range
environmental
consultants

Bushfire Management Report

1401 Pierces Creek Road, Pierces Creek

CLIENT: DARRAN AND NAOMI HUTCHINGS

PROJECT NO.	J002256
STATUS	FINAL
DATE	24/04/2026
VERSION	1

Disclaimer

Range Environmental provides this report directly and exclusively to Darran and Naomi Hutchings (the client) for their sole use and solely for the specific purpose for which it is supplied. This report is not to be distributed to any other party without the consent of Range Environmental and Range Environmental will not be liable to any other entity other than the Client in relation to any matters dealt with in this report. Third parties (including, but not limited to, successors or assigns of the Client) may not rely on anything contained in this report whatsoever. The Client indemnifies Range Environmental against any claim, loss, expense, damage or the like arising from any third party which results from the Client providing this report to that third party without the prior knowledge or consent of Range Environmental.

This report has been prepared based on the information, documentation and representations given by the Client to Range Environmental. The Client releases Range Environmental from any claim for damage, cost, loss, expense or the like which is caused or contributed to by the incorrect, inaccurate, false, misleading, or deceptive information, documentation or representations given by the Client to Range Environmental. The validity and comprehensiveness of any information given by the Client has not been independently verified by Range Environmental and, for the purposes of this report, it is assumed that the information provided to Range Environmental is both complete and accurate.

Where site inspections, testing, surveying, or fieldwork have taken place, this report is based on the site conditions and information made available by the Client or their agents or nominees during the visit, the visual observations, and any subsequent discussions with regulatory authorities. It is further assumed that normal activities were being undertaken at the site on the day of the site visit(s), unless explicitly stated otherwise.

The Client acknowledges that this Report and all information and content in it shall at all times be and remain the property of Range Environmental and must not be disclosed to any third party at any time, except with the prior consent of Range Environmental or where the Client is required by statute, rule, regulation, judicial process or in connection with any litigation to which it is a party.

It must be borne in mind that the measures dealt with in this report cannot guarantee that a building will survive a bushfire event. This is due mainly to the unpredictable nature and behaviour of fire and the difficulties associated with extreme weather conditions.

It must also be stated that this report is based on site conditions prevailing at the time the inspection was undertaken. These conditions can and will change dependent on both weather conditions and the maintenance undertaken by property owners.

This fire report has been prepared on the basis that bushfire mitigation measures identified are implemented and maintained into the future. Failure to maintain these measures may contribute to the development being exposed to a higher level of bushfire threat and attack.

As site conditions can and will change over time this report is valid for a period of 2 years. Where a development application is lodged greater than 2 years following the version date of this report Range Environmental Consultants are to be contacted to ensure accuracy of this report.

Document Control

Version	Purpose	Lead Author	Reviewer	Approved by	Date
1.	Final Report	HB	WG	LMT	24/04/2026

Table of Contents

Table of Tables

Table of Figures

Table of Photographs

Table of Appendices

1 Introduction

Range Environmental was engaged by Darran and Naomi Hutchings to prepare a Bushfire Management Report for an proposed development at 1401 Pierces Creek Road, Pierces Creek (Figure 1) (formally described as Lots 8 and 9 RP861104, hereafter 'the site'). A development application for boundary realignment is proposed to be submitted to Toowoomba Regional Council (TRC) (Appendix A and Figure 2).

This bushfire hazard assessment is provided as an attached supporting document in accordance with development application and allows for assessment against the TRCPS (2012 Version 28) Bushfire Hazard Overlay Code and the SPP (2017) Natural hazards, risk and resilience (Bushfire) assessment requirements. A summary of site details is provided in Table 1.

Table 1 Summary of Site Details

Site details	
Address	1401 Pierces Creek Road, Pierces Creek
Lot on Plan	Lots 8 and 9 RP861104
Area	48.65 and 52.57 ha (respectively)
Local Government Area	Toowoomba Regional Council (TRC)
Planning Scheme/Local Plan	Toowoomba Regional Council Planning Scheme (TRPS) 2012 Version 28
Vegetation Management Act 1999 (VMA 1999)	Category X, Category C & Category B
Area Classification/Zone	Rural
Proposed Landuse	Rural

1.1 Site Context and Proposed Development

The site is bounded by Pierces Creek Road to the northeast (Figure 1). Rural properties are located in all directions surrounding site that contain areas of unmanaged bushland areas.

The proposed development comprises a two (2) into two (2) rural lot boundary realignment as shown in Appendix A and Figure 2.

The proposed Lot 8 contains an existing dwelling and associated infrastructure, and proposed Lot 9 is currently vacant, with no existing infrastructure present. As existing infrastructure does not require further assessment, this Bushfire Management Report largely assesses the proposed bushfire risk and mitigation measures to facilitate development on proposed Lot 9.

The site contains varying slopes due to the presence of gullies, with underlying slopes in the order of 6 to 34%, or 10 to 19 degrees (Figure 3). The real property descriptions of adjacent properties are provided in Figure 4 for where references to these are made. The following photographs provide an overview of the condition of the site at the time of site assessment.

Photograph 1 View of VHC 13.2 in the proposed development envelope

Photograph 2 View of VHC 13.2 in the proposed Lot 9

Photograph 3 View of VHC 13.2 in the proposed Lot 9 with weed encroachment

Photograph 4 View to of VHC 13.2 within the site to the west of the development

Photograph 5 View of typical vegetation within the eastern extent of the site

Photograph 6 View of VHC 40.4 within the existing easement north of the development envelope

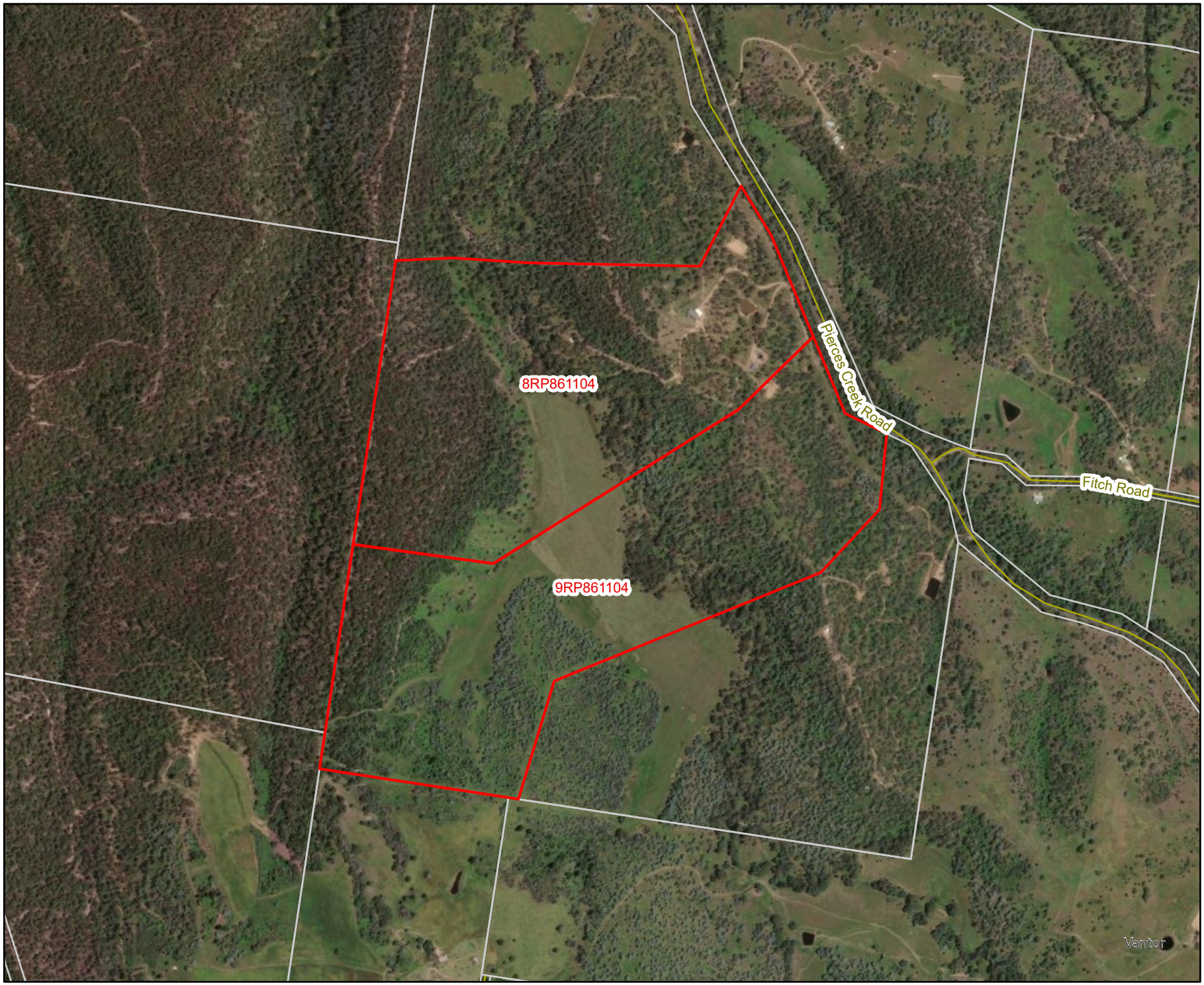


Figure 1 Site Locality

Project: 1401 Pierces Creek Road, Pierces Creek

Client: Darran and Naomi Hutchings

Project No.: J002757

Compiled by: HannahBakker Date: 24/03/2026
Approved by: Will Gibson Date: 24/03/2026

Metres
0 140 280

Legend

- Cadastre
- Roads
- Site boundary

The content of this document includes third party data. Range Environmental Consultants does not guarantee the accuracy of such data.

Source: Cadastral data sourced from DNRME (2026). Aerial imagery sourced from NearMap (2026).

N

range environmental consultants

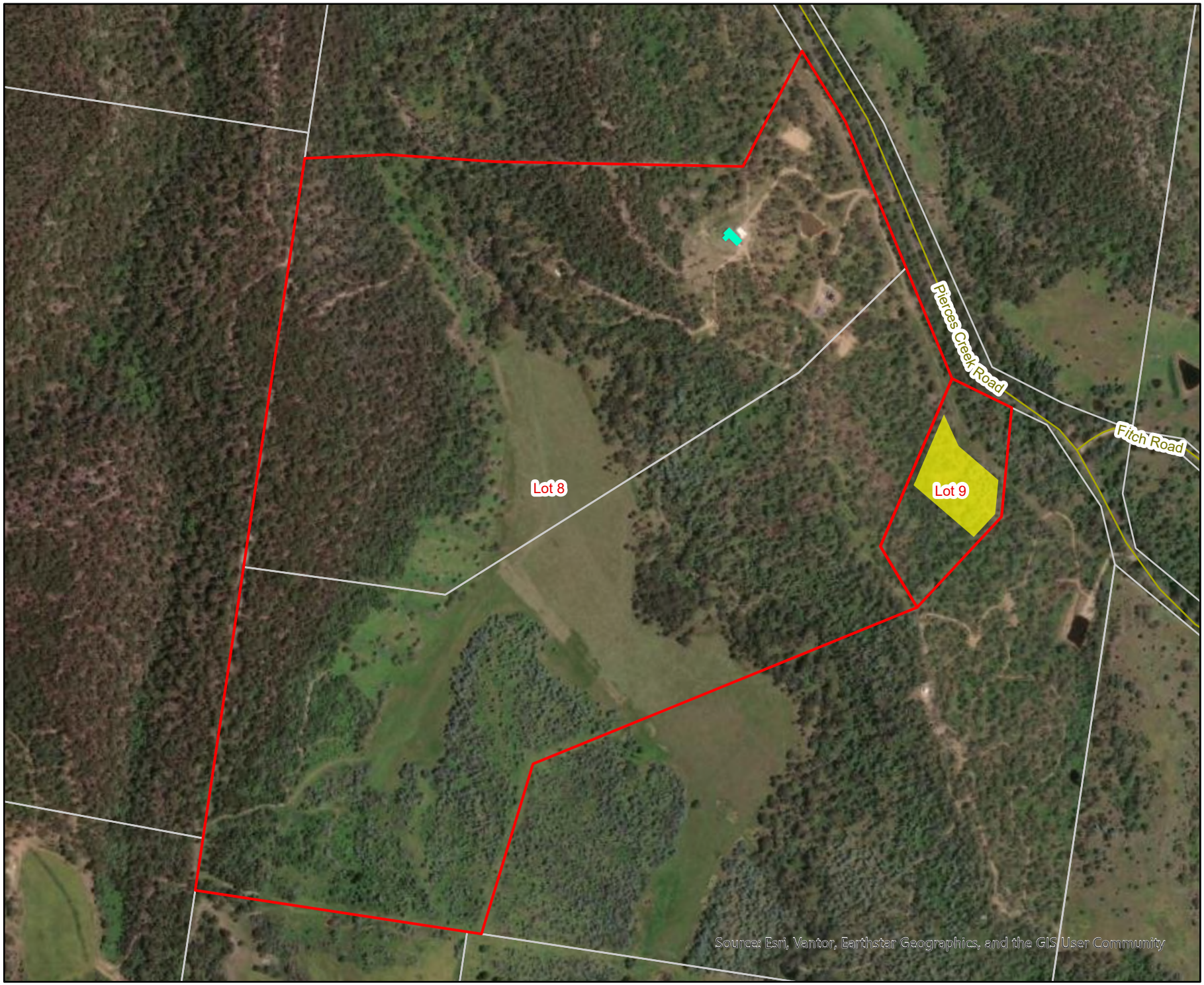


Figure 2 Proposed Development

Project: 1401 Pierces Creek Road, Pierces Creek

Client: Darran and Naomi Hutchings

Project No.: J002757

Compiled by: HannahBakker Date: 24/03/2026
Approved by: Will Gibson Date: 24/03/2026

Metres
0 90 180

Legend

- Cadastre
- Roads
- Lot layout
- Existing dwelling
- Proposed development envelope

The content of this document includes third party data. Range Environmental Consultants does not guarantee the accuracy of such data.

Source: Cadastral data sourced from DNRME (2026). Aerial imagery sourced from NearMap (2026).

N

range environmental consultants

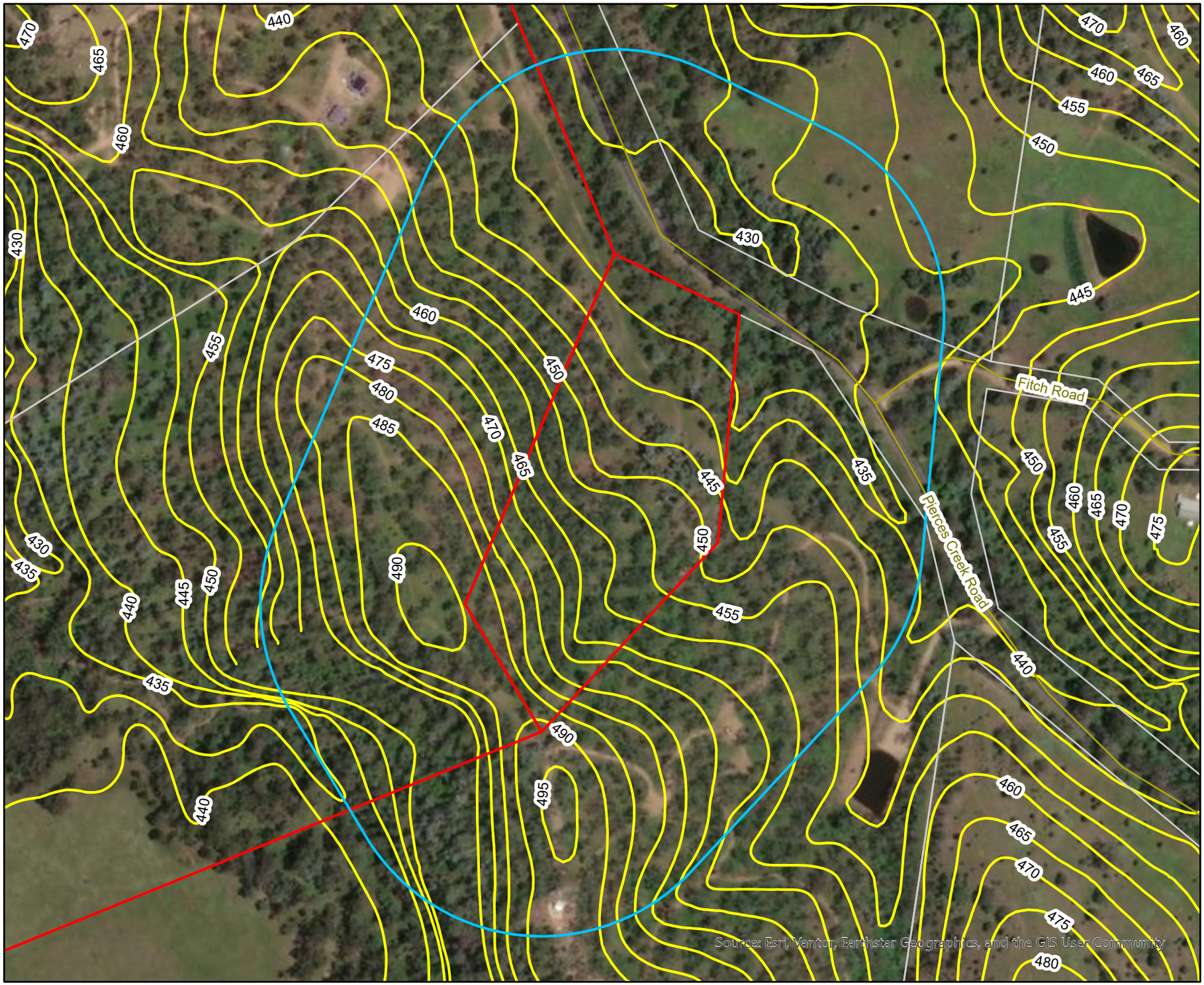


Figure 3 Topography of the Site

Project: 1401 Pierces Creek Road, Pierces Creek

Client: Darran and Naomi Hutchings

Project No.: J002757

Compiled by: HannahBakker Date: 24/03/2026
Approved by: Will Gibson Date: 24/03/2026

Metres
0 40 80

Legend

- Cadastre
- Roads
- 150m buffer
- Lot layout
- Contours (5m)

The content of this document includes third party data. Range Environmental Consultants does not guarantee the accuracy of such data.

