



Bushfire Management Plan: District Structure Plan North Ellenbrook West

Parcel Property

DOCUMENT TRACKING

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Template 2.8.1

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1. Introduction

1.1 Proposal details

Eco Logical Australia (ELA) was commissioned by Parcel Property to prepare a Bushfire Management Plan (BMP) to support the North Ellenbrook West District Structure Plan (hereafter referred to as the subject site; Figure 1; Figure 2).

Majority of the subject site is within a designated bushfire prone area as per the *Western Australia State Map of Bush Fire Prone Areas* (DFES 2019; Figure 3), which triggers bushfire planning requirements under *State Planning Policy 3.7 Planning in Bushfire Prone Areas* (SPP 3.7; WAPC 2015) and reporting to accompany submission of the Structure Plan in accordance with the associated *Guidelines for Planning in Bushfire Prone Areas v 1.3* (the Guidelines; WAPC 2017).

This assessment has been prepared by ELA Bushfire Consultants, Ian Mullins, Stephen Moore and James Leonard with quality assurance undertaken by ELA Senior Bushfire Consultant, Daniel Panickar (FPAA BPAD Level 3 Certified Practitioner No. BPAD37802-L3).

1.2 Purpose and application of the plan

The primary purpose of this BMP is to act as a technical supporting document to inform planning assessment. This BMP is also designed to provide guidance on how to plan for and manage the bushfire risk to the subject site through implementation of a range of bushfire management measures in accordance with the Guidelines.

1.3 Environmental considerations

Some bushfire prone areas also have high biodiversity values. SPP 3.7 policy objective 5.4 recognises the need to consider bushfire risk management measures alongside environmental, biodiversity and conservation values.

Environmental approvals for the development are being obtained and impacts associated with bushfire protection measures have been considered through consultation with the project team.

Some retention and revegetation is proposed within the subject site and this has been accounted for in the post development vegetation class and Bushfire Hazard Level assessments. A summary of the retention and revegetation considerations is provided below and depicted in Figure 2:

- The proposed Metropolitan Region Scheme Parks and Recreation zoned areas reflect existing *Environment Protection and Biodiversity Protection Act 1999* (EPBC Act) approval (2014/7120) retention areas and Department of Water and Environmental Regulation (DWER) conservation covenant areas associated with Native Vegetation Clearing Permit (NVCP) approval (CPS 5981/2). Vegetation within these areas will be retained and no clearing/thinning of vegetation will occur;
- The NVCP approval included commitments to revegetate and rehabilitate a 31.1 ha area (management Zones 1 to 6) and conservation covenant under section 30B of the *Soil and Land Conservation Act 1945*. The following completion criteria may be applicable for consideration within the BMP which includes:

- Plant density (excluding weeds): 3 species per 2.5 m x 2.5 m quadrat for any 2 representative quadrants over any treated area of 100 m²/6,000 stems per hectare;
- Plant structure: Vegetation structure consists of 20% overstorey, 50% midstorey and 30% understorey within any 100 m² area by Year 5;
- Within the Public Open Space (POS) areas, it is noted that clearing/thinning of vegetation will be required for drainage, POS facilities etc. areas to be retained are yet to be determined and will be finalised through the subsequent planning processes (e.g. Structure Plans and subdivision).

Any changes to revegetation and landscaping will be addressed in future BMPs.

Figure 1: Site Overview



Legend

- Subject site
- 100m site assessment
- 150m site assessment

0 200 400 800

Metres

Datum/Projection:
GDA 1994 MGA Zone 50

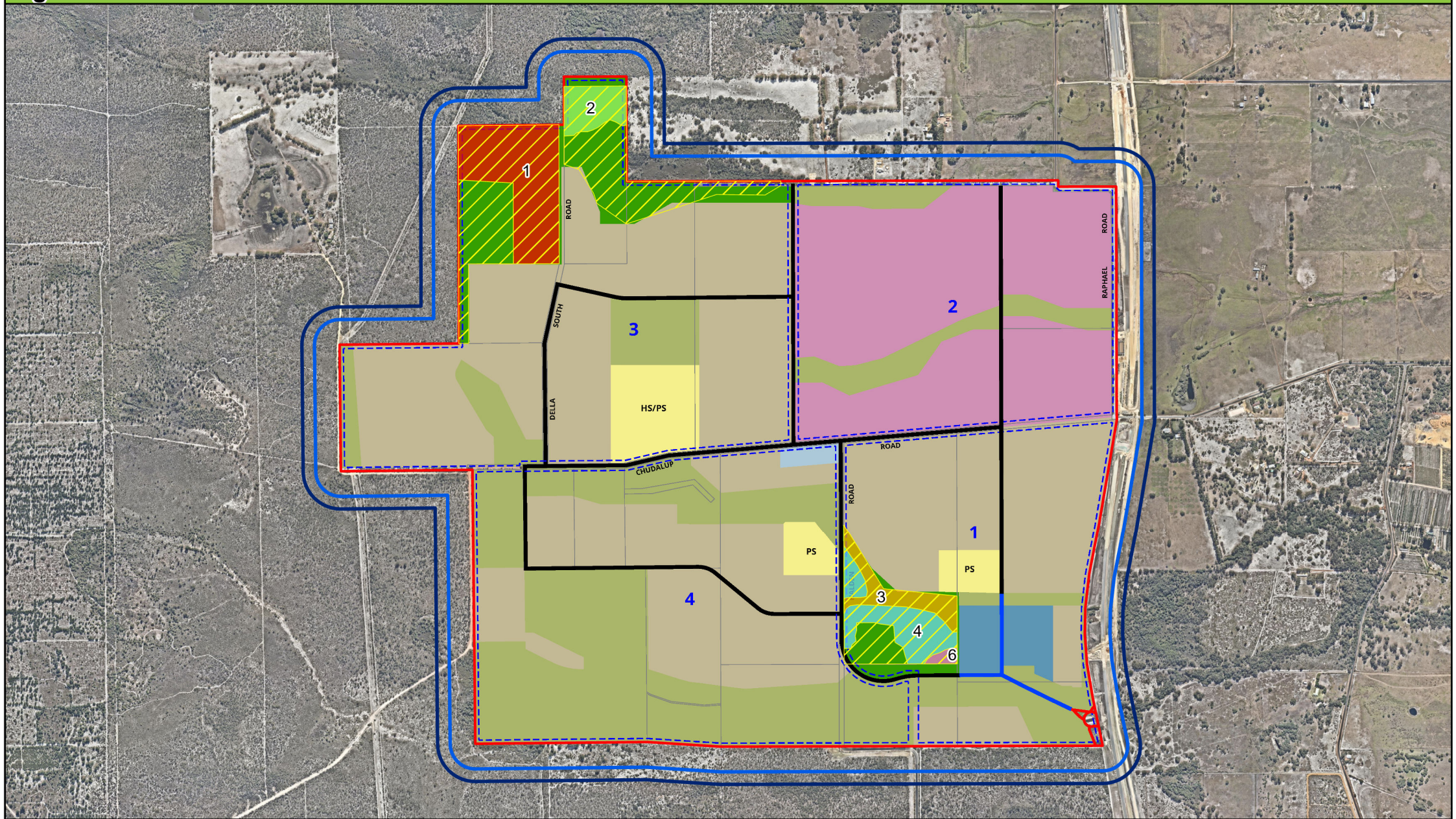
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Figure 2: Site Plan

