



DEVELOPMENT PLAN REPORT

**Lot 504 Nickol, Karratha
(Former Tambrey Primary School Site)**

Part I – Statutory Provisions

Prepared by:

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Prepared for:

ABN DEVELOPMENTS

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Report No: 3789

Version/Date: Rev 6, March 2012



ENDORSEMENT PAGE

This structure plan is prepared under the provisions of the City of Karratha
Local Planning Scheme No.8

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

3 MAY 2012

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

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Rev 2	Revised Final Draft for Council review	TK	FV	11.11.11	11.11.11	Filipe Vieira	11.11.11
Rev 3	Final Report for Council Meeting	TK	FV	01.12.11	02.12.11	Filipe Vieira	02.12.11
Rev 4	Modifications to Built Form provisions	FV	FV	03.02.12	03.02.12	Filipe Vieira	03.02.12
Rev 5	Final Draft for Council endorsement	FV	FV	29.02.12	29.02.12	Filipe Vieira	29.02.12
Rev 6	Final for Council adoption	FV	FV	27.03.12	27.03.12	Filipe Vieira	27.03.12

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TABLE OF AMENDMENTS – DEVELOPMENT PLAN FOR LOT 504 NICKOL (KARRATHA)

<i>Amendment No.</i>	<i>Description of Amendment</i>	<i>Endorsed by Council</i>	<i>Endorsed by WAPC</i>

CERTIFICATION OF DEVELOPMENT PLAN

IT IS HEREBY CERTIFIED THAT THE DEVELOPMENT PLAN FOR LOT 504 NICKOL (KARRATHA)
WAS ADOPTED BY RESOLUTION OF THE WESTERN AUSTRALIAN PLANNING COMMISSION ON

Being an officer of the Commission duly
Authorised by the Commission pursuant to
Section 16 of the Planning and Development Act 2005

AND BY
RESOLUTION OF THE COUNCIL OF THE SHIRE OF ROEBOURNE ON

AND THE SEAL OF THE MUNICIPALITY WAS PURSUANT TO THE COUNCIL'S RESOLUTION
HEREUNTO AFFIXED IN THE PRESENCE OF:



PRESIDENT, SHIRE OF ROEBOURNE



CHIEF EXECUTIVE OFFICER, SHIRE OF ROEBOURNE



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1.0 DEVELOPMENT PLAN AREA

- 1.1 The Development Plan area relates to Lot 504, Nickol (Karratha) as identified on the Development Plan Map (Ref: 3789-5-005).

2.0 DEVELOPMENT PLAN CONTENT

- 2.1 The Development Plan comprises the following sections:
- Part One – Statutory Section
 - Part Two – Explanatory Information
 - Appendices – Technical Reports
- 2.2 Part One includes only the provisions and requirements that need statutory effect including the Development Plan Map.
- 2.3 Part Two of the Development Plan provides justification and clarity on the provisions contained in Part One, and is to be used as a reference to guide interpretation and implementation of Part One.

3.0 INTERPRETATIONS

- 3.1 The terms used in the Development Plan have the respective meaning given to them in the Shire of Roebourne Town Planning Scheme No. 8.

4.0 OPERATION DATE

- 4.1 The Development Plan will become operative following the endorsement of the Plan by the Shire of Roebourne and adoption of the Plan by the Western Australian Planning Commission pursuant to Clause 7.2 of Town Planning Scheme No. 8. The operative date of the Plan is the later of the endorsement or adoption as identified on the Certification page.

5.0 RELATIONSHIP TO THE SCHEME

- 5.1 The provisions of this Development Plan are made pursuant to Clause 5.2, Clause 6.4, Clause 7.2 and Appendices 7 and 8 of the Shire of Roebourne Town Planning Scheme No. 8. The Development Plan is a Policy Statement and forms part of the Shire of Roebourne Land Use Planning Policy Manual.

- 5.2 The Shire of Roebourne Town Planning Scheme No. 8 provides that land use, development and subdivision of land within the Development Plan area shall be generally be in accordance with the Development Plan subject to compliance with the provisions of the Scheme.
- 5.3 Land uses permitted within the Development Plan area shall be in accordance with the Shire of Roebourne Town Planning Scheme No. 8 "Residential Zone".

6.0 PUBLIC OPEN SPACE PROVISION

- 6.1 The Development Plan does not contemplate the provision of any land for the purposes of Public Open Space (POS) on the basis that the subject site is situated immediately adjacent to existing POS (to the east) and Tambrey Oval (to the north-east).
- 6.2 It is intended that the POS contribution be provided through a cash-in-lieu arrangement.

7.0 RESIDENTIAL DENSITY

- 7.1 The residential areas of the Development Plan are coded R20 and R30, as illustrated on the Development Plan.
- 7.2 Part Two of the Development Plan provides justification for the location and distribution of residential densities within the Development Plan area.

8.0 SUBDIVISION AND DEVELOPMENT REQUIREMENTS

- 8.1 Subdivision is to be in accordance with the applicable density code indicated on the Development Plan Map and the minimum lot sizes listed under Table I of State Planning Policy 3.1 Residential Design Codes.

9.0 BUILT FORM PROVISIONS

- 9.1 The Built Form provisions provided for in Section 9.2 below form part of and are to be read in conjunction with the Development Plan Map.
- 9.2 Except as otherwise determined by the Council, development is to be in accordance with the following:

a) Raised Floor Levels

- Where a concrete slab is provided it shall not be raised in a manner which requires stairs from the laneway or crossovers.

b) Outdoor Living Areas

Each dwelling shall be provided with an Outdoor Living Area at the front of the home - with a minimum of half of the Outdoor Living Area being suitably covered - consistent with the Performance Criteria of the Residential Design Codes. The minimum prescribed dimensions of the Outdoor Living Areas shall be as follows:

A. Cottage Lots

Minimum Depth - 3.5m

Minimum Width – 4.0m

In the case of the Cottage Lot identified in Appendix 8 - Outdoor Living Areas - the Minimum Depth of the Outdoor Living Area shall be 2.8m

B. Traditional Lots

Minimum Depth – 3.5m

Minimum Width – 6.0m

In the case of the Traditional Lots identified in Appendix 8 - Outdoor Living Areas - the Minimum Width of the Outdoor Living Area shall be 4.0m

c) Eaves

- Eaves shall have a minimum depth of 800mm where glazing is provided.
- Glazing on the east and west sides of a dwelling shall be kept to a minimum and be small in format.

d) Colours and Materials

- Colours and materials are to be predominantly light in tone and reflect the harsh sunlight.
- Tones shall be reflective of the natural landscape and local vernacular of Karratha.

e) Elevation Treatments

- No two adjoining building shall have the same front elevation or colour scheme.

f) Boat Parking

- Boat parking for lots serviced by a rear lane must be located off the rear lane.
- Boat parking will not be permitted in car parking bays located on streets.
- Boat parking for lots not serviced by a rear lane must be located behind the front building line of the dwelling.

g) Access

- All buildings shall be accessed without the use of stairs either by the laneway for cottage lots or via the driveway for traditional lots.

h) Fencing

- Fencing to all streets, including the adjoining POS, shall be a maximum height of 1800mm and visually permeable above 1200mm

i) Setbacks to Laneways

- a 1.1m setback shall be provided to allow for bins and to facilitate larger vehicle turning circles.

10.0 VARIATIONS TO THE RESIDENTIAL DESIGN CODES

10.1 The Development Plan provides for the following variations to the Residential Design Codes:

- o A reduction in the front setback for all R20 lots from 6m to 3m (with no average setback);
- o A reduction in the front setback for all R30 lots from 4m to 2.5m (with no average setback) and;
- o Permanent roof cover is permitted over 100% of outdoor living areas for all R30 coded lots.

10.2 Part Two of the Development Plan provides justification for the abovementioned variations to the Residential Design Codes.

11.0 OPERATION AND IMPLEMENTATION

- 11.1 Prior to any subdivision or development being supported, the Shire will, as a minimum, require the following reports to be completed (refer Table A below).

Table A – Reports and Plans

Documentation	Approval Stage	Approving Authority
Urban Water Management Plan	Prior to clearance of development and/or subdivision conditions	Shire of Roebourne & Department of Water
Landscaping Plan	Prior to clearance of development and/or subdivision conditions.	Shire of Roebourne

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DEVELOPMENT PLAN

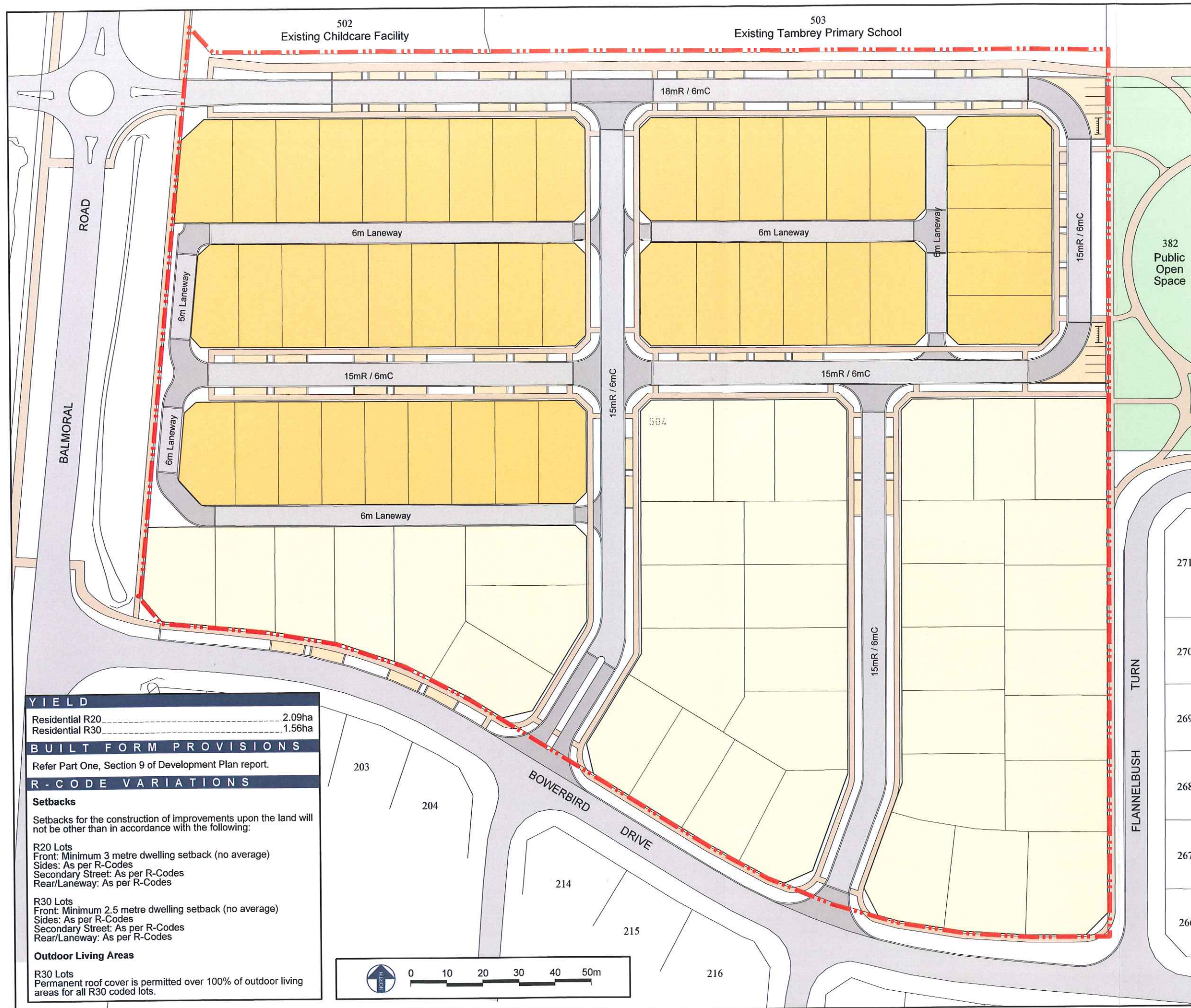
Lot 504 NICKOL (KARRATHA)

DRAFT DEVELOPMENT PLAN

Lot 504 Nickol, TAMBREY

LEGEND

- Development Plan Boundary
- Residential R20
- Residential R30
- Pedestrian Footpath
- Visitor Car Bays



YIELD	
Residential R20	2.09ha
Residential R30	1.56ha
BUILT FORM PROVISIONS	
Refer Part One, Section 9 of Development Plan report.	
R-CODE VARIATIONS	
Setbacks	
Setbacks for the construction of improvements upon the land will not be other than in accordance with the following:	
R20 Lots	
Front: Minimum 3 metre dwelling setback (no average)	
Sides: As per R-Codes	
Secondary Street: As per R-Codes	
Rear/Laneway: As per R-Codes	
R30 Lots	
Front: Minimum 2.5 metre dwelling setback (no average)	
Sides: As per R-Codes	
Secondary Street: As per R-Codes	
Rear/Laneway: As per R-Codes	
Outdoor Living Areas	
R30 Lots	
Permanent roof cover is permitted over 100% of outdoor living areas for all R30 coded lots.	

