growth Strategy.





The Smart Growth Assessment Tool (SGAT) has been further development to assist proponents to assess their performance against Smart Growth principles and strategies. The North Alkimos LSP has been assessed using SGAT, and the results can be found in **Appendix 7**.

The following section summarises the performance of the LSP against the Smart Growth Strategies:

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


13.1 GENERAL

Creating separate, comprehensive strategies that support the LSP and relate to a number of key sustainability aspects, including:


-  Community Development Strategy
-  Economic Development and Employment Strategy
-  Local Water Management Strategy
-  Transport Strategy


Establishing a design philosophy based on Liveable Neighbourhoods, which places strong emphasis on creating sense of place, access and quality of life within new urban developments


13.2 LIFESTYLE AND HOUSING CHOICE


-  Mix of housing types, densities and dwelling yields, meeting the dwelling type targets of the City of Wanneroo's *Local Housing Strategy*. In seeking to achieve the desired mix of housing by 2021, consideration has been given to higher densities and the introduction of new housing types will be a key feature of the Peet Alkimos project.
 - A range of lot sizes and dwelling types accommodated, catering for the full range of needs including those seeking low maintenance homes close to areas of high amenity, families seeking larger homes with large or small backyards and dress circle lots featuring views, parkside locations and elevated locations. Diversity of lot sizes and dwellings types also attracts a diverse population, in terms of both age and socio-economic status.

- Densities across the site range from R12.5 to R100, and in each Precinct a variety of densities are proposed. Cottage lots with rear lanes, traditional lots and compact lots will be accommodated, as well as townhouses and apartment living opportunities.
- The highest densities are provided in those areas with the greatest degree of access to services and amenities, such as within and immediately surrounding the Coastal Village.


 A strongly-linked POS network of passive and active recreation spaces (including informal kick-about areas, picnic areas, play areas, walking tracks, formal oval and beach access), to encourage residents and visitors to contributing to physical and mental health, and contribute to whole-year appeal of the development.

 Affordable housing choice within a range of low-medium residential densities within the Central Precinct. In particular, housing product in this Precinct will be positioned and promoted to first homebuyers, in partnership with builders.

 Demonstration product will be developed at strategic sites (e.g. dunal housing) to promote innovative and diverse building product. Projects and possible joint venture partners will be identified early and developed. Demonstration buildings will illustrate the 'benchmark' requirements for building design and construction (e.g. Energy Star Rating requirements, material selection criteria, 'Bioclimatic' design criteria for medium to high rise development, etc.).








 Variety of quality lifestyle options across the development offered through the individual character and attributes of the four precincts. In particular, the range of lot sizes and housing types, POS functions, the Coastal Village and foreshore area, the application of mixed use and TOD principles in centres, the provision of a range of centres across the site and permeable street network facilitate a range of lifestyle opportunities.

13.3 EFFECTIVE USE OF LAND AND INFRASTRUCTURE

 Development of a Transit Precinct, in response to the proposed rail station approximately 150 m south of the subject land. The precinct is almost wholly within 800 m walkable catchment of the potential rail station.

- While the ability to deliver transit supportive land use will be contingent on the delivery of the rail station, the street block pattern is sufficiently robust to allow lesser or greater intensity of use depending on station outcomes.
- A small section of retail/commercial is proposed, dependent on the delivery of the rail station.
- The Transit Precinct will further seek to maximise land use potential surrounding this potentially significant transport node, through an affordable mix of housing, commercial and retail uses in the area.
- Built form (which will consist of a combination of townhouses, apartments and cottage homes) will be designed with the capability to convert to a variety of uses over time (such as from residential to office). This will be controlled through LDPs or design guidelines.