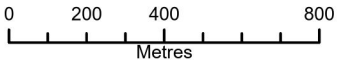


Legend

- Subject site
- 100m site assessment
- 150m site assessment
- Retention area

Management zones

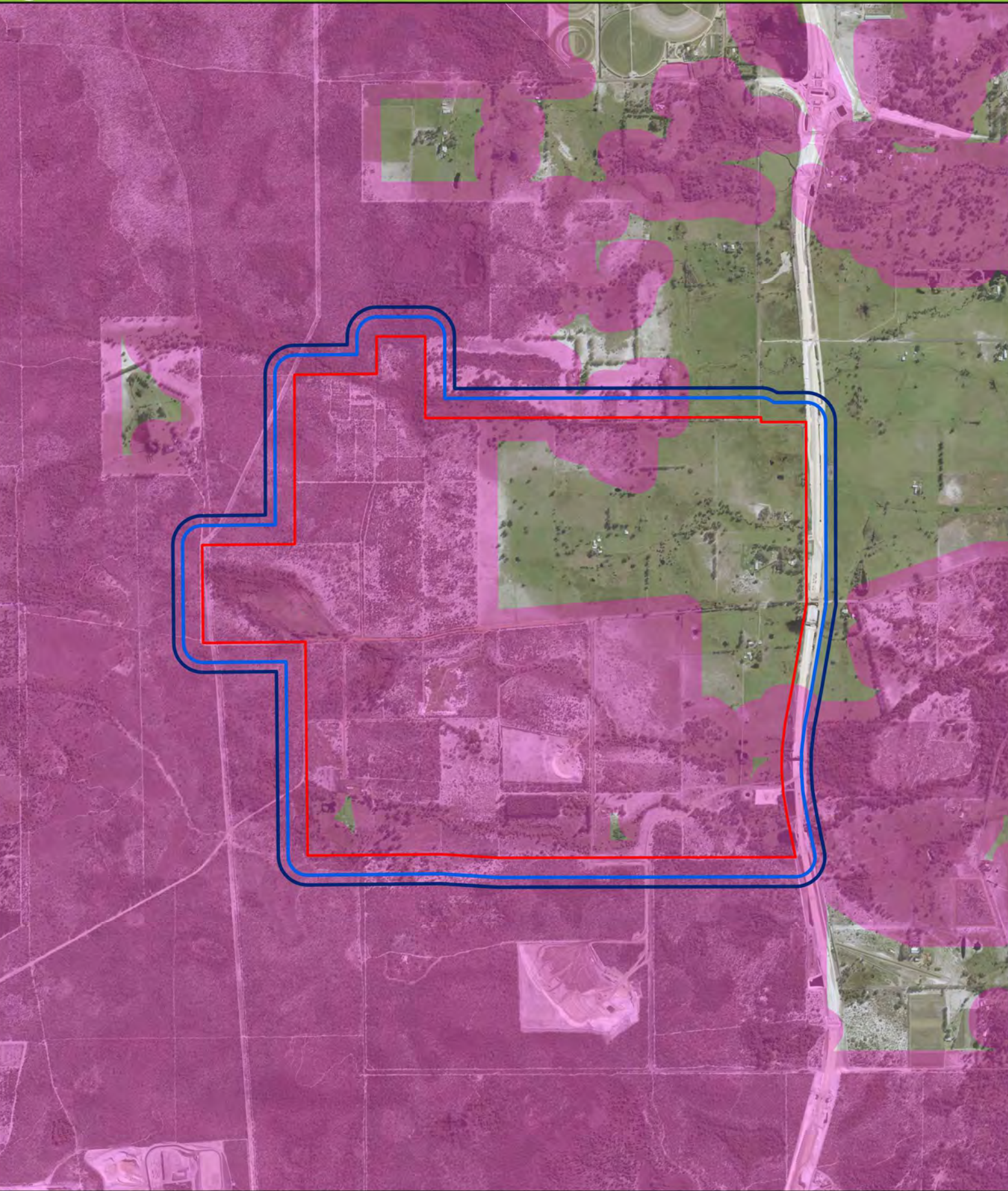
- Management Zone 1
- Management Zone 2
- Management Zone 3
- Management Zone 4
- Management Zone 6



Datum/Projection:
GDA 1994 MGA Zone 50



Figure 3: Bushfire Prone Areas



Legend

- Subject site
- 100m site assessment
- 150m site assessment
- Bushfire Prone Mapping (DFES 2019)

0 200 400 800
Metres

Datum/Projection:
GDA 1994 MGA Zone 50

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2. Bushfire assessment results

2.1 Bushfire assessment inputs

The following section is a consideration of spatial bushfire risk and has been used to inform the bushfire assessment in this report.

2.1.1 Vegetation classification

Vegetation within the subject site and surrounding 150 m (the assessment area) was assessed in accordance with the Guidelines and AS 3959-2018 *Construction of Buildings in Bushfire Prone Areas* (SA 2018) with regard given to the *Visual guide for bushfire risk assessment in Western Australia* (DoP 2016). An initial site assessment was undertaken on 31 October 2018 and reinspection occurred on 9 May 2019.

The following vegetation classes and exclusions were identified within the assessment area as depicted in Figure 4 and listed below:

- Class A forest;
- Class B woodland;
- Class D scrub;
- Class G grassland; and
- Exclusions as per clause 2.2.3.2 (e) and (f) (i.e. non-vegetated areas and low-threat vegetation).

Photographs relating to each vegetation type are included in Appendix A.

