



AS3959 Bushfire Attack Level Assessment Report

This report has been prepared using the Simplified Procedure (Method 1) as detailed in Section 2 of AS3959-2018.

Site Details	
Address:	Subdivision Stage 5 - Lake Treeby
Suburb:	Treeby WA 6164
Local Government Area	City of Cockburn
State:	Western Australia
Description of Building Works	Residential lots for Class 1 Dwellings

Report Details			
Report / Job Number:	2310-38	Report Version	1.0
Assessment Date:	15/8/2023	Report Date	18/10/2023
Assessor Details			
Name:	Rohan Carboon		
Accredited Practitioner	Rohan Carboon Level 3 - BPAD 23160		

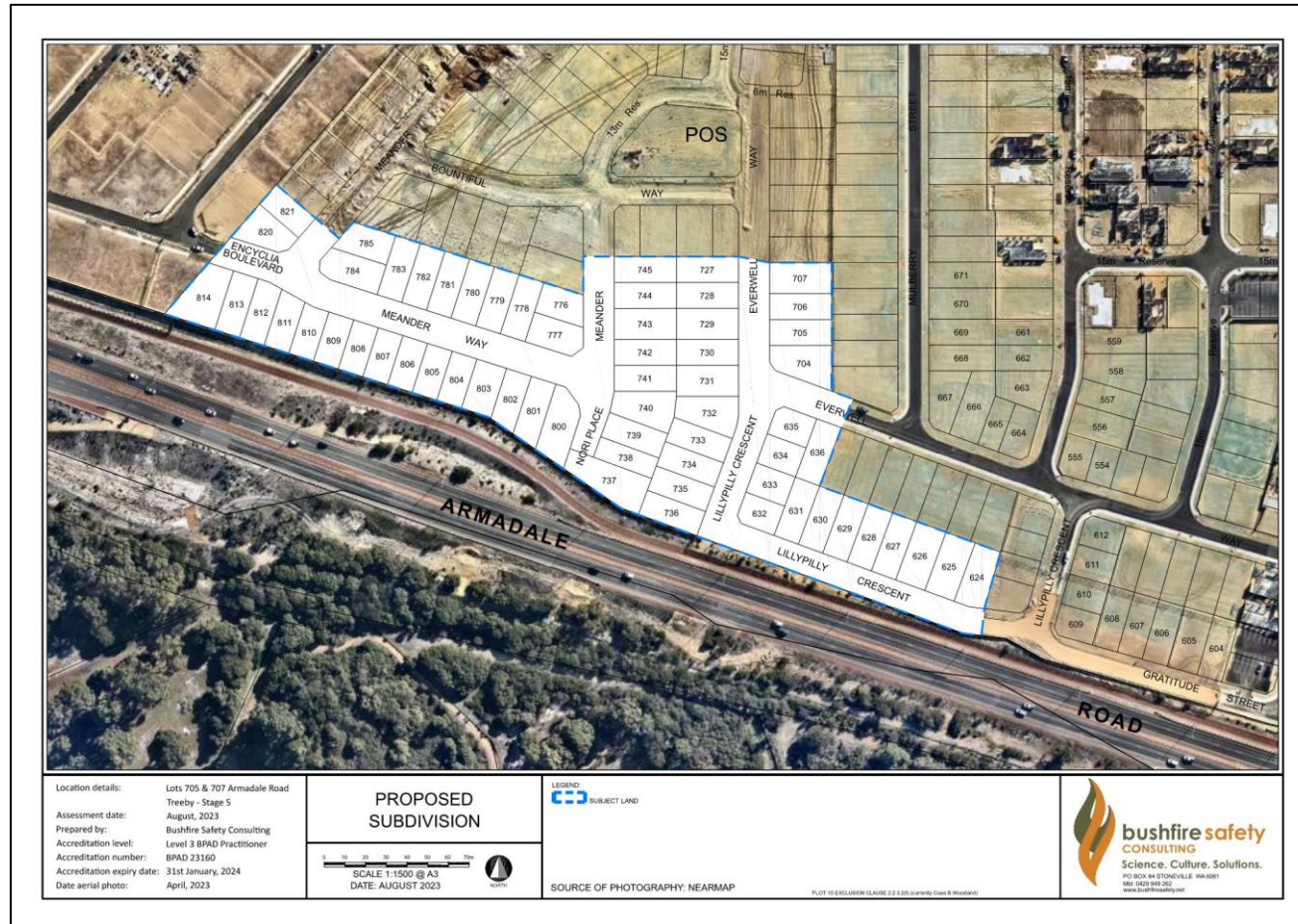
Disclaimer:

This report has been prepared in good faith and is derived from sources believed to be reliable and accurate at the time of publication. Nevertheless, this publication is distributed on the terms and understanding that the author is not responsible for results of any actions taken based on information in this publication or for any error in or omission from this publication.