North Alkimos Local Structure Plan

- The TOD approach is proposed as an alternative to service commercial (as this portion of the Structure Plan area is designated in the DSP), to ensure that the DSP's employment targets are achieved while allowing for residential development in proximity to rail thereby adding to housing choice and diversity, supporting rail patronage and reducing vehicular kilometres travelled. An area of service commercial land is proposed adjacent to the Mitchell Freeway in accordance with DSP designations.
-  A dynamic, mixed use Coastal Village providing population-serving and tourism-serving retail, café and restaurant uses, as well as hospitality, health, community and personal services. This effectively provides primary activity and employment nodes at the west and eastern edges (i.e. the TOD Precinct and service commercial area) of the Structure Plan area, with a well-serviced catchment in between.
-  Two proposed centres (Neighbourhood Centre and Local Centre) for the Central Precinct to ensure that convenience retail and café/restaurant uses are within close walking distance of residents thereby assisting to minimise car journeys, potentially reducing greenhouse emissions, reducing the use of non-renewable energy forms and promoting an active, healthy community.
-  High walkability and permeability across the LSP area, through an interconnected movement network of pedestrians, cyclists, cars and public transport users. Facilities and features to further support cyclists and pedestrians, such as secure bicycle parking and low lighting, will be incorporated.
-  Allocation of the highest densities in those areas with the greatest degree of access to services and amenities, such as within and immediately surrounding the Coastal Village.
-  The requirement for a minimum average density of 25 dwellings per site hectare within 400 m of the centre of neighbourhood centres, and along neighbourhood connectors supporting future public transport routes, has been achieved.
-  With regards to the infrastructure requirements and provisions:
 - The Structure Plan area will be serviced by a reticulated gravity sewer providing a connection to all lots within the development. The developer is currently liaising with other major landowners in the district to jointly approach the Corporation to discuss sewer servicing options to enable lot clearance and dwellings construction prior to completion and commissioning of the AWWTP (scheduled from August 2010)
 - Opportunities for effective Waste Management Strategies are currently being investigated, Peet Alkimos will finalise preparation of a Waste Minimisation Strategy prior to the completion of the engineering design phase / commencement of construction or within 12 months of LSP approval, whichever comes first.
 - An internal underground electrical distribution system will be provided in accordance with Western Power requirements. Western Power is undertaking a feasibility study for the Structure Plan area, based on the anticipated development rates and timeframes proposed by the developer.
 - Provision for broadband will be made.
-  Shared (pedestrian/cycle) paths are proposed for all District Distributor and Local Distributor roads. In addition, shared paths are proposed along the Foreshore and through/along linear green spaces.

13.4 LONG TERM HEALTH OF THE ENVIRONMENT

Water conservation has been identified as a primary consideration for the site, particularly in landscaping and POS, in response to groundwater constraints. Peet Alkimos will apply *Waterwise Land Development* criteria to the site, and seek accreditation from the Water Corporation as such. A water saving sustainability package will be offered to buyers (potentially including rainwater tank, greywater system and other water-saving technologies), as well as a Waterwise landscaping package option.

An Integrated Urban Water Management Strategy (IUMWS) has also been developed, and stipulates that Water Sensitive Urban Design (WSUD) principles and techniques will be incorporated into the planning, design and construction of the development.




Furthermore, Peet will aim to become an accredited HIA GreenSmart Estate, applying these principles across the site. The use of GreenSmart will further be promoted to builders, and display villages will be encouraged to adopt GreenSmart principles and apply for accreditation accordingly.

Out of the total area designated for residential or mixed use purposes, approximately 60% is oriented to within 20° of either east-west or north-south. Design Guidelines will further be enacted to promote solar passive design and encourage residents to optimise solar orientation, thereby potentially reducing energy demand for heating and cooling. Where topography constrains solar access on certain lots, LDPs or design guidelines for affected lots will ensure built form outcomes that maximise climate responsiveness.











The City of Wanneroo's 3% biodiversity target has been met. Biodiversity will be encouraged through non-contiguous green linkages (Parks and Recreation Reserve, POS, streetscape and landscape) between natural areas.

Suspected Threatened Ecological Communities (TECs) has been mapped and will be retained.

Sustainability will be included as a component of the 'Welcome Kit' that will be distributed to all households, and include educational material, resources and connections to local and regional programs and activities. This will include at minimum information on topics such as energy, water, waste, travel and conservation. Community education programs will further be enacted to promote sustainable living. Sustainability information will be included as a component of the 'Welcome Kit' that will be distributed to all households, and include educational material, resources and connections to local and regional programs and activities. This will include at minimum information on topics such as energy (including renewable energy) water, waste, travel and conservation. Community education programs will further be enacted to promote sustainable living.