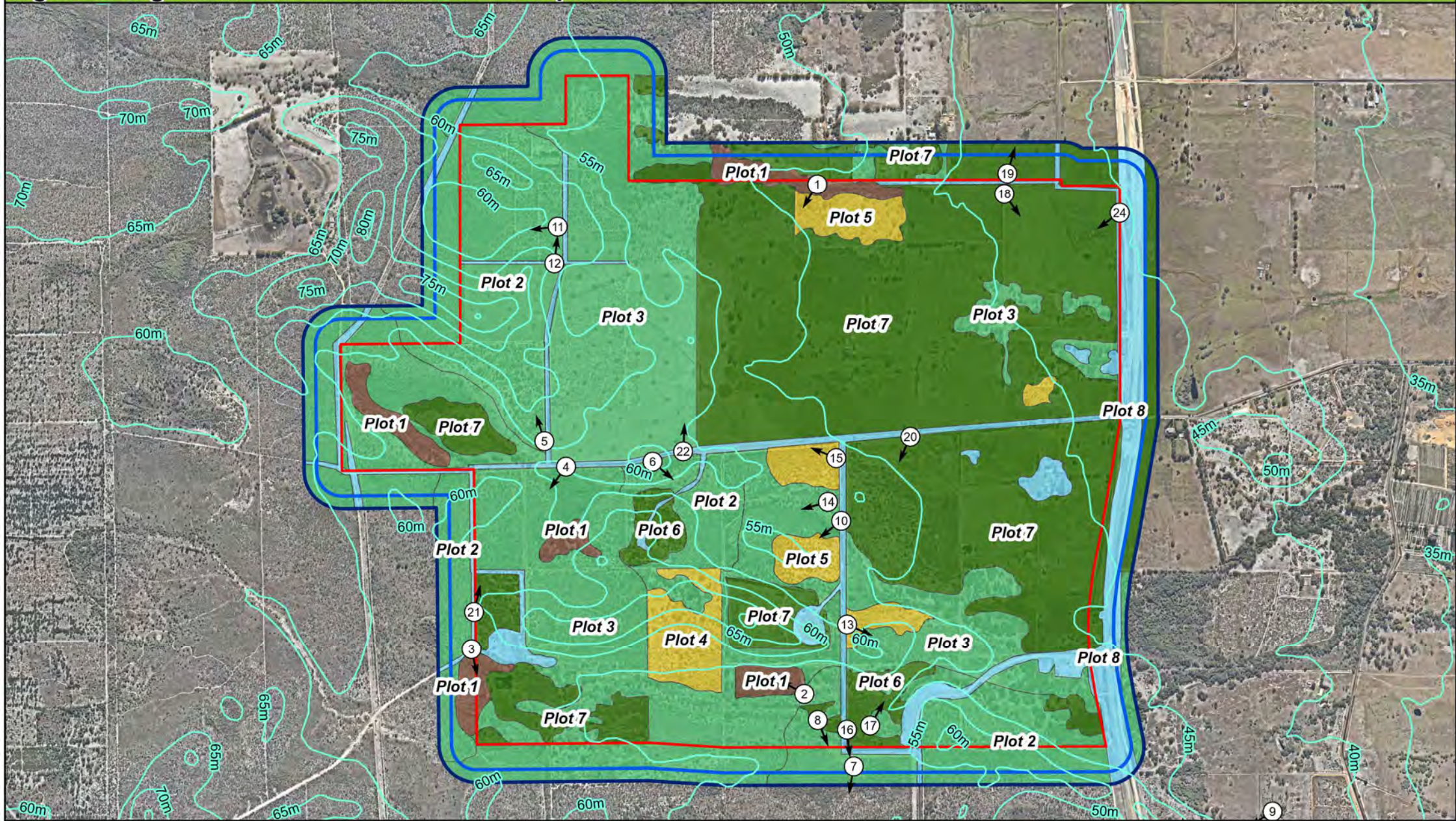
2.1.2 Topography and slope under vegetation

Effective slope under vegetation was assessed for a distance of 150 m from the subject site in accordance with the Guidelines and AS 3959-2018. Slope under vegetation ranged from upslope/flat land to downslope $>0-5^{\circ}$ as depicted in Figure 4.

2.1.3 Post-development bushfire assessment

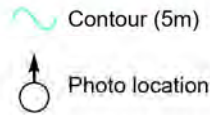
An assessment of vegetation and slope was undertaken based on the proposed development concept in Figure 2. Retention and revegetation areas described in section 1.3 have also been considered and the results of this 'post-development' assessment are depicted in Figure 5.

Figure 4: Vegetation Classification - Pre Development



Legend

- Subject site
- 100m site assessment
- 150m site assessment



Vegetation classification

- Class A forest
- Class B woodland
- Class D scrub
- Class G grassland
- Excluded as per clause 2.2.3.2 (e) and (f)

Plot	Vegetation Classification	Slope
1	Class A forest	Upslope / Flat Land
2	Class B woodland	Downslope >0 to 5 degrees
3	Class B woodland	Upslope / Flat Land
4	Class D scrub	Downslope >0 to 5 degrees
5	Class D scrub	Upslope / Flat Land
6	Class G grassland	Downslope >0 to 5 degrees
7	Class G grassland	Upslope / Flat Land
8	Excluded as per clause 2.2.3.2 (e) and (f)	N/A