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 Accuracy +/- 4m. Projection KAR94.

Areas and dimensions shown are subject to final survey calculations.
 All carriageways are shown for illustrative purposes only and are subject to detailed engineering design.

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**Lot 504 Nickol, Karratha
(Former Tambrey Primary School Site)**

Part 2 – Explanatory Report

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FIGURES

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FIGURE 3: Aerial Plan

FIGURE 4: City Growth Plan

FIGURE 5: Local Context Plan

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-
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- FIGURE 19: Laneway Entry
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- APPENDIX 1: Preliminary Site Investigation (GHD)
- APPENDIX 2: Department of Education Correspondence
- APPENDIX 3: Concept Masterplan
- APPENDIX 4: Transport Assessment Report (ARUP)
- APPENDIX 5: Local Water Management Strategy (Emerge)
- APPENDIX 6: Engineering Services Report (Wood & Grieve Engineers)
- APPENDIX 7: Geotechnical Report (Douglas Partners)
- APPENDIX 8: Outdoor Living Areas
-

1.0 PLANNING BACKGROUND

1.1 Introduction and Purpose

This Development Plan report has been prepared on behalf of ABN Developments for Lot 504 Nickol (the subject site).

In October 2010, LandCorp sought Expressions of Interest (EOI) from selected builders to enter into a Structured Sale Agreement for a land and built form development arrangement for approximately 5.3ha south of the Tambrey Primary School. The land was identified as being surplus to Department of Education requirements.

ABN's proposal was accepted by LandCorp and in 2011 ABN and LandCorp entered into a conditional Contract of Sale for the site.

ABN's vision for the site is to deliver a high quality residential estate that is in keeping with the surrounding area, while trying to provide a diverse and quality built form outcome with enhanced streetscapes. ABN will utilise its manufactured housing division, TR Homes, to facilitate the quick delivery of a quality housing outcome for the site.

The proposed Development Plan has been designed to incorporate environmentally sensitive design initiatives around a highly connected road network, and provides low and medium density housing options which contribute to the required supply of housing in Karratha.

The preparation of the Development Plan has been supported by a number of technical and design investigations, including input from the following disciplines:

- **Emerge** – Landscaping and Local Water Management Strategy
- **GHD** – Environmental Investigations
- **Wood and Grieve** – Civil Infrastructure
- **ARUP** - Traffic and Transportation
- **Simon Youngleson Architects and Urban Design** – Architecture and Urban Design
- **Whelans** – Surveying
- **Douglas Partners** – Geotechnical Investigations

The Development Plan has been prepared in accordance with the design requirements established by Liveable Neighbourhoods and responds to the core elements of the Karratha Vernacular Design Principles.

1.2 Land Description

1.2.1 Location

The subject site is located at the corner of Balmoral Road and Bowerbird Drive within the suburb of Nickol, approximately 5.5 kilometres to the west of the Karratha town centre (refer **Figure 1**).

1.2.2 Area and Land Use

Lot 504 has a total land area of 5.3066 hectares. The subject site is vacant and has no structures or infrastructure (refer **Figure 2** and **Figure 3**).

1.2.3 Legal Description and Ownership

The subject site is formally described as Lot 504 on Certificate of Crown Land Title Volume LR3160, Folio 298 on Deposited Plan 68025.

The subject site is currently Unallocated Crown Land (UCL) and vested with the State of Western Australia.

1.3 Planning Framework

1.3.1 Zoning and Reservations

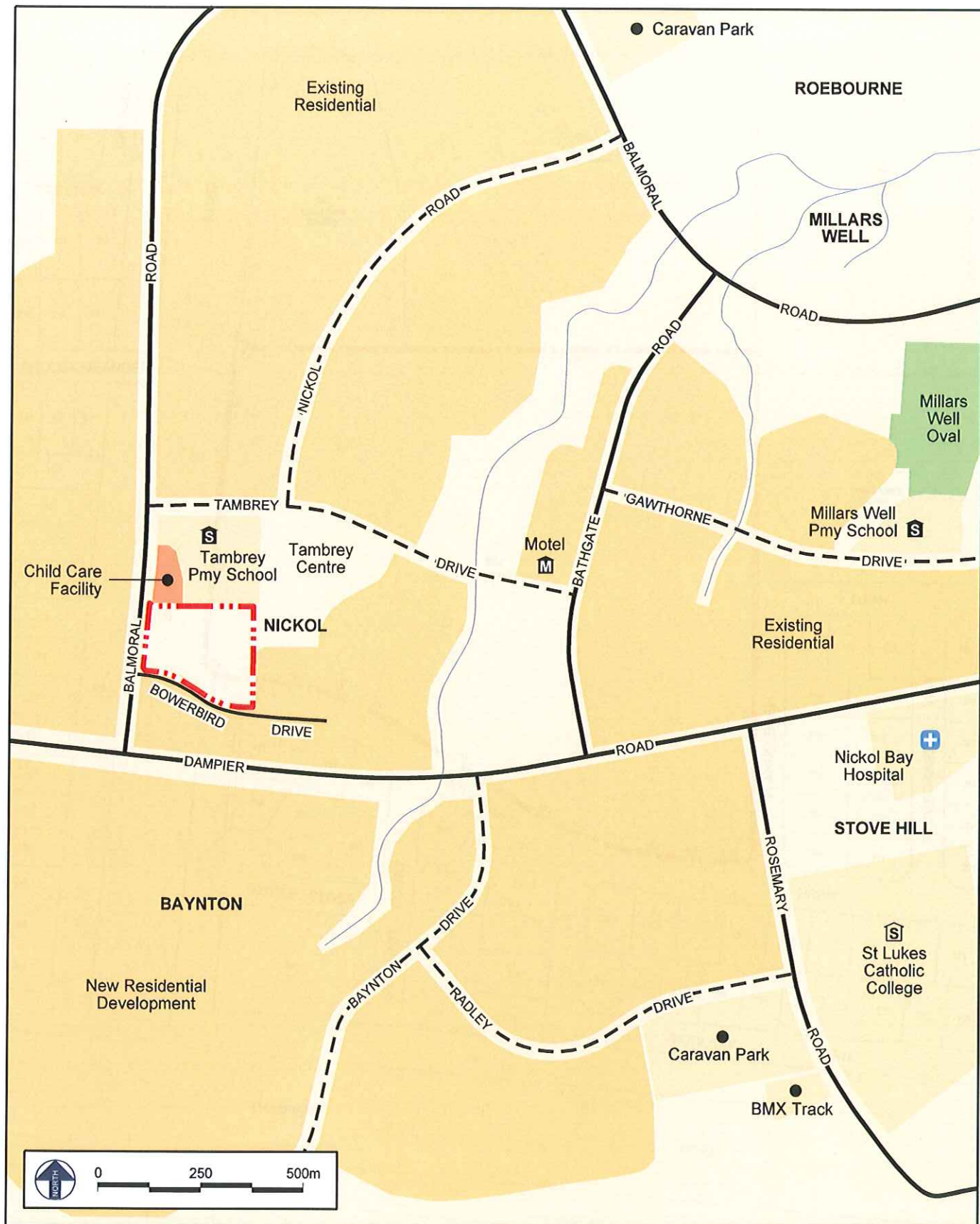
The subject site was recently rezoned to “Urban Development” under the Council of Roebourne Town Planning Scheme No. 8 (TPS 8) - refer Section 1.3.3 below for further details.

1.3.2 Strategic Planning Framework (Regional)

Karratha City of the North Plan

The Karratha City of the North Plan (KCNP), adopted by the Council of Roebourne on 18 May 2010, comprises a series of strategic documents including the Karratha City Growth Plan, the Karratha City Centre Master Plan and the Implementation Blueprint. Together, these documents identify a range of spatial and non-spatial requirements to guide the future growth of Karratha to a regional city of up to 50,000 residents.

The KCNP provides the basis for guiding decision makers in assessing rezoning, subdivision and development applications, as well as the provision of infrastructure and community facilities over time.



--- Site Boundary

LOCATION PLAN

Property Description Lot 504 Nickol, TAMBREY

Base data supplied by Landgate.
Accuracy +/- 4m. Projection MGA Zone 50.
Areas and dimensions shown are subject to final survey calculations.
All carriageways are shown for illustrative purposes
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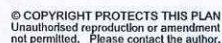
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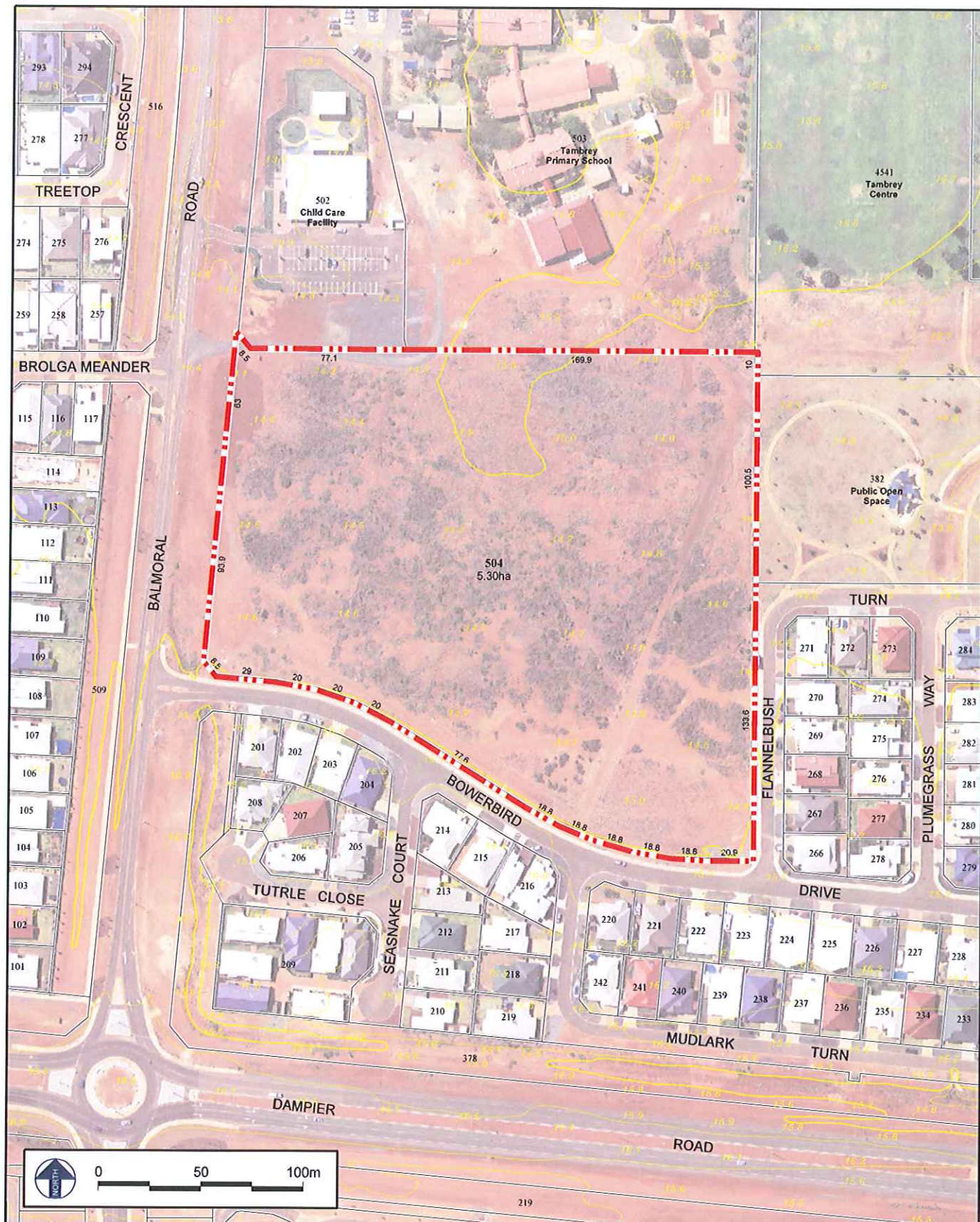
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--- Site Boundary

