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Bushfire Management Plan

Brighton Business Park North

Prepared for
Satterley Property Group
by Strategen

February 2019



Bushfire Management Plan

Brighton Business Park North

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February 2019

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Client: Satterley Property Group

Report Version	Revision No.	Purpose	Strategen author/reviewer	Submitted to Client	
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Final Report	Rev 1	Issue for approval	Z Cockerill (BPAD37803) / L Wears (BPAD19809)	Electronic (email)	04/02/2019

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1. Introduction

Satterley Property Group (Satterley) is proposing to lodge a subdivision application to facilitate commercial development within Brighton Business Park North, located in Butler in the City of Wanneroo. The original Bushfire Management Plan (BMP) previously proposed two options for the proposed subdivision pending the outcome of a land sales agreement with Main Roads WA (MRWA). This amended BMP will focus on a single scenario given the successful purchase of adjacent land from MRWA.

The subdivision encompasses Lot 715 Amesbury Loop, Lot 9332 Landbeach Boulevard and a small portion of the adjacent east Lot 29 (currently owned by MRWA), as depicted in Figure 1, and will result in creation of 26 lots.

The subdivision area, hereon referred to as the project area, is predominantly designated as bushfire prone on the WA Map of Bush Fire Prone Areas (DFES 2018) and consequently, a Bushfire Management Plan (BMP) is required to support subdivision application in accordance with 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).

1.1 Purpose and application of the plan

The purpose of the BMP is to provide guidance on how to plan for and manage the potential bushfire risk to future assets of the project areas through implementation of a range of bushfire risk mitigation measures. The BMP outlines how future on-site assets can be protected during the summer months when the threat from bushfire is at its peak. This is particularly relevant when existing fire appliances in the area may be unable to offer an immediate emergency suppression response; therefore, development planning and design should aim to provide mitigation strategies that protect future life and property from bushfire as a priority.

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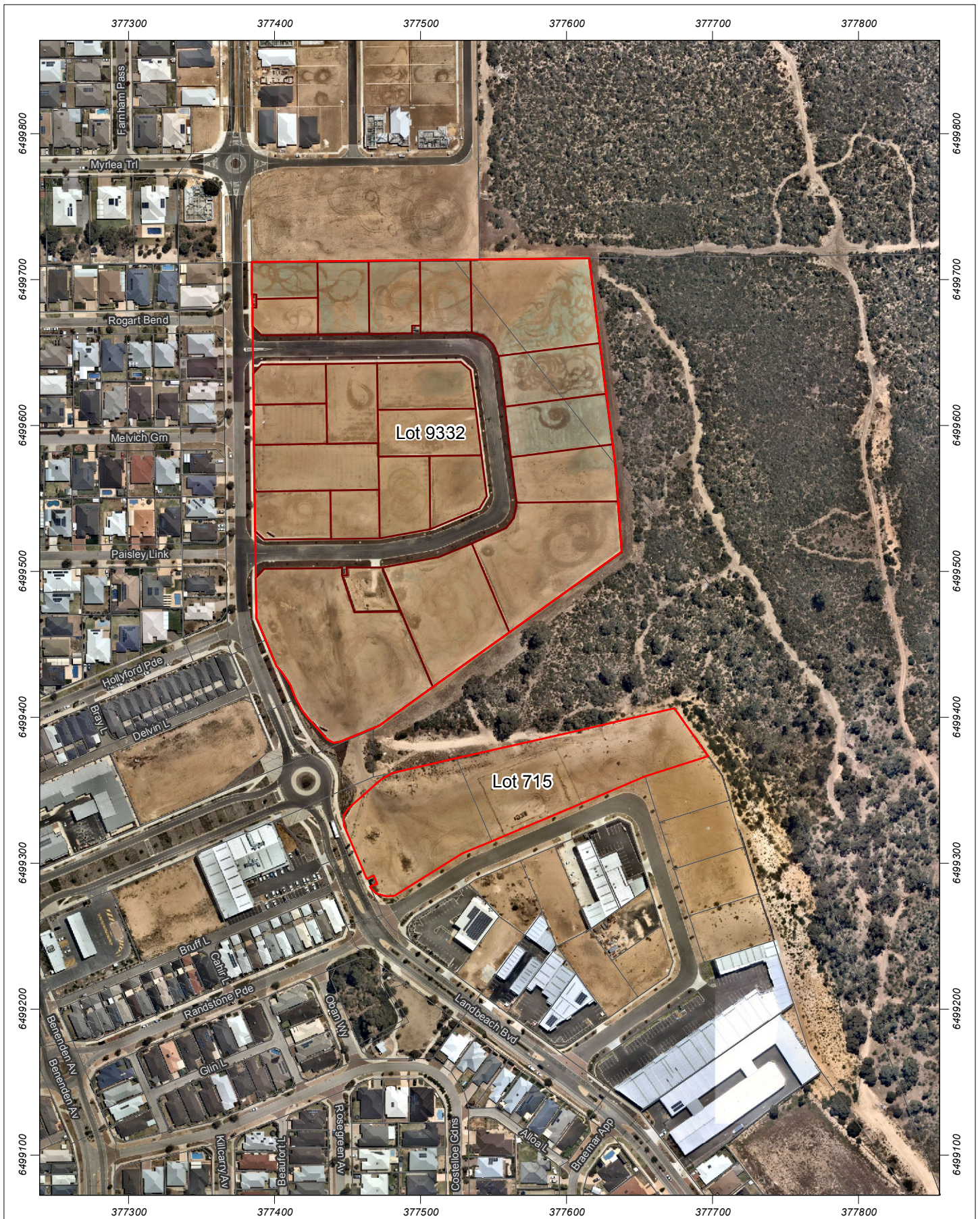
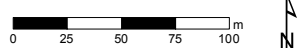


Figure 1: Site Plan

Scale 1:3,500 at A4



Coordinate System: GDA 1994 MGA Zone 50
 Note that positional errors may occur in some areas
 Date: 12/12/2018

Author: JCrute

Source: Aerial image: Nearmap, flown 10/2018. Subdivision plan: Client 8/2018.