0 200 400 800
Metres

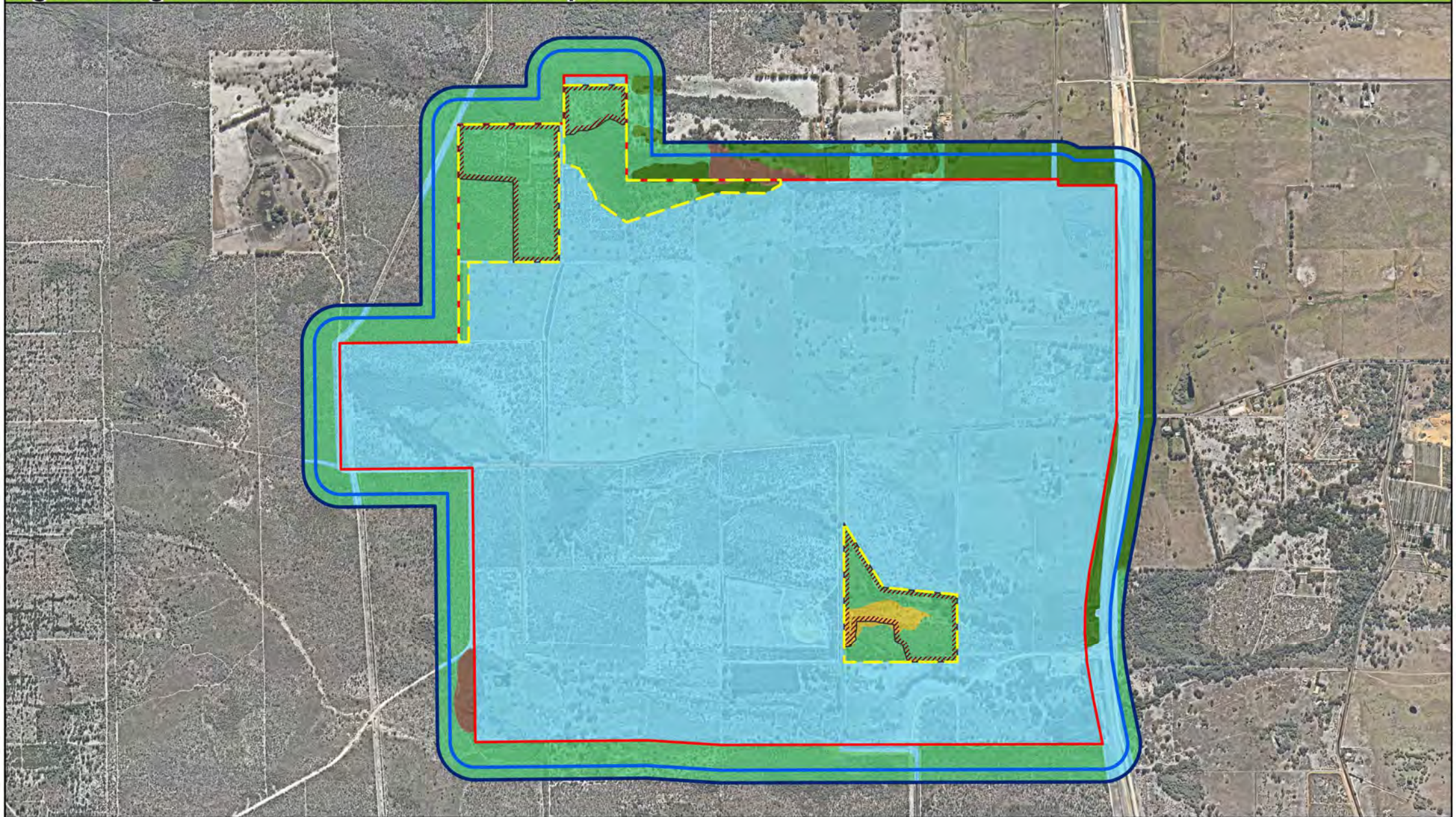
Datum/Projection:
GDA 1994 MGA Zone 50



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Figure 5: Vegetation Classification - Post Development



Legend

Subject site

100m site assessment

150m site assessment

Retention area

Management zones

Vegetation classification

Class A forest

Class B woodland

Class D scrub

Class G grassland

Excluded as per clause 2.2.3.2 (e) and (f)

Datum/Projection:
GDA 1994 MGA Zone 50

Prepared by: SM Date: 27/02/2020

2.2 Assessment outputs

A Bushfire Hazard Level (BHL) assessment has been undertaken in accordance with SPP 3.7, the Guidelines and the bushfire assessment inputs in Section 2.1.

2.2.1 BHL assessment

All land located within 100 m of the classified vegetation depicted in Figure 4 is considered bushfire prone and is subject to a BHL assessment in accordance with the Guidelines.

Pre-development BHLs have been assessed for the subject site in accordance with the methodology contained within the Guidelines and incorporates the following factors:

- Vegetation class; and
- Slope under classified vegetation.

Table 1 contains a summary of the BHL assessment for each vegetation plot depicted in Figure 4. All land within 100 m of Extreme and Moderate BHLs has also been mapped as a Moderate hazard as per the Guidelines, and the final result is depicted in Figure 6.

Table 1: Bushfire Hazard Level assessment

Plot	Vegetation classification	Effective Slope	Bushfire Hazard Level
1	Class A forest	Upslope/ flat land	Extreme
2	Class B woodland	Downslope >0-5°	Extreme
3	Class B woodland	Upslope/ flat land	Extreme
4	Class D scrub	Downslope >0-5°	Extreme
5	Class D scrub	Upslope/ flat land	Extreme
6	Class G grassland	Downslope >0-5°	Moderate
7	Class G grassland	Upslope/ flat land	Moderate
8	Excluded as per clause 2.2.3.2 (e) and (f)	N/A	Low

2.3 Identification of issues arising from the BHL assessment

Clearing and revegetation will be undertaken within the subject site for development purposes, and consequently the pre-development BHLs are subject to change. A post-development BHL assessment is provided in Figure 7 based on expected changes to vegetation within the subject site depicted in Figure 5.

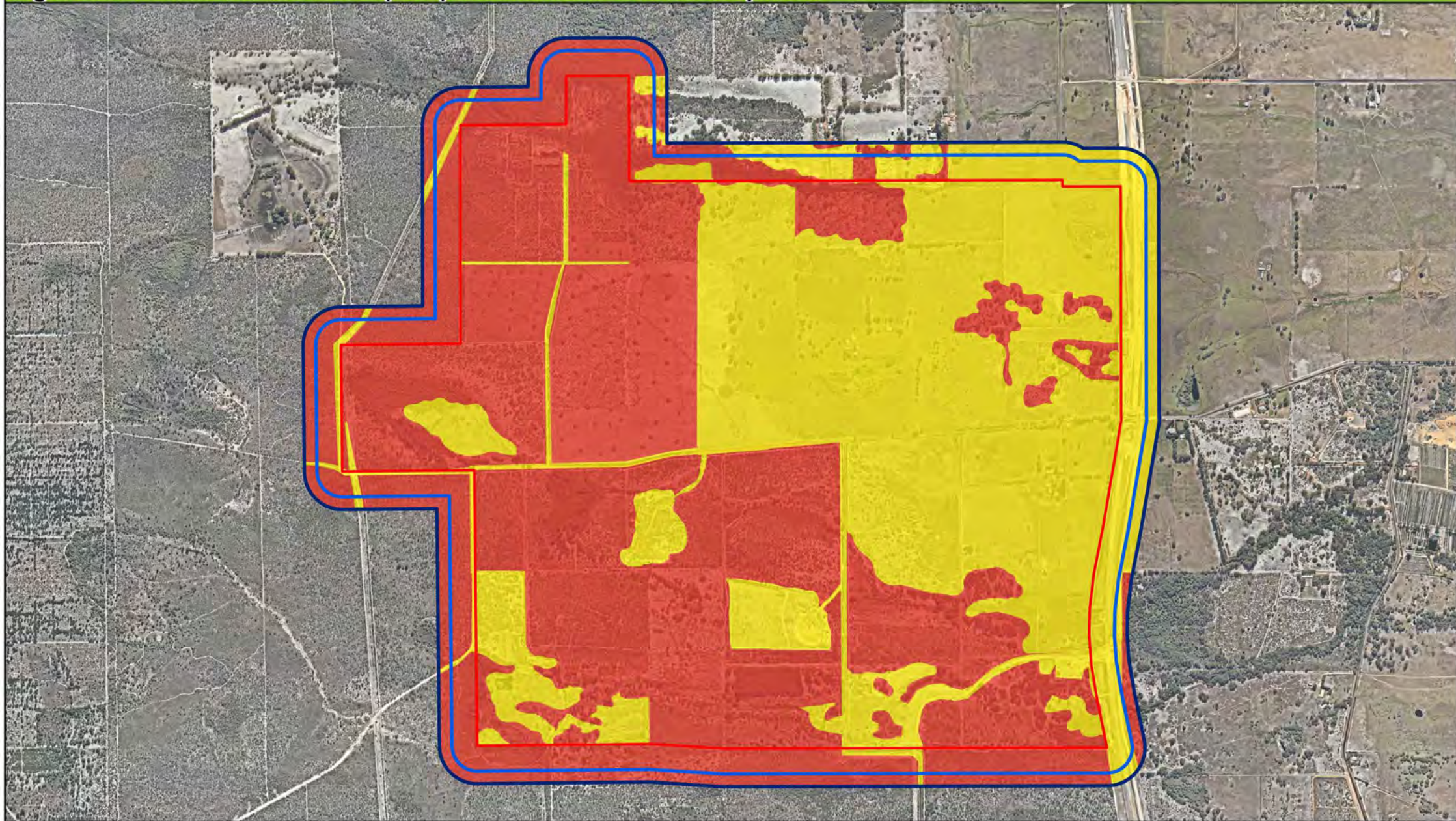
The on-site vegetation extent is proposed to be cleared to enable development of a significant urban built footprint amongst areas of landscaped/managed Public Open Space (POS) and various easements. Therefore, for the purposes of strategic level planning, ELA does not consider the current on-site vegetation extent to be a bushfire hazard issue post-development, since these hazards can be managed through a staged clearing process, adequate separation of future built assets from classified vegetation (both external and internal [e.g. retained vegetation] to the subject site), and ongoing fuel management that can be undertaken in and around individual development stages.

