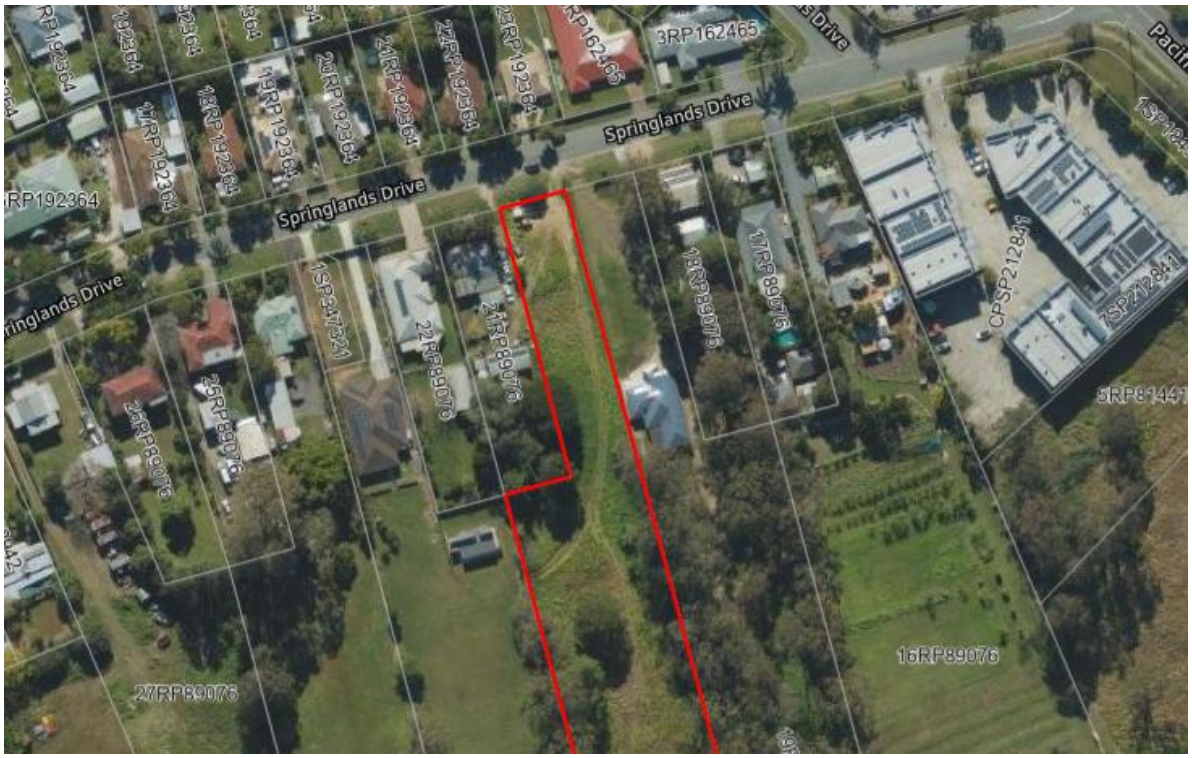
Bushfire Hazard Assessment Report

Bushfire Management Plan



Project No:	B6754
Address:	18 Springlands Dr Slacks Creek 4217
Lot Plan:	Lot 20 RP 89076
Local Government Area:	Logan City Council
Proposed Development:	Reconfiguring a lot (one (1) lot into two (4) lots)
Maximum Radiant Heat Flux:	Less than 29 kW/m^2

Max Bushfire Protection Consulting / ABN 81 671 088 887
Suite 1605 17 Gould Rd Herston QLD 4006 / PO BOX 186 Toowong DC QLD 4066
Mobile: 0432 89 82 82 / Email: service@maxbp.com.au
www.maxbp.com.au

Document History				
Version	**Description**	**Date**	**Author**	**Approved by**
1.0	Report - Draft	29/07/2026	HL	HL
2.0	Report - Final	5/08/2026	HL	HL

Report Expiry

Please be aware that the bushfire hazard assessment and BAL rating provided in this report are valid for 12 months from the date of issuance. It is advisable to consult with a qualified professional to confirm the accuracy of the assessment if this report is more than 12 months old. If any discrepancies are identified or if an update is necessary, a new report should be obtained.

Copyright Statement

The contents of this document are the exclusive property of Max Bushfire Protection Consulting and are protected by copyright and other intellectual property laws. This document is intended solely for the use of the client and regulatory agencies involved in the project. Any reproduction or distribution, in whole or in part, without the prior written consent of the copyright holder, is strictly prohibited and may constitute a violation of copyright law. This report is provided for the specific purpose of the project at hand and may not be used for any other purpose without the express written consent of the author. Individuals are required to maintain all copyright and other notices contained within the materials. Unauthorized distribution of copies, whether in electronic or physical form, is prohibited without the prior written consent of the copyright holder.

Disclaimer

This report has been prepared based on information provided by the client and is intended solely for the client's exclusive use for the stated purpose for which it was provided. Any inaccuracies or amendments to the report or development application will require revision. Please note that, despite our best efforts, there is no guarantee that desirable outcomes are achievable during extreme bushfire weather episodes, which may result in unpredictable bushfire behaviour and detrimental consequences to life, property, and the environment. Any representation, statement, opinion, or advice expressed or implied in this report is made in good faith.

Max Bushfire Protection Consulting and its employees will not be liable (whether by reason of negligence, lack of care, or otherwise) to any person for any damage or loss whatsoever that may occur in relation to that person taking or not taking action in respect of any representation, statement, or advice referred to in this report.

Legislation may impact vegetation clearing activities. It is strongly recommended that clients contact the relevant agencies to determine if their proposed vegetation clearing activity complies with local, state, and federal laws.

Practitioner Declaration

Name: **Position:**	**Henry (Hongxi) Liang** **Senior Bushfire Consultant**
I hereby certify that I have undertaken the assessment of the above-mentioned site and determined the Bushfire Attack Level stated above in accordance with the requirements of AS 3959:2018 and/or the Bushfire Resilient Communities - Technical Reference Guide published by Queensland Fire and Emergency Services. I hereby declare that I am a suitably qualified bushfire consultant, holding AQF Level 8 qualifications and tertiary degrees below: ▪ Graduate Diploma in Bushfire Protection ▪ Graduate Certificate in Bushfire Protection ▪ Master of Business Administration ▪ Bachelor in Engineering	
Signature:	
Email: service@maxbp.com.au Mobile: 0432898282	**Max Bushfire Protection Consulting** ABN: 81 671 088 887

Table of Contents

Executive Summary 7
1. Introduction 8
1.1 Purpose 8
1.2 Subject site 8
1.3 The proposed development 9
1.4 Bushfire Prone Land 9
1.5 Scope and objectives 9
2. Assessment Methodology 10
2.1 Assessment and Legislative 10
2.2 Bushfire Hazard Assessment 10
2.3 Bushfire Attack Level Assessment 11
3. Legislative Context 12
3.1 State Planning Policy (July 2017) 12
3.2 National Construction Code 2022: Building Code of Australia 12
3.3 AS 3959 Construction of Buildings in Bushfire-prone Areas 13
3.4 Logan City Council Planning Scheme 13
4. Bushfire Hazard Assessment 14
4.1 Current Bushfire Hazard Mapping 14
4.2 Local FFDI 14
4.3 Site-Specific Hazard Assessment 15
4.3.1 Ground-Truthed VHC 16
4.3.2 Potential Bushfire Intensity Calculations 28
4.4 Probable Direction of Bushfire Attack 29
4.5 Fire History 29
4.6 BAL and Radiant Heat Flux Modelling 29
4.7 Building Envelope and Asset Protection Zone 30
5. Bushfire Management Plan 33
5.1 Bushfire Behaviours 33
5.1.1 Topography 33
5.1.2 Weather Conditions 33
5.1.3 Vegetation 34
5.2 Potential Bushfire Impacts and Attack Mechanisms 34
5.2.1 Direct Flame Contact 35
5.2.2 Radiant Heat Exposure 35
5.2.3 Ember Attack 36