Source: Cadastral data sourced from DNRME (2026). Aerial imagery sourced from NearMap (2026).

N

range environmental consultants

Figure 4
Real Property Descriptions for Adjacent Lots

Project: 1401 Pierces Creek Road, Pierces Creek

Client: Darran and Naomi Hutchings

Project No.: J002757

Compiled by: HannahBakker Date: 24/03/2026
Approved by: Will Gibson Date: 24/03/2026

Metres
0 40 80

Legend

- Cadastre
- Roads
- Lot layout

The content of this document includes third party data. Range Environmental Consultants does not guarantee the accuracy of such data.

Source: Cadastral data sourced from DNRME (2026). Aerial imagery sourced from NearMap (2026).

N

range environmental consultants

2 Vegetation

The majority of the site is classified as Category B (remnant) vegetation across the eastern and western extents of the site, with the central extent of the site comprising Category C (high-value regrowth) and Category X (non-remnant) vegetation. The field assessment conducted by Range Environment Consultants identified that the canopy layer within the proposed development extent aligned with RE 12.11.14, with the understorey layer dominated by the woody environmental weed lantana in areas not subject to weed management.

The extent of mapped vegetation in the area and its conservation status is shown in Figure 5, with Table 2 providing a description of the mapped REs.

Table 2 Description of regional ecosystems for the site

Regional Ecosystem	12.12.2	**Conservation Status**	Least concern
Description	Eucalyptus pilularis tall open forest with shrubby or grassy understorey. Other canopy species include Syncarpia glomulifera or S. verecunda, Angophora woodsiana, Eucalyptus microcorys, E. resinifera, E. tindaliae, E. propinqua and E. saligna. Occurs on Mesozoic to Proterozoic igneous rocks. Not a Wetland. (BVG1M: 8b).		
Regional Ecosystem	12.3.3	**Conservation Status**	Endangered
Description	Eucalyptus tereticornis woodland. Eucalyptus crebra and E. moluccana are sometimes present and may be relatively abundant in places, especially on edges of plains and higher level alluvium. Other species that may be present as scattered individuals or clumps include Angophora subvelutina or A. floribunda, Corymbia clarksoniana, C. intermedia, C. tessellaris, Lophostemon suaveolens and E. melanophloia. Occurs on Quaternary alluvial plains, terraces and fans where rainfall is usually less than 1000mm/y. Not a Wetland. (BVG1M: 16c).		
Regional Ecosystem	12.3.7	**Conservation Status**	Least concern
Description	Narrow fringing woodland of Eucalyptus tereticornis, Casuarina cunninghamiana subsp. cunninghamiana +/- Melaleuca viminalis. Other species associated with this RE include Melaleuca bracteata, M. trichostachya, M. linariifolia. North of Brisbane Waterhousea floribunda commonly occurs and may at times dominate this RE. Melaleuca fluviatilis occurs in this RE in the north of the bioregion. Lomandra hystrix often present in stream beds. Occurs on fringing levees and banks of rivers and drainage lines of alluvial plains throughout the region. Riverine. (BVG1M: 16a).		
Regional Ecosystem	12.11.14	**Conservation Status**	Of concern
Description	Eucalyptus crebra, E. tereticornis, Corymbia intermedia grassy woodland. Other species including Eucalyptus melanophloia, Corymbia clarksoniana, C. erythrophloia, C. tessellaris, E. siderophloia, Angophora spp. May be present in low densities or in patches. Mid-layer generally sparse but can include low trees such as Vachellia bidwillii, Capparis spp., Dodonaea triquetra, Alphitonia excelsa and Xanthorrhoea spp. Occurs on mid and lower slopes on Palaeozoic and older moderately to strongly deformed and metamorphosed sediments and interbedded volcanics. Not a Wetland. (BVG1M: 13c).		
Regional Ecosystem	12.11.19	**Conservation Status**	Of concern
Description	Eucalyptus fibrosa subsp. fibrosa woodland +/- Corymbia citriodora subsp. variegata, E. crebra, E. moluccana, E. acmenoides or E. portuensis, E. tereticornis, Angophora leiocarpa. Isolated patches of Eucalyptus sideroxylon on western margins of bioregion (e.g. Wondai SF). Occurs on drier ridges and slopes in sub-coastal and inland parts of the bioregion on Palaeozoic and older moderately to		

	strongly deformed and metamorphosed sediments and interbedded volcanics. Not a Wetland. (BVG1M: 9h).		
Regional Ecosystem	12.11.3	**Conservation Status**	Least concern
Description	Eucalyptus siderophloia and E. propinqua open forest +/- E. microcorys, Lophostemon confertus, Corymbia intermedia, E. biturbinata, E. acmenoides, E. tereticornis, E. moluccana, Angophora leiocarpa, Syncarpia verecunda with vine forest species and E. grandis or E. saligna in gullies. Eucalyptus pilularis and E. tindaliae sometimes present e.g. mid D'Aguilar Range, Conondale Range. Occurs predominantly on hills and ranges of Palaeozoic and older moderately to strongly deformed and metamorphosed sediments and interbedded volcanics. Not a Wetland. (BVG1M: 9a).		
Regional Ecosystem	12.12.24	**Conservation Status**	Least concern
Description	Eucalyptus carnea or E. tindaliae, Corymbia intermedia woodland +/- E. crebra or E. siderophloia, Eucalyptus resinifera, Eucalyptus major, E. helidonica, Angophora woodsiana, C. trachyphloia, E. microcorys, Corymbia citriodora subsp. Variegata, C. henryi. Occurs on Palaeozoic and older moderately to strongly deformed and metamorphosed sediments and interbedded volcanics usually at altitudes <300 metres. Not a Wetland. (BVG1M: 9g).		
Regional Ecosystem	12.2.25	**Conservation Status**	Of concern
Description	Corymbia henryi and/or Eucalyptus fibrosa subsp. fibrosa woodland. Other frequently occurring canopy species may include Eucalyptus crebra, E. carnea, E. tindaliae, E. siderophloia, C. citriodora subsp. variegata, Angophora leiocarpa, E. acmenoides, E. helidonica, E. propinqua, C. intermedia and E. seeana. Rarely includes patches of E. dura. Usually occurs on low hills, hills and footslopes of mountains in near coastal areas on Palaeozoic and older moderately to strongly deformed and metamorphosed sediments and interbedded volcanics. Not a Wetland. (BVG1M: 10b).		
Regional Ecosystem	12.9-10.18	**Conservation Status**	Of concern
Description	Angophora leiocarpa, Eucalyptus crebra woodland +/- E. longirostrata, Corymbia citriodora subsp. variegata. Other species such as Eucalyptus tereticornis, Corymbia trachyphloia subsp. trachyphloia and C. intermedia may be present in scattered patches or in low densities. Understorey can be grassy or shrubby. Occurs on Cainozoic and Mesozoic sediments. Not a Wetland. (BVG1M: 9h).		
Regional Ecosystem	12.9-10.19	**Conservation Status**	Least concern
Description	Eucalyptus fibrosa subsp. fibrosa woodland +/- Corymbia citriodora subsp. variegata, E. acmenoides or E. portuensis, Angophora leiocarpa, E. major. Understorey often sparse. Localised occurrences of Eucalyptus sideroxylon. Occurs on Cainozoic and Mesozoic sediments. Not a Wetland. (BVG1M: 12a).		
Regional Ecosystem	12.9-10.20	**Conservation Status**	Of concern
Description	Eucalyptus montivaga woodland. Associated species vary from place to place but include Corymbia trachyphloia subsp. trachyphloia, Eucalyptus acmenoides and C. intermedia in the north of the bioregion and E. helidonica, C. gummifera, E. resinifera, Angophora woodsiana in subregion 6 (Crows Nest area). Occurs on Cainozoic and Mesozoic sediments. Not a Wetland. (BVG1M: 8b).		

The information above was sourced from the Queensland Herbarium (2024) Regional Ecosystem Description Database (REDD). Version 13 (May 2024) (DES: Brisbane).

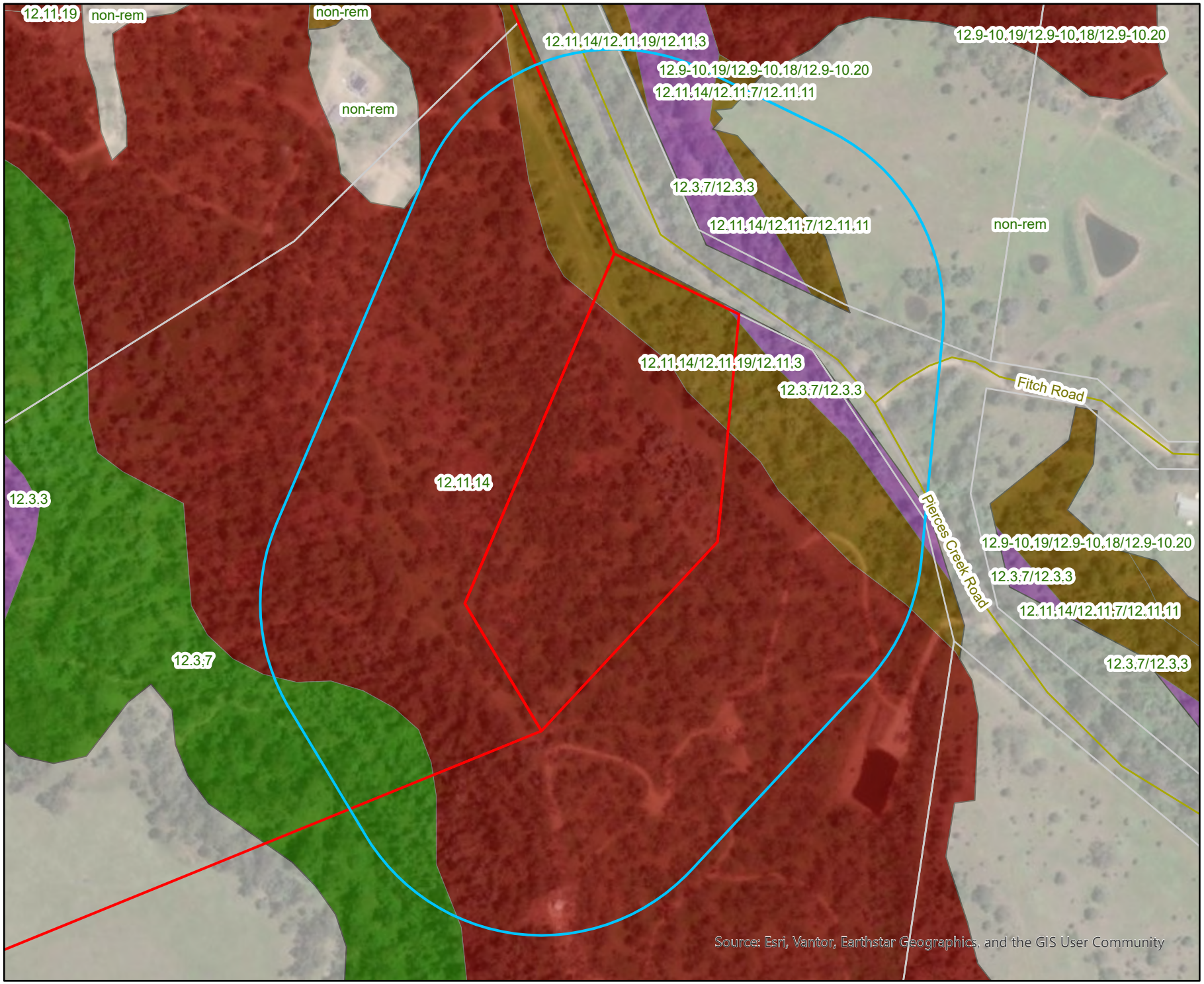


Figure 5
Regulated Vegetation and Regional Ecosystems

Project: 1401 Pierces Creek Road, Pierces Creek

Client: Darran and Naomi Hutchings

Project No.: J002757

Compiled by: HannahBakker Date: 24/03/2026
Approved by: Will Gibson Date: 24/03/2026

Metres
0 40 80

Legend

- Cadastre
- Roads
- 150m buffer
- Lot layout
- Category A or B containing endangered
- Category A or B containing of concern
- Category A or B that is of least concern
- Category C or R containing endangered
- Category C or R containing of concern
- Category C or R that is of least concern
- Water
- Non-remnant

Source: Cadastral data sourced from DNRME (2026). Aerial imagery sourced from NearMap (2026).

N

range environmental consultants

3 Bushfire

Appendix B provides an overview of the Queensland State-wide mapping methodology used to identify Bushfire Prone Areas.

3.1 Bushfire Hazard Mapping

The bushfire hazard for the site and surrounds as identified by the Queensland Government SPP Interactive Mapping System using the Statewide mapping methodology is shown in Figure 6. The Toowoomba Regional Council Bushfire Hazard Mapping indicates the site contains areas of Medium Fire Risk and is shown in Figure 7.

The site assessment identified that the bushfire hazard largely aligns with the levels mapped by the Queensland Government due to unmanaged native and invasive vegetation, and historical and current vegetation present on the site. Additional details are provided in Section 3.4 which identifies the VHCs present.

Under adverse conditions, a bushfire could potentially approach from virtually any direction. Severe fire weather conditions are typically associated with hot strong westerly to northerly winds. Bushfires in the area have the potential to generate quantities of embers that could impact on a building even though the fire does not necessarily reach it.

A field assessment was conducted to confirm the vegetation hazard classes (VHCs) present within and surrounding the site and the level of exposure to bushfire risk. VHCs are discussed in Section 3.4.

3.2 Fire Brigade

The development site is contained within the Queensland Fire and Rescue Service South Emu Creek Rural Command. The closest fire brigade to the site is the Crows Nest Fire & Rescue Station (auxiliary) located 28 Creek Street, Crows Nest approximately 15 kilometres by road to the southeast of the site.

The closest fire brigade equipped to fight structural fires is the Toowoomba Station (permanent) located at 11 Kitchener Street, Toowoomba approximately 59 kilometres by road to the south of the site.

3.3 Fire Run

The length of fire run influences the area in which a fire has to develop and reach its potential maximum intensity for the conditions prevailing at the time. It is important to assess the length of fire run to determine the potential scale and intensity of fires that may occur in the area. Fire runs less than 1 kilometre in length are generally considered to pose a lesser risk than those with a longer run. Fire runs may be modified by natural features such as creeks, rock formation and vegetation types and be influenced by weather and fuel conditions.

Areas of potentially hazardous vegetation are located in all directions of the proposed development. Fire runs in the area are extreme due to the extensive vegetation on the site and in surrounding landscape. Fire runs on site and in the surrounding landscape are extensive and over 1 km in length. Figure 8 shows the location of potential fire runs and the areas of the development that could be impacted on by a bushfire.

Figure 6 SPP Bushfire Hazard Map

Project: 1401 Pierces Creek Road, Pierces Creek

Client: Darran and Naomi Hutchings

Project No.: J002757

Compiled by: HannahBakker Date: 24/03/2026
Approved by: Will Gibson Date: 24/03/2026

Metres
0 40 80

Legend

- Cadastre
- Roads
- 150m buffer
- Lot layout
- Very High Potential Bushfire Intensity
- High Potential Bushfire Intensity
- Medium Potential Bushfire Intensity
- Potential Impact Buffer

The content of this document includes third party data. Range Environmental Consultants does not guarantee the accuracy of such data.

Source: Cadastral data sourced from DNRME (2026). Aerial imagery sourced from NearMap (2026).