Notwithstanding the precautions adopted in this report, it should always be remembered that bushfires burn under a wide range of conditions. An element of risk, no matter how small always remains. The objective of the standard (AS 3959:2018) is 'to prescribe particular construction details for buildings to reduce the risk of ignition from a bushfire while the front passes' (Standards Australia, 2018). Building to the standard (AS 3959:2018) does not guarantee a building will survive a bushfire.

Site Assessment and Site Plans

The assessment of this development was undertaken on 15/08/2023 by Bushfire Safety Consulting Pty Ltd for the purposes of determining the Bushfire Attack Level for each lot and dwelling in accordance with AS 3959 – 2018 Simplified Procedure (Method 1). The Stage 5 subdivision development creates a further 63 urban residential lots and internal roads adjacent to an existing developed area and Armadale Road. This assessment has been undertaken to provide BAL ratings for each lot in the subdivision stage (below) as outlined in the vegetation classification map.



Vegetation Classification

All vegetation within 150m of the subdivision was classified in accordance with Clause 2.2.3 of AS 3959-2018. There is no vegetation on the lots, the entire area has been cleared and adjacent subdivision stages have also been cleared including the adjacent development. Roads and lots are near completion. Classified vegetation within 150 metres only occurs south of the stage where revegetation is occurring in Armadale Road reserve. Remnant forest vegetation and revegetation is found south of Armadale Road.

Each distinguishable vegetation plot with the potential to determine the Bushfire Attack Level is identified below and outlined in the Vegetation Classification Plan.

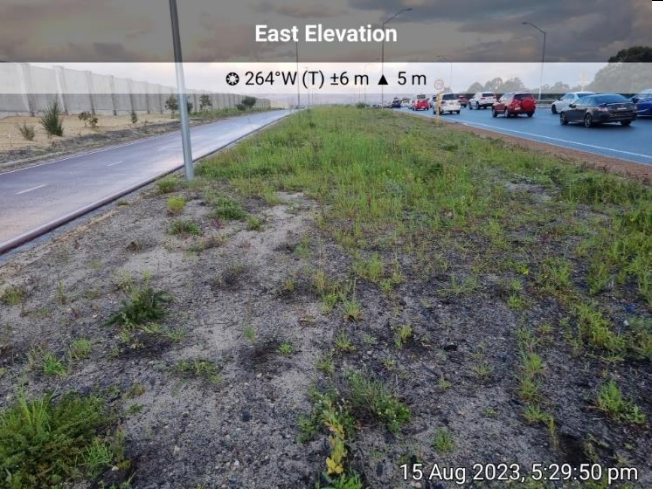
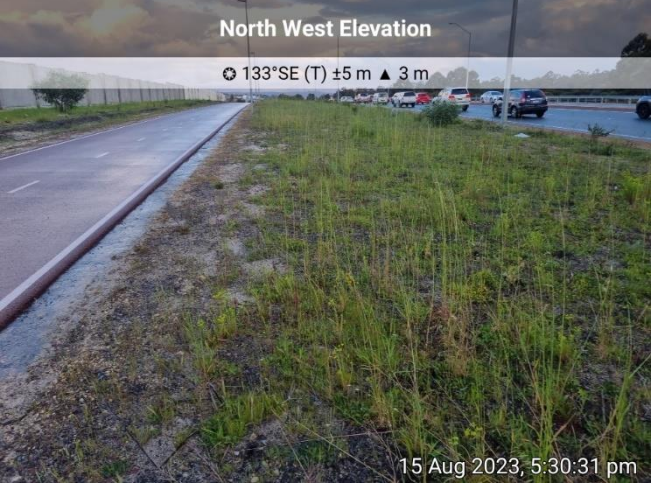
<p>Photo ID: 1</p> <p>Plot Number: 1</p> <p>Vegetation classification or exclusion clause: Class C Shrubland</p> <p>Description/justification of classification: Armadale Road reserve which is currently being re-vegetated into a vegetation class consistent with shrubland according to the approved landscape plans.</p>	
<p>Photo ID: 2</p> <p>Plot Number: 1</p> <p>Vegetation classification or exclusion clause: Class C Shrubland</p> <p>Description/justification of classification: Armadale Road reserve which is currently being re-vegetated into a vegetation class consistent with shrubland according to the approved landscape plans.</p>	

Photo ID: 3

Plot Number: 1

Vegetation classification or exclusion clause:
Class C Shrubland

Description/justification of classification: Low Armadale Road reserve which is currently being re-vegetated into a vegetation class consistent with shrubland according to the approved landscape plans.