AERIAL PLAN

Property Description
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Karratha City Growth Plan

The Karratha City Growth Plan (CGP) is a city-wide strategy to guide the future development of Karratha into a city of 50,000 residents. Specifically the CGP will guide the future spatial and non-spatial development requirements for the growth of Karratha, identifying the need for land supply, housing diversity, open spaces, commercial nodes, entertainment and retail areas, as well as the provision of community and servicing infrastructure.

The CGP identifies Karratha as a series of neighbourhood precincts. Each precinct is described in terms of its desired urban character, land use and urban structure as well as identifying key assumptions and planning considerations requiring further resolution.

Under the CGP, the subject site is situated within the 'Nickol/Baynton' precinct which is identified as an 'Enhanced Existing Residential' area with the 'Potential for Increased Density' (refer **Figure 4**).

The general design and intent of the Precinct is for the development of a site responsive, walkable and connected residential neighbourhood that provides good pedestrian and vehicular connectivity within, to and from existing residential areas.

Generally the Karratha CGP envisages residential development to provide a range of densities to encourage housing diversity, including densities of R40 with some areas of R60 around centres of activity.

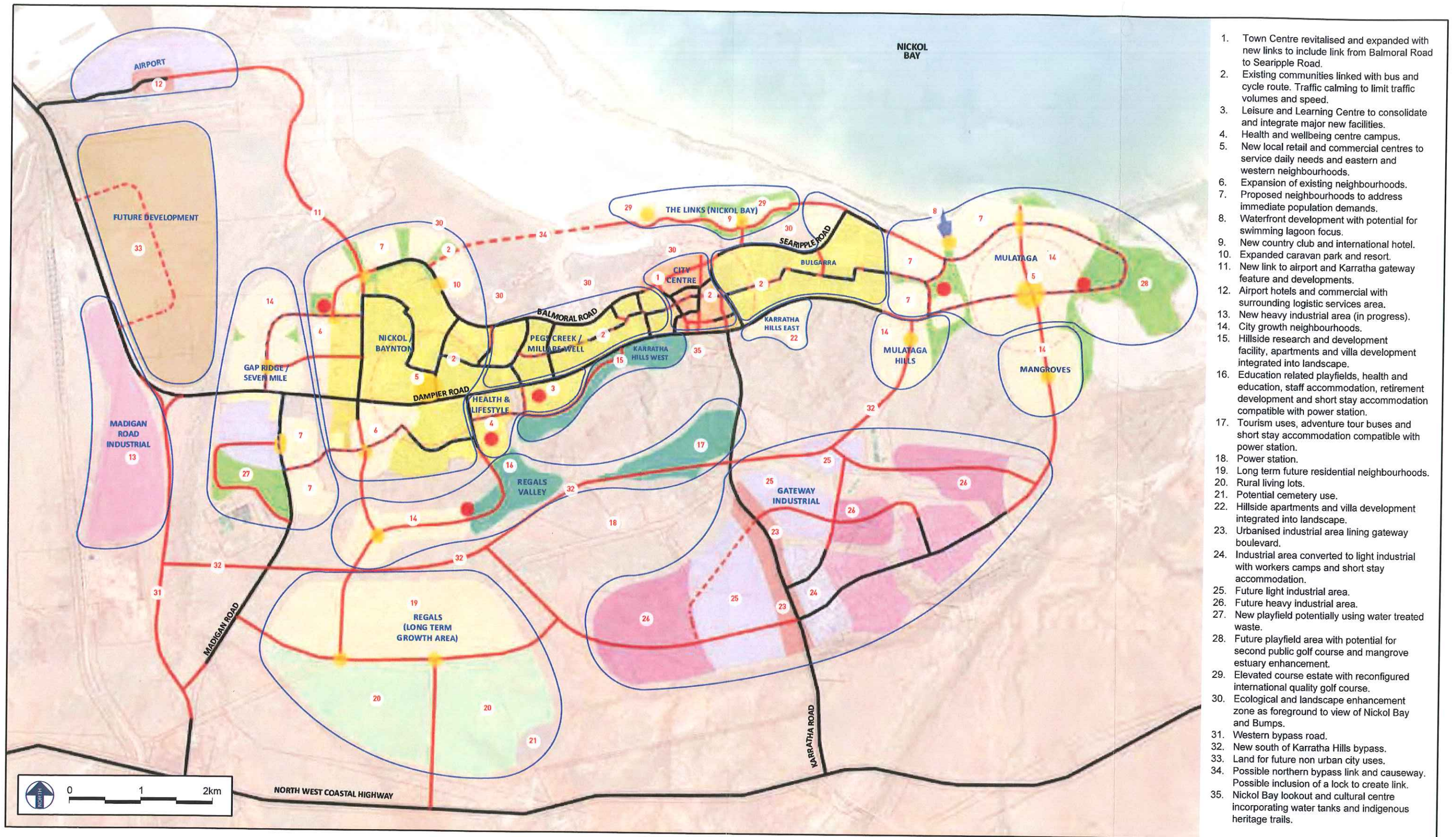
The proposed Development Plan responds strongly to the objectives of the City Growth Plan, making efficient use of available land, and providing a highly walkable, pedestrian friendly design which offers a range of housing densities to facilitate a range of dwelling types.

Karratha Area Development Strategy

The Karratha Area Development Strategy provided the strategic direction for the development of Karratha and planning at the local level for a period of 12 years, however the document has now been superseded by the KCNP.

Karratha Regional HotSpots Land Supply Update

The Karratha Regional HotSpots Land Supply Update, updated recently by the WAPC in December 2010, provides an overview of land supply within Karratha based on the status of major projects and current and anticipated lot creation activity. The latest update reflects the Karratha City Growth Plan which is proposed to be reflected in the Scheme via Amendment 21 (refer Section 1.3.3).



KARRATHA CITY GROWTH PLAN

Shire of Roebourne

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The subject site is identified on Map 6 of the Hotspots document as Area KA35. The document identifies the subject land as surplus to the requirements of the Department of Education and subject to the adoption and formal gazettal of Scheme Amendment No. 11 and No. 21.

This document is relevant to the future planning of the site, as it guides infrastructure agencies in the planning of future servicing requirements.

Karratha 2020

The Karratha 2020 Vision and Community Plan (2009), prepared by the Council of Roebourne in partnership with the State Government and industry, assesses Karratha's infrastructure and service needs in response to anticipated future population growth.

The key themes highlighted in the document include the need to provide affordable, non-mining related housing to address the escalating costs of housing as well as the need to provide a diverse range of housing types, including housing for seniors, which appeal to a greater variety of family types and increase the Council's liveability.

The proposed Development Plan meets the objectives of Karratha 2020 by providing for a range of non-mining related housing types in a walkable, pedestrian friendly and community focused development.

1.3.3 Statutory Planning Framework

Shire of Roebourne Town Planning Scheme No. 8

The Council of Roebourne Town Planning Scheme No. 8 (TPS 8) was gazetted on 22 August 2000 and provides the statutory basis for the planning of all land within the Council of Roebourne.

With regard to the development of land within the "Urban Development" zone of the Scheme, Clause 6.4.1 of TPS 8 states:

"Before considering any proposal for subdivision or development of land within the Urban Development Zone, the Council may prepare or require the preparation of a Development Plan for the entire development area or any part or parts as is considered appropriate by Council."

TPS 8 outlines the following matters that are required to be addressed by a Development Plan:

"All development plans shall address the following matters:

- (i) Landform, topography, landscape, vegetation and soils of the area;*
- (ii) Location, existing roads, land uses and surrounding land uses and features;*
- (iii) Legal considerations, ownership, title description, area and encumbrances;*

- (iv) Existing and proposed services and infrastructure including reticulated or other portable water supply, sewerage, energy, communications, drainage and catchment considerations;
- (v) Existing places and features of Aboriginal and non-Aboriginal heritage and/or cultural significance, including natural landscapes, flora and fauna in addition to built structures and other modified environments;
- (vi) Road layouts and traffic assessments, communal and incidental parking areas, pedestrian/cycle network/underpasses, including impacts on the surrounding movement network;
- (vii) Public open space and recreation provision, environmental protection areas, and relationships to natural features;
- (viii) Assessments of the impact of the proposal on the natural environment, including management of potential effluent, emissions and other forms of pollution;
- (ix) Comprehensive drainage systems for stormwater runoff and natural drainage lines;
- (x) Indicate the design of the proposal including lot layout, major buildings, roads and landscaping proposals;
- (xi) The demand for the development in relation to the overall market for similar developments;
- (xii) The method of carrying out the development including the projected times of completion of each stage;
- (xiii) Provide provisions, as may be considered appropriate by Council, for inclusion in the Policy Manual; and
- (xiv) Other information as may be required by Council.

Development plans in specific zones should also address the following matters:

Urban Development Zone

- (i) Location and density of housing areas, including lot and dwelling yield, population outcomes, net residential density and detailed subdivision standards relating to solar access, efficient use of water resources, design features and density rationale; and
- (ii) Indicate demand for commercial and community facilities, including schools, generated by the proposal and implications for the provision of these within the development area or elsewhere.”

Clause 3.2.3 of the Scheme states that development may only be permitted within the “Urban Development” zone where:

“(a) A Development Plan has been adopted for the subject land and the development is in accordance with the plan; or

(b) Council has resolved that a Development Plan is not required.”

Scheme Amendment No. 11

Amendment No. 11 to TPS No. 8 rezoned the subject site from “Public Purpose – Education” to “Urban Development”. The Amendment was gazetted in May 2011.

Scheme Amendment No. 18

While the initial intent of Amendment No. 18 was to address the Karratha Town Centre, remove the R40 density cap and create a City Centre, the Council resolved to undertake an 'Omnibus Amendment' which, in addition to creating a City Centre zone for Karratha and inserting numerous provisions into the Scheme, contained provisions in relation to the preparation, adoption and operation of Development Plans.