5.2.4 Wind and Smoke Attack 36
5.2.5 Convection and Conduction 36
5.3 Bushfire Protection Measures 36
5.3.1 Asset Protection Zone (APZ) 37
5.3.2 Building Construction, Siting and Design 40
5.3.3 Access and Egress Arrangement 41
5.3.4 Water Supply 41
5.3.5 Emergency Response Procedures 42
5.3.6 Landscaping Management Plan 43
5.3.7 Reducing Fuel Load and Weed Management 43
5.3.8 Importance of Ongoing Vegetation Management 43
6. Conclusion 44
7. References 45
8. Appendix 45

Acronyms and Abbreviations

APZ	Asset Protection Zone
AEP	Annual Exceedance Probability
AS 3959:2018	Australian Standard 3959:2018 Construction of Buildings in Bushfire prone Areas (This Standard incorporates Amendment No. 1 (June 2019) and Amendment No. 2 (December 2020))
BCA	Building Code of Australia
BPA	Bushfire Prone Area
BMP	Bushfire Management Plan
BVG	Broad Vegetation Group
FDI	Fire Danger Index
FFDI	Forest Fire Danger Index
FWS	Fire Weather Severity
IMS	Interactive Mapping System
LMP	Landscape Management Plan
MCU	Material Change of Use
NCC	National Construction Code
QFES	Queensland Fire and Emergency Services
RH	Relative Humidity
RAL/ROL	Reconfigure A Lot/Reconfiguration of Lot
SPP	State Planning Policy 2017
SPP map input data	Statewide Map of Bushfire Prone Areas Input Data E.G. FFDI (5% AEP), Maximum Landscape and Vegetation Hazard Class
VHC	Vegetation Hazard Class
VMP	Vegetation Management Plan

Executive Summary

Project No:	**B6754**
Type of bushfire assessment:	Site-specific bushfire hazard assessment Bushfire attack level assessment Bushfire management plan
Location:	18 Springlands Dr Slacks Creek 4217 Lot 20 RP 89076
Site area:	10,430 sqm
Local Government Area:	Logan City Council
Client(s):	Davin Sachar C/o Steffan Harries
Proposed Development:	Reconfiguring a lot (one (1) lot into two (4) lots)
Site plan by:	The Client(s)
Asset Protection Zone:	Designed APZ with IPA and OPA
Maximum Radiant Heat Flux:	Less than 29 kW/m^2

1. Introduction

1.1 Purpose

Max Bushfire Protection Consulting was engaged by the client(s) to conduct a site-specific bushfire hazard assessment for the proposed development on the subject site.

The objective of this report is to assess the potential bushfire hazard and related risks concerning the proposed development, aligning with several regulatory frameworks such as the Queensland State Government State Planning Policy - Part E (SPP 2017), the Bushfire Resilient Communities Technical Reference Guide (QFES, 2019), the local council planning scheme - bushfire hazard overlay code, and the Australian Standard – Construction in Bushfire Prone Areas (AS 3959:2018). These guidelines delineate the State and Council's concerns regarding bushfire hazard within the context of evaluating development applications.

The development shall be carried out on the lot referred to as the 'Subject Site,' and the dwelling shall be situated within the proposed building location envelope.

1.2 Subject site

- Site Address: 18 Springlands Dr Slacks Creek 4217
- Lot Plan: Lot 20 RP 89076
- Site Area: 10,430 sqm

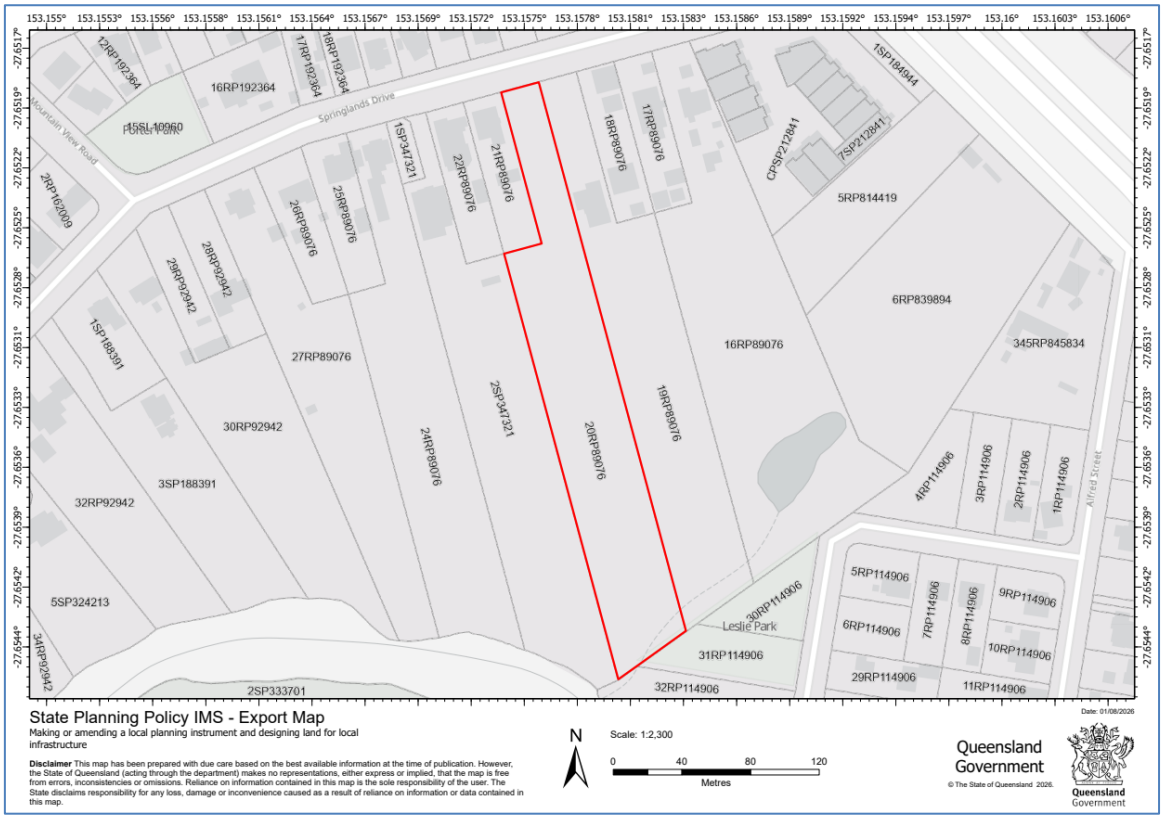


Figure 1-1: Subject Site

1.3 The proposed development

The proposed development is seeking a development permit for reconfiguring a lot (one (1) lot into two (4) lots) from Logan City Council.

1.4 Bushfire Prone Land

The Council's designation of land as "bushfire prone" carries two primary consequences:

- It mandates the formulation of a Bushfire Management Plan that conforms to the specifications delineated in the Planning Scheme. This includes strict adherence to the Bushfire Overlay Code stipulated within the planning scheme.
- It activates the application of the Building Code of Australia (BCA) and the National Construction Code (NCC), necessitating compliance with their performance objectives pertaining to bushfire mitigation. Furthermore, adherence to AS 3959:2018, which governs the construction of buildings in bushfire prone regions, is imperative.

1.5 Scope and objectives

The scope and objectives of this assessment are to:

- Identify bushfire-related risk factors linked to the positioning of the development footprint. This includes the probable direction of bushfire attack, hazard ratings associated with existing and proposed vegetation on and around the subject site, and planning separation from potential hazards.
- Recommend suitable protective measures to alleviate the risk posed by the assessed BAL in alignment with the State Planning Policy (SPP 2017), AS 3959:2018, and the Bushfire Hazard Overlay Code of the Council Planning Scheme.
- Prepare a comprehensive site-specific bushfire management plan and conduct an assessment of compliance with the Bushfire Hazard Overlay Code to illustrate how adherence can be attained.

