



LOCAL STRUCTURE PLAN

MANDOGALUP EAST
SPN/0774



ROWEGROUP

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ENDORSEMENT PAGE

This Local Structure Plan is prepared under the provisions of the City of Kwinana Town Planning Scheme No. 2.

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

..... 28 March 2018 Date

Signed for and on behalf of the Western Australian Planning Commission:



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



..... Witness

..... 28 March 2018 Date

..... 28 March 2028 Date of Expiry



TABLE OF AMENDMENTS

Amendment No.	Summary of the Amendment	Amendment Type	Date Approved by WAPC
0	<i>[Original Local Structure Plan]</i>		



EXECUTIVE SUMMARY

This Local Structure Plan addresses the Urban zoned land comprising Part Lots 9002, 9006 and 11 Hoffman Road, and Lot 9019 Rowley Road, Mandogalup. The Local Structure Plan area also includes a portion of the Peel Main Drain (Lot 8018). The subject site is herein referred to as the Mandogalup East Local Structure Plan or MELSP.

The Local Structure Plan area was transferred to the Urban zone on 18 March 2014, by notice in the Government Gazette (notice reference PL403).

The purpose of this Local Structure Plan is to provide a plan for the coordination of future zoning and subdivision of the subject land to facilitate development for residential purposes, complementary to its Urban zoning.

The preparation of this Local Structure Plan has been undertaken in liaison and collaboration with Qube Property Group and associated project team (the adjacent landholder comprising the Mandogalup West Local Structure Plan), the City of Kwinana and all other relevant approval agencies.

Structure Plan Summary Table

Item	Data	Section number referenced in report										
Total area covered by the Structure Plan	42.67 hectares	1.2										
Area of each land use proposed: <u>Zones</u> Residential <u>Reserves</u> Road Parks, Recreation and Drainage Public Purpose – Primary School	<table border="0"> <tr> <td>Hectares</td> <td>Lot yield</td> </tr> <tr> <td>22.12 hectares</td> <td>581 lots</td> </tr> <tr> <td>11.64 hectares</td> <td></td> </tr> <tr> <td>4.3 hectares</td> <td></td> </tr> <tr> <td>1.49 hectares</td> <td></td> </tr> </table>	Hectares	Lot yield	22.12 hectares	581 lots	11.64 hectares		4.3 hectares		1.49 hectares		3
Hectares	Lot yield											
22.12 hectares	581 lots											
11.64 hectares												
4.3 hectares												
1.49 hectares												
Estimated lot yield	581 lots	3.3										
Estimated number of dwellings	674 dwellings	3.3										
Estimated residential site density: Dwellings per Gross Urban Hectare Dwellings per Site Hectare	<p>15.8 dwellings per gross urban hectare.</p> <p>30.5 dwellings per residential site hectare.</p>	3.3										
Estimated population	1887 people @ 2.8 people per household	3.3										
Number of high schools	nil	3.7										
Number of primary schools	1 primary school	3.7										
Estimated commercial floor space (for activity centres if appropriate)	Not applicable	3.8										
Estimated area and % of public open space: Total public open space Unrestricted public open space Restricted public open space <i>1:1 yr drainage deduction from net area</i>	<p>4.3 hectares</p> <p>3.4 hectares (8.84% of GSA)</p> <p>0.9 hectares (2.39% of GSA)</p>	3.2										
Composition of public open space: - Regional open space - District open space - Neighbourhood parks - Local parks	<p>- nil</p> <p>- 1.15 hectares (playing fields)</p> <p>- 2.8 hectares, 4 parks</p> <p>- 0.35 hectares, 2 parks</p>	3.2										
Estimate percentage of natural area	<p>POS Area 5 is intended to comprise approximately 0.9 hectares of retained vegetation, subject to detailed design.</p> <p>Various significant trees and landscape features to be retained throughout the site, subject to detailed design.</p>	2.1.2 and 3.2										

Note: All information and areas are approximate only and are subject to survey and detailed design.



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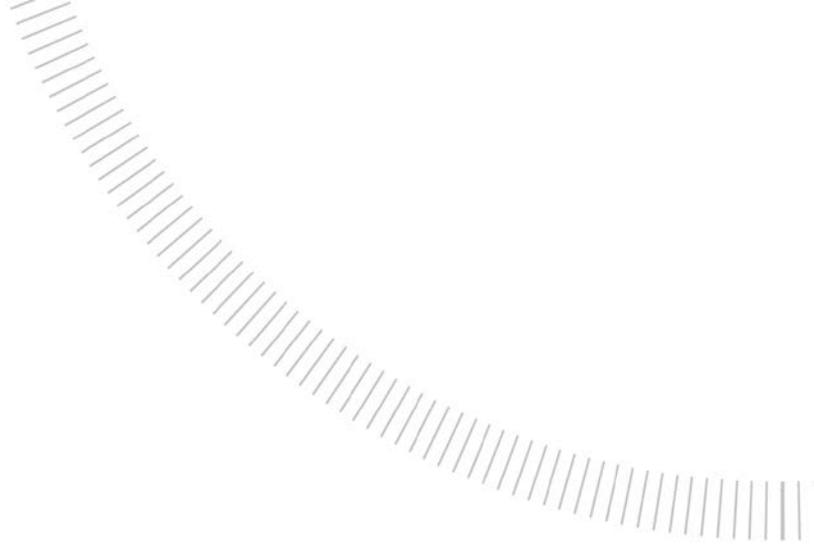
TECHNICAL APPENDICES

Appendix Number	Document Title	Nature of Document	Referral/ Approval Agency	Approval status and Modifications
1.	Certificates of Title	Supporting	n/a	
2.	Government Gazette Notice for Urban Zoning	Supporting	n/a	
3.	Environmental Assessment Report	Supporting	n/a	
4.	Bushfire Management Plan	Requires Approval	Department of Planning, Lands and Heritage	DFES comments addressed. Awaiting final Approval from DoPLH.
5.	Road and Railway Noise Assessment Report	Requires Approval	Main Roads WA	MRWA approval letter issued 27 Jan 2017.
6.	Landscape and Public Open Space Strategy	Supporting	n/a	
7.	Transport Assessment	Supporting	n/a	
8.	Local Water Management Strategy	Requires Approval	Department of Water/ Water Corporation/ City of Kwinana	Water Corporation support received 28 Nov 2017. Waiting Department of Water and City of Kwinana.
9.	Retail Needs Assessment	Supporting	n/a	
10.	Engineering Services Report	Supporting	n/a	
11.	Department of Education Correspondence	Supporting	n/a	



Part One

IMPLEMENTATION



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1. Local Structure Plan Area

This Local Structure Plan applies to the land contained within the inner edge of the line denoting the Local Structure Plan boundary on the Local Structure Plan map (Refer Plan 1 situated at the end of Part 1 of this Local Structure Plan report).

2. Operation

This Local Structure Plan comes into effect on the day it is approved by the Western Australian Planning Commission (WAPC).

3. Staging

Figure 17 of Part Two of this Local Structure Plan report depicts indicative staging for the subdivision of the Local Structure Plan area.

Development of the site will generally be from the south to north. Whilst water mains are to be extended from the north, initial site access and sewerage infrastructure servicing will come from the south.

4. Subdivision and Development Requirements

4.1 Residential densities for the Local Structure Plan area are the residential density codes shown on the Local Structure Plan Map, and as indicatively shown at Figure 12.

4.2 The Local Structure Plan is to provide for a minimum of 10% public open space in accordance with the WAPC's Liveable Neighbourhoods requirements. Public open space is to be provided generally in accordance with the Local Structure Plan Map, and as indicatively shown at Figures 13 and 14.

4.3 This Local Structure Plan is supported by a Bushfire Management Plan (BMP) (Strategen May 2017). Any land falling within 100 metres of a bushfire hazard identified in the BMP is designated as a Bushfire Prone Area for the purpose of the Building Code of Australia.

4.4 Notifications on Title

The Council shall recommend to the WAPC that a condition be imposed on the grant of subdivision approval for a notification to be placed on the Certificate of Title to suitably respond to the following:

- a) The BMP for lots with a Bushfire Attack Level (BAL) rating of 12.5 or higher;
- b) Transport noise for lots that are the subject of noise levels exceeding the noise target as per *State Planning Policy 5.4 – Road and Rail Transport Noise and Freight Considerations in Land Use Planning*; and
- c) Lots adjacent to the Dampier to Bunbury Natural Gas Pipeline (DBNGP) Corridor advising of the existence of the DBNGP.

4.5 Management Plans

The Council shall recommend to the WAPC that a condition be imposed on the grant of subdivision approval to respond to the following as identified by the Local Structure Plan:

- a) Urban Water Management Plan;

- 
- b) Dieback Management Plan;
 - c) Acid Sulphate Soils Management Plan;
 - d) Fauna and Habitat Management Plan;
 - e) Landscape Feature and Tree Retention Management Plan;
 - f) Qualitative Risk Assessment for the purposes of the DBNGP Corridor;
 - g) Construction Environmental Management Plan; and
 - h) Midge and Mosquito Management Plan.

5. Local Development Plans

A Local Development Plan is required in the following circumstances:

- a) Lots with an area of 260 square metres or less;
- b) Irregular shaped lots;
- c) Lots where specific vehicle access and egress control is required;
- d) Lots abutting public open space;
- e) Lots with particular site constraints;
- f) Lots subject of a notification on title;
- g) Lots abutting the Western Power High Voltage Power Line Easement;
- h) Lots abutting / adjacent to the Peel Main Drain;
- i) Lots abutting the DBNGP Corridor;
- j) Lots with a BAL Rating of 12.5 or greater; and
- k) Lots that require quiet house design for noise attenuation through deemed-to-comply noise insulation packages, and/or lots identified as requiring specialist acoustic requirements.

6. Other Requirements

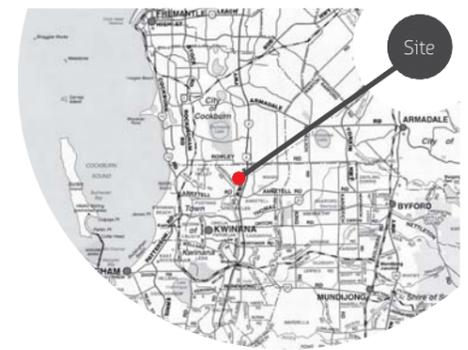
6.1 Developer Contribution Arrangements

Under the City of Kwinana Town Planning Scheme No. 2, the following development contribution arrangements apply and/or are contemplated:

- a) Development Contribution Area 8 for the funding of community infrastructure; and
- b) Development Contribution Area 6 for traditional 'hard' infrastructure.

6.2 Bushfire Management Plan Addendum

An addendum to the BMP is to be lodged with any subdivision application for the site, containing the necessary development and associated bushfire planning detail, in accordance with the stated requirements of the BMP.



- RESIDENTIAL**
- Residential (R30-R60)
- PUBLIC PURPOSE**
- PS Educational/Institutional
- PS Primary School
- PARKS, RECREATION & CONSERVATION**
- Parks, Recreation and Drainage
- Drainage
- TRANSPORT**
- Access Street - Local Road
- Primary Distributor Road
- Regional Distributor Road
- Neighbourhood Connector B
- Temporary Neighbourhood Connector B
- Indicative Cycleway Access
- OTHER**
- Local Structure Plan Boundary
- ADDITIONAL INFORMATION**
- Revised Kwinana Industrial (including Air Quality) Buffer (as of 21 September 2010)
- DBNGP Easement
- Western Power Easement
- Existing Lot Boundaries

0 200 400 Metres

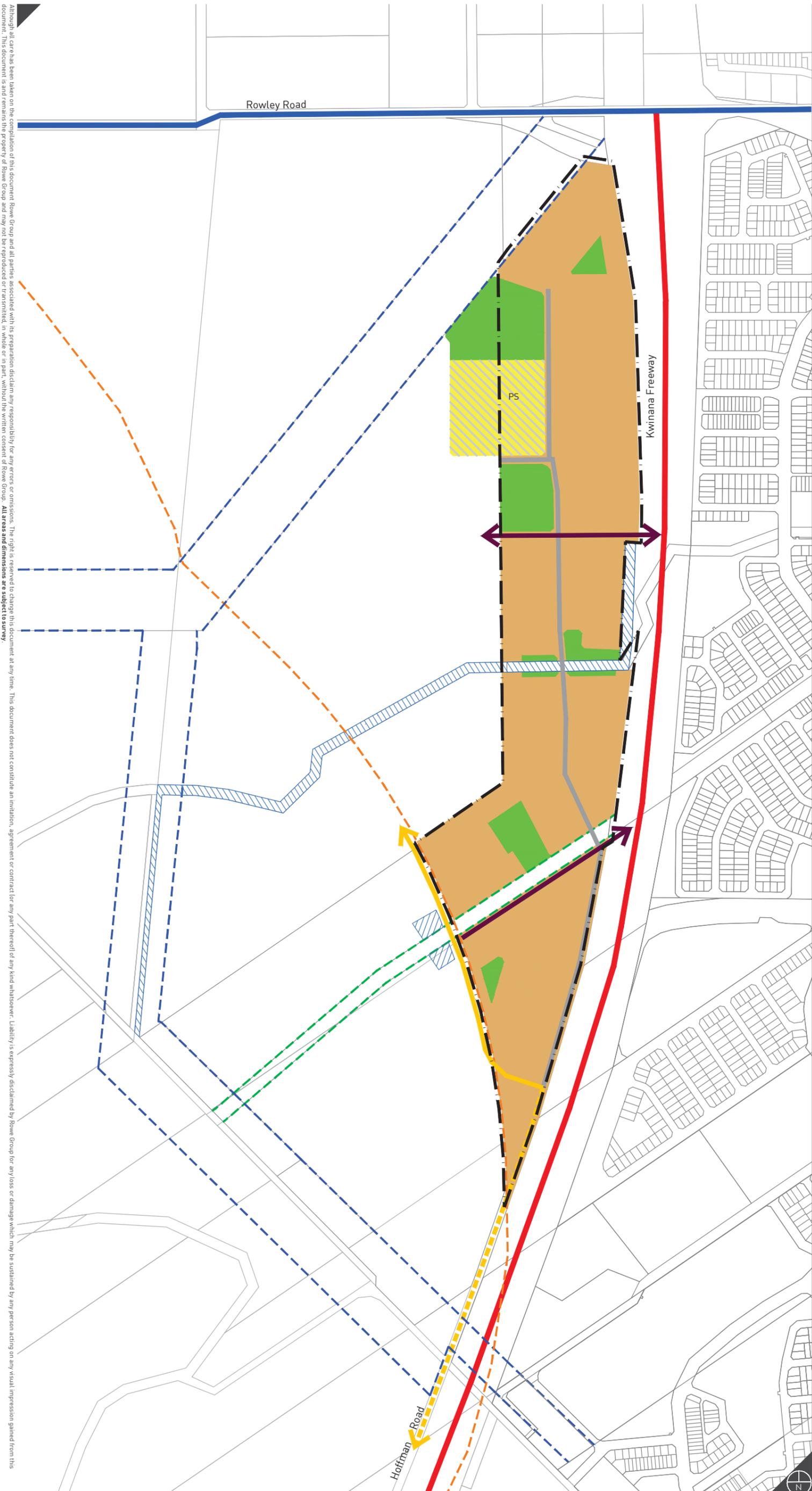
REVISIONS

Rev	Date	Drawn
C	2016.11.03	M. Sullivan
D	2017.04.12	M. Sullivan
E	2017.07.03	M. Sullivan
F	2017.12.07	W. Clements



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 Scale: 1:7,500 @ A3
 Client: Satterley Property Group
 Designer: R. Cumming
 Drawn: M. Sullivan
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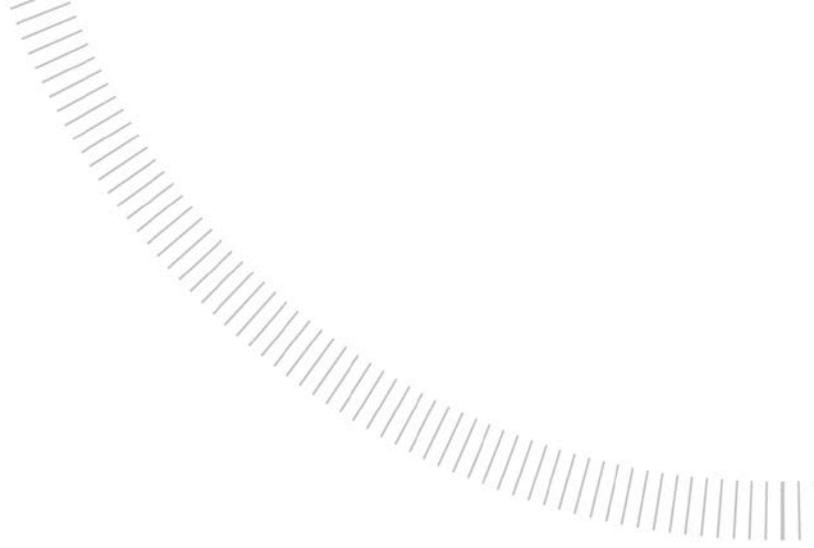
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Mandogalup East Local Structure Plan



Part Two

EXPLANATORY SECTION



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Planning Background

1.1 Introduction and Purpose

The purpose of the Local Structure Plan is to provide a plan for the coordination of future zoning and subdivision of the subject land. The subject land relates to the urban zoned land within Part Lot 9002 Hoffman Road, Part Lot 9006 Hoffman Road, Part Lot 11 Hoffman Road, and Lot 9019 Rowley Road, Mandogalup, herein referred to as the Mandogalup East Local Structure Plan or MELSP.

Subdivision and development of the subject land in accordance with this Local Structure Plan represents a logical progression of the development front from the north (Hammond Park), as well as the eastern side of the Kwinana Freeway (Wandi).

1.1.1 Project Team

The following multi-disciplinary project team has been engaged to progress the preparation of the MELSP:

Discipline	Consultant
Acoustic	ATP Consultants
Civil Engineering	Peritas Group
Environmental	Strategen
Fire Management	Strategen
Hydrological	JDA
Landscape Architecture	Emerge Associates
Retail	Taktics 4
Survey	McMullen Nolan
Town Planning and Design	Rowe Group
Traffic	Transcore

1.1.2 Mandogalup West Local Structure Plan

The MELSP is adjoined on its western boundary by land comprising the Mandogalup West Local Structure Plan (MWLSP). The MWLSP is currently being progressed by Qube Property Group, and is being assessed and determined concurrently with the MELSP.

Ongoing collaboration between the relevant landowners and project consultant teams for the MELSP and MWLSP has taken place to ensure coordination between the two Local Structure Plan areas. In particular, the concept subdivision designs ensure the alignment of local roads, distribution of public open space, residential property boundaries, service provision and staging.

The proposed primary school and local playing fields have been sited within the MELSP and MWLSP to ensure equitable pro rata provision of the required land area, as well as in consultation with the Department of Education and City of Kwinana to ensure appropriate location within the catchment and surrounding land use context.

Refer Figure 1 - Combined MELSP and MWLSP Concept Plan.

1.2 Land Description

1.2.1 Location

The MELSP is located within the metropolitan south west corridor, within the municipality of the City of Kwinana. The site is situated approximately 24 km south of the Perth Central Area, and is accessible via the Kwinana Freeway. The Kwinana Town Centre is located approximately 8 km south of the site and the Spectacle Regional Reserve approximately 4 km from the subject site.

The subject site is generally bound by the Kwinana Freeway to the east and Rowley Road to the north. Land to the immediate west of the site is zoned urban and urban deferred. The Urban zoned portion of the adjoining site is subject to a separate Local Structure Plan currently being progressed by Qube Property Group, known as the Mandogalup West Local Structure Plan or MWLSP.

Refer to Figure 2 – Regional Location.

Refer to Figure 3 – Local Location.

1.2.2 Area and Land Use

The MELSP comprises approximately 42.67 hectares of land situated west of the Kwinana Freeway, immediately south of Rowley Road. The site is currently accessed by Hoffman Road, which runs parallel to the Kwinana Freeway and connects to Anketell Road in the south.

The subject site has historically been used for agricultural purposes including grazing, cropping and horse agistment. There are no existing dwellings or structures remaining on site.

Lot 9019 comprises existing vegetation, with some areas of larger and denser vegetation. Lots 9002, 9006 and 11 are generally cleared with some stands of trees. A referral under the EPBC Act was submitted for the site in August 2014, with an approved controlled action issued by the Department of the Environment in July 2015, and appropriate offset arrangements secured in October 2015.