Scheme Amendment No 18 was gazetted in March 2011.

Proposed Amendment No. 21

Pursuant to Amendment No. 21, the subject site is to be designated Development Area (DA) number 'DA 31' where the Special Conditions are proposed to be:

- An approved Development Plan together with all approved amendments shall apply to the land in order to guide subdivision and development;
- To provide for residential development; and
- Land uses classified on the Development Plan apply in accordance with clause 7.2.11.4.

Amendment 21 is yet to be gazetted, however, the proposed Development Plan meets the intent of the stated objectives for DA 31.

1.3.4 Planning Policies

Liveable Neighbourhoods

Liveable Neighbourhoods is an adopted policy intended to guide the subdivision and development of land in Western Australia. The key principles of this policy include:

- Providing a variety of lots sizes and housing types to cater for the diverse housing needs of the community at a density that can ultimately support the provision of local services;
- To ensure cost-effective and resource efficient development to promote affordable housing; and
- To maximise land efficiency.

The proposed Development Plan not only acknowledges the objectives of Liveable Neighbourhoods in providing a greater diversity in housing types, but meets the important objective of maximising land efficiency by rationalising development in an established and well serviced residential area. The proposed development will also allow for the development of housing options that will directly target ongoing affordability constraints and housing demand in Karratha.

2.0 SITE CONDITIONS AND ENVIRONMENT

2.1 Environmental Assets and Constraints

GHD undertook a Preliminary Site Investigation (PSI) of the subject site to ascertain the environmental and social particulars of the site (refer **Appendix I**). A summary of the findings of the investigation is provided below.

2.1.1 Contaminated Sites

The PSI indicates there are no known risks of Acid Sulfate Soils occurring within three metres of the natural surface on site.

A search of the DEC Contaminated Sites Database reveals that the Development Plan area and surrounding land have not been identified as contaminated sites.

2.1.2 Flora and Fauna

The site is well vegetated with grasses and small shrubs, including some areas of dense shrubs and small trees. There are no known Declared Rare and Priority Flora or Threatened Fauna on the site.

2.2 Landform and Soils

The PSI indicates that the subject site is relatively flat with an elevation between 14.6m and 15.2m AHD, and falls gradually from the north-east down to the south and north-west.

Soils within the subject site are categorised as “Clay Soils”, with proximity to deep sandy and sandy earth soils.

2.3 Ground Water and Surface Water

The PSI has concluded that no detailed information is available on the depth of groundwater at the subject site. However, based on information provided in the Department of Water (DoW) bore search, it is likely to be at depths greater than 4m below Ground Level (bGL).

There are no potentially sensitive environmental receptors in the form of surface water, wetlands or watercourses on or in close proximity to the subject site.

2.4 Heritage and Cultural Significance

A search of the Australian Government Heritage Database has not uncovered any areas of Aboriginal or European heritage significance on the subject site.

A search of the Western Australian Heritage database identified the Tambrey Centre, located on Lot 4227, as a building of heritage significance. The Tambrey Centre is located approximately 200m to the north east of the subject site and therefore will not adversely impact on the future development of the land.

2.5 Climate

Karratha is located within a hot, semi-arid climatic zone. Summers (October to April) are extremely hot with an average maximum temperature of 36.1°C. Winters average a minimum temperature of 13.6°C.

2.6 Context Analysis

2.6.1 Historical Context

Prior to being developed as a Primary School in October 1989, the subject site had been set aside by the Department of Education (DoE) as a future District High School. However, a subsequent educational needs assessment in the Karratha area revealed that a District High School would not be required, and that a Primary School would be sufficient to meet the educational needs of the local population.

The Tambrey Primary School was subsequently only developed on a portion of the subject land.

In 2007, the DoE resolved that the existing Karratha Primary School would be re-built on its existing site and new facilities would be constructed for students in Years 11 and 12 on the Pilbara TAFE (Karratha Campus) site.

At the same time, the DoE resolved that funding for an upgraded Karratha Primary School and additional facilities at Pilbara TAFE should come from the excision and disposal of the vacant portion of the Tambrey Primary School site, the subject of this Development Plan.

The DoE has resolved to support the proposed Development Plan on the basis that the use of the subject site for future residential development will not adversely impact upon provision of education in the area i.e. the Department has confirmed that the remaining portion of the Tambrey Primary School site will adequately meet the educational needs of the Tambrey area and any future expansion of the Tambrey Primary School (refer **Appendix 2**).

2.6.2 Surrounding Land Use and Development Pattern

The local area surrounding the subject site has generally been developed for single residential purposes at R20 – R30 densities. Grouped dwelling lots at a density of R25/30 have been created in the area on the western side of Balmoral Road. Reserve 48995, immediately to the east of the subject site, is a children's playground surrounded by a significant grassed area. Located north-east of the subject site is the Tambrey Oval and the Tambrey Tavern and Function Centre (refer **Figure 5**).

The Karratha City Growth Plan identifies a new local retail and commercial centre located at the intersection of Bathgate Road and Dampier Road, approximately 800m from the subject site (refer **Figure 4**). LandCorp, as the developer of the retail and commercial centre, has advised that detailed planning for development of this centre has not yet commenced. However, it is reasonable to assume that the centre will be of sufficient size and diversity to provide the necessary services to meet the needs of surrounding residents, including those within the Tambrey development.

2.6.3 Karratha Housing Market

Karratha is currently experiencing a critical shortage of accommodation for both long-term residents and short-term fly-in / fly-out workers which is recognised as one of the biggest constraints affecting the growth of the Council into a city.

The quarterly Housing and Land Snapshot report prepared by the Pilbara Development Commission (PDC) in June 2011 outlines the average advertised price of the residential properties for sale in Karratha based on the number of bedrooms, over the previous three quarters.

Table 1: Karratha Housing Market

Karratha	Quarter	Number	Min \$	Max \$	Avg \$
One Bedroom	Dec-10	5	\$ 275,000	\$ 530,000	\$ 446,800
	Mar-11	5	\$ 265,000	\$ 600,000	\$ 431,800
	Jun-11	2	\$ 490,000	\$ 525,000	\$ 507,500
Two Bedroom	Dec-10	4	\$ 507,000	\$ 739,000	\$ 578,750
	Mar-11	14	\$ 507,000	\$ 850,000	\$ 620,786
	Jun-11	14	\$ 459,000	\$ 710,000	\$ 599,000
Three Bedroom	Dec-10	99	\$ 535,000	\$ 1,125,000	\$ 767,009
	Mar-11	116	\$ 485,000	\$ 1,150,000	\$ 760,780
	Jun-11	102	\$ 580,000	\$ 1,150,000	\$ 757,920
Four Bedroom & above	Dec-10	78	\$ 749,000	\$ 1,420,000	\$ 1,023,156
	Mar-11	95	\$ 650,000	\$ 1,395,000	\$ 1,002,989
	Jun-11	87	\$ 650,000	\$ 1,700,000	\$ 1,029,744
Total	Dec-10	186	\$ 275,000	\$ 1,420,000	\$ 861,769
	Mar-11	230	\$ 265,000	\$ 1,395,000	\$ 845,150
	Jun-11	205	\$ 459,000	\$ 1,700,000	\$ 859,983

The proposed Development Plan will facilitate development of critical additional housing stock, which in turn will assist in relieving the severe shortage currently being experienced throughout the Council and broader Pilbara region.

LOCAL CONTEXT PLAN

Lot 504 Nickol,
TAMBREY

LEGEND

--- Site Boundary

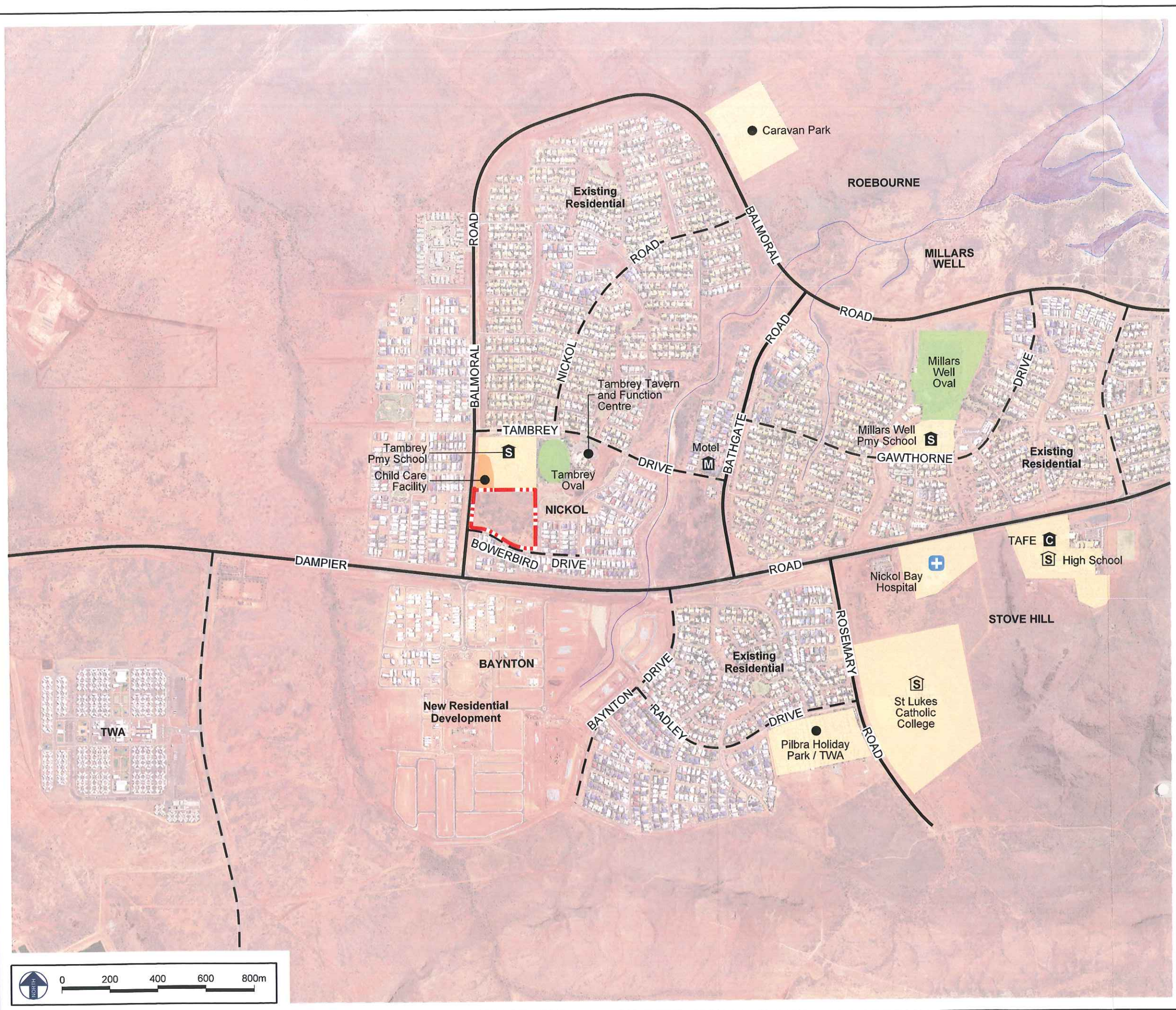


FIGURE 5

ABN Developments : CLIENT
1:15,000@A3 : SCALE
7 September 2011 : DATE
3789-5-004.dgn : PLAN No
- : REVISION
T.K. : PLANNER
R.F. : DRAWN
N.T. : CHECKED

Base data supplied by Landgate.
Aerial Photography dated 2010.
Accuracy +/- 4m. Projection MGA Zone 50.