-  Energy efficient public lighting design will be developed and implemented.
-  A proportion of cleared vegetation from site will be mulched for re-use, where suitable (i.e. weed-free plant matter).
-  A stand-alone waste management strategy will be prepared, addressing civil works though to house construction and then further education for homeowners. Preparation of the strategy will commence during the subdivision design phase, and will be finalised prior to consideration of the LSP for final approval.

IDENTITY, EQUITY AND INCLUSIVENESS




-  An iconic element of the development will be the parabolic dunal system, which will be reflected in the Coastal Village Precinct in the final form of development. It will include a highly connected and continuous walk trail containing a new urban landscape comprising native vegetation, public art and interpretive signage referencing the history of the land and contributing strongly to legibility and sense of place.
 - Built form and landscape treatments within this area will further explore and enhance sense of place. A range of construction approaches (e.g. framed techniques, part benching and terraces) and building typologies will be used.
 - The apex of the walk trail will link with an east-west landscape corridor/pathway that would inject amenity and sense of place through to the Eastern Precinct. This will also assist in the integration and inclusiveness of all Precincts within the Structure Plan area.
-  Public art will be incorporated within all public realm areas and is considered an integral component of civic design. All public art projects will be intimately related to the site and serve an interpretive function.
-  Grass trees and limestone rocks will be harvested and re-used on site where possible, creating a sense of place and unique character.
-  Community development will be a strong theme at North Alkimos. Discussions with the City of Wanneroo have identified a means forward for the development of a Community Development Strategy, being a summary document outlining broad principles at structure plan stage, with ongoing dialogue and discussions informing the development of more detailed strategies and reporting as the project unfolds.
-  A range of key aspects for a vibrant and functional community to be established at North Alkimos have been identified, including the walk trail, community and public art, the coastal village, education precinct, interface with surrounding communities, and beach/coastal interface.
-  A dedicated, multi-purpose community space will be designed to meet local needs and provide a designated meeting place and resource centre.
-  Each precinct strives to create a distinct sense of place, particularly capitalising on its key amenity (such as POS) attributes, whilst being integrated with other Precincts.
-  Strong connectivity (both physical and sense of place) between all four precincts, through a consistency of built form, landscaping themes, designs and finishes. East-west connection will be well-provided via a distributor road, public transport and green linkages, extending from the service commercial area to the Coastal Village.
-  As well as strong east-west connection, the plan connects well with the landholdings to the north and south, through road alignment and vegetated and pedestrian connections.
-  A primary school, active POS and local centre have been co-located to promote multiple use of school infrastructure by the broad community, efficient service delivery, increased accessibility, and reduced travel between facilities. Furthermore, co-located facilities will be well-supported by public transport and safe walking and cycling routes, to reduce car use and potential for congestion.

- ☞ A Community Needs Assessment has been prepared for the DSP and a Developer Contribution Plan will be prepared in accordance with DSP guidelines.
- ☞ The sequence of staging in the development is such that stages will be released on a number of development fronts, simultaneously, across the different precincts. This will ensure that each precinct has an identity from early development phases, in particular ensuring that from an early stage, residents of the Eastern Precinct will feel part of and connected to the wider North Alkimos.
- ☞ Crime Prevention Through Environmental Design (CPTED) principles are broadly followed and implemented (with particular emphasis on passive surveillance in all POS areas, walkability, activation of streets, and facilitation of day/night activity in Coastal Village).