Legend

- Project area
- Proposed lots
- Cadastre



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2. Spatial consideration of bushfire threat

2.1 Existing site characteristics

2.1.1 Location

The project area comprises Lot 715 Amesbury Loop (Lot 715), Lot 9332 Landbeach Boulevard (Lot 9322) and a small portion of Lot 29 (purchased from MRWA), Butler in the City of Wanneroo, which is located approximately 38 km north-northwest of the Perth Central Business District.

The project areas are bound by the following, as depicted in Figure 1 :

- cleared land for proposed development to the north
- a combination of bushland and cleared land for proposed development to the south
- bushland and Neerabup National Park to the east
- high density urban residential development to the west.

2.1.2 Zoning and land use

The project areas are zoned 'Urban Development' under the City of Wanneroo District Planning Scheme No. 2 (DPS 2) and 'Urban' under the Metropolitan Region Scheme (MRS). Land surrounding the project areas is zoned as follows:

- 'Urban Development' under DPS 2 and 'Urban' under the MRS to the north, west and south
- 'Parks and Recreation', 'Primary Regional Roads' and 'Urban' to the east and in between Lots 715 and 9332.

The project area is currently undeveloped and predominantly cleared. A small portion of remnant bushland is currently retained between Lot 9332 and Lot 715, and a narrow strip of newly planted revegetation abuts the eastern boundary of Lot 715. Lot 29 to the east is predominantly vegetated; however, this area forms part of the Mitchell Freeway extension and will ultimately be cleared.

2.1.3 Assets

There are no life or property assets currently present throughout the project areas; however, proposed development will significantly increase the critical life and property assets by intensifying the number of inhabitants, visitors and built assets across the land.

There are no significant environmental values contained within Lots 715 and 9332 as a result of previous land use. Environmental assets are contained within Lot 29 to the east in the form of native vegetation.

2.1.4 Access

The key source of vehicular access to the project areas is via Landbeach Boulevard and Butler Boulevard to the west. Lot 715 is also accessible from the south via Amesbury Loop.

2.1.5 Water and power supply

Water and power supply services are available to the site through extension from adjacent developed land. This will result in provision of a reticulated water supply and underground power supply.

2.2 Existing fire environment

2.2.1 Vegetation class

Strategen undertook an assessment of the vegetation within the project areas and adjacent 100 m of land on 9 August 2018 in accordance with the *Visual guide for bushfire risk assessment in Western Australia* (DoP 2016) and *Australian Standard AS 3959–2009 Construction of Buildings in Bushfire-prone Areas* (AS 3959; SA 2009). Georeferenced site photographs have also been provided to validate site assessment observations (see Appendix 1).

2.2.2 Effective slope

Topography of the project areas and surrounds constitutes gently sloping land, decreasing in elevation from west to east. On-site elevation ranges from approximately 45 mAHD (Australian Height Datum) at the highest point to 27 mAHD at the lowest point in the southeast of Lot 715. Therefore, effective slope under classified vegetation has been assessed as >0–5 degrees down-slope.

2.2.3 Summary of inputs

Figure 2 illustrates the anticipated post-development vegetation classifications and exclusions following completion of subdivision works and creation of 3 m wide firebreaks along the bushland interface. The post-development vegetation classifications/exclusions and effective slope are summarised in Table 1.

Table 1: Summary of post-development vegetation classifications, exclusions and effective slope

Vegetation plot	Vegetation classification	Effective slope	Comments
1	Class B Woodland	Downslope >0–5°	Measured downslope of 1°
2	Class B Woodland	Downslope >0–5°	
3	Class C Shrubland	Downslope >0–5°	
4	Class D Scrub	Downslope >0–5°	
5	Class G Grassland	Flat/upslope (0°)	Currently a combination of patchy grass and non-vegetated. Assumed to be grassland at maturity
6	Class B Woodland	Downslope >0–5°	
7	Class B Woodland	Flat/upslope (0°)	
8	Class C Shrubland	Flat/upslope (0°)	
9	Class D Scrub	Downslope >15–20°	Revegetation on batter
10	Excluded – Non-vegetated & Low threat (Clauses 2.2.3.2 [e] and [f])	N/A	Existing development and cleared land outside project area
11	Excluded – Non-vegetated & Low threat (Clauses 2.2.3.2 [e] and [f])	N/A	Existing cleared land within Lot 9332 which will remain non-vegetated or low threat condition following development
12	Excluded – Non-vegetated & Low threat (Clauses 2.2.3.2 [e] and [f])	N/A	Existing cleared land within Lot 715 which will remain non-vegetated or low threat condition following development