Areas and dimensions shown are subject to final survey calculations.
All carriageways are shown for illustrative purposes
only and are subject to detailed engineering design.



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3.0 PROPOSED DEVELOPMENT PLAN

3.1 Design Intent and Philosophy

Simon Youngleson Architects and Urban Designers (SYAUD) have prepared a concept Masterplan to support the Development Plan (refer **Appendix 3**).

The concept Masterplan is consistent with the design intent and philosophy of the site, which is to provide for the creation of a village, with a vibrant sense of place, purpose, community and integrity where residents have an opportunity to be part of a successful, integrated and supportive community in Karratha.

The Masterplan (and associated Development Plan) is underpinned by the following Urban Design principles:

- Increased passive surveillance of the school site and POS through the provision of a greater number of lots with direct frontage to these areas;
- Improved level of pedestrian safety with the absence of crossovers on the street fronting the school site;
- The provision of a variety of lot sizes and product choices to ensure purchasers have a range of options for cottage and traditional lots in a range of different price points;
- Improved pedestrian movement with enhanced connectivity through streets to the school site and eastern POS;
- The creation of internal focal points and vistas through to the open space that will be treated with landscaping features to break up the mass of the project;
- The creation of a permeable road network that also provides a more appropriate overland flow path for stormwater drainage;
- Lot frontages on traditional lots which will facilitate the construction of homes more in keeping with the lifestyle needs of Karratha's residents, including accommodating off street boat parking;
- The provision of wider lots in areas fronting existing properties that will facilitate the construction of homes with comparable elevations which mirror the existing streetscape;
- The creation of laneways with clear sightlines and no 'dead' corners;
- The creation of a pedestrian friendly environment through the reduced dominance of the automobile and a greater provision of rear-loaded cottage lots;
- Increased community interaction and surveillance of the street encouraged through the provision of large front Outdoor Living Areas (verandahs) to both cottages and traditional homes;
- All homes to address the street through defined entries and front living spaces;

- Embed the development with an identity unique to Karratha through a colour and materials palette reflective of the surrounding built and natural environment;
- Address parking shortages and create activity in the street through the provision of on-street parallel parking bays;
- The use of appropriate permeable fencing will provide a clear definition between the public and private domain and create aesthetically pleasing streetscapes;
- The provision of street trees to both sides of the street to provide, shade, scale and beauty to the streetscape; and
- Minimised front setbacks will ensure homes address the street, community interaction is promoted, and a more intimate scale to the streetscape is achieved.



Figure 6: Design Features

3.2 Karratha Vernacular

In addition to the design intent and philosophy outlined in Section 3.1 above, the Development Plan responds to key elements of the Karratha Vernacular Design Principles (2011), namely:

Residential Streetscapes

The Development Plan has considered the provision of boat parking, which will be through the provision of laneways (in order to remove boats from the streetscape entirely) as well as front verge parking for the

traditional lots. Street trees and ground cover planting will be provided on all streets being accessed by a Cottage lot, providing a pedestrian friendly environment.

The Development Plan proposes avenues of trees on all streets. It also considers the front verandah as an important element of the delivery of the built form and an important element of the vernacular style. The Development Plan also details the delivery of permeable fencing on residential properties providing an interactive streetscape.

Landscaping

The approach to landscaping for the proposed development will respond to the *Karratha Vernacular Design Guidelines* in a number of ways.

Where possible, vehicle access to lots has been located at the rear of properties (via laneways) to reduce the dominance of vehicles within the streetscape. Low, semi permeable fencing will be used at the front of lots to increase passive surveillance and encourage neighbourhood interaction. All fencing will be cyclone rated.

Where practical, local materials will be used and the colour palette of materials/finishes selected shall reflect the natural environment of Karratha.

Low maintenance, predominantly native plant species will be used which are better adapted to the local conditions. Local plant species will also enhance the sense of place. Only hardy exotic species shall be used where appropriate. Street trees will be mainly native species and assist in providing shade, improving the aesthetics of the streetscape and in creating microclimates.

Trees within the proposed lots will be selected to provide a canopy for shade whilst not becoming too large for the residential scale.

Vegetation will be used around the perimeter of housing to filter the breeze path and aid in cooling. In addition, climbers will add further shading to the houses and alfresco areas.

Xeriscaping principles will be adopted including suitable plant selection (as mentioned above), stone mulch to aid in retention of moisture in the soil and limited use of lawn areas. Irrigation will be subsurface and directed to individual plants to minimise water wastage, with the aim of gradually reducing the amount of irrigation over time as plants become established.

Location of Breezeways

Due to the compact size of the proposed dwellings a breezeway throughout the extent of the homes will not be possible. Nevertheless, as a preferred alternative to breezeways, a large covered outdoor room will

be provided for each dwelling, accessed from the main living areas designed with multiple openings to promote cross ventilation.

Moreover, the planning of the dwellings has been designed around separating the building into zones to ensure that bedroom wings are well sealed to allow for efficient mechanical cooling of these spaces where it is required.

Outdoor Living Areas

Large Outdoor Living Areas will be provided for all dwellings in the form of deep elevated, covered, front verandahs, with an additional covered alfresco area in one of the cottage products and all the traditional products. Section 9.0 in Part 1 – Statutory Provisions - of the Development Plan report prescribes, among other matters, minimum dimensions for the Outdoor Living Areas. In addition, **Appendix 8** highlights those lots where minor variations to the prescribed dimensions are required as a result of physical lot constraints.

The Outdoor Living Areas are consistent with the Performance Criteria of the Residential Design Codes in that they are all capable of use in conjunction with a habitable room of the dwelling and take best advantage of the lot orientation for solar gain.

The location of the covered Outdoor Living Areas adjacent to the main living spaces at the front of the dwellings will be ideal for the barbecue and nocturnal lifestyle of Karratha's residents, and will facilitate community interaction and surveillance of the street.

In addition to being roofed and having permeable balustrading, the Outdoor Living Areas have been designed to be fitted with vertical canvas blinds to provide additional shade, privacy and comfort for residents and to enable flexibility in how the outdoor rooms are utilised. The use of blinds on the Outdoor Living Areas will also aid in creating an interesting and varying streetscape.

Eaves (Shade)

This design principle is a key element of the design response for the housing through the use of large shaded verandahs or "outdoor rooms" on all dwellings.

Maximum transportable dimensions restrict the size of eaves. However, a minimum 800mm sized eave will be provided where there is glazing.

The deep covered front verandahs and rear alfresco areas provide a large amount of shade and enable all major openings accessed from the adjacent living areas to be located under constant shade.

Glazing on the east and west facades will be kept to a minimum and be small in format, located under the eaves or fitted with additional shading attachments such as awnings or external window boxes.

Colours and Materials

The delivery of the homes at Tambrey will be exclusively constructed in lightweight construction as a result of being modular homes.

Using imagery from site visits to Karratha, and with the aid of a specialist colour consultant, a unique colour palette has been produced that consists of tones that reflect and complement the natural landscape and local vernacular buildings of Karratha.

The colours in the Tambrey palette are predominantly light in tone to reflect the harsh sunlight and when applied across the development will tie in to create a common architectural language and coherency across the built form.

The intended colour scheme for housing in Tambrey is for the bases of the buildings and streetscape, such as retaining walls and decking, to consist of rich, earthy tones to reference the surrounding ground plane, and for the houses and attachments to be lighter in tone with a textural quality to reflect the cooler pastel tones of the unique Karratha vegetation.

Boat Parking

The demand for boat bays has been carefully considered and incorporated into the designs of the dwellings without detracting from the intended urban design outcomes.

Each traditional dwelling type makes provision for a boat bay located at the side of the house in addition to a double carport. A number of the cottage products also cater for two (2) covered car bays and a boat bay accessed off the rear laneway.

In addition, a large amount of on-street parking has been provided within the Development Plan to accommodate visitors.

Access

All dwellings will be easily accessed without the use of stairs either by the laneway for the cottage lots or via the driveway for the traditional lots.

Fencing to Streets and POS

Fencing to all streets, including those lots adjacent to the POS, will be a maximum height of 1800mm and visually permeable above 1200mm. For the lots adjacent to the existing POS, a small amount of retaining

will be required, including a low permeable fence fixed above to facilitate community interaction, enable surveillance of the street and to allow breezes through. The provision of this type of front and side fencing will also create a distinction between the public and private domain.

Setbacks to Laneways

The laneway design consists of a 6m carriageway with a 1.1m setback to allow for bins and to facilitate larger vehicle turning circles.

Designated areas for planting have been incorporated into the laneway design, to soften the laneway. A narrower entry 'throat' to laneways has also been designed to differentiate the laneway from the main access roads.

3.3 Built Form

ABN intends to utilise its manufactured housing division, TR Homes, to facilitate a quick delivery of a range of Traditional (R20) and Cottage (R30) modular housing products across the site, designed specifically on the unique local environment and lifestyle.

Some conceptual/indicative examples of the housing products are illustrated below:

Traditional Modular Housing Products



Figure 7: Front Elevation TOI – Type A



Figure 8: Front Elevation TO2 – Type A



Figure 9: Front Elevation TO3 – Type A

Cottage Modular Housing Products



Figure 10: Front Elevation COI – Type A



Figure 11: Front Elevation CO2 – Type A



Figure 12: Front Elevation Co3 – Type A

Indicative Design Outcomes



Figure 13: Transect Elevation (Cottage Dwellings)



Figure 14: Transect Elevation (Traditional Dwellings)

3.3.1 Integration with Surrounding Development

Surrounding development consists of the Primary School site to the north and north-east, existing POS to the east, and residential development adjacent to Balmoral Road, Bowerbird Drive and Flannel Bush Turn.

The proposed development has been designed to appropriately address the POS and Primary School site with all R30 lots orientated toward the adjacent sites providing passive surveillance and enhancing the amenity, safety and security of the area. The provision of on-street parking also encourages the active use of the adjacent sites for recreational purposes.

The Development Plan has been prepared having regard to the adjacent Child Care Centre and likely future expansion of the Tambrey Primary School. This notwithstanding, the Department of Education has advised that planning for the expansion of the Primary School has not yet commenced.

The Development Plan provides parallel car parking embayments, a shared-use path and wider road reserves to accommodate potential increases in vehicular and pedestrian traffic during peak periods of demand. The verge adjacent to the Child Care Centre also provides adequate space to facilitate the construction of a new crossover at some point in the future (it is acknowledged that the current location of the cross-over to the child care centre off Balmoral Road is less than ideal).

3.4 Residential

3.4.1 R-Code Variations

In order to achieve the 'vision' for the site and address the Urban Design principles identified, the proposed Development Plan will require the Council's support to a number of variations to the R-Codes notably in relation to front setbacks and outdoor living areas.

With respect to the proposed Development Plan, the provisions of Clause 6.2.1 (A1.1) and Table 1 of the R-Codes prescribe the following minimum primary street setback requirements:

- R20 zoned land: 6 metres; and
- R30 zoned land: 4 metres.

Furthermore, Clause 6.4.2 (A2) of the R-Codes states the following:

“outdoor living area[s] [are] to be provided [with] at least two-thirds of the required area without permanent roof cover”.

Specifically, the Council is requested to support variations to the abovementioned R-Code requirements as follows:

- i. A reduction in the front setback for all R20 lots to 3m (with no average setback);
- ii. A reduction in the front setback for all R30 lots to 2.5m (with no average setback) and;
- iii. Permanent roof cover over 100% of outdoor living areas for all R30 coded lots.