Photo ID: 4

Plot Number: 1

Vegetation classification or exclusion clause:
Class C Shrubland

Description/justification of classification: Low Armadale Road reserve which is currently being re-vegetated into a vegetation class consistent with shrubland according to the approved landscape plans.

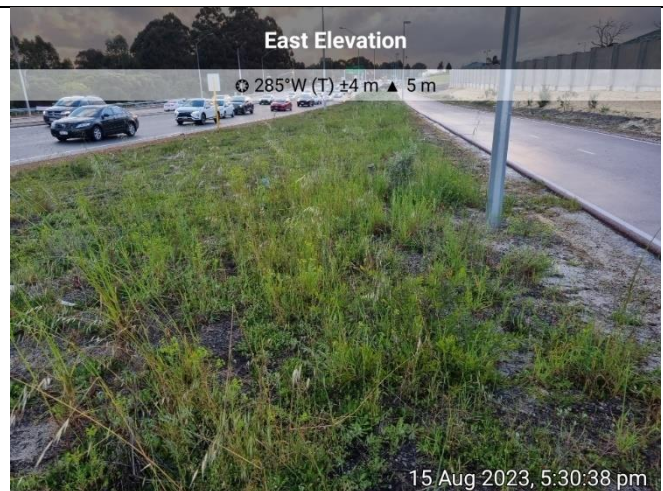


Photo ID: 5

Plot Number: 2

Vegetation classification or exclusion clause:
Class D Scrub

Description/justification of classification: Degraded land which is currently being re-vegetated into a vegetation class consistent with shrubland vegetation 2-6 metres in height.



Photo ID: 6

Plot Number: 2

Vegetation classification or exclusion clause:

Class: D Scrub

Description/justification of classification:

Degraded land which is currently being re-vegetated into a vegetation class consistent with shrubland vegetation 2-6 metres in height.



Photo ID: 7

Plot Number: 2

Vegetation classification or exclusion clause:

Class: D Scrub

Description/justification of classification:

Degraded land which is currently being re-vegetated into a vegetation class consistent with shrubland vegetation 2-6 metres in height.



Photo ID: 8

Plot Number: 2


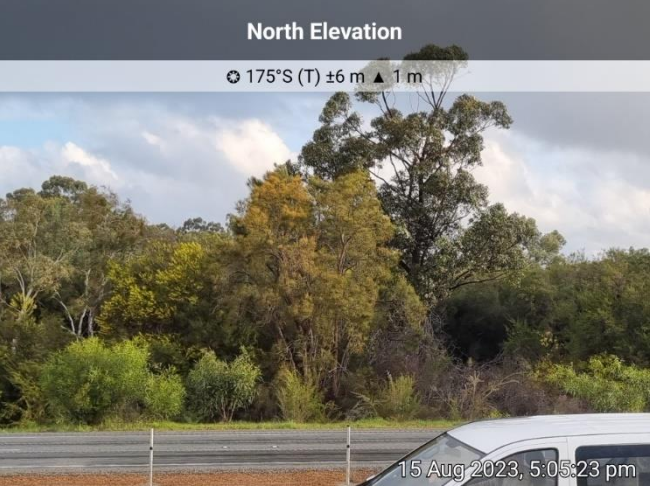
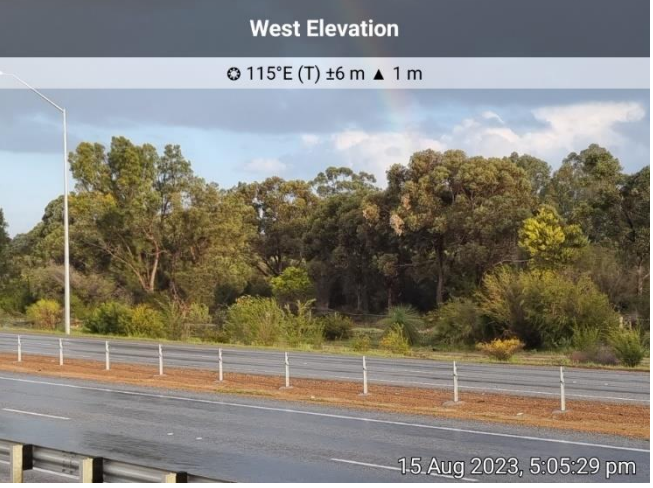
Vegetation classification or exclusion clause:


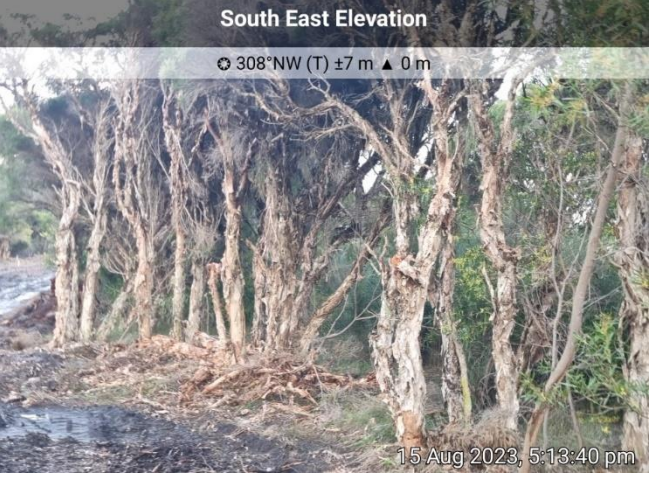

Class: D Scrub




Description/justification of classification:




Degraded land in road reserve which is currently being re-vegetated into a vegetation class consistent with shrubland vegetation 2-6 metres in height.



<p>Photo ID: 9</p> <p>Plot Number: 2</p> <p>Vegetation classification or exclusion clause: Class: D Scrub</p> <p>Description/justification of classification Degraded land in road reserve which is currently being re-vegetated into a vegetation class consistent with shrubland vegetation 2-6 metres in height.</p>	 <p>East Elevation 261°W (T) ±96 m ▲ 1 m 15 Aug 2023, 5:11:04 pm</p>
<p>Photo ID: 10</p> <p>Plot Number: 3</p> <p>Vegetation classification or exclusion clause: Class A Forest</p> <p>Description/justification of classification: Eucalypt and Melaleuca trees to 20m high; 30-70% foliage cover with shrubs in the middle storey.</p>	 <p>North Elevation 175°S (T) ±6 m ▲ 1 m 15 Aug 2023, 5:05:23 pm</p>
<p>Photo ID: 11</p> <p>Plot Number: 3</p> <p>Vegetation classification or exclusion clause: Class A Forest</p> <p>Description/justification of classification Eucalypt and Melaleuca trees to 20m high; 30-70% foliage cover with shrubs in the middle storey.</p>	 <p>West Elevation 115°E (T) ±6 m ▲ 1 m 15 Aug 2023, 5:05:29 pm</p>

<p>Photo ID: 12</p> <p>Plot Number: 3</p> <p>Vegetation classification or exclusion clause: Class A Forest</p> <p>Description/justification of classification: Eucalypt and Melaleuca trees to 20m high; 30-70% foliage cover with shrubs in the middle storey.</p>	 <p>South East Elevation 339°NW (T) ±26 m ▲ -1 m 15 Aug 2023, 5:13:26 pm</p>
<p>Photo ID: 13</p> <p>Plot Number: 3</p> <p>Vegetation classification or exclusion clause: Class A Forest</p> <p>Description/justification of classification: Melaleuca forest to 10m high; 30-70% foliage cover with ladder fuels.</p>	 <p>South East Elevation 308°NW (T) ±7 m ▲ 0 m 15 Aug 2023, 5:13:40 pm</p>
<p>Photo ID: 14</p> <p>Plot Number: 3</p> <p>Vegetation classification or exclusion clause: Class A Forest</p> <p>Description/justification of classification: Melaleuca forest to 10m high; 30-70% foliage cover with ladder fuels.</p>	 <p>South East Elevation 347°NW (T) ±15 m ▲ -1 m 15 Aug 2023, 5:14:23 pm</p>

<p>Photo ID: 15</p> <p>Plot Number: 3</p> <p>Vegetation classification or exclusion clause: Class A Forest</p> <p>Description/justification of classification: Melaleuca forest to 10m high; 30-70% foliage cover with ladder fuels.</p>	 <p>South East Elevation 330°NW (T) ±21 m ▲ -5 m 15 Aug 2023, 5:15:57 pm</p>
<p>Photo ID: 16</p> <p>Plot Number: 3</p> <p>Vegetation classification or exclusion clause: Class A Forest</p> <p>Description/justification of classification: Melaleuca forest to 10m high; 30-70% foliage cover with ladder fuels.</p>	 <p>South West Elevation 52°NE (T) ±4 m ▲ 0 m 15 Aug 2023, 5:15:14 pm</p>
<p>Photo ID: 17</p> <p>Plot Number: 3</p> <p>Vegetation classification or exclusion clause: Class A Forest</p> <p>Description/justification of classification: Eucalypt and Melaleuca trees to 20m high; 30-70% foliage cover with shrubs in the middle storey.</p>	 <p>North East Elevation 253°SW (T) ±6 m ▲ 0 m 15 Aug 2023, 5:16:22 pm</p>

