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BPAD Bushfire Planning & Design

Bushfire Management Plan Coversheet

This Coversheet and accompanying Bushfire Management Plan has been prepared and issued by a person accredited by Fire Protection Association Australia under the Bushfire Planning and Design (BPAD) Accreditation Scheme.

Bushfire Management Plan and Site Details

Site Address / Plan Reference: Stages 29-38 Amberton Estate

Suburb: Eglinton **State:** WA **P/code:** 6034

Local government area: City of Wanneroo

Description of the planning proposal: Subdivision application

BMP Plan / Reference Number: STO19108_01 **Version:** R001 Rev 0 **Date of Issue:** 28/03/2019

Client / Business Name: Stockland

Reason for referral to DFES	Yes	No
~~Has the BAL been calculated by a method other than method 1 as outlined in AS3959 (tick no if AS3959~~ method 1 has been used to calculate the BAL)?	☐	☑
Have any of the bushfire protection criteria elements been addressed through the use of a performance principle (tick no if only acceptable solutions have been used to address all of the BPC elements)?	☐	☑
Is the proposal any of the following special development types (see SPP 3.7 for definitions)?		
Unavoidable development (in BAL-40 or BAL-FZ)	☐	☑
Strategic planning proposal (including rezoning applications)	☐	☑
Minor development (in BAL-40 or BAL-FZ)	☐	☑
High risk land-use	☐	☑
Vulnerable land-use	☐	☑

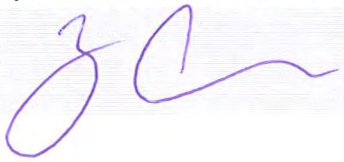
If the development is a special development type as listed above, explain why the proposal is considered to be one of the above listed classifications (E.g. considered vulnerable land-use as the development is for accommodation of the elderly, etc.)?
N/A.

Note: The decision maker (e.g. local government or the WAPC) should only refer the proposal to DFES for comment if one (or more) of the above answers are ticked "Yes".

BPAD Accredited Practitioner Details and Declaration

Name	Accreditation Level	Accreditation No.	Accreditation Expiry
Zac Cockerill	Level 2	BPAD 37803	31/08/2019
Company		**Contact No.**	
Strategen Environmental		(08) 9792 4797	

I declare that the information provided within this bushfire management plan is to the best of my knowledge true and correct

Signature of Practitioner  **Date** 28/03/2019

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Stages 29-38 Amberton Estate, Eglinton

Bushfire Management Plan (Subdivision Application)

Prepared for
Stockland
by Strategen

March 2019

BPAD Bushfire Planning & Design Accredited Practitioner Level 2

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Stages 29-38 Amberton Estate, Eglinton

Bushfire Management Plan (Subdivision Application)

Strategen is a trading name of
Strategen Environmental Consultants Pty Ltd
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ACN: 056 190 419

March 2019

Limitations

Scope of services

This report ("the report") has been prepared by Strategen Environmental Consultants Pty Ltd (Strategen) in accordance with the scope of services set out in the contract, or as otherwise agreed, between the Client and Strategen. In some circumstances, a range of factors such as time, budget, access and/or site disturbance constraints may have limited the scope of services. This report is strictly limited to the matters stated in it and is not to be read as extending, by implication, to any other matter in connection with the matters addressed in it.

Reliance on data

In preparing the report, Strategen has relied upon data and other information provided by the Client and other individuals and organisations, most of which are referred to in the report ("the data"). Except as otherwise expressly stated in the report, Strategen has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report ("conclusions") are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. Strategen has also not attempted to determine whether any material matter has been omitted from the data. Strategen will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to Strategen. The making of any assumption does not imply that Strategen has made any enquiry to verify the correctness of that assumption.

The report is based on conditions encountered and information received at the time of preparation of this report or the time that site investigations were carried out. Strategen disclaims responsibility for any changes that may have occurred after this time. This report and any legal issues arising from it are governed by and construed in accordance with the law of Western Australia as at the date of this report.

Environmental conclusions

Within the limitations imposed by the scope of services, the preparation of this report has been undertaken and performed in a professional manner, in accordance with generally accepted environmental consulting practices. No other warranty, whether express or implied, is made.

Document control

Client: Stockland

Report Version	Revision No.	Purpose	Strategen author	Strategen reviewer	Submitted to Client	
					Form	Date
Draft Report	Rev A	For client review	Brodie Mastrangelo (BPAD 45985, Level 1)	Zac Cockerill (BPAD 37803, Level 2)	Electronic (email)	28/03/2019
Final Report	**Rev 0**	**Issued for use: to accompany subdivision application**	**Brodie Mastrangelo (BPAD 45985, Level 1)**	**Zac Cockerill (BPAD 37803, Level 2)**	**Electronic (email)**	**28/03/2019**

Filename: STO19108_01 R001 Rev 0 - 28 March 2019

Table of contents

List of tables

List of figures

List of plates

List of appendices

1. Proposal details

1.1 Background

Stockland is seeking to lodge a subdivision application to guide future residential development within Stages 29–38 Amberton Estate, Eglinton (the project area), located in the City of Wanneroo. The subdivision plan (Figure 1) identifies the following proposed development intensification:

- 578 residential lots
- 3 foreshore lots
- 8 areas of Public Open Space (POS) and drainage
- internal road layout.

1.2 Site description

The project area comprises approximately 43.3 ha within Lots 9023 and 9510 and is surrounded by (see Figure 2):

- remnant vegetation to be retained and partially rehabilitated to the northeast within conservation POS
- land predominantly cleared for ongoing development stages of Amberton Estate to the south
- vegetation to be cleared as part of future development stages of Amberton Estate to the east
- remnant vegetation to be retained and partially rehabilitated as part of a Bush Forever Area and proposed foreshore POS to the west.

The project area is designated as bushfire prone on the *Map of Bush Fire Prone Areas* (DFES 2019; see Plate 1).

1.3 Purpose

This Bushfire Management Plan (BMP) has been prepared to address requirements under Policy Measure 6.4 of *State Planning Policy 3.7 Planning in Bushfire-Prone Areas* (SPP 3.7; WAPC 2015) and *Guidelines for Planning in Bushfire-Prone Areas* (the Guidelines; WAPC 2017).

1.4 Other plans/reports

Other reports that have been prepared by Strategen for the project area include:

- Amberton Estate Fire Management Plan (Strategen 2016)
- Stages 8 & 9 Amberton Estate Bushfire Management Plan (Strategen 2017)
- Portion Stages 8, 9, 39 & 40 Amberton Estate Bushfire Management Plan (Strategen 2018a)
- Stages P3N and P4E Amberton Estate Bushfire Management Plan (Strategen 2018b).

Other plans/reports relating to this development include:

- MRS Amendment 1284/57
- Commonwealth EPBC Approval 2010/5777
- EPBC Approval 2013/7068
- EPBC Approval 2014/7137.

Plate 1: Map of Bush Fire Prone Areas (DFES 2019)

Source: Creative Design and Planning 2019

Figure 1: Plan of subdivision

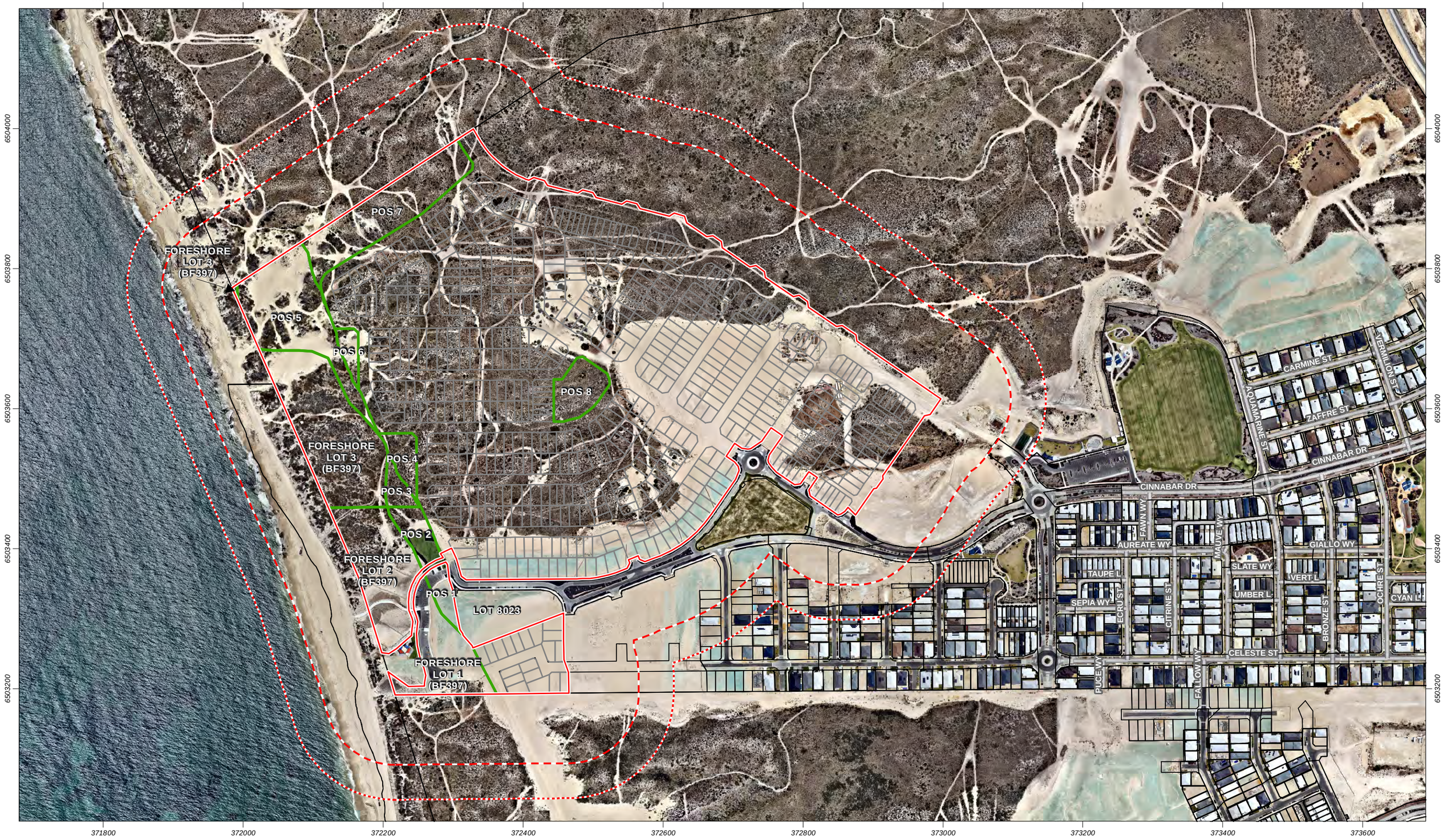

Figure 2: Site overview

N

Scale 1:5,000 at A3

0 50 100 m

Coordinate System: GDA 1994 MGA Zone 50

Date: 7/03/2019

Legend

- Project area
- 100m assessment area
- 150m assessment area
- POS
- Cadastral boundary
- Development layout
- Roads

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Data source: Nearmap: Aerial image, flown 01/2019. Landgate: Cadastre, 07/2018. Stockland. Development layout, 2/2019. Created by: jcrute

2. Environmental considerations

2.1 Native vegetation – modification and clearing

A large portion of the project area contains remnant vegetation, which will be cleared as part of the proposal. The proposed development will also necessitate clearing of native vegetation adjacent to the project area to the northeast and southeast as part of a low threat staging buffer. There will be a combination of POS areas to be excluded under Clauses 2.2.3.2 (e) and (f) and POS areas where vegetation is to be retained and reintroduced (i.e. classifiable), which will be designed in accordance with the landscape plan (as discussed in Section 2.2).

