



## Bushfire Attack Level (BAL) Assessment Report

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*Prepared for: Gold Right Pty Ltd*

*Site: West Karnup Subdivision Stages 1B & 1C  
Part of Lot 806 Mandurah Road, Karnup  
City of Rockingham  
Western Australia*

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*Notwithstanding the precautions adopted in this report, it should always be remembered that bushfires burn under a wide range of conditions. An element of risk, no matter how small always remains. The objective of the standard (AS 3959:2009) is 'to prescribe particular construction details for buildings to reduce the risk of ignition from a bushfire while the front passes' (Standards Australia, 2009). Building to the standard (AS 3959:2009) does not guarantee a building will survive a bushfire.*

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- Appendix B: Exposed Lots Requiring Notification on Title

## ATTACHMENTS

- Attachment 1: Development Staging Plan (DPS 2014)

## EXECUTIVE SUMMARY

This Report provides an assessment of the Bushfire Attack Level (BAL) in accordance with AS 3959:2009 *Construction of Buildings in Bushfire Prone Areas* for West Karnup Subdivision Stages 1B & 1C in the City of Rockingham.

Ten residential lots on the perimeter of the development stages are exposed to a Bushfire Attack Level (BAL) rating of BAL-12.5. The proposed dwellings on these lots are predicted to be exposed primarily to ember attack and this risk can be partially mitigated by constructing the dwellings to sections 3 and 5 in the Australian Standard (AS 3959-2009 Construction of buildings in bushfire prone areas).

If there is a bushfire within or near the site, constructing the identified dwellings to the relevant section in AS 3959-2009 will reduce the risk of ignition to the buildings.

***The BAL depicted within this report and mapping have been determined by an assessment of the site and the surrounding 100 metres in August and September 2014. It should be noted that conditions may change in the future and over time and this may result in a different BAL rating.***

## 1 INTRODUCTION

Bushfire Safety Consulting Pty Ltd has been engaged by Gold Right Pty Ltd to undertake a Bushfire Attack Level (BAL) assessment within the Subdivision Stages 1B and 1C. This assessment has been undertaken to satisfy the Developer's Responsibilities for subdivision within the LSP area as outlined in the endorsed FMP for the broader West Karnup LSP Area (attached is Attachment 1). The BAL Assessment identifies the level of predicted exposure for proposed lots and the subsequent recommended construction standards. Exposed lots will require a Section 70A Notification on titles informing purchasers of the responsibilities of the FMP and of any bushfire construction standards.

Subdivision Stages 1B and 1C are an entirely residential development. Future development stages approved by the WAPC will each be provided with a separate BAL assessment before the creation of titles to ensure an accurate representation of the bushfire threat.

Subdivision Stages 1B and 1C are hereafter referred to as the 'site'. Table 1 specifies the site details and the site plan is attached in Attachment 1.

Table 1: Site Details

<b>Locality</b>	<b>City of Rockingham</b>
<b>Address</b>	West Karnup Subdivision Stages 1B and 1C (portion of Lot 806 Mandurah Road, Karnup)
<b>Fire Management Plan</b>	Bushfire Safety Consulting (2013)
<b>Endorsed Local Structure Plan</b>	West Karnup LSP
<b>Zoning</b>	Development
<b>Forest Danger Index</b>	80
<b>Site Inspection</b>	August & September, 2014

This BAL report assesses the application of AS 3959-2009 *Construction of Buildings in Bushfire Prone Areas* and relevant part of Appendix 1 of *Planning for Bushfire Protection Guidelines – Edition 2* (WAPC et al., 2010).

The proposal is to create 81 residential lots in the development including a centrally located public open space area.

## 2 METHODOLOGY AND ASSUMPTIONS

The Australian Standard for assessing the BAL and providing the detailed requirements for construction includes the version titled AS 3959-2009/Amendment 3-2011 *Construction of Buildings in Bushfire Prone Areas* (Standards Australia, 2011).

In addition, the WA method for determining the BAL, found in Appendix 1 of *Planning for Bushfire Protection Guidelines – Edition 2* (WAPC et al., 2010) is consistent with the methodology in AS 3959-2009.