<p>Photo ID: 18</p> <p>Plot Number: 3</p> <p>Vegetation classification or exclusion clause: Class A Forest</p> <p>Description/justification of classification: Eucalypt and Melaleuca trees to 20m high; 30-70% foliage cover with shrubs in the middle storey.</p>	
<p>Photo ID: 19</p> <p>Plot Number: 3</p> <p>Vegetation classification or exclusion clause: Class A Forest</p> <p>Description/justification of classification: Eucalypt and Melaleuca trees to 20m high; 30-70% foliage cover with shrubs in the middle storey.</p>	
<p>Photo ID: 20</p> <p>Plot Number: 5</p> <p>Vegetation classification or exclusion clause: Exclusion Clause 2.2.3.2(e)</p> <p>Description/justification of classification: Non vegetated area; cleared development stages for residential lots – future road and residential lots.</p>	

<p>Photo ID: 21</p> <p>Plot Number: 5</p> <p>Vegetation classification or exclusion clause: Exclusion Clause 2.2.3.2(e)</p> <p>Description/justification of classification: Non vegetated area; cleared development stages for residential lots – future road and residential lots.</p>	 <p>West Elevation 121°E (T) ±9 m ▲ 5 m 15 Aug 2023, 5:36:48 pm</p>
<p>Photo ID: 22</p> <p>Plot Number: 5</p> <p>Vegetation classification or exclusion clause: Exclusion Clause 2.2.3.2(e)</p> <p>Description/justification of classification: Non vegetated area; cleared development stages for residential lots – future road and residential lots.</p>	 <p>59°NE (T) ±5 m ▲ 4 m 15 Aug 2023, 5:38:35 pm</p>
<p>Photo ID: 23</p> <p>Plot Number: 5</p> <p>Vegetation classification or exclusion clause: Exclusion Clause 2.2.3.2(e)</p> <p>Description/justification of classification: Non vegetated area; cleared development stages for residential lots – future road and residential lots.</p>	 <p>Checking street address ... 63°NE (T) ±12 m ▲ 5 m 15 Aug 2023, 5:40:23 pm</p>

Photo ID: 24

Plot Number: 5

Vegetation classification or exclusion clause:

Exclusion Clause 2.2.3.2(e)

Description/justification of classification:

Non vegetated area; cleared development stages for residential lots – future road and residential lots.



Relevant Fire Danger Index

The fire danger index for this site has been determined in accordance with Table 2.1 in AS3959–2018.

Fire Danger Index:	Table
FDI : 80	2.5

Effective Slope

The effective slope under the classified vegetation is outlined in the following table.