13.5 LONG TERM ECONOMIC HEALTH

- ☞ Through the creation of jobs in North Alkimos – primarily in and around the Coastal Village and Transit Precinct, the LSP area will contribute positively to long-term economic health of the North-West Corridor.
- ☞ Total floorspace demand of 21,254 m² is forecasted by post-residential build-out in 2041, with the TOD/Service Commercial land accounting for the largest share. Such floorspace will generate approximately 941 jobs in the North Alkimos Local Structure Plan area.
- ☞ Despite the absence of economic centres of regional or district significance, between 1 in 20 and 1 in 13 jobs in Alkimos Eglinton in 2041 will be located in North Alkimos, highlighted the commitment of the area to contributing to overall DSP and corridor employment self-sufficiency.
- ☞ Employment self-sufficiency in North Alkimos is estimated to increase from 18.6% in 2011 to 32.9% in 2041, if a rail station is delivered. In the absence of such critical enabling infrastructure, such self-sufficiency rates will be lower (15.2% in 2011 and 24.2% in 2041). These rates are considered high for such a small geographical area, lack significant centres of economic activity, such as a regional or district centre.
- ☞ North Alkimos' share of Alkimos Eglinton employment, which may be considered a more relevant measure of economic prosperity and dynamism in a LSP area, is estimated at 7.8% (with rail station) or 6.0% (without rail station) by post-residential build out in 2041. Again, this share is particularly high given the lack of areas of significant economic activity in the Structure Plan area.
- ☞ Commercial and retail land uses are provided for across the Structure Plan area through:
 - The Coastal Village (4, 123 m²), located adjacent to the Indian Ocean in what is presently a blowout in the existing dunal system. It is intended that the land uses within the Coastal Village will provide a diverse and sustainable mix of activities that will ensure activation of the place throughout the day and evening. Appropriate uses include community, retail, commercial, and residential.
 - Neighbourhood Centre (3,439 m²), proposed to the east of the primary school. Anticipated land uses include local convenience retail, child care, medical and lower-order commercial tenancies. The aim of this centre is to respond to the convenience needs of residents within the Central Precinct.

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- Local Centre (1, 051 m²), proposed on the eastern margins of the Central Precinct where it abuts Marmion Avenue. While this centre would provide convenience retail, potentially some local offices and such like, its high exposure location on Marmion Avenue means that this centre is more likely to capitalise and focus on meeting demand generated by passing trade. Therefore, other uses may include petrol filling stations and fast food restaurants.
-  A combination of office commercial, retail and service commercial-based employment will be provided for in the TOD/Service Commercial Precinct. This area is forecast to have approximately 12,600 m² floorspace by post residential build-out 2041 with rail station, or 11,250 m² without rail station. The reason for the higher forecast without a rail station is that the floorspace is entirely accounted for by service commercial developments.
-  Other non-centre activities will also generate employment in the LSP area, including education (24 jobs) and home-based employment (281 jobs), by post-residential build-out 2041. Home-based employment comprises 78 people working at home in home-based businesses, 47 people telecommuting on average per business day, and 156 mobile trades workers using their home as a base.
-  High-speed broadband Internet access will be provided to each lot within the development.

13.6 PEOPLE AND GOVERNMENT

Consultation with local residents, businesses, the City of Wanneroo and other relevant stakeholders will be undertaken throughout the detailed planning and development stages at Alkimos.


13.7 INITIATIVES FOR FURTHER INVESTIGATION

Peet has identified a range of initiatives for potential inclusion and implementation at later development stages. Some may also be appropriate to include in Stage 1, pending the outcomes of further analysis. As the development process unfolds, Peet will investigate each of the following initiatives further to assess their feasibility and suitability for implementation at Alkimos. The Sustainability Strategy contains further detail about process and indicative timeframes for investigation, a summary is provided below:

-  Use of alternative materials in construction (such as low embodied energy cement replacement materials, porous pavements, alternative housing construction materials).
-  Replace traditional spray sprinkler systems in POS and other landscaped areas with sub-surface irrigation, where appropriate, to increase water efficiency and reduce water wastage.
-  In partnership with the Water Corporation and other Alkimos landowners, use treated wastewater from Alkimos Waste Water Treatment Plant to irrigate POS.
-  Provide renewable energy technology on focal point or iconic building in town centre, to increase renewable energy use and greenhouse emission, educate residents and visitors and foster sense of identity.
-  Provide sustainability-themed purchaser packages, for waste reduction/recycling and energy efficiency, either for standard inclusion or optional upgrades.
-  Establish a green roof demonstration project on a commercial or community building, to demonstrate innovative approaches to reducing building energy requirements and providing amenity to occupants.