Reducing the minimum front setback requirements for all lots within the Development Plan will facilitate more effective use of private open space on the lots and will place greater emphasis on the dwelling's articulation toward the primary street, thereby increasing community interaction and surveillance of the street.

Given the design of the cottage style modular housing product, and the extreme climatic conditions experienced in Karratha, it is considered appropriate to provide 100% roof cover for the R30 outdoor living areas. This will not only mitigate the harsh climatic conditions but will also encourage the outdoor areas to be used on a more frequent basis resulting in greater interaction with neighbours and the street.

A variation to the R-Code requirements for outdoor living areas is not required for the R20 lots as these are of sufficient size to satisfy the requirements of Clause 6.4.2 (A2) above (while at the same time providing sufficient permanently covered outdoor areas for protection from the weather and promoting interaction with the street).

3.4.2 Density and Diversity

The Development Plan incorporates a mix of low and medium density housing generally of densities R20 and R30 and provides for the creation of thirty-eight (38) R20 lots and forty-four (44) R30 lots. While the total yield is marginally less than the number of lots that could be achieved - based on the strict interpretation of the minimum average lot size requirements of the R-Codes - it is important to note that the development has been holistically planned to achieve the highest possible urban design outcomes, and that the lots have been designed around the dwellings, rather than the other way around, where lot yields are maximised at the expense of good design.

The Residential R20 sites occupy the southern portion of the Development Plan. These R20 sites are provided with direct street access and will be developed to provide the 'Traditional' modular housing product. The Residential R30 sites generally occupy the northern portion of the Development Plan area and are provided with rear laneway access. The R30 sites will be developed to provide the 'Cottage' style modular housing product.

The proposed densities will facilitate the provision of a built form development that represents the unique lifestyle and climatic conditions which characterise Karratha while helping to relieve the severe housing demand currently being experienced throughout the town and broader region.

The site is located within 100m of the Tambrey Primary School and a large area of POS increasing the walkable catchment and further supporting the proposed densities.

3.4.3 Lot Type and Shape

The proposed Development Plan has been specifically designed to provide lot sizes which are capable of accommodating the 'Traditional' and 'Cottage' modular housing product developed by TR Homes.

The R30 lots are largely characterised by narrower lot widths of 13m with rear laneway access. The R20 lots generally have widths of between 16.5m to 17.5m.

Laneways have been used to reduce the dominance of carports and vehicles and to achieve a positive urban design outcome by promoting walkability, and designing houses to address the street with large elevated front Outdoor Living Areas (verandahs) and facilitate passive surveillance.

The reliance on vehicular travel and the high number of vehicles per household has been acknowledged and addressed through an efficient laneway design that enables the majority of cottage homes to have two covered car bays and one boat bay.

The laneway product has been designed to be narrow and compact at only 120sqm to ensure the availability of affordable housing product in the development. Having regard to the design principles associated with the cottage and traditional lot product, and the resulting passive surveillance opportunities that these dwellings will provide, the addition of a second storey to accommodate studio apartments is considered unnecessary.

Critically, the provision of studio apartments would significantly raise the cost of the houses, which in turn would need to be reflected in higher prices for prospective purchasers.

3.4.4 Lot Orientation

The majority of the cottage (R30) lots are oriented north-south to ensure that living areas and the large Outdoor Living Areas (verandahs) addressing the street are north facing to capture the prevailing north-westerly breezes and cooling north-easterly breezes. This orientation also enables residents to effectively control the amount of daylight entering the dwellings on the northern façade, and enables all major openings to be located in shade under the roof of the front Outdoor Living Area.

In addition to the front Outdoor Living Areas the cottage lots, have a large covered rear alfresco and living area with a northern aspect for lots that have a southern frontage.

This layout and integral design feature of the Outdoor Living Areas that encourage community interaction and surveillance ensures that the dwellings effectively address the street, and will enable a good urban design outcome to be achieved. In the Development Plan, dwellings will appropriately address the main entry road adjacent to the Primary School and existing Bowerbird Drive, mirroring the lot layout of the neighbouring developments along this route.

All traditional lots have a large covered front Outdoor Living Areas and covered rear alfresco of comparable size to allow flexibility in the plans through the arrangement of secondary living spaces and extra bedrooms to facilitate multiple living arrangements, and to ensure all living spaces and outdoor rooms have a northern aspect.

It should be noted that as a result of the location of the main drainage route parallel to Balmoral Road, a number of roads and laneways are aligned east-west to cater for overland drainage in accordance with the civil engineering requirements.

3.4.5 Climatic Responsiveness

The proposed Development Plan has been designed to respond to the unique microclimate that characterises Karratha through the implementation of passive solar design and natural cross ventilation.

The design of the cottage modular dwellings are narrow to promote cross ventilation, with minimal side setbacks between buildings to increase shade on the eastern and western facades. As previously highlighted, glazing on the eastern and western facades will be kept to a minimum and be small in format, located under the eaves or fitted with additional shading attachments such as awnings or external window boxes.

The use of microclimate landscaping will also be applied close to the houses to further provide shade for the buildings and a comfortable environment.

3.5 Movement Network

Located in an existing urban environment, the Development Plan integrates with the existing street network. The street network proposed by the Development Plan is a modified connected grid pattern and includes the following characteristics:

- A North-south road alignment allowing cooling breezes to flow between dwellings;
- Provision of dedicated on-street parking;
- No vehicular access to Flannel Bush Turn on the site eastern boundary to reduce through traffic movement and increase safety for pedestrians; and
- Three (3) external access points to the development being one (1) onto Balmoral Road and two (2) on Bowerbird Drive providing a high level of accessibility.

The primary point of access into the proposed development will be via the road at the northern end of the Development Plan adjacent to the proposed Balmoral/Brolga Meander roundabout. Notwithstanding the primacy of this entry point the Development Plan provides a further access focal point at the southern end of the main north-south road link. The creation of a short boulevard at this location is intended to provide an attractive alternative way into and out of the proposed development.

A detailed Transport Assessment Report (TAR) was prepared by ARUP (refer **Appendix 4**) which assesses the impacts of the proposed development on the adjacent road network. ARUP's investigations can be summarised as follows.

3.5.1 Surrounding Road Network

The TAR established that the intersections considered to be significantly affected by the proposed development are the intersection of Balmoral Road and Bowerbird Drive and, the intersection of Balmoral Road and Brolga Meander. The TAR concluded both intersections are expected to operate well within capacity during peak hour in 2013 when the residential development is finished, assuming the Balmoral Road and Brolga Meander intersection is converted to a four-way roundabout with direct access to the development.

It should be noted that the TAR has considered operating conditions in the ultimate design year. The analysis took into account baseline traffic growth at a rate of 5% *per annum* (agreed with Council) plus full development traffic (using conservative estimates). The analysis of the roundabout shows that it is highly likely to operate effectively in the ultimate design year with significant residual capacity.

3.5.2 Local Streets

The internal road network includes predominantly 15m road reserves with a 6.0m carriageway. An 18m road reserve has been provided adjacent to the Primary School site to the north consistent with 'Liveable

Neighbourhoods' principles of design. The wider road reserve adjacent to the school site allows for the provision of a 2.5m shared use path on one side of the road.

On-street parking provision is anticipated for all streets with bays at 2.5 metres in width interspersed with landscaping nibs. Given the close proximity to the Primary School, the overall design intent is to reduce the visual width of the trafficable reserve to support low traffic speeds and create a highly pedestrian friendly environment.

A number of indicative cross sections for the streets within the proposed development have been prepared, examples of which are illustrated below:

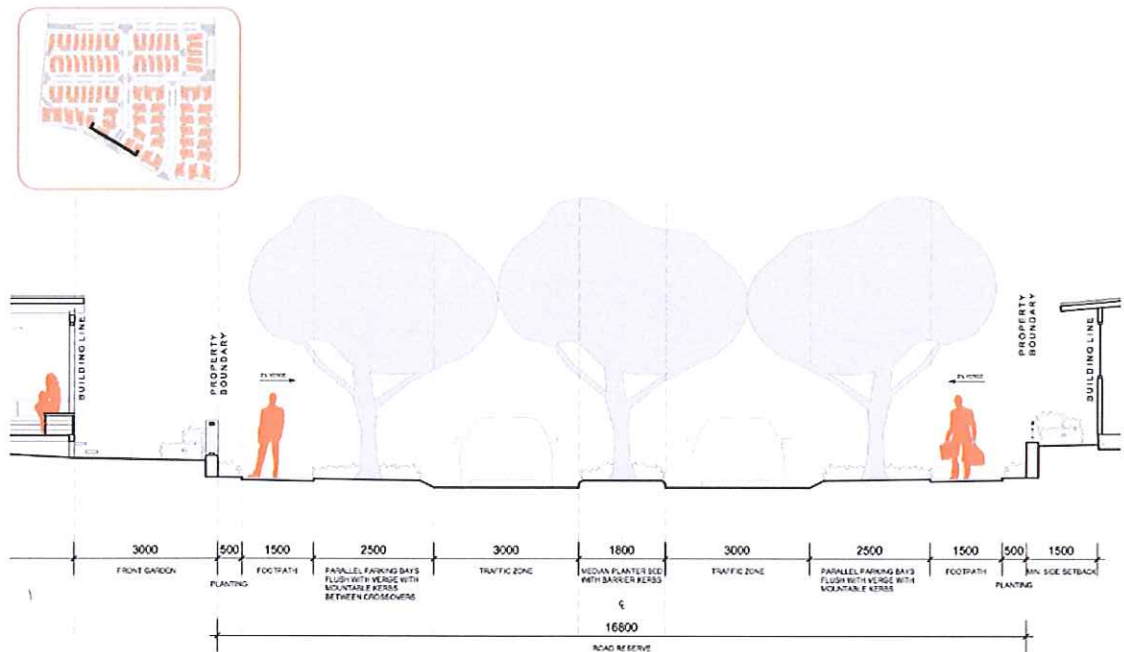


Figure 15: Section through Entry Boulevard

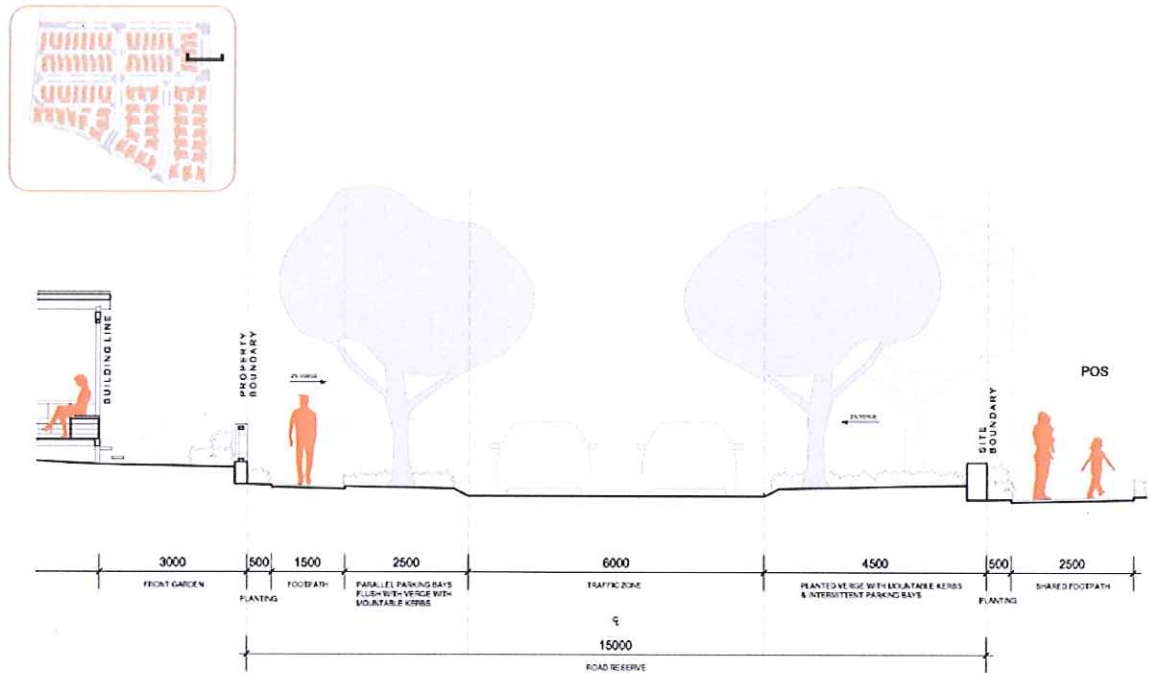


Figure 16: Section through Street adjacent to POS

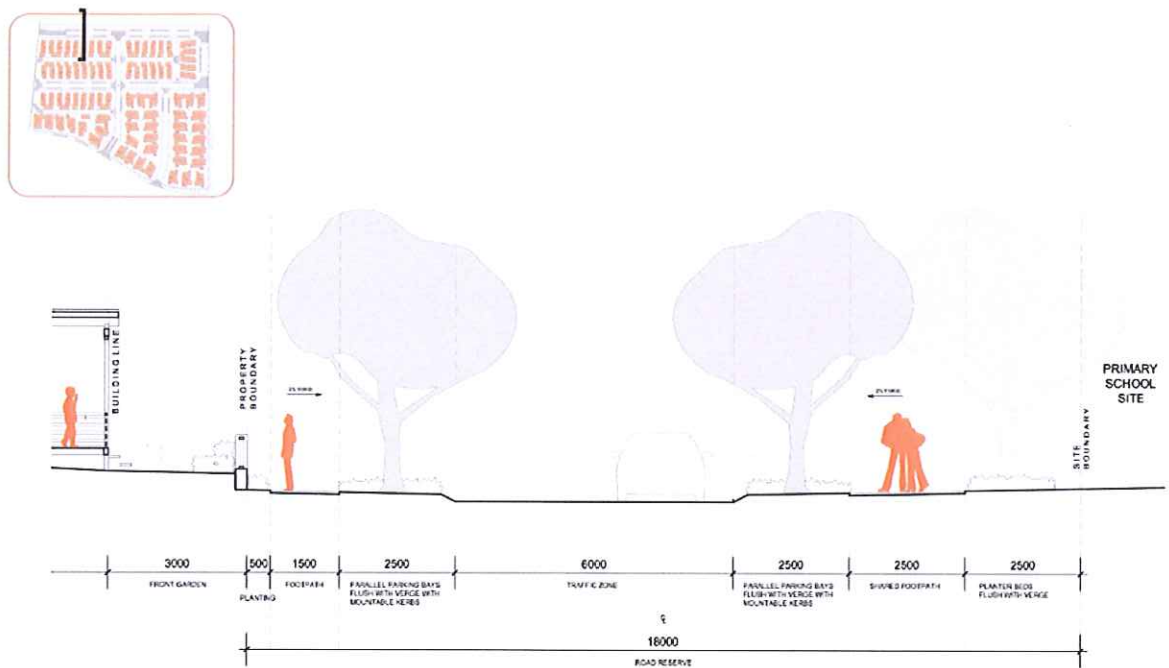


Figure 17: Section through Street adjacent to Primary School Site

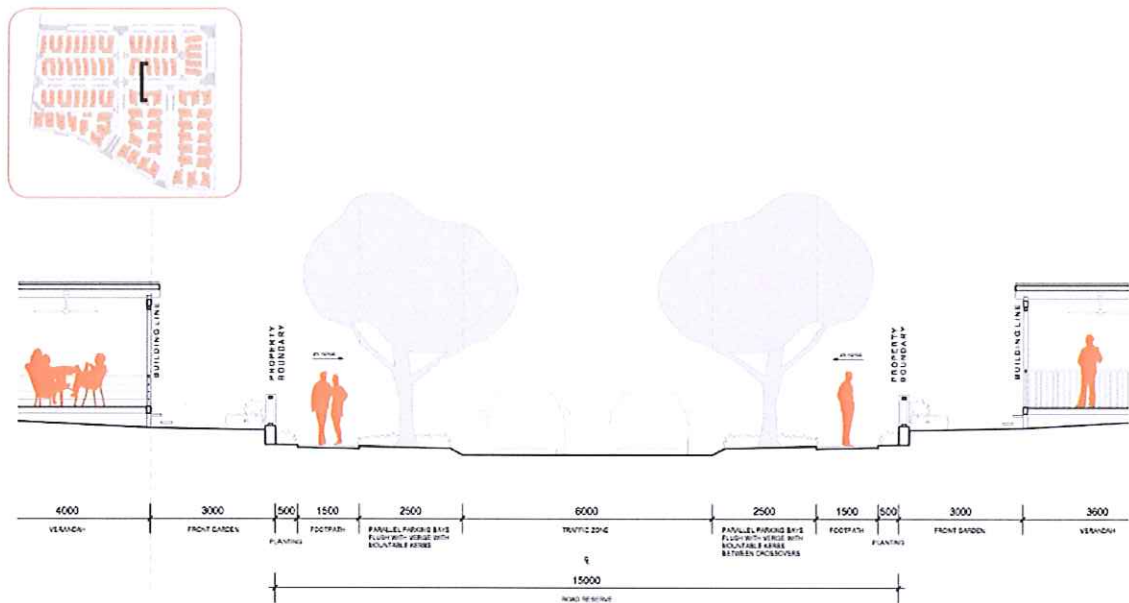


Figure 18: Street with Cottage Lots opposite Traditional Lots

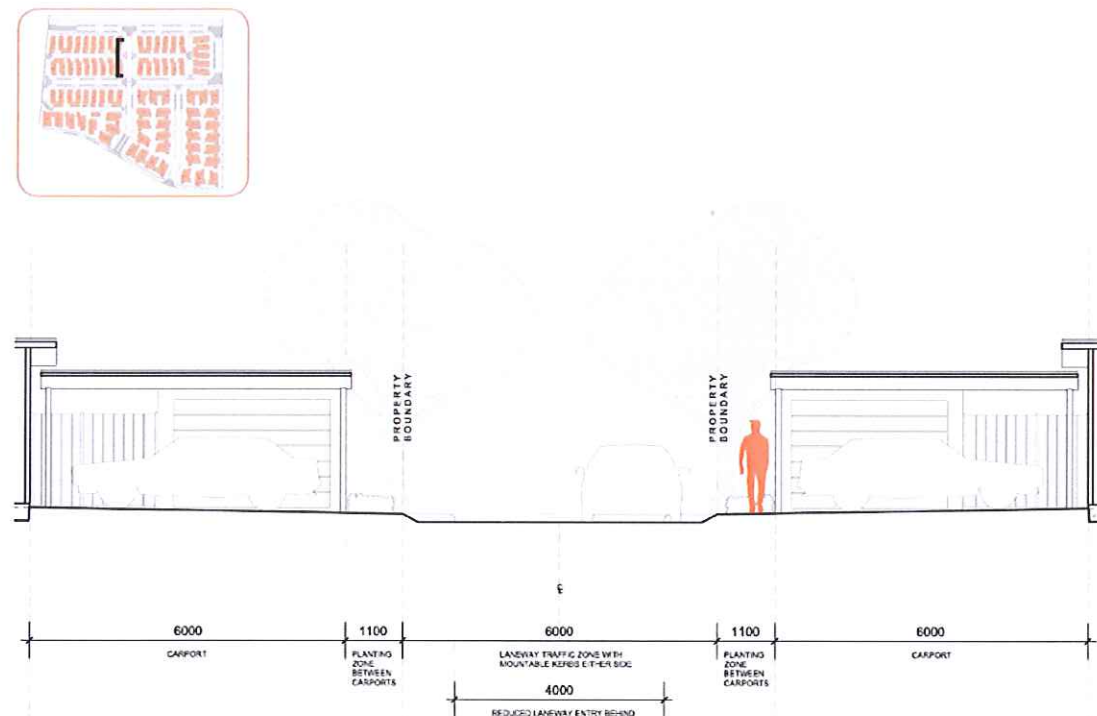


Figure 19: Laneway Entry

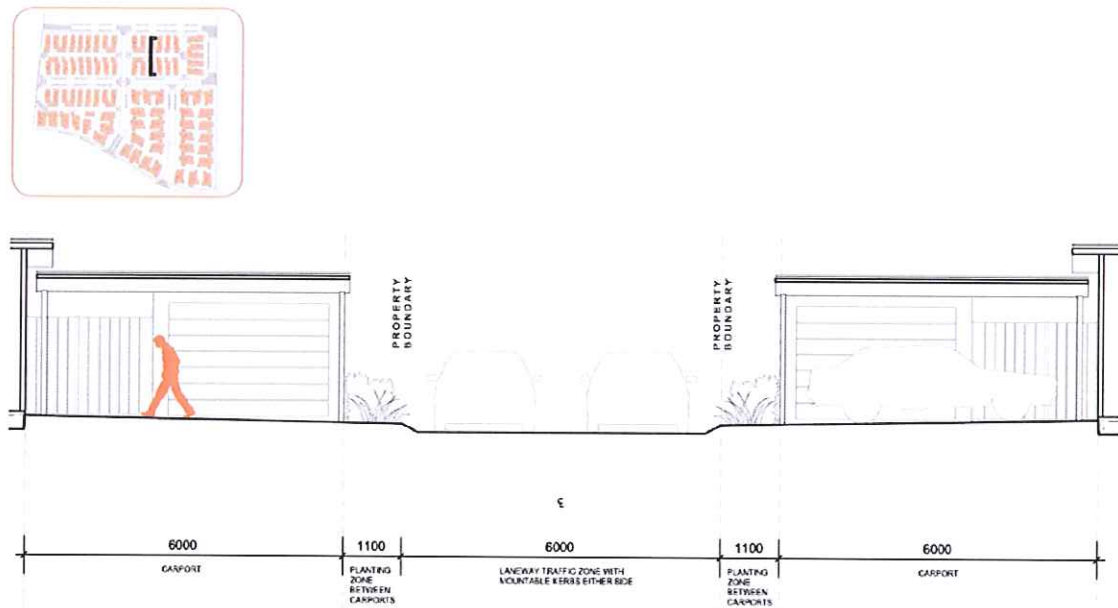


Figure 20: Typical Laneway Section

3.5.3 Laneways

The proposed laneways have been designed to a width of 6m which is sufficient given the narrower 'throat' intended to restrict access to one way at a time. While Liveable Neighbourhoods suggests a 5.5m carriageway for access ways, the Council of Roebourne's technical services personnel advised that a 6m carriageway for laneways is preferred given the prevalence of larger vehicles in Karratha. The 6m width of the laneways will also effectively help reduce traffic speeds and increase the safety for crossing pedestrians and on-street cyclists.

3.5.4 Intersection Spacing

All intersections are spaced so as to comply with the requirements of the Liveable Neighbourhoods. Accordingly, the Development Plan will result in a safe environment for pedestrians, cyclists and motorists.

3.5.5 Traffic Speed

The local streets proposed by the Development Plan are designed to produce the target vehicle speeds as prescribed by Liveable Neighbourhoods. The proposed local streets are short in length and do not create opportunities for speeding.

3.5.6 Public Transport

Currently, there is little public transport provided in the Karratha region, with a single bus route currently operating twice a day on Tuesdays, Saturdays and Sundays between Dampier and Port Sampson. A bus stop associated with this route is situated at Tambrey Oval approximately 400 metres north of the development site.