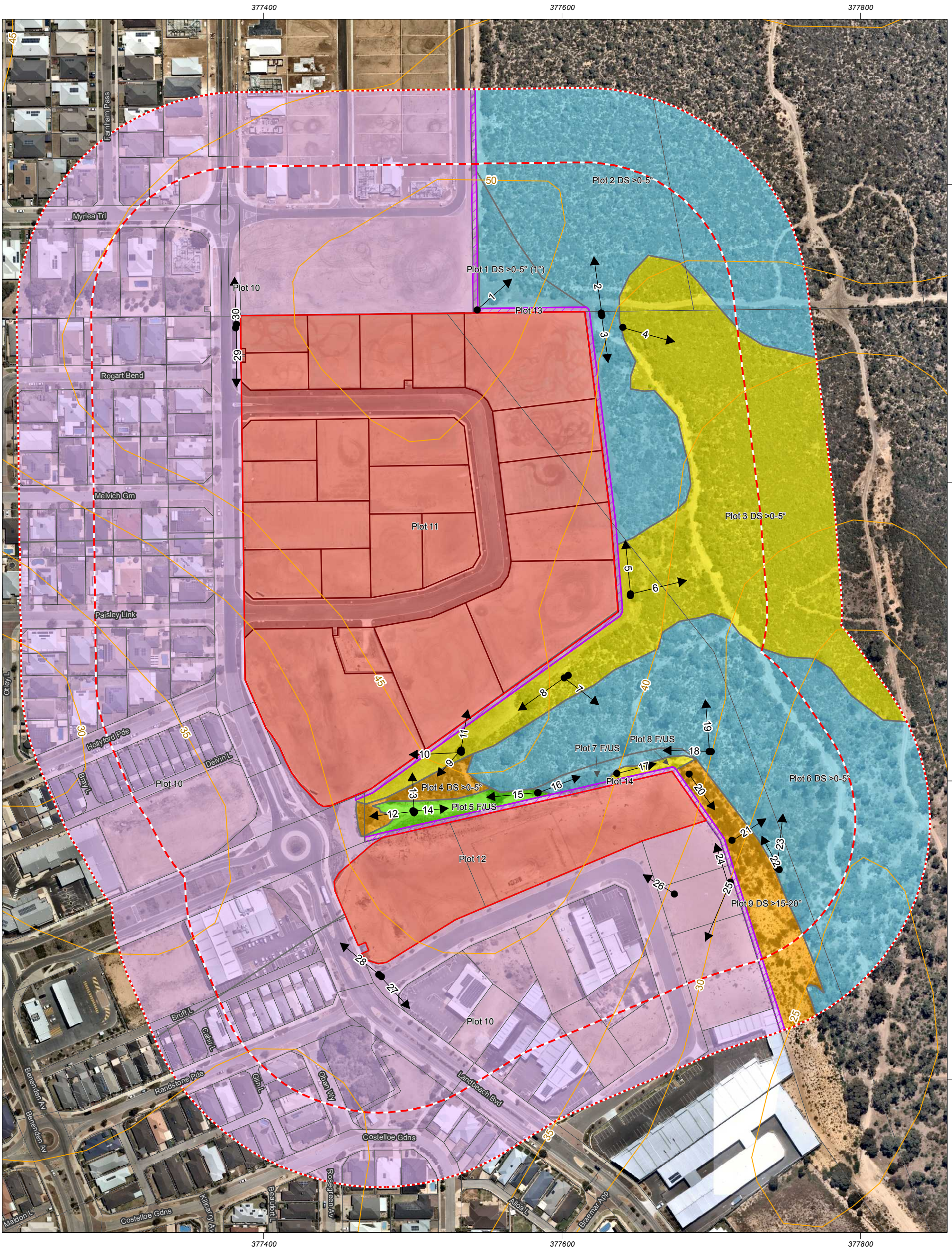


Figure 2: Vegetation Classification and Effective Slope (Post-Development)

<p>Scale 1:2,400 at A3</p> <p>Coordinate System: GDA 1994 MGA Zone 50</p> <p>Date: 31/01/2019</p>	<p>Legend</p> <ul style="list-style-type: none"> Photo point and direction Surface elevation (mAHD) 150m assessment area 100m assessment area Proposed lots Cadastre 3m wide firebreak 	<p>Vegetation class</p> <ul style="list-style-type: none"> Class B Woodland Class C Shrubland Class D Scrub Class G Grassland To be modified to low threat state Excluded under Clause 2.2.3.2. (e) and (f) 	<p>F/US: Flat/Upslope DS: Downslope</p>	

2.3 Bushfire Attack Level (BAL) contour assessment

Strategen has undertaken a BAL contour assessment adopting Method 1 in accordance with AS 3959 for proposed development situated within 100 m of classified vegetation. The BAL contours determined are based on post-development conditions in line with the proposed subdivision, as depicted in Figure 3.

The Method 1 procedure for calculating the BAL (as outlined in AS 3959) incorporates the following factors:

- state-adopted FDI 80 rating
- vegetation class
- 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 class and effective slope observed at the time of inspection as well as consideration of the proposed on-site clearing extent and resultant vegetation exclusions
- implementation and maintenance of a 3 m wide firebreak along the eastern boundary in accordance with the firebreak notice and MRWA policy.

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 2 and illustrated in Figure 3. The highest BAL applicable to the external boundary of the proposed lots is BAL-FZ. Through the implementation of the APZ, the highest modified BAL applicable to the proposed development within lots is BAL-29.

Table 2: BAL contour assessment results

Method 1 BAL determination						
Plot	Vegetation classification	Effective slope	Separation distance (to lot boundary)	Highest BAL (to lot boundary)	Separation distance (to proposed development)	Modified BAL (with APZ setback)
1	Class B Woodland	Downslope >0–5°	3 m	BAL-FZ	17 m	BAL-29
2	Class B Woodland	Downslope >0–5°	3 m	BAL-FZ	17 m	BAL-29
3	Class C Shrubland	Downslope >0–5°	3 m	BAL-FZ	10 m	BAL-29
4	Class D Scrub	Downslope >0–5°	4 m	BAL-FZ	15 m	BAL-29
5	Class G Grassland	Flat/upslope (0°)	3 m	BAL-FZ	8 m	BAL-29
6	Class B Woodland	Downslope >0–5°	9.5 m	BAL-FZ	17 m	BAL-29
7	Class B Woodland	Flat/upslope (0°)	3 m	BAL-FZ	14 m	BAL-29
8	Class C Shrubland	Flat/upslope (0°)	3 m	BAL-FZ	9 m	BAL-29
9	Class D Scrub	Downslope >15–20°	3 m	BAL-FZ	21 m	BAL-29

Method 1 BAL determination						
Plot	Vegetation classification	Effective slope	Separation distance (to lot boundary)	Highest BAL (to lot boundary)	Separation distance (to proposed development)	Modified BAL (with APZ setback)
10	Excluded – Non-vegetated & Low threat (Clauses 2.2.3.2 [e] and [f])	N/A	N/A	N/A	N/A	N/A
11	Excluded – Non-vegetated & Low threat (Clauses 2.2.3.2 [e] and [f])	N/A	N/A	N/A	N/A	N/A
12	Excluded – Non-vegetated & Low threat (Clauses 2.2.3.2 [e] and [f])	N/A	N/A	N/A	N/A	N/A

3. Identification of bushfire hazard issues

3.1 Potential bushfire scenarios

Potential fire runs through vegetation adjacent to the project areas are long (approximately 11.5 km of continuous vegetation) and are associated with Neerabup National Park, which extends in a north-south orientation adjacent to the eastern boundary of the site.