N

range environmental consultants

Figure 7 TRC Bushfire Hazard Map

Project: 1401 Pierces Creek Road, Pierces Creek

Client: Darran and Naomi Hutchings

Project No.: J002757

Compiled by: HannahBakker Date: 24/03/2026
Approved by: Will Gibson Date: 24/03/2026

Metres
0 40 80

Legend

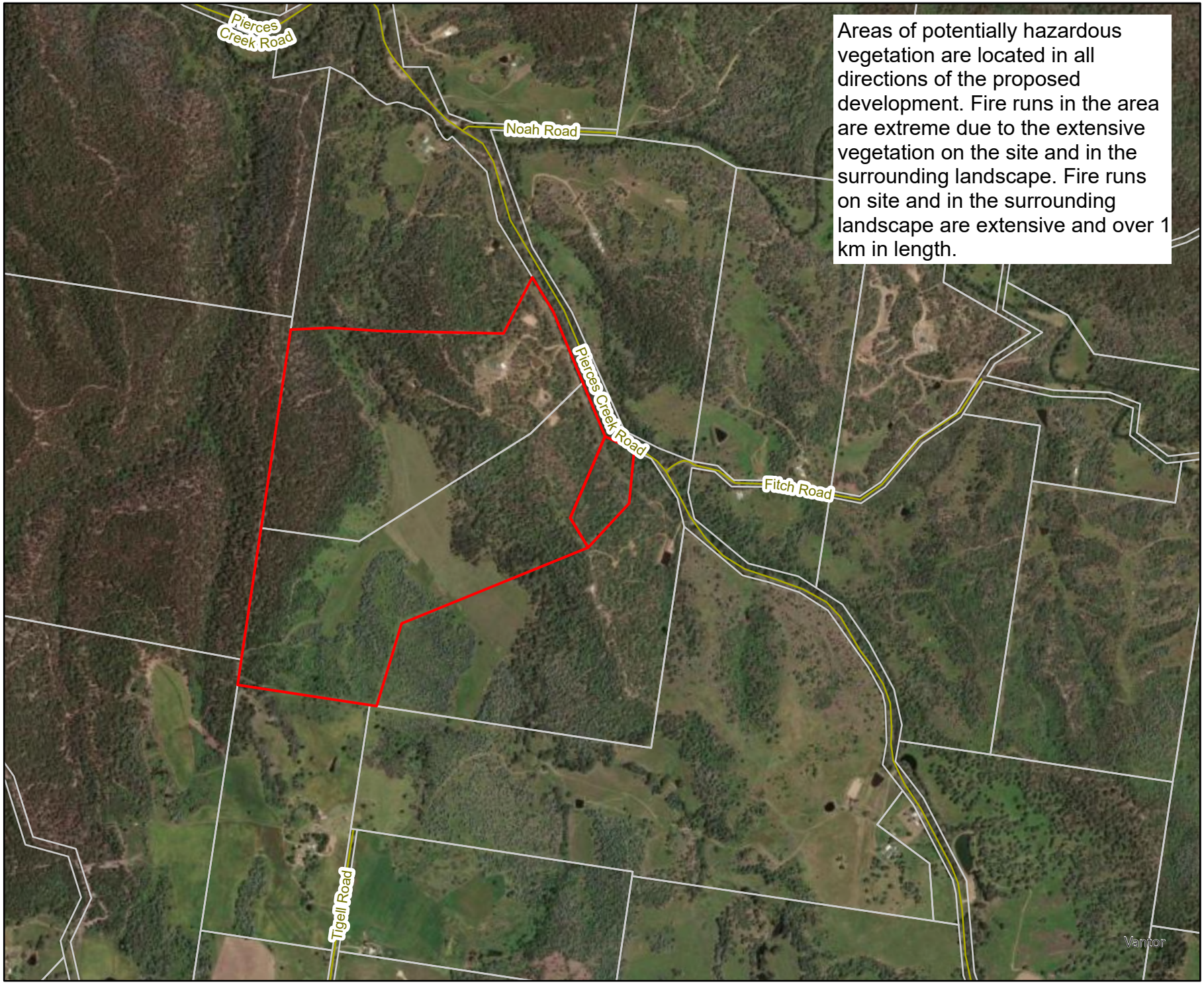
- Cadastre
- Roads
- 150m buffer
- Lot layout
- High Bushfire Hazard
- Medium Bushfire Hazard

The content of this document includes third party data. Range Environmental Consultants does not guarantee the accuracy of such data.

Source: Cadastral data sourced from DNRME (2026). Aerial imagery sourced from NearMap (2026).

N

range environmental consultants



Areas of potentially hazardous vegetation are located in all directions of the proposed development. Fire runs in the area are extreme due to the extensive vegetation on the site and in the surrounding landscape. Fire runs on site and in the surrounding landscape are extensive and over 1 km in length.

Figure 8 Potential Fire Runs

Project: 1401 Pierces Creek Road, Pierces Creek

Client: Darran and Naomi Hutchings

Project No.: J002757

Compiled by: HannahBakker Date: 24/03/2026
Approved by: Will Gibson Date: 24/03/2026

Metres
0 200 400

Legend

- Cadastre
- Roads
- Lot layout

The content of this document includes third party data. Range Environmental Consultants does not guarantee the accuracy of such data.

Source: Cadastral data sourced from DNRME (2026). Aerial imagery sourced from NearMap (2026).

N

range environmental consultants

3.4 Vegetation Hazard Classes

A field assessment was conducted to confirm the vegetation hazard classes (VHCs) present within and surrounding the development extent and the level of exposure to bushfire risk. Appendix B provides an explanation of the statewide methodology used to calculate potential fuel loads and VHCs.

The VHCs mapped for the development extent and immediate adjoining areas by the State-wide mapping methodology were VHC 12.2 Dry eucalypt woodlands on sandstone and shallow soils, VHC 13.2 Dry to moist eucalypt woodlands on undulating metamorphics and granite, VHC 16.2 Eucalyptus dominated woodland on drainage lines and alluvial plains, and VHC 40.4 Continuous low grass or tree cover (Figure 9).

Range Environmental completed a detailed site assessment to facilitate preparation of a representative vegetation hazard class map in relation to the site. Based on detailed field assessment, a site-based vegetation hazard class map has been produced to accurately determine potential bushfire hazards and resulting building requirements for the site.

Vegetation in the greater surrounding landscape (within 150m radius) aligned predominantly with VHC 13.2, with areas of VHC 40.4 present associated with existing roadways and power easements at the site. The ground truthed VHCs for the site and surrounds are shown in Figure 10.

Following the development for the site, a concept post-development VHC map is presented in Figure 11 which demonstrates the VHCs following establishment of a development envelope on proposed Lot 9 and the subsequent management of this area. Post-development, the identified development envelope on Lot 9 is to be located in areas of managed at low fuel loads consistent with VHC 39.2. Table 3 provides a summary of the mapped, ground truthed and post development VHCs and potential fuel loads.

Table 3 Vegetation Hazard Class and Potential Fuel Loads

Vegetation Hazard Class (VHC)	Surface and near surface Fuel Load (t/ha)	Total Fuel Load (t/ha)	Prone type[1]	Fuel continuity[2]
12.2 Dry eucalypt woodlands on sandstone and shallow soils	14.6	17.4	1	1
13.2 Dry to moist eucalypt woodlands on undulating metamorphics and granite	12.8	14.4	1	1
16.2 Eucalyptus dominated woodlands on drainage lines and alluvial plains	11.1	11.6	1	1
39.2 Low to moderate tree cover in built up areas	5	8	3	2
40.4 Continuous low grass or tree cover	4.5	5	2	1
42.6 Nil to very low vegetation cover	2	2	3	2

Fuel load data sources from Bushfire Resilient Communities Technical Reference Guide October 2019

The identification of VHCs determines the extent to which the vegetation contributes to prevailing bushfire hazard. All VHCs are identified as being one of three prone types[1], with prone types being a categorical indicator of the capacity of a VHC to support a significant bushfire. VHCs are also given a binary indicator of fuel continuity[2]. Continuous fuel vegetation generally has a consistent distribution of fuel. Discontinuous fuel types include non-hazardous vegetation or land uses.

VHC 39.2, 40.4 and 42.6 are considered non-bushfire prone VHCs under Bushfire Resilient Communities (2019) and BAL calculations using the SPP APZ calculator involving these VHCs results in a radiant heat flux of 0kW/m^2 (BAL-Low). VHC 40.4, while listed as a grass fire prone VHC with a continuous fuel load under Bushfire Resilient Communities (2019), is considered a non-hazardous VHC due to low fuels loads of 5t/ha or less and calculations using the SPP APZ calculator involving this VHC results in a radiant heat flux of 0kW/m^2 (BAL-Low).

The proposed development envelope on Lot 9 is to be located in areas of VHC 39.2, which has been assessed as having Potential Bushfire Hazard Class of 'Low hazard' (further detailed in Section 3.5).

[1] Prone type: 1= Bushfire prone, 2 = Grass fire prone, 3 = Low hazard

[2] Fuel continuity: 1= Continuous, 2 = Discontinuous

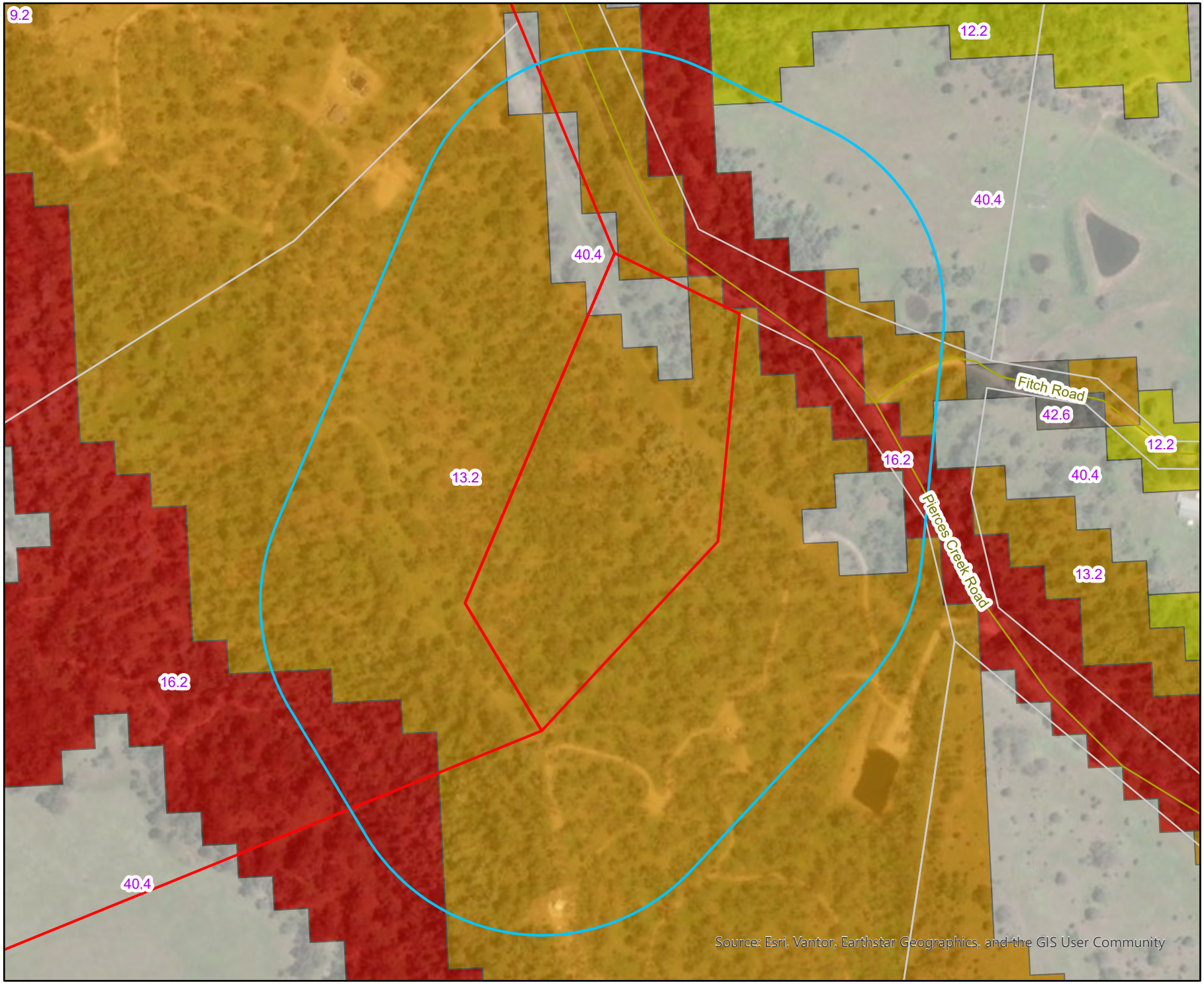


Figure 9 Vegetation Hazard Class Mapping

Project: 1401 Pierces Creek Road, Pierces Creek

Client: Darran and Naomi Hutchings

Project No.: J002757

Compiled by: HannahBakker Date: 24/03/2026
Approved by: Will Gibson Date: 24/03/2026

Metres
0 40 80

Legend

- Cadastre
- Roads
- 150m buffer
- Lot layout
- 9.2 Moist to dry eucalypt woodland on coastal lowlands and ranges
- 12.2 Dry eucalypt woodlands on sandstone and shallow soils
- 13.2 Dry to moist eucalypt woodlands on undulating metamorphics and granite
- 16.2 Eucalyptus dominated woodland on drainage lines and alluvial plains
- 40.4 Low grass or tree cover in rural areas
- 42.6 Nil to very low vegetation cover

Source: Cadastral data sourced from DNRME (2026). Aerial imagery sourced from NearMap (2026).

N

range environmental consultants

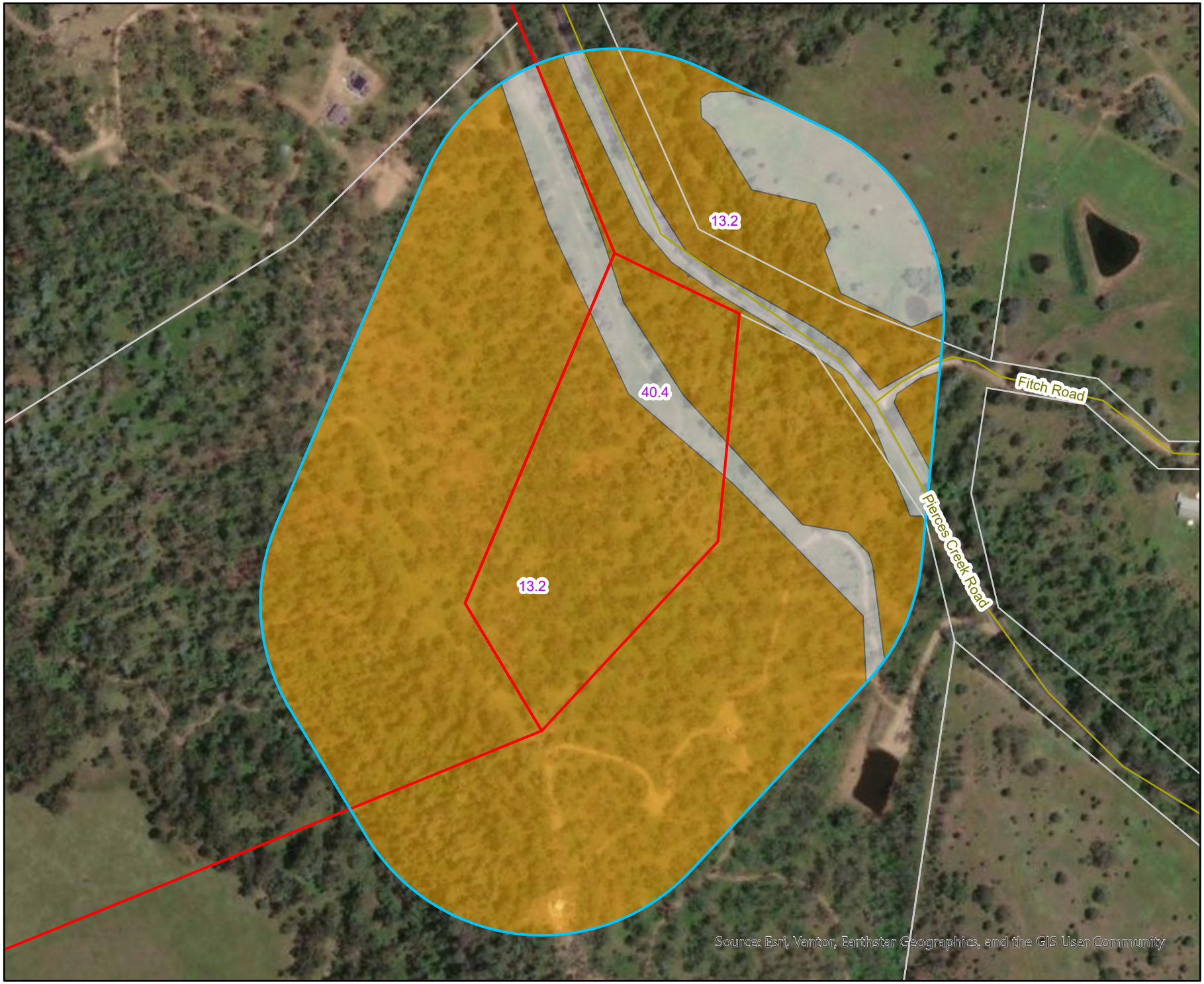


Figure 10 Ground Truthed VHCs

Project: 1401 Pierces Creek Road, Pierces Creek

Client: Darran and Naomi Hutchings

Project No.: J002757

Compiled by: HannahBakker Date: 24/03/2026
Approved by: Will Gibson Date: 24/03/2026

Metres
0 40 80

Legend

- Cadastre
- Roads
- 150m buffer
- Lot layout
- 13.2 Dry to moist eucalypt woodlands on undulating metamorphics and granite
- 40.4 Low grass or tree cover in rural areas

Source: Cadastral data sourced from DNRME (2026). Aerial imagery sourced from NearMap (2026).