A new bus route may be considered as part of the development of Karratha consistent with the vision articulated in the Karratha City of the North Plan. This route is only at the concept planning stage and is unlikely to be in operation in the short-medium term. Public transport is therefore unlikely to affect the mode split of residents in the proposed development for the foreseeable future.

3.5.7 Pedestrian Circulation and Amenity

The proposed walking and cycling network within the development has been developed to provide for the convenient and safe movement of pedestrians and cyclists through and external to the site, notwithstanding limitations to surrounding infrastructure. It is expected that residents of the development will utilise the walking and cycling network for recreational purposes, as well as for access to the nearby Tambrey Primary School and proposed child care centre in the future.

The provision of an east-west shared path aligned along the northern boundary of the site should, in the future facilitate an external connection northwards to the Tambrey route shown in the Council Bike Plan.

The following principles will be implemented as part of the proposed development to contribute to the amenity of the streetscape and to facilitate safe movement of pedestrians and cyclists north to the Tambrey Primary School, as well as through to the existing path network external to the subject site:

- Footpaths on both sides of internal streets;
- Footpaths with a minimum width of 1.5m;
- A 2.5m shared use path adjacent to POS and the Primary School site which connects to the existing path network on Bowerbird Drive, Flannelbush Turn and the western side of Balmoral Road;
- The provision of street trees adjacent to footpaths at a distance of 10m to 12m providing ample shade for pedestrians on both sides of the street; and
- The design of the modular homes for the traditional and cottage lots provide front Outdoor Living Areas and living spaces that protrude into the front setback area to encourage street surveillance, pedestrian activity and community interaction.

3.5.8 Streetscape

The proposed street network has been designed to convey to users its primary function and unique character, and identify and encourage appropriate driver behaviour. Development will be subject to specific design provisions which have been established by the Built Form Vision document developed by SYAUD.

3.6 Public Open Space (POS)

The WAPC's Policy No. DC 2.3 'Public Open Space in Residential Areas' requires that for residential subdivision, 10% of the gross subdivisible area shall be given up free of cost by the subdivider for POS purposes. The aim of the policy is to ensure that the provision of POS allows for a reasonable distribution of land for active and passive recreation.

However, WAPC Planning Bulletin No. 21 'Cash-in-Lieu of Public Open Space' provides for the following:

"In some circumstances the provision of an area of land for public open space is not practical and it may be more appropriate for cash-in-lieu of public open space to be given for the following reasons:

- *in small subdivisions, the provision of public open space may result in a small unusable area of land being set aside;*
- *there may be sufficient public open space already available in the locality;*
- *public open space may have been provided in earlier subdivisions; or*
- *open space is planned in another location by way of a town planning scheme or local structure plan."*

The principles of Planning Bulletin No. 21 are consistent with 'Liveable Neighbourhoods'.

The proposed development is situated in an area which contains adequate amounts of POS. In this regard, the site is located immediately adjacent to an existing area of POS (1.6ha) and the Tambrey Oval (to the north-east), which provides a further 2ha (approx.) of open space (refer **Figure 5**).

Accordingly, a cash payment in lieu of the 10% POS is considered appropriate in this instance, with the amount to be determined by the Council in accordance with prevailing market conditions.

3.7 Urban Water Management

Emerge Associates have prepared a Local Water Management Strategy (LWMS) to support the Development Plan, consistent with the requirements established by the WAPC's Better Urban Water Management policy (refer **Appendix 5**).

The LWMS establishes a Total Water Cycle Management approach to water management at the site, and has been developed based on detailed site-specific investigations, industry best-practice and relevant state and Council of Roebourne policies relating to water management. The overall objective for the LWMS is to mimic the hydrological regime that currently exists prior to urban development of the site. Underpinning this is the requirement to protect life, property and the environment from intense rainfall events.

The water management approach associated with the Development Plan includes:

- Surface runoff should be conveyed by surface drainage within road reserves, not piped drainage;
- On-site detention should only be considered if absolutely necessary to slow down peak flows;
- There will be no onsite retention;
- There are no requirements to address water quality, or to treat runoff prior to leaving site;
- Culverts will be required to convey flows at road crossings;
- Finished floor levels should be driven by separation requirements from 100 year flood levels, and from established tidal inundation levels;
- Drainage design elements must comply with the Council of Roebourne drainage standards; and
- Water should be conserved wherever possible, and the State Water Strategy consumption target of 40kL/person/year has been adopted.

The LWMS was prepared with the intention of not only demonstrating that the Development Plan is spatially able to accommodate the water management approaches proposed, it also guides the future detailed designs for the site by providing clear, auditable criteria that will ensure that overall objectives are met.

The criteria established for the LWMS includes:

Water Conservation Criteria:

- WC 1 Ensure the efficient use of all water resources; and
- WC 2 Consumption target for scheme water of 40 kL/person/year.

Surface Water Criteria:

- SW1 Post-development critical 5 year and 100 year ARI peak flows will be generally consistent with pre-development peak flows;
- SW2 Conveyance of the 5 year ARI event will be achieved by open swales within road reserves;
- SW3 Conveyance of events up to the 100 year ARI to be achieved in a combination of the open drainage channel and road pavement;
- SW4 Maximum flow velocity for surface runoff conveyance is 2m/s;

- SW5 Finished floor levels of lots must have a 300 mm clearance from the 100 year ARI event flows being conveyed within road pavement;
- SW6 Finished floor levels of lots must have a 500 mm clearance above the 100 year ARI flood level within major drainage channels;
- SW7 The finished floor levels must have a minimum of 500 mm clearance from the tidal influence level of 7.6m AHD;
- SW8 Culverts are to be used for road crossings, and these should be greater than 450 mm in diameter; and
- SW9 Reduce nutrient loads by applying appropriate non-structural measures.

As a part of the LWMS investigation process Emerge Associates determined the pre-development catchments to establish which direction of surface water will flow. This included referencing the design contours within the drain adjacent to Dampier Drive. The design contours from this drain indicate that upstream runoff flows from a localised high point within the drain. This high point (15.5m AHD) is adjacent to the end of Seasnake Court. From this point the flows within the drain are west towards Balmoral Road and then north along Balmoral Road. Analysis of contours further downstream (i.e. north) along Balmoral confirm that the next downstream culvert under Tambrey Drive is of lower elevation (12.38m AHD) than Bowerbird drive (14.28 m AHD). Consequently, discharging runoff from the Tambrey site in a southerly direction would not be possible.

The approach taken for earthworks is to minimise the modification to the landscape and thereby reduce the amount of fill to be brought onto the site. The earthworks plan introduces a uniform grade across the site towards Balmoral Road, resulting in the minor portion of the eastern end of the site being drained to the west.

This approach is further justified by analysis of the land area available adjacent to Balmoral Drive and the capacity of culverts downstream at Tambrey Drive, which indicates that both the road reserve and the culverts have sufficient capacity to adequately convey runoff from the site.

The 'baseline' criteria that the Council stated needed to be met – that pre-development flows should not be exceeded – can be achieved within the Balmoral Rd reserve.

The LWMS has been endorsed by the Department of Water.

3.8 Infrastructure Coordination, Servicing and Staging

Wood & Grieve Engineers were commissioned by ABN to undertake a servicing investigation to establish the availability of services for the development of the subject land (refer **Appendix 6**).

A summary of the key findings of the investigation are provided below.

3.8.1 Earthworks and Retaining Walls

The investigation undertaken by Wood and Grieve Engineers established the need to import fill with minor on-site cut to fill to create flat lots that provide adequate clearance to the proposed lot levels and overland stormwater flood routing. WGE's Concept Earthworks Plan demonstrates the proposed finished surface levels.

Investigations revealed that the site will achieve a site classification of M-D (moderately [M] reactive clay or silts with deep seated [D] movement) which is typical of most developments in the Karratha Area.

The construction of sewer mains deeper than the underlying natural bedrock layer may require rock breaking.

No retaining walls are proposed for this development.

On-site test pitting undertaken by Douglas Partners discovered Gilgai (highly reactive clay) soils in the north western and south eastern corners of the site. Proof rolling during construction will confirm any further deposits exist across the site, or between testpits. Gilgai soils may be excavated and treated onsite, or more likely removed from site.

Douglas Partners Geotechnical Investigation provides further technical background on subsurface conditions (refer **Appendix 7**).

3.8.2 Stormwater Drainage

The drainage system proposed for this site is typical of that found in Karratha, consisting of overland flow paths discharging into open channel drains.

This development will be split into two drainage sub-catchments in general accord with the pre-development grade of the site. Two drainage discharge locations have been determined to efficiently and effectively convey overland flows to Balmoral Road.

3.8.3 Water Reticulation

A Media Statement released by the Government on 9 September 2011 announced Rio Tinto's agreement to surrender its priority entitlement to the Millstream water supply system for use by towns in the Pilbara. In light of this recent initiative, the proposed development should be able to have access to a potable water supply in the near future.

3.8.4 Sewer Reticulation

The Water Corporation are unable to confirm whether the existing sewerage system has adequate capacity to service the proposed development until the provision of a potable water service is determined.

Upon securing an appropriate water source, the majority of the proposed development can be serviced via existing Water Corporation infrastructure which surrounds the development being two sewer connections within Balmoral Road. A number of lots will also be serviced from infrastructure within Flannelbush Turn.

No off-site sewer extensions will be required.

3.8.5 Roadworks and Footpaths

Road pavement design and construction will be in accordance with the City of Roebourne's minimum design standards and recommendations made by Douglas Partner's Geotechnical Investigation. All roadways would be designed to accommodate the 100yr stormwater design flow, including the laneways.

Brickpaved intersection thresholds and parallel car parking embayment's have been proposed adjacent cottage lots and appropriate locations throughout the development.

Two trafficable links to Bowerbird Drive are proposed as well as new roundabout to access the development from Balmoral Road, at the existing intersection of Brolga Meander.

A 2.5m wide dual use path is proposed along the northern boundary of the development to cater for the influence of the neighbouring school site and cycling links through the adjacent POS. Concrete footpaths are proposed on both sides of all proposed access roads.

3.8.6 Power

Supply of underground power and street lighting to the site will come from connection to existing infrastructure surrounding the site. Timing of access will be subject to the implementation of the Karratha 22kV power upgrade as part of the Pilbara Underground Power Project. These works have commenced and it is anticipated that the upgraded system will be available at the time of construction.

Details relating to on street lighting and lighting to shared paths and adjoining public areas will be provided at the detailed design stage.

3.8.7 Telstra

On the basis of the new Government initiative under the National Broadband Network (NBN), all telecommunications infrastructure is capable of being provided to the development site by NBN Co subject to a formal application being made and an agreement being negotiated with the Developer.

3.9 Implementation and Staging

A subdivision application has been lodged with the Department of Planning. The application has been referred to stakeholders for comment with a determination by the WA Planning Commission pending the Council's endorsement of the Development Plan.

4.0 CONCLUSION

The proposed Development Plan, prepared on behalf of ABN Developments, illustrates the preferred development option for Lot 504 Nickol.

The Development Plan will facilitate development of critical housing stock that will assist in meeting a demand for housing in this region.

The Development Plan has been based on a number of best-practice design principles, including climatic responsiveness, legibility, walkability, diversity and connectivity and is supported by a concept Masterplan and Built Form Vision. Development will also integrate with the existing urban structure and land use.

The Development Plan has been prepared in accordance with the design requirements established by Liveable Neighbourhoods and responds to the core elements and design principles outlined in the Karratha Vernacular.

Having regard to the matters raised in this report, the Council's endorsement of the Development Plan is respectfully requested at the earliest opportunity.