Based on the above, a bushfire has the potential to ignite and occur in and around the project areas, particularly in the northeast and southeast. Should a bushfire occur in and around the project areas, the long bushfire runs may facilitate significantly elevated levels of radiant heat and ember attack as a result of the bushfire potentially reaching full rate of spread and fire escalation.

Bushfire impacts are most likely to be received from the east and southeast in the morning in association with the predominant prevailing winds from the east during the bushfire season.

3.2 Bushfire hazard issues

The BAL contours identified in Figure 3 demonstrate that, with the exception of 10 lots adjacent to vegetation along the eastern interface, all proposed lots are located within areas of BAL-29 or lower. The 10 lots impacted by small areas of BAL-40 and BAL-FZ are developable to BAL-29 or lower, with capacity within the lots for provision of the APZ setbacks required to achieve this rating.

Section 6.6.2 of SPP 3.7 states that subdivision and development applications in areas of BAL 40 or BAL FZ will not be supported without extraordinary planning approval. Therefore, all proposed lots must be able to accommodate future buildings outside of areas subject to BAL FZ or BAL 40 to avoid applying for extraordinary planning approval (i.e. proposal for unavoidable or minor development).

On this basis, all areas of habitable development areas can achieve minimum separation distances through provision of Asset Protection Zones (APZs) at all interfaces where proposed buildings abut post-development classified vegetation. The required APZs comprise of one or a combination of firebreaks and building setbacks, where private driveways, carparking or managed onsite landscaping will be used within the APZ.

The bushfire risks to proposed development posed by post development hazards can be managed through standard application of acceptable solutions under the Guidelines, including provision for and implementation of APZs around habitable buildings, provision of adequate emergency water supply and vehicular access, as well as through a direct bushfire suppression response if required.

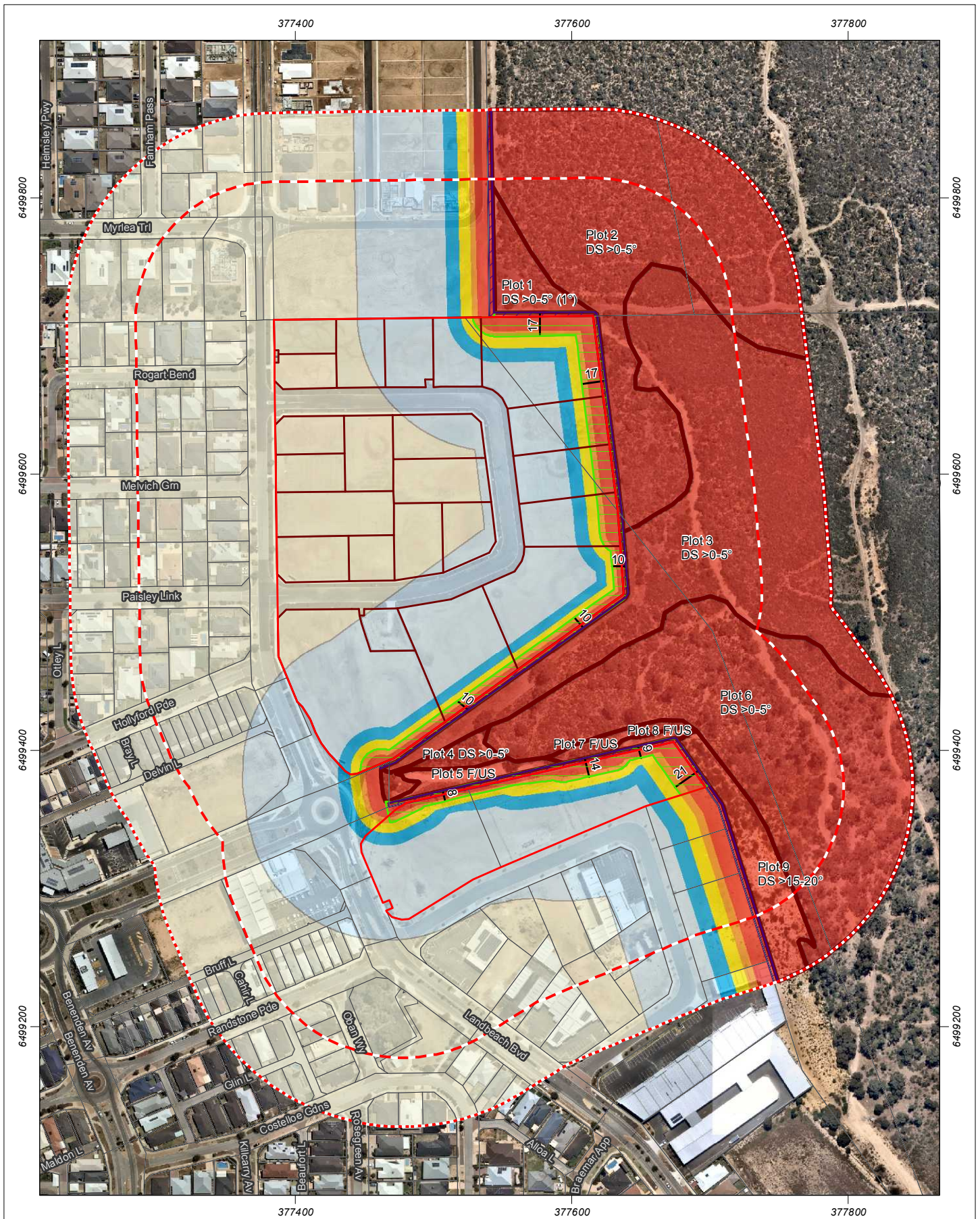
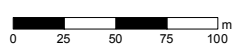


Figure 3: BAL Contour Map

Scale 1:3,700 at A4



Coordinate System: GDA 1994 MGA Zone 50
 Note that positional errors may occur in some areas
 Date: 31/01/2019
 Author: jcrute

Source: Aerial image: Nearmap, flown 06/2018. Subdivision plan: Client 8/2018.