An EPBC referral (Ref: 2010/5777) was submitted for the proposed development (including adjacent development areas) in 2010 for potential impacts to Carnaby's Black Cockatoo. Department of Environment and Energy (DoEE) approved the proposal with conditions including the creation of Carnaby's Black Cockatoo habitat within POS areas throughout the Eglinton LSP. This process was outlined in Amendment No.1 to Eglinton LSP No.82.

The Eglinton LSP No.82 was approved by the Commonwealth Minister for Environment on 30 April 2013, modified on 17 July 2013 and 20 October 2015. The south-western section of the Eglinton LSP No.82 area (Amberton Estate) was referred under the EPBC Act by Stockland WA Development Pty under the following two separate proposals, both of which were determined as 'Not a Controlled Action':

- Part Lot 9005 Marmion Avenue (*EPBC 2013/7068*)
- Lot 5000 and Part lot 5001 (EPBC 2014/7137)

Based on the above information, Strategen understands that all relevant environmental approvals have been sought up to this point in time. Subdivision approval will provide a valid clearing exemption to undertake the necessary subdivisional and clearing works required.

A search of publicly available environmental data relating to the project area has been undertaken and is summarised in Table 1.

Table 1: Summary of environmental values

Environmental value	Present within or adjacent to project area	Description
Environmentally Sensitive Area	Within/ adjacent	The project area and adjacent land is mapped as Environmentally Sensitive Areas. The ESA is likely to be associated with the endangered Banksia Woodlands of the Swan Coastal Plain TEC.
Swan Bioplan Regionally Significant Natural Area	N/A	No Swan Bioplan Regionally Significant Natural Areas were identified.
Wetlands	N/A	No Geomorphic Wetlands of the Swan Coastal Plain or RAMSAR Wetlands were identified.
Waterways	Within/ adjacent	No waterways were identified.
Threatened Ecological Communities listed under the EPBC Act	Within/ adjacent	Threatened Ecological Communities are mapped throughout the project area and adjacent vegetation and are likely to be associated with the endangered Banksia Woodlands of the Swan Coastal Plain which may occur in this area.
Threatened and priority flora	Within/ adjacent	Priority 4 flora is mapped as occurring within the eastern portion of project area and adjacent land to the east.
Fauna habitat listed under the EPBC Act	Within/ adjacent	Carnaby's Black Cockatoo habitat is mapped throughout the project area and adjacent land, including confirmed breeding areas and confirmed roosting areas (buffered) The project area was also mapped as potential Quenda habitat.
Threatened and priority fauna	N/A	No Threatened or Priority fauna were identified.

Environmental value	Present within or adjacent to project area	Description
Bush Forever Site	Adjacent	A Bush Forever Site (BF397) exists along the foreshore reserve, encompassing a mapped Perth Regional Ecological Linkage.
DBCA managed lands and lands and waters (includes legislated lands and waters and lands of interest)	N/A	No lands of interest or legislated lands or waters were identified.
Conservation covenants	N/A	N/A

Regional vegetation surveys and mapping of the Swan Coastal Plain indicate the project area and adjacent land is contained predominantly within the Quindalup Vegetation Complex. This vegetation complex is described as:

- Quindalup Complex: coastal dune complex consisting mainly of two alliances including the strand and fore dune alliance and the mobile and stable dune alliance (local variations include low closed forest of *Melaleuca lanceolata-Callitris preissii* and closed scrub of *Acacia rostellifera*).

Aside from existing cleared and developed areas, the project area (i.e. Quindalup Complex) is a combination of low shrubland and open heath, both of the Class C shrubland vegetation classification.

Vegetation to be retained to the west within the foreshore reserve/POS consists of very low shrubland with numerous bare sand dunes. Vegetation growth in the foreshore reserve is restricted due to maritime effects, prevailing winds and salt drift, plus added disturbance from off-road vehicle use along the coastal strip.

The above observations are consistent with detailed vegetation survey undertaken over the Eglinton LSP area by PGV Environmental (2013). The dominant on-site vegetation types were surveyed as:

- *Acacia cyclops* shrubland
- *Melaleuca systena*, *Lomandra maritima* low open heath
- *Acacia rostellifera*, *Melaleuca systena* low open heath.

No Aboriginal Heritage Places were identified within or adjacent to the project area.

2.2 Revegetation / Landscape Plans

Revegetation within the project area will be limited to the foreshore lots, proposed foreshore POS and drainage areas to the west. The Landscape Plan (refer to Appendix 1) demonstrates that revegetation within POS and the foreshore lots will result in a vegetation extent consistent with the surrounding vegetation (i.e. Class C shrubland). Post development classification of proposed revegetation is considered and identified in Section 3.1.

Landscaping within the project area will be limited to the proposed POS areas and street scaping. Selected POS areas identified in Figure 3 abutting proposed lots will consist of vegetation excludable under Clauses 2.2.3.2 (b), (e) and/or (f) of AS3959. Final determination of vegetation classifications and the applicable exclusion clauses will be confirmed as part of detailed landscape design once final size, location, density and species selection are known. Detailed landscape planning and design will need to be consistent with the provisions of this BMP with regards to any exclusions/ managed land proposed.

Other POS and drainage adjacent to the project area established during previous stages of Amberton Estate is maintained in a low threat state, comprising heavy mulch, manicured lawns and sparse planting of shrubs.

Based on the conceptual landscaping information available, landscaping and rehabilitation of POS areas and Foreshore lots is detailed below:

- POS 1 – low threat landscaping, including the current constructed carpark entry into the foreshore area
- POS 2 – partial low threat landscaping for the southern portion, with the northern portion retaining the existing vegetation
- POS 3 – retention of existing vegetation
- POS 4 – assuming retention of existing vegetation as a precaution
- POS 5 – retention and rehabilitation of existing vegetation
- POS 6 – assuming retention of existing vegetation as a precaution
- POS 7 – conservation vegetation to be retained and rehabilitated
- POS 8 – park to be landscaped to low threat
- Foreshore Lot 1 – predominantly low threat landscaping with a small portion of the area abutting the Shorehaven Development and south of the café lot to be rehabilitated coastal vegetation. The final Landscape Plan will ensure a low threat outcome is achieved north of the Emergency Access Way within Foreshore Lot 1. The proposed 15 m wide coastal road reserve will absorb BAL-40/FZ radiant heat impact from the southwest.
- Foreshore Lot 2 – retention of existing vegetation and rehabilitation where required
- Foreshore Lot 3 – retention of existing vegetation and rehabilitation where required
- Lot 8023 – proposed drainage basin and associated replanting (final size and dimensions to be confirmed) requiring a minimum 10 m separation from all drainage vegetation. Strategen has assumed a worst case of Class C shrubland at downslope 0–5 degrees. A 10 m APZ surrounding all lots at the southern interface of Lot 8023 will be implemented to achieve BAL-29 or lower.

As a sub-note to the above information, Lot 8023 has been assumed to comprise future classified vegetation as a precautionary worst case, as there is insufficient detail to state otherwise. However, Strategen understands that the likely landscape outcome will depict a drainage component and a turfed open space component within Lot 8023. Therefore, there may be an opportunity to exclude the drainage vegetation entirely based on specific size, design, planting density, species use and management regime. Confirmation of the classified/excluded extent of Lot 8023, as well as all POS areas, will be confirmed as part of BMP/BAL compliance once the appropriate level of landscaping plans and detailed design information in available. Irrespective of the status of the future drainage area within Lot 8023, sufficient separation will be provided to adjacent residential lots to achieve a compliance BAL-29 or lower rating.

3. Bushfire assessment results

3.1 Assessment inputs

3.1.1 Vegetation classification

Strategen assessed classified vegetation and exclusions within the 150 m assessment area through on-ground verification on 1 March 2019 in accordance with *AS 3959—2009 Construction of Buildings in Bushfire-Prone Areas* ([AS 3959]; SA 2009) and the *Visual Guide for Bushfire Risk Assessment in Western Australia* (DoP 2016). Georeferenced site photos and a description of the vegetation classifications and exclusions are contained in Appendix 2.

Strategen identified the predominant vegetation within and adjacent to the site to be Class C shrubland consisting of very low coastal heath vegetation less than 2 m in height fragmented by informal tracks and sand dune blow-outs. This was identified within the vegetated areas of the project area, as well as to the south (Peet Shorehaven land), west (foreshore reserve), north (adjacent undeveloped Eglinton site) and east (future stages of Amberton Estate).

Some isolated vegetation pockets west of the project area that directly front the coast are significantly degraded and occur in very small clumps of individual low shrubs amongst predominant areas of bare sand dunes (i.e. there is a distinct lack of continuous fuel profile in this area). This vegetation is directly exposed to the year-round effects of coastal processes such as wind, waves and salt drift that significantly limit vegetation growth and fuel accumulation. On this basis, the area along the fore-dune situated west and northwest of the proposed building site has been largely excluded from classification under Clause 2.2.3.2 (e) and (f) of AS 3959 as being in a non-vegetated or low threat state incapable of supporting bushfire.

Post-development conditions will return the foreshore lots and relevant POS areas discussed in Section 2.2 to a Class C shrubland classification following revegetation/rehabilitation/drainage works in accordance with an approved landscape plan. Remaining POS will be modified to a low threat state excluded under Clauses 2.2.3.2 (e) and (f) in accordance with an approved landscape plan, including provision of three beach access points, pedestrian pathways and boardwalks, lawn areas and managed gardens. The remainder of the project area, adjacent staging buffers and APZs will be modified to a low threat state excluded under Clauses 2.2.3.2 (e) and (f) to allow for future lot and road construction.

3.1.2 Effective slope

Strategen assessed effective slope under classified vegetation within the 150 m assessment area through on-ground verification on 1 March 2019 in accordance with AS 3959. Results were cross-referenced with DAFWA 2 m contour data and are depicted in Figure 3.

Strategen assessed effective slope to be highly variable due to the nature of the dune systems in which the proposed development is situated. Effective slope was assessed to vary between up-slope/flat land (i.e. 0 degrees) to down-slope >10–15 degrees. Given Class C shrubland was assessed to be the predominant vegetation type throughout the assessment area, plot numbers were categorised predominantly on the basis of effective slope.