The Peel Main Drain (PMD) and the Dampier to Bunbury Natural Gas Pipeline (DBNGP) both dissect the site from its eastern to western boundaries.

The south western boundary of the Local Structure Plan area is defined by the outer edge of the Revised Kwinana Industrial (including air quality) Buffer (as of 21 September 2010) (herein referred to as KIB), being the extent of the Urban zone. Further information on the KIB and its impact on the MELSP area are provided throughout this report.

1.2.3 Legal Description and Ownership

The MELSP comprises five land parcels, being:

Lot Number / Address	Proprietor	Deposited Plan	Volume / Folio
Lot 9019 Rowley Road	Wandi Anketell Holdings Pty Ltd	400699	2838/776
Part Lot 9006 Hoffman Road	Wandi Anketell Holdings Pty Ltd	70124	2769/ 846
Part Lot 9002 Hoffman Road	Wandi Anketell Holdings Pty Ltd	69132	2758/ 177
Part Lot 11 Hoffman Road	S and A Galati Rando	76538	2809/ 569
Lot 8018 (UCL – Peel Main Drain)	State of WA	77243	LR 3024 / 314

The LSP area comprises approximately 42.67 hectares of land.

Refer Figure 4 - Site Plan and Appendix 1 - Certificates of Title.

1.3 Planning Framework

1.3.1 Zoning and Reservations

Land within the MELSP boundary is zoned 'Urban' under the Metropolitan Region Scheme (MRS), and 'Development' under the City of Kwinana Town Planning Scheme No. 2 (TPS 2).

The land was transferred to the 'Urban' zone under the MRS on 18 March 2014, by notice in the Government Gazette (notice reference PL403). Upon Gazettal of the Urban zone, the site was concurrently zoned 'Development' under TPS 2, by resolution of the WAPC and notice in the Government Gazette.

The subdivision, use and development of land within the Development zone is to generally be in accordance with a Local Structure Plan that has been prepared and adopted under the provisions of 6.17 of TPS 2.

The Hoffman Road reservation runs parallel to the Kwinana Freeway. Hoffman Road provides access to the site from Anketell Road and will form part of the development of the site, however is excluded from the MELSP boundary.

The Peel Main Drain comprises Lot 8018.

The Dampier to Bunbury Natural Gas Pipeline (DBNGP) also dissects the site generally in an east-west direction along the southern boundary of Lot 9006.

Refer Figure 5 - Metropolitan Region Scheme Zoning.

Refer Figure 6 - Town Planning Scheme No.2 Zoning.

1.3.2 Regional and Sub-Regional Structure Plan

1.3.2.1 Jandakot Structure Plan

In 1993, a Select Committee Report on Metropolitan Development and Groundwater Supplies reviewed the boundaries of the Jandakot Underground Water Pollution Control Area (JUWPCA). This review decreased the extent of the JUWPCA and, as a result, revealed an area that was now without any strategic planning for future use and development. The Jandakot Structure Plan was prepared over this subsidiary piece of land and was subsequently adopted, by the WAPC, in August 2007.

The Jandakot Structure Plan sets out the broad strategic planning framework for the 'U' shaped parcel of land surrounding the Rural Water Protection area. It covers an area of land up to Rowley Road to the north and Millar and Jackson Roads to the south, dealing with the issues of both groundwater and storm water management. The Jandakot Structure Plan requires that a Local Water Management Strategy (LWMS), consistent with the Jandakot Water Resources Management Strategy (JWRMS), be prepared and lodged with any subsequent Local Structure Plan.

The Jandakot Structure Plan projects a population of approximately 40,000 residents within the Jandakot Structure Plan area and outlines the general location of conservation areas, primary schools and transport links. The specific details of these aspects, such as the coordination of development and remnant vegetation protection were limited. Subsequently these formed the basis of further investigations associated with the then Town of Kwinana Draft District Structure Plan, known as the Eastern Residential Intensification Concept (ERIC).

The district level requirements of the Jandakot Structure Plan and ERIC, such as the identification and preservation of natural areas, the allocation of public open space and public purpose areas, road



network and hierarchy, and the allocation of school sites have been further refined through the preparation of this Local Structure Plan.

The Jandakot Structure Plan identifies the MELSP area for urban development.

The proposed MELSP is considered to be consistent with the intent and requirements of the Jandakot Structure Plan.

Refer Figure 7 - Jandakot Structure Plan.

1.3.2.2 Eastern Residential Intensification Concept (ERIC)

The Eastern Residential Intensification Concept (ERIC) was prepared by the then Town of Kwinana in November 2005 and provides strategic direction and refinement of the future urban areas identified under the Jandakot Structure Plan. In particular, it expands upon the opportunities and constraints inherent to the land and, whilst yet to be formally adopted by Council, 'defines a framework by which urban subdivision and development is able to occur in an orderly and co-ordinated manner'.

The MELSP has been prepared giving due consideration to the provisions of ERIC, albeit updated to respond to the current planning framework, policies, principles and objectives. The MELSP provides a response to more detailed site-specific analysis as required by ERIC, such as flora and fauna, water management, noise controls and traffic management and those requirements emanating from WAPC Statement of Planning Policies.

Refer Figure 8 - Eastern Residential Intensification Concept.

1.3.2.3 Directions 2031 and Beyond

Directions 2031 and Beyond (Directions 2031) is the high-level spatial framework and strategic plan for the Perth and Peel metropolitan regions. Directions 2031 provides a framework for the detailed planning and delivery of housing, infrastructure and services necessary for various growth scenarios presented within the document.

Directions 2031 identifies growth scenarios for low, medium and high-density rates of infill and greenfield development. The Connected City scenario of Directions 2031 is identified as the preferred growth scenario, which was then modelled to determine the area of greenfield land that will be required for a City of 3.5 million people. Consistent with the outcomes of this approach, Directions 2031 sets a target of 15 dwellings per gross hectare of Urban zoned land in development areas.

Directions 2031 is supported by a series of Sub-Regional Strategies which provide information pertaining to the levels of expected population growth in individual local government areas. The Sub-Regional Strategies also identify development opportunities and prospects for increased density within greenfield areas to facilitate achievement of the housing targets set in Directions 2031.

Consistent with Directions 2031 targets, concept planning prepared to support the MELSP achieves a density of approximately 15.8 dwellings per gross Urban hectare.

1.3.2.4 Draft Outer Metropolitan Perth and Peel Sub-Regional Strategy

The subject site is located in the south-west sub-region of the Draft Outer Metropolitan Perth and Peel Sub-Regional Strategy. The south-west sub-region is forecast to supply an additional 54,580 dwellings under the adopted 'Connected City' approach of Directions 2031. The draft strategy identifies the subject site and surrounding area as 'Urban zoned undeveloped' with an estimated yield of 2200 dwellings (site MA1). The strategy also identifies an additional 400 ha of land to the south and west of



the subject land as 'Urban Expansion Area 2011-2015' (Site MA2), with a target of 4500+ dwellings subject to the resolution of the KIB.

Based on indicative concept planning, the MELSP is expected to yield in the order of 674 dwellings, helping to facilitate the dwelling targets identified under the Draft Outer Metropolitan Perth and Peel Sub-Regional Strategy.

1.3.2.5 Draft Perth and Peel @ 3.5 Million

The Draft Perth and Peel @ 3.5 Million was released for public comment in May 2015, and seeks to provide a framework for the development of the Perth and Peel regions as the population reaches an estimated 3.5 million by 2050. The document seeks to meet the targets identified under Directions 2031 and the State Planning Strategy 2050. The suite of documents also includes four draft sub-regional planning frameworks for the Central, North-West, North-East and South Metropolitan Peel sub-regions. The four draft sub-regional planning frameworks detail where future homes and employment should be located, and where important environmental assets should be avoided and protected.

The subject site is situated within the South Metropolitan Peel Sub-Region, and is identified as 'Urban', consistent with the current MRS zoning.

1.3.2.5.1 Draft South Metropolitan Peel Sub-Regional Planning Framework: Towards Perth and Peel @ 3.5 Million

The Draft South Metropolitan Peel Sub-Regional Planning Framework (the Framework) represents a whole of State Government approach to managing the future urban form within the sub-region, and identifies sufficient land to meet the increased demand for residential dwellings. The South Metropolitan Peel sub-region is proposed to accommodate more than 1.26 million people, over 507,000 homes and approximately 430,000 jobs, with a projected additional dwelling target of 19,549 (49,499 people) within the City of Kwinana.

The subject site is identified for Urban development under the draft Framework.

An indicative subdivision design for the MELSP identifies an approximate yield of 581 lots (674 dwellings), equating to a population of approximately 1,887 people (based on 2.8 people per household). The development of the MELSP will therefore assist in achieving dwelling and population targets identified under the draft Framework.

The draft Framework also requires new urban development meet a residential density target of 15 dwellings per gross hectare. The proposed MELSP is capable of achieving this.

1.3.3 Liveable Neighbourhoods

Liveable Neighbourhoods (2009) was prepared by the WAPC to implement the objectives of the State Planning Strategy and deliver the strategies and actions of metropolitan spatial frameworks. Liveable Neighbourhoods is an operational policy that guides structure planning (regional, district and local), subdivision and development for new urban areas, including greenfield and large brownfield (urban infill) sites. Liveable Neighbourhoods seeks to promote design of walkable neighbourhoods; places that offer community and a sense of place; mixed uses and active streets; accessible and sustainable parks; energy efficient design; and a variety of lot sizes and housing types.

The MELSP has been designed in accordance with the principles and requirements of Liveable Neighbourhoods.



The indicative layout has been designed using relatively short street blocks to provide for a permeable and legible pedestrian, cycle and vehicle movement network. The public open space network provides for connectivity through the site, intended to serve a variety of functions to cater for a wide demographic, with all proposed lots within approximately 200 metres of public open space.

The Local Structure Plan provides for a primary school and local playing fields generally central within the Mandogalup catchment (MELSP and MWLSP areas).

The indicative layout has also had consideration for the existing topography and landform of the site, as well as facilitating solar orientation of future lots. Servicing and water management considerations have also been facilitated within the indicative layout.

In accordance with Liveable Neighbourhoods requirements for a minimum average density of 22 dwellings per residential site hectare, indicative subdivision design for the MELSP achieves approximately 30.5 dwellings per residential site hectare.

1.3.4 City of Kwinana Local Commercial and Activity Centres Strategy

The City of Kwinana Local Commercial and Activity Centres Strategy, adopted by Council in 2014, provides background information and input to inform the preparation of the City's new Local Planning Strategy (LPS). The document reviews and responds to the state policy setting and analyses the current configuration and future requirements for activity centres within the City based upon retail trends and population projections.

The Strategy identifies a potential local centre within Mandogalup, however noting this is unconfirmed and is subject to further more detailed consideration.

Given the uncertainty surrounding the appropriate location and viability of a centre to service the Mandogalup residents, a Retail Needs Assessment has been prepared by Taktics 4 to guide the appropriate location, size and nature of commercial activity within the MELSP and MWLSP areas (Refer Appendix 9).

The Taktics 4 report concludes that based upon the current distribution of centres there is a spatial opportunity in the Mandogalup area for the provision of a small single supermarket based centre, subject to market demand. The MWLSP notes this centre would be most logically located on Mandogalup Road, where it can serve north and south catchments once the Rowley Road/ Mandogalup Road full access intersection is realised.

Notwithstanding, a small centre is indicatively proposed within the MWLSP to service the Mandogalup catchment (including the MELSP) in the interim. However, prior to commitment to and development of the centre, further studies are required to determine the long term viability of a centre at either location.

1.3.5 City of Kwinana Local Housing Strategy

The Draft City of Kwinana Local Housing Strategy, prepared in February 2007, is provided as an appendix to the Draft Local Planning Strategy and facilitates the review of and amendments to TPS 2. The intent of the strategy is to promote a broader range of housing types, encourage development of suitable sites, protect existing residential areas from incompatible land uses and preserve areas of remnant vegetation.

The strategy identifies a housing strategy that promotes medium density housing in close proximity to Public Open Space, Neighbourhood centres and transport nodes and more traditional lot sizes for areas not within close proximity to these services.

The MELSP has been prepared in accordance with the principles identified in the strategy.

1.3.6 State Planning Policies

Development of land must have due regard to any relevant WAPC State Planning Policies which are prepared and adopted by the WAPC under statutory procedures set out in Part 3 of the Planning and Development Act 2005. The WAPC and Local Government must have due regard to the provisions of State Planning Policies when preparing or amending planning schemes and when making decisions on planning matters.

The MELSP responds to the following State Planning Policies:

▲ State Planning Policy 2.1 – Peel Harvey Coastal Plain Catchment

- Preparation and approval of a LWMS to support the MELSP; and
- Preparation and implementation of an Urban Water Management Plan to be required as a condition of subdivision approval.

▲ State Planning Policy 2.9 – Water Resources

- The MELSP design and LWMS ensure the quality of water collected and infiltrated through the site does not impact the landscape and environmental qualities of the locality.

▲ State Planning Policy 3 – Urban Growth and Settlement

- Consideration of lot product mix and distribution/ location of density;
- Provision and distribution of amenity throughout the MELSP;
- Consideration of access, both locally and beyond;
- Considerations for walkability and cycle opportunities; and
- Consideration of 'neighbourhood character' in street block layout, open space provision and landscape design.

▲ State Planning Policy 3.7 – Planning in Bushfire Prone Areas

- Preparation of a Bushfire Management Plan to support the MELSP; and
- Consideration of fire management in concept planning and allocation of public open space, as well as in the landscape master plan.

▲ State Planning Policy 4.1 – State Industrial Buffer

- The south west boundary of the MELSP is defined by the outer-edge of the Revised Kwinana Industrial (including Air Quality) Buffer as of 21 September 2010 (KIB).
- The MELSP is in accordance with the provisions of SPP 4.1, including the identification of the KIB area and exclusion of sensitive land uses within it.

▲ State Planning Policy 5.4 – Road and Rail Transport and Freight Considerations in Land Use Planning

- Preparation and endorsement of an acoustic assessment responding the noise impacts of the Kwinana Freeway, the Perth to Mandurah Railway Line and Rowley

Road (future Freight Route). The assessment includes noise mitigation requirements and the identification of lots subject to quiet house design and 'deemed-to-comply' noise insulation packages.

1.3.7 Local Planning Policies

The MELSP responds to the following City of Kwinana Local Planning Policies:

▲ Planning for Bushfire Protection Guidelines

- Preparation of a Bushfire Management Plan to support the MELSP; and
- Consideration of fire management in concept planning and allocation of public open space, as well as in the landscape master plan.

▲ Public Open Space

- Provision of a minimum of 10% open space;
- Consideration for the City of Kwinana Community Infrastructure Plan;
- Consideration of public open space location, size, functional distribution and useability requirements;
- Consideration for drainage requirements and restrictions within credited public open space areas; and
- Consideration for requirements regarding conservation and wetland areas within public open space.

▲ Landscape Feature and Tree Retention

- Identification and retention of significant trees (in accordance with the definition under the policy) within public open space and road reserves;
- Consideration of existing site topography in preliminary earthworks, servicing and drainage considerations, informing the indicative street block layout; and
- The preparation of the landscape feature and significant tree retention strategy (comprising part of the Environmental Assessment Report).

Other Local Planning Policies to be addressed and considered through the subdivision and detailed design stages include:

- ▲ Design Guidelines for Medium Density Development;
- ▲ Crossovers;
- ▲ Footpaths;
- ▲ Residential Development
- ▲ Residential Subdivision Development Guidelines;
- ▲ Residential Subdivision Road Standards;
- ▲ Retaining Wall Levels;
- ▲ Street Lighting;

- ▲ Street Naming, and
- ▲ Street Trees and Verge Treatments.

1.3.8 Other Approvals and Decisions

1.3.8.1 Urban Deferred Lifting

As previously noted, the land was concurrently transferred to the 'Urban' zone under the MRS and 'Development' zone under TPS 2 in March, 2014.

Land adjoining the MELSP on its south western boundary remains Urban Deferred pending resolution of the KIB and associated land uses.

Refer Appendix 2 - Government Gazette Notice for the Urban zoning.

1.3.8.2 Revised Kwinana Industrial (Including Air Quality) Buffer (21 September 2010)

The south west boundary of the MELSP is defined by the extent of the MRS Urban zone, which aligns to the *Revised Kwinana Industrial (Including Air Quality) Buffer (as of 21 September 2010)* (the KIB). The KIB is currently subject to draft legislation for the Western Trade Coast Protection Area.

The MELSP provides a road interface to the KIB to provide for flexibility for future land uses within the KIB, to be defined by the Western Trade Coast Protection Area Bill and subsequent relevant Region and Local Scheme zonings.

The MELSP proposes drainage within the KIB to support the urban residential development of the Local Structure Plan area. The use of the KIB for urban drainage has been supported by the City of Kwinana. Such drainage areas are not proposed to contribute to the public open space requirements for the MELSP.

Refer Figure 9 – KIB Plan.

1.3.8.3 Mandogalup Train Station

Under the draft Jandakot Structure Plan, two railway station sites were proposed for the Perth to Mandurah railway line adjacent to the MELSP area, being the Rowley Road (north) and Anketell Road sites. However, in early 2007 under a Ministerial directive, the then Department of Planning and Infrastructure in conjunction with the Public Transport Authority began a review of all proposed railway stations along the Perth to Mandurah railway line, including the Rowley Road (north) and Anketell Road sites.

As a result of this review, the WAPC resolved in 2008 to consolidate the two sites and endorse a station 400-600 metres south of Rowley Road (Mandogalup Station site). The station was also identified in the 2010 draft Outer Metropolitan Perth and Peel Sub-Regional Strategy for the south-west sub region.

Following further review and consideration, and in order to provide certainty for the future development of the corridor, the WAPC resolved on 23 April, 2013 to delete the Mandogalup station from future planning for the corridor. The MELSP is therefore reflective of this decision.

1.3.8.4 Environmental Protection and Biodiversity Conservation Act 1999 Referral

A Carnaby's Black Cockatoo habitat assessment was undertaken for the site in 2013. The assessment identified approximately 19.07 hectares of potential foraging habitat and up to 29 significant trees are likely to be impacted by the MELSP.



On this basis, an EPBC Act referral was submitted to the Department of the Environment (DotE) in August 2014. The referral identified the clearing of 19.7 hectares of Carnaby's Black-Cockatoo foraging and potential breeding habitat. DotE released a notification in September 2014 determining the referral was considered a Controlled Action to be assessed by preliminary documentation, with the preliminary assessment documentation being released for public comment during March 2015.

Additional information relating to the proposal was later released for public comment in June 2015. In July 2015 DotE approved the proposed action subject to a number of conditions relating to clearing procedures, reporting and the acquisition of an offset property. Following this, Satterley Property Group secured the appropriate offset property in agreement with DotE and the Department of Parks and Wildlife (DPaW) in October 2015. The approval remains in effect until 31 July 2025. No clearing to date has been undertaken.

Opportunities to minimise potential impacts to Carnaby's Black Cockatoo will be addressed in the Fauna Management Plan, expected to be required as a condition of subdivision approval.

Site Conditions and Constraints

The following provides a summary of the environmental site conditions and constraints. For further information the Environmental Assessment Report (EAR) is provided in Appendix 3.

2.1 Biodiversity and Natural Area Assets

2.1.1 Flora and Vegetation

A Level 2 flora survey was undertaken across the MELSP area during Spring 2004 and 2006, and Autumn 2007. A targeted threatened flora survey was also undertaken in 2013.

The surveys identified the MELSP area as being predominantly cleared farmland with patches of eucalypts. A total of six vegetation types were mapped across the site, comprising of:

1. *Banksia attenuata* Low Woodland, with *Eucalyptus marginata*, *Dasyogon bromeliifolius*, *Phlebocarya ciliate*, local *Melaleuca preissiana*, *Pultenaea reticulata* and *Hypocalymma angustifolium*, some other natives and, commonly, weeds.
2. *Banksia attenuata* Low Woodland with *Eucalyptus marginata*, *Allocasuarina fraseriana* and understoreys of *Xanthorrhoea preissii*, *Adenanthos cygnorum*, *Acacia pulchella*, *Stirlingia latifolia* and other natives, and of weeds; much of it regenerating after the 2004 fire.
3. *Banksia attenuata* Low Woodland, with thickets of *Adenanthos cygnorum*.
4. *Eucalyptus rudis* very healthy Open Forest in soak/spring, with *Melaleuca preissiana* and *M. Rhapsiphylla* tall trees, over *Pteridium esculentum* – *Cyathochaeta teretifolia* – *Baumea articulata* Closed Herb-Sedgeland; with *Lepidosperma longitudinale*, *Hemarthria uncinata*, *Hibbertia perfoliata*, *Dielsia stenostachya*, *Baumea vaginalis*, *Poa serpentum*; few aliens.
5. *Eucalyptus rudis* (largely leafless) Woodland (to Open Forest) over *Kunzea glabrescens* and *Astartea sp.* Closed Tall Scrubs, dense *Pteridium esculentum* and weeds; locally with healthy *Eucalyptus marginata* and *Melaleuca preissiana* trees.
6. *Kunzea glabrescens* Closed Tall to Tall Open Scrub; with, in more open sites, *Dasyogon bromeliifolius*, *Phlebocarya ciliate*, *Euchilopsis linearis* and other natives; some weedy degraded areas and many dead shrubs over 1 metre tall.