2. Assessment Methodology

2.1 Assessment and Legislative

Assessment and legislative review were conducted to identify overlay mapping and requirements under the SPP 2017 and Logan City Council planning scheme. The review included:

- Planning Act 2016 (Planning Act)
  - Planning Regulation 2017 (Planning Regulation)
  - State Planning Policy (SPP 2017) mapping
  - State Assessment and Referral Agency (SARA) mapping (Department of Infrastructure, Local Government and Planning)
- Logan City Council Planning Scheme
  - Bushfire Hazard Overlay Code
  - Planning Scheme interactive mapping
- Queensland Fire and Emergency Services
  - Catalyst/BRC interactive mapping
- Building Act 1975 (Building Act)
- National Construction Code 2022: Building Code of Australia (NCC 2022)
- AS 3959:2018 Construction of Buildings in Bushfire-prone Areas

2.2 Bushfire Hazard Assessment

A site-specific bushfire hazard assessment aims to identify and understand the bushfire hazards on the site. The site's vegetation and terrain characteristics were surveyed using a complete site examination, aerial photography, accessible databases, and relevant mapping. The site-specific assessment included:

- Recording the structure, composition, and condition of vegetation communities located in the development footprint and all land within 100m of the development footprint, extending to 150m-300m where necessary.
- Assessing site slope and effective slope.
- Determining the aspect of the site.
- Identifying waterway and wetland features within the assessment area.
- Calculating potential fire line intensity and Radiant Heat Flux.

Bushfire Hazard Assessment and subsequent BAL review were conducted in accordance with the Bushfire Resilient Communities Technical Reference Guide for the State Planning Policy State Interest ‘Natural Hazards, Risk and Resilience – Bushfire’ (QFES 2019), which was prepared by the Queensland Fire and Emergency Services to provide technical guidance for the SPP 2017 guidance material. The method involves a quantitative assessment of the vegetation communities, fuel loads, slope, and other relevant factors.

2.3 Bushfire Attack Level Assessment

The determination of the site-specific Bushfire Attack Level (BAL) for the development footprint and classified vegetation was undertaken in accordance with the Bushfire Resilient Communities – SPP Technical Reference Guide and AS 3959:2018. This includes the identification of the following input values:

- FFDI (5% AEP fire weather event)
- Vegetation hazard class, surface and overall fuel load
- Site slope, effective slope, and whether the effective slope is upslope or downslope of the development
- Distance of the development footprint from classified vegetation

Radiant heat exposure was calculated using the Bushfire Asset Protection Zone calculator provided by the Sustainable Development Unit of Queensland Fire and Emergency Services and/or the AS 3959:2018 Method 2 Calculator.

AS 3959:2018 defines the Bushfire Attack Level as a method for measuring the severity of a building's potential exposure to ember attack, radiant heat, and direct flame contact, using increments of radiant heat expressed in kilowatts per square metre. This method serves as the basis for establishing construction requirements to improve the protection of building elements from bushfire attack. Consequently, the assessment results and accompanying BAL construction requirements only apply to proposed buildings or structures, not the entire development area.

3. Legislative Context

The following key legislation, policies and guidelines are relevant to the preparation of bushfire assessment:

- State Planning Policy (July 2017, QLD)
- National Construction Code 2022
- AS 3959:2018 Construction of Buildings in Bushfire-prone Areas
- Local Council Planning Scheme
- Planning Act 2016 (Planning Act) and Building Act 1975 (Building Act)

3.1 State Planning Policy (July 2017)

Supporting the Planning Act 2016 (Planning Act) (Qld), the purpose of the SPP is to guide State and Local government in land-use planning and development by defining the Queensland Government's polices about matters of state interest, to which there are 17 state interests arranged under five broad themes:

- liveable communities and housing
- Economic growth
- Environment and heritage
- Safety and resilience to hazards
- Infrastructure

The SPP Interactive Mapping System includes bushfire hazard area (bushfire prone area) mapping based on the methodologies outlined in Leonard et al. (2014). Under the safety and resilience to hazards theme, the state's interest is to ensure that natural hazards are properly considered in all levels of the planning system. This includes the avoidance of natural hazard areas or the mitigation of risks to an acceptable or tolerable level. The SPP is supported by the SPP – State Interest Guideline – Natural Hazards, Risk and Resilience (April 2016), Technical Manual – Evaluation Report: Bushfire Hazards (April 2016), and Technical Manual – A 'Fit for Purpose' Approach in Undertaking Natural Hazard Studies and Risk Assessments (April 2016) by the Department of Infrastructure, Local Government and Planning. These documents identify the outcomes sought by the state and their application when planning development within a bushfire hazard area (bushfire prone area).

3.2 National Construction Code 2022: Building Code of Australia

The National Construction Code 2022: Building Code of Australia (NCC 2022) sets out technical requirements for the design and construction of buildings and other structures in Australia (The Australian Building Codes Board). NCC 2022 defines ten core building classes, along with various subclasses. It mandates that buildings constructed within designated bushfire prone areas must be designed and constructed to minimise the risk of ignition from bushfires.

3.3 AS 3959 Construction of Buildings in Bushfire-prone Areas

Where development is proposed in designated bushfire prone areas, AS 3959:2018 provides construction requirements designed to enhance resistance against bushfire attack. These construction specifications are determined by specific heat flux exposure thresholds and are categorized into six Bushfire Attack Levels (BAL):

Bushfire Attack Level (BAL)	Radiant Heat Exposure (AS3959:2018)	Description of Predicted Bushfire Attack and Levels of Exposure
BAL – Low	Insignificant	Minimal attack from radiant heat and flame due to the distance of the building from the vegetation, although some attack by burning debris is possible. There is insufficient threat to warrant specific construction requirements
BAL - 12.5	0 to 12.5kW/m^2	Attack by burning debris is significant with radiant heat (not greater than 12.5kW/m^2). Radiant heat is unlikely to threaten building elements (such as unscreened glass). Specific construction requirements for ember protection and accumulation of debris are warranted.
BAL - 19	12.5 to 19kW/m^2	Attack by burning debris is significant with radiant heat flux (not greater than 19kW/m^2) threatening some building elements (such as screened glass). Specific construction requirements for embers and radiant heat are warranted.
BAL – 29	19 to 29kW/m^2	Attack by burning debris is significant and radiant heat flux (not greater than 29kW/m^2) threatens building integrity. Specific construction requirements for ember and higher levels of radiant heat are warranted. Some flame contact is possible.
BAL – 40	29 to 40kW/m^2	Radiant heat flux and potential flame contact could threaten building integrity.
BAL - FZ	40kW/m^2 plus (Flame Contact)	Significant radiant heat and significantly higher likelihood of flame contact from the fire front will threaten building integrity and result in significant risk to residents.

Table 1: AS3959:2018 Using BAL to determine construction requirements

3.4 Logan City Council Planning Scheme

Relevant bushfire provisions of the Council's Planning Scheme reflect SPP State and Local level interests by identifying designated bushfire prone areas. Where assessable development is proposed on land mapped as containing bushfire hazard areas, a site-specific bushfire hazard assessment prepared in accordance with the planning scheme is required.

4. Bushfire Hazard Assessment

Several factors determine the likelihood and severity of bushfires in a landscape. Key factors include the type of vegetation and the amount of available fuel. Other considerations are topography and land use patterns around potentially hazardous vegetation. Additionally, connectivity between vegetation communities can influence the development and persistence of bushfires.

4.1 Current Bushfire Hazard Mapping

A review of the Bushfire Hazard Overlay Mapping indicates that the site contains bushfire hazard areas, as shown in Figure 4-1.



Figure 4-1: Bushfire Hazard Overlay Mapping

4.2 Local FFDI

The fire season in Queensland typically begins in the far north in July, advancing southward by spring and occasionally lasting until February in southern and far south-western regions. These timeframes vary annually due to fuel loads, long-term climate patterns, and short-term weather conditions, differing from other Australian states. In the far north and the northwest, warm, dry winters and springs, with dead grasses and dry fuels, heighten bushfire risks. In the south, the greatest danger follows dry winters and springs, with severe conditions arising when low-pressure

systems bring strong, hot, dry westerly winds to coastal areas. The season ends with the arrival of moist conditions, often influenced by tropical cyclones near the coast.

The Forest Fire Danger Index (FFDI) evaluates the likelihood of fire ignition, its propagation rate, intensity, and the difficulties encountered during suppression, amalgamating factors like air temperature, relative humidity, wind speed, and drought effects. This assessment is accessible through state mappings, revealing an annual exceedance probability FFDI of 54 at a 5% probability level for the subject site. Fire Danger Ratings (FDR) are determined by forecasted weather conditions, particularly the FFDI, offering insight into the level of bushfire threat on a given day. This FFDI corresponds to a high FDR, indicating hot, dry, and windy conditions. Under such circumstances, the ignition and spread of fires may present significant challenges for containment, especially in areas with extensive bushland vegetation.