N

range environmental consultants

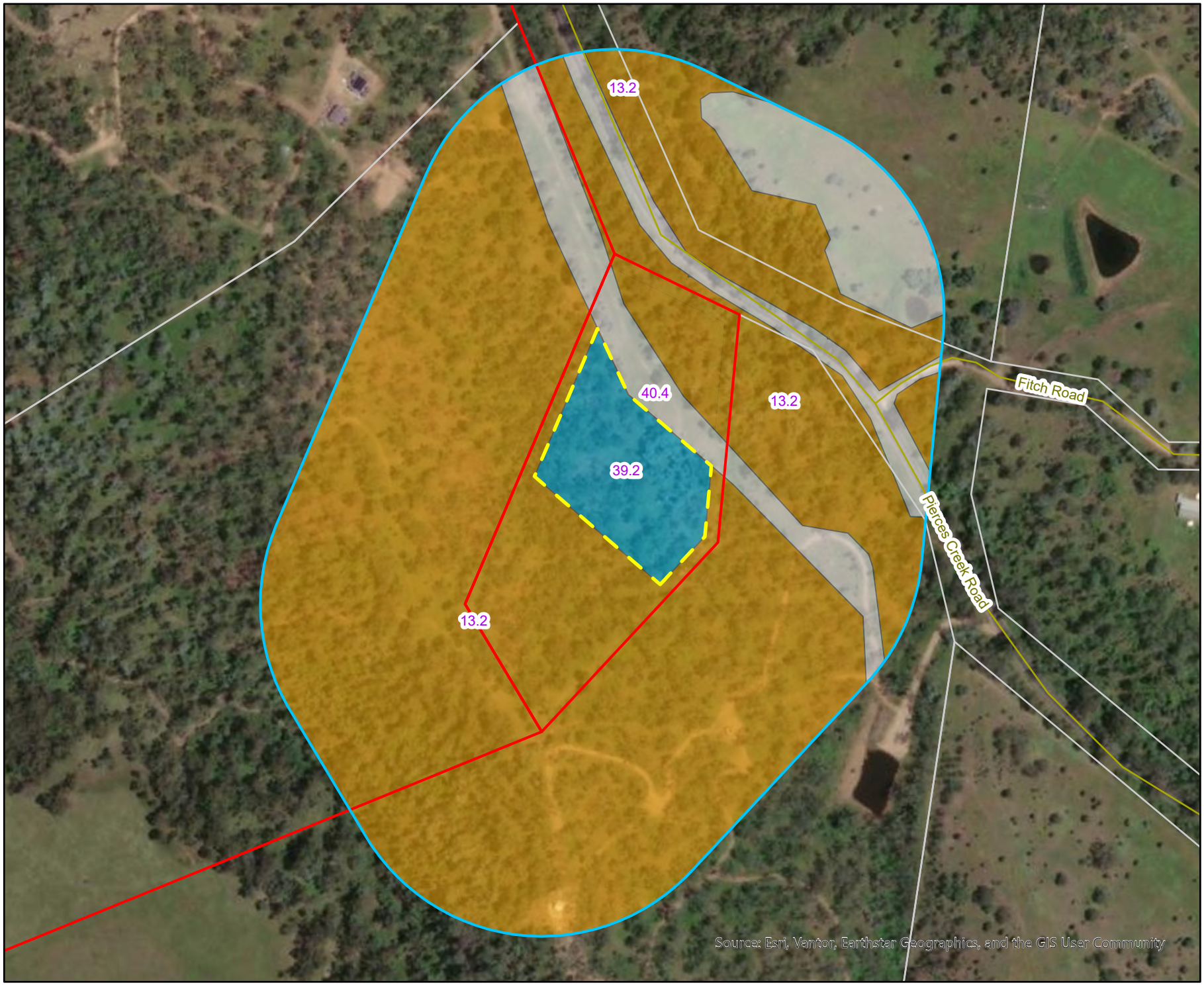


Figure 11 Post Development VHCs

Project: 1401 Pierces Creek Road, Pierces Creek

Client: Darran and Naomi Hutchings

Project No.: J002757

Compiled by: HannahBakker Date: 24/03/2026
Approved by: Will Gibson Date: 24/03/2026

Metres
0 40 80

Legend

- Cadastre
- Roads
- 150m buffer
- Lot layout
- Development envelope
- 13.2 Dry to moist eucalypt woodlands on undulating metamorphics and granite
- 39.2 Low to moderate tree cover in built-up areas
- 40.4 Low grass or tree cover in rural areas

Source: Cadastral data sourced from DNRME (2026). Aerial imagery sourced from NearMap (2026).

N

range environmental consultants

3.5 Potential Bushfire Hazard Classes

A 'fit for purpose' approach was undertaken to identify the bushfire risk present using the statewide mapping methodology in conjunction with local-scale vegetation and slope maps. The location of post-development VHCs on the site and in the surrounding landscape in conjunction with the underlying slope of land was utilised to develop Potential Bushfire Hazard Classes. The Potential Fireline Intensity calculator was used to calculate the Potential Fireline Intensity (kW/m) to which a Potential Bushfire Hazard Class was attributed. The maximum slope in any direction was used for each area of identified post-development VHC as outlined in Figure 10. Potentially hazardous vegetation is located level with the proposed development. Table 4 provides the various site attributes used to calculate the Potential Bushfire Hazard Class at representative locations around the site. Table 5 provides the correlation between Potential Fireline Intensity and Potential Bushfire Hazard Class.

Table 4 Attributes used to calculate the Potential Bushfire Hazard Class

Vegetation Hazard Class (VHC)	Potential Fuel Load (t/ha)	Potential Fire Weather Severity (FFDI)	Slope under hazardous vegetation (deg)	Potential Fireline Intensity (kw/m)	Potential Bushfire Hazard Class
13.2 Dry to moist eucalypt woodlands on undulating metamorphics and granite	14.4	60	1 - 10	8,954 – 16,661	Medium
39.2 Low to moderate tree cover in built up areas	8	60	1 - 10	2,763 – 5,142	Low
40.4 Continuous low grass or tree cover	5	60	10	2,009	Low

Table 5 Potential Bushfire Hazard Classes

Potential Bushfire Intensity Class	Potential Fire-line Intensity
1. Very high (potential intensity)	40,000+kW/m
2. High (potential intensity)	20,000 – 40,000kW/m
3. Medium (potential intensity)	4,000 – 20,000kW/m
4. Low hazard (potential impact buffer)	<4,000kW/m

Areas assessed as Low hazard within a 100-metre radius of vegetation mapped as comprising Medium Potential Intensity or higher were classified as 'Potential Impact Buffer'.

Following development of the site, Figure 12 identifies a post development potential bushfire hazard map for the proposed development. The maximum slope in any direction was used for each area of identified post development VHC as outlined in Figure 11. The methodology provided in Section 4.2.6 of Bushfire Resilient Communities (2019) was utilised to refine the mapping.

The location of vegetation in relation to the site is a key attribute to be considered when mapping bushfire hazards. In this situation, most of the potentially hazardous vegetation is located downslope and upslope of the proposed development envelope.

Additional details on the Bushfire Attack Level (BAL) that the site may be exposed to is provided in Appendix E Explanation of Bushfire Attack Levels.

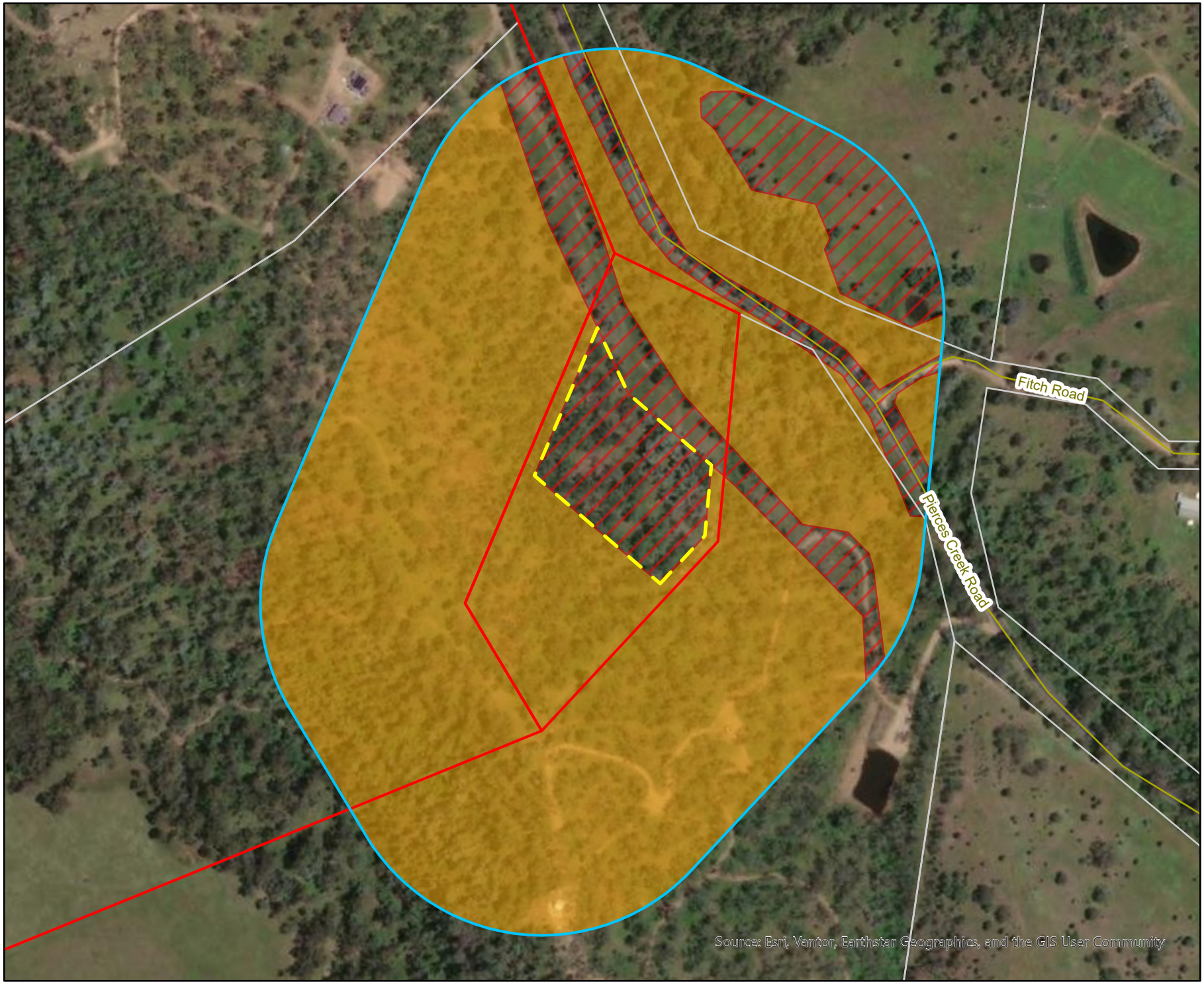


Figure 12 Post Development Potential Bushfire Hazard Map

Project: 1401 Pierces Creek Road, Pierces Creek

Client: Darran and Naomi Hutchings

Project No.: J002757

Compiled by: HannahBakker Date: 24/03/2026
Approved by: Will Gibson Date: 24/03/2026

Metres
0 40 80

Legend

- Cadastre
- Roads
- 150m buffer
- Lot layout
- Development envelope
- Medium potential intensity
- Potential impact buffer

The content of this document includes third party data. Range Environmental Consultants does not guarantee the accuracy of such data.

Source: Cadastral data sourced from DNRME (2026). Aerial imagery sourced from NearMap (2026).

N

range environmental consultants

4 Mitigating Potential Bushfire Impact

A number of actions should be implemented to mitigate the potential impacts of bushfire on the development. This suite of bushfire mitigation measures, when implemented in an integrated manner can achieve a better outcome for the site than when used individually and in isolation from other measures. This suite of potential measures is illustrated in Figure 13.

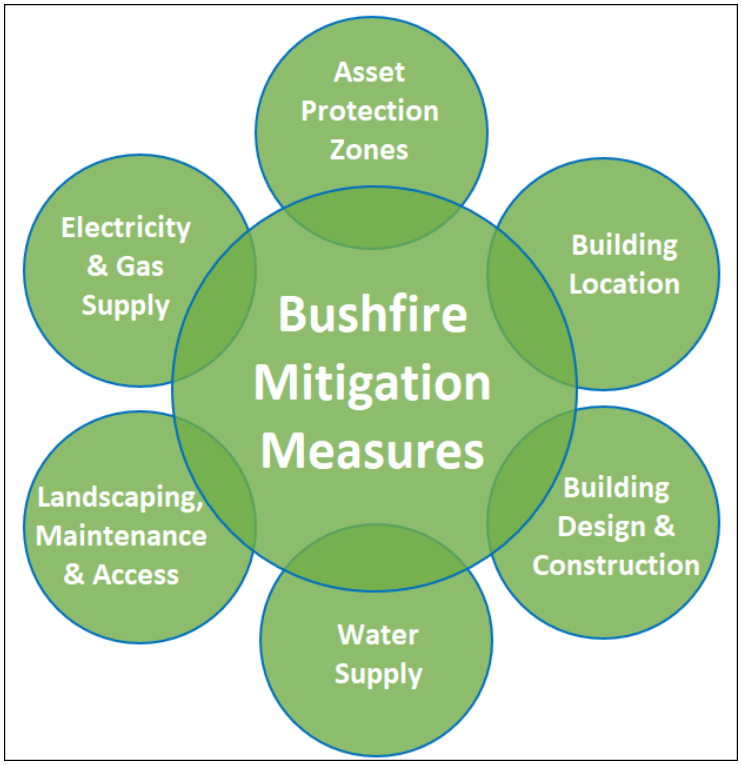


Figure 13 Bushfire mitigation measures in combination (Redrawn from Guideline for Building in Bushfire Prone Areas; Emergency Management Victoria 2016)

4.1 Building Location and Separation

The location of buildings and their relationship with vegetation in the immediate surrounding area is critical for maximising their survival in the event of a bushfire. The development layout has been designed to ensure that potential dwellings are able to achieve adequate minimum separation distances from potentially hazardous vegetation.

A development envelope has been identified for the site, with sufficient area to ensure that potential dwellings are able to achieve minimum separation distances from hazardous vegetation to enable a BAL of no greater than BAL-29 to be achieved (Appendix C).

4.1.1 Asset Protection Zones

The establishment of an Asset Protection Zone (APZ) is an effective mechanism for reducing bushfire hazards that a building may be exposed to. An APZ is a fuel-reduced area surrounding a built asset or structure. Potential bushfire fuels should be minimised within an APZ, so that the vegetation within it does not provide a path for the transfer of fire to the asset either from the ground level or through the tree canopy. An APZ, if designed correctly, implemented, and maintained regularly, will reduce the risk of:

- direct flame contact on the asset;

- damage to the built asset from intense radiant heat; and
- ember attack.

Additional details on creating and managing an APZ are provided in Appendix F Living in a Bushfire Prone Area.

4.2 Building Design and Construction

Careful design of new buildings in areas of mapped bushfire hazard needs to be undertaken, which includes consideration of site characteristics. Buildings should be constructed to meet the requirements of the relevant building standards and Council bylaws prevailing at the time to enable a building to be designed and constructed according to the site conditions. This includes the Building Code of Australia (BCA, 2022) and the Australian Standard for "Construction of buildings in bushfire-prone areas (AS3959 – 2018). Building issues can be adequately addressed during the design and construction phase with compliance to the National Construction Code and the Australian Standard for construction of buildings in bushfire-prone areas (AS3959-2018). Currently a site-specific assessment is required for all new dwellings being constructed in identified bushfire prone areas.

Indicative Bushfire Attack Levels (BAL) for a future dwelling located on Lot 9 within 100m of potentially hazardous vegetation (post development as assessed in Section 3.5) are in the order of BAL-12.5 to BAL-29, dependant on the final location of a dwelling within the lot. A BAL map is provided in Appendix C. A site-specific Bushfire Building Report should be prepared at the time of constructing a dwelling on a lot within 100m of potentially hazardous vegetation that that identifies actual building location, separation distances from potentially hazardous vegetation, level of vegetation management activities undertaken, BAL and level of construction required.