The condition of vegetation ranges in quality across the site from Excellent to Completely Degraded, with most remnant vegetation being in Very Good to Degraded condition. Weeds are common in the majority of the bushland existing across the site.

2.1.2 Significant Trees and Landscape Features

In accordance with the City of Kwinana *Landscape Feature and Tree Retention Policy*, the following arboricultural assessments have been undertaken for the identified significant trees and landscape features within the MELSP area:

- ▲ Mandogalup Urban Development Site Lyon Road, Mandogalup Tree Survey (Paperbark Technologies, July 2014 – Appendix 7 of the EAR).
- ▲ Assessment of melaleuca: Mandogalup (Arborlogic, March 2016 – Appendix 8 of EAR).



▲ Significant Tree Assessment: Mandogalup (Arborlogic, October 2016 – Appendix 9 of EAR).

In response to the *Landscape Feature and Tree Retention Policy*, arboricultural assessments of individual trees within unique landscape features and/or having a diameter breast height greater than 500mm were undertaken across the site. Assessment of the structural integrity and viability of retaining individual trees within the site was also undertaken.

During October 2016, Arborlogic completed a site wide assessment of significant trees, assessing 173 trees as having a retention value of 'very low', 'low', 'medium' or 'high'. The retention value was based on an assessment of health and/or structural integrity. This was used to inform the location and configuration of public open space across the MELSP, as well as road network configuration considerations.

A landscape feature and significant tree retention strategy is provided within the attached Environmental Assessment Report (refer Appendix 3).

2.1.3 Conservation Areas

There are no Bush Forever sites or other such areas of conservation significance mapped over the MELSP area.

A Protected Matters database search identified seven threatened species protected under the EPBC Act that may occur within the MELSP area. However, during surveys undertaken for the site, no Threatened Ecological Communities (TEC) as listed under the EPBC Act or the Wildlife Conservation Act 1950, or Priority Ecological Communities (PEC) as listed by Department of Parks and Wildlife (DPaW) were recorded in the MELSP area.

A small confined area of vegetation within the north western portion of the site is identified through the surveys as being significant and worthy of retention. This is based on the excellent condition of the vegetation, the relative rarity of this vegetation type within the local area, and the presence of the Priority 3 Species *Cyathochaeta teretifolia*. A portion of this vegetation type is intended to be retained in public open space.

The survey recorded one individual of *Jacksonia sericea* (Priority 4 species) in the MELSP area. However, the survey noted the removal of this individual during development is not considered to have a significant impact to this taxon.

2.1.4 Dieback

A dieback assessment of the MELSP area was undertaken in November 2013.

Much of the area was found to be either heavily disturbed (hence unmappable), or completely void of vegetation (excluded from the assessment). No confirmed dieback infestations were recorded during the survey, however, some areas exhibited a pattern of vegetation decline consistent with *Phytophthora* dieback infestation, and are highly likely to be infested.

A single, uninfested protectable area in the general northern portion of the site was identified and demarcated during the assessment (refer Appendix 11 of the EAR). The area exhibited some signs of vegetation decline; however, representative samples were negative for the presence of *Phytophthora cinnamoni*.

A Dieback Management Plan is expected to be required as a condition of subdivision approval to manage both the known and suspected infested areas, as well as the demarcated area for protection.

2.1.5 Wetlands

There is a Multiple-Use (MU) category wetland mapped over the northern and southern portions of the MELSP area, with a small area of Resource Enhancement (RE) wetland mapped in the north of the site. The Resource Enhancement wetland forms part of a larger wetland which originally extended to the Wandri North Urban Cell, however was dissected and degraded through works associated with the construction of the Kwinana freeway. Vegetation within the RE wetland is predominantly in a degraded condition and is considered to have low wetland values. On this basis, the RE wetland is not intended to be retained under the MELSP.

The closest Ramsar-listed wetland to the site is the 'Spectacles Reserve,' situated approximately 4 kilometres south of the MELSP. The Spectacles wetland is classified as a Conservation Category Wetland by the DPaW and is also situated within Bush Forever site number 269.

The Thomsons Lake Nature Reserve is situated approximately 3 kilometres to the north of the MELSP and comprises the Ramsar-listed Thomsons Lake. This area forms part of the Beeliar Regional Park.

These wetlands will not be impacted by the proposed development.

Refer Figure 10 – Wetland Plan.

2.2 Landform and Soils

The MELSP is situated at the interface of the Bassendean and Spearwood dune systems. Soils within the site are predominantly Lacustrine deposits consisting of sandy silt and light grey, fine to medium grey sand over Lacustrine deposits. A small portion in the north of the site does not contain underlying Lacustrine deposits.

The topography of the site is mostly low lying and gently undulating, with local relief from 12 metres AHD at the westernmost point to 28 metres AHD in the north. The site slopes generally in a south west direction.

2.2.1 Acid Sulfate Soils

The Department of Environmental Regulation (DER) Acid Sulfate Soil Risk Mapping identifies the site as having a moderate to high risk of Acid Sulfate Soils (ASS) occurring within three metres of natural soil surface.

A study undertaken for the site in 2009 determined there was a high risk of disturbing potential or actual ASS during ground intrusive earthworks in the low lying central, western and northern areas of the MELSP area, given most of this area is less than 1 metre above the water table.

In this regard, an ASS Management Plan is expected to be required as a condition of subdivision approval.

Refer Figure 11 – Acid Sulfate Soils Plan.

2.2.2 Contamination

The Department of Environmental Regulation Contaminated Sites Database does not list the site as being a known or suspected contaminated site.

Notwithstanding, a Preliminary Site Investigation was undertaken in 2015 which confirmed a number of potential contamination sources and contaminating site activities had occurred. On this basis, remediation was undertaken between June 2015 and February 2016 to remove known potential contamination sources.



Following removal of all known potential contamination sources to an off-site licensed landfill facility, the soil and groundwater quality was further investigated (Detailed Site Investigation) to:

- ▲ Assess the nature and extent of contamination, if any, following preliminary remediation activities at the site.
- ▲ Assess the future risk to human health and the environment from residual site contamination.

Based upon the results of the Detailed Site Investigation (DSI), a human health and ecological risk assessment for the site was undertaken and concluded:

- ▲ Residual contaminant sources have been removed from the site and there are no residual soil risks to human health or the environment.
- ▲ Groundwater and surface water is suitable for non-potable use and irrigation, and is not considered to be a risk to human health. Groundwater is not recommended for drinking water purposes.
- ▲ Groundwater quality is indicative of the regional superficial aquifer and minor groundwater contamination is considered a result of regional agricultural activities. There are no unacceptable groundwater or surface water contamination risks to human health and/or the environment.

Based on the DSI results, no further investigations to characterise soil, groundwater and/or surface water contamination are deemed necessary and the site is considered to be suitable for residential purposes, as proposed by the MELSP.

A Contaminated Sites Auditor accredited under the *Contaminated Sites Act 2003* was commissioned to prepare a voluntary audit report for the site and surrounds following completion of the DSI. The voluntary audit report was submitted to Department of Environment Regulation in December 2016 to support the assessment of the MELSP application under the *Planning and Development Act 2005*.

2.3 Groundwater and Surface Water

2.3.1 Groundwater

There are two aquifers of significance underlying the site; each assigned the name of the major geological unit in which the aquifer occurs. In descending order of depth from natural surface they are:

- ▲ Superficial Aquifer (unconfined, +20 to -25 mAHD)
- ▲ Leederville Aquifer (confined, -25 to -250 mAHD)

2.3.1.1 Superficial Aquifer

The Superficial Formation forms an unconfined aquifer containing generally fresh to slightly brackish groundwater (500 to 1500 mg/L Total Dissolved Solids), with slightly acid to neutral pH (5 to 7). The water table is shallow in places, rising to the surface during winter, depending on surface elevation.

Pre-development groundwater monitoring was completed in 2007 to determine the estimated Average Annual Groundwater Maximum Level (AAMGL). Water quality bores were monitored from 19 October 2004 to September 2006.

A summary of the monitoring results are as follows:

- 
- ▲ Average Total Nitrogen (TN) concentrations for all bores were above the ANZECC 2000 TN guideline of 1.2 mg/L with the exception of WAM3(d).
 - ▲ Average Total Phosphorus (TP) concentrations varied between bores. WAM3(d), WAM4(s) and WAM4(d) were above the Peel-Harvey WQIP TP target value of 0.1 mg/L.
 - ▲ The pH is slightly acidic to neutral (4.5 to 7.1) and below ANZECC guideline values.

The site is characterised by high nutrient concentrations and pH levels generally less than 6.0. Groundwater quality at the water table, within the Bassendean Sand, is generally acidic due to organic acids generated by decomposition of vegetation in swampy environments. High nitrate and phosphorous levels are present in the superficial aquifer in areas of intensive horticulture as a direct result of fertiliser leaching.

The Superficial Aquifer is the most cost effective groundwater source for irrigation of public open space for the development of the site.

2.3.1.2 Leederville Aquifer

The Leederville Aquifer is a major regional aquifer from which large yields of fresh groundwater can be obtained. The groundwater in the Leederville Formation is confined within the potentiometric surface in this area approximately at ground level.

The South Perth Shale is present from -260 to -310m AHD and forms the confining layer between the Leederville Aquifer and Yarragadee Aquifer.

2.3.2 Surface Water

The Peel Main Drain runs east to west through the MELSP between Lots 9019 and 9006. The Peel Main Drain flows into the Mandogalup Swamp at the southern boundary of the site and the Spectacles Wetland south of Anketell Road. The Peel Main Drain outlets at the Serpentine River, which flows to the Peel Harvey Estuary.

The Peel Main Drain was modelled by the Department of Water as part of the preparation of the Jandakot DWMP. The maximum flood level for the 100 year ARI for the existing system is 16.1 metres AHD, upstream of the Mandogalup Swamp, causing inundation of the Mandogalup Swamp area along the southern boundary of the site. The balance of the site is not expected to be affected by flooding.

The surface water quality of the Peel Main Drain was measured as part of pre-development monitoring from October 2004 to September 2006. Results indicate the Peel Main Drain is characterised by high nutrient concentrations and pH levels generally less than 6.8. This is consistent with other drains in the area, as well as the historic land use.

2.4 Bushfire Management

The majority of the MELSP is designated as bushfire prone under the Western Australian *Map of Bush Fire Prone Areas* (DFES 2017), due to the extent of on-site and adjacent vegetation. On this basis, a Bushfire Management Plan (BMP) has been prepared for the MELSP in accordance with *State Planning Policy 3.7: Planning in Bushfire Prone Areas* (SPP 3.7) and Australian Standard 3959 (AS 3959). The BMP is provided within Appendix 4, however the following provides an overview of fire management assessment undertaken and applicable provisions to development of the site.

2.4.1 Hazard Assessment

The BMP identifies the site as comprising a moderate to extreme fire hazard, associated with remnant vegetation. The development of the MELSP area in accordance with the proposed layout will result in a reduction to bush fire risk across the site. Additionally, any existing hazards within the MELSP can be managed through a staged clearing approach and ongoing fuel management undertaken in and around individual development stages.

The BMP concludes the worst case bushfire hazard currently affecting future development within the MELSP is from the vegetation existing within the MWLSP. Given the development proposed by the MWLSP, this risk is considered to be temporary. Notwithstanding, bushfire risk to the MELSP from this vegetation will need to be adequately managed until such time as this vegetation is removed. This may be achieved through delayed development and application of AS 3959, and/or the provision of Asset Protection Zones (APZ's) along the interfacing boundary of the MWLSP.

There is also existing scrub and woodland vegetation to the east of MELSP along the Kwinana Freeway, however this is 'patchy' in nature and contained within relatively short runs, and will therefore not enable a bushfire to exhibit elevated levels of radiant heat and ember attack.

On the basis of the above hazard assessment (as summarised), the BMP considers the bushfire hazards within and adjacent to the MELSP, and the associated bushfire risk, is readily manageable through standard management responses and compliance with acceptable solutions outlined in the Guidelines and AS 3959. These management measures will be factored in to the subdivision design and detailed planning for the site.

2.4.2 Bushfire Attack Level (BAL) Contour Assessment

Vegetation with a 'Moderate' or 'Extreme' bushfire hazard level is considered bushfire prone and any proposed development within 100 m of the bushfire prone vegetation extent will require application of *Australian Standard AS 3959-2009 Construction of Buildings in Bushfire-prone Areas (SA 2009)* via implementation of increased building construction standards in response to the assessed Bushfire Attack Level (BAL).

The BMP includes a BAL contour assessment and plan for the MELSP, utilising an indicative subdivision layout and taking into consideration the landscape master plan proposal (type and nature of public open space areas etc). The assessment also takes in to account the existing vegetation within the MWLSP. However, as subdivision within the MWLSP progresses and detailed landscape design is undertaken for the MELSP, it is likely the extent of classified vegetation will change. On this basis, the BAL contours provided are indicative only and will be reassessed at the subdivision application and/or development application stage.

2.4.3 Interim Emergency Access

Access to the initial development stages is proposed via Hoffman Road, connecting to Anketell Road in the south. Following the initial stages of development within the MELSP area and the adjoining MWLSP (subject to a similar development program), ultimate primary access will be through the adjoining MWLSP north to Rowley Road. Given the initial development stages will only have one point of formal public access, a temporary fire and emergency access route is proposed along the water mains alignment, connecting from the initial stages in the south of the site, through the MWLSP and north to Rowley Road. This route has been determined in consultation with the adjoining MWLSP landowner, Qube Property Group, however is subject to detailed design to determine the ultimate alignment.



The Bushfire Management Plan will be required to be implemented as a condition of subdivision approval.

Refer Appendix 4 – Bushfire Management Plan.

2.5 Heritage

A search of the Department of Indigenous Affairs Aboriginal Heritage Inquiry System identified no registered sites of aboriginal heritage significance within the MELSP area or immediate surrounds. However, the search did identify one 'Other Heritage Place', being a mythological site (Site 3427 – Mandogalup Swamp / Spectacles) that extends in to the southern portion of the MELSP area. This listing does not restrict development.

A search of the Western Australian Register of Heritage Places identified no sites of state heritage significance within the MELSP area.

A search of the City of Kwinana's Municipal Heritage Inventory identified no sites of local historic significance within the MELSP area.

2.6 Context and Other Land Use Constraints and Opportunities

2.6.1 Peel Main Drain

The Peel Main Drain dissects the site in an east west direction between Lots 9006 and 9019. The drain is currently constructed to a 'rural' standard, and is intended to be upgraded and landscaped to an urban standard as part of residential development works. The Peel Main Drain will therefore be integrated in to the public open space for the site, however not credited towards the MELSP 10% public open space provision.

The Peel Main Drain (PMD) within the subject site is currently under the management of the Department of Water.

As with the agreements for the portion of the PMD dissecting the Wandi North LSP area on the eastern side of the Kwinana Freeway, it is understood the City of Kwinana will take over the management of the PMD following upgrade works. Further discussion is required in regard to any agreements relating to the management and maintenance of the drain. The Department of Water has been provided with initial concepts for the PMD to initiate this discourse.

2.6.2 Dampier to Bunbury Natural Gas Pipeline

The Dampier to Bunbury Natural Gas Pipeline (DBNGP) traverses the MELSP area in an east west direction between Lots 9006 and 9002. The DBNGP is protected by an easement for its full extent.

The DBNGP is intended to be landscaped to a minimum urban standard, providing a lineal active public open space corridor through the site. This is consistent with the landscape treatment for the DBNGP corridor on the eastern side of the Kwinana Freeway within the Wandi North LSP area (Honeywood estate). Notwithstanding the intended landscape treatment for the DBNGP, the easement is not afforded a credit toward the MELSP required 10% public open space provision.

Prior to any development taking place on or within proximity to the DBNGP, appropriate approvals will need to be in place, including the potential requirement for a Qualitative Risk Assessment and associated Pipeline Protection Plan (requirement to be determined at subdivision stage via referral to the pipeline operator, DBP).

2.6.3 High Voltage Power Line Easement

The subject site abuts a high voltage power line easement on its northern boundary. This easement does not affect the development potential of the site.

We confirm the portion of the easement abutting the site is in private ownership and does not comprise part of the MWLSP, and therefore the treatment for that area is not known. On this basis, the MELSP proposes residential development directly abutting (backing on to) the easement on its northern most boundary. It is anticipated any subdivision approvals for the site will include a standard uniform fencing condition for this interface. This will provide for a consistent amenity along this interface, whilst also restricting access within the easement. This approach will also assist with noise attenuation in the north of the site, mitigating against road and rail noise impacts emanating from the Kwinana Freeway and Rowley Road (identified by MRWA as a designated freight route).

Interface treatments between the MELSP and the easement will need to be complimentary to and have consideration to the interface treatments proposed within the MWLSP. This is to be addressed at the detailed design stage as part of the preparation of future Local Development Plans.

2.6.4 Noise Management

The Kwinana Freeway and the Perth to Mandurah railway line abuts the MELSP on its eastern boundary. On this basis, in accordance with *State Planning Policy 5.4: Road and Rail Transport Noise and Freight Considerations in Land Use Planning* (SPP 5.4), a Road and Railway Noise Assessment has been prepared to inform the MELSP, included as Appendix 5 of this report.

The acoustic modelling and assessment considers the potential noise impacts from the Kwinana Freeway within a 15 year planning horizon (to year 2031). Modelling for the railway line was undertaken based on the current 2016 situation.

The acoustic modelling indicates that transport noise from both the road and rail infrastructure are likely to cause noise impacts above the prescribed criteria under SPP 5.4. On this basis, modelling considered the effect of a 4 metre high noise attenuation wall along the extent of the MELSP abutting the Kwinana Freeway. The noise wall showed a significant reduction in the predicted transport noise levels, and is consistent with the noise mitigation strategy adopted for the Wandi North MELSP area on the eastern side of the Kwinana Freeway.

Notwithstanding the construction of a noise attenuation wall, two storey houses will still be affected by traffic noise. There will also be residual traffic noise in the interior of the development and therefore further noise mitigation measures are required to achieve compliance. This will be managed through notifications on Certificates of Title, requiring dwellings to be constructed to minimum construction standards consistent with the 'deemed to comply' noise limit packages and/ or quiet house design. These requirements are outlined within the Noise Assessment Report contained in Appendix 5 of this report.

03

Land Use and Subdivision Requirements

3.1 Land Use

The MELSP sets out land use, residential densities, public open space, public and private transport provision, environmental considerations and servicing requirements.

The MELSP is proposed to comprise residential development with density codes ranging from R30 to R60. The MELSP also comprises a range of local and neighbourhood public open space areas in accordance with Liveable Neighbourhoods requirements, as well as a Primary School site to service the Mandogalup catchment.

The following describes the design response proposed under the MELSP, and addresses the relevant elements of Liveable Neighbourhoods (LN). Please also refer to the land use summary table provided within the Executive Summary on Page IV of this report.

Please also refer to Plan 1 – MELSP, and Figure 12 – Indicative Zoning and Residential Density Code Plan.

3.2 Public Open Space

Under the provisions of LN a range of site responsive urban parkland is required, which appropriately addresses district, neighbourhood and local needs of residents, comprising a mixture of unrestricted and restricted open space.

The MELSP therefore provides a framework for the hierarchy and location of public open space areas across the site, considering the requirements for drainage and vegetation retention. Detailed subdivision design will provide further refinement to the MELSP public open space framework, defining the configuration, uses and treatment within each public open space area.

The MELSP provides for approximately 4.3 hectares of public open space (POS) across the MELSP area by way of four neighbourhood and two local parks, as well as local playing fields. This comprises approximately 3.4 hectares of unrestricted (8.84% of gross subdivisible area) and approximately 0.9 hectares of restricted open space (2.39% of gross subdivisible area). As noted above, the hierarchy and location of POS areas have been designed to ensure residents are within:

- ▲ 150m of a local park;
- ▲ 400m of a neighbourhood park; and
- ▲ 600m – 1km of an active playing field.