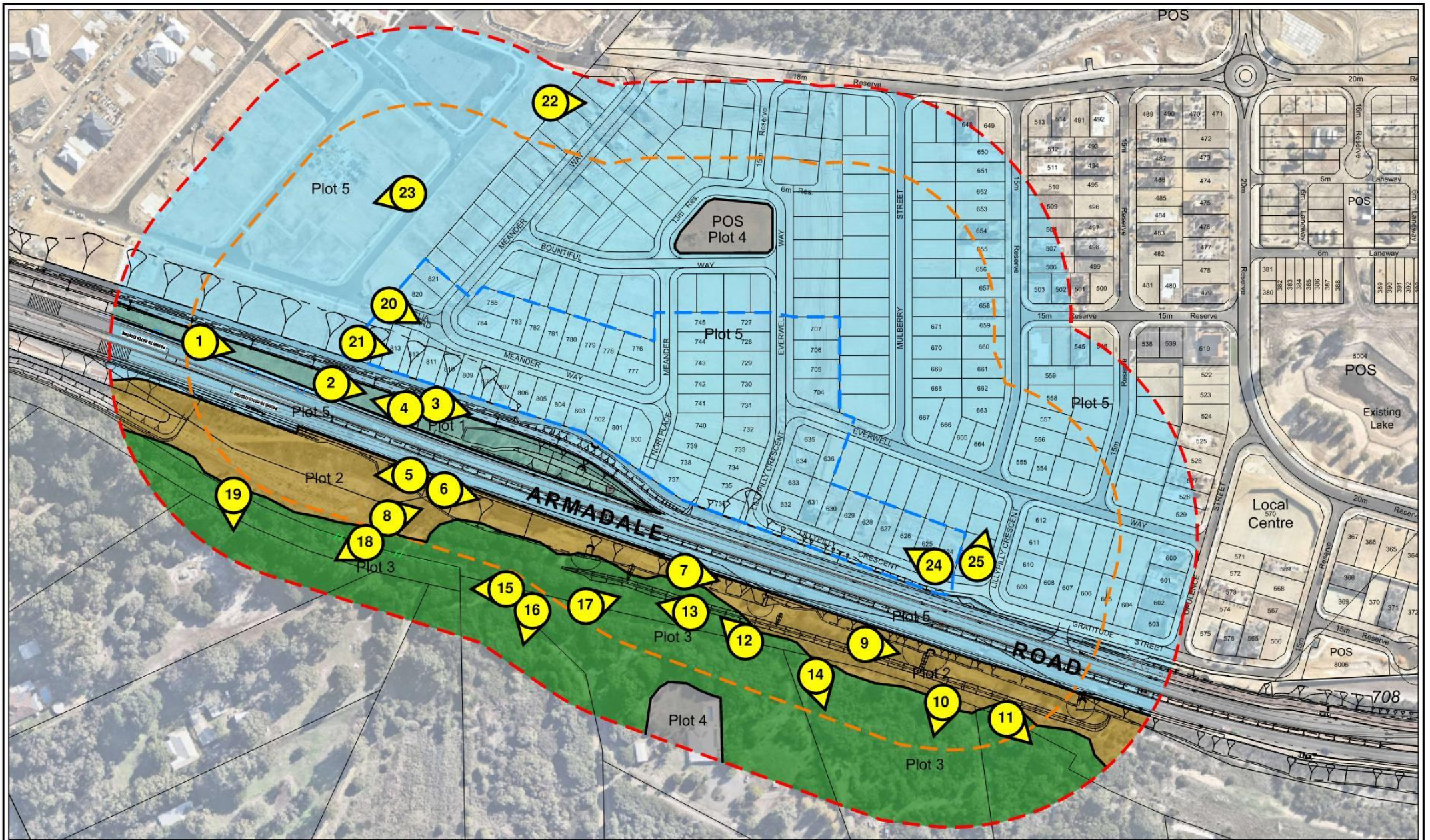
Plot No.	Classified Vegetation	Effective slope
1	Class C Shrubland	Flat
2	Class D Scrub	Downslope 0-5°
3	Class A Forest	Flat
4	Exclusion Clause 2.2.3.2 (f)	N/A
5	Exclusion Clause 2.2.3.2(e)	N/A

Determined Bushfire Attack Level

The determined Bushfire Attack Level (highest BAL) for the lots has been determined in accordance with clause 2.2.6 of AS3959-2018 using the above analysis.

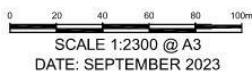
Potential Bushfire Impacts

The predicted radiant heat flux levels into the site from the assessment are outlined below in Table 1 and the BAL Contour Plan.



Location details: Lots 705 & 707 Armadale Road
 Treeby - Stage 5
 Assessment date: August, 2023
 Prepared by: Bushfire Safety Consulting
 Accreditation level: Level 3 BPAD Practitioner
 Accreditation number: BPAD 23160
 Accreditation expiry date: 31st January, 2024
 Date aerial photo: April, 2023

VEGETATION CLASSIFICATION MAP (BAL CONTOUR MAP)



LEGEND:

- SUBJECT LAND
- ASSESSMENT AREA (150m) FROM THE EXTERNAL BOUNDARY OF THE SUBJECT SITE
- ASSESSMENT AREA (100m) FROM THE EXTERNAL BOUNDARY OF THE SUBJECT SITE