4.3 Site-Specific Hazard Assessment

This Site-Specific Bushfire Hazard Assessment draws upon several key references and sources, including:

- Vegetation Hazard Classification and Potential Fire-line Intensity for Queensland, as outlined in "A new methodology for state-wide mapping of bushfire prone areas in Queensland" by CSIRO, Australia (2014).
- The Bushfire Resilient Communities Technical Reference Guide (QFES, 2019).
- The Bushfire Attack Level (BAL), Building setback requirements, and Construction Standards as specified in the Australian Standard AS3959:2018 Construction of buildings in bushfire prone areas.
- Bushfire Risk Mitigation Measures aligned with current industry best-practice assessment methodologies and compliance with Council's Planning Scheme.

This assessment will utilize factors such as vegetation composition and extent, slope, and industry-standard fuel load calculations to determine the potential bushfire hazard affecting the proposed development. Furthermore, this Bushfire Management Plan (BMP) will ensure compliance with the Council's Bushfire Overlay Code in relation to the proposed development.

The assessment involved an analysis of the site and its immediate 100 m radius surroundings to determine the typical bushfire risk characteristics. It included the application of Vegetation Hazard Classifications to vegetation located within 100 m of the site. Where necessary, it was expanded to cover an additional area ranging from 150 to 300 m.

According to AS3959:2018, the following vegetation shall be excluded from a BAL assessment, which is considered as low threat vegetation and/or non-vegetation areas:

- Vegetation of any type that is more than 100m from the site.

- Single areas of vegetation less than 1 ha in area and not within 100 m of other areas of vegetation being classified vegetation.
- Multiple areas of vegetation less than 0.25 ha in area and not within 20 m of the site, or each other or of other areas of vegetation being classified vegetation.
- Strips of vegetation less than 20 m in width (measured perpendicular to the elevation exposed to the strip of vegetation) regardless of length and not within 20 m of the site or each other, or other areas of vegetation being classified vegetation.
- Non-vegetated areas, that is, areas permanently cleared of vegetation, including waterways, exposed beaches, roads, footpaths, buildings and rocky outcrops.
- Vegetation regarded as low threat due to factors such as flammability, moisture content or fuel load. This includes grassland managed in a minimal fuel condition, mangroves and other saline wetlands, maintained lawns, golf courses (such as playing areas and fairways), maintained public reserves and parklands, sporting fields, vineyards, orchards, banana plantations, market gardens (and other non-curing crops), cultivated gardens, commercial nurseries, nature strips and windbreaks.

The assessment also takes into account the small and or isolated patches and corridor filtering process of Bushfire Resilient Communities:

- Sub-hectare areas of continuous fuel (i.e. surrounded by either no fuel or non-continuous fuel) those are further than 100 m from any other continuous fuel greater than two hectares.
- Downgrade the effective fuel load of continuous vegetation patches measuring (a) 1 to 2 hectares (by 66 per cent), and (b) 2-3 hectares patches (by 50 per cent) if the patch is surrounded by either non-continuous fuel or a low-hazard vegetation or land use type, and if the patch is further than 100 m from any other continuous-fuel vegetation patch greater than two hectares.
- Remove narrow corridors and areas of continuous fuel < 50 m in width that are not sufficiently wide to support a fully developed flame front.
- Small fragments are removed because of the varied quality of the vegetation mapping inputs.

It is noted that the client is actively undertaking vegetation management activities on the site, including the removal of invasive weeds, thinning of overgrown vegetation, and general landscape and property maintenance.

4.3.1 Ground-Truthed VHC

The locations of site assessment plots are shown on Figure 4-2. Table 2 presents a summary of observations and the features of site assessment points.

Aspect	Assessment Plot	Mapped VHC	Ground-Truthed VHC
North	A	VHC 41.4 Discontinuous low grass or tree cover	VHC 41.4 Discontinuous low grass or tree cover
East	B	VHC 41.4 Discontinuous low grass or tree cover	VHC 39.2 Low to moderate tree cover in built-up areas
South	C	VHC 16.1 Eucalyptus dominated forest on drainage lines and alluvial plains	VHC 16.1 Eucalyptus dominated forest on drainage lines and alluvial plains
West	D	VHC 16.1 Eucalyptus dominated forest on drainage lines and alluvial plains	VHC 40.4 Continuous low grass or tree cover

Table 2: Ground-Truthed VHC

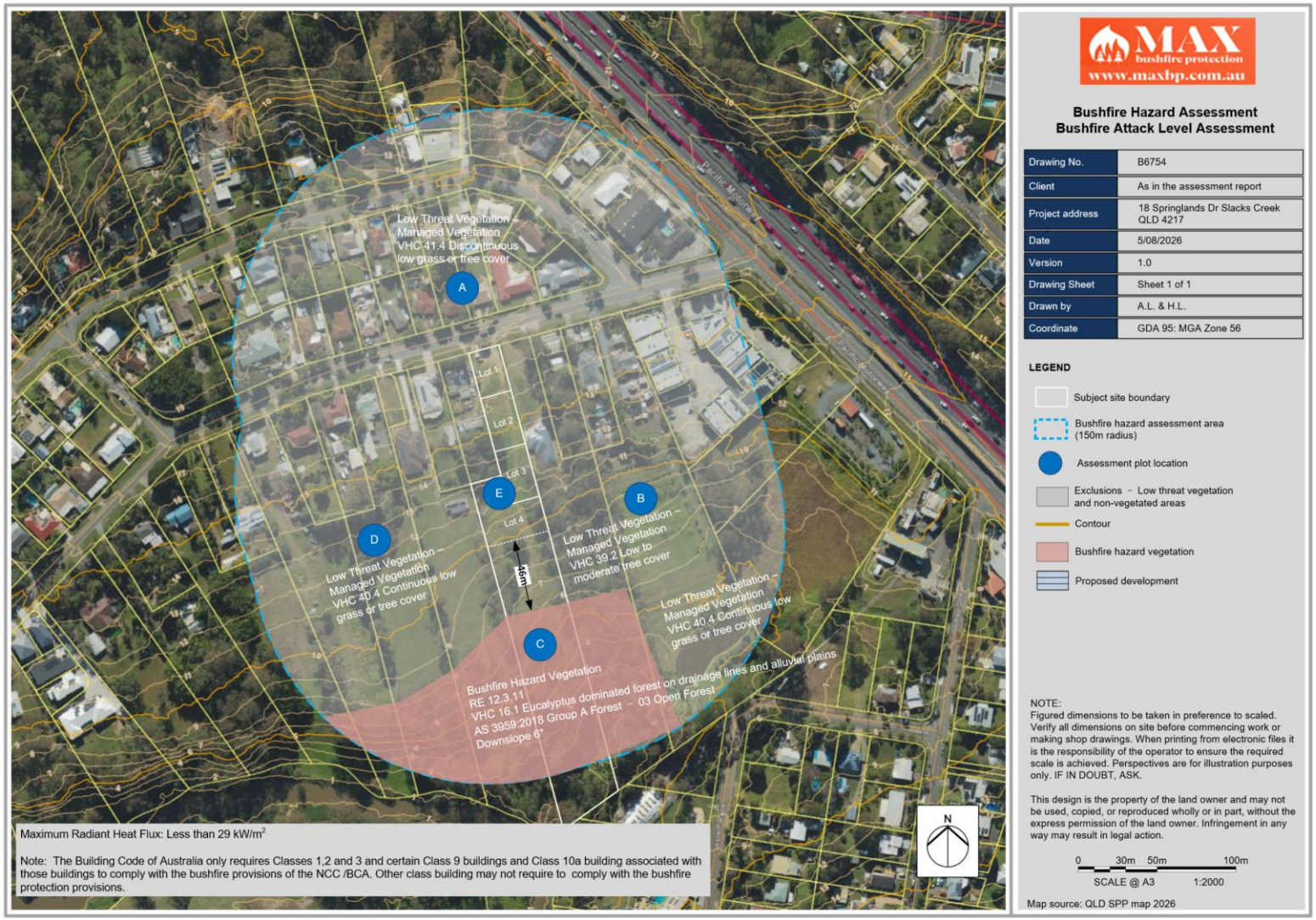


Figure 4-2: Ground-Truthed VHC and local Bushfire Prone Area map

- **Classified vegetation conditions to South**

Land at assessment plot C, a narrow and discontinuous hazardous vegetation patch VHC 16.1 Eucalyptus dominated forest on drainage lines and alluvial plains was identified 46m from the southern boundary of Lot 4 to the south. This vegetation patch may contain RE 12.3.11 Eucalyptus tereticornis +/- Eucalyptus siderophloia, Corymbia intermedia open forest on alluvial plains usually near coast. Limited regular maintenance actives have been carried out in this area.