Legend

- | | | | | | | | | | | | | | | |
|--------------|----------------------|----------------------|---------------|----------|-------------------|-----|--------------|-----------------------|--------|--------|----------|--------|--------|---------|
| Project area | 100m assessment area | 150m assessment area | Proposed lots | Cadastre | 3m wide firebreak | APZ | Distance (m) | Classified vegetation | BAL 29 | BAL 19 | BAL 12.5 | BAL 40 | BAL FZ | BAL Low |
|--------------|----------------------|----------------------|---------------|----------|-------------------|-----|--------------|-----------------------|--------|--------|----------|--------|--------|---------|



4. Bushfire management measures

Strategen has identified a range of bushfire management measures that on implementation will enable all proposed lots to be developed whilst maintaining a manageable level of bushfire risk and compliance with the Guidelines. The bushfire management measures are discussed in the following subsections.

4.1 Asset Protection Zones (APZs) and fuel management

Strategen has designated areas of separation between classified vegetation and proposed buildings in the form of an APZ. The width of the APZ has been determined on the basis of avoiding development in areas of BAL-40 and BAL-FZ. Therefore, a variable width APZ (8 - 21 m wide) will be maintained between all proposed buildings and classified vegetation and this will be in the form of building setbacks and adjacent cleared firebreaks.

APZs are low fuel areas where buildings are prohibited and are required to be maintained on a regular and ongoing basis in accordance with the technical specifications outlined in the Guidelines (see Appendix 2) including having a fine fuel load less than 2 t/ha to achieve a low threat minimal fuel condition status all year round.

Overstorey trees can be retained to some extent within the APZ provided all flammable material including understorey grasses, weeds, shrubs and scrub are removed from the fuel profile, essentially creating a managed parkland cleared landscape, which would result in a diminishing level of radiant heat, ember attack and fire rate of spread at the building interface.

4.2 Increased building construction standards

Proposed development will be situated in areas of BAL 29 or lower following implementation of a variable width APZ at the bushland interface. The commercial and industrial buildings proposed within the project are likely to be classified as Class 5, 6, 7 or 8 under the National Construction Code and therefore the bushfire construction provisions of AS 3959 as per the assessed BALs will not apply to proposed buildings. In these instances, the applicant has the discretion to utilise any or all of the elements of AS 3959 in the construction of the building that they deem appropriate.

It is noted that should any Class 1a, Class 1b, Class 2, Class 3 residential buildings and associated Class 10a structures be proposed within the project area and also be subject to BAL—12.5 or higher, they will be required to comply with the bushfire specific construction requirements of AS 3959.

4.3 Vehicular access

The proposed vehicular access network will ensure no dead ends or cul-de-sacs are created and at least two different vehicle access routes are provided, these being via linkage with Landbeach Boulevard and Butler Boulevard to the west and Amesbury Loop to the south.

All public roads created as part of the subdivision will comply with technical requirements of the Guidelines, as outlined in Table 3.

Table 3: Vehicular access technical requirements

Technical requirement	Public roads
Minimum trafficable surface (m)	6*
Horizontal distance (m)	6
Vertical clearance (m)	4.5
Maximum grade <50 m	1 in 10
Minimum weight capacity (t)	15
Maximum crossfall	1 in 33

Technical requirement	Public roads
Curves minimum inner radius	8.5

* Refer to E3.2 Public roads: Trafficable surface

Source: WAPC 2017

4.4 Reticulated water supply

All proposed lots will be provided a reticulated water supply through extension of existing services from adjacent development areas. The reticulated system will ensure an all year round supply of water is provided for each lot to meet minimum potable and emergency water supply requirements.

A network of hydrants will also be provided along the internal road network at locations which meet relevant water supply authority and DFES requirements, in particular the Water Corporation Design Standard DS 63 'Water Reticulation Standard Design and Construction Requirements for Water Reticulation Systems up to DN250'. This standard will guide construction of the internal reticulated water supply system and fire hydrant network, including spacing and positioning of fire hydrants so that the maximum distance between a hydrant and the rear of a building envelope (or in the absence of a building envelope, the rear of the lot) shall be 120 m and the hydrants shall be no more than 200 m apart.

4.5 Additional measures

Strategen makes the following additional recommendations to inform ongoing stages of development:

1. Notification on Title: notification is to be placed on the Title of all proposed lots located within a designated bushfire prone area as a condition of subdivision to ensure all landowners/proponents and prospective purchasers are aware that a BMP has been prepared over the site.
2. Compliance with the City of Wanneroo annual firebreak notice: the developer/land manager and prospective land purchasers are to comply with the current City of Wanneroo annual firebreak notice (Appendix 3).
3. BMP addendum or individual lot BAL assessment: an addendum to this BMP or individual lot BAL assessment may be prepared at the discretion of the decision-making authority to support future planning or building stages in response to any significant changes in development design (i.e. lot layout), post development extent of vegetation class or bushfire management approach.

5. Proposal compliance and justification

The following information has been referenced from SPP 3.7 to demonstrate that the proposed development is compliant with the requirements of SPP 3.7 and associated guidelines.