The following provides a detailed overview of the public open space design response proposed under the MELSP.

A Landscape and Public Open Space Strategy has been prepared for the MELSP area, depicting the anticipated use and intent of each of the public open space areas. Refer Appendix 6.

Please also refer Figure 13 – Public Open Space Distribution and Figure 14 – Public Open Space Schedule.

3.2.1 Public Open Space Area 5

Through consultation with the City's Technical Officer's in preparation of the MELSP, the City advised of its preference to prioritise the retention of upland vegetation within areas of POS rather than the degraded wetland vegetation located within the mapped RE wetland. It is understood the preference for upland vegetation is on the basis that upland vegetation is of higher conservation value to the City, given the extensive and larger wetland reserves which already exist within the locality.

As a consequence, POS 5 was established within the north western area of the site to enable the retention of a landscape feature and specific trees identified by the City, as well as by definition under the City of Kwinana *Landscape Feature and Tree Retention Policy*. The final extent of retention of the landscape feature will be subject to further detailed landscape design at subdivision stage.

Throughout the MELSP area, significant trees (as defined by the City of Kwinana *Landscape Feature and Tree Retention Policy*) have also been identified for retention within areas of POS and road reserves. The retention of significant trees also formed the basis of the Federal EPBC Act Referral, as approved in July 2015.

3.2.2 Local Playing Fields

The MELSP and MWLSP provide for a 2.5 hectare local playing fields site located immediately adjacent to the proposed primary school, intended for a shared-use arrangement. Of the 2.5 hectare site, approximately 1.15 hectares is situated within the MELSP, and approximately 1.35 hectares in the MWLSP.

The size, location and configuration of the local playing fields in a shared use arrangement, as proposed by the MELSP, has been supported by the Department of Education and the City of Kwinana.

The local playing fields are intended to form part of the 10% public open space contribution (unrestricted POS) for the MELSP, and are therefore included in the public open space schedule.

3.2.3 Peel Main Drain

The Peel Main Drain (PMD) traverses the northern portion of the MELSP area abutting Lots 9019 and 9006. As previously discussed, this drain currently exists within a 20m corridor and is built to a rural standard. The MELSP proposes additional open space either side of the existing PMD to provide sufficient width to facilitate the urbanisation of this drain to a living stream profile (with appropriate urban grades). The reconfiguration of the drain will utilise a mixture of planted, walled or contoured banks, with native sedges and rushes to assist with nutrient stripping and midge and mosquito control. The reconfigured drain will be unfenced and landscaped in accordance with Liveable Neighbourhoods to allow for informal and passive recreational uses, to be integrated with a neighbourhood park located to the northern boundary of the PMD corridor.

The landscaped outcome of the reconfigured PMD and associated neighbourhood park will continue the landscaping treatment of the PMD within the Wandri North Local Structure Plan area (Honeywood estate).

Whilst intended to serve a passive recreational function and landscaped accordingly, the PMD does not form part of the credited minimum 10% POS provision for the site.

3.2.4 DBNGP Corridor

The DBNGP, traversing Lots 9006 and 9002, comprises an underground high pressure gas pipeline protected within an easement. As per the landscape response delivered within Wandri North Local



Structure Plan area (Honeywood estate), the MELSP proposes the development of the DBNGP as a lineal public open space corridor to a minimum urban standard, serving an active recreation function.

Notwithstanding, given the restrictions placed on development and hard landscaping within the easement, the DBNGP easement does not form part of the credited minimum 10% POS provision for the site.

Prior to any development taking place on or within proximity to the DBNGP, appropriate approvals will need to be in place, including the potential requirement for a Qualitative Risk Assessment and associated Pipeline Protection Plan (requirement to be determined at subdivision stage via referral to the pipeline operator, DBP).

3.2.5 Rebated Lot Rain Gardens

The landscape strategy for the MELSP is tightly woven into the Local Water Management Strategy (LWMS), whereby streetscapes will contain at source infiltration of the minor storm events (up to 5yr ARI). The development of good streetscapes through landscaping has been a strong objective of the MELSP, as well as to satisfy the City's streetscape objectives. Amongst other features, the use of 'rebated lot rain gardens' and 'porous tree pits' to capture and infiltrate minor event stormwater runoff has been proposed (as detailed under the LWMS). The rain gardens are not intended to comprise part of the POS provision for the MELSP and will be an extension of the road reserve; however will have a significant positive impact to the streetscape amenity of the MELSP, providing unique landscape opportunities whilst also serving an important drainage function.

Rebated lot rain gardens are proposed to be positioned at specified locations within the local road network to capture minor storm events (up to 5 year ARI) higher in the drainage catchment. These will be developed as traditional rain gardens (of approximately 250m²) adjacent to rebated residential lots, comprising part of the road reserve (refer Landscape Strategy and LWMS for further detail). These areas are proposed to be self-sustaining at maturity, include an amended soil profile and specialised planting palette to address stripping of nutrients contained within the runoff.

The use of rain gardens throughout the road network will reduce the area down catchment required for minor event stormwater retention within POS, therefore facilitating a greater useability of and flexibility in the design of POS areas. The location and configuration of POS areas will therefore not be dictated by minor drainage events. Notwithstanding, POS areas are intended to accommodate major drainage events (detention of up to 100 year ARI events), and are therefore proposed to be located at the low points in the catchment.

3.2.6 External Local Drainage

Whilst drainage is principally managed within the MELSP, two local drainage basins are proposed within the south western portion of the site situated adjacent to the MELSP area, within the Rural A zone, straddling the DBNGP. The existing topography results in the general east to west movement of drainage across the site. The location of the two local drainage basins along the western boundary of the catchment therefore maximises the drainage efficiency whilst minimising the importation of fill and earthworks required within these drainage catchments. These are not intended to form part of the open space contribution for the MELSP area, and are intended to be used for drainage purposes only. No drainage is proposed to be retained within the DBNGP easement.

In addition to local drainage, there is also an area of regional drainage to be provided in accordance with the requirements under the JDWMP. This is to be provided within and adjacent to the Western Power easement along the southern boundary of Lots 9006, 9002, 11 and 9000. Whilst the regional



drainage area is situated outside the MELSP boundary, it may be created and handed over to the City of Kwinana as part of the development of the MELSP area.

The location of the local and regional drainage basins within the Rural A zone enables the maximisation of the residential catchment, assisting in achieving density targets for the site and the minimum population requirements for the delivery the primary school and playing fields. It is acknowledged that whilst this arrangement is not a standard approach to residential drainage planning, the Mandogalup Cell characteristics, specifically the resulting regional drainage being dissected from the residential catchment, lends itself to a site specific approach to drainage provision.

This approach has been agreed to in principle by both the Department of Water and the City of Kwinana.

3.3 Residential

An indicative subdivision layout has been prepared for the site, identifying a yield of approximately 581 lots (approximately 674 dwellings). Based on 674 dwellings, the site achieves a density of approximately 30.5 dwellings per residential site hectare, and 15.8 dwellings per gross urban hectare. This is consistent with Liveable Neighbourhoods targets for a minimum average residential density of 22 dwellings per residential site hectare for green field subdivision areas. This is also consistent with the Draft Sub-regional Planning Framework targets for a minimum of 15 dwellings per gross urban hectare.

For reference, an Indicative Plan of Subdivision is provided at Figure 15. This is provided for explanatory purposes only, and is subject to review and detailed design at the subdivision stage.

Residential density codes have been allocated across the site and have been used in the preparation of indicative subdivision layouts and density calculations. The MELSP allocates a base density of R30, with areas of R40 and R60 allocated to lots within proximity to areas of high amenity and access including (but not limited to) within proximity to the primary school, around public open space, and adjacent to public transport or neighbourhood connector routes.

The density code range also facilitates a diversity of lot product across the site, providing for a range of dwelling types. The preparation of Local Development Plans will also assist in facilitating the delivery of diversity in lot product, as well as seeking to achieve built form outcomes consistent with the development intent of the site.

Please refer to Figure 12 for the Zoning and Residential Density Code Plan.

3.4 Local Development Plans

A Local Development Plan is required in the following circumstances:

- ▲ Lots with an area of 260 square metres or less;
- ▲ Irregular shaped lots;
- ▲ Lots where specific vehicle access and egress control is required;
- ▲ Lots abutting public open space;
- ▲ Lots with particular site constraints;
- ▲ Lots subject of a notification on title;

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- ▲ Lots abutting the Western Power High Voltage Power Line Easement;
 - ▲ Lots abutting / adjacent to the Peel Main Drain;
 - ▲ Lots abutting the DBNGP Corridor;
 - ▲ Lots with a BAL Rating of 12.5 or greater; and
 - ▲ Lots that require quiet house design for noise attenuation through deemed-to-comply noise insulation packages, and/or lots identified as requiring specialist acoustic requirements.

Local Development Plans are to address, as a minimum, the following:

- ▲ Dwelling orientation;
- ▲ Type of fencing;
- ▲ Location of carports/ garages and vehicular access;
- ▲ Surveillance;
- ▲ Setback variations;
- ▲ Solar Orientation; and
- ▲ Requirements for dwelling construction compliant with an approved Bushfire Management Plan and Noise Management Plan.

In preparing Local Development Plans, the design responses and interface treatments between the MELSP and MWLSP will need to be considered to ensure an effortless transition between the two developments, however noting the different design objectives of the two estates to create individual character and sense of place.

Given the various design requirements, it is anticipated Local Development Plans will be prepared estate-wide, likely on a stage by stage basis. This is consistent with the typical approach taken for other developments within the City of Kwinana.

3.5 Movement Networks

The following provides a summary of the proposed movement network. For further information, refer the Transport Assessment included at Appendix 7.

3.5.1 Existing Road Network

Hoffman Road

Hoffman Road is a local access road that runs parallel to the Kwinana Freeway, and connects the LSP area to Anketell Road in the south.

Hoffman Road is proposed to be the interim primary access to the MELSP area, until such time as an alternate access becomes available via connections to Rowley Road in the north through the adjoining development on the site's western boundary (MWLSP), and connection to Anketell Road in the south via the future extension of Hammond Road.

The intersection of Hoffman Road and Anketell Road is currently a basic T-intersection. Hoffman Road is constructed to a sealed rural standard, and is intended to be upgraded to an urban standard as part of the development of the site.

There is no existing traffic volume data available for Hoffman Road, however given the limited development adjacent to Hoffman Road volumes are likely low.

Rowley Road

Rowley Road is classified as a Regional Distributor in the Main Roads WA Functional Road Hierarchy. It provides an east-west connection between the South Western Highway (via Eleventh Avenue in Armadale), Tonkin Highway, Kwinana Freeway and Rockingham Road in Wattleup (via Wattleup Road).

Rowley Road is currently constructed as a rural standard single carriageway road, with existing traffic volumes of approximately 4,870 vehicles per day east of Barfield Road and approximately 3,280 vehicles per day between Frankland Avenue and Barfield Road. Notwithstanding, Rowley Road has been identified as a primary freight route to the Naval Base / Kwinana Beach industrial areas. Timing for the upgrades to Rowley Road are unknown at this stage. The widening and upgrade of Rowley Road is not expected to impact the development of the subject site.

There is currently no connection from the subject site to Rowley Road. It is anticipated future connections will be established via access roads through the land to the west of the site (MWLSP).

Hammond Road (future extension)

Current planning identifies the extension of Hammond Road south to Rowley Road, ultimately connecting with Anketell Road. The connections of Hammond Road with Rowley and Anketell Roads are intended to be full movement intersections.

It is anticipated the Neighbourhood Connector proposed along the western boundary of the MELSP, running north through the MWLSP area, will ultimately connect with Hammond Road to the west, providing a higher order access from the site to Anketell and Rowley Roads. Following establishment of this connection, Hoffman Road will be downgraded to a lower order access road. At this time, it is expected the intersection of Hoffman Road and Anketell Road will be downgraded to left in/ left out or be terminated, given its proximity to the Kwinana Freeway interchange.

3.5.2 Proposed Road Network

The proposed road hierarchy for the MELSP (refer Figure 16 – Indicative Movement Network) has been determined from modelling based on the indicative subdivision layout, and provides for simple and efficient vehicle movements through the site.

The movement network reflects a strong north-south and east-west modified grid configuration, with a number of direct connections to the road network within the MWLSP. The street block lengths are consistent with the requirements of Liveable Neighbourhoods, providing for connectivity and permeability through the site, for both pedestrians and vehicles.

The indicative road network is proposed to comprise of the following road classifications:

Road Classification	Indicative Upper Traffic Volume (Vehicles Per Day)	Indicative Road Reserve Width
Neighbourhood Connector A	7,000	24.4 metres
Neighbourhood Connector B	3,000	19.4 metres
Access Street B	3,000	17.9 metres
Access Street C	1,000	15.4 metres (13.2 metres adjacent to POS)



The road hierarchy primarily consists of Access Street C roads, with a central Access Street B providing the key north south link connection through the MELSP.

Neighbourhood Connector

The Neighbourhood Connector runs along the western boundary of the MELSP and is proposed, as an interim solution, to connect to Anketell Road in the south via a connection to the existing Hoffman Road reserve.

Ultimately, the Neighbourhood Connector will connect to the future Hammond Road extension to the west, via a connection through the MWLSP. The Hammond Road extension will provide a Neighbourhood Connector link between Rowley Road in the north and Anketell Road in the south. Upon completion of this ultimate solution, the Hoffman Road / Anketell Road intersection will be downgraded to a left in / left out access or terminated, with the section of Hoffman Road connecting to Anketell Road being downgraded to a local road.

Refer Figure 5 of the Transport Assessment at Appendix 7, depicting the interim and ultimate road changes to the road network.

Traffic volumes along the Neighbourhood Connector routes are estimated to be between 3,000 to 7,000 vehicles per day.

Access Streets

The access streets are proposed to primarily consist of Access Street C roads, designed to a 15.4 metre cross-section. Where services are only required to one side of the road, such as adjacent to public open space or the Kwinana Freeway reserve, a reduced Access Street C cross-section of 13.2 metres is proposed. This is consistent with other recent developments within the City of Kwinana, including within the Wandi North and South Local Structure Plan areas on the eastern side of the Kwinana Freeway.

Traffic volumes along the access roads are typically estimated to be in the order of 1,000 to 3,000 vehicle movements per day, which is consistent with the road hierarchy classification under Liveable Neighbourhoods.

Traffic modelling for the MELSP area estimates the completed development will generate in the order of approximately 4,856 vehicle movements per day.

Refer Figure 16 - Indicative Movement Network

3.5.2.1 Truncation Variation – Small Lot Product

In accordance with the provisions of Liveable Neighbourhoods, Element 2 – Movement Network R55, truncations of 3m x 3m are to generally be provided on corner lots. Notwithstanding, truncations of 6m x 6m have been the traditional standard applied by Local Governments in greenfield areas.

With the introduction of small lot product, the traditional 6m x 6m truncations significantly impede on small lot sites. As such, discussions with the City's Technical Services have indicated that reduced truncations of 3m x 3m in accordance with Liveable Neighbourhoods may be entertained at subdivision, subject to an assessment of appropriate sightlines in accordance with Austroads Standards.

Further assessment and documentation is proposed to be undertaken at detailed subdivision, to enable truncations and kerb radii in accordance with R55 and R57 of Liveable Neighbourhoods.

3.5.3 Public Transport

The MELSP area is not currently directly serviced by public transport. The closest existing bus service is Bus Route No. 57, which runs along Lyon Road, north of Rowley Road through Aubin Grove, approximately 500 metres east of the site.

The Public Transport Authority has advised the area west of the Kwinana Freeway would be served by future Bus Routes 535 and 536. Timing for the commencement of those services is unknown at this stage, and are subject to the progress of adjoining development and availability of funding. These services will operate out of the Russell Road, Success train station, and are intended to ultimately connect Hammond Park to Mandogalup.

Timing for the extension of bus services through Mandogalup is not known at this stage. Notwithstanding, the proposed Neighbourhood Connector will be designed to accommodate buses, should future services be established.

The Perth to Mandurah railway line runs along the eastern boundary of the site within the Kwinana Freeway reserve. The closest passenger stations to the site are Success, approximately 2.7 kilometres to the north, and Kwinana, approximately 5 kilometres to the south.

3.5.4 Pedestrian and Cycle Network

In accordance with Liveable Neighbourhoods requirements, footpaths will be provided on at least one side of every street. A shared path is proposed along the Access Street B running north south through the site and adjacent to the proposed Primary School.

The Perth Bike Map series shows an existing principal shared path (PSP) along the Kwinana Freeway adjacent to the MELSP area. The Perth Bike Map also designates Rowley Road and Barfield Road (north of the site) as being part of the Perth Bicycle Network, and nominates these as continuous signed routes. The MELSP proposes two connections to the PSP, one in the north of the site and one in the south.

3.6 Water Management

3.6.1 Regional Water Management Strategy

The Jandakot Drainage and Water Management Plan (JDWMP) was released by the Department of Water in December 2009. The JDWMP provides district scale flood modelling, a surface water management strategy and a groundwater management strategy, which specify post-development levels and flows to address the City of Kwinana's District Structure Plan (ERIC).

3.6.2 District Water Management Strategy

A District Water Management Strategy (DWMS) was prepared in 2011 and provides guidance on water re-use options, stormwater detention basins, monitoring requirements, and structural and non-structural controls for stormwater treatment. The DWMS has been approved by both the City of Kwinana and the Department of Water.

3.6.3 Local Water Management Strategy

A Local Water Management Strategy (LWMS) has been prepared in support of this MELSP, and is provided at Appendix 8.

The LWMS addresses the MELSP area, and provides a refinement of flood modelling, the surface water management strategy and the groundwater management strategy to a local scale. The LWMS has



been prepared in accordance with the water sensitive urban design practices as described in the Stormwater Management Manual of WA.

3.6.4 Proposed Drainage Network and Infrastructure Requirements

3.6.4.1 Wetland Management

The following measures will be implemented to ensure the wetlands and watercourses to the south and east of the site, including Mandogalup Swamp, will not be negatively impacted by urban stormwater runoff:

- ▲ All stormwater and groundwater discharge from the development will be treated prior to discharging to the Peel Main Drain.
- ▲ Peak outflows will be consistent with pre-development flow rates.

3.6.4.2 Regional / District Drainage

As previously discussed, the Peel Main Drain will be retained through the MELSP area, upgraded to an urban standard generally characteristic of the design concept implemented for the portion of the drain within the Wandi North Local Structure Plan area.

The final drain profile will be required to achieve sufficient hydraulic capacity to convey the post-development 100 year ARI flow within the drain, and maintain the current drain easement width of 20 metres.

It is expected the management and maintenance requirements and responsibilities will be reflective of the portion of the drain running through the Wandi North LSP area. However, this is subject to further discussion and agreement between the Water Corporation and the City of Kwinana.

In addition to the Peel Main Drain, the LWMS identifies an area of district drainage associated with the Mandogalup Swamp to satisfy the requirements under the JDWMP. This drainage, within the Satterley landholdings (Lots 9006 and 9002), is proposed to be retained within the Western Power easement. The use of the Western Power easement for district drainage purposes is consistent with the drainage scenarios identified under the JDWMP, recognising this approach has a minimal and manageable effect on the Spectacles Wetlands, when compared to other scenarios explored.

3.6.4.3 Local Drainage

The local stormwater drainage system has been designed using a major/minor approach.

The major drainage system is designed to manage rainfall events greater than the 5 year ARI, up to the 100 year ARI. The key elements of the major drainage system strategy are as follows:

- ▲ In major storm events the minor drainage structures will be at capacity, with excess stormwater bypassing the minor drainage structures and discharging to the major storage basin. The basin is to be located in the lowest point of the catchment.
- ▲ Overland flow from Catchment B will be directed into the retained wetland. An overflow pipe from the wetland in to the PMD will be provided to prevent prolonged inundation.
- ▲ Discharge rates from POS detention basins will be controlled to pre-development flow rates as per the DWMS.
- ▲ All finished lot levels will have a minimum 0.5 metre clearance above the estimated 100 year ARI flood level of the detention storages.

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- ▲ Public open space storage areas are to have a minimum separation of 0.5 metres between maximum or controlled groundwater levels, and a side slope of 1:6.
 - ▲ Catchment A utilises infiltration to dispose of stormwater.
 - ▲ All pipe outlets to the PMD will be free flowing.