3.1.3 Summary of inputs

Figure 3 illustrates the anticipated post-development vegetation classifications and exclusions following completion of subdivision works including implementation of APZs, low threat staging buffers and low threat landscaping. The post-development vegetation classifications/exclusions and effective slope are summarised in Table 2.

Table 2: Summary of post-development vegetation classifications, exclusions and effective slope

Vegetation plot	Vegetation classification	Effective slope	Comments
1	Class C Shrubland	Flat/upslope (0°)	Shrub vegetation to the east of the project area.
2	Class C Shrubland	Flat/upslope (0°)	Shrub vegetation to the northeast of the project area.
3	Class C Shrubland	Flat/upslope (0°)	Shrub vegetation within the northwest of the project area.
4	Class C Shrubland	Flat/upslope (0°)	Shrub vegetation within the southwest of the project area.
5	Class C Shrubland	Flat/upslope (0°)	Shrub vegetation to the south of the project area.
6	Class C Shrubland	Downslope >0–5°	Shrub vegetation to the east of the project area.
7	Class C Shrubland	Downslope >0–5°	Shrub vegetation within Lot 8023.
8	Class C Shrubland	Downslope >0–5°	Shrub vegetation to the south of the project area.
9	Class C Shrubland	Downslope >5–10°	Shrub vegetation to the north of the project area.
10	Class C Shrubland	Downslope >5–10°	Shrub vegetation to the west of the project area.
11	Class C Shrubland	Downslope >5–10°	Shrub vegetation to the south of the project area.
12	Class C Shrubland	Downslope >10–15°	Shrub vegetation to the west of the project area.
13	Excluded – Non-vegetated & Low threat (Clauses 2.2.3.2 [e] and [f])	N/A	Existing excluded land to the south to remain excluded under Clauses 2.2.3.2 (e) and (f).
14	Excluded – Non-vegetated & Low threat (Clauses 2.2.3.2 [e] and [f])	N/A	Existing excluded land to the east to remain excluded under Clauses 2.2.3.2 (e) and (f).
15	Excluded – Non-vegetated & Low threat (Clauses 2.2.3.2 [e] and [f])	N/A	Existing excluded land to the west to remain excluded under Clauses 2.2.3.2 (e) and (f).
16	Excluded – Non-vegetated & Low threat (Clauses 2.2.3.2 [e] and [f])	N/A	Existing excluded land to the north to remain excluded under Clauses 2.2.3.2 (e) and (f).
17	Excluded – Non-vegetated (Clause 2.2.3.2 [e])	N/A	Indian Ocean.
18	Excluded – Non-vegetated (Clause 2.2.3.2 [e])	N/A	Built form (i.e. existing sealed roads and buildings).
19	Excluded – Non-vegetated & Low threat (Clauses 2.2.3.2 [e] and [f])	N/A	Existing non-vegetated land within the project area.
20	Area to be modified to a low threat state and excluded under Clause 2.2.3.2 (e) and (f)	N/A	Vegetation within the project area and staging buffer to be modified and excluded under Clause 2.2.3.2 (e) and (f).

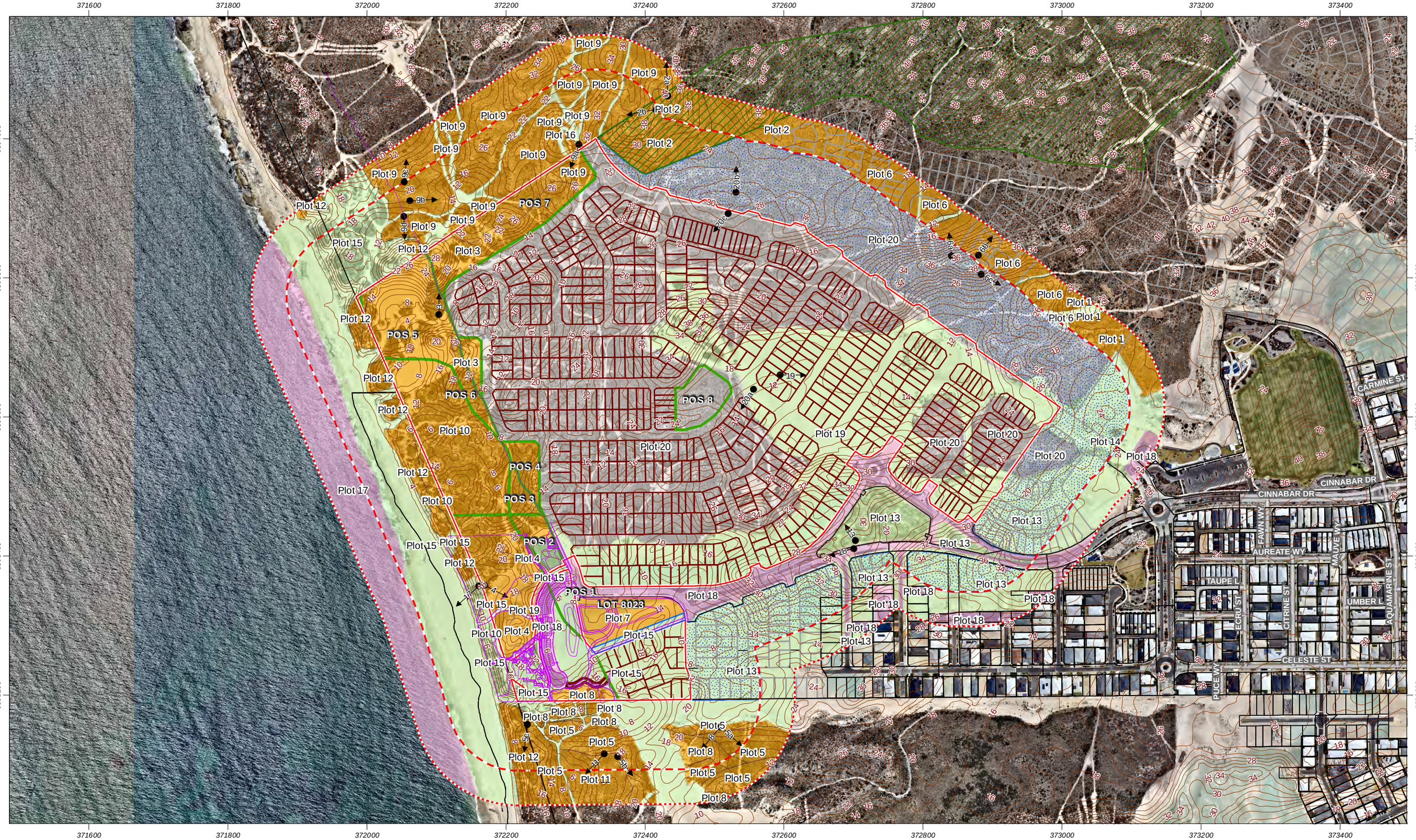

Figure 3: Post-development vegetation classification and effective slope

N

Scale 1:5,000 at A3

0 50 100 m

Coordinate System: GDA 1994 MGA Zone 50

Date: 8/03/2019

Legend

- Layout
- Surface elevation (mAHD)
- Photo point and direction
- 10m wide APZ
- Project area
- 100m assessment area
- 150m assessment area
- POS
- Conservation POS
- Cadastral boundary
- Development layout
- 100m wide low threat staging buffer
- EAW
- Indicative future subdivision layout

Vegetation class

- Class C Shrubland
- To be modified to a low threat state
- Excluded under Clause 2.2.3.2 (e)
- Excluded under Clauses 2.2.3.2 (e) and (f)

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Data source: Nearmap: Aerial image, flown 01/2019. Landgate: Cadastre, 07/2018. Stockland. Development layout, 2/2019. Created by: jcrute

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3.2 Assessment outputs

3.2.1 Bushfire Attack Level (BAL) contour assessment

Strategen has undertaken a BAL contour assessment in accordance with Method 1 of AS 3959 for the project area (Figure 4). The Method 1 procedure incorporates the following factors:

- state-adopted FDI 80 rating
- vegetation classification
- effective slope
- distance maintained between proposed development areas and the classified vegetation.

The BAL rating gives an indication of the level of bushfire attack (i.e. the radiant heat flux) that may be received by proposed future development and subsequently informs the standard of building construction and/or setbacks required for proposed habitable development to potentially withstand such impacts.

The BAL contours are based on:

- the post-development vegetation classifications and effective slope observed at the time of inspection as well as consideration of the proposed on-site and off-site clearing extent, resultant vegetation exclusions and separation distances achieved in line with the plan of subdivision
- implementation and maintenance of a 100 m wide low threat staging buffer maintained to Asset Protection Zone (APZ) standards extending into future Amberton development stages to the east and south, as depicted in Figure 4
- classified vegetation throughout conservation POS within adjacent stages of Amberton Estate to the northeast (see Figure 4)
- implementation and maintenance of a proposed 10 m wide APZ within the southern boundary of Lot 8023
- extent of revegetation, retention of existing vegetation and low threat landscaping based on the Landscaping Plan and landscaping detail provided in Section 2.2 of this BMP.

The external low threat staging buffer is discussed further in Section 5. Should there be any changes in development design or classified vegetation extent that results in a modified BAL outcome, then the BAL contours will need to be reassessed.

The results of the BAL contour assessment are detailed in Table 3 and illustrated in Figure 4. The highest BAL applicable to the external boundary of the proposed lots is BAL-29. Lower BAL ratings may be achieved for individual lots following implementation of landscaping and building setbacks.