Trees ranging from 10m to 30m in height, characterized by foliage cover 30% to 70%, are typically dominated by eucalypts. The understorey is sclerophyllous, comprising small trees, tall scrubs, or tall shrubs with hard leaves and short internodes. A diverse range of weeds and invasive plant species, including weedy grasses and Lantana, is widespread across the area, occurring under conditions varying from sparse to moderately dense. The predominant tree canopy reaches a height of approximately 22m.

This vegetation patch also contains some rainforest species due to the highly humid environment, with an understory of palms, tree ferns, and vines, and a ground layer dominated by mosses, fungi, and decomposing organic matter. While rainforest fuels are typically moist, low flammability, and non-combustible, fire risk may increase under prolonged drought or extreme heat conditions, particularly in transition zones adjacent to dry eucalypt forests. Bushfire impact in these areas can lead to structural changes, promoting the spread of more flammable species.

The potential fuel load of the bushfire hazard vegetation patch is determined as following:

Vegetation context	VHC 16.1 with RE 12.3.11
Vegetation structure	Open Forest
AS3959:2018 Classification of vegetation	Group A Forest – Open Forest 03
Effective slope under the hazardous vegetation	Downslope 6° South
Slope Between Site and hazardous vegetation	Downslope 6° South
Surface fuel load	10.0 t/ha
Near-surface fuel load	3.8 t/ha
Elevated fuel load	1.2 t/ha
Bark fuel load	1.0 t/ha
Total fuel load	16.0 t/ha

Table 3: Potential fuel load

- **Unmanaged vegetation**

Unmanaged vegetation, such as unmanaged grassland and grassy woodland, characterised by overgrowth typically exceeding 10cm in height, dense ground cover, and the accumulation of dry or dead vegetation due to the absence of mowing, slashing, or grazing would contribute to a build-up of fine fuels that are easily ignitable and capable of sustaining rapid fire spread under dry and windy conditions, thereby posing a potential bushfire risk.

- **Low hazard conditions to North, East and West**

Ground-Truthed VHC to the north, the east and the west, these areas comprise managed gardens, residential houses, well-maintained lawns, and paddocks, with trees regularly trimmed, mowing, slashing, and weed removal conducted to minimise fuel load. As a result, it is classified as managed vegetation with a low bushfire hazard.

- **Vegetation Conditions within the proposed development**

Within the proposed development area and the designed Asset Protection Zone, vegetation conditions will be consistently maintained in a low-fuel state, aligning with the characteristics of VHC 41.4 Discontinuous low grass or tree cover.

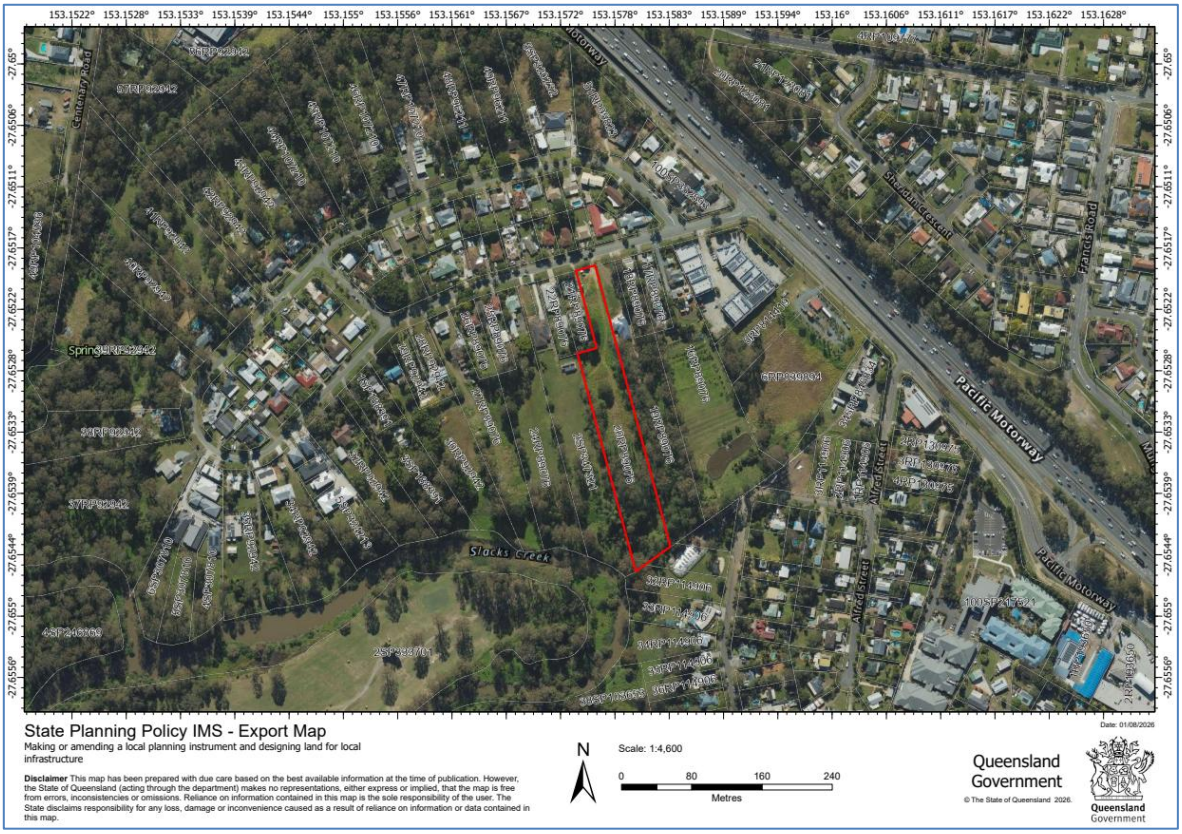


Figure 4-3: Aerial view providing landscape context for the site (Sourced from QLD SPP mapping, captured 07/2026)