In assessing vegetation classes for forests, woodlands and rainforests, the classified vegetation will be determined by the unmanaged understorey rather than either the canopy (drip line) or trunk of any trees (AS3959-2018).

Appendix D Calculation of bushfire hazard contains information on the methodologies used to calculate the potential bushfire hazard that the site is exposed to and 0 has an explanation of BALs.

4.3 Access and Egress

Access to the site is via Pierces Creek Road to the north, and the proposed internal road network, all of which will be of all-weather construction.

4.3.1 Fire Trails

The development does not propose a new constructed road or fire maintenance trails due to the good site access from existing roads, the small extent of development (two into two lots), identification of a development envelope and separation distances achieved from potentially hazardous vegetation by the establishment of the identified asset protection zone at the time of constructing the dwelling on Lot 9.

All lots will be readily accessible by emergency service vehicles.

4.4 Vegetation Management

The majority of vegetation across the development extent comprises Category B (remnant) vegetation comprising a canopy layer consistent with RE 12.11.14, with the remainder of the development extent containing Category C (high-value regrowth) areas. Areas suitable for the construction of a dwelling are to be well-separated from areas of unmanaged vegetation. Ongoing vegetation management and control of woody weeds (such as lantana) will assist in the prevention of hazardous of potentially hazardous fuel loads accumulating. General site maintenance (i.e. slashing or mowing) within the development footprint and asset protection zone will limit the potential for the accumulation of potentially hazardous vegetation to occur.

4.4.1 Landscaping

The design, management, and maintenance of the landscape in the immediate vicinity of buildings are fundamental to the chances of survival of both people and buildings in a bushfire event. Vegetation provides the major fuel element in a bushfire. All vegetation, regardless of how succulent or green it is will eventually burn, provided the fire has sufficient intensity. Contrary to common belief, the area around the building does not need to be totally devoid of vegetation, and in fact some trees in this area can serve a valuable role in trapping embers before they impact on the asset. It is important however that:

- There are substantial gaps (of at least 2 - 5m) between the canopies of any trees in this area;
- There are no continuous fuels linked horizontally or vertically (smooth barked trees provide a lesser fuel ladder to the canopy than rough barked or ribbon barked species);
- Tree canopies do not overhang the roof;
- Surface and near surface fuels are kept to a minimum. This includes lawns to be kept short (less than 10 cm in height) and removal of accumulated leaf and bark litter;
- Avoidance of flammable mulches on garden beds such as woodchip or straw within 10 metres of dwellings; and
- Use of non-flammable mulches such as river pebbles or stones on garden beds near dwellings and buildings.

Guidelines for landscaping in fire prone areas are provided in Appendix G.

4.5 Water Supply

An adequate water supply suitable for firefighting purposes should be available at all times. The TRPS (2012 Version 28) Bushfire Hazard Overlay Code contains a provisions for bushfire prone areas which requires that the development be provided with a reliable water supply for fire-fighting purposes that is safely located and freely accessible. This can be achieved by:

- A dedicated on site water storage system that permanently holds a minimum of 10,000 litres (e.g. water tank) for fire fighting purposes and has fire brigade tank fittings.

The proposed development will be serviced by a dedicated on site water storage system that is capable of providing a fire-fighting water supply.

4.6 Prepare, Act, Survive

It is important that residents are well prepared during times of high fire danger and have well made plans that can be readily enacted in a time of bushfire emergency. This includes having plans in place to guide actions on days of extreme and catastrophic, identifying safe refuge areas and planning to either ‘stay’ or ‘go’. The key message being: Prepare, Act and Survive. The Queensland Fire and Emergency Services have information readily available to assist people living in bushfire prone areas to develop their own plans. Details can be downloaded from:

https://www.qfes.qld.gov.au/sites/default/files/2023-06/Bushfire-Safety-Guide_0.pdf and

https://bushfire-survival-plan.qfes.qld.gov.au/

4.7 Maintenance of Bushfire Mitigation Measures

This fire report has been prepared on the basis that bushfire mitigation measures identified are implemented and maintained into the foreseeable future. Failure to maintain these measures may contribute to the development being exposed to a higher level of bushfire threat and attack.

5 Planning Requirements

The Queensland Government's State Planning Policy (SPP) for Natural Hazards (Bushfire) contains development assessment requirements that developments in bushfire prone areas are required to address. Likewise, the TRPS (2012 Version 28) Bushfire hazard overlay code contains provisions to protect the safety of people and property in bushfire risk areas. The Code proposes Performance outcomes and Acceptable outcomes which have been addressed through Proposed Solutions.

5.1 State Planning Policy – Bushfire

The State Planning Policy (July 2017) provides a comprehensive set of principles which underpin Queensland's planning system to guide local government and the state government in land use planning and development assessment. The State's interest in relation to natural hazards is: "The risks associated with natural hazards are avoided or mitigated to protect people and property and enhance the community's resilience to natural hazards". The State Planning Policy (July 2017) development assessment requirements have been addressed in Table 6.

Table 6 State Planning Policy development assessment requirements (Natural hazards, risk and resilience - Bushfire)

Assessment Benchmark	Development Assessment Requirement	Proposed Solution
Applicable development	A development application for a material change of use, reconfiguration of a lot or operational works on premises in any of the following: 1. bushfire prone areas 2. flood hazard areas 3. landslide hazard areas 4. storm tide inundation areas 5. erosion prone area.	Development is a Reconfiguration of a Lot (RoL) that will result in the boundary realignment of two (2) into two (2) rural lots with lots sizes between 3.93 ha to 97.29 ha. Development is proposed in an area identified as bushfire prone.
3	Bushfire, flood, landslide, storm tide inundation, and erosion prone areas outside the coastal management district: Development other than that assessed against (1) above, avoids natural hazard areas, or where it is not possible to avoid the natural hazard area, development mitigates the risks to people and property to an acceptable or tolerable level.	PS1. The development is located in an area of mapped Potential Impact Buffer and Medium, High and Very High Potential Bushfire Intensity by the Queensland Government Development Assessment Mapping System Natural Hazards Risk and Resilience mapping (Bushfire). The Toowoomba Regional Council Bushfire Hazard Overlay Code mapping identifies the site as being contained within an area of Medium bushfire hazard. A site assessment was conducted to confirm the presence of mapped VHC classes and the level of potential bushfire hazard present. A Bushfire Management Plan was prepared that identifies measures to mitigate the risks to people and property to an acceptable level. Included in the hazard assessment were identification of vegetation hazard class (VHC) present and the calculation of Bushfire Attack Levels. Mitigation measures identified include: 1. Establishment of Asset Protection Zones at the time of constructing new dwellings on the site; 2. Buildings to comply with relevant standards of building construction including the BCA and AS3959-2018. Indicative Bushfire Attack Levels (BAL) for proposed Lot 9 (post

		development as assessed in Section 3.5) are in the order of BAL-12.5 to BAL-29, dependant on the final location of a dwelling within the lot. A BAL map is provided in Appendix C. A site-specific Bushfire Building Report should be prepared at the time of constructing a dwelling on Lot 9 which identifies the actual building location, separation distances from potentially hazardous vegetation, level of vegetation management activities undertaken, BAL and level of construction required. 3. Provision of an adequate water supply that can be readily accessed for fire-fighting purposes; and 4. Adequate ingress and egress to the site. Provided the measures identified in the bushfire management plan are implemented and maintained, the bushfire risk to people, property and infrastructure can be kept to an acceptable level.
4	All natural hazard areas: Development supports and does not hinder disaster management response or recovery capacity and of capabilities.	PS2. Development, comprising a boundary realignment is proposed to occur at the site in an area mapped by the Queensland Government Development Assessment Mapping System as comprising Potential Impact Buffer and Medium, High and Very High Potential Bushfire Intensity. The development actively assists and supports disaster management capacity and capabilities by: 1. Providing ready access to a water supply suitable for fire-fighting purposes. This can be achieved by provision of a dedicated on site water storage system that permanently holds a minimum of 10,000 litres at the time of constructing infrastructure on the site; 2. Managing potentially hazardous fuel loads on the site; and 3. The design and construction of dwellings in accordance with AS3959:2018
5	All natural hazard areas:	PS3.

	Development directly, indirectly and cumulatively avoids an increase in the severity of the natural hazard and the potential for damage on the site or to other properties	The development takes into consideration topography, location of existing vegetation and potential natural hazards. The site comprises open forest. Mitigation measures identified include: 1. Maintenance of vegetation (including understorey) on the site to prevent the accumulation of hazardous fuel loads; 2. Ongoing management of woody environmental and highly flammable weeds on the site such as lantana in the vicinity of dwellings; 3. Landscaping near buildings to consist of plants that have low flammability.
6	All natural hazard areas: Risks to public safety and the environment from the location of hazardous materials and the release of these materials as a result of a natural hazard are avoided.	PS4. Development is a rural boundary realignment. It does not involve the location or use of hazardous materials on the site. In this situation there is no potential for the release of these materials as a result of a natural hazard event.
7	All natural hazard areas: The natural processes and the protective function of landforms and the vegetation that can mitigate risks associated with the natural hazard are maintained or enhanced.	PS5 The development seeks to maintain and enhance the protective function of landforms and vegetation present on the site by: 1. Ongoing and effective management of environmental weeds on the site; and 2. Ensuring that any landscape plantings are compatible with the natural environment and do not contribute to an elevated bushfire hazard. Incorporation of these measures in the development will enable natural processes and functions to continue and aid in the mitigation of risks associated with potential natural hazards.

5.2 Toowoomba Regional Council (TRC) Planning Scheme – Bushfire

The Toowoomba Regional Planning Scheme (TRPS) (2012 Version 28) contains a Bushfire hazard overlay code.

1. The purpose of this code is to protect the safety of people and property in bushfire risk areas.
2. The purpose of the code will be achieved through the following overall outcomes:
   a. development does not increase the exposure of people and property to an unacceptable bushfire hazard risk;
   b. development located in a bushfire risk area is designed to mitigate the bushfire risk through siting, design and management measures;
   c. development provides access and evacuation routes for both private and emergency service vehicles which are appropriate to the nature of the development and the level of bushfire risk;
   d. development for essential community infrastructure is able to function effectively during and immediately after a bushfire event;
   e. public health and safety and the environment are not put at risk by development involving the manufacture and/or storage of hazardous goods in a bushfire hazard area;
   f. the reconfiguration of land appropriately responds to bushfire hazard having regard to the appropriate siting of future development and access for evacuation; and
   g. development provides access to an adequate water supply for firefighting purposes.

This code identifies performance outcomes and acceptable outcomes. Where appropriate, this Code has been applied to the development and outcomes proposed to comply with the accepted development and assessment benchmarks. Table 7 and Table 8 provide responses to the Bushfire hazard overlay code.

Table 7 Bushfire Hazard Overlay Code –requirements for accepted development and assessment benchmarks for assessable development

Performance outcomes	Acceptable Outcomes	Proposed solutions
PO1 Development is provided with an adequate water supply for fire-fighting purposes that is safely located and freely accessible.	**AO1.1** Development within a water supply area involving the creation of a new lot/s or involving proposed and existing buildings with a combined gross floor area greater than 50m^2, is connected to Council's reticulated water supply system It will be readily available at all times for fire fighting vehicles and a water supply outlet located within the road reserve is within 40m of the following: 1. All of the land; or 2. A building envelope designated on each lot; or 3. The centre of each lot, excluding access handles (where no building envelope is designated); and 4. All existing and proposed buildings And Fire hydrants are designed and installed in accordance with Queensland Fire and Emergency Services Fire Hydrant and Vehicle Access Guidelines, unless otherwise specified by the relevant water entity **AO1.2** Development outside a water supply area involving proposed or existing buildings with a combined gross floor area greater than 50m^2, are provided with a dedicated on site water storage system that permanently holds a minimum of 10,000 litres (e.g. dam, swimming pool or water tank) for fire fighting purposes. **AO1.3**	**PS1.1** Not applicable. The site is located outside of a reticulated water supply area. **PS1.2** Where a lot doesn't have access to a reticulated water supply in accordance with AO1.1, a dedicated on-site water storage system that permanently holds a minimum of 10,000 litres for fire-fighting purposes is to be provided at the time of constructing a dwelling on that lot. **PS1.3** Where a water tank is provided for firefighting purposes, then it is to comply with the requirements of AO1.3

	A water tank is provided within 10m of each building (other than a class 10 building) which: a. Is either below ground level or of non-flammable construction; b. Has a take-off connection at a level that allows the following dedicated, static water supply to be left available for access by fire fighters: i. 10,000 litres for residential buildings; ii. For industrial, commercial and other buildings: a volume specified in AS2304- 2011; c. Includes shielding of tanks and pumps in accordance with AS2304-2011; d. Includes a hardstand area allowing medium rigid vehicle (15 tonne fire appliance) access within 6m of the tank; e. Is provided with rural fire brigade tank fittings if serviced by a rural fire brigade (i.e. 50mm ball valve and male camlock coupling and, if underground, an access hole of 200mm (minimum) to accommodate suction lines); and f. Is clearly identified by directional signage at the street frontage	
PO2 Development provides for the safety of people and people by avoiding areas of High or Medium bushfire risk.	**AO2.1** Development is located on land that is not subject to High or Medium bushfire hazard. OR **AO2.2** Where development is located in a High or Medium bushfire hazard area (except for single dwellings on existing lots), it complies with a Bushfire Management Plan for the premises.	**PS2.1** The proposed development extent is mapped by Council as being wholly contained within areas of Medium Bushfire Hazard. Mapping by the Queensland Government identifies the bushfire hazard as comprising Potential Impact Buffer and Medium, High and Very High Potential Bushfire Intensity. **PS2.2** A Bushfire Management Plan has been prepared for the site which identifies the standard of building required,

		emergency fire-fighting water supplies and ingress and egress requirements. New buildings to be constructed are to comply with current relevant building standards. This includes the Building Code of Australia (Parts 1 and 2) and AS3959-2018.
PO3 Development provides for the safety of people and property by mitigating the bushfire risk through the siting of buildings.	**AO3.1** Buildings and structures: a. are sited in locations of lowest hazard within the lot; and b. achieve setbacks from hazardous vegetation of 1.5 times the predominant mature canopy tree height or 10 metres, whichever is the greater; and c. are 10 metres from any retained vegetation strips or small areas of vegetation; and d. are sited so that elements of the development least susceptible to fire are sited closest to the bushfire hazard.	**PS3.1** a. Suitable areas are available on proposed Lot 9 which enable future buildings are able to be located in areas of least hazard. Sufficient area is available on for a future dwelling on Lot 9 to achieve a BAL of BAL-12.5 to BAL-29, dependant on the final location of a dwelling within the lot. (post development as assessed in Section 3.5); and b. A concept APZ for a future dwelling on Lot 9 allows a future dwelling to achieve a minimum separation distance of 13m to the southwest and 22m northeast from potentially hazardous vegetation to be exposed to a maximum BAL of 29 (Appendix C). The height of mature canopy trees on the site is in the order of 20 to 25 metres. The Australian Standard AS3959-2018 allows for the construction of buildings closer to vegetation than this provided that they are built to a higher standard; and c. Implementation of an APZ at the time of constructing a dwelling on Lot 9 will ensure a separation distance sufficient to achieve a maximum BAL-29 between buildings and bushland areas; and

		d. Elements least susceptible to fire such as tennis courts or swimming pools should be located closest to the bushfire hazard. Appendix D provides additional information on the level of bushfire hazard posed to buildings and the methodology used to calculate it. A site-specific Bushfire Building Report should be prepared at the time of constructing a dwelling that that identifies actual building location, separation distances from potentially hazardous vegetation, level of vegetation management activities undertaken, BAL and level of construction required

Table 8 Bushfire Hazard Overlay Code- assessment benchmarks for assessable development