Table 3: BAL contour assessment results

Method 1 BAL determination				
Plot	Vegetation classification	Effective slope	BAL contour width	Highest BAL (to lot boundary)
1	Class C Shrubland	Flat/upslope (0°)	N/A (greater than 100 m from the project area)	BAL–Low
2	Class C Shrubland	Flat/upslope (0°)	19-<100 m	BAL–12.5
3	Class C Shrubland	Flat/upslope (0°)	13-<19 m	BAL–19
4	Class C Shrubland	Flat/upslope (0°)	13-<19 m	BAL–19
5	Class C Shrubland	Flat/upslope (0°)	19-<100 m	BAL–12.5
6	Class C Shrubland	Downslope >0–5°	N/A (greater than 100 m from the project area)	BAL–Low
7	Class C Shrubland	Downslope >0–5°	10-<15 m	BAL–29
8	Class C Shrubland	Downslope >0–5°	15-<22 m	BAL–19

Method 1 BAL determination				
Plot	Vegetation classification	Effective slope	BAL contour width	Highest BAL (to lot boundary)
9	Class C Shrubland	Downslope >5–10°	11-<17 m	BAL–29
10	Class C Shrubland	Downslope >5–10°	11-<17 m	BAL–29
11	Class C Shrubland	Downslope >5–10°	25-<100 m	BAL–12.5
12	Class C Shrubland	Downslope >10–15°	N/A (greater than 100 m from the project area)	BAL–Low
13	Excluded – Non-vegetated & Low threat (Clauses 2.2.3.2 [e] and [f])	N/A	N/A	N/A
14	Excluded – Non-vegetated & Low threat (Clauses 2.2.3.2 [e] and [f])	N/A	N/A	N/A
15	Excluded – Non-vegetated & Low threat (Clauses 2.2.3.2 [e] and [f])	N/A	N/A	N/A
16	Excluded – Non-vegetated & Low threat (Clauses 2.2.3.2 [e] and [f])	N/A	N/A	N/A
17	Excluded – Non-vegetated (Clause 2.2.3.2 [e])	N/A	N/A	N/A
18	Excluded – Non-vegetated (Clause 2.2.3.2 [e])	N/A	N/A	N/A
19	Excluded – Non-vegetated & Low threat (Clauses 2.2.3.2 [e] and [f])	N/A	N/A	N/A
20	Area to be modified to a low threat state and excluded under Clause 2.2.3.2 (e) and (f)	N/A	N/A	N/A
Determined highest BAL				**BAL-29**

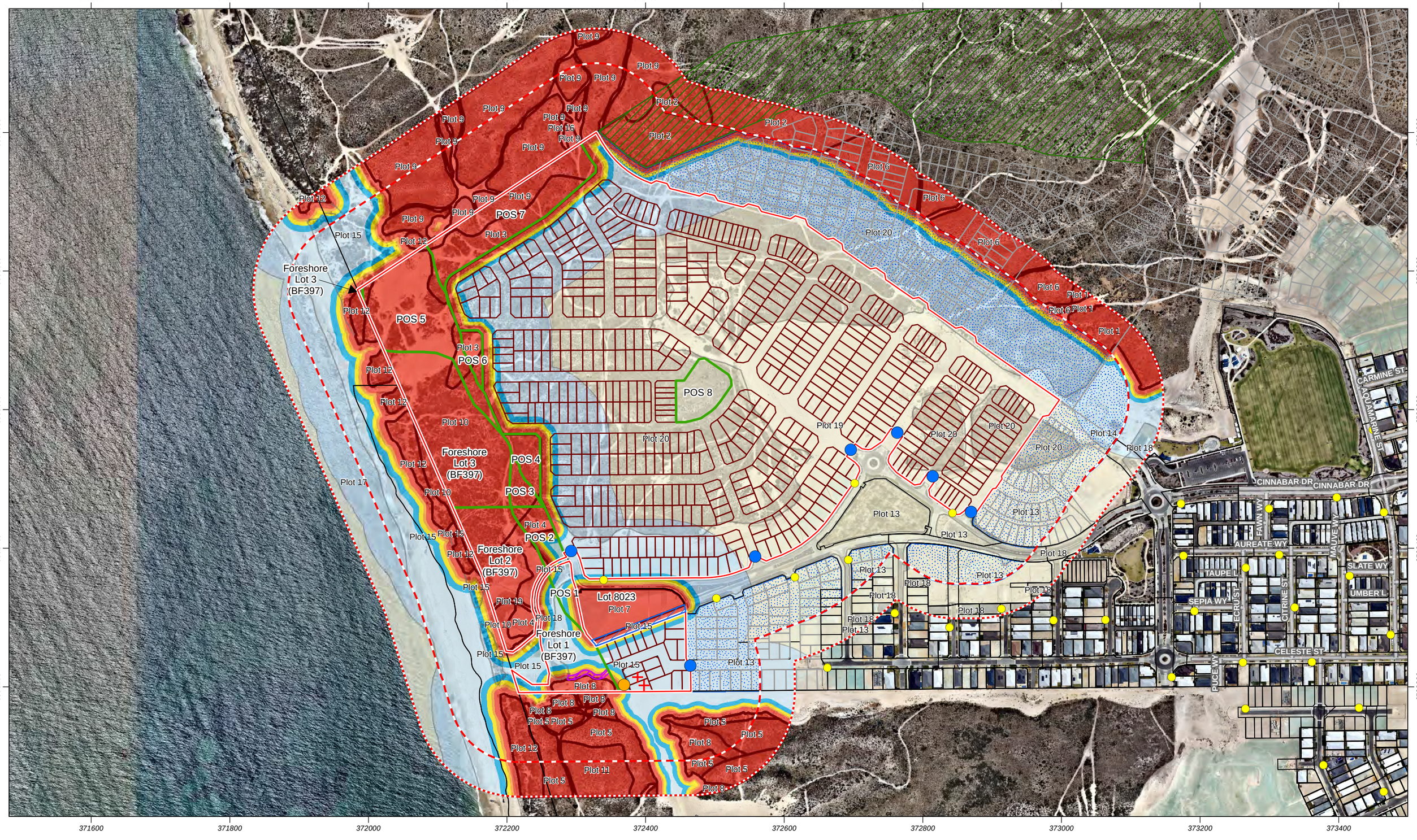

Figure 4: BAL contour map and spatial representation of bushfire management strategies

N

Scale 1:5,000 at A3

0 50 100 m

Coordinate System: GDA 1994 MGA Zone 50

Date: 27/03/2019

Legend

- Street hydrant
- Connections to existing road network
- Temporary cul-de-sac with 17.5m turnaround head
- Temporary quarantining of development until temporary cul-de-sac is resolved
- 10m wide APZ
- Project area
- 100m assessment area
- 150m assessment area
- POS
- Conservation POS
- Cadastral boundary
- Development layout
- Indicative future subdivision layout
- 100m wide low threat staging buffer
- EAW
- Classified vegetation

BAL contours

- BAL FZ
- BAL 40
- BAL 29
- BAL 19
- BAL 12.5
- BAL Low

Q:\Consult\2019\STO\STO19108\01_GIS_documents\ArcMap_documents\STO19108_G003_RevA_A3.mxd

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Data source: Nearmap: Aerial image, flown 01/2019. Landgate: Cadastre, 07/2018. Stockland. Development layout, 2/2019. Created by: h.sullivan

4. Identification of bushfire hazard issues

4.1 Bushfire context

The project area is surrounded by a combination of existing residential development, remnant shrubland vegetation and cleared land. A summary of the bushfire scenarios from each direction is as follows:

- The capacity of vegetation to the north to support long fire runs of over 3 km significantly increases the potential bushfire risk to proposed development. However, this risk is temporary given the broad extent of urban development proposed to the north under the approved Eglinton LSP No. 82. A large parcel of vegetation will be retained within conservation POS to the northeast, which will retain some potential for an isolated bushfire scenario. This will be managed through a combination of low threat staging buffers, provision of perimeter roads, increased building construction standards (where required) and provision of street hydrants to assist a direct suppression response.
- Similar to the north, fire run from the east are significant (albeit temporary) and comprise intact shrubland fuels with a moderate fuel loading. Fire behaviour has the potential to escalate over the course of the fire run and impact the site with moderate to high levels of radiant heat and ember attack. However, the separation provided by the proposed 100 m wide low threat staging buffer and interfacing road reserve will limit the potential for this bushfire scenario to impact the project area. Potential bushfire from the east is temporary given this area will ultimately comprise future development stages of Amberton Estate.
- Land to the south comprises existing and ongoing residential development in the form of roads, cleared vacant lots, houses and low threat managed landscaping that do not pose a bushfire threat. Vegetation beyond 150 m to the south consists of low shrubland, similar to vegetation contained within the foreshore reserve to the west. This vegetation is very low and sparse, particularly throughout the steep sand dune interface with the beach and areas disturbed by off-road vehicle use. Ongoing development of future stages of Shorehaven will ultimately remove the majority of vegetation to the south, except for that located in the foreshore reserve.
- A Bush Forever site (BF397) is located to the west within the Foreshore Lots comprising intact remnant vegetation, and along with interfacing POS, will form a permanent bushfire hazard. 15 m wide perimeter road reserves will form a permanent buffer and defendable space to this vegetation, while increased building construction standards will be employed where required.

All other land within the project area and adjacent 150 m is either already excluded under Clauses 2.2.3.2 (e) or (f) or will be modified to a low threat state as part of future development to achieve exclusion under Clauses 2.2.3.2 (e) or (f). A summary of these exclusions is provided as follows:

- non-vegetated land (i.e. existing buildings, roads, paths, etc) is excluded under Clause 2.2.3.2 (e)
- low threat managed land (i.e. road verges, managed gardens/landscaping, etc) is excluded under Clause 2.2.3.2 (f).

It is considered that the bushfire risk to the proposed development posed by the hazards identified in Section 4.1 can be managed through standard application of acceptable solutions under the Guidelines, including provision of adequate emergency water supply, vehicular access, low threat staging buffers/APZs, increased building construction standards (as addressed in Section 5 and Table 4), as well as through a direct bushfire suppression response if required. On this basis, Strategen considers the bushfire hazards adjacent to the project area and the associated bushfire risks are readily manageable.

4.2 Bushfire hazard issues

The BAL contours identified in Figure 4 demonstrate that all proposed lots are located within areas of BAL-29 or lower.

On completion of development within the project area, there will be a reduced bushfire risk to future assets as a result of vegetation clearing/modification that will be undertaken to facilitate development. Vegetation clearing throughout development staging will play an important role in managing the bushfire risk posed by on-site temporary vegetation during roll out of individual development stages. If development is staged, vehicular access arrangements will also need to ensure that that all occupiers and visitors are provided with at least two vehicular access routes at all times (from Stage 1 onwards). Potential staging matters are discussed as key management measures in Section 5.

If subdivisional works are to be staged internal to the project area, the following staging provisions are to be implemented as required and in advance of lot creation within each development stage to negate any unnecessary bushfire risk from future development stages:

- internal 100 m wide low threat staging buffers surrounding all proposed residential lots and the permanent cul-de-sac, as discussed in Section 5
- provision of temporary compliant cul-de-sacs and turn-around points (if staged road construction is to be less than 200 m long), until such time that through access can be achieved onto adjacent development stages (this may also require consideration of temporarily quarantined lots to accommodate 17.5 m diameter cul-de-sac heads that cannot otherwise be achieved within existing road reserve widths)
- provision of temporary compliant Emergency Access Ways (EAWs) to achieve through access for each internal development stage if the access route is longer than 200 m and cannot be dealt with via a compliant temporary cul-de-sac.

These provisions will not apply for internal stages that are subject to BAL-LOW.

Quinns Rocks Bush Fire Brigade and Fire and Rescue Services stationed at Yanchep and Butler are expected to provide a best-case emergency suppression response time of 15–20 minutes should a bushfire threaten habitable buildings within the project area.

On this basis, Strategen considers the bushfire hazards within and adjacent to project area and the associated bushfire risks are readily manageable through standard management responses outlined in the Guidelines and AS 3959. These responses have been factored in to proposed development as early as possible at all stages of the planning process to ensure a suitable, compliant and effective bushfire management outcome is achieved for protection of future life, property and environmental assets.

5. Assessment against the bushfire protection criteria

5.1 Compliance table

An acceptable solutions assessment against the bushfire protection criteria is provided in Table 4.