AS 3959-2009 has six categories of Bushfire Attack Level, namely BAL-LOW, BAL-12.5, BAL19, BAL-29, BAL-40 and BAL-FZ. These categories are based on heat flux exposure thresholds. The method for determining the BAL involves a site assessment of vegetation and local topography. The assumed Fire Danger Index (FDI) for Western Australia is 80. The BAL identifies the appropriate construction standard that applies as a minimum standard in AS 3959-2009.

It is a legal requirement of each lot owner to comply with section 33 of the *Bush Fires Act 1958*. Specific responsibilities under this legislation are outlined in the City of Rockingham Fire Control Notice which can be downloaded at:

[http://www.rockingham.wa.gov.au/getattachment/Residents/Home-safety-and-security/Fire-safety/CD\\_IS\\_FIRECONTROLNOTICE2013\\_2014.pdf.aspx](http://www.rockingham.wa.gov.au/getattachment/Residents/Home-safety-and-security/Fire-safety/CD_IS_FIRECONTROLNOTICE2013_2014.pdf.aspx)

This assessment is undertaken on the basis that each lot owner's legal responsibilities will be achieved and maintained in perpetuity.

The BAL assessment involves an assessment of the vegetation, setback distance to classified vegetation and effective slope.

## 2.1 Vegetation Assessment

Vegetation survey and mapping of the site has been undertaken as follows:

- Aerial photographic interpretation to identify broad vegetation types and boundaries
- Field assessment to confirm vegetation classes, condition, fuel structure and land-use.

## 2.2 Setback Distance to Classified Vegetation

The horizontal setback distance assessment has been undertaken as follows:

- Aerial photographic interpretation and analysis of scaled digital map
- Field assessment and setback measurement using a measuring wheel.

## 2.3 Effective Slope Assessment

The effective slope assessment has been undertaken as follows:

- Aerial photographic interpretation and analysis of digital contour maps
- Field assessment and slope measurements using a clinometer.

# 3 SITE ASSESSMENT

A site assessment of the vegetation, setback distance and slope was undertaken in accordance with *Planning for Bushfire Protection Guidelines – Edition 2* (WAPC et al., 2010) and AS 3959-2009. The assessment criteria outcomes are summarised in Appendix A.

## 3.1 Vegetation Assessment

The site is entirely cleared of vegetation, all of the original vegetation has been removed during initial earthworks for the residential development. The site survey undertaken for this assessment identified two vegetation classes located west of Mandurah Road which qualify as classified vegetation according to AS3959-2009.

A strip of woodland trees is located west of Mandurah Road Reserve which consists of Eucalypt overstorey vegetation with elevated scrub and shrubland fuels with a grassland understorey (Figure 1). Further west and upslope from the woodland is scrub vegetation which is dominated by Acacia species in the dune swales (Figure 2).

The grassland fuels in the entire length of the Mandurah Road Reserve within 100 m of the site is treated with a grass slashing program and the fuel levels are generally well managed (Figure 3). Immediately adjacent to western perimeter of the site, a single strip of Acacia plants occurs amongst grass fuels (Figure 4). Roadside slashing of grass fuels by the City of Rockingham occurs in large areas in the Mandurah Road Reserve adjacent to the site and this on-going management of grass fuels will ensure the threat remains low.

Refer to Table 2 and Appendix A for details and summary of the vegetation assessment.



*Figure 1: Eucalypt woodland strip on the western side of Mandurah Road*



*Figure 2: Scrub vegetation west of Mandurah Road.*



*Figure 3: Slashed grass fuels in the median strip of Mandurah Road Reserve*



*Figure 4: Single strip of Acacia scrub and grass fuels between Mandurah Road and the acoustic wall*

### **3.2 Setback Distance**

The woodland vegetation west of the site is setback 62 – 100 metres from the residential lots. The scrub located further west is setback 90-100 metres from the site. Refer to Table 2 for summary of setback distance assessment.