On the basis of the above information, ELA considers that the bushfire hazards within and adjacent to the subject site and the associated bushfire risk is readily manageable through standard management

responses and compliance with acceptable solutions outlined in the Guidelines. These management measures will need to be factored into the development design as early as possible to ensure a suitable, compliant and effective bushfire management outcome is achieved to ensure protection of future life and property assets.

Demonstration of compliance with the relevant requirements of SPP 3.7, the Guidelines and AS 3959-2018 at future planning stages will also depend on the developer's ability to coordinate the timing and staging of clearing and development works within the subject site with the aim of avoiding bushfire impacts from temporary, retained vegetation.

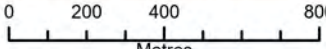
Figure 6: Bushfire Hazard Level (BHL) Assessment - Pre Development



Legend

- Subject site
- 100m site assessment
- 150m site assessment

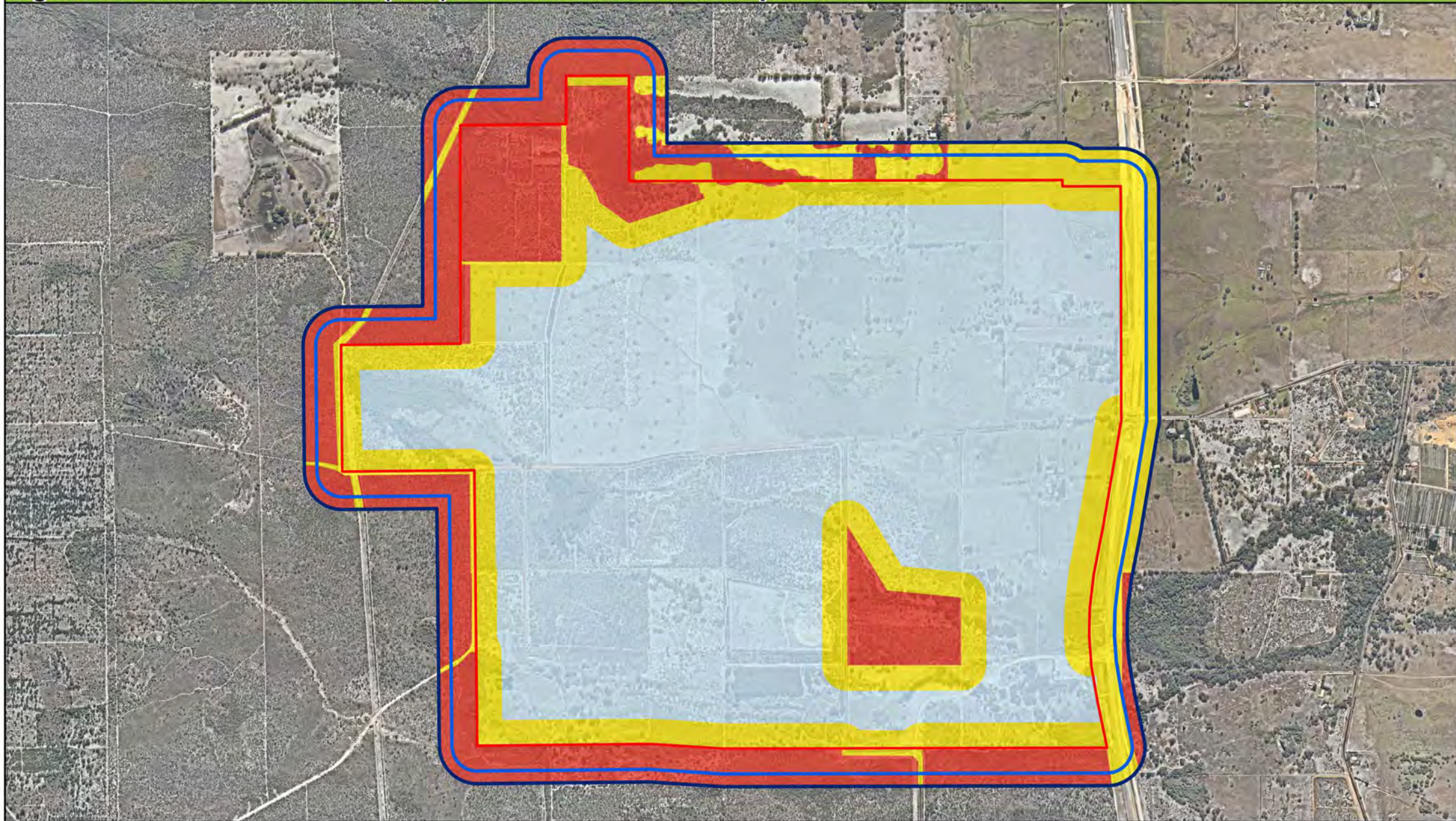
- Bushfire Hazard Level (BHL)**
- Extreme
 - Moderate
 - Low






Datum/Projection:
GDA 1994 MGA Zone 50






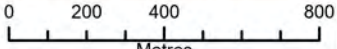
Figure 7: Bushfire Hazard Level (BHL) Assessment - Post Development



Legend

-  Subject site
-  100m site assessment
-  150m site assessment

- Bushfire Hazard Level (BHL)**
-  Extreme
 -  Moderate
 -  Low



Datum/Projection:
GDA 1994 MGA Zone 50



3. Assessment against the Bushfire Protection Criteria

3.1 Compliance

The proposed District Structure Plan is required to comply with policy measures 6.2 and 6.3 of SPP 3.7 and the Guidelines. Implementation of this BMP is expected to meet objectives 5.1 - 5.4 of SPP 3.7.

Bushfire management measures have been devised for the proposed development in accordance with Guideline acceptable solutions to meet compliance with bushfire protection criteria.

The 'acceptable solutions assessment' is provided below to assess the proposed bushfire management measures against each bushfire protection criteria in accordance with the Guidelines. The assessment demonstrates that the proposed measures meet the intent of each element of the bushfire protection criteria. Figure 8 depicts bushfire management strategies where necessary.