This design strategy is consistent with the objectives provided in the DWMS.

The minor drainage system is designed to manage rainfall events up to the 5 year ARI. The following strategies are proposed:

- ▲ All lots (including driveways) are to have soakwells to infiltrate the 5 year rainfall event.
- ▲ The road drainage system consists of porous tree pits with runoff entering the pit via the road. Runoff not infiltrated in the porous tree pits will be conveyed overland to the rebated lot rain gardens and linear rain gardens.
- ▲ Retention storages (linear rain gardens and rebated lot rain gardens) are located throughout the development to increase infiltration higher in the catchment, sized to contain the critical 5 year ARI.
- ▲ No pit and pipe system is proposed, with the exception of Catchment B where an outlet pipe from the wetland into the Peel Main Drain is provided.
- ▲ In events above the 5 year ARI, the retention storages are assumed to be full, with excess stormwater runoff bypassing the structures and discharging to the major detention storages via overland flow. The detention storages will be located in the catchment low point within the public open space.

The key design criteria for the porous tree pits and retention storages are as follows:

- ▲ Porous tree pits located within the road reserve and between driveways.
- ▲ Linear rain gardens are uninterrupted verge gardens located along non-active lot frontages and public open space, underlain with at least 250mm of amended soil media.
- ▲ Rebated lot rain gardens are located between residential lots and underlain with at least 250mm of amended soil media.

In accordance with the processes defined under *Better Urban Water Management*, an Urban Water Management Plan (UWMP) will be required to be prepared and implemented at the time of subdivision. The UWMP will refine and implement the proposed drainage network/system, as defined under the LWMS.

3.7 Education Facilities

In accordance with discussions undertaken with the Department of Education (DoE) regarding school catchment requirements, the MELSP proposes one primary school located generally centrally within the Mandogalup urban cell, to be co-located with the local playing fields in a shared use arrangement.

The provision of one primary school is consistent with the catchment requirements under Liveable Neighbourhoods, which stipulates an average of one primary school per 1500 lots. Based on current planning, it is envisaged the current Mandogalup urban cell (MELSP and MWLSP) has the potential to yield in the order of 1500 lots.



The location, size and configuration of the primary school identified on the MELSP and MWLSP has been informally supported by the Department of Education and City of Kwinana. Please refer Appendix 11 for email correspondence outlining this support.

It is understood from discussions with the DoE, the Mandogalup cell will be serviced by the Wandi High School site located within the Wandi South LSP area.

A search of the DoE system identifies the Mandogalup area as currently being within the intake areas for the Hammond Park Primary School (approximately 4.7km to the north), Gilmore College (Kwinana Senior High School) (approximately 5km to the south), and Atwell College (approximately 7.3km to the north). It is understood these will service the proposed Mandogalup population until such time as the Mandogalup Primary School and Wandi High School are delivered.

3.8 Activity Centres and Employment

The MELSP does not propose any commercial or retail uses. A small local centre is indicatively shown within the MWLSP, intended to service the Mandogalup catchment, including the MELSP.

3.8.1 Secondary Centres

In accordance with *State Planning Policy 4.2: Activity Centres for Perth and Peel* (SPP 4.2), the closest secondary centres to the MELSP area are Cockburn Gateway (approximately 6 kilometres to the north) and the Kwinana Town Centre (approximately 7.5 kilometres to the south).

Beside the Perth City Centre (Strategic Metropolitan Centre), these centres comprise the main regional activity centres within relatively close proximity to the Mandogalup cell. They provide a diversity of uses, providing for a range of economic and community services required to service the future population.

3.8.2 District Centre

Current strategic planning identifies a future District Centre to be located within Wandi on Anketell Road, east of the Kwinana Freeway.

Under the City of Kwinana's *Local Commercial and Activity Centres Policy* (LCAC), the District Centre has been allocated approximately 20,000m² of retail floor space and 10,000m² of 'other retail', including bulky goods/ showroom floor space. This floor space allocation is capable of supporting two full line supermarkets and a discount department store, as well as a wide range of complementary specialty shops.

In accordance with the City of Kwinana *Draft Community Infrastructure Plan* (2015), the District Centre is also intended to comprise a range of community facilities.

Mandogalup residents will have direct access to the District Centre via Anketell Road. The centre will provide for the daily and weekly needs of residents.

Timing for the development of concept plans and lodgement of a Structure Plan for the District Centre is unknown at this stage, and is subject to ongoing negotiations for a potential anchor tenant.

3.8.3 Neighbourhood / Local Centre

Consistent with the LCAC Policy, the MELSP does not propose a Neighbourhood or Local Centre within the MELSP area. Notwithstanding a Retail Needs Assessment was prepared to inform the proposed MELSP and assess the needs of the future population across both the MELSP and MWLSP. This is provided within Appendix 9.



The assessment concludes there may be a spatial opportunity to provide for a single supermarket based centre in the Mandogalup locality. The potential retail sales from the residential population for the MELSP and MWLSP will ultimately be capable of potentially supporting a centre of approximately 750m² of retail floor space, comprising a small supermarket and up to 4 specialty shops. These activities will not be sustained until the full development of the catchment occurs.

On the basis of the modelling undertaken for the current Mandogalup urban cell, the MWLSP identifies an interim local centre generally central within the catchment.

Notwithstanding, any expansion of the current residential catchment within Mandogalup would increase the spending capacity and sales potential within the community. Therefore, any future planning for the expansion of the Mandogalup residential catchment should be cognisant of providing and planning for additional retail activity.

Should expansion of the residential catchment occur, there may be opportunity to provide a larger centre. This would ideally be located within close proximity to Rowley Road and the future extension of Hammond Road to capitalise on the future needs of the Hammond Park community. A centre located more centrally within the Mandogalup Cell would be less viable given the location of the proposed District Centre on Anketell Road (east of the Kwinana Freeway). Accessibility and passing trade exposure would also be limited and therefore be less likely to attract a wider catchment beyond the current urban area within Mandogalup.

The location of a larger centre in an alternate location to that currently identified under the MWLSP is subject to zoning and further detailed planning.

3.9 Infrastructure Coordination, Servicing and Staging

The following provides a summary of the infrastructure and servicing for the MELSP area. Further information is contained within the Engineering Services Report provided at Appendix 10.

3.9.1 Water

Preliminary information from the Water Corporation indicates there are no existing potable water services available within the MELSP area. Notwithstanding, planning for a number of developments to the north has now resolved supply issues adjacent to the MELSP area, enhancing the regional network to ultimately provide services to the site.

The Water Corporation has indicated water distribution mains along Brushfoot Boulevard and Russell Road (situated to the north of the site in Success) have been completed, and a 500DN extension southwards along Hammond Road / Frankland Avenue will be completed in the near future.

Current advice from the Water Corporation indicates the mains infrastructure constructed under a pre-fund arrangement would terminate at the intersection of the future Hammond Road and Rowley Road intersection, from which point the developer would need to extend a minimum 250DN distribution main along Rowley Road to services the northern end of the Mandogalup precinct.

All internal water reticulation pipe-work will be designed and constructed in accordance with Water Corporation standards and requirements. Standard Water Corporation head work charges will apply.

3.9.2 Sewer

Preliminary information from the Water Corporation indicates there are no existing wastewater services available to the MELSP area. Notwithstanding, wastewater planning for development to the



north has now resolved supply issues adjacent to the MELSP area, enhancing the regional network to ultimately accept discharge from the MELSP area.

The MELSP area will be serviced in accordance with current Water Corporation sewerage planning. This sewer planning identifies the need for a prefunded waste water pump station (WWPS), with a long term pumping rate of approximately 190 litres per second. This is intended to be located in the south-eastern corner of the MELSP area on Lot 9002.

The WWPS and associated rising main (to be routed through the MELSP area) is required to be included on the Water Corporation capital works program.

A preliminary staging plan has been developed by Peritas Group for discussion with Water Corporation that outlines a staged approach proposing to use the existing Honeywood pump station (Thompsons Lake Pump Station J) by diverting flow under the Kwinana Freeway from the southern corner of the Mandogalup precinct and upgrading the existing pump station for the increased flow conditions.

This may be a temporary or an interim measure until such time as the Mandogalup catchment develops to its full extent and as the MWLSP comes on stream in later stages. The Water Corporation may consider allowing the early stages of the MELSP to gravitate to that catchment to save construction of the major infrastructure necessary for the Mandogalup catchment to stall the major expenses within the Capital works for the Mandogalup area.

3.9.3 Electricity

It is intended all lots within the MELSP area will be serviced with underground power. The cost of this work will be funded by the developer.

Western Power studies indicate the existing power network in the vicinity of MELSP area has insufficient capacity to accommodate the whole development and provide recommendations for possible network extensions that would be required to deliver power services to the site. It is anticipated the initial stages of the MELSP development could be serviced from the existing network by way of upgrading existing feeders. However, the exact capacity cannot be established until the detailed design stage.

Standard Western Power requirements will apply, including the cost for head works upgrades and exclusions to service the site.

It is understood, as is standard practice, that a number of pad mount sites will be required throughout the development. The location of these will be determined at the detailed design and subdivision stage.

3.9.4 Gas

ATCo Gas has advised reticulated gas services are available in the surrounding locality.

ATCo gas may provide road crossing conduits for future use; however this is subject to cost allocations and budgets being approved by the relevant gas authorities. No developer contributions to provide for future reticulated gas supplies are anticipated.

In addition, as previously noted, the DBNGP traverses the MELSP area in an east west direction between Lots 9006 and 9002. Earthworks within the DBNGP easement are not permitted, with adjacent land required to be graded to maintain access and existing DBNGP levels. Any services or roads required to cross the corridor will need prior approval of DBNGP (WA) Nominees Pty Ltd (DBP).

3.9.5 Telecommunications

It is intended all lots within the MELSP area will be serviced with telecommunication services. This will be either by way of standard Telstra / NBN services or an external private supplier such as The Local Broadband Network Company (LBN Co) (as was the case for the Wandi North and South LSP areas).

The service provider will be responsible for installing telecommunication facilities within the development. The developer will fund the provision of trenches for cable laying. Alternatively, where cable routes are on the same alignment as Western Power underground power supply routes, the telecommunications will use, where possible, the Western Power trenches in lieu of the developer providing additional trenching.

Headworks charges for telecommunication service extensions are anticipated.

3.9.6 Earthworks

Based on the information currently available, it is not expected that any major difficulties will be experienced during the development of the MELSP area in regard to earthworks and the creation of building pads.

Site grading will generally be determined by the servicing requirements and environmental constraints of the site, with a view to keeping grading and remodelling to minimum limits wherever possible.

It is anticipated that bulk earthworks will be completed using material available from within the site, and that if required, importation of material will be locally sourced from existing sand mining operations within the locality. Once earthworks have been completed, the site will be stabilised either by the respreading of stockpiled top soil from the bulk earthworks operations, or by hydromulch stabilisation as appropriate, or otherwise in accordance with the requirements of the City of Kwinana.

Site levels are intended to be set in accordance with the following parameters:

- ▲ Geotechnical and soil parameters are to ensure the site achieves an appropriate site classification for its purpose, which is generally *Class A* for residential purposes.
- ▲ Fill levels are to provide clearance to groundwater.
- ▲ Building pad levels are to be designed to ensure floor levels maintain a clearance of a minimum of 0.5 metres to the regional 1 in 100 year flood levels.
- ▲ Finished pad levels are to conform to the regional drainage requirements as identified in the published urban stormwater drainage strategies consistent with recent government initiatives for the area.

3.9.7 Indicative Staging

It is intended development of the site will commence from the south of the MELSP area and will occur across approximately seven stages, moving northward.

The staging of development has predominantly being informed by the servicing (delivery of the sewer pump station) and access requirements for the site (Hoffman Road). Until such time as development to the west of the site (MWLSP) has commenced providing alternate access, Hoffman Road provides for the sole access in to the site, connecting with Anketell Road in the south. In addition, the extension of sewer services will be most efficient and cost effective if occurring in a south to north direction.

Please refer to Figure 17 for an indicative staging plan. This is subject to further detailed design and is provided for explanatory purposes only.

3.10 Developer Contribution Arrangements

The MELSP is situated within the Mandogalup cell for the purposes of Developer Contribution arrangements, and forms part of Development Contribution Area 8 (DCA 8) for community infrastructure and Development Contribution Area 6 (DCA 6) for traditional infrastructure.

DCA 8 was introduced to TPS 2 by way of Scheme Amendment 115 (Gazetted on 19 June 2012). However, the City of Kwinana has since reviewed the requirements for community infrastructure on the basis of current planning and population forecasts, in accordance with a revised draft Community Infrastructure Plan (2011-2031). The City of Kwinana therefore advertised Amendments 145 and 100A, concurrently with the Community Infrastructure Plan (2015) between 16 October and 30 November 2015, seeking to amend DCA 8 and introduce DCA 6 to TPS 2. Amendment 100A was subsequently adopted by Council on the 23 November 2016, however is yet to be considered by the Minister and Gazetted. It is understood Amendment 145 and the Community Infrastructure Plan will be adopted by Council in the relatively near future.

Timing for Gazettal of the Amendments is unknown at this stage.

As advertised, the following items are intended to be funded by DCA 8 and DCA 6 (adopted), however noting these are yet to be Gazetted and may therefore be subject to change.

DCA 8	Item
Sub-Regional	Community Knowledge and Resource Centre (excluding leasable office space and cafe component)
	Destination Park (Calista)
	Wells Beach Foreshore Upgrade (Park and Boating facility)
	Sub-Regional Sporting Ground (Thomas Oval / Kelly Park extension/ upgrade)
District A	Sporting Ground
	Youth Centre
	Dry Recreation Centre
	Branch Library
Local	Community Centre
	Sporting Ground with Community Sports Facility Building A
Admin	Administrative Costs

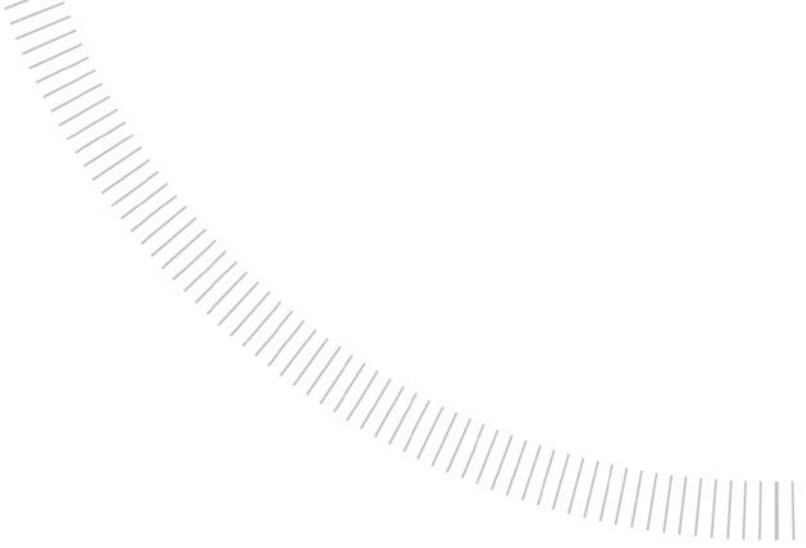
DCA 6	Item
Roads	Frankland Avenue extension – 100% of the full cost of design and construction of the Frankland Avenue extension to a single carriageway urban standard, for a distance of approximately 600 metres south from Rowley Road, or as required to connect with the internal connector road. Includes full earthworks, carriageway, drainage, landscaping, undergrounding of power, and all treatments (including intersections, lighting, kerbing and footpaths).
	East-west connection between internal connector road to Frankland Avenue extension. 100% of the full cost of design and construction of the east-west

DCA 6	Item
	internal connector road to cross Lot 2 on DP11392 to a single carriageway urban standard. Includes land acquisition, full earthworks, carriageway, drainage, landscaping, undergrounding of power and all treatments (intersections, roundabouts, lighting, kerbing and footpaths).
Public Open Space	100% of total cost of land and improvements for public open space in accordance with the adopted structure plans for the DCA, including land for community purposes and local sporting grounds as per the City of Kwinana Community Infrastructure Plan 2011-2031, as revised. Only creditable public open space as per Liveable Neighbourhoods forms part of this contribution.
District Sporting Ground	Costs associated with the acquisition, site works and basic servicing of land for a District Sporting Ground to be located within Casuarina as per the Community Infrastructure Plan 2011-2031.
Community Facilities	Costs associated with the acquisition of land for a Branch Library as part of a combined community facility to be located with the Wandi District Centre as per the City of Kwinana Community Infrastructure Plan 2011-2031, as revised.
	Costs associated with the acquisition of land for a District Youth Centre as part of a combined community facility to be located with the Wandi District Centre as per the City of Kwinana Community Infrastructure Plan 2011-2031, as revised.
Administration Costs	Administration costs associated with administering the DCP.

Whilst the Amendments are considered to be seriously entertained proposals, should these not be Gazetted prior to subdivision within the MELSP area, it is likely a legal agreement will be entered into between the City of Kwinana and the Developer for the payment of interim costs. These costs are to be reconciled upon the Gazetted of the Amendments. This is consistent with the approach taken for the Wandi North LSP (DCA 9 and DCA 5). However, this is subject to further discussion and negotiation with the City of Kwinana.



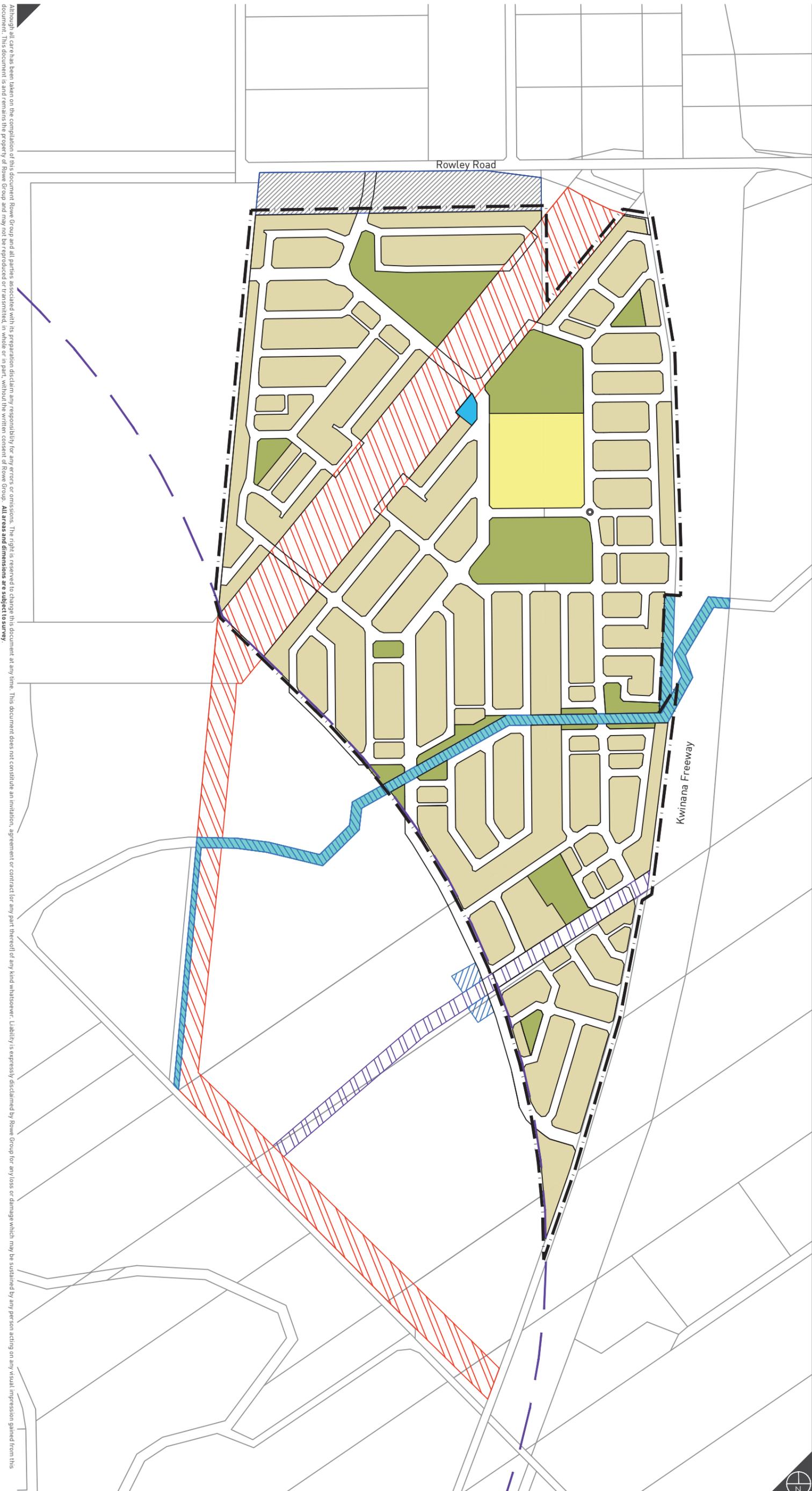
FIGURES





LEGEND

- Structure Plan Boundary
- Existing Cadastre
- Proposed Boundaries
- Residential (R30 - R80)
- POS
- School
- Planning Control Area No.112
- Local Drainage
- DBNGP Easement
- High Voltage Powerline Easement
- Peel Main Drain
- Revised Kwinana Industrial (Including Air Quality) Buffer (as of 21 September 2010)
- Indicative Local Centre