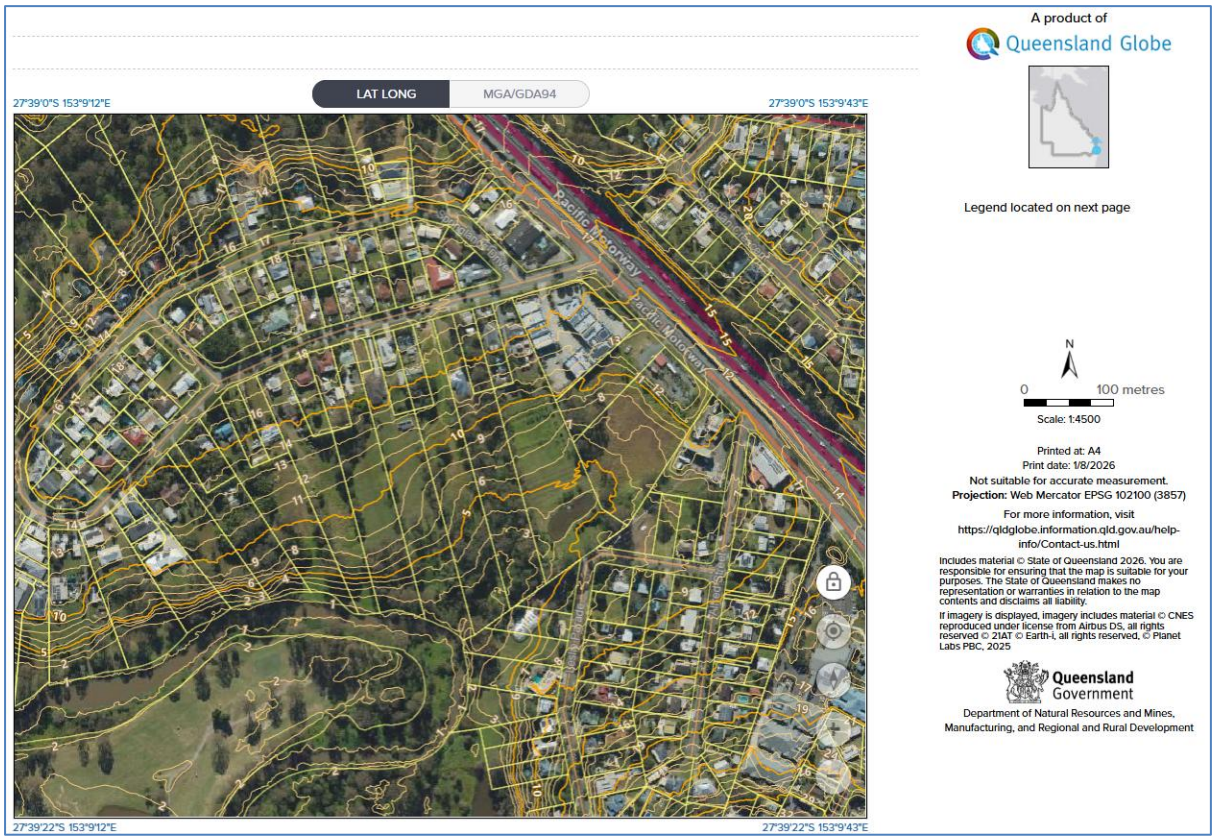


Figure 4-4: 1m interval contour map (Sourced from Queensland Globe mapping, captured 07/2026)

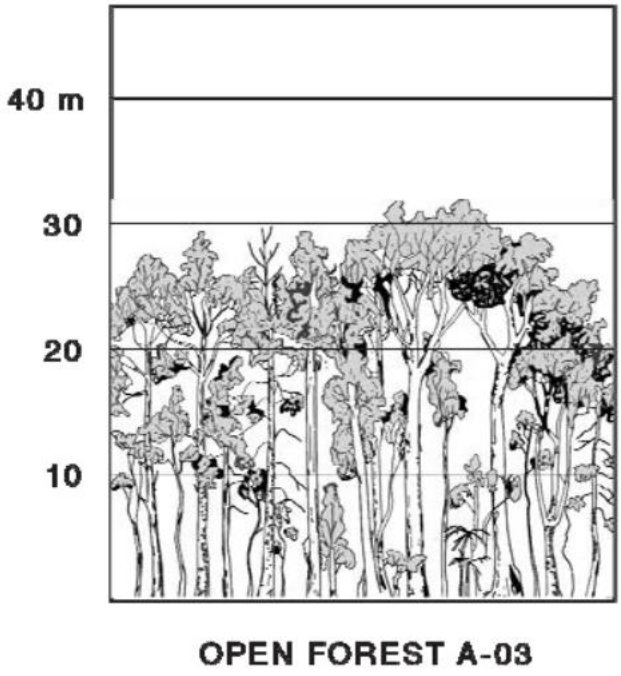


Figure 4-5: AS 3959:2018 Classification of vegetation – Open Forest A-03

Regional ecosystem details for 12.3.11

Regional ecosystem	12.3.11
Vegetation Management Act class	Of concern
Wetlands	Contains Palustrine
Biodiversity status	Of concern
Subregion	8, 7, 9, 3, 2, (4), (10), (5), (1)
Estimated extent[1]	Pre-clearing 164000 ha; Remnant 2021 40000 ha
Short description	Eucalyptus tereticornis +/- Eucalyptus siderophloia, Corymbia intermedia open forest on alluvial plains usually near coast
Structure code	Open Forest
Description	Eucalyptus tereticornis +/- E. siderophloia and Corymbia intermedia open forest to woodland. Corymbia tessellaris, Lophostemon suaveolens and Melaleuca quinquenervia frequently occur and often form a low tree layer. Other species present in scattered patches or low densities include Angophora leiocarpa, E. exserta, E. grandis, E. latisinensis, E. tindaliae, E. racemosa and Melaleuca sieberi. Corymbia trachyphloia and/or C. citriodora subsp. variegata may dominate on areas of Pleistocene alluvia. Eucalyptus seeana may be present south of Landsborough and Livistona decora may occur in scattered patches or low densities in the Glenbar SF and Wongi SF areas. Occurs on Quaternary alluvial plains and drainage lines along coastal lowlands. Rainfall usually exceeds 1000mm/y. Contains Palustrine. (BVG1M: 16c).
Fire management guidelines	SEASON: Late summer, autumn and spring after rain. INTENSITY: Low. INTERVAL: 3-6 years. INTERVAL_MIN: 3. INTERVAL_MAX: 6. STRATEGY: Aim to burn 40-60% of any given area. Spot ignition in cooler or moister periods encourages mosaics. ISSUES: Maintain ground litter and fallen timber habitats by burning only with sufficient soil moisture. Burning should aim to produce fine scale mosaics of unburnt areas.



Condition class 1
Reference condition, mature and minimal disturbance
- Tree canopy cover: > 55%; Tree height: > 23 m
- Tree sub-canopy cover: > 32%; Tree sub-canopy height: > 8 m
- Native shrub cover: 20-25%
- Large trees: > 2 eucalypts > 49 cm DBH
- Coarse Woody Debris: 50-60 m total length
- Species richness: Trees ≥ 7; Shrubs ≥ 7; Grass ≥ 12; Forbs and other ≥ 25
- Ground cover: Perennial grass cover 45-50%; Organic litter cover > 35%
- Non-native plant species: < 2% cover
- Regeneration: > 5 tree species in regeneration phase



Condition class 2
Mature, some disturbance e.g. fragmentation, grazing
- Tree canopy cover: 35-55%; Tree height: 18-23 m
- Tree sub-canopy cover: 20-32%; Tree sub-canopy height: 5-8 m
- Native shrub cover: 10-20%
- Large trees: 1-2 eucalypts > 49 cm DBH
- Coarse Woody Debris: 30-50 m total length
- Species richness: Trees 4-7; Shrubs 4-7; Grass 7-12; Forbs and other 15-25
- Ground cover: Perennial grass cover 25-45%; Organic litter cover 20-35%
- Non-native plant species: 2-15% cover.
- Regeneration: 3-5 tree species in regeneration phase



Condition class 3
Advanced regrowth or moderate disturbance e.g. grazing, clearing
- Tree canopy cover: 10-35%; Tree height: 10-18 m
- Tree sub-canopy cover: 10-20%; Tree sub-canopy height: 5-8 m
- Native shrub cover: < 10% or > 50%
- Large trees: ≤ 1 eucalypts > 49 cm DBH
- Coarse Woody Debris: 10-30 m or > 120 m total length
- Species richness: Trees < 4; Shrubs < 4; Grass < 7; Forbs and other 5-15
- Ground cover: Perennial grass cover < 25% or > 70%; Organic litter cover 10-20%
- Non-native plant species: 15-25% cover
- Regeneration: 0-3 trees species in regeneration phase