### **3.3 Effective Slope Assessment**

The woodland and scrub vegetation west of the site has either no effective slope or a slight upslope. Refer to Table 2 for summary of effective slope assessment.



*Table 2: Vegetation, effective slope and setback distance assessment*

Direction from Site	Vegetation Classification	Effective Slope	Setback Distance
North	Development Area – Mineral Earth Low Threat Vegetation <sup>1</sup>	N/A	N/A
East	Development Area – Mineral Earth Low Threat Vegetation <sup>1</sup>	N/A	N/A
South	Development Area – Mineral Earth Low Threat Vegetation <sup>1</sup>	N/A	N/A
West	Woodland	Flat and Upslope	62-100 metres

*Note: 1. Section 2.2.3.2 of AS 3959-2009 classifies Low Threat Vegetation where the vegetation is one or a combination of the following:*

- a) Vegetation of any type that is more than 100 m from the site;*
- b) Single areas of vegetation less than 1 ha in area and now within 100m of other areas of vegetation being classified;*
- c) Multiple areas of vegetation less than 0.25 ha and not within 20 m of the site, or each other;*
- d) Strips of vegetation less than 20 m in width (measured perpendicular to the elevation exposed to the strip of vegetation) regardless of length and not within 20 m of the site or each other, or other areas of vegetation being classified;*
- e) Non-vegetated areas, including waterways, roads, footpaths, buildings and rocky outcrops; and*
- f) Low threat vegetation, including grassland managed in a minimal fuel condition, maintained lawns, golf courses, maintained public reserves and parklands, vineyards, orchards, cultivated gardens, commercial nurseries, nature strips and windbreaks.*

#### **4 DETERMINATION OF BUSHFIRE ATTACK LEVEL ASSESSMENT**

The results from this methodology were used to calculate the BAL rating for the proposed lots using Table 2.4.3 in AS 3959-2009. The results of this BAL Assessment are outlined in Table 3.

*Table 3: Bushfire Attack Level assessment for the site*

Setback Distance (m)	Classified Vegetation	Effective Slope (°)	BAL Rating
62-100 metres	Woodland	Flat & Upslope	BAL-12.5

#### **5 CONCLUSION, SHIELDING AND RECOMMENDATION S**

Ten residential lots on the western perimeter of the site are exposed to a Bushfire Attack Level (BAL) of BAL-12.5 as spatially shown in Appendix A.

The construction elements on future dwellings located on these lots are expected to be exposed to ember attack and a radiant heat flux of not greater than 12.5 kW/m<sup>2</sup>. The recommended construction section in (AS 3959-2009) Construction of Buildings in Bushfire Prone Areas is Section 3 and 5 (Table 2).



The proposed dwellings are not shielded from the predicted ember attack because embers cannot be shielded by other structures, they blow on the wind unlike radiant heat which travels in straight lines.

These exposed lots (as highlighted in Appendix B) will require a section 70A Notification on title informing purchasers of the responsibilities of the FMP and the bushfire construction standards.

*Table 4: Heat flux exposure thresholds, predicted bushfire attack mechanisms and recommended construction standard*

BAL	Heat flux thresholds	Description of predicted bushfire attack and levels of exposure	Recommended Construction Section in AS 3959-2009
BAL-12.5	<12.5KW/m <sup>2</sup>	Ember attack	3 and 5

## 6 REFERENCES

Bushfire Safety Consulting (2013) Fire Management Plan Lots 3, 805 & 806 Mandurah Road, Karnup

City of Rockingham Fire Control Notice (downloadable at:

[http://www.rockingham.wa.gov.au/getattachment/Residents/Home-safety-and-security/Fire-safety/CD\\_IS\\_FIRECONTROLNOTICE2013\\_2014.pdf.aspx](http://www.rockingham.wa.gov.au/getattachment/Residents/Home-safety-and-security/Fire-safety/CD_IS_FIRECONTROLNOTICE2013_2014.pdf.aspx))

Standards Australia. (2009). AS 3959-2009 *Construction of buildings in bushfire-prone areas*.