0 375 Metres

REVISIONS

Rev	Date	Drawn
K	2017.05.02	M. Sullivan
L	2017.07.03	M. Sullivan
M	2017.10.19	W. Clements
N	2017.10.23	W. Clements



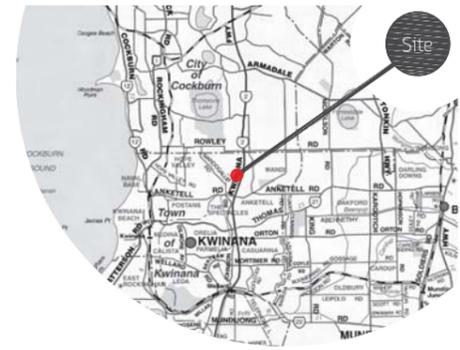
w: www.rowegroup.com.au
 e: info@rowegroup.com.au
 p: 08 9221 1991

Date Drawn: 2016-03-16
 Job Ref: 7282A
 Scale: 1:7,500 @ A3
 Client: Satterley Property Group
 Designer: R. Cumming
 Drawn: M. Sullivan
 Projection: PCG94
 Plan ID: 7282A-CON-08-N

Combined MELSP and MWLSP Concept Plan

Mandogalup Figure 1

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LEGEND

- Local Structure Plan Boundary
- Existing Lot Numbers
- Existing Boundaries
- DBNGP Easement
- High Voltage Powerline Easement



0 125 250 Metres

REVISIONS

Rev	Date	Drawn
A	2014.02.07	K. Trenberth
B	2016.09.06	M. Sullivan
C	2017.05.03	M. Sullivan



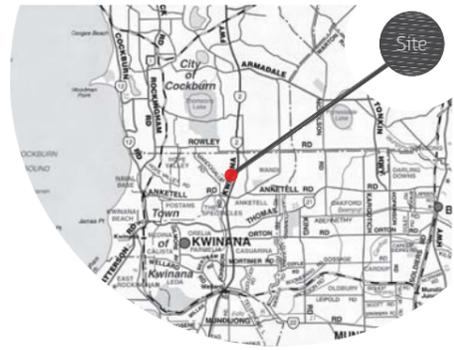
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Date Drawn: 2014-02-07
 Job Ref: 7282A
 Scale: 1:6000 @ A3
 Client: Satterley
 Designer: R. Cumming
 Drawn: K. Trenberth
 Projection: PCG94
 Plan ID: 7282A-FIG-10-C
 Aerial photography captured and supplied by NEARMAP

Site Plan

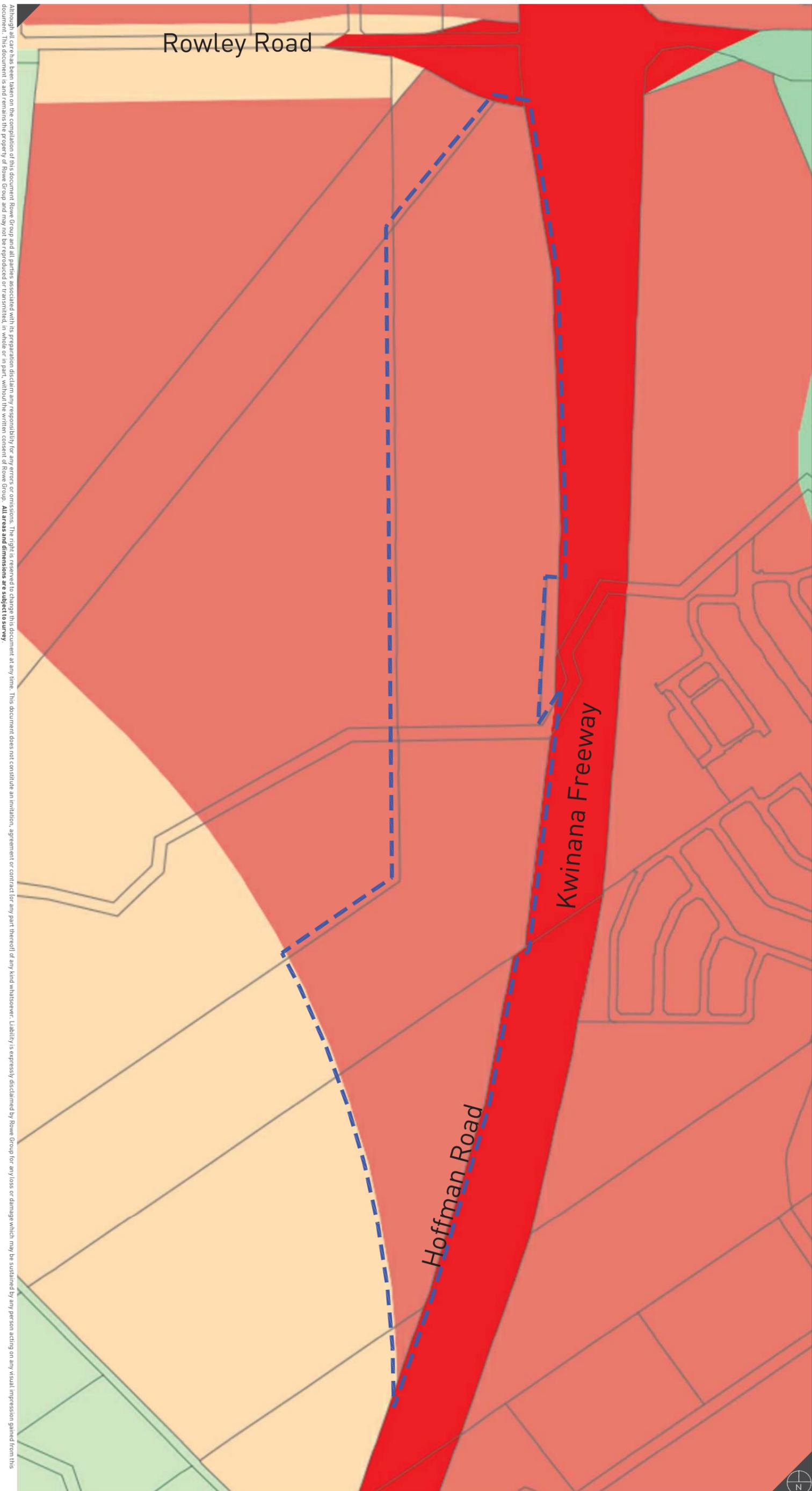
Mandogalup
Figure 4

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LEGEND

- Local Structure Plan Boundary
- RESERVED LANDS**
- Primary Regional Roads
- ZONES**
- Urban
- Urban Deferred
- Rural
- Rural - Water Protection



0 125 250 Metres

REVISIONS

Rev	Date	Drawn
A	2014.02.07	K. Trenberth
B	2016.09.06	M. Sullivan
C	2017.05.03	M. Sullivan



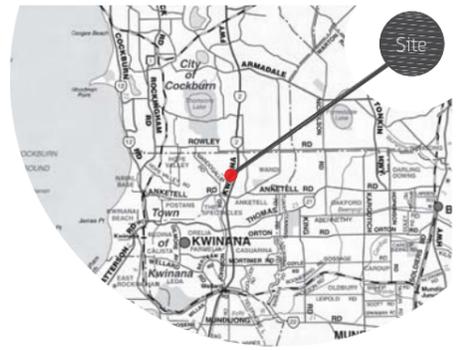
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 Job Ref: 7282A
 Scale: 1:6000 @ A3
 Client: Satterley
 Designer: R. Cumming
 Drawn: K. Trenberth
 Projection: PCG94
 Plan ID: 7282A-FIG-11-C
 Zoning supplied by WAPC

Metropolitan Region Scheme

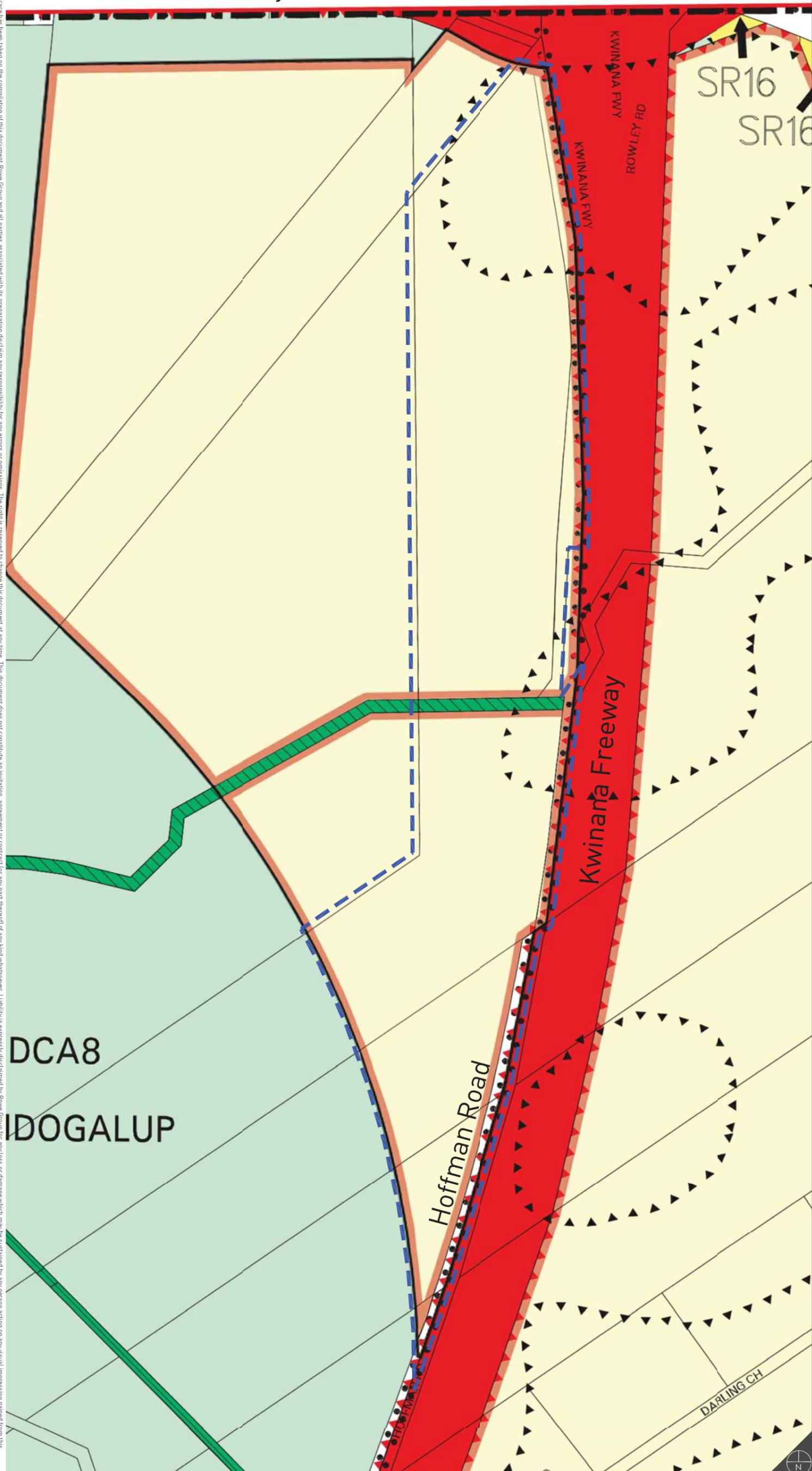
Mandogalup
Figure 5

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LEGEND

- Local Structure Plan Boundary
- METROPOLITAN REGION SCHEME RESERVES**
- Primary Regional Roads
- LOCAL SCHEME RESERVES**
- Open Space/recreation
- ZONES**
- Development
- Rural A
- Special Rural
- OTHER**
- Area of Landscape Protection
- Development Contribution Area (See Scheme Text)
- Policy Areas (See Scheme Text)
- SR2 Special Rural Area (See Scheme Text)
- No Zone



0 125 250 Metres

REVISIONS

Rev	Date	Drawn
A	2014.02.07	K. Trenberth
B	2016.09.06	M. Sullivan
C	2017.05.03	M. Sullivan



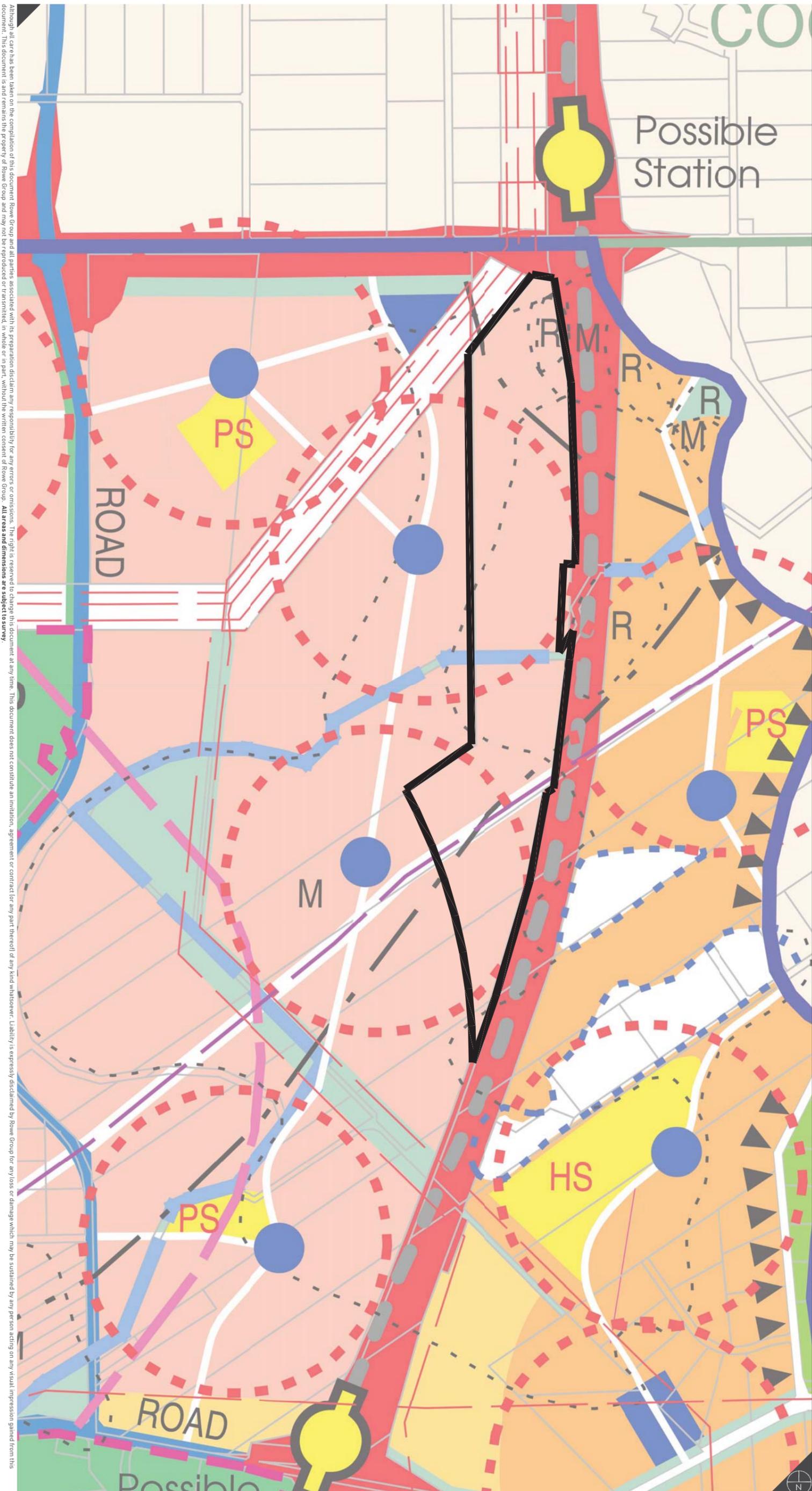
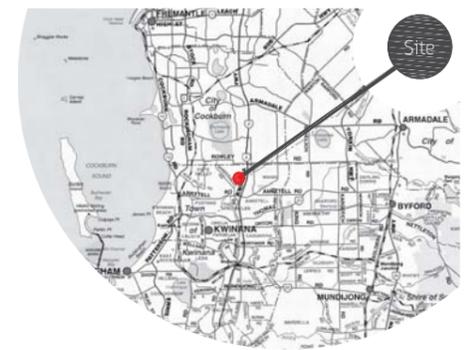
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 Designer: R. Cumming
 Drawn: K. Trenberth
 Projection: PCG94
 Plan ID: 7282A-FIG-12-C
 Zoning supplied by WAPC

Town Planning Scheme No. 2

Mandogalup Figure 6

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- LEGEND**
JANDAKOT STRUCTURE PLAN
- Short-term Urban
 - Medium-term Urban
 - Long-term Urban
 - Rural
 - Community Facilities
 - Open Space
 - Parks and Recreation Reservation (Existing and Proposed)
 - Bush Forever Site
 - EPP Wetlands
 - Conservation Category Wetlands
 - Walkable Catchment
 - Drainage
 - Kwinana Air Pollution area B Boundary
 - Primary Regional Road
 - Other Regional Road
 - JSP Boundary
- OTHER**
- Local Structure Plan Boundary

0 500 1,000 Metres

REVISIONS

Rev	Date	Drawn
A	2015.06.08	W. Clements
B	2015.11.04	W. Clements
C	2015.11.16	M. Sullivan
D	2017.05.03	M. Sullivan