Table 2: Summary of solutions used to achieve bushfire performance criteria

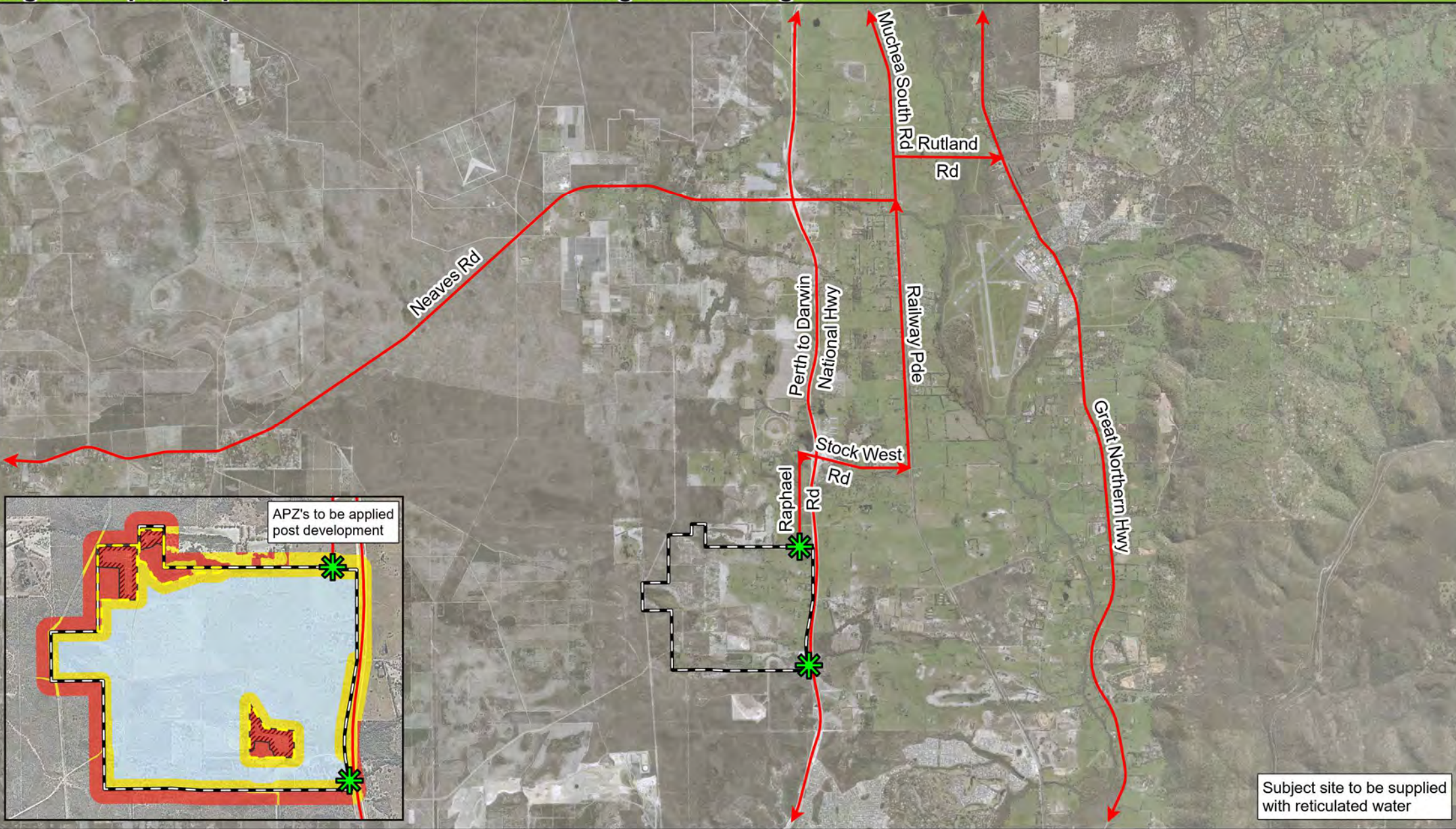
Bushfire Performance Criteria	AS	PS	N/A	Comment
Element 1: Location				
A1.1 Development location	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Post-development, all buildings within the subject site will be situated in areas subject to BHLs of moderate or low (refer to Figure 8). The proposed development is considered to be compliant with A1.1.
Element 2: Siting and design of development				
A2.1 Asset Protection Zone (APZ)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	As the lot layout is currently unconfirmed, APZs are unable to be prescribed at this level of planning. APZs will be defined in BMPs supporting future planning applications (e.g. Structure Plans and subdivisions) to ensure that all future lots will be subject to a BAL rating of BAL-29 or lower. Figure 8 demonstrates that the majority of the subject site will be subject to BHLs of Moderate or Low and ELA expects that APZs will be able to be accommodated within road reserves, maintained Public Open Space areas etc. The proposed development is considered to be compliant with A2.1.
Element 3: Vehicular access				
A3.1 Two access routes	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	There are two proposed vehicular access points from the subject site that join onto the existing road network (refer to Figure 8). BMPs supporting future planning applications (e.g. Structure Plans and subdivisions) will provide greater detail on road networks and ensure that all stages of development are provide with two forms of access at all times where relevant and possible. The proposed development is considered to be compliant with A3.1.

Bushfire Performance Criteria	AS	PS	N/A	Comment
Element 3: Vehicular access A3.2 Public road	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	The road network internal to the subject site is not known at this level of planning. BMPs supporting future planning applications (e.g. Structure Plans and subdivisions) will address this element in greater detail.
Element 3: Vehicular access A3.3 Cul-de-sac	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No cul-de-sacs are proposed as part of the development. BMPs supporting future planning applications (e.g. Structure Plans and subdivisions) will address this element in greater detail.
Element 3: Vehicular access A3.4 Battle-axe	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No battle-axe lots are proposed as part of the development. BMPs supporting future planning applications (e.g. Structure Plans and subdivisions) will address this element in greater detail.
Element 3: Vehicular access A3.5 Private Driveway longer than 50 m	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No private driveways longer than 50 m are proposed as part of the development. BMPs supporting future planning applications (e.g. Structure Plans and subdivisions) will address this element in greater detail.
Element 3: Vehicular access A3.6 Emergency Access way	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No emergency access ways are proposed or required as part of the development.
Element 3: Vehicular access A3.7 Fire-service access routes	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	No fire service access routes are required or proposed.
Element 3: Vehicular access A3.8 Firebreak width	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	All lots within the subject site will be managed in accordance with the City of Swan Fire Hazard Reduction Notice (Firebreak Notice). BMPs supporting future planning applications (e.g. Structure Plans and subdivisions) will address this element in greater detail. The proposed development is considered to be compliant with A3.8.
Element 4: Water A4.1 Reticulated areas	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The subject site will be connected to a reticulated water supply. BMPs supporting future planning applications (e.g. Structure Plans and subdivisions) will address this element in greater detail The proposed development is considered to be compliant with A4.1. A4.2 and A4.3 are not applicable to this proposed development.