Table 4: Compliance with the bushfire protection criteria of the Guidelines

Bushfire protection criteria	Method of compliance Acceptable solutions	Proposed bushfire management strategies
Element 1: Location	A1.1 Development location	The BAL contour assessment (see Figure 4 and Table 3) identifies all lots as being situated in areas subject to BAL-29 or lower.
Element 2: Siting and design	A2.1 Asset Protection Zone	The BAL contour assessment identifies a 10 m wide APZ within Lot 8023 to ensure proposed development abutting this lot can achieve BAL-29. The future landscape plan for Lot 8023 will need to adhere to APZ requirements for the proposed 10 m side APZ. All other lots have the capacity to achieve APZs within surrounding permanent low fuel areas (i.e. roads, landscaping and staging buffers). APZs are to be implemented and subject to ongoing management in accordance with standards outlined in the Guidelines (see Appendix 3).
Element 3: Vehicular access	A3.1 Two access routes.	A combination of six access points to the existing public road network to the south are proposed, which will provide all occupants with the option of travelling to more than two different destinations (i.e. east to Marmion Avenue via Viridian Boulevard and Cinnabar Drive, and south to Peet Shorehaven via Fallow Way). The main distributor road in Marmion Avenue provides occupants with the option of travelling north towards Yanchep or south towards Alkimos.
	A3.2 Public road	All public roads will be constructed to relevant technical requirements under the Guidelines (see Appendix 4).
	A3.3 Cul-de-sac (including a dead-end-road)	The proposed 60 m long permanent cul-de-sac located in the northeast of proposed development will be located within a BAL-LOW area post-development and will therefore not be subject to specific bushfire compliance requirements. Provision of low threat staging buffers will ensure the proposed cul-de-sac is established in a BAL-LOW area throughout internal staging of development. All temporary cul-de-sacs established as part of internal staging of development will be less than 200 m in length, will include minimum 17.5 m diameter turn-around heads and will be constructed to relevant technical requirements under the Guidelines (see Appendix 4).
	A3.4 Battle-axe	N/A – no battle-axes are proposed as part of the subdivision and the project area is not serviced by an existing battle-axe.
	A3.5 Private driveway longer than 50 m	N/A – the proposed lots are of size where all future habitable development will be located within 50 m of a public road.
	A3.6 Emergency access way	No permanent emergency access ways (EAW) are proposed; however, if development and vehicular access construction is to be staged, any proposed temporary EAW is to be constructed to relevant technical requirements under the Guidelines (see Appendix 4).
	A3.7 Fire service access routes (perimeter roads)	N/A – the proposed subdivision design does not require fire service access routes (FSARs) to achieve access within and around the perimeter of the project area. The proposed development provides perimeter roads at the following interfaces: • 15 m wide perimeter roads (Indigo Street and Celeste Street) along the foreshore reserve to the east • 15 m wide perimeter road (Canary Way) along the interface with future stages of Amberton Estate to the southeast • 27 m wide perimeter road (Heath Avenue) along the interface with future stages of Amberton Estate to the northeast.
	A3.8 Firebreak width	N/A – given that all residential lots will be cleared and developed, individual lot boundary firebreaks will not be required.

Bushfire protection criteria	Method of compliance Acceptable solutions	Proposed bushfire management strategies
Element 4: Water	A4.1 Reticulated areas	The proposed development will be connected to reticulated water supply via surrounding development in accordance with Water Corporations Design Standard 63 requirements (as per Appendix 5). Existing water hydrants are located at 200 m intervals throughout the existing stages of Amberton Estate to the southeast.
	A4.2 Non-reticulated areas	N/A – the proposed subdivision is located within an existing reticulated area.
	A4.3 Individual lots within non-reticulated areas (Only for use if creating 1 additional lot and cannot be applied cumulatively)	N/A – the proposed subdivision is located within an existing reticulated area.

5.2 Additional management strategies

Strategen makes the following additional bushfire management recommendations to inform ongoing planning stages of the development and increase the level of bushfire risk mitigation across the site.

5.2.1 On-site staging buffers

If development (and therefore clearing) is to occur on a staged basis, clearing in advance will need to occur to ensure building construction is not inhibited by a temporary vegetation extent located within adjacent development stages yet to be cleared. This can be achieved by ensuring that each approved stage subject to construction is surrounded by a 100 m wide, on-site cleared or low threat staging buffer (not including vegetation proposed to be retained). Once the buffers are created, they will need to be maintained on a regular and ongoing basis in accordance with AS 3959 Clause 2.2.3.2 (f) (including the management of grassland at 100 mm or lower) to achieve a low threat minimal fuel condition all year round until such time that the buffer area is developed as part of future development stages. This will assist in managing the current on-site temporary vegetation hazards.

5.2.2 Staging of access

If development (and therefore construction of vehicular access) is to occur on a staged basis, vehicular access arrangements will need to ensure that all occupiers and visitors are provided with at least two access routes at all stages of development. This can be achieved via construction of public access roads in advance of stages or through provision of temporary emergency access ways/cul-de-sacs until two formal access roads are available.

Two lots adjacent to the temporary cul-de-sac along the southern project area boundary will be temporarily quarantined until such time as the temporary cul-de-sac is resolved through the creation of a coastal road within the Shorehaven development to the south or modified orientation of the cul-de-sac head such that it does not impede on the two residential lots. Currently, the 15 m wide road reserve cannot fully cater for the temporary cul-de-sac head and will require a 2.5 m intrusion into the two lots to achieve a compliant 17.5 m diameter width.

5.2.3 Fuel management within cleared vacant lots

Cleared lots are to be managed on a regular and ongoing basis by the developer until sale of lots after which time landowners will be responsible for ongoing management. Maintenance is to be in accordance with Clause 2.2.3.2 (f) of AS 3959 and Schedule 1 of the Guidelines (refer to Appendix 3) and will involve slashing/mowing of grassland and weeds to height of less than 100 mm.

5.2.4 Road verge fuel management

Surrounding road verges that have been excluded as low threat are to continue to be managed to ensure the understorey and surface fuels remain in a low threat, minimal fuel condition in accordance with Clause 2.2.3.2 (f) of AS 3959. Ongoing road verge management is the responsibility of the City.

5.2.5 Notification on title

Notification is to be placed on the Title of proposed lots subject to BAL-12.5 or higher (either through condition of subdivision or other head of power) to ensure landowners/proponents and prospective purchasers are aware that their lot is subject to an approved BMP and BAL assessment.

5.2.6 Building construction standards

Future Class 1a, Class 1b, Class 2, Class 3 residential buildings and associated Class 10a structures in an area subject to BAL—12.5 or higher are required to comply with the bushfire specific construction requirements of AS 3959.

5.2.7 BMP/BAL compliance report

A BMP/BAL compliance report will be prepared as evidence demonstrating that the BMP has been implemented as intended as a mechanism to clear subdivision conditions relating to the BMP. The BMP/BAL compliance report will be prepared following completion of subdivisional works and prior to issue of lot title to validate and confirm the accuracy of the BAL contour map depicted in the BMP, as well as identify that compliant vehicular access and water provisions have been implemented for the subdivision as required under the BMP. The BMP/BAL compliance report will also demonstrate any change in the assessed BAL or other management measures documented in this BMP, which may occur as a result of changes in building location, vegetation class or bushfire management approach.

5.2.8 Landscaping Plan

The BAL contour assessment is reliant on all landscaping being implemented and maintained in accordance with an approved Landscaping Plan, as guided by the proposed landscape design outlined in Appendix 1 and details under Section 2.2 of this BMP. Responsibility for establishment and maintenance of low threat landscaping is discussed in Section 6.

5.2.9 Compliance with annual firebreak notice

The developer/land manager and prospective land purchasers are to comply with the current City of Wanneroo annual firebreak notice as amended (refer to Appendix 6).

6. Responsibilities for implementation and management of the bushfire measures

Implementation of the BMP applies to the developer, prospective landowners and the City to ensure bushfire management measures are adopted and implemented on an ongoing basis. A bushfire responsibilities table is provided in Table 5 to drive implementation of all bushfire management works associated with this BMP.

Table 5: Responsibilities for implementation and management of the bushfire measures

Implementation/management table	
Developer – prior to issue of titles	
No.	Implementation action
1	Construct the public roads to the standards stated in the BMP.
2	Construct temporary cul-de-sacs to the standards stated in the BMP as required throughout internal staging of the development (this also includes potential temporary quarantining of lots until the impeding cul-de-sac heads are removed/relocated).
3	Implement landscaping as per an approved Landscaping Plan that adheres to the requirements specified under this BMP.
4	Install temporary emergency access ways and associated signs and gates to the standards stated in the BMP as required throughout internal staging of the development.
5	Install 10 m wide APZ within the southern boundary of POS Lot 8023.
6	If lot creation is staged, implement on-site 100 wide low threat staging buffers to achieve exclusion Clause 2.2.3.2 (f) of AS 3959, including slashing/ mowing of grassland and weeds to height of less than 100 mm.
7	Construct reticulated water supply and network of hydrants to the standards stated in the BMP.
8	Undertake BMP/BAL compliance assessment as evidence to demonstrate proper implementation of the BMP.
Developer – until sale of lot	
No.	Implementation action
1	If lot creation is staged, maintain on-site 100 wide low threat staging buffers to achieve exclusion Clause 2.2.3.2 (f) of AS 3959, including slashing/ mowing of grassland and weeds to height of less than 100 mm.
2	Maintain 10 m wide APZ and all vacant lots in a low threat state to achieve exclusion Clause 2.2.3.2 (f) of AS 3959, including slashing/ mowing of grassland and weeds to height of less than 100 mm.
3	Maintain road reserves and verges as low threat minimal fuel condition under Clause 2.2.3.2 (f) of AS 3959, including slashing/mowing of grassland and weeds to height of less than 100 mm.
4	Comply with the relevant local government annual firebreak notice issued under s33 of the Bush Fires Act 1954, including establishment and maintenance of boundary firebreaks.
Landowner/occupier – prior to building construction and ongoing	
No.	Management action
1	Maintain vacant lots in a low threat state to achieve exclusion Clause 2.2.3.2 (f) of AS 3959, including slashing/ mowing of grassland and weeds to height of less than 100 mm, until developed to a permanent low fuel state.
2	Comply with the City of Wanneroo annual firebreak notice.
Local government – ongoing management	
No.	Management action
1	Maintain excluded areas of existing road reserves/POS in a low threat state to achieve exclusion Clause 2.2.3.2 (f) of AS 3959, including slashing/ mowing of grassland and weeds to height of less than 100 mm.

7. References

Department of Fire and Emergency Services (DFES) 2019, *Map of Bush Fire Prone Areas*, [Online], Government of Western Australia, available from: *https://maps.slip.wa.gov.au/landgate/bushfireprone/*, [27/02/2019].

Department of Planning (DoP) 2016, *Visual guide for bushfire risk assessment in Western Australia*, Department of Planning, Perth.