Performance Outcomes	Acceptable Outcomes	Proposed Solutions
For all Development		
PO1 Community infrastructure is only located in a bushfire medium and high risk area where the function and role of the infrastructure necessitates its location in the area and there are no suitable alternative sites in a low bushfire hazard area.	No acceptable outcome is nominated.	N/A
PO2 Community infrastructure is able to function effectively during and immediately after bushfire events.	**AO2.1** The community infrastructure is located on land that is not subject to High or Medium bushfire risk; or **AO2.2** The community infrastructure will not involve any new building work other than a minor extension (<20 m^2 Gross Floor Area) to an existing building; or **AO2.3** The community infrastructure development is located within a bushfire hazard area (as identified in the Bushfire Hazard Overlay Maps) but is designed to function effectively during and immediately after bushfire events.	N/A
Water Supply		
PO3 Development is provided with an adequate water supply for fire fighting purposes that is safely located and freely accessible.	**AO3.1** Development within a water supply area involving the creation of a new lot/s or involving proposed and existing buildings with a combined gross floor area greater than 50m^2, is connected to Council's reticulated water supply system. It will be readily available at all times for fire fighting	**PS3.1** Development is not located within a Council reticulated water supply area. A dedicated on-site water storage system that permanently holds a minimum of 10,000 litres for fire-fighting purposes is to be

	vehicles and a water supply outlet located within the road reserve is within 40m^2 of the following: a. All of the land; or b. A building envelope designated on each lot; or c. The centre of each lot, excluding access handles (where no building envelope is designated); and d. All existing and proposed buildings And Fire hydrants are designed and installed in accordance with Queensland Fire and Emergency Services' Fire Hydrant and Vehicle Access Guidelines, unless otherwise specified by the relevant water entity. **AO3.2** Development outside a water supply area involving proposed or existing buildings with a combined gross floor area greater than 50m^2, are provided with a dedicated on site water storage system that permanently holds a minimum of 10,000 litres (e.g. dam, swimming pool or water tank) for fire fighting purposes. **AO3.3** A water tank is provided within 10m of each building (other than a class 10 building) which: a. Is either below ground level or of non-flammable construction; b. Has a take-off connection at a level that allows the following dedicated, static water supply to be left available for access by fire fighters: i. 10,00 litres for residential buildings; ii. (For industrial, commercial; and other buildings, a volume specified in AS2304-2011	provided at the time of constructing a dwelling on Lot 9. **PS3.2** Where a lot doesn't have access to a reticulated water supply in accordance with AO1.1, a dedicated on-site water storage system that permanently holds a minimum of 10,000 litres for fire-fighting purposes is to be provided at the time of constructing a dwelling on that lot. **PS3.3** Where a water tank is provided for firefighting purposes, then it is to comply with the requirements of AO1.3

	c. Includes shielding of tanks and pumps in accordance with AS2304-2011 d. Includes a hardstand area allowing medium rigid vehicle (15 tonne fire appliance) access within 6m of the tank e. Is provided with rural fire brigade tank fittings if serviced by a rural fire brigade (i.e. 50mm ball valve and male camlock coupling and, if underground, an access hole of 200mm (minimum) to accommodate suction lines); and f. Is clearly identified by directional signage at the street frontage	
Hazardous Materials		
PO4 Public safety and the environment are not adversely affected by the detrimental impacts of bushfire on the manufacture or storage of hazardous materials in bulk.	**AO4.1** Development complies with a Bushfire Management Plan for the premises.	**PS4.1** Development is to comply with this Bushfire Management Plan. The proposed land use does not include the storage of bulk quantities of hazardous materials.
Reconfiguring a lot and Material Change of Use		
PO5 Lot design and the siting of buildings provide safe sites for habitable and non-habitable buildings.	**AO5.1** All development enables buildings and structures to achieve setbacks from hazardous vegetation that are: a. sited within the area of lowest hazard within the lot; and b. provide for adequate setbacks from hazardous vegetation; and c. 1.5 times the predominant mature canopy tree height or 10m, whichever is the greater; and d. 10m from any retained vegetation strips or small areas of vegetation; and	**PS5.1** The proposed RaL configuration enables buildings and structures to be sited within development in areas with: a. The lowest area of bushfire hazard (adjacent to an existing cleared service corridor); b. Adequate setbacks from potentially hazardous vegetation are achieved;

	e. sited so that elements of the development least susceptible to fire are sited closest to the bushfire hazard.	c. A concept APZ for a future dwelling on Lot 29 allows a minimum separation distance of 13m to the southwest and 22m to the northeast from potentially hazardous vegetation to be exposed to a maximum BAL of 29 (Appendix C). The height of mature canopy trees on the site is in the order of 20 to 25 metres. The Australian Standard AS3959-2018 allows for the construction of buildings closer to vegetation than this provided that they are built to a higher standard; d. A distance of greater than 10m from retained vegetation strips or small areas of vegetation maintained by APZs; and e. Consideration of siting of less susceptible development uses (e.g. swimming pools) in areas of increased bushfire hazard. Construction of structures is to comply with AS3959-2018 and the BCA. Appendix D provides additional information on the level of bushfire hazard posed to buildings and the methodology used to calculate it. A site-specific Bushfire Building Report should be prepared at the time of constructing a dwelling that identifies actual

		building location, separation distances from potentially hazardous vegetation, level of vegetation management activities undertaken, BAL and level of construction required
PO6 For development that will result in multiple buildings or lots, roads and access are designed to mitigate against bushfire hazard by ensuring adequate access for: f. fire fighting and other emergency vehicles; and g. the evacuation of people in the event of an emergency.	**AO6.1** The road design is capable of providing access for fire fighting and other emergency vehicles, in accordance with the standards identified in SC6.2 PSP No. 2 – Engineering Standards – Roads and Drainage Infrastructure. **AO6.2** The lot layout ensures that all roads are through roads. **AO6.3** The lot layout does not include long narrow lots, long access ways or rear lots. **AO6.4** The road has a maximum gradient of 1 in 8 (12.5%).	**PS6.1** The adjacent road (Pierces Creek Road) which the site accesses, and the proposed internal driveway are capable of providing good access for firefighting and other emergency vehicles. **PS6.2** The lot layout and location of the internal driveways avoids the potential for entrapment and exposure to elevated levels of hazard to residents and responders in the event of a bushfire. Fire fighting vehicles and other emergency vehicles will have adequate access to existing and proposed dwellings. **PS6.3** The development does not result in long narrow lots. Lots are sized adequately to facilitate the setback of a future dwelling to achieve minimum from potentially hazardous vegetation to allow a future dwelling to achieve a maximum BAL 29. The development will seek access from Pierces Creek Road to allow for Lot 9 to be readily accessible by emergency service vehicles.

		PS6.4 The proposed access road with have a gradient not exceeding 12.5%.
PO7 For development that will result in multiple buildings or lots, fire breaks are provided that: a. adequately and effectively separate the development site from surrounding vegetation to mitigate against bushfire hazard; b. have sufficient width to enable continuous access for fire fighting and other emergency vehicles, residents and equipment; and c. are in secure tenure and are maintained.	**AO7.1** The development incorporates a fire break provided by a perimeter road that: a. separates the boundary of the lots and the adjacent bushland; b. has a minimum cleared width of 20m; c. has a formed road width of 6m; and d. is constructed to an all weather standard. **AO7.2** The development includes fire breaks which are located as close as possible to the boundaries of the lot(s) and the adjoining bushfire hazard and the fire breaks have: a. a minimum cleared width of 6m; b. a minimum formed width of 4m; c. a maximum gradient of 1 in 8 (12.5%); d. are constructed and maintained to prevent erosion, provide adequate drainage and provide continuous access for fire fighting vehicles; e. provide passing bays and turning areas for fire-fighting appliances; and f. are either located on public land, or within an access easement that is granted in favour of the Toowoomba Regional Council and the Queensland Fire and Rescue Service. g. **AO7.3**	**PS7.1-4** Due to the siting and nature of the development, the use of perimeter roads as firebreaks and fire management lines are not proposed.

	Vehicular access is provided along and at each end of the fire break to existing fire maintenance trails or roads. **AO7.4** The development includes sufficient cleared breaks of 6m minimum width in retained bushland within the development (e.g. creek corridors and retained vegetation) to allow burning of sections and access for bushfire response.	

6 Conclusion

The bushfire assessment of the site identified that in general hazards are in the medium category, with indicative Bushfire Attack Levels (BAL) indicating that sufficient area is available within the identified Development Envelope to allow for a future dwelling on Lot 9 to achieve a BAL which is in the order of BAL-12.5 to BAL-29 (Appendix C), dependant on the final location of a dwelling and extent of vegetation management works. Lot 8 contains an existing dwelling.

The bushfire risk to built assets can be effectively managed at the design and construction phase through the application of the National Construction Code and the Australian Standard Construction of buildings in bushfire-prone areas (AS3959-2018) and ongoing vegetation maintenance.

6.1 Recommendations

The following recommendations are made for the proposed development with reference to the ecological values and bushfire management requirements of the site:

- That buildings are designed and constructed to meet the requirements of the relevant building standards prevailing at the time. This includes AS3959 – 2018, the BCA and relevant Council bylaws and building regulations.
- That vegetation within the identified development envelope be managed to fuel load no greater than 8 t/ha.
- That vegetation be managed in each proposed lot to minimise the accumulation of hazardous fuel loads and to control understory woody and highly flammable weeds such as lantana.
- That any landscaping works utilise plant species and design principles suitable for bushfire prone areas and in accordance with Appendix G.
- That Lot 9 is provided with a minimum 10,000L permanent water supply be established at the time of construction of a structure which is capable of supplying water for fire-fighting purposes.
- That bushfire mitigation measures identified in this bushfire management report are implemented and maintained.

7 References

Australian Standard; 2018. Construction of Buildings in Bushfire-prone Areas (AS3959–2018). Sydney.

Building Code of Australia (BCA); 2022. National Construction Code Volumes 1 and 2.

Bushfire Resilient Communities: Technical Reference Guide for SPP State Interest 'Natural Hazards, Risk and Resilience - Bushfire'; 2019

Department of Resources website; 2025. https://www.resources.qld.gov.au/

Emergency Management Victoria; 2016. Guideline for Building in Bushfire Prone Areas. Melbourne.

Gould JS, McCaw WL, Cheney NP, Ellis PF, Knight IK, Sullivan AL; 2008. Project Vesta: Fire in Dry Eucalypt Forest. Fuel Structure, Fuel Dynamics and Fire Behaviour, CSIRO publishing.

Leonard, J, Newnham, G, Opie, K, and Blanchi, R; 2014. A New Methodology for State-wide Mapping of Bushfire Prone Areas in Queensland. CSIRO, Australia.

NSW Rural Fire Service; 2019. Planning for Bush Fire Protection. Sydney.

Queensland Development Assessment Mapping System; 2025. https://sara.dsdip.esriaustraliaonline.com.au/saraviewer/

Queensland Fire and Emergency Service (QFES); 2017. Bushfire prone area - Vegetation hazard class – Darling Downs Region September 2014

Queensland Government SPP Interactive Mapping System; 2025. http://www.dilgp.qld.gov.au/planning/state-planning-instruments/spp-interactive-mapping-system.html

Ramsay, C & Rudolph, L.; 2003. Landscape and Building Design for Bushfire Areas. CSIRO, Australia.

The State of Queensland, July 2017. Queensland State Planning Policy (July 2017). Queensland Department of Infrastructure, Local Government and Planning. Brisbane.

Toowoomba Regional Planning Scheme (2012 Version 28)

Toowoomba Regional Planning Scheme v28 Interactive Mapping System

Victoria State Government, July 2010. Overall Fuel Hazard Assessment Guide 4th Edition. Melbourne.

Victoria State Government; 2014. Planning Practice Note 65. Melbourne.

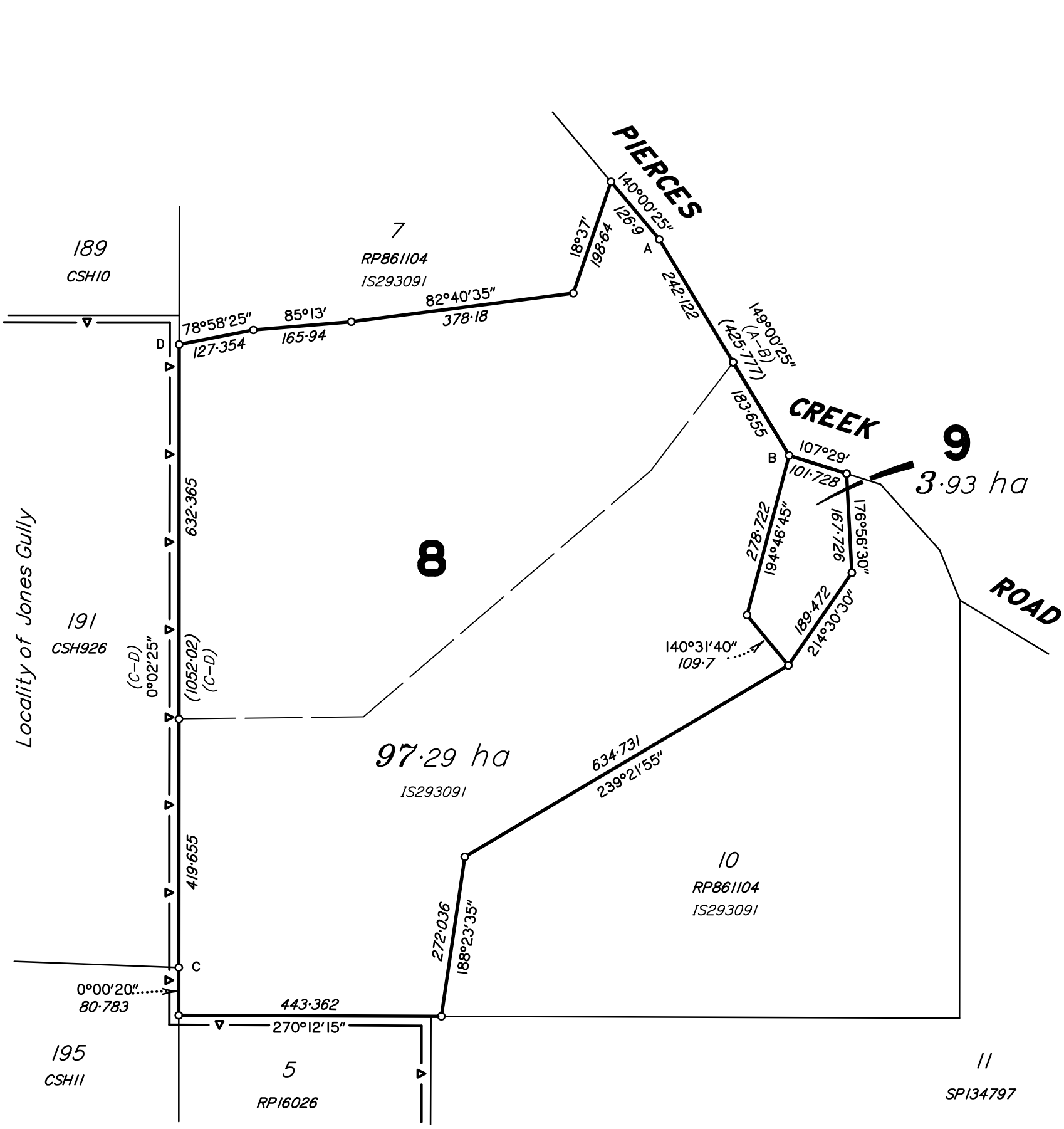
Appendices

Appendix A Site Plan

PROPOSAL PLAN

Sheet 1 of 1

DRAFT



Scale 1:8000 – Lengths are in metres.

100 0 100 200 300 400 500 600 700 800 900 1000 1100

Important Note:
This plan was prepared for the stated client to accompany an application to council and should not be used for any other purpose.
The dimensions, areas and number of lots shown hereon are subject to cadastral survey and the requirements of Council and any other Authority which may have requirements under relevant legislation.
No reliance should be placed on this plan for financial dealings involving this land.
This note is an integral part of this plan.

DEFINEGROUP (QLD) PTY LTD
ACN 630 494 585
SURVEYORS
P: 07 4572 3890
E: admin@definegroup.com.au
W: www.definegroup.com.au

Job: **D419**
Plan:
File:

Locality: PIERCES CREEK
Local Govt: TOOWOOMBA REGIONAL

PROPOSED LOTS 8 & 9

Cancelling Lots 8 & 9 on RP861104

Scale: **1:8000** at (A3)

DRAFT

Site Address: 1401 Pierces Creek Road

Client: DARRAN HUTCHINGS

Meridian: IS293091 | Date: 22/01/2025 | Map: 9343–43434 | Dra Ref: PROP – D419 – D5.dwg

Appendix B Queensland Statewide Mapping Methodology

Overview

The Queensland State-wide mapping methodology was used to identify Bushfire Prone Areas on and surrounding the site. This methodology scales bushfire hazard based on the Potential Fire-line Intensity of a severe bushfire and can be used to predict the radiation profile of areas adjacent to potentially hazardous vegetation. The Potential Fire-line Intensity is a useful indicator of the level of safety afforded for resident egress and firefighter access.

The Potential Fire-line Intensity is calculated using 3 key factors operating at a landscape level, these being Potential Fuel Load (tonnes / hectare), Maximum Landscape Slope (degrees) and Fire Weather Severity (Forest Fire Danger Index). Figure 14 illustrates the variables used to determine the Potential Fire-line Intensity.

Figure 14 Variables used to determine Potential Fire-line Intensity. (Redrawn from Leonard et al 2013)

Potential Fuel Load represent the approximate mass (measured in tonnes/ha) of combustible fuel material that would typically accumulate if vegetation is not regularly burnt or subject to fuel reduction practices. Potential fuel loads vary according to the type of vegetation present and management of it. Fuel: its availability, arrangement, size, amount and moisture content contribute to the speed and intensity of a bushfire. The type of vegetation present determines the flammability of the fuel, with the finer and drier the fuel, the more easily it will burn. Fuel loads in general are related to the quantities of fine fuels available to burn. The primary components of fuel loads are the fine fuels; that is; flammable materials that are less than 6 mm in diameter such as leaves, twigs and bark principally on or near the ground.