The proposed Brighton Business Park North Development is required to comply with SPP 3.7 and the Guidelines, as required under the following policy measures:

6.2 Strategic planning proposals, subdivision and development applications

a) Strategic planning proposals, subdivision and development applications within designated bushfire prone areas relating to land that has or will have a Bushfire Hazard Level (BHL) above low and/or where a Bushfire Attack Level (BAL) rating above BAL-LOW apply, are to comply with these policy measures.

b) Any strategic planning proposal, subdivision or development application in an area to which policy measure 6.2 a) applies, that has or will, on completion, have a moderate BHL and/or where BAL-12.5 to BAL-29 applies, may be considered for approval where it can be undertaken in accordance with policy measures 6.3, 6.4 or 6.5.

c) This policy also applies where an area is not yet designated as a bushfire prone area but is proposed to be developed in a way that introduces a bushfire hazard, as outlined in the Guidelines.

6.4 Information to accompany subdivision applications

Any subdivision application to which policy measure 6.2 applies is to be accompanied by the following information in accordance with the Guidelines:

a) a BAL Contour Map to determine the indicative acceptable BAL ratings across the subject site, in accordance with the Guidelines. BAL Contour Maps should be prepared by an accredited Bushfire Planning Practitioner;

b) the identification of any bushfire hazard issues arising from the BAL Contour Map; and

c) an assessment against the bushfire protection criteria requirements contained within the Guidelines demonstrating compliance within the boundary of the subdivision site.

Implementation of this BMP is expected to meet the following objectives of SPP 3.7:

- 5.1: Avoid increasing the threat of bushfire to people, property and infrastructure. The preservation of life and the management of bushfire impact is paramount
- 5.2: Reduce vulnerability to bushfire through the identification and assessment of bushfire hazards in decision-making at all stages of the planning and development process
- 5.3: Ensure that planning proposals and development applications take into account bushfire protection requirements and include specified bushfire protection measures where land has or will have a moderate or extreme bushfire hazard level, and/ or where a rating higher than BAL-Low applies
- 5.4: Achieve a responsible approach between bushfire management measures and landscape amenity and biodiversity conservation values, with consideration of the potential impacts of climate change.

In response to the above requirements of SPP 3.7 and the Guidelines, bushfire management measures, as outlined in Section 4 have been devised for the proposed development accordance with Guideline acceptable solutions where possible to meet compliance with bushfire protection criteria. An 'acceptable solutions' assessment' is provided in Table 4 to assess the proposed bushfire management measures against each bushfire protection criteria in accordance with the Guidelines and demonstrate that the measures proposed meet the intent of each element of the bushfire protection criteria.

Table 4: Acceptable solutions assessment against bushfire protection criteria

Bushfire protection criteria	Method of compliance	Proposed bushfire management strategies
	Acceptable solutions	
Element 1: Location	A1.1 Development location	The BAL contour assessment (see Figure 3 and Table 2) identifies all lots as having capacity to achieve minimum APZ requirements for a rating of BAL-29 or lower.
Element 2: Siting and design	A2.1 Asset Protection Zone	The BAL contour assessment identifies all development as having the capacity to achieve APZs within lot boundaries and surrounding permanent non-vegetated firebreaks, to achieve a BAL-29 or lower rating (see Figure 3). APZs are to be subject to ongoing management in accordance with technical standards outlined in the Guidelines (see Appendix 2)
Element 3: Vehicular access	A3.1 Two access routes.	Refer to Section 4.3, which demonstrate that a minimum of two different vehicular access routes will be provided for all proposed lots via the internal road network.
	A3.2 Public road	All public roads will be constructed to relevant technical requirements under the Guidelines
	A3.3 Cul-de-sac (including a dead-end-road)	N/A – no cul-de-sacs are proposed as part of the subdivision and the project area is not serviced by an existing cul-de-sac.
	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	N/A – the proposed subdivision design does not require Emergency Access Ways (EAWs) to provide through access to a public road.
	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.
	A3.8 Firebreak width	Refer to Section 4.5, which demonstrates that all future users of the land will be required to comply with the current City of Wanneroo annual firebreak notice.
Element 4: Water	A4.1 Reticulated areas	Refer to Section 4.4, which demonstrates that all proposed lots will be provided a reticulated water supply and network of hydrants in accordance with local water authority, City and DFES requirements.
	A4.2 Non-reticulated areas	N/A – the proposed subdivision is to be located within a reticulated area.

Bushfire protection criteria	Method of compliance	Proposed bushfire management strategies
	Acceptable solutions	
	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 to be located within a reticulated area.

6. Implementation and enforcement

Implementation of the BMP applies to the developer and prospective landowners to ensure bushfire management measures are adopted and implemented on an ongoing basis. A works program and summary of bushfire management measures is provided in Table 5. These measures will be implemented to ensure the ongoing protection of proposed life and property assets is achieved. Timing and responsibilities are also defined to assist with implementation of each measure.

Table 5: Proposed works program

Bushfire management measure	Timing for application	Responsibility
Creation of APZs	APZs are to be created, prior to building construction	Developer
Ongoing maintenance of APZs	APZs are to be maintained as required to ensure they are kept in a low threat minimal fuel condition on a regular and ongoing basis	Developer until lot sale; the land owner following lot sale
Implementation of increased building construction standards (if required – Class 1, 2 3 or associated 10a only)	Prior to occupancy	Future landowners and associated builder
Construction of public roads	Prior to subdivision approval and individual lot development	Developer
Provision of reticulated water supply and fire hydrant network	Prior to subdivision approval and individual lot development	Developer
Notification on Title	Following subdivision approval	Developer
Reassessment of the BAL	Following any significant change in lot design, vegetation class extent or bushfire management approach.	Developer, future landowners
Compliance with the current City of Wanneroo annual firebreak notice	All year round as specified in the firebreak notice (Appendix 3)	Developer/land manager/future landowners

6.1 Document review

This BMP will be updated as necessary following the date of approval to ensure:

1. Implementation is assessed and corrective actions are applied in cases of non-compliance.
2. The effectiveness and impact of fire prevention work is evaluated and any significant changes in development design or the surrounding environment are reassessed in a BMP addendum.