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-  Establish the coastal village (and possibly other centres) as a 'plastic bag free' zone, to support national campaigns and complement local coastcare/foreshore management initiatives.

14.0 IMPLEMENTATION

14.1 ADOPTION OF LOCAL STRUCTURE PLAN

This Structure Plan, comprising Part 1, Part 2 and Appendices (technical reports), has been prepared in accordance with the requirements of DPS2 and is submitted under clause 9.4 for a determination by Council that it be advertised.

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

14.2 ACTIVITY CENTRES

Whilst the LSP provided an indicative development concept plan for the purposes of confirming the location, function and form of the centres outlined within the LSP, a more detailed analysis and review of the centres will be progressed as the project progresses through to development and implementation. In addition, a Scheme Amendment will be required to include and identify the floorspace and type of each of the centres within Schedule 3 of Council's District Planning Scheme.

Upon finalisation, these planning and design parameters will need to be implemented through an update to this Local Structure Plan, or through a separate, stand alone Structure Plan process as identified in Council's Activity Centres Policy. It is submitted that a separate structure plan process, outside of the framework provided by this comprehensive Overall Local Structure Plan, is considered onerous and has the potential to duplicate much of the planning framework already provided for by this LSP given the planning rationale and provisions to be dealt with in a single volume of documentation and ensures that the planning for the village occurs in a fully integrated manner.

As such, it is maintained that progression of the planning framework for the centres identified within this LSP should occur as a revision to this LSP at an appropriate time in the future.

14.3 METROPOLITAN REGION SCHEME AND CITY OF WANNEROO DISTRICT PLANNING SCHEME PLAN NO. 2 AMENDMENTS

The current alignment of the rail line through the subject land per the MRS marginally differs from that shown in the DSP. This anomaly will ultimately need to be addressed via an amendment to the MRS to bring it into line with the DSP. Due to the proposed staging pattern for the development (refer section 14.5) this is a process that could occur simultaneous with the construction of earlier stages.

As the detailed planning for the site continues and the detailed design of transport infrastructure takes place and EMPs for Parks and Recreation Reserve are developed, there may be a requirement to undertake further minor amendments to MRS to reflect final reserve requirements.

DPS2 would be amended simultaneously to reflect the ultimate pattern of MRS reserves.






14.4 PROPONENT CONTRIBUTIONS

It is a requirement of the DSP that a letter of Intent be provided at local structure plan stage to outline a commitment and path to the provision of district-level infrastructure via a developer contributions scheme.

This process has occurred through correspondence sent to the Department for Planning and Infrastructure on behalf of Alkimos Eglinton landowners dated 4 July 2008, refer **Appendix 8**.

That correspondence detailed the preparation of a Schedule of Infrastructure Items and subsequent Preliminary Contribution Items Report.

The next step in this process shall be the finalisation of this schedule and report via a workshopping process that will provide for agreement on:

-  The preliminary scoping of all items;
-  Those items to be included as Developer Contributions;
-  The parties involved in sharing of the items;
-  Methods of delivery and contributions; and
-  Mechanisms for delivery.

The Developer Contribution Scheme will be subject to further negotiations with the Department for Planning and Infrastructure. in line with the requirements of Planning Bulletin 18, Development Control Policy 2.3 and Liveable Neighbourhoods.

This process will allow for the finalisation of the Developer Contributions Scheme in parallel with structure plan approval processes.