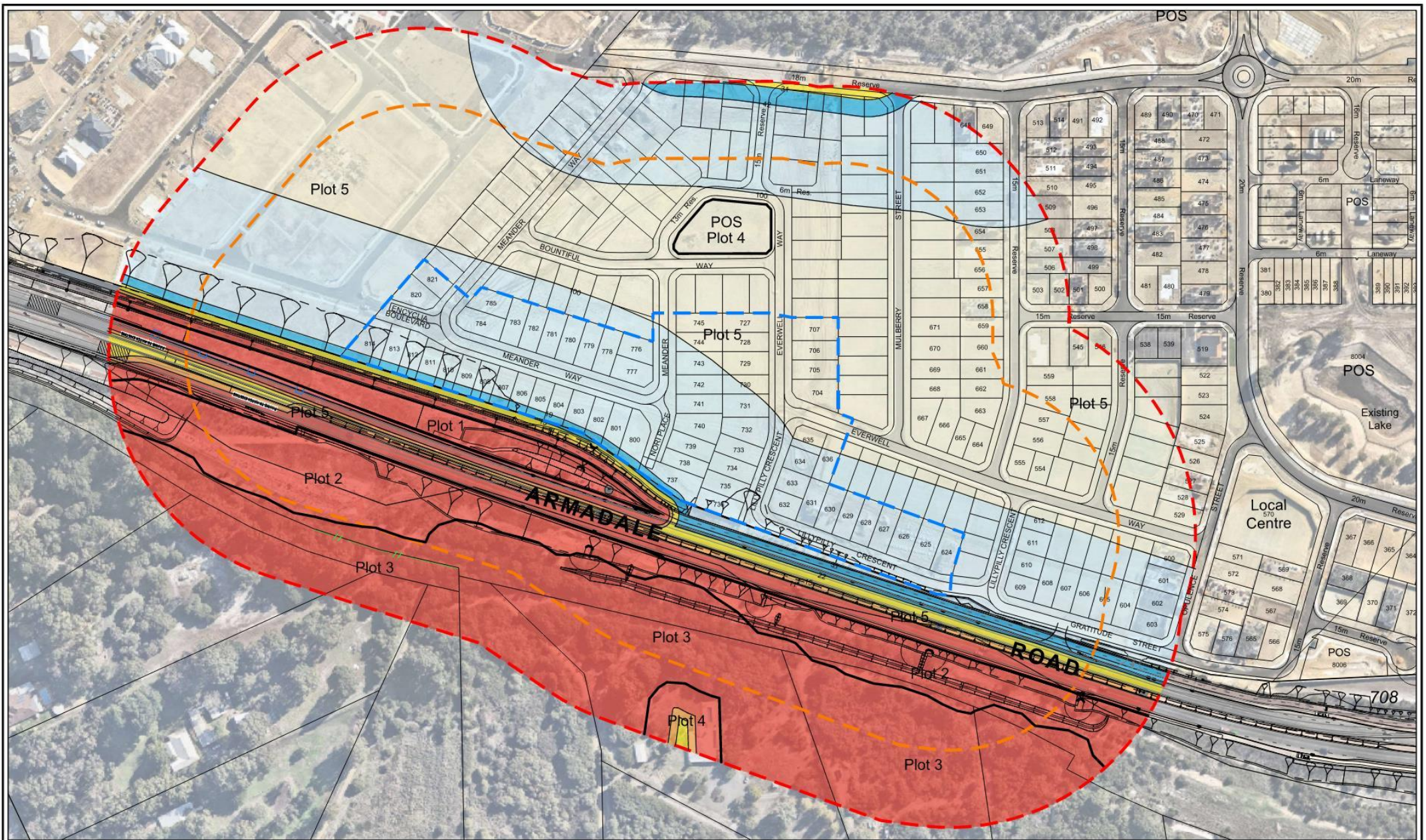
- PLOT 1 - CLASS C SHRUBLAND - FLAT
- PLOT 2 - CLASS D SCRUB - DOWNSLOPE 0-5
- PLOT 3 CLASS A FOREST - FLAT
- PLOT 4 EXCLUSION CLAUSE 2.2.3.2(i)
- PLOT 5 - EXCLUSION CLAUSE 2.2.3.2(e)

SOURCE OF PHOTOGRAPHY: NEARMAP

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 Mbl: 0429 949 262
 www.bushfiresafety.net

Table 1: BAL Inputs and BAL Ratings					
Lots	Vegetation Class	Plot No.	Slope	Setback Distance	BAL Rating
624 - 626	Class D Scrub	2	Downslope 0-5°	35.4 metres	BAL-12.5
627 - 629	Class D Scrub	2	Downslope 0-5°	37 metres	BAL-12.5
630	Class D Scrub	2	Downslope 0-5°	37.5metres	BAL-12.5
631	Class D Scrub	2	Downslope 0-5°	38.4 metres	BAL-12.5
632	Class D Scrub	2	Downslope 0-5°	39 metres	BAL-12.5
633	Class D Scrub	2	Downslope 0-5°	53.9 metres	BAL-12.5
634	Class D Scrub	2	Downslope 0-5°	69.4 metres	BAL-12.5
635	Class D Scrub	2	Downslope 0-5°	84 metres	BAL-12.5
636	Class D Scrub	2	Downslope 0-5°	68.8 metres	BAL-12.5
704 – 707	Class D Scrub	2	Downslope 0-5°	>100 metres	BAL-LOW
727 -728	Class C Shrubland	1	Flat	>100 metres	BAL-LOW
729	Class C Shrubland	1	Flat	92 metres	BAL-12.5
730	Class C Shrubland	1	Flat	80.9 metres	BAL-12.5
731	Class C Shrubland	1	Flat	69 metres	BAL-12.5
732	Class C Shrubland	1	Flat	60.6 metres	BAL-12.5
733	Class C Shrubland	1	Flat	47.7 metres	BAL-12.5
734	Class C Shrubland	1	Flat	37.7 metres	BAL-12.5
735	Class C Shrubland	1	Flat	25.6 metres	BAL-12.5
736	Class C Shrubland	1	Flat	19 metres	BAL-12.5
737	Class C Shrubland	1	Flat	13 metres	BAL-19
800 - 814	Class C Shrubland	1	Flat	13 metres	BAL-19
738	Class C Shrubland	1	Flat	23.8 metres	BAL-12.5