Figure 4-6: Ecological Condition Profile of RE 12.3.11

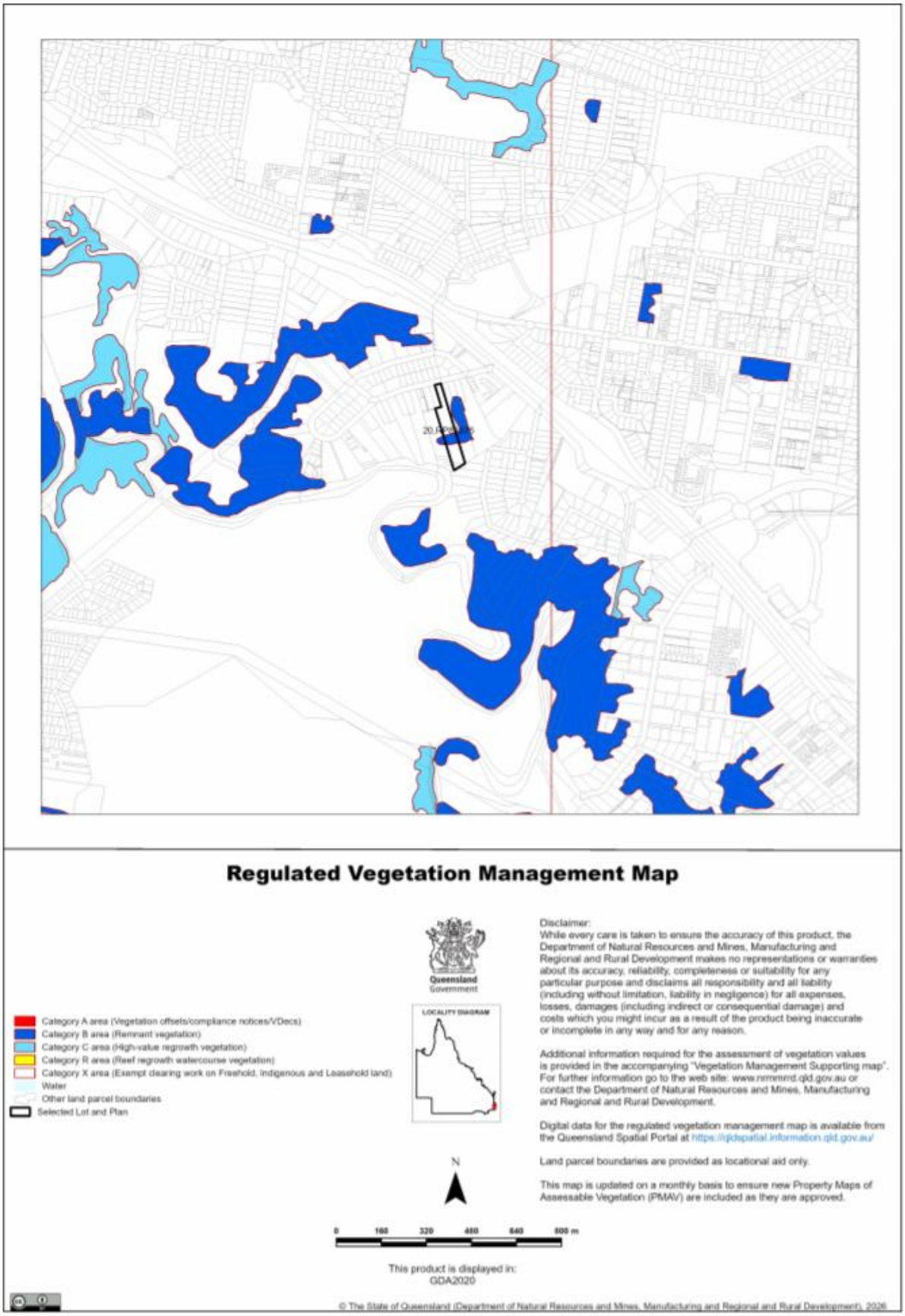


Figure 4-7 Regulated vegetation management map (sourced from Vegetation management report, Department of Resources, 2025)

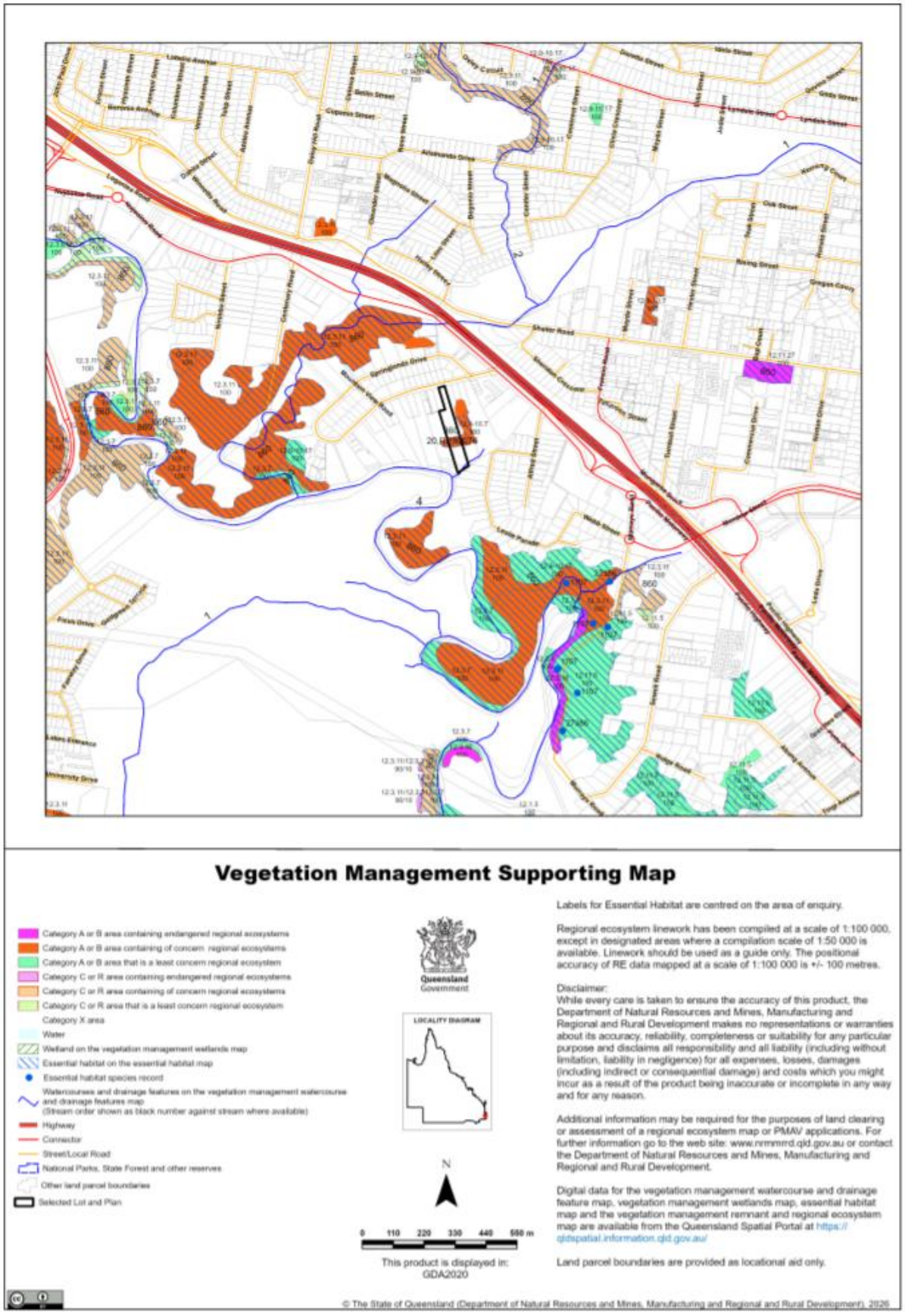


Figure 4-8: Vegetation Management Support Map providing RE context on the site (sourced from Vegetation management report, Department of Resources, 2025)







Photo 1: Bushfire hazard vegetation in the southern portion of the site



Photo 2: Managed grassland on adjoining site



Photo 3: Proposed Lot 4



Photo 4: Site entrance

4.3.2 Potential Bushfire Intensity Calculations

The Bushfire Resilient Communities Technical Reference Guide (QFES, 2019) defines bushfire hazard classes as follows:

- Very high potential bushfire intensity > 40,000 kW/m.
- High potential bushfire intensity 20,000 - 40,000 kW/m.
- Medium potential bushfire intensity 4,000 - 20,000kW/m.
- Grass fire hazard, generally less than 4,000kW/m.
- Potential impact buffer, where land is within 100m of a very high, high and medium potential bushfire intensity area.
- Low hazard, where potential bushfire intensity < 4,000kW/m and more than 100m to very high, high and medium potential bushfire intensity area.

Potential fireline intensity is a function of fire weather severity (Local FFDI), landscape slope and vegetation fuel load based on classified vegetation communities according to the method described by the CSIRO methodology as follows:

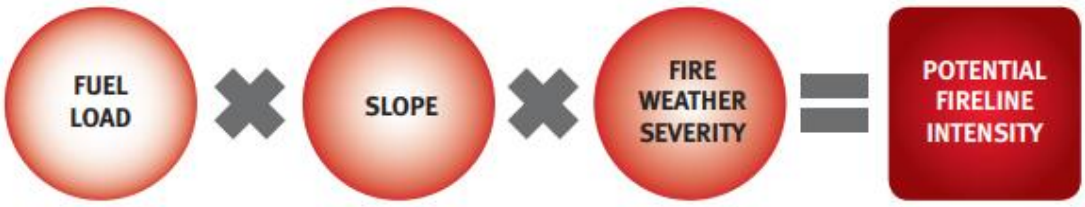


Figure 4-9: Method for calculation of potential fireline intensity (by CSIRO)

The results of the potential bushfire intensity calculations as presented in Table 4.