3.2 Additional management strategies

Future demonstration of compliance with the relevant requirements of SPP 3.7, the Guidelines and AS 3959-2018 will depend on the developer's ability to coordinate the timing of development works within the subject site. Updated BMPs will be prepared to support subsequent planning applications where relevant and will contain re-assessments of bushfire risk including Bushfire Attack Level assessments etc.

Figure 8: Spatial representation of the bushfire management strategies



Legend

- Access point
- Subject site
- Retention area
- Management zones
- Access / egress route

**Bushfire Hazard Level (BHL)
Post development**

- Extreme
- Moderate
- Low

0 1 2 4
Kilometres

Datum/Projection:
GDA 1994 MGA Zone 50

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Prepared by: SM Date: 5/03/2020

4. Implementation and enforcement

Implementation of the BMP applies to Parcel Property, the City of Swan, and future landowners to ensure bushfire management measures are adopted and implemented on an ongoing basis. This BMP has been prepared as a strategic guide to demonstrate how development compliance will be delivered at future planning stages in accordance with the Guidelines. In this respect, management measures documented in Section 3, where applicable, will be incorporated into development design as early as possible and confirmed through Structure Plan and subdivision design. Therefore, aside from the revision of this BMP or preparation of a BMP addendum to accompany future subdivision applications, there are no further items to implement, enforce or review at this stage of the planning process.

The revised BMPs or addendums to this BMP are required to meet the relevant commitments outlined in this strategic level BMP, address the relevant requirements of SPP 3.7 (i.e. Policy Measure 6.4) and demonstrate in detail how the proposed development will incorporate the relevant acceptable solutions to meet the performance requirements of the Guidelines.

5. Conclusion

In the author's professional opinion, the bushfire protection requirements listed in this assessment provide an adequate standard of bushfire protection for the proposed development. As such, the proposed development is consistent with the aim and objectives of SPP 3.7 and associated guidelines and is recommended for approval.

6. References

Department of Fire and Emergency Services (DFES). 2019. *Map of Bush Fire Prone Areas*, [Online], Government of Western Australia, available from:
<http://www.dfes.wa.gov.au/regulationandcompliance/bushfireproneareas/Pages/default.aspx>

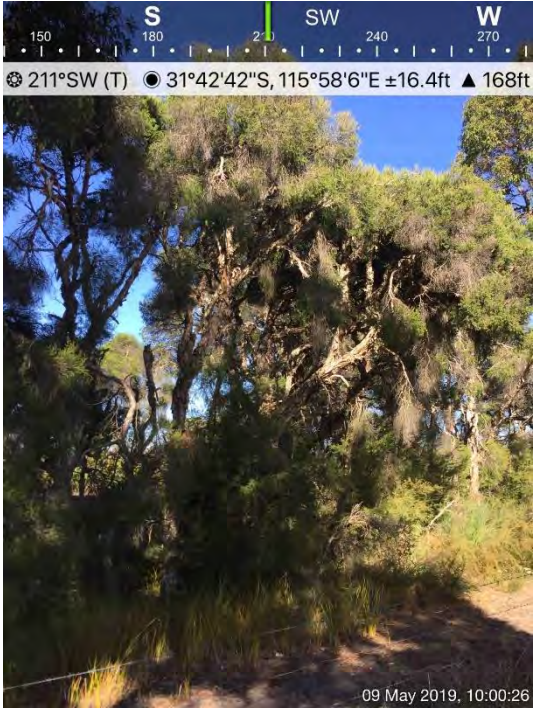

Department of Planning (DoP). 2016. *Visual guide for bushfire risk assessment in Western Australia*. DoP, Perth.


Standards Australia. 2018. *Construction of buildings in bushfire-prone areas, AS 3959-2018*. SAI Global, Sydney.



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

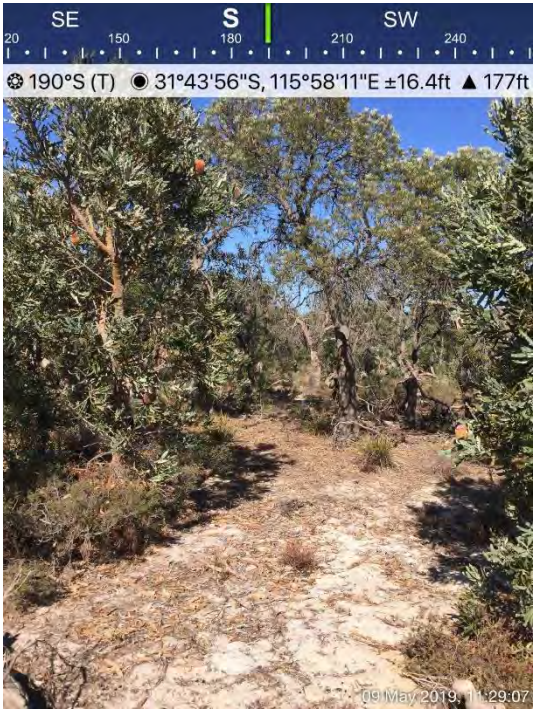

Western Australian Planning Commission (WAPC). 2017. *Guidelines for Planning in Bushfire Prone Areas Version 1.3 (including appendices)*. WAPC, Perth.


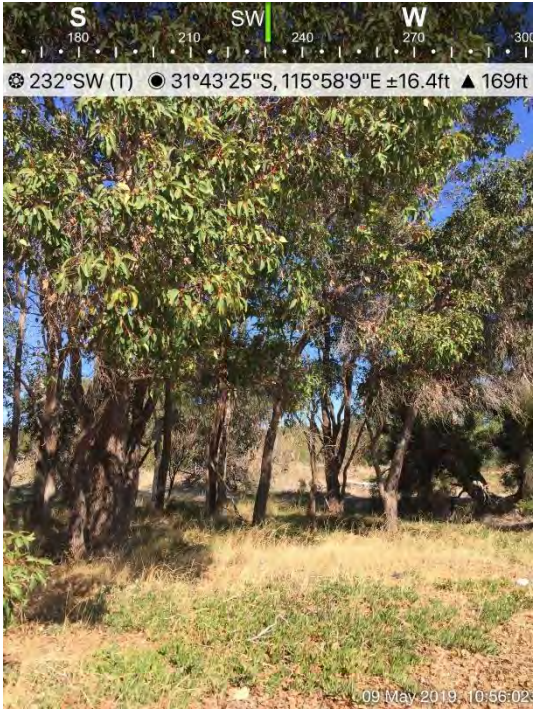
Appendix A – Plates



Plot	Photo ID	Photo and vegetation class
1	1	 <p>Class A forest – upslope / flat land</p>
1	2	 <p>Class A forest - upslope / flat land</p>

Plot	Photo ID	Photo and vegetation class
1	3	 <p>Class A forest - upslope / flat land</p>
1	4	 <p>Class A forest - upslope / flat land</p>