The developer will be responsible for updating and revising the BMP as required until such time that the development is complete.

7. References

Department of Fire and Emergency Services (DFES) 2018, Map of Bush Fire Prone Areas, [Online], Government of Western Australia, available from:
<http://www.dfes.wa.gov.au/regulationandcompliance/bushfireproneareas/Pages/default.aspx>,

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

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

Western Australian Planning Commission (WAPC) 2015a, 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, Western Australian Planning Commission, Perth.

Appendix 1 Site Photos



Photo ID: 1

Plot number		Plot 1
Vegetation classification	Pre-development	Class B Woodland
	Post-development	Class B Woodland
Description / justification		Banksia Woodland



Photo ID: 2

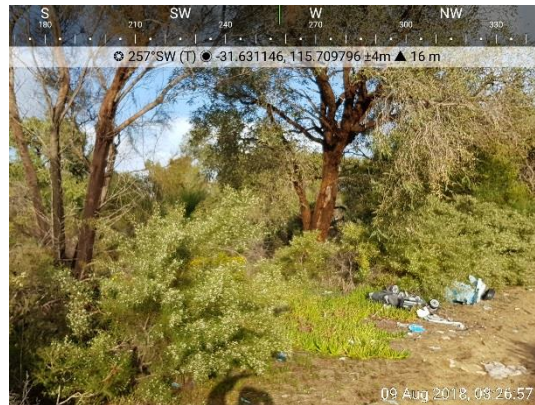


Photo ID: 3

Plot number		Plot 2
Vegetation classification	Pre-development	Class B Woodland
	Post-development	Class B Woodland
Description / justification		Banksia Woodland

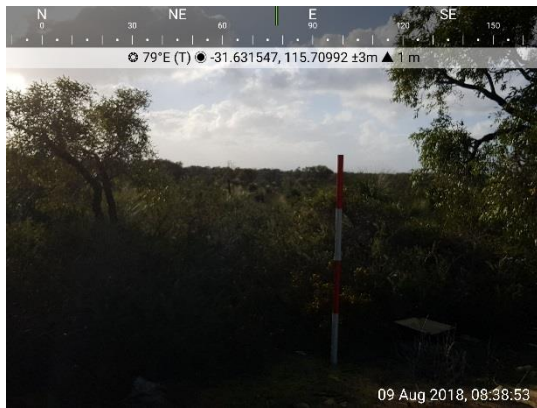


Photo ID: 4



Photo ID: 5



Photo ID: 6



Photo ID: 8

Plot number		Plot 3
Vegetation classification	Pre-development	Class C Shrubland
	Post-development	Class C Shrubland
Description / justification		Shrub vegetation less than 2 m high at maturity.



Photo ID: 9



Photo ID: 13

Plot number		Plot 4
Vegetation classification	Pre-development	Class D Scrub
	Post-development	Class D Scrub
Description / justification		Vegetation with a continuous horizontal and vertical structure, greater than 2 m high at maturity.



Photo ID: 12



Photo ID: 14



Photo ID: 15

Plot number		Plot 5
Vegetation classification	Pre-development	Class G Grassland
	Post-development	Class G Grassland
Description / justification		



Photo ID: 7



Photo ID: 19

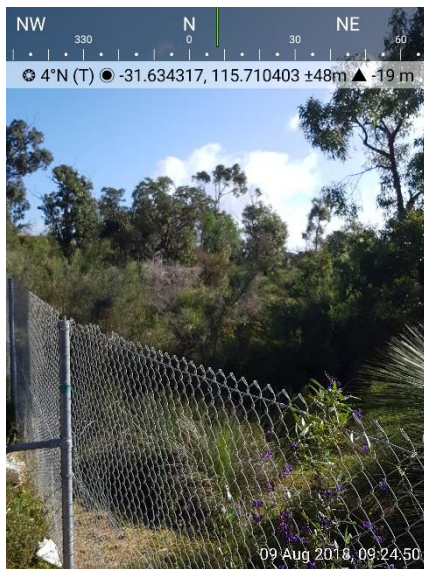


Photo ID: 23

Plot number		Plot 6
Vegetation classification	Pre-development	Class B Woodland
	Post-development	Class B Woodland
Description / justification		Banksia Woodland



Photo ID: 16



Photo ID: 18

Plot number		Plot 7
Vegetation classification	Pre-development	Class B Woodland
	Post-development	Class B Woodland
Description / justification		Banksia Woodland



Photo ID: 17

Plot number		Plot 8
Vegetation classification	Pre-development	Class C Shrubland
	Post-development	Class C Shrubland
Description / justification		Shrub vegetation less than 2 m high at maturity.



Photo ID: 20



Photo ID: 21

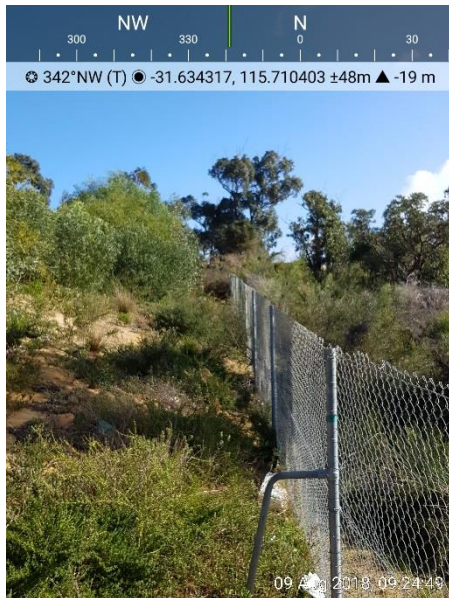


Photo ID: 22

Plot number		Plot 9
Vegetation classification	Pre-development	Class D Scrub
	Post-development	Class D Scrub
Description / justification		Vegetation with a continuous horizontal and vertical structure, greater than 2 m high at maturity.