Standards Australia. (2011). AS 3959-2009/Amendment 3-2011 *Construction of buildings in bushfire-prone areas*.

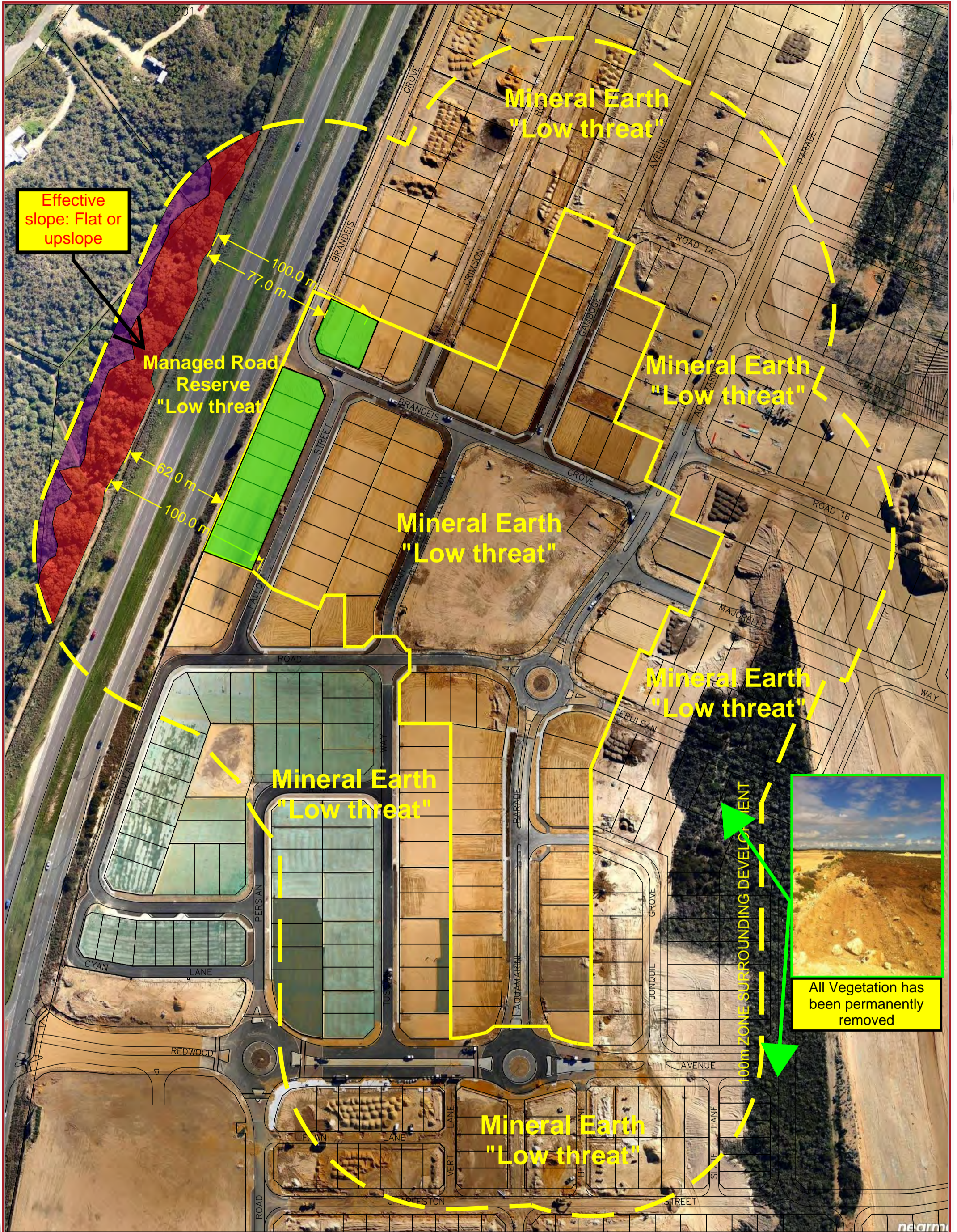
Western Australian Planning Commission (WAPC), FESA and Department of Planning and Infrastructure. (2010). *Planning for Bush Fire Protection Guidelines - Edition 2*. Western Australian Planning Commission, Perth.