Plot	Photo ID	Photo and vegetation class
2	5	 <p>09 May 2019, 12:06:22</p> <p>Class B woodland – downslope >0-5 degrees</p>
2	6	 <p>09 May 2019, 12:00:37</p> <p>Class B woodland – downslope >0-5 degrees</p>

Plot	Photo ID	Photo and vegetation class
2	7	 <p>Class B woodland – downslope >0-5 degrees</p>
3	8	 <p>Class B woodland - upslope / flat land</p>


Plot	Photo ID	Photo and vegetation class
3	9	 <p>Class B woodland - upslope / flat land</p>
3	10	 <p>Class B woodland - upslope / flat land</p>

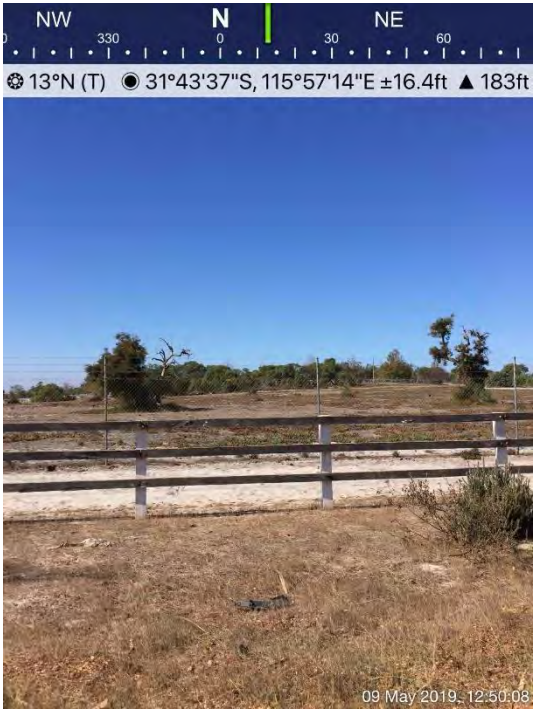

Plot	Photo ID	Photo and vegetation class
4	11	 <p>Class D scrub - downslope >0-5 degrees</p>
4	12	 <p>Class D scrub - downslope >0-5 degrees</p>

Plot	Photo ID	Photo and vegetation class
5	13	 <p>Class D scrub - upslope / flat land</p>
5	14	 <p>Class D Scrub - upslope / flat land</p>

Plot	Photo ID	Photo and vegetation class
5	15	 <p>Class D scrub - upslope / flat land</p>
6	16	 <p>Class G grassland - downslope >0-5 degrees</p>

Plot	Photo ID	Photo and vegetation class
6	17	 <p>Class G grassland - downslope >0-5 degrees</p>
7	18	 <p>Class G grassland- upslope / flat land</p>

Plot	Photo ID	Photo and vegetation class
7	19	 <p>Class G grassland- upslope / flat land</p>
7	20	 <p>Class G grassland- upslope / flat land</p>

Plot	Photo ID	Photo and vegetation class
7	21	 <p>Class G grassland- upslope / flat land</p>
8	22	 <p>Excluded under 2.2.3.2 (e) and (f)</p>

Plot	Photo ID	Photo and vegetation class
8	23	 <p>Excluded under 2.2.3.2 (e) and (f)</p>
8	24	 <p>Excluded under 2.2.3.2 (e) and (f)</p>

Appendix B – Standards for Asset Protection Zones

The following standards have been extracted from the *Guidelines for Planning in Bushfire Prone Areas v 1.3* (WAPC 2018).

Every habitable building is to be surrounded by, and every proposed lot can achieve, an APZ depicted on submitted plans, which meets the following requirements:

a. Width: Measured from any external wall or supporting post or column of the proposed building, and of sufficient size to ensure the potential radiant heat impact of a fire does not exceed 29kW/m^2 (BAL 29) in all circumstances.

b. Location: the APZ should be contained solely within the boundaries of the lot on which a building is situated, except in instances where the neighbouring lot or lots will be managed in a low-fuel state on an ongoing basis, in perpetuity (see explanatory notes).

c. Management: the APZ is managed in accordance with the requirements of 'Standards for Asset Protection Zones' (below):

- 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 9**).

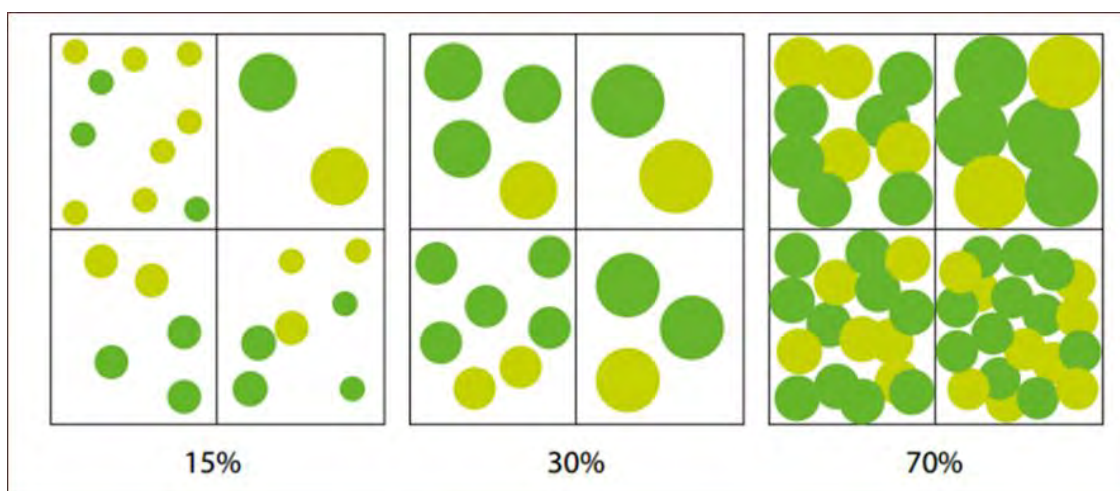


Figure 9: Illustrated tree canopy cover projection (WAPC 2017)

- **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.

Additional notes

The Asset Protection Zone (APZ) is an area surrounding a building that is managed to reduce the bushfire hazard to an acceptable level. Hazard separation in the form of using subdivision design elements or excluded and low threat vegetation adjacent to the lot may be used to reduce the dimensions of the APZ within the lot.

The APZ should be contained solely within the boundaries of the lot on which the building is situated, except in instances where the neighbouring lot or lots will be managed in a low-fuel state on an ongoing basis, in perpetuity. The APZ may include public roads, waterways, footpaths, buildings, rocky outcrops, golf courses, maintained parkland as well as cultivated gardens in an urban context, but does not include grassland or vegetation on a neighbouring rural lot, farmland, wetland reserves and unmanaged public reserves.

Appendix C - Vehicular access technical requirements (WAPC 2017)

Technical requirements	Public road	Cul-de-sac	Private driveway	Emergency access way	Fire service access route
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	15	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					