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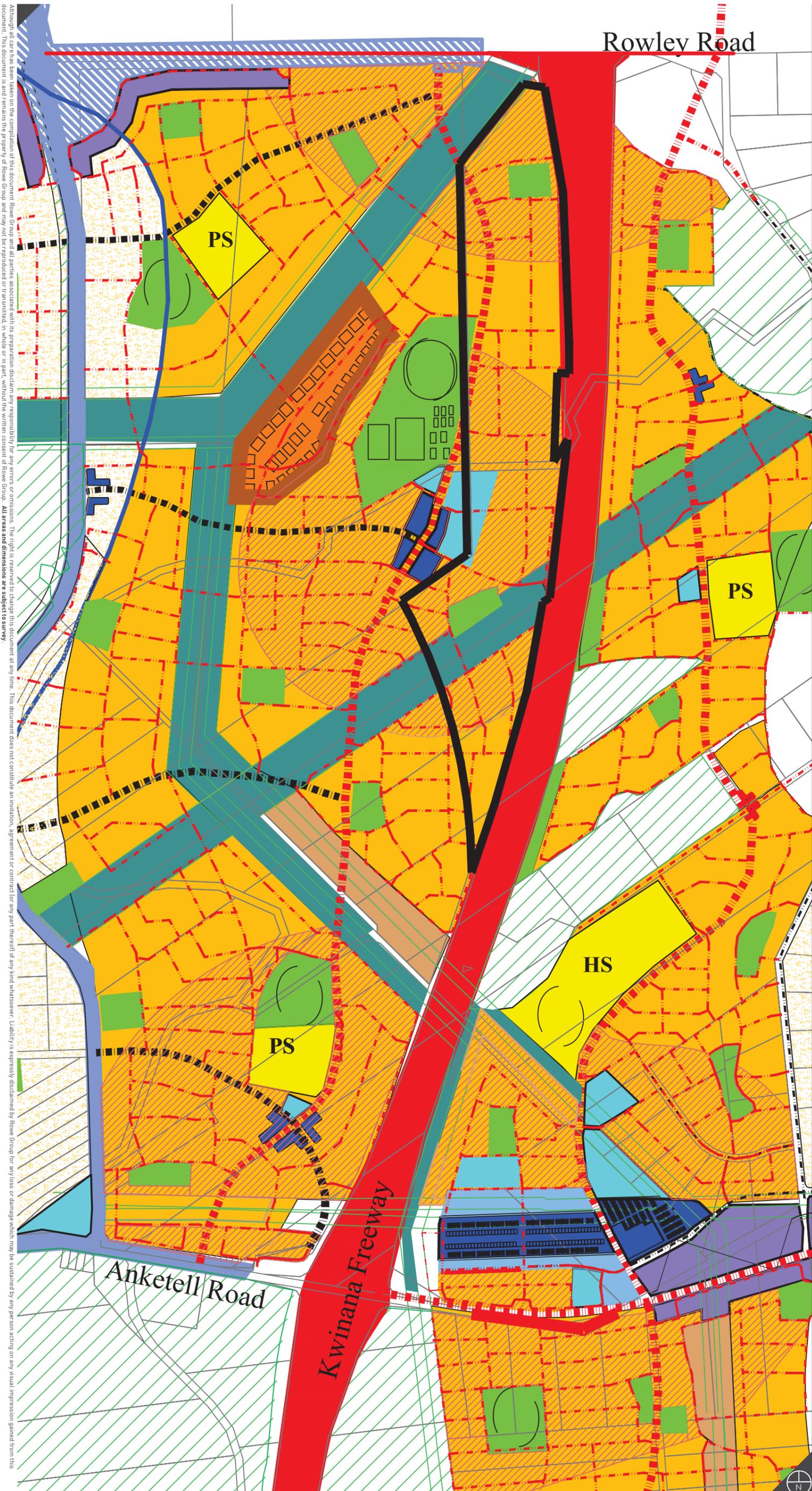
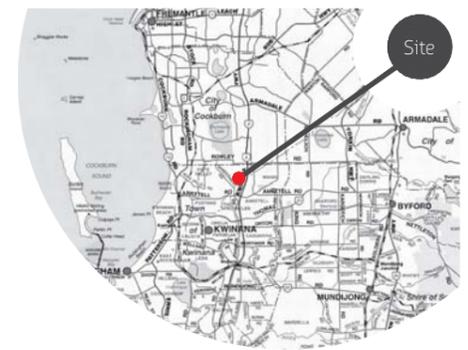
Date Drawn: 2015-06-08
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 Scale: 1:20,000 @ A3
 Client: Satterley Property Group
 Designer: R. Cumming
 Drawn: W. Clements
 Projection: PCG 94
 Plan ID: 7282A-FIG-47-D

Jandakot Structure Plan

Mandogalup Figure 7

N:\TOWN PLANNING\7000-7999\7282\7282A\DRAWING\A-CAD\7282A_FIG47D_20170503_MANDOGALUP [JANDAKOT STRUCTURE PLAN].DWG
 Matt Sullivan 3 May 2017

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Proposed Land Use

- Residential R20
- Residential R25 (& Higher)
- Residential/Business (Home Based Business)
- Special Residential R5
- Special Residential (Power Lines)
- Possible Mid to Long Term Future Residential
- Commercial Centre
- Mixed Business
- Commercial Centre Mixed Use
- Neighbourhood Node
- High School
- Primary School
- Local/District Recreation
- Community Facilities
- Conservation
- Bush Forever area No.
- Multiple Use Corridor -Infrastructure (Power & Gas Lines) & Ecological Linkages

Transport Infrastructure

- Primary Regional Road
- Other Regional Road
- Future Regional Road
- Planning Control Area
- Railway Purposes
- Railway Station Location
- Local Distributor
- Local Collector
- Long Term Road Closure Following Realignment of Current Route
- Noise and Impact Attenuation Bunds

Other Factors

- Modeled Dust Buffer Edge Requires 2 Years of Dust Monitoring by Developers to Validate Model

0 250 500 Metres

REVISIONS

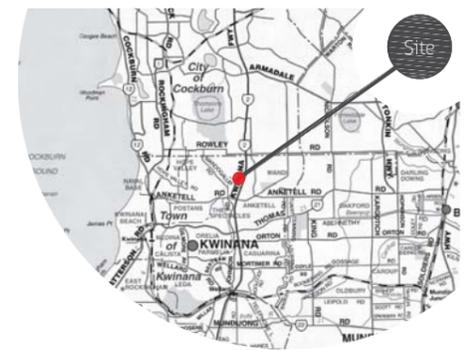
Rev	Date	Drawn
A	2015.11.17	M. Sullivan
B	2017.05.03	M. Sullivan



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 Job Ref: 7282A
 Scale: 1:10,000 @ A3
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 Designer: K. Kyle
 Drawn: M. Sullivan
 Projection: PCG 94
 Plan ID: 7282A-FIG-55-B

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- LEGEND**
- Local Structure Plan Boundary
 - Existing Cadastre
 - ALCOA Residue Storage Area F
 - Urban
 - Urban Deferred
 - Revised Kwinana Industrial (Including Air Quality) Buffer - 21 September 2010
 - 0.5km Residential Development and Sensitive Land Uses Restriction Area



0 250 500 Metres

REVISIONS

Rev	Date	Drawn
A	2014.07.09	M. Winfield
B	2016.09.07	M. Sullivan
C	2017.05.03	M. Sullivan



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Date Drawn: 2014-07-09
 Job Ref: 7282A
 Scale: 1:10,000 @ A3
 Client: Satterley Property Group
 Designer: K Kyle
 Drawn: M. Winfield
 Projection: PCG94
 Plan ID: 7282A-FIG-35-C

**Revised Kwinana Industrial (Including Air Quality) Buffer
 21 September 2010**

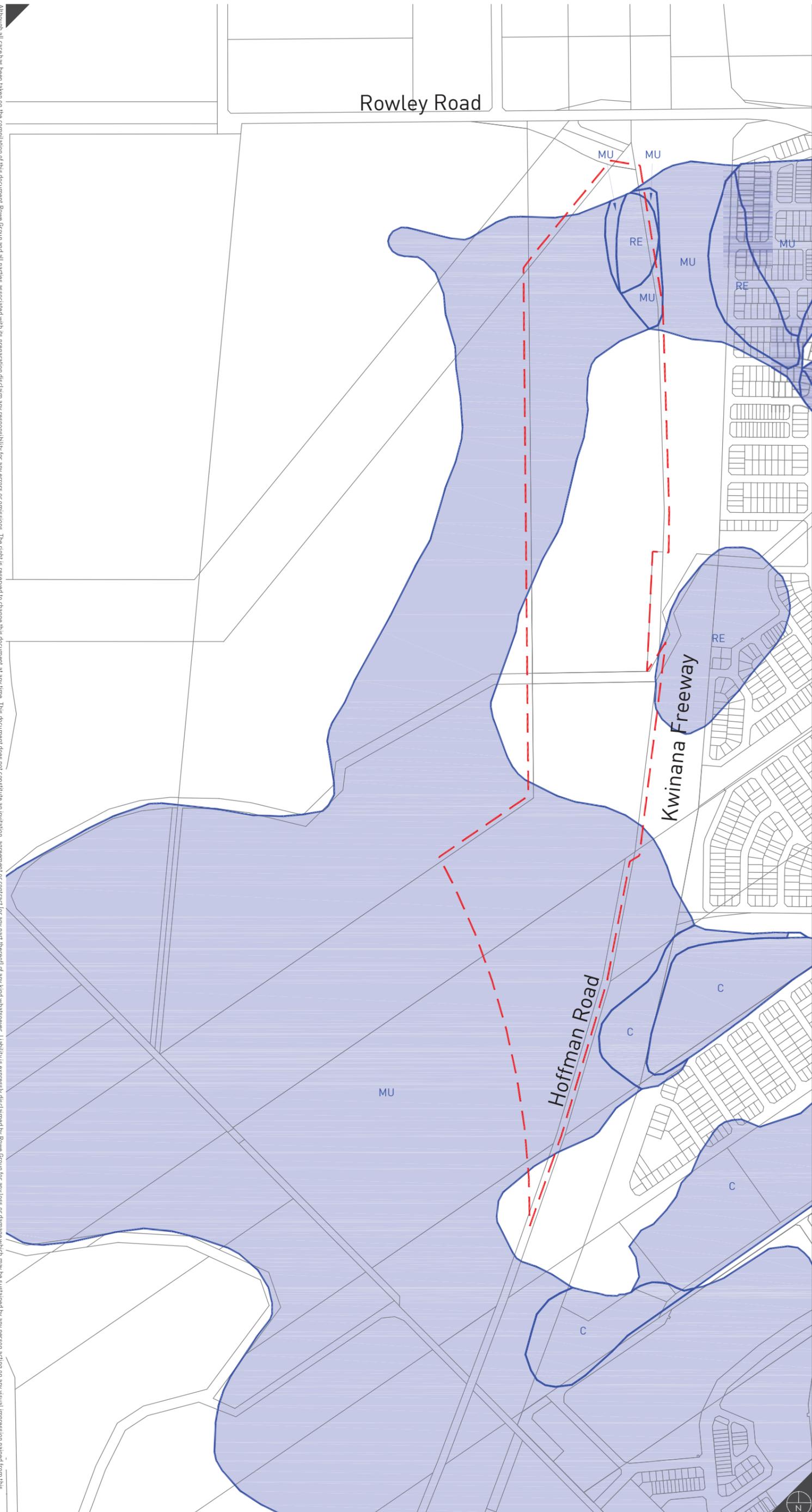
**Mandogalup
 Figure 9**

N:\TOWN PLANNING\7000-7999\7282\7282A\DRAWING\A-CAD\7282A_FIG35C_20170503_MANDOGALUP (AIR BUFFER).DWG
 Matt Sullivan 3 May 2017

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- LEGEND**
- - - Local Structure Plan Boundary
 - Existing Cadastre
 - Wetlands
 - MU Multiple Use Wetlands
 - RE Resource Enhancement Wetlands
 - C Conservation Category Wetlands



0 50 100 200 400 Metres

REVISIONS

Rev	Date	Drawn
A	2014.07.09	M. Winfield
B	2016.09.07	M. Sullivan
C	2017.05.03	M. Sullivan



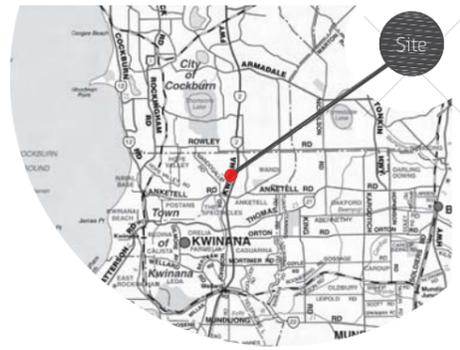
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Date Drawn: 2014-07-09
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 Scale: 1:7500 @ A3
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 Designer: K. Kyle
 Drawn: M. Winfield
 Projection: PCG 94
 Plan ID: 7282A-FIG-33-C
Cadastre supplied by McMullen Nolan

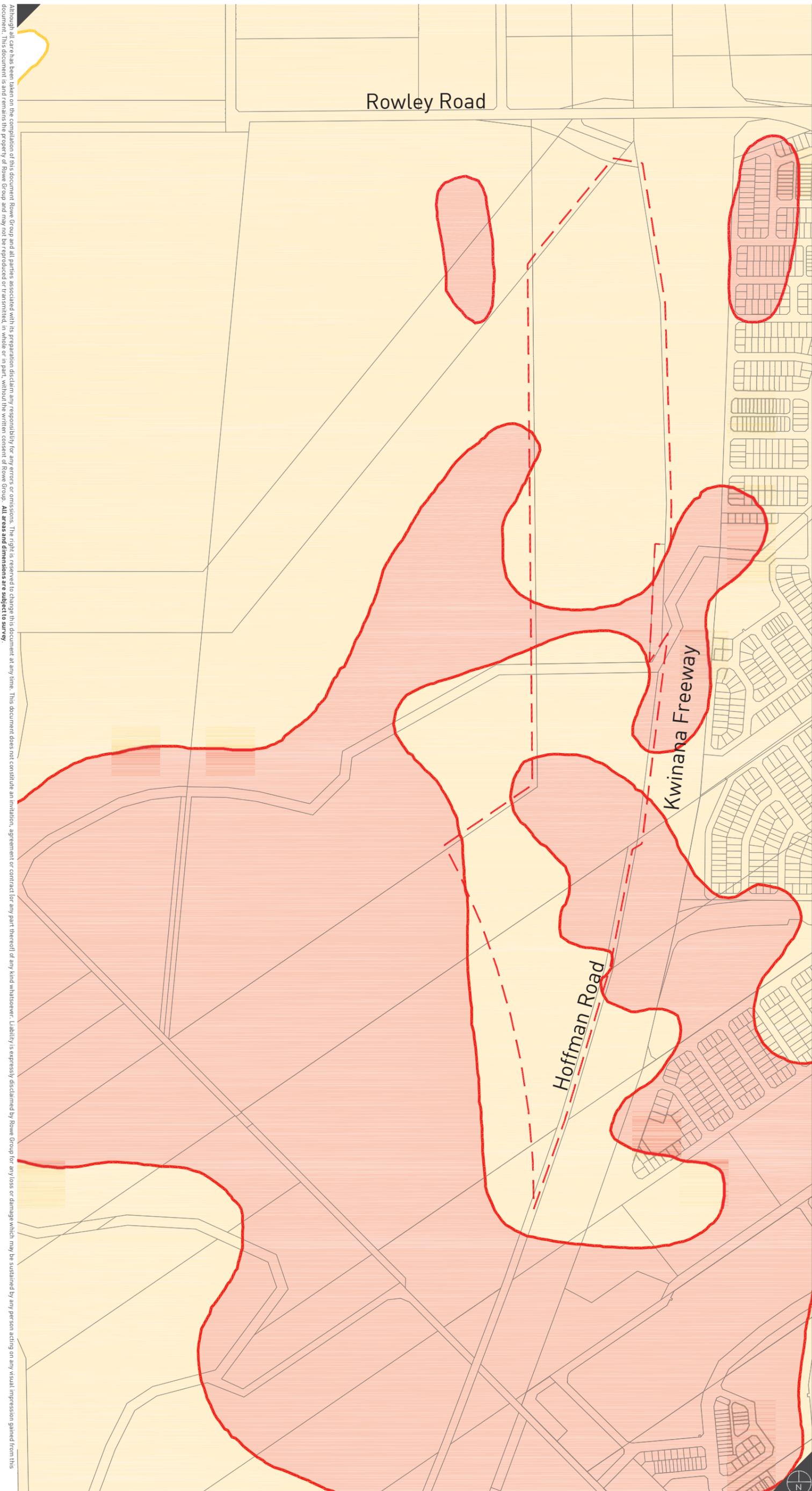
Wetlands

**Mandogalup
Figure 10**

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- LEGEND**
- Local Structure Plan Boundary
 - Existing Cadastre
 - Class 1 - High to Moderate Risk ASS
 - Class 2 - Moderate to Low Risk ASS



0 50 100 200 400 Metres

REVISIONS

Rev	Date	Drawn
A	2014.07.09	M. Winfield
B	2016.09.07	M. Sullivan
C	2017.05.03	M. Sullivan



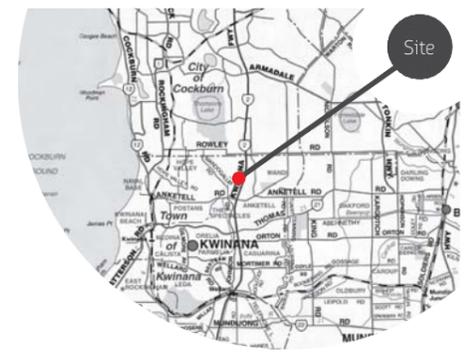
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e: info@rowegroup.com.au
p: 08 9221 1991

Date Drawn: 2014-07-09
 Job Ref: 7282A
 Scale: 1:7500 @ A3
 Client: Satterley Property Group
 Designer: K. Kyle
 Drawn: M. Winfield
 Projection: PCG 94
 Plan ID: 7282A-FIG-34-C
Cadastre supplied by McMillen Nolan

Acid Sulfate Soils

**Mandogalup
Figure 11**

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- LEGEND**
- - - Local Structure Plan Boundary
 - Existing Cadastre
 - Indicative Lot Layout
 - - - Indicative Lot Layout By Others
 - DBNGP Easement
 - High Voltage Powerline Easement
 - Peel Main Drain
 - Residential - R30
 - Residential - R40
 - Residential - R60
 - Parks, Recreation & Drainage
 - Public Purpose - Primary School

NOTE: Lot layout provided for explanatory purposes only, and is subject to review and detailed design at subdivision stage.

0 125 250 Metres

REVISIONS

Rev	Date	Drawn
C	2016.09.07	M. Sullivan
D	2016.11.29	M. Sullivan
E	2017.05.03	M. Sullivan
F	2017.07.04	M. Sullivan



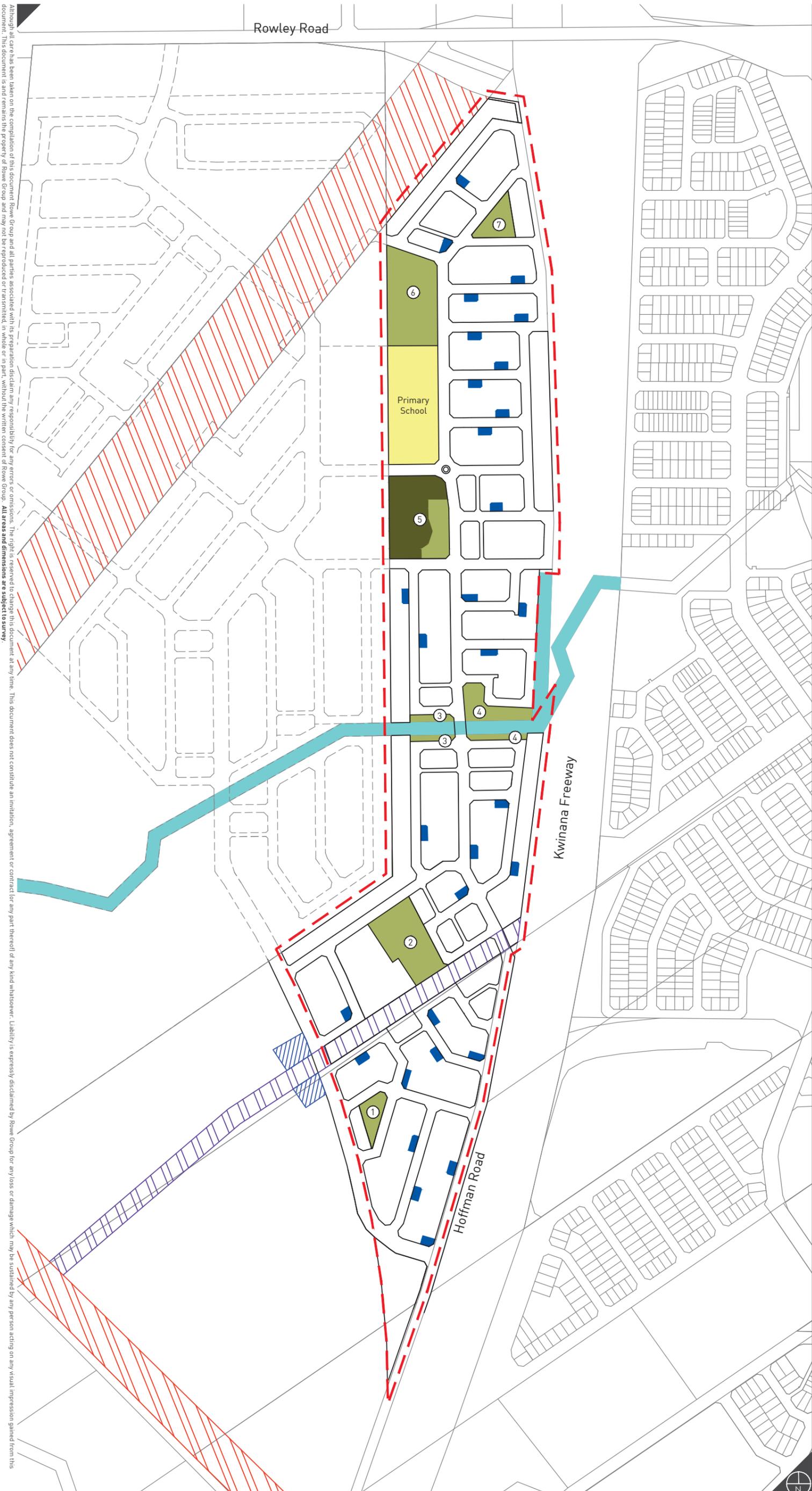
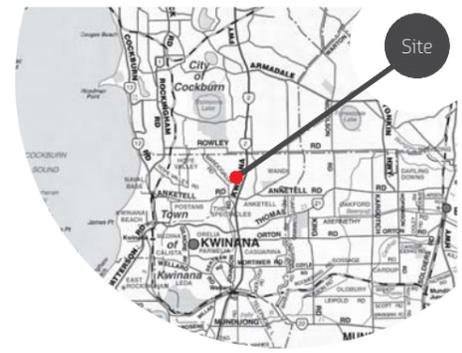
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Date Drawn: 2014-07-09
 Job Ref: 7282A
 Scale: 1:6000 @ A3
 Client: Satterley Property Group
 Designer: K. Kyle
 Drawn: M. Winfield
 Projection: PCG 94
 Plan ID: 7282A-FIG-31-F
Cadastre supplied by McMullen Nolan

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Indicative Zoning and Residential Density Code Plan **Mandogalup**
Figure 12



LEGEND

- - - Local Structure Plan Boundary
- Existing Boundaries
- Indicative Layout
- - - Indicative Layout By Others
- DBNGP Easement
- Peel Main Drain
- High Voltage Powerline Easement
- ⑥ POS Reference No.
- Unrestricted POS
- Restricted POS
- Rebated Lot Rain Gardens
- Drainage (5 year ARI)
- Primary School

NOTE: Layout provided for explanatory purposes only, and is subject to review and detailed design at subdivision stage.