# APPENDICES

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**APPENDIX A:  
BAL ASSESSMENT  
CRITERIA**

**WEST KARNUP STAGES 1B & 1C**

**LEGEND**

STAGE 1B and 1C BOUNDARY



WOODLAND



SCRUB



LOTS EXPOSED TO BAL-12.5



NORTH

0 20 40 60 80m

SCALE 1:2000 @ A3  
DATE: SEPTEMBER 2014

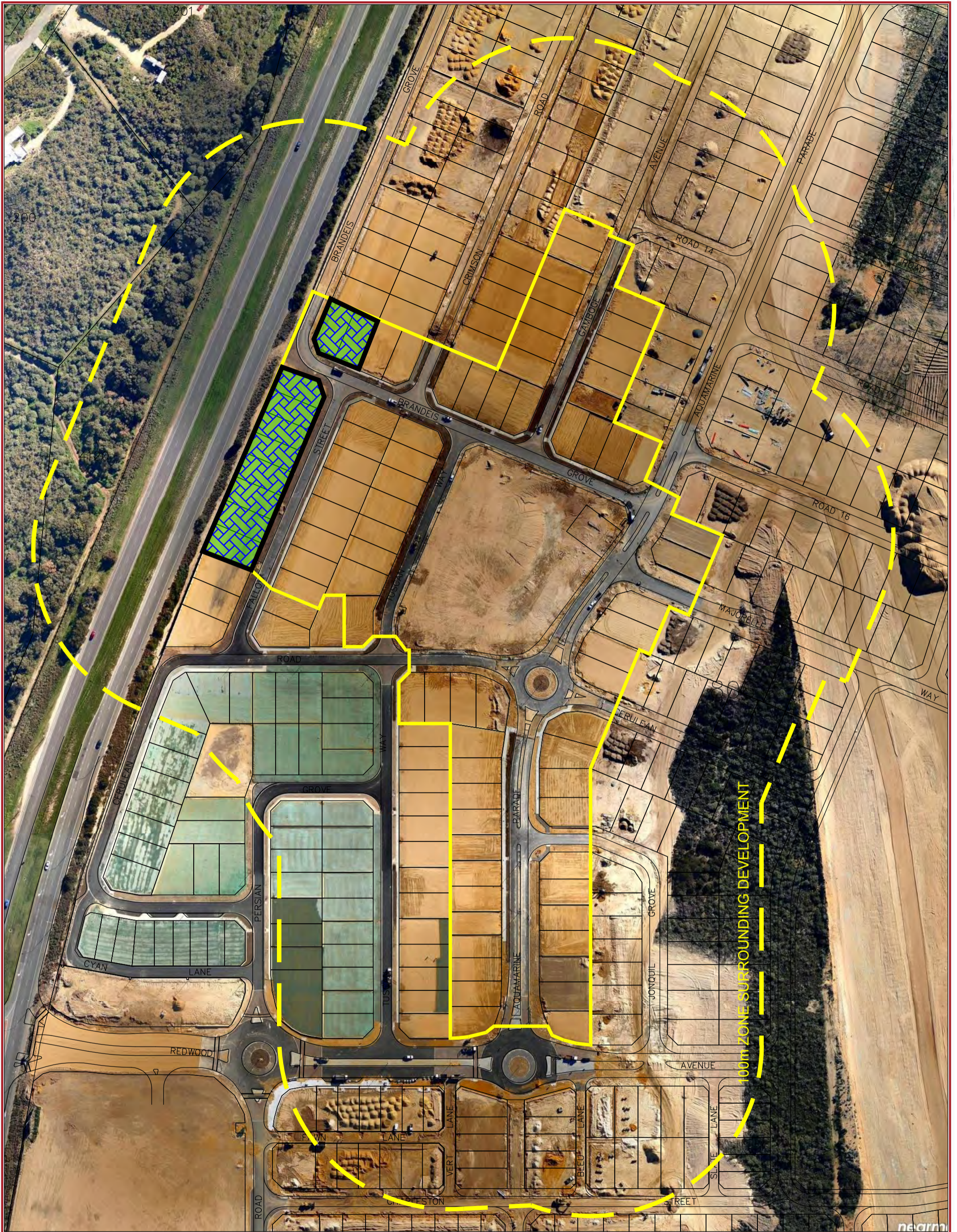
Base mapping supplied by  
Development Planning Strategies