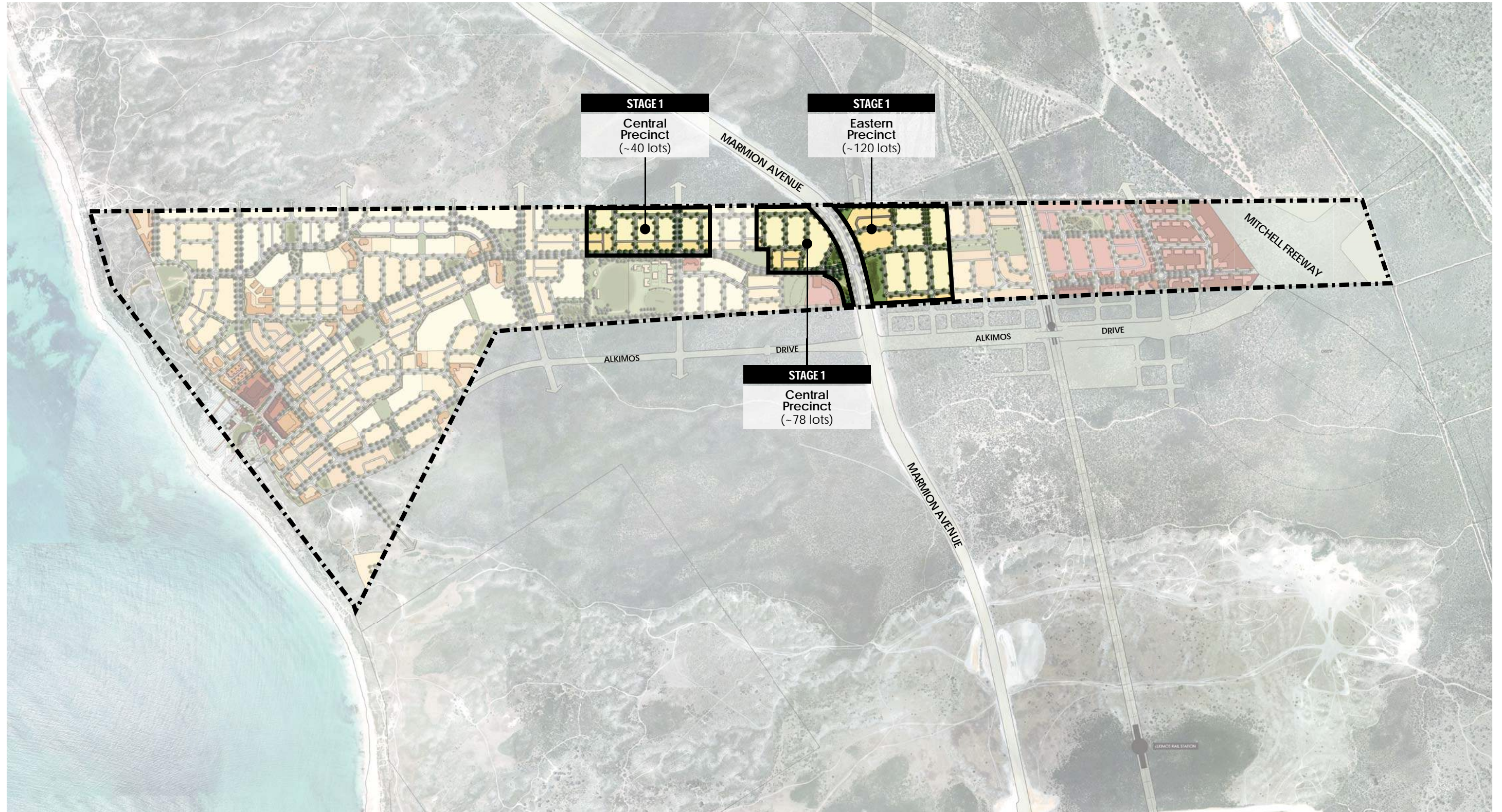
14.5 STAGING & SUBDIVISION

The intention is to achieve approval to the Local Structure Plan by mid-2009. This will be closely followed by built form LDP/subdivision approvals facilitating the commencement of early stage earthworks as soon as practicable after the completion of approval processes (indicatively late 2009).

It is proposed, at this time, to release the first stages on three fronts each comprising of approximately 80 residential lots, refer **Figure 55**.

One stage either side of Marmion Avenue (i.e. in the Central and Eastern Precincts). This approach will help to ensure that there is a strong character and marketing connection between these precincts. And that from early development stages, residents of the Eastern precinct will feel part of and connected to the wider North Alkimos project. Framing either side of Marmion Avenue with development shall ensure a sense of urbanity and connection to an urban setting rather than generating the sense of an isolated urban cell surrounded by bushland.