Slope or steepness of land (described as Landscape Slope) is a major determinant of fire behaviour, controlling fire spread, the rate of fuel consumption and thus Potential Fire-line Intensity.

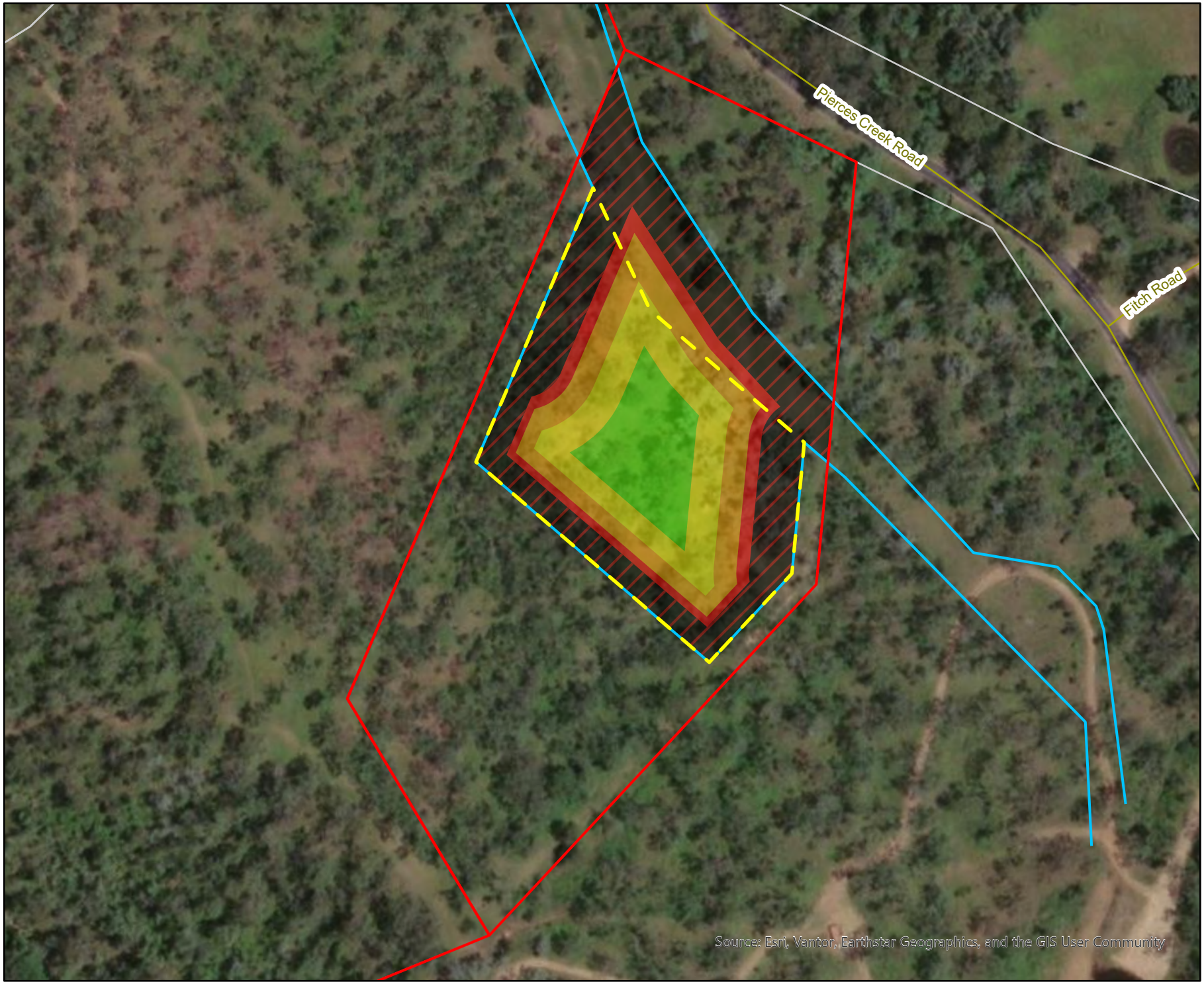
Fire behaviour is influenced by a range of weather variables including recent precipitation, current wind speed, relative humidity, and temperature. Due to the complexity of these influences, they are commonly combined into a single weather index that can be used to estimate potential fire behaviour. The McArthur (1973) Forest Fire Danger Index (FFDI) is the best known, most widely used and thoroughly tested fire weather index adopted by fire agencies throughout Australia.

Fuel Loads and Vegetation Hazard Classes

The new methodology for State-wide mapping of bushfire prone areas in Queensland identifies Potential Fuel Loads that are assigned to vegetation categories (Vegetation Hazard Classes) formed by amalgamating land use and vegetation types with a moderately consistent fuel load and structure. The Potential Fuel Load assigned to each Vegetation Hazard Class (VHC) is generally representative of the higher fuel load expected for the typical vegetation types, landscape, and site conditions within each Vegetation Hazard Class. This Potential Fuel Load of each Vegetation Hazard Class would approximate the 80th percentile fuel load of the “long unburnt condition” for the class (generally greater than 10 years without burning).

The Queensland State Government has introduced a State-wide mapping methodology to identify Bushfire Prone Areas. This methodology was developed by the CSIRO Climate Adaptation Flagship and scales bushfire hazard based on the Potential Fire-line Intensity of a severe bushfire. It is used to predict the radiation profile of areas adjacent to potentially hazardous vegetation. A key component of the methodology is the allocation of Vegetation Hazard Classes (VHC) which are used to estimate Potential Fuel Loads. These fuel loads were derived from a combination of expert appraisals and field measurements using the upper range of fuel loads for each fuel element (i.e., surface, near surface, elevated and bark). A “long unburnt condition” of generally greater than 10 years without burning was used for estimating fuel loads.

Appendix C Bushfire Attack Levels



Appendix C Bushfire Attack Levels

Project: 1401 Pierces Creek Road, Pierces Creek

Client: Darran and Naomi Hutchings

Project No.: J002757

Compiled by: HannahBakker Date: 24/03/2026
Approved by: Will Gibson Date: 24/03/2026

Metres
0 25 50

Legend

- Cadastre
- Roads
- Lot layout
- Development envelope
- Edge of hazardous vegetation
- BAL 12.5
- BAL 19
- BAL 29
- BAL 40
- BAL Flame Zone

Source: Cadastral data sourced from DNRME (2026). Aerial imagery sourced from NearMap (2026).

N

range environmental consultants

Appendix D Calculation of Bushfire Hazard

In accordance with SPP guidance material (Bushfire Resilient Communities (QFES 2019)) the vegetation hazard class (VHC) mapping was reviewed and modified to accurately represent the on-ground matters through a field assessment.

Vegetation hazard class and 80th percentile potential fuel load inputs from QFES (2019) were utilised to determine the radiant heat exposure using the QFES SPP Asset Protection Zone Width Calculator.

Determination of Bushfire Attack Level – SPP APZ Calculator

The bushfire hazard that buildings could potentially be exposed to was calculated using the QFES SPP Asset Protection Zone Width Calculator and fuel loads consistent with the post-development VHCs as set out in SPP technical reference guide 'Bushfire Resilient Communities' (2019). AS 3959-2018 identifies the level of construction required for the purpose of ensuring that a building is constructed to withstand a potential bushfire attack. This Standard is primarily concerned with improving the ability of buildings in designated bushfire-prone areas to better withstand attack from bushfire, thus giving a measure of protection to the building occupants (until the fire front passes) as well as to the building itself. AS3959-2018 requires that vegetation be assessed within 100 metres of a building when determining the Bushfire Attack Level.

Bushfire Resilient Communities Technical Reference Guide for the State Planning Policy State Interest 'Natural Hazards, Risk and Resilience - Bushfire' (2019) requires that bushfire hazard is to be assessed within 150m of the development footprint.

Climatic Conditions and Forest Fire Danger Index

The McArthur Forest Fire Danger Index (or FFDI) is the most common proxy of fire weather severity in Australia and is used for bushfire hazard assessments, emergency management and in regulations such as the Australian Standard 3959–2018 Construction of buildings in bushfire-prone areas.

Unlike Queensland's adoption of AS 3959–2018 (Method 1) that uses a single FFDI value for all of Queensland (40), the estimate of fire weather severity used as an input to identifying the SPP bushfire prone areas in Queensland recognises that weather conditions vary across the state.

Spatially explicit 5% annual exceedance probability (AEP) fire weather event FFDI values for Queensland have been estimated from a gridded (83 kilometre, three-hourly resolution) prediction of FFDI from long-term spatial weather products produced by the Australian Bureau of Meteorology (BoM). The adopted FFDI values reflect a 5% AEP weather event. Adopted FWS (i.e., 5% AEP fire weather event FFDI) values for Queensland vary from 50 in Southeast Queensland and Cape York bioregions to 130 in the south-western parts of the state.

Adopting a worst-case scenario, an FDI of 60 was used for the site when calculating Bushfire Attack Levels (BAL) for 'the site'. Figure 15 provides a Fire Danger Index (FDI) map of Southeast Queensland and identifies the location of the site.

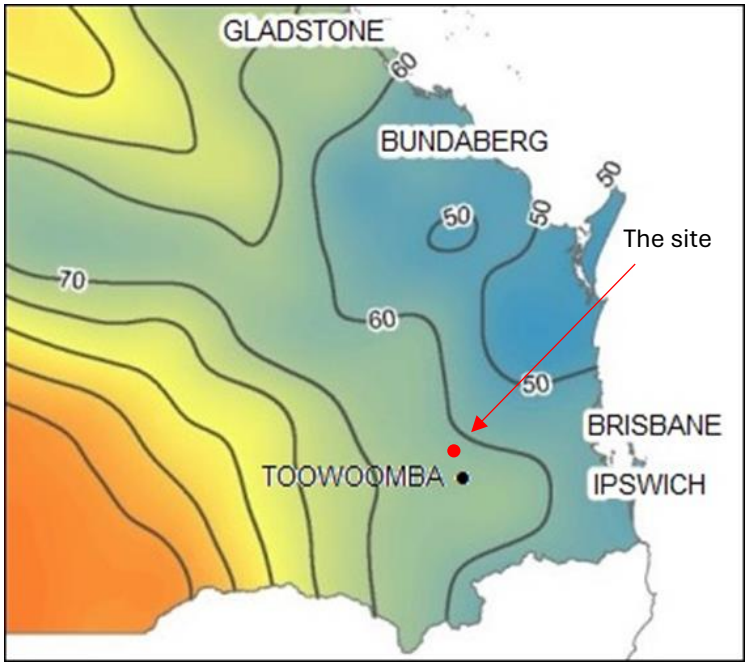


Figure 15 FDI map for Southeast Queensland. Leonard. J. A New Methodology for State-wide Mapping of Bushfire Prone Areas in Queensland. 2014

The potential radiant heat flux was calculated using the SPP APZ Width Calculator for representative areas upslope and downslope of the site. Figure 16 shows the radiant heat flux vs distance from vegetation and potential BALs.

In assessing vegetation classes for forests, woodlands and rainforests, the classified vegetation will be determined by the unmanaged understorey rather than either the canopy (drip line) or trunk of any trees (AS3959-2018).

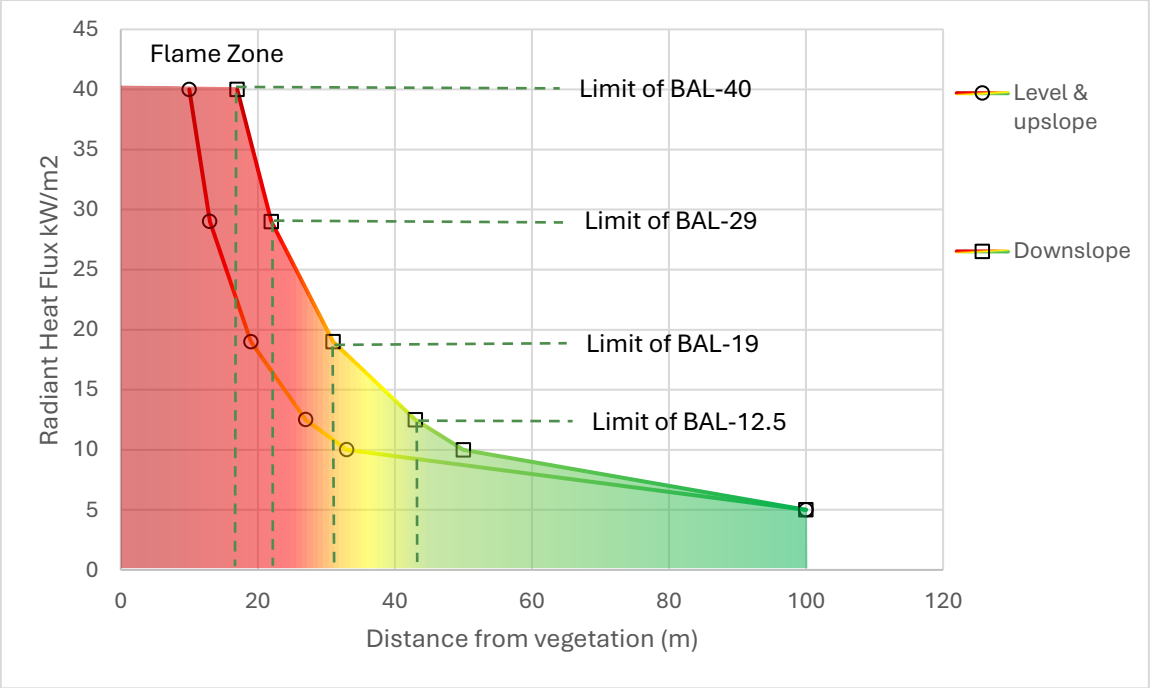


Figure 16 Potential radiant heat flux versus distance from bushland areas (VHC 13.2 upslope and downslope)

Calculation of Bushfire Attack Level – SPP APZ Calculator

The following steps were carried out using information collected from the relevant site and applying this information to the conditions required and set out in QFES SPP Bushfire Asset Protection Zone Calculator and the Australian Standard 'Construction of Buildings in Bushfire-prone areas' (AS 3959-2018).

Table 9 Parameters used in SPP APZ calculations

Step	Procedure	Value (VHC 13.2)	Value (VHC 13.2)
1	Fire Danger Index (FDI)	60	60
2	Vegetation Hazard Class (VHC)	13.2	13.2
3	Surface fuel load (t/ha)	12.8	12.8
4	Overall fuel load (t/ha)	14.4	14.4
5	Location of vegetation (Upslope/Downslope)	Level & Upslope	Downslope
6	Site slope	0 degrees	1 degree
7	Effective slope of land under classified vegetation	0 degrees	10 degrees

In assessing vegetation classes for forests, woodlands and rainforests, the classified vegetation will be determined by the unmanaged understorey rather than either the canopy (drip line) or trunk of any trees (AS3959-2018).

Table 10 to Table 11 provide details of the BAL calculations for the site using the SPP APZ Calculator in relation to the areas of unmanaged vegetation in the vicinity of the development.

Table 10 State Planning Policy Asset Protection Zone Width Calculator (VHC 13.2 – level and upslope)

SPP Bushfire Asset Protection Zone Width Calculator							
VARIABLE DESCRIPTION	**VARIABLE**	**UNITS**	**VALUE**				
Input Values							
FIRE WEATHER SEVERITY	**FDI**		60.00				
VEGETATION HAZARD CLASS	**VHC**	-	13.2 Dry to moist eucalypt woodlands on undulating metamorphics and granite				
REMNANT STATUS	**-**	-	Remnant				
SLOPE TYPE (UPSLOPE OR DOWNSLOPE)	**ST**	-	Level & upslope				
EFFECTIVE SLOPE UNDER THE HAZARDOUS VEGETATION	**eSlope**	degrees	1.00				
SLOPE BETWEEN SITE AND HAZARDOUS VEGETATION	**θ**	degrees	1.00				
DISTANCE OF THE SITE FROM HAZARDOUS VEGETATION	**d**	m	9.00	10.00	13.00	19.00	27.00
Output Values							
SURFACE FUEL LOAD	**-**	t/ha	9.40				
NEAR SURFACE FUEL LOAD	**-**	t/ha	3.40				
BARK FUEL LOAD	**-**	t/ha	0.60				
ELEVATED FUEL LOAD	**-**	t/ha	1.00				
TOTAL OVERALL FUEL LOAD	**W**	t/ha	14.40				
TOTAL SURFACE FUEL LOAD	**w**	t/ha	12.80				
POTENTIAL FIRE LINE INTENSITY	**I**	kW/m	6857				
RADIANT HEAT FLUX	**q**	kW/m^2	>40.00	37.44	28.36	18.74	12.48
BUSHFIRE ATTACK LEVEL (AS 3959-2018)	**BAL**	-	BAL Flame Zone	BAL 40	BAL 29	BAL 19	BAL 12.5
DISCLAIMER: Fire-line intensity and radiant heat calculations where effective slope exceeds 20 degrees (downslope) or 15 degrees (upslope) may be unreliable. In these locations, specialist assessment is warranted.							