Photo ID: 24



Photo ID: 25



Photo ID: 27



Photo ID: 28



Photo ID: 30

Plot number		Plot 10
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		Low threat cultivated gardens and maintained lawns within surrounding properties and non-vegetated areas including roads, footpaths, driveways and building footprints.



Photo ID: 10



Photo ID: 11



Photo ID: 29

Plot number		Plot 11
Vegetation classification	Pre-development	Excluded – Non-vegetated (Clause 2.2.3.2 [e])
	Post-development	Excluded – Non-vegetated & Low threat (Clauses 2.2.3.2 [e] and [f])
Description / justification		To be in a non-vegetated or low threat state following completion of development



Photo ID: 26

Plot number		Plot 12
Vegetation classification	Pre-development	Excluded – Non-vegetated (Clause 2.2.3.2 [e])
	Post-development	Excluded – Non-vegetated & Low threat (Clauses 2.2.3.2 [e] and [f])
Description / justification		To be in a non-vegetated or low threat state following completion of development

Appendix 2

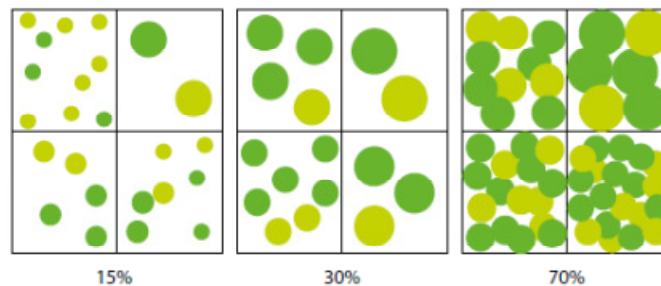
APZ technical specifications

ELEMENT 2: SITING AND DESIGN OF DEVELOPMENT

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.

Figure 16: Tree canopy cover – ranging from 15 to 70 per cent at maturity



- **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 5m² 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 3
City of Wanneroo annual firebreak
notice

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

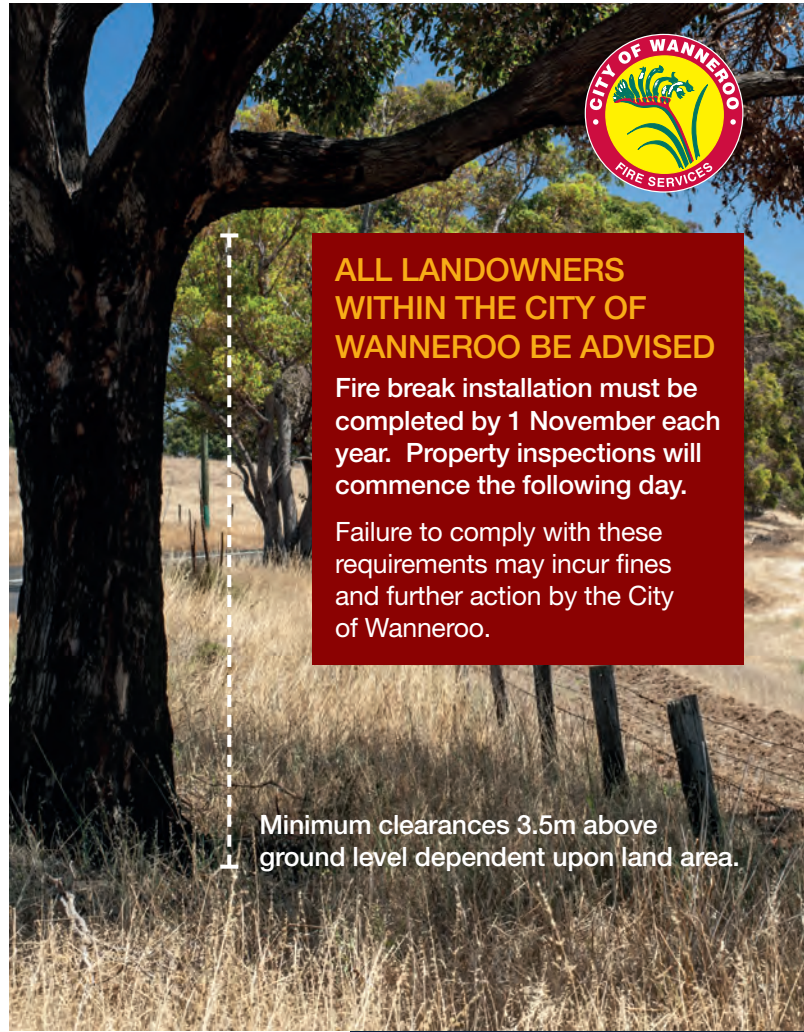
- Install and maintain a twenty (20) metre building protection zone surrounding all buildings, large hay stacks and fuel storage areas. A building protection zone includes undertaking measures such as pruning all lower tree branches to prevent fire entering the trees, ensuring three (3) metre spacing 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

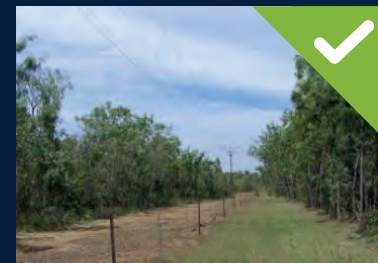
In addition to the requirements of this Notice, you may be required to carry out further works which are considered necessary by an Authorised Officer and specified by way of a separate written notice forwarded to the address of the owner/s as shown on the City of Wanneroo rates record for the relevant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



Minimum clearances 3.5m above ground level dependent upon land area.



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