Standards Australia (SA) 2009, *Australian Standard AS 3959–2009 Construction of Buildings in Bushfire-prone Areas*, Standards Australia, Sydney.

Strategen Environmental (Strategen) 2016, *Fire Management Plan: Amberton Estate, Eglinton*, report prepared for Stockland Corporation Limited, December 2016.

Strategen Environmental (Strategen) 2017, *Bushfire Management Plan: Stages 8 & 9 Amberton Estate, Eglinton*, report prepared for Stockland Corporation Limited, November 2017.

Strategen Environmental (Strategen) 2018a, *Bushfire Management Plan: Portion Stages 8, 9, 39 & 40 Amberton Estate, Eglinton*, report prepared for Stockland Corporation Limited, July 2018.

Strategen Environmental (Strategen) 2018b, *Bushfire Management Plan:* Stages P3N and P4E *Amberton Estate, Eglinton*, report prepared for Stockland Corporation Limited, October 2018.

Western Australian Planning Commission (WAPC) 2015, *State Planning Policy 3.7 Planning in Bushfire Prone Areas*, Western Australian Planning Commission, Perth.

Western Australian Planning Commission (WAPC) 2017, *Guidelines for Planning in Bushfire Prone Areas*, Version 1.3 August 2017, Western Australian Planning Commission, Perth.

Appendix 1
Landscape Plan

NOTE:
This master plan is indicative only. Further design development is required to determine the exact locations of pathways, infrastructure and drainage. This drawing should be read as concept only but will inform and guide future detailed design for development approval.

SUBDIVISION ROAD ALIGNMENT
Ultimate road layout to the north is subject to a separate approval process.

LOOKOUT

REST POINT
including low wall seating, beach views.

BEACH ACCESS
1.5m wide concrete beach access is located on existing tracks. Sleeper steps as well as chain and logs will be used at steeper sections of the tracks.

NORTHERN PASSIVE RECREATION AREA
Existing degraded blowout area will provide open space and cater for 1:100yr flood storage areas.

RESTORATION OF DEGRADED AREAS
Works to involve re-contouring where required, stabilisation and revegation.

AREA OF 'VERY GOOD' VEGETATION
Areas of 'Very Good' vegetation to be retained, protected and shall be fenced with conservation style fencing to restrict access.

DUAL USE PATH
This section of DUP may require minor clearing of vegetation.

BOARDWALK ACCESS
Boardwalk access allows direct access to the beach with the least amount of disturbance to existing vegetation.

SAND PATH TO ACCESS BEACH

CLOSURE AND REVEGETATION OF TRACKS TO RE-STRICT ACCESS

DUAL USE PATH
A 3m wide DUP traverses the site, following the existing contours to meet with the proposed road levels.

EXISTING REHABILITATION AREA IDENTIFIED FOR FUTURE CAFE NODE RELOCATION

DUNE BLOWOUT TREATMENT
A range of facilities are proposed within existing degraded blowout area including sheltered active open space which accommodates 1:100 flood storage areas, play and art elements, low walls and slope to create an amphitheatre within the lower sheltered area. Passive surveillance occurs from adjacent lots, road and car park.

PLAYGROUND
Playground (including safety surface), seating, shade structures, BBQs and drink fountains located in close proximity to car parking, open space and beach access.

CAFÉ NODE
The café will be located to provide passive surveillance to the west, north and east from a strategically located highpoint. The structure will allow for future relocation if needed. The node caters for landscaped areas, beach showers, shelters, bike racks, BBQ area, low walls and playground elements. The adjacent path system allows vehicle and pedestrian access to the beach. Bollard control will restrict vehicle access to the beach and POS areas. The ultimate café structure and location will be finalised through future development approval application.

EMERGENCY VEHICLE BEACH ACCESS

LINK TO FUTURE DEVELOPMENT
SITE BOUNDARY
REGIONAL OPEN SPACE
1:100 FLOOD STORAGE
FUTURE REPLACEMENT ON-ROAD CARBAYS (15)
TWL 11.00
TWL 13.00
1:10 FLOOD STORAGE
LINK TO SHOREHAVEN
LINK TO SHOREHAVEN

LEGEND

- Usable open space.
- Irrigated native planting to earthworked slopes (max 1:6).
- Re-contouring, stabilisation and revegetation of dune areas (no irrigation)
- Dual use path located along existing tracks.
- Dual use path to be created.
- Pedestrian paths located along existing tracks.
- Composite timber decking or lookouts to minimise further damage to existing dunes.
- Conservation fence.
- 30 year coastal processes setback
- 50 year coastal processes setback
- P & R / POS — Parks and Recreation Reserve boundary.
- Existing property boundary
- Amberton Foreshore area
- Bollards
- Speed hump

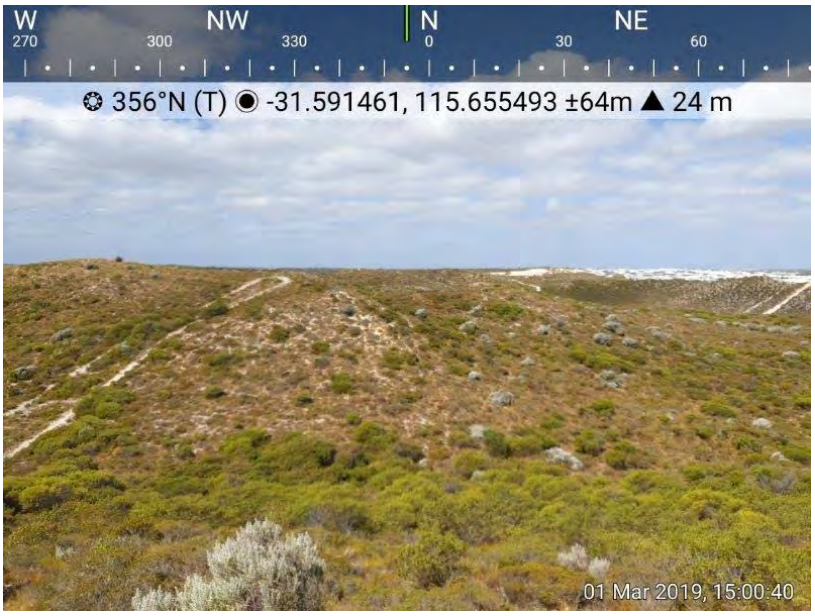
dwg • AA-16
date • MAY 2016
rev • s
scale • 1:1000 @ A1

0 10 20 30 m

AMBERTON FORESHORE MASTER PLAN REV S
FIGURE 10 -
PRELIMINARY LANDSCAPE CONCEPT WITH CAFE STAGING PLAN

emerge ASSOCIATES
Integrated Science & Design

Appendix 2
Vegetation plot photos and description



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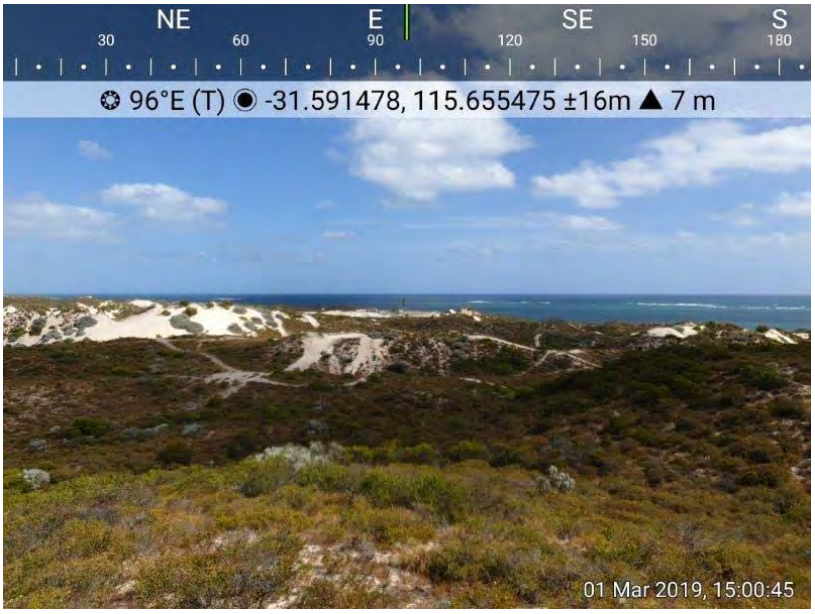


Photo ID: 2b

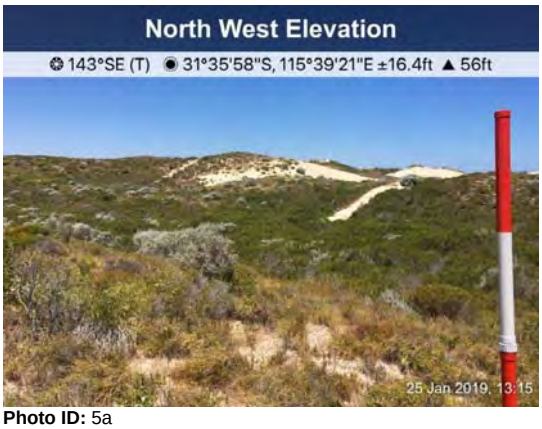
Plot number		Plot 2
Vegetation classification	**Pre-development**	Class C Shrubland
	Post-development	Class C Shrubland
Description / justification		Coastal shrub vegetation less than 2 m in height at maturity.

Photo ID: 3

Plot number		Plot 3
Vegetation classification	**Pre-development**	Class C Shrubland
	Post-development	Class C Shrubland
Description / justification		Coastal shrub vegetation less than 2 m in height at maturity.

Photo ID: 3

Plot number		Plot 4
Vegetation classification	**Pre-development**	Class C Shrubland
	Post-development	Class C Shrubland
Description / justification		Coastal shrub vegetation less than 2 m in height at maturity.



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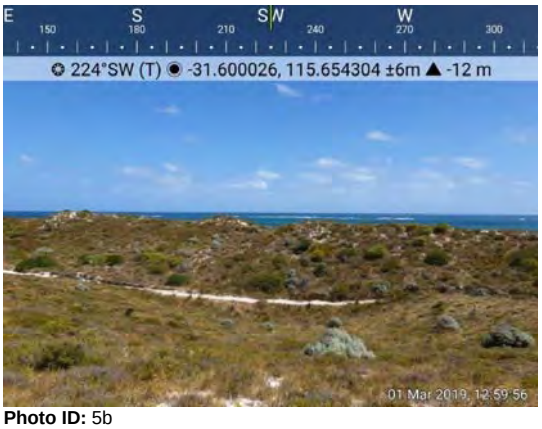


Photo ID: 5b

Photo ID: 5c

Plot number		Plot 5
Vegetation classification	**Pre-development**	Class C Shrubland
	Post-development	Class C Shrubland
Description / justification		Coastal shrub vegetation less than 2 m in height at maturity.

Photo ID: 6a

Photo ID: 6b

Photo ID: 6c

Plot number		Plot 6
Vegetation classification	**Pre-development**	Class C Shrubland
	Post-development	Class C Shrubland
Description / justification		Coastal shrub vegetation less than 2 m in height at maturity.