Table 11 State Planning Policy Asset Protection Zone Width Calculator (VHC 13.2 – downslope)

SPP Bushfire Asset Protection Zone Width Calculator							
VARIABLE DESCRIPTION	**VARIABLE**	**UNITS**	**VALUE**				
Input Values							
FIRE WEATHER SEVERITY	**FDI**		60.00				
VEGETATION HAZARD CLASS	**VHC**	-	13.2 Dry to moist eucalypt woodlands on undulating metamorphics and granite				
REMNANT STATUS	**-**	-	Remnant				
SLOPE TYPE (UPSLOPE OR DOWNSLOPE)	**ST**	-	Downslope				
EFFECTIVE SLOPE UNDER THE HAZARDOUS VEGETATION	**eSlope**	degrees	10.00				
SLOPE BETWEEN SITE AND HAZARDOUS VEGETATION	**θ**	degrees	1.00				
DISTANCE OF THE SITE FROM HAZARDOUS VEGETATION	**d**	m	10.00	17.00	22.00	31.00	43.00
Output Values							
SURFACE FUEL LOAD	**-**	t/ha	9.40				
NEAR SURFACE FUEL LOAD	**-**	t/ha	3.40				
BARK FUEL LOAD	**-**	t/ha	0.60				
ELEVATED FUEL LOAD	**-**	t/ha	1.00				
TOTAL OVERALL FUEL LOAD	**W**	t/ha	14.40				
TOTAL SURFACE FUEL LOAD	**w**	t/ha	12.80				
POTENTIAL FIRE LINE INTENSITY	**I**	kW/m	13670				
RADIANT HEAT FLUX	**q**	kW/m^2	>40.00	37.83	28.30	18.77	12.17
BUSHFIRE ATTACK LEVEL (AS 3959-2018)	**BAL**	-	BAL Flame Zone	BAL 40	BAL 29	BAL 19	BAL 12.5
DISCLAIMER: Fire-line intensity and radiant heat calculations where effective slope exceeds 20 degrees (downslope) or 15 degrees (upslope) may be unreliable. In these locations, specialist assessment is warranted.							

Appendix E Explanation of Bushfire Attack Levels

Table 12 BAL Descriptions - Australian Standard - Construction of Buildings in Bushfire-prone Areas (AS 3959-2018)

				
BAL-12.5	BAL-19	BAL-29	BAL-40	BAL-FZ
The risk is considered to be LOW	The risk is considered to be MODERATE	The risk is considered to be HIGH.	The risk is considered to be VERY HIGH.	The risk is considered to be EXTREME.
There is a risk of ember attack. The construction elements are expected to be exposed to a heat flux not greater than 12.5 kW/m^2.	There is a risk of ember attack and burning debris ignited by wind borne embers and a likelihood of exposure to radiant heat. The construction elements are expected to be exposed to a heat flux not greater than 19 kW/m^2.	There is an increased risk of ember attack and burning debris ignited by windborne embers and a likelihood of exposure to an increased level of radiant heat. The construction elements are expected to be exposed to a heat flux not greater than 29 kW/m^2.	There is a much increased risk of ember attack and burning debris ignited by windborne embers, a likelihood of exposure to a high level of radiant heat and some likelihood of direct exposure to flames from the fire front. The construction elements are expected to be exposed to a heat flux not greater than 40 kW/m^2.	There is an extremely high risk of ember attack and burning debris ignited by windborne embers, and a likelihood of exposure to an extreme level of radiant heat and direct exposure to flames from the fire front. The construction elements are expected to be exposed to a heat flux greater than 40 kW/m^2.

Images sourced from Planning Practice Note 65 September 2014 Victoria State Government

Appendix F Living in a Bushfire Prone Area

A bushfire can ignite fuel and spread in three ways:

- Embers and burning debris carried by wind,
- Heat radiation from fire, and
- Direct flame contact.

	Ignition of buildings by burning embers carried by the wind
	Ignition of buildings by heat radiation from the fire
	Ignition of buildings by direct flame contact

Figure 17 The three main elements of bushfire which threaten life and property. (Ramsay & Rudolf 2003)

Overall, the intention of bush fire protection measures should be to prevent flame contact to a structure, reduce radiant heat to below the ignition thresholds for various elements of a building, to minimise the potential for wind driven embers to cause ignition and reduce the effects of smoke on residents and fire-fighters.

Whilst research shows that ember attack ultimately claims more vacant houses than radiant heat or flames, if a house is occupied, ember attack can be relatively easily dealt with. The consequence of leaving a house unattended is that there will probably be nobody there to prevent the small fires which initially start, from gradually taking hold of various parts of the structure. This process can occur over a significant period of time, usually simply with embers which fly about and settle, and start smouldering. The hot windy conditions associated with the fire help fan the smouldering clumps of fuel and bring many small fires to life. These are

usually easy fires to extinguish if there is someone there with the equipment and water to put them out. In their absence, often some time, even hours after the initial fire front, the house succumbs to small fires which have grown to larger ones.

Over 90% of houses burnt down in bushfires are attributable to ember attack, and the vast majority of these are unattended at the time. In the 1984 study of the Ash Wednesday Fires around Mt Macedon, the survival rate amongst the 450 houses was 82% where they were occupied and 90% where the occupants were active, able-bodied defenders, while only 30% of houses survived without someone to patrol them (Wilson & Ferguson, 1984).

Asset Protection Zones

The most immediate form of defence for an asset is a well-designed Asset Protection Zone (APZ). An APZ is a fuel reduced area surrounding a built asset or structure. This can include any residential building or major building such as farm and machinery sheds, or industrial, or commercial buildings.

Various amenities can contribute to the Asset Protection Zone, provided they are not combustible or otherwise they will add to radiant heat levels. Such amenities include driveways, tennis courts, swimming pools or fire trails, each adding to the distance from the hazard.

Radiant heat barriers such as non-combustible walls or water tanks can help shield assets from radiant heat, thereby complementing the APZ, and in some cases reducing the requirement for distance from the hazard to a degree.

An APZ provides:

- a buffer zone between a bush fire hazard and an asset;
- an area of reduced bush fire fuel that allows suppression of fire;
- an area from which backburning may be conducted; and
- an area which allows emergency services access and provides a relatively safe area for firefighters and homeowners to defend their property.

Potential bush fire fuels should be minimised within an APZ. This is so that the vegetation within the planned zone does not provide a path for the transfer of fire to the asset either from the ground level or through the tree canopy.

An APZ, if designed correctly and maintained regularly, will reduce the risk of:

- direct flame contact on the asset;
- damage to the built asset from intense radiant heat; and
- ember attack on the asset.

The APZ can be made up of an Inner Protection Area (IPA) and an Outer Protection Area (OPA).

Inner Protection Area (IPA)

The IPA is the area closest to the building and creates a fuel-managed area which can minimise the impact of direct flame contact and radiant heat on the development and act as a defendable space. Vegetation within the IPA should be kept to a minimum level. Litter fuels within the IPA should be kept below 1cm in height and be discontinuous.

In practical terms the IPA is typically the curtilage around the building, consisting of a mown lawn and well-maintained gardens.

When establishing and maintaining an IPA, the following requirements apply:

Trees

- tree canopy cover should be less than 15% at maturity;
- trees at maturity should not touch or overhang the building (preferably, there should be no trees within 10 metres of a dwelling);
- lower limbs should be removed up to a height of 2m above the ground; and
- tree canopies should be separated by 2 to 5m.

Shrubs

- create large discontinuities or gaps in the vegetation to slow down or break the progress of fire towards buildings should be provided;
- shrubs should not be located under trees;
- shrubs should not form more than 10% ground cover; and
- clumps of shrubs should be separated from exposed windows and doors by a distance of at least twice the height of the vegetation.

Grass

- grass should be kept mown (as a guide grass should be kept to no more than 100mm in height); and
- leaves and vegetation debris should be removed.

Outer Protection Area (OPA)

An OPA is located between the IPA and the unmanaged vegetation. It is an area where there is maintenance of the understorey and some separation in the canopy. The reduction of fuel in this area aims to decrease the intensity of an approaching fire and restricts the potential for fire spread from crowns, reducing the level of direct flame, radiant heat and ember attack on the IPA.

When establishing and maintaining an OPA the following requirements apply:

Trees

- tree canopy cover should be less than 30%; and
- canopies should be separated by 2 to 5m.

Shrubs

- shrubs should not form a continuous canopy; and
- shrubs should form no more than 20% of ground cover.

Grass

- grass should be kept mown to a height of less than 100mm; and
- leaf and other debris should be removed.

An APZ should be maintained in perpetuity to ensure ongoing protection from the impact of bushfires. Maintenance of the IPA and OPA as described above should be undertaken regularly, particularly in advance of the bush fire season.

The required distances for Asset Protection Zones are dependent on the vegetation type (hazard), the slope of the site and whether the hazard is upslope or downslope from the asset. An example of an APZ in relation to a dwelling is provided in Figure 18.

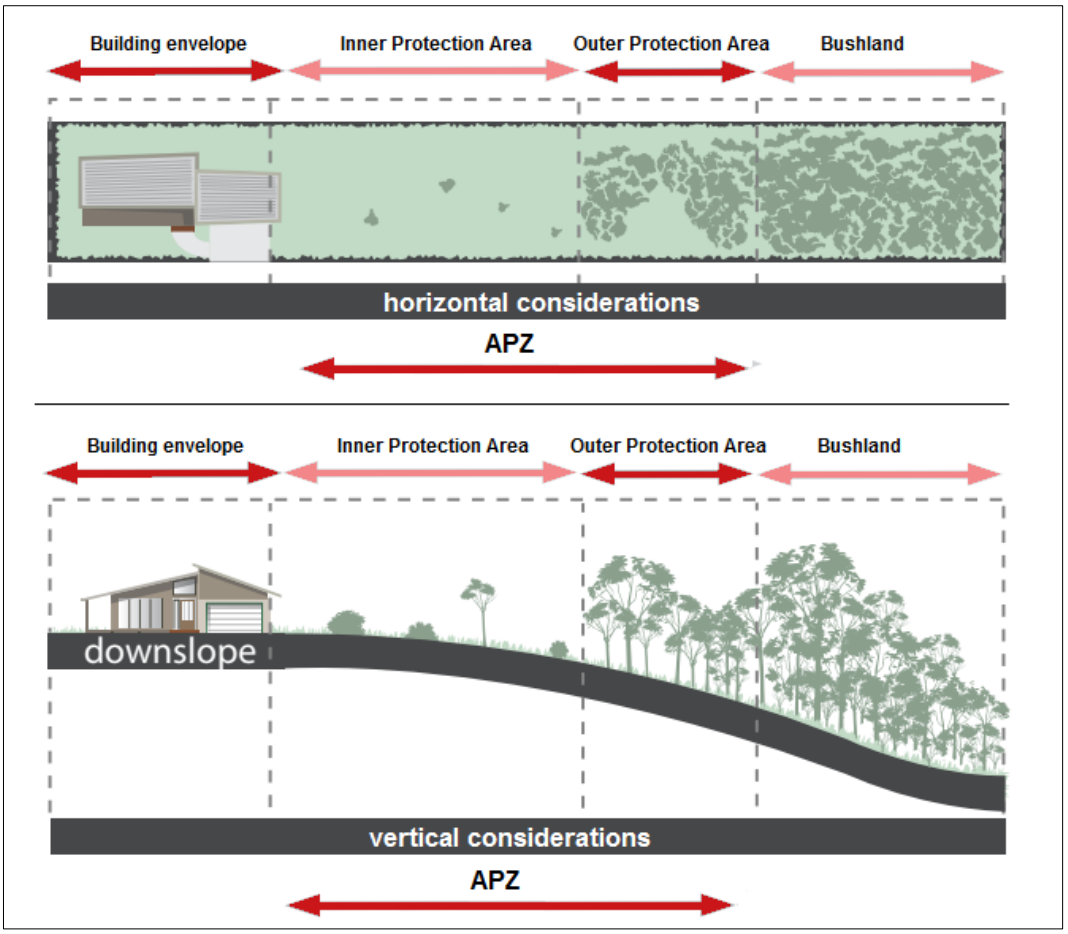


Figure 18 APZ Elements (Adapted from Planning for Bushfire Protection 2019)

Information presented in this Appendix was drawn from Planning for Bushfire Protection, A guide for councils, planners, fire authorities and developers (NSW Rural Fire Service November 2019) and Standards for Asset Protection Zones (NSW Rural Fire Service undated).

Appendix G Landscaping in Fire Prone Areas

The design, management, and maintenance of the landscape in the immediate vicinity of buildings are fundamental to the chances of survival of both people and buildings in a bushfire event. Vegetation provides the major fuel element in a bushfire. All vegetation, regardless of how succulent or green it is will eventually burn, provided the fire has sufficient intensity. When landscaping in bushfire prone areas, it is important to use or retain plants of low flammability that have the relevant characteristics as identified in Table 13.

Table 13 Characteristics of low flammability species and effect on performance in bushfire situations

Plant attribute	Effect	Design measure
Foliage moisture content	Leaves with higher moisture content retard ignition and slow the rate of combustion	Select species with high leaf moisture content (e.g., rainforest species, succulents, and semi-succulents)
Foliage volatile oil content	Foliage with higher volatile oil content ignite more readily and enhance ignition of surrounding vegetation, even though volatile oils themselves do not contribute significantly to total radiant heat	Select species with lower volatile oil content
Foliage mineral content	Foliage with higher mineral content tend to be less flammable (e.g., Amyema spp mistletoes)	Species selection should favour species with higher leaf mineral content
Leaf fineness	The ratio of area-to-volume of leaves is one of the main factors affecting ease of ignition and intensity of burning. Finer leaves (greater area to volume ratio) tend to ignite and burn more easily than broader leaves	Species selection should favour broad-leafed species
Density of foliage and continuity of plant form	Species with continuous, denser foliage can act as a barrier to wind-borne embers and radiant heat; however, increased density can increase flammability. Species with open branching and low foliage density are less effective as a barrier, though can be less flammable	Select species on a case-by-case basis
Height of lowest foliage	Shrub and tree species with persistent low height foliage are more likely to be ignited by surface fires, allowing the spread of fires into the canopy above	Species selection should favour species which can be maintained or pruned to reduce persistent, near-ground foliage
Size of plant (volume and spread)	The effect of plant size varies according to volume or spread. Species with a greater spread tend to be more effective as a barrier to the diffusion of radiant heat than narrower trees with the same volume. Species with a greater volume can result in increased ember attack, radiation and flame if ignited. For example, narrow columnar trees are	Species selection should ensure plant size (volume and spread) does not increase ignition likelihood

Plant attribute	Effect	Design measure
	less effective as a barrier than wider trees with the same overall volume	
Dead foliage on plant	Persistent dead leaves and woody twigs increase flammability	Species selection should favour species which have a low volume of persistent dead leaves and woody material or can be maintained or pruned to reduce persistent, dead leaves and woody material
Bark texture	Loose, flaky, stringy, papery, or ribbon-like bark contribute to ladder fuels which: • can contribute to destructive crown fires • act as a potential source of flame, radiant heat, and ember attack	Avoid species with persistent loose, flaky, stringy, papery, or ribbon-like bark. Species selection should favour smooth barked and tightly held bark species
Potential available surface fuel	The availability of surface fuel is a function of volume (quantity) and fineness. The fireline intensity increases in proportion to available fine fuel quantity. Fine fuel includes dead fallen material such as leaves, bark, twigs and branches up to 6mm in diameter (forest) and grass greater than 5cm in height (grasslands). Coarse fuel ignites less readily but may burn for longer	Species selection should favour species which do not contribute significantly to persistent, fine ground fuel

The characteristics of low flammability species and effect on performance in bushfire situations was sourced from the publication *Bushfire Resilient Communities, Technical Reference Guide for the State Planning Policy State Interest 'Natural Hazards, Risk and Resilience - Bushfire'*.

To assist building survival in a bushfire event, it is important that a fuel-reduced zone is maintained around it. This can be achieved by keeping all vegetation away from the building or by using low flammability plantings to help shield the building from radiant heat. Trees and shrubs that drop litter should not be planted or retained close to buildings where they can contribute to the accumulation of flammable material.

Ongoing maintenance of vegetation should be undertaken in the area surrounding the site to prevent hazardous fuel loads from occurring. These actions include:

- Pruning lower branches of trees to provide a minimum vertical 2-metre-high fire break;
- Removal of loose bark, dead twigs, leaves;
- Regular mowing of lawns;
- Keeping other grassed areas to less than 100mm in height;
- Use of non-flammable mulches such as river pebbles or stones on garden beds near buildings; and
- Avoidance of flammable mulches on garden beds such as woodchip or straw.

www.rangeenviro.com.au

BRISBANE
Unit 1/7 Birubi Street
Coorparoo Qld 4151

TOOWOOMBA
Office A, 189 Hume St
Toowoomba QLD 4350

T 07 4588 6711
E admin@rangeenviro.com.au