0 150 300 Metres

REVISIONS

Rev	Date	Drawn
F	2016.11.28	M. Sullivan
G	2017.05.03	M. Sullivan
H	2017.07.04	M. Sullivan
I	2017.10.23	W. Clements



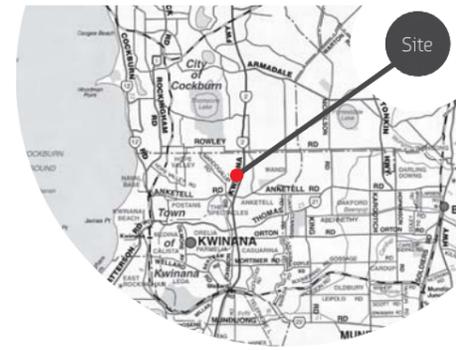
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 Job Ref: 7282A
 Scale: 1:6,000 @ A3
 Client: Satterley Property Group
 Designer: K. Kyle
 Drawn: M. Winfield
 Projection: PCG 94
 Plan ID: 7282A-FIG-29-I
Cadastre supplied by McMullen Nolan

Indicative Public Open Space Plan

Mandogalup Figure 13

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NOTE: Layout provided for explanatory purposes only, and is subject to review and detailed design at subdivision stage.

Mandogalup Local Structure Plan – Public Open Space Schedule			
Site Area (Local Structure Plan boundary)		42.67 ha	
Less			
Peel Main Drain	1.07 ha		
DBNGP Easement	1.08 ha		
Rain Gardens	0.78		
Total	2.93 ha		
Net Site Area		39.75 ha	
Deductions			
Primary School	1.49 ha		
Total	1.49 ha		
Gross Subdivisible Area		38.25 ha	
POS @10%		3.83 ha	
Public Open Space Contribution			
May comprise:			
- Min 80% unrestricted POS	3.06 ha		
- Min 20% restricted use POS	0.77 ha		
Total Required POS		3.83 ha	
POS Reference Number	Unrestricted Urban POS sites (m²)	Restricted Urban POS sites (m²)	
1	2,007.87	0	
2	8,392.62	0	
3	1,508.65	0	
4	4,551.33	0	
5	3,060.67	9124.80	
6	11,541.74	0	
7	2,744.29	0	
Total	33,807.16 m²	9,124.80 m²	
	[3.4 ha]	[0.9 ha]	

Schedule based on plan – 7282A_Fig38H_20161115

Table Notes:

- Unrestricted POS equates to approx 8.84% of gross subdivisible area.
- Restricted POS equates to approx 2.39% of gross subdivisible area.
- Oversupply of Unrestricted POS – Approx. 3203.46m²
- Total site area excludes existing Hoffman Road reserve and Lot 1404
- Layout based on total 2.5 hectare playing fields and 3.5 hectare primary school
- DBGNP as a deduction. No POS credit.
- Area of restricted / unrestricted for POS 5 is to be reconciled at detailed design once fenced boundary of vegetation retention/conservation is determined.

REVISIONS

Rev	Date	Drawn
A	2014.07.16	M. Winfield
B	2016.05.11	M. Sullivan
C	2016.11.28	M. Sullivan
D	2017.05.03	M. Sullivan



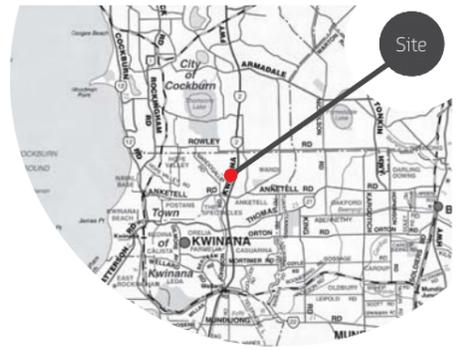
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Scale: N.T.S. @ A3
Client: Satterley
Designer: R. Cumming
Drawn: M. Winfield
Projection: PCG94
Plan ID: 7282A-FIG-36-D



Mandogalup Figure 14

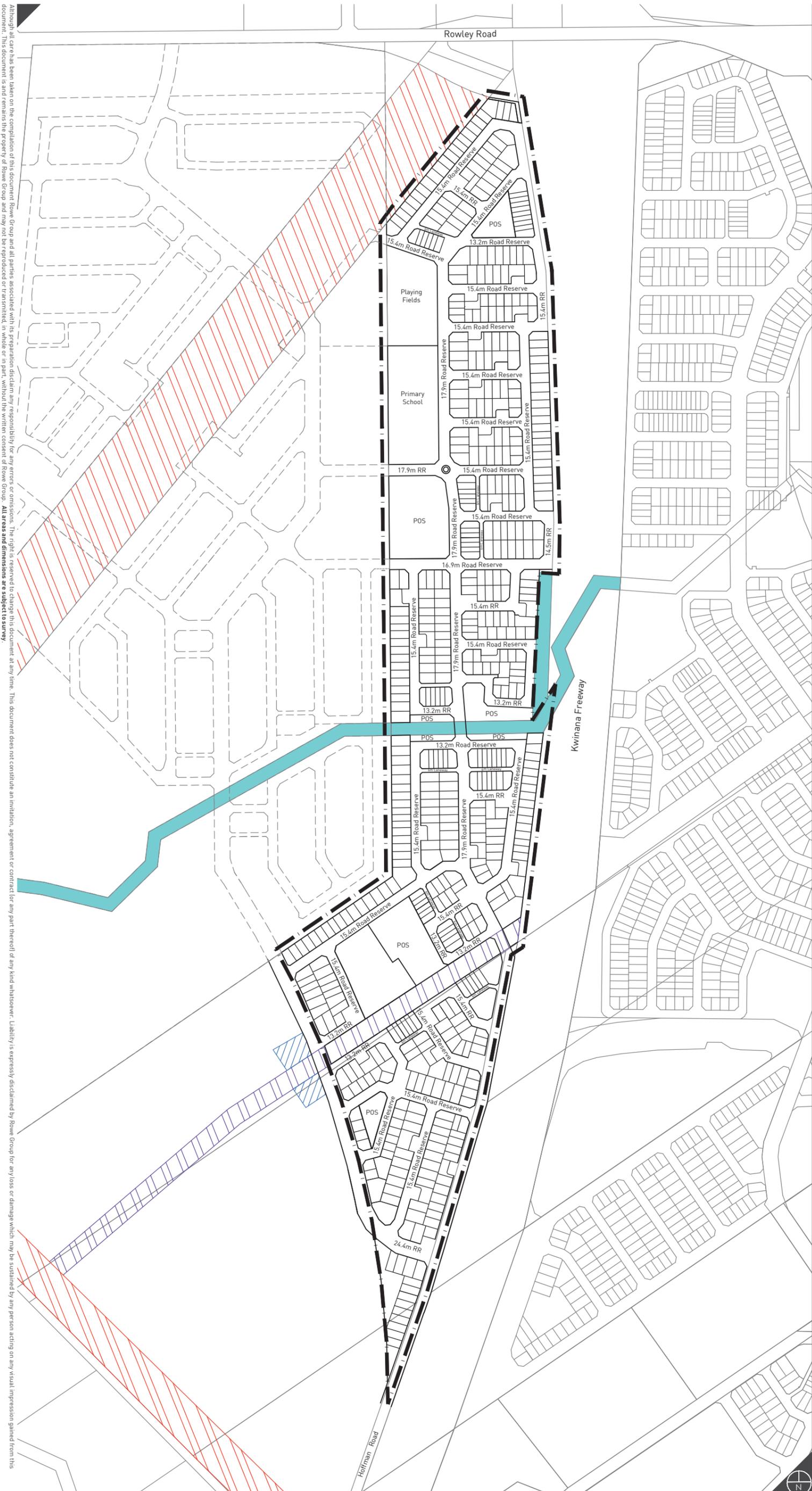
Indicative Public Open Space Schedule



LEGEND

- Local Structure Plan Boundary
- Existing Cadastre
- Indicative Lot Layout
- Indicative Layout By Others
- Local Drainage
- DBNGP Easement
- High Voltage Powerline Easement
- Peel Main Drain

NOTE: Lot layout provided for explanatory purposes only, and is subject to review and detailed design at the subdivision stage.



0 125 250 Metres

REVISIONS

Rev	Date	Drawn
H	2016.11.15	M. Sullivan
I	2017.05.03	M. Sullivan
J	2017.07.04	M. Sullivan
K	2017.10.23	W. Clements



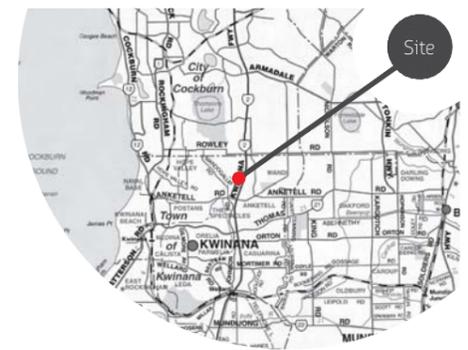
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 Job Ref: 7282A
 Scale: 1:6000 @ A3
 Client: Satterley Property Group
 Designer: K. Kyle
 Drawn: M. Winfield
 Projection: PCG 94
 Plan ID: 7282A-FIG-38-K
 Cadastre supplied by McMillen Nolan

Indicative Plan of Subdivision

Mandogalup
Figure 15

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- LEGEND**
- Local Structure Plan Boundary
 - Existing Cadastre
 - Indicative Lot Layout
 - Indicative Lot Layout By Others
 - Neighbourhood Connector A
 - Temporary Neighbourhood Connector A
 - Neighbourhood Connector B
 - Temporary Neighbourhood Connector B
 - Access Street B
 - Access Street D
 - Laneway (Rear)

NOTE: Layout provided for explanatory purposes only, and is subject to review and detailed design at subdivision stage.

0 125 250 Metres

REVISIONS

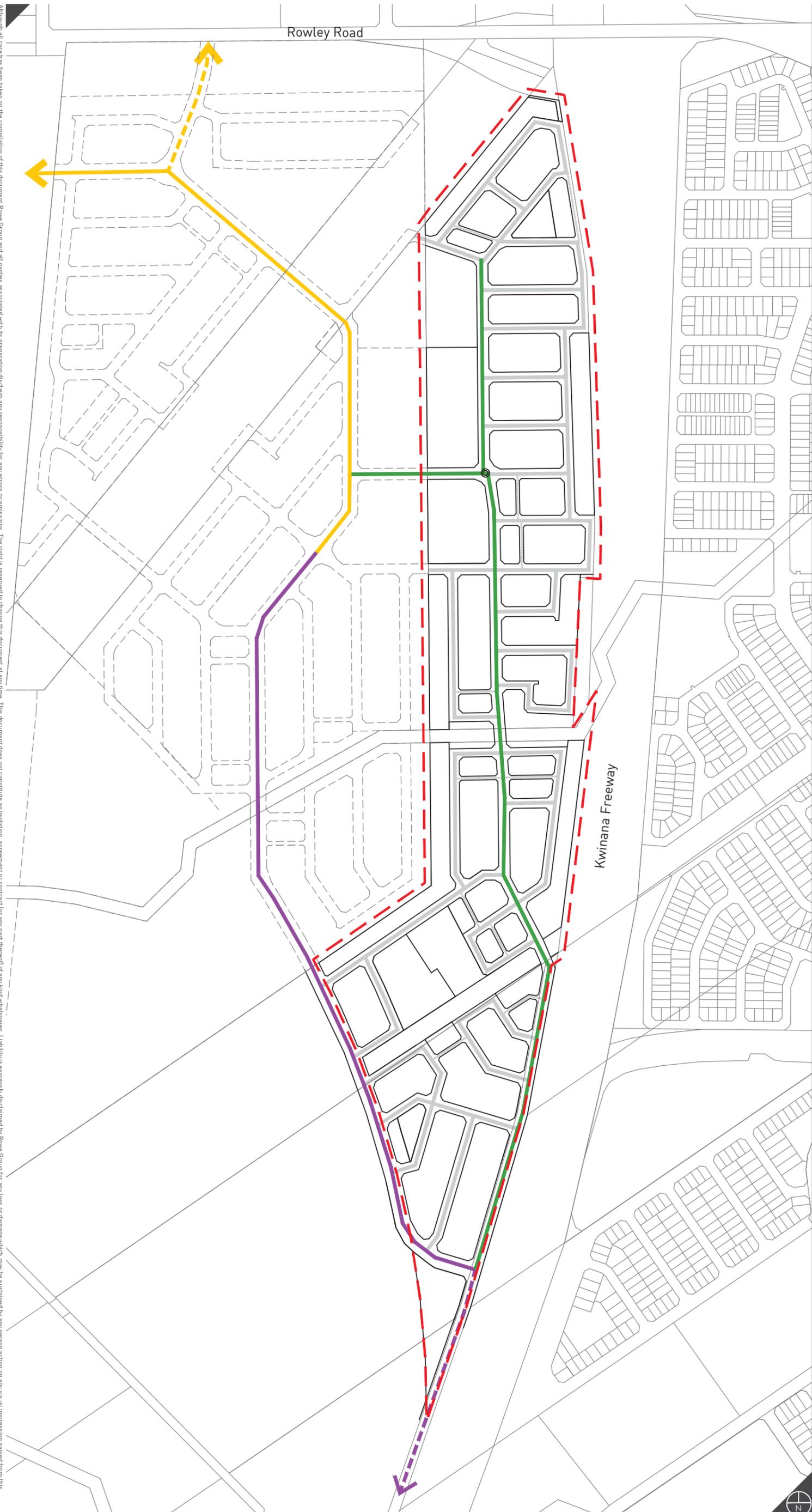
Rev	Date	Drawn
E	2017.05.29	M. Sullivan
F	2017.07.04	M. Sullivan
G	2017.07.26	M. Sullivan
H	2017.10.23	W. Clements



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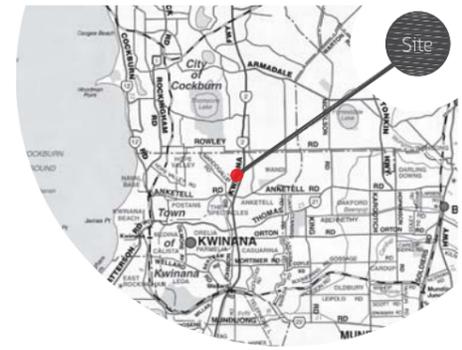
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 Designer: K. Kyle
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 Projection: PCG 94
 Plan ID: 7282A-FIG-30-H
Cadastre supplied by McMullen Nolan

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Indicative Movement Network

**Mandogalup
Figure 16**



LEGEND

- Local Structure Plan Boundary
- Existing Cadastre
- Indicative Layout
- - - Indicative Layout By Others
- Indicative Staging Boundary
- Display Village Precinct (Stage 1)
- Connections with MWLSP

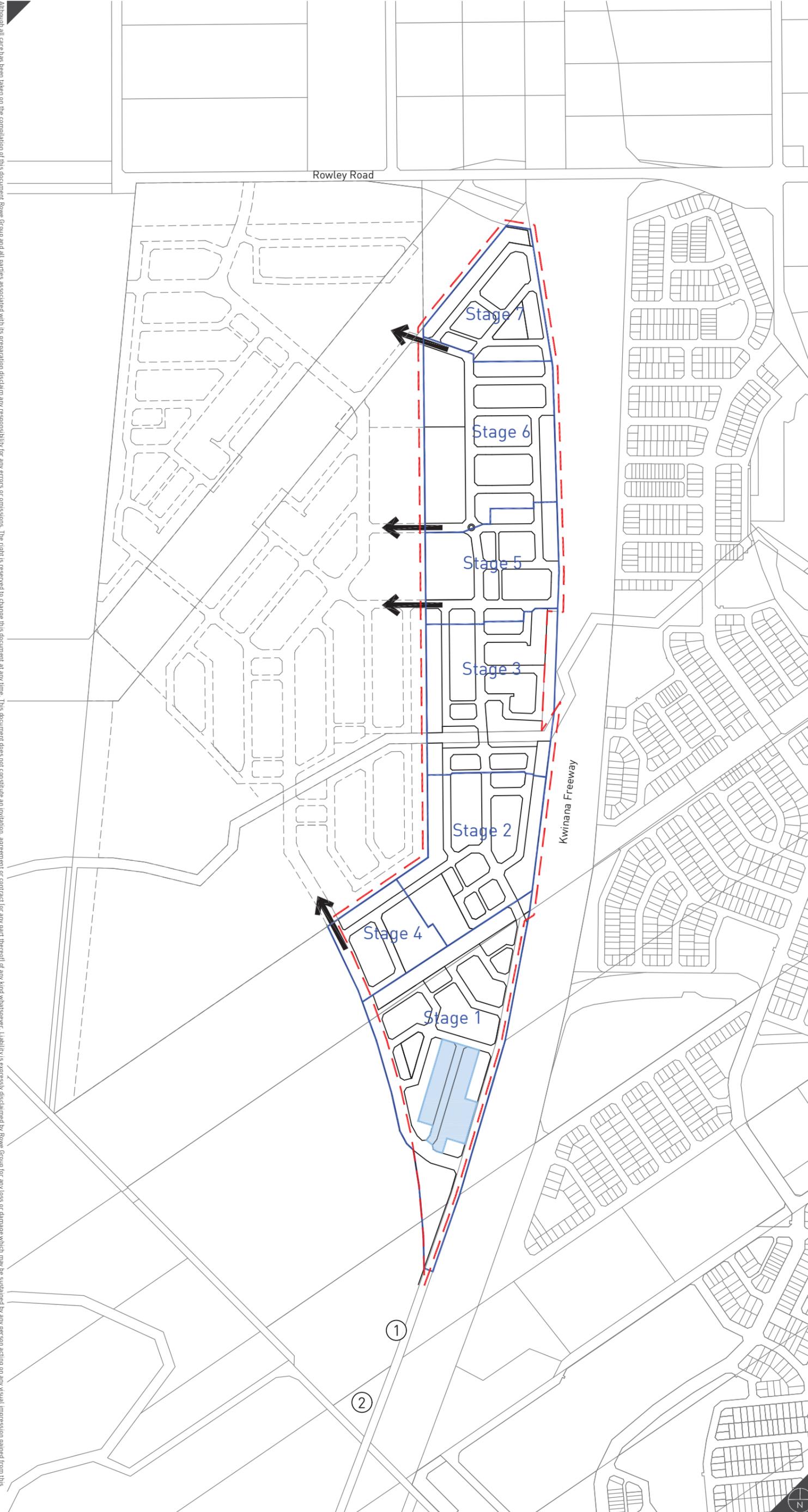
NOTES

- ① Hoffman Road to be landscaped as part of Stage 1.
- ② Indicative Wastewater Pump Station Location.

NOTE: Layout provided for explanatory purposes only, and is subject to review and detailed design at subdivision stage.

Rowley Road

Kwinana Freeway



0 375 Metres

REVISIONS

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E	2017.10.23	W. Clements



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 Projection: PCG 94
 Plan ID: 7282A-FIG-32-E
Cadastre supplied by McMullen Nolan

Indicative Staging Plan

Mandogalup
Figure 17

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