Lot	Vegetation Class	Number	Topography	Distance (metres)	BAL Rating
739	Class C Shrubland	1	Flat	31.6 metres	BAL-12.5
740	Class C Shrubland	1	Flat	43 metres	BAL-12.5
741	Class C Shrubland	1	Flat	52.9 metres	BAL-12.5
742	Class C Shrubland	1	Flat	62.8 metres	BAL-12.5
743	Class C Shrubland	1	Flat	73 metres	BAL-12.5
744	Class C Shrubland	1	Flat	86 metres	BAL-12.5
745	Class C Shrubland	1	Flat	>100 metres	BAL-LOW
777	Class C Shrubland	1	Flat	50 metres	BAL-12.5
776	Class C Shrubland	1	Flat	65 metres	BAL-12.5
778 -779	Class C Shrubland	1	Flat	48.4 metres	BAL-12.5
780 -784	Class C Shrubland	1	Flat	47.4 metres	BAL-12.5
785	Class C Shrubland	1	Flat	61.9 metres	BAL-12.5



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BAL CONTOUR MAP



SCALE 1:2300 @ A3
 DATE: OCTOBER 2023



- LEGEND:
- SUBJECT LAND
 - ASSESSMENT AREA (150m) FROM THE EXTERNAL BOUNDARY OF THE SUBJECT SITE
 - ASSESSMENT AREA (100m) FROM THE EXTERNAL BOUNDARY OF THE SUBJECT SITE

SOURCE OF PHOTOGRAPHY: NEARMAP

INDICATIVE BUSHFIRE ATTACK LEVELS

- BAL LOW
- BAL 12.5
- BAL 19
- BAL 29
- BAL 40
- BAL FLAME ZONE

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Appendix 1: Additional Information / Advisory Notes

A Bushfire Attack Level (BAL) Assessment is a means of measuring the severity of a buildings potential exposure to ember attack, radiant heat and direct flame contact from a bushfire event, and thereby determining the construction measures required for the dwelling.

The method used to determination of the BAL rating, and subsequent building construction standards, are directly referenced from Australian Standard *AS3959-2018 Construction of buildings in bushfire prone areas*.

The BAL rating is determined through the identification and assessment of the following parameters:

- Fire danger Index (FDI) rating; assumed to be FDI-80 for Western Australia
- All classified vegetation **within 100m** of the subject building
- Separation distance between the building and the classified vegetation
- Slope of the land under the classified vegetation

AS3959-2018 has six (6) levels of BAL, based on the radiant heat flux exposure to the building, and also identifies the relevant sections for building construction as detailed below;

Bushfire Attack Level (BAL)	Classified Vegetation within 100m of the site and heat flux exposure thresholds	Description of predicted bushfire attack and levels of exposure	Construction Sections (within AS3959)
BAL-LOW	See Clause 2.2.3.2	There is insufficient risk to warrant specific construction requirements	4
BAL-12.5	$\leq 12.5 \text{ kW/m}^2$	Ember attack	3 & 5
BAL-19	$> 12.5 \text{ kW/m}^2$ to $\leq 19 \text{ kW/m}^2$	Increasing levels of ember attack and burning debris ignited by windbourne embers together with increasing heat flux	3 & 6
BAL-29	$> 19 \text{ kW/m}^2$ to $\leq 29 \text{ kW/m}^2$	Increasing levels of ember attack and burning debris ignited by windbourne embers together with increasing heat flux	3 & 7
BAL-40	$> 29 \text{ kW/m}^2$ to $\leq 40 \text{ kW/m}^2$	Increasing levels of ember attack and burning debris ignited by windbourne embers together with increasing heat flux with the increased likelihood of exposure to flames	3 & 8
BAL-FZ	$> 40 \text{ kW/m}^2$	Direct exposure to flames from fire front in addition to heat flux and ember attack	3 & 9