A third stage in the north-eastern corner of the Coastal Village Precinct capitalising on the unique character setting of this location on the ridge of the parabolic dune and with views to the Indian Ocean. This stage is important in generating an early presence in the more western portions of the Structure Plan area, facilitating the future development of residential-supportive land use in the Coastal village.



LEGEND

- Staging Boundary
- Subject Land

Note: Indicative staging only
- subject to change.

STAGING PLAN

NORTH ALKIMOS LOCAL STRUCTURE PLAN | LOTS 1005 & 1006 MARMION AVENUE, ALKIMOS

TAYLOR BURRELL BARNETT | TABEC | EPCAD
SHARNI HOWE | CREATING COMMUNITIES
MACROPLAN | MP ROGERS & ASSOCIATES
SUSTAINABLE SOLUTIONS | WHEELANS | ENV
OVERMAN ZUIDVELD | TAYLOR ROBINSON



PLAN - 07/085
DATE - MAY 2009



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It is intended that all three stages shall be single residential in nature given that higher densities and alternative housing types can only be realistically supported once a critical mass of transport infrastructure, services and place making (within the Coastal Village for example) is achieved.

Each subdivisional stage and application must be supported by a LDP to be endorsed by the City of Wanneroo outlining the manner in which the subdivision would satisfy requirements with respect to minimum dwelling targets and ensure that the ability for future stages to meet the targets is maintained.

The timing, location and composition of future stages will be dependent on market factors over time as the project unfolds.

14.6 DESIGN GUIDELINES, LOCAL DEVELOPMENT PLANS & DEMONSTRATION PRODUCT

The North Alkimos Local Structure Plan aims to create an integrated planning, built form and landscape design vision. Where each 'layer' of the design approach will serve to reinforce each other in order to create a strong and identifiable 'place' suited to this important coastal location.

All development will be guided by a range of planning and design instruments such as 'Policy' statements, Local Development Plans (LDPs), Design Guidelines, Landscape Codes or Contractual Covenants. These will be prepared by the experienced and competent team of consultants, over the coming years. This process will be subject to stakeholder discussion and investigation.

14.6.1 DENSITY

Subdivision must accord with a Residential Density Code Plan (DCP) endorsed by the City of Wanneroo, which identifies the residential density code applicable for each lot.

These DCPs shall be submitted at the time of subdivision to provide for concurrent assessment and approval. The DCPs shall be limited to demonstrating the residential density code applicable for each lot.

14.6.2 BUILT FORM

Key landmark sites (e.g. a R100 multiple dwelling sites) would be subject to a further design review process to ensure best practice aesthetic and sustainability targets are achieved. Strategic demonstration projects (e.g. dunal housing) and possible joint venture partners, will be identified early and developed to ensure that our strong design vision matures effectively into reality.





At a lot level, LDPs would establish the correct building envelope to take advantage of the climatic context. Whilst the design guidelines and demonstration buildings will illustrate the benchmark requirements for building design and construction (e.g. Energy star rating requirements, material selection criteria, 'bioclimatic' design criteria for medium to high rise development, etc.).

A general landscape code will ensure that gardens and the public realm treatments are appropriate to a coastal and water wise environment. This will ensure a consistent and harmonious outcome for the community.

15.0 CONCLUSION

The North Alkimos LSP, report and technical supplementary reports is submitted to the City of Wanneroo for consideration in accordance with the requirements of Council's Scheme.

Peet Limited and the consultant team, on behalf of the landowner group is very excited about delivering this project and have a deliberate program in place to achieve some key project milestones as outlined below:

	Submission to the City of Wanneroo	19 December 2008
	Council consideration and approval	December 2008 to June 2009
	DPI Consideration/endorsement	July 2009
	Commence development	Mid-2009

With this program in mind, Council's consideration of the Local Structure Plan in a timely manner is requested. As previously advised, the client and its team of consultants is available to meet with Council officers at a technical level to discuss any/all aspects of the LSP in the new year to facilitate this program. In addition, a site inspection has been identified for January 2009 to familiarise Council officers with the key attributes of the site.