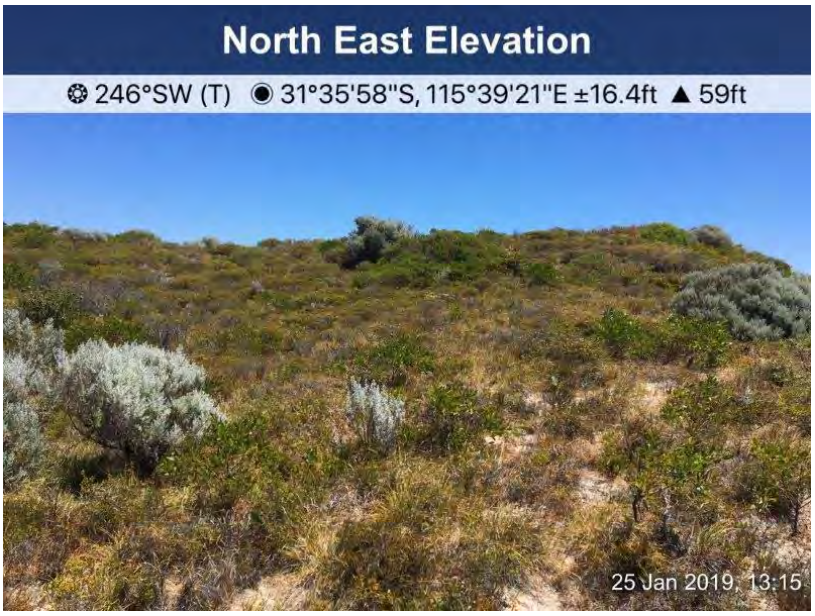


Photo ID: 8

Plot number		Plot 8
Vegetation classification	**Pre-development**	Class C Shrubland
	Post-development	Class C Shrubland
Description / justification		Coastal shrub vegetation less than 2 m in height at maturity.

Photo ID: 9a

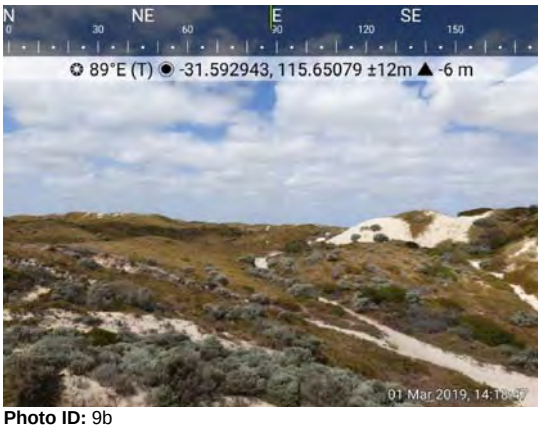


Photo ID: 9b

Photo ID: 9c

Photo ID: 9d

Plot number		Plot 9
Vegetation classification	**Pre-development**	Class C Shrubland
	Post-development	Class C Shrubland
Description / justification		Coastal shrub vegetation less than 2 m in height at maturity.

Photo ID: 11

Plot number		Plot 11
Vegetation classification	**Pre-development**	Class C Shrubland
	Post-development	Class C Shrubland
Description / justification		Coastal shrub vegetation less than 2 m in height at maturity.

Photo ID: 13

Plot number		Plot 13
Vegetation classification	**Pre-development**	Excluded – Non-vegetated & Low threat (Clauses 2.2.3.2 [e] and [f])
	Post-development	Excluded – Non-vegetated & Low threat (Clauses 2.2.3.2 [e] and [f])
Description / justification		Existing non-vegetated and low threat portions of adjacent stages of Amberton Estate.

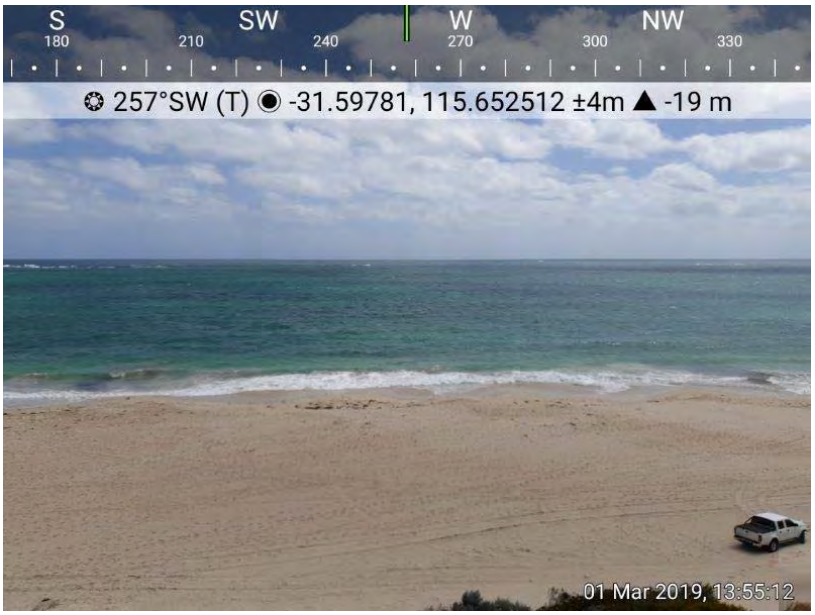


Photo ID: 17

Plot number		Plot 17
Vegetation classification	**Pre-development**	Excluded – Non-vegetated (Clause 2.2.3.2 [e])
	Post-development	Excluded – Non-vegetated (Clause 2.2.3.2 [e])
Description / justification		Indian ocean and adjacent non-vegetated beach.

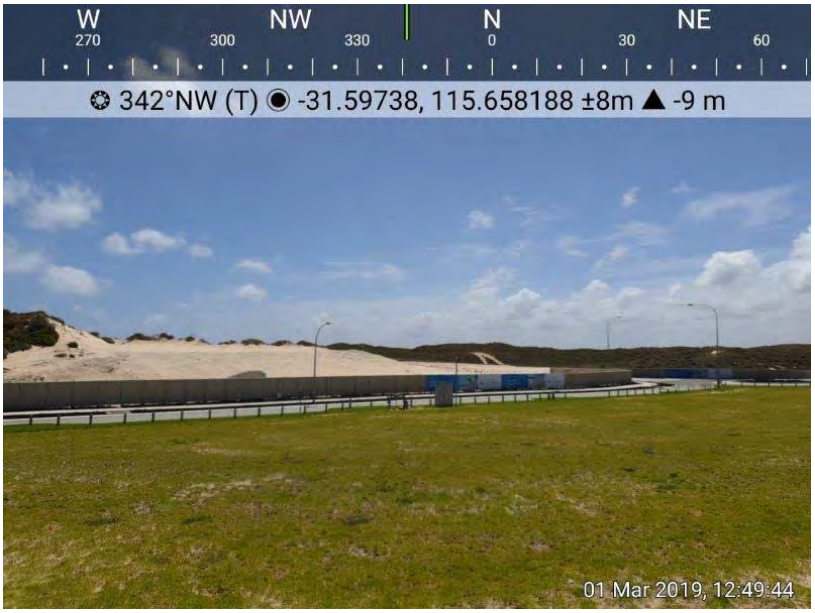


Photo ID: 18

Plot number		Plot 18
Vegetation classification	**Pre-development**	Excluded – Non-vegetated & Low threat (Clauses 2.2.3.2 [e] and [f])
	Post-development	Excluded – Non-vegetated & Low threat (Clauses 2.2.3.2 [e] and [f])
Description / justification		Existing non-vegetated and low threat portions of adjacent stages of Amberton Estate.

Photo ID: 19

Plot number		Plot 19
Vegetation classification	**Pre-development**	Excluded – Non-vegetated & Low threat (Clauses 2.2.3.2 [e] and [f])
	Post-development	Excluded – Non-vegetated & Low threat (Clauses 2.2.3.2 [e] and [f])
Description / justification		Existing non-vegetated portion of the project area.

Photo ID: 20a

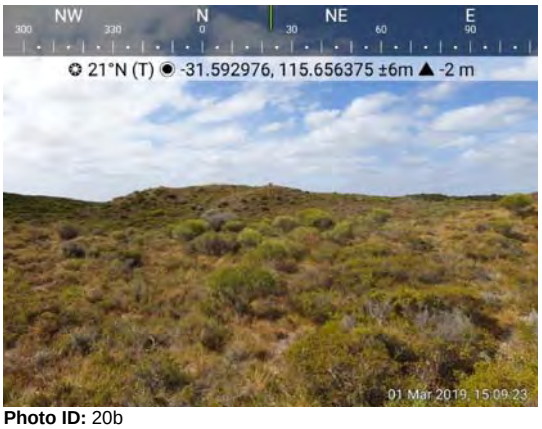


Photo ID: 20b

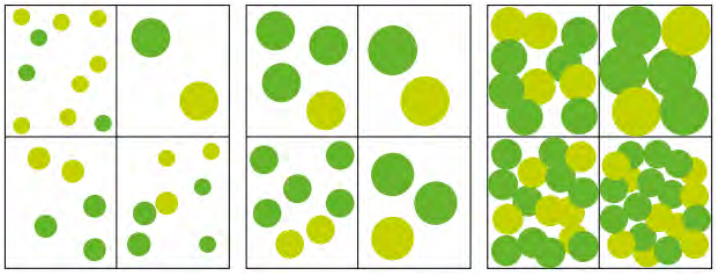
Photo ID: 20c

Plot number		Plot 20
Vegetation classification	**Pre-development**	Excluded – Non-vegetated & Low threat (Clauses 2.2.3.2 [e] and [f])
	Post-development	Excluded – Non-vegetated & Low threat (Clauses 2.2.3.2 [e] and [f])
Description / justification		Vegetated areas within the project area and staging buffer that will be modified to a low threat state as part of development works.

Appendix 3
APZ standards (Schedule 1; the Guidelines, WAPC 2017)

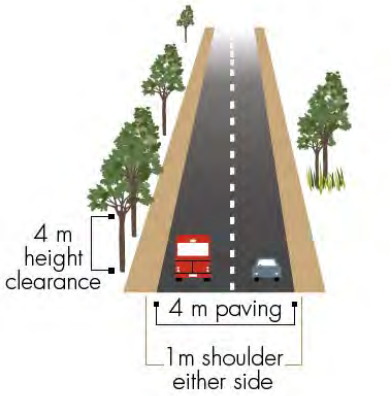
Schedule 1: Standards for Asset Protection Zones

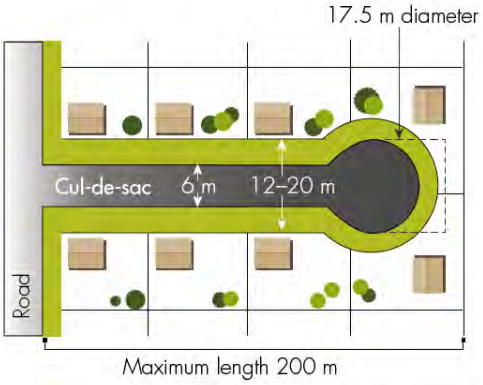
- **Fences:** within the APZ are constructed from non-combustible materials (e.g. iron, brick, limestone, metal post and wire). It is recommended that solid or slatted non-combustible perimeter fences are used.
- **Objects:** within 10 metres of a building, combustible objects must not be located close to the vulnerable parts of the building i.e. windows and doors.
- **Fine Fuel load:** combustible dead vegetation matter less than 6 millimetres in thickness reduced to and maintained at an average of two tonnes per hectare.
- **Trees (> 5 metres in height):** trunks at maturity should be a minimum distance of 6 metres from all elevations of the building, branches at maturity should not touch or overhang the building, lower branches should be removed to a height of 2 metres above the ground and or surface vegetation, canopy cover should be less than 15% with tree canopies at maturity well spread to at least 5 metres apart as to not form a continuous canopy.