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CONSULTING

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**APPENDIX B:  
EXPOSED LOTS REQUIRING  
NOTIFICATION ON TITLE**


**WEST KARNUP STAGES 1B & 1C**

**LEGEND**

STAGE 1B and 1C BOUNDARY 

LOTS REQUIRING NOTIFICATION ON TITLE 

  
NORTH



SCALE 1:2000 @ A3  
DATE: SEPTEMBER 2014  
Base mapping supplied by  
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# ATTACHMENTS

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**LEGEND:**

--- Staging Boundary

**RESIDENTIAL LOT SUMMARY:**

STAGE 1	
8.5m	-
10m	9
13m	49
15m	80
17m	13
18m	-
<b>GH</b>	2
<b>Dwellings</b>	9
<b>TOTAL LOTS</b>	<b>153</b>
<b>TOTAL DWELLINGS</b>	<b>160</b>

STAGE 2	
8.5m	-
10m	24
13m	56
15m	78
17m	3
18m	-
<b>GH</b>	1
<b>Dwellings</b>	2
<b>TOTAL LOTS</b>	<b>161</b>
<b>TOTAL DWELLINGS</b>	<b>162</b>

STAGE 3	
8.5m	-
10m	6
13m	49
15m	73
17m	36
18m	-
<b>GH</b>	1
<b>Dwellings</b>	4
<b>TOTAL LOTS</b>	<b>165</b>
<b>TOTAL DWELLINGS</b>	<b>168</b>

STAGE 4	
8.5m	-
10m	-
13m	75
15m	64
17m	28
18m	2
<b>GH</b>	-
<b>Dwellings</b>	-
<b>TOTAL LOTS</b>	<b>169</b>
<b>TOTAL DWELLINGS</b>	<b>169</b>

STAGE 5	
8.5m	4
10m	2
13m	43
15m	59
17m	22
18m	-
<b>GH</b>	-
<b>Dwellings</b>	-
<b>TOTAL LOTS</b>	<b>130</b>
<b>TOTAL DWELLINGS</b>	<b>130</b>

STAGE 6	
8.5m	-
10m	60
13m	62
15m	60
17m	35
18m	11
<b>GH</b>	-
<b>Dwellings</b>	-
<b>TOTAL LOTS</b>	<b>228</b>
<b>TOTAL DWELLINGS</b>	<b>228</b>

STAGE 7	
8.5m	-
10m	51
13m	-
15m	-
17m	-
18m	-
<b>GH</b>	2
<b>Dwellings</b>	43
<b>TOTAL LOTS</b>	<b>53</b>
<b>TOTAL DWELLINGS</b>	<b>94</b>

OVERALL	
8.5m	4
10m	152
13m	334
15m	413
17m	137
18m	13
<b>GH</b>	6
<b>Dwellings</b>	58
<b>LOT 3 TOTAL LOTS</b>	<b>111</b>
<b>TOTAL LOTS</b>	<b>1170</b>
<b>TOTAL DWELLINGS</b>	<b>1222</b>

**LOT SUMMARY**

Lots 805 & 806 Mandurah Road, KARNUP

for: Gold Right Pty Ltd.

NORTH

Scale 1: 6000 @ A3

COMPLETED: DPS, MAPS, JDSI	DRAWN BY: NM
DATE: 08/02/2013	REVISED: 19/02/2014
GRID: PCG 94	DATUM: AHD
DRAWING NUMBER: GOGKA-1-008d	JOB CODE: GOGKAST1
FILE ID: M:\GOGKA\BASE\FEASIBILITY & CONCEPT PLANNING\GOGKA-1-008d.dgn	



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