- **Shrubs (0.5 metres to 5 metres in height):** should not be located under trees or within 3 metres of buildings, should not be planted in clumps greater than 5m^2 in area, clumps of shrubs should be separated from each other and any exposed window or door by at least 10 metres. Shrubs greater than 5 metres in height are to be treated as trees.
- **Ground covers (<0.5 metres in height):** can be planted under trees but must be properly maintained to remove dead plant material and any parts within 2 metres of a structure, but 3 metres from windows or doors if greater than 100 millimetres in height. Ground covers greater than 0.5 metres in height are to be treated as shrubs.
- **Grass:** should be managed to maintain a height of 100 millimetres or less.

Appendix 4
Vehicular access technical standards
(the Guidelines, WAPC 2017)

Public roads	
Acceptable solution A3.2	A public road is to meet the requirements in Table 1, Column 1.
Explanatory note E3.2	Trafficable surface: Widths quoted for access routes refer to the width of the trafficable surface. A six metre trafficable surface does not necessarily mean paving width. It could, for example, include four metre wide paving one metre wide constructed road shoulders. In special circumstances, where eight lots or less are being serviced, a public road with a minimum trafficable surface of four metres for a maximum distance of 90 metres may be provided subject to the approval of both the local government and Department of Fire and Emergency Services. Public road design: All roads should allow for two-way traffic to allow conventional two-wheel drive vehicles and fire appliances to travel safely on them. 

Cul-de-sac (including a dead-end road)	
Acceptable solution A3.3	A cul-de-sac and/ or a dead end road should be avoided in bushfire prone areas. Where no alternative exists (i.e. the lot layout already exists and/ or will need to be demonstrated by the proponent), the following requirements are to be achieved: • Requirements in Table 1, Column 2 • Maximum length: 200 metres (if public emergency access is provided between cul-de-sac heads maximum length can be increased to 600 metres provided no more than eight lots are serviced and the emergency access way is no more than 600 metres) • Turn-around area requirements, including a minimum 17.5 metre diameter head.
Explanatory note E3.3	In bushfire prone areas, a cul-de-sac subdivision layout is not favoured because they do not provide access in different directions for residents. In some instances it may be possible to provide an emergency access way between cul-de-sac heads to a maximum distance of 600 metres, so as to achieve two-way access. Such links must be provided as right of ways or public access easements in gross to ensure accessibility to the public and fire services during an emergency. A cul-de-sac in a bushfire prone area is to connect to a public road that allows for travel in two directions in order to address Acceptable Solution A3.1. 

Emergency access way	
Acceptable solution A3.6	An access way that does not provide through access to a public road is to be avoided in bushfire prone areas. Where no alternative exists (this will need to be demonstrated by the proponent), an emergency access way is to be provided as an alternative link to a public road during emergencies. An emergency access way is to meet all of the following requirements: • Requirements in Table 1, Column 4 • No further than 600 metres from a public road • Provided as right of way or public access easement in gross to ensure accessibility to the public and fire services during an emergency • Must be signposted.
Explanatory note E3.6	An emergency access way is not a preferred option however may be used to link up with roads to allow alternative access and egress during emergencies where traffic flow designs do not allow for two-way access. Such access should be provided as a right-of-way or easement in gross to ensure accessibility to the public and fire emergency services during an emergency. The access should comply with minimum standards for a public road and should be signposted. Where gates are used to control traffic flow during non-emergency periods, these must not be locked. Emergency access ways are to be no longer than 600 metres and must be adequately signposted where they adjoin public roads. Where an emergency access way is constructed on private land, a right of way or easement in gross is to be established. 

Table 1: Vehicular access technical requirements

Technical requirement	1	2	3	4	5
	Public road	Cul-de-sac	Private driveway longer than 50 m	Emergency access way	Fire service access routes
Minimum trafficable surface (m)	6*	6	4	6*	6*
Horizontal distance (m)	6	6	6	6	6
Vertical clearance (m)	4.5	N/A	4.5	4.5	4.5
Maximum grade <50 m	1 in 10	1 in 10	1 in 10	1 in 10	1 in 10
Minimum weight capacity (t)	15	15			
Maximum crossfall	1 in 33	1 in 33	1 in 33	1 in 33	1 in 33
Curves minimum inner radius	8.5	8.5	8.5	8.5	8.5

* Refer to E3.2 Public roads: Trafficable surface

Appendix 5
Water technical standards (the Guidelines, WAPC 2017)

Reticulated areas	
Acceptable solution A4.1	The subdivision, development or land use is provided with a reticulated water supply in accordance with the specifications of the relevant water supply authority and Department of Fire and Emergency Services.
Explanatory note E4.1	Water supply authorities in Western Australia include the Water Corporation, Aqwest and the Busselton Water Board. The Water Corporation's 'No. 63 Water Reticulation Standard' is deemed to be the baseline criterion for developments and should be applied unless local water supply authorities' conditions apply.

Appendix 6
City of Wanneroo Firebreak Notice
(2018/2019)

FIRE BREAKS / FUEL HAZARD REDUCTION / FIRE BREAK EXAMPLES

City of Wanneroo

Under the Bushfires Act (1954), all owners and occupiers of land in Western Australia must establish and maintain fire breaks.

Fire breaks and protection measures are vital in assisting the prevention of fires spreading and to allow safer access for bushfire fighters and vehicles.

Land with an area of less than 4,000m²

- A fire break, not less than three (3) metres wide must be cleared immediately inside (or as close as possible) around all external boundaries of the land.
- All tree branches that over-hang a fire break must be trimmed back to a minimum height of three and a half (3.5) metres above ground level and the growth on the fire break cannot exceed fifty (50) millimetres high.

Land with an area of 4,000m² or more

- A fire break, not less than three (3) metres wide, must be cleared immediately inside (or as close as possible) around all external boundaries of the land.
- All tree branches that over-hang a fire break must be trimmed back to a minimum height of three and a half (3.5) metres above ground level and the growth on the fire break cannot exceed fifty (50) millimetres high.

Buildings

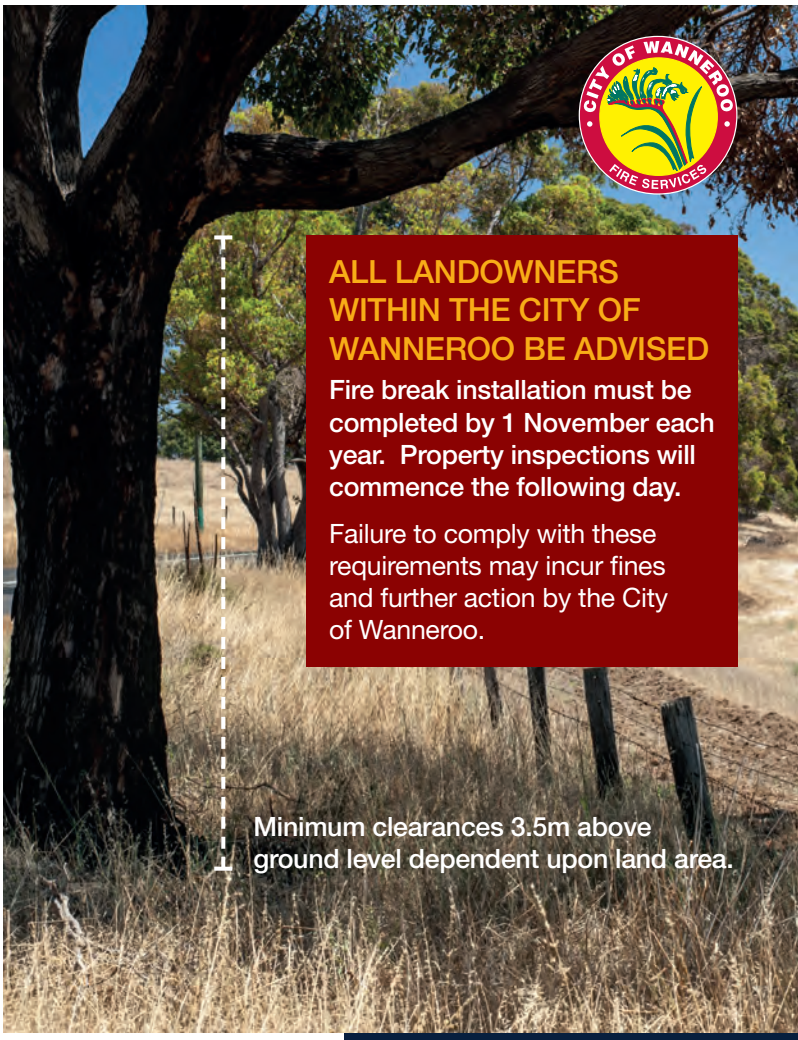
- Install and maintain a twenty (20) metre building protection zone surrounding all buildings, large hay stacks and fuel storage areas. A building protection zone includes undertaking measures such as pruning all lower tree branches to prevent fire entering the trees, ensuring three (3) metre spacing between tree canopies to prevent treetop fires spreading between trees, keeping all grasses to a height of not more than fifty (50) millimetres and storing all firewood piles more than twenty (20) metres away from the buildings.

APPLICATION TO VARY THE ABOVE REQUIREMENTS

If it is considered impracticable for any reason to implement any of the requirements of this Notice, application may be made not later than the 18th of October annually to the Council or its authorised officer for permission to provide alternative fire protection measures. If permission is not granted the requirements of this Notice must be complied with.

ADDITIONAL WORKS

In addition to the requirements of this Notice, you may be required to carry out further works which are considered necessary by an Authorised Officer and specified by way of a separate written notice forwarded to the address of the owner/s as shown on the City of Wanneroo rates record for the relevant land.




Non-compliant: no fire break installed inside boundary fence


Compliant: grass slashed to ground level


Non-compliant: mineral earth fire break showing grass/weed regrowth


Compliant: mineral earth fire break


Non-compliant: thick scrub creates a fire hazard around power poles


Compliant: cleared buffer zone around power poles