Local FFDI	Aspect	Ground-Truthed VHC	Potential fuel load (t/ha)	Slope (°)	Potential bushfire intensity (kW/m)	Bushfire hazard class
54	North	VHC 41.4	3	Upslope 3	245	Low hazard
	East	VHC 39.2	8	Downslope 4	2428	Low hazard
	South	VHC 16.4	16	Downslope 6	12967	Medium potential bushfire intensity
	West	VHC 40.4	5	Downslope 4	1103	Low hazard

Table 4: Potential bushfire intensity calculation

Figure 4-2 presents a local bushfire hazard prone area map, which confirms the potential fireline intensity class of all identified Vegetation Hazard Classes (VHCs) in proximity to the site, taking into account the patch and corridor filtering process as defined by the Bushfire Resilient Communities Technical Reference Guide. This local bushfire prone area map can then replace the SPP map and the Council's Bushfire Hazard Overlay map for the purposes of assessing the application.

4.4 Probable Direction of Bushfire Attack

The anticipated directions of bushfire threat to the proposed development are expected to originate from any direction, primarily in areas classified as having medium, high and very high bushfire hazard levels from the west and the south.

4.5 Fire History

Fire history information from QFES reveals that between 2015 and 2025, there were no recorded fires within a 1-kilometre radius of the location. Both the historical fire data and observations of fire scars suggest that it has been a substantial amount of time since the site was last exposed to a large-scale fire event. However, it is important to note that while this information does not guarantee the site will remain free from future fires, the likelihood of such events occurring appears to be decreasing due to the surrounding residential and commercial land development patterns.

4.6 BAL and Radiant Heat Flux Modelling

The radiant heat exposure outcome for residential development, as outlined in the SPP Bushfire Prone Area Code under the Natural Hazards, Risk and Resilience – State Planning Policy State Interest guidance material (DSDMIP 2019), is a radiant heat flux of $\leqslant$ 29 kW/m^2 .

Figure 4-1 indicates that sufficient building area exists on each lot for Class 1a buildings. Compliance with the no more than 29 kW/m² radiant heat flux criterion is achieved from the suitable separation is provided for the classified bushfire hazard vegetation to the south.

The Class 1a dwellings on Lots 1 and 2 are expected to achieve BAL-LOW, while the dwellings on Lots 3 and 4 are expected to achieve BAL-12.5.

For building approval on each new lot, a bushfire report to determine the accurate BAL will be requested where the location of the building location is decided.

4.7 Building Envelope and Asset Protection Zone

An Asset Protection Zone (APZ) will need to be established and maintained within the subject site to provide adequate separation from hazardous vegetation. For Lots 1, 2 and 3, the APZ will encompass the entirety of each lot.

For Lot 4, the entire nominated building envelope will form the Inner Protection Area, with a further 20 m extending to the south to form the Outer Protection Area.

All APZ distances are to be measured horizontally. Vegetation and any structures within the APZ are to be managed so that they do not increase the overall potential fuel load. The detailed APZ establishment and ongoing maintenance requirements will be specified in the Bushfire Management Plan.

All distance measurements for the APZ should be taken as horizontal distances. Management strategies within the APZ will ensure that vegetation or other structures proposed do not increase the overall potential fuel load. The Bushfire Management Plan will detail these requirements comprehensively.

In the remaining areas, the client should continue to maintain the current vegetation management practices. Unmanaged vegetation will increase the bushfire risk.

It is critically important to note that failure to maintain the Asset Protection Zone (APZ) will compromise its effectiveness, leading to an elevated bushfire risk to the proposed development.

Bushfire Impact from VHC 16.1 to South

Minimum Distance Calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	54	Rate of spread	1.35 km/h
Vegetation Classification	Forest	Flame length	10.71 m
Understorey fuel load	13.8 t/ha	Flame angle	58 °, 69 °, 77 °, 83 °, 84 ° & 90 °
Total fuel load	16.0 t/ha	Elevation of receiver	3.63 m, 3.77 m, 3.39 m, 2.65 m, 2.13 m & 0 m
Vegetation height	n/a	Fire intensity	11,183 kW/m
Effective slope	6 °	Transmissivity	0.88, 0.864, 0.842, 0.818, 0.805 & 0.737
Site slope	6 °	Viewfactor	0.5926, 0.439, 0.2959, 0.1999, 0.1628 & 0.0445
Flame width	100 m	Minimum distance to < 40 kW/m²	8.5 m
Windspeed	n/a	Minimum distance to < 29 kW/m²	11.6 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m²	17.3 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m²	25.3 m
		Minimum distance to < 10 kW/m²	30.4 m

Rate of Spread - Mcarthur, 1973 & Noble et al., 1980

Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

Bushfire Impact on Lot 4 from VHC 16.1 to South

Bushfire Attack Level calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	54	Rate of spread	1.35 km/h
Vegetation Classification	Forest	Flame length	10.71 m
Understorey fuel load	13.8 t/ha	Flame angle	87 °
Total fuel load	16 t/ha	Panel height	10.69 m
Vegetation height	n/a	Elevation of receiver	0.51 m
Effective slope	6 °	Fire intensity	11,183 kW/m
Site slope	6 °	Transmissivity	0.774
Distance to vegetation	46 m	Viewfactor	0.0976
Flame width	100 m	Radiant heat flux	5.74 kW/m²
Windspeed	n/a	Bushfire Attack Level	BAL-12.5
Heat of combustion	18,600 kJ/kg		
Flame temperature	1,090 K		

Rate of Spread - Mcarthur, 1973 & Noble et al., 1980

Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

Figure 4-10: Radiant Heat Flux Modelling and BAL Rating

5. Bushfire Management Plan

This Bushfire Management Plan (BMP) identifies the bushfire protection measures that should be implemented as part of the proposed development to manage and to reduce the risk from bushfire to an acceptable level. It is important to understand the processes that influence bushfire behaviour and the sources of damage that threaten people and property.

5.1 Bushfire Behaviours

Understanding bushfire behaviour is crucial when planning development on bushfire prone land to effectively mitigate the risks associated with bushfires. Three primary elements significantly influence bushfire behaviour, as follows:

5.1.1 Topography

The physical characteristics of the landscape significantly influence bushfire behaviour. It is well-established that fires tend to spread more rapidly when they move uphill. This is because flames can easily access unburnt fuel ahead of the fire, which is pre-heated by radiant heat, making it more combustible. Studies indicate that for every 10-degree increase in slope, the fire's speed can double. For example, if a fire is moving at a rate of 5 km per hour on flat ground, and it encounters a 10-degree slope, its speed can double to 10 km per hour uphill. As the fire gains momentum, it also increases in intensity, becoming even hotter.

Conversely, when a fire moves downhill, its speed decreases because the flames have less fuel to consume, and radiant heat pre-heats less fuel in front of the fire. For every 10-degree decrease in slope, the fire's speed is halved. It is important to note that fires typically move more slowly as the slope declines.

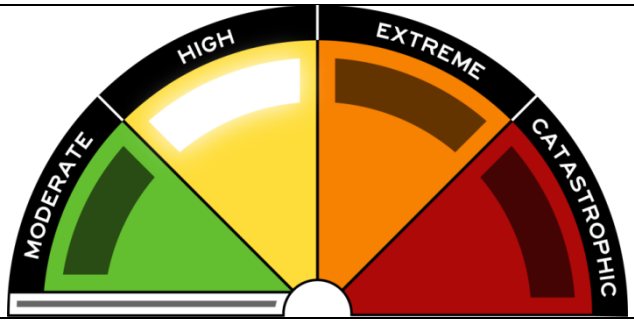
5.1.2 Weather Conditions

Weather conditions are a major factor in the behaviour and spread of bushfires. Hot, dry, and windy conditions can make fires more intense and difficult to control, while cooler and more humid conditions can slow their spread. Wind can also influence the direction and speed of the fire, and changes in wind direction can make it more difficult for firefighters to predict the fire's behaviour. Weather forecasting is a critical component of bushfire management, as it allows firefighters and other responders to anticipate changes in fire behaviour and take action to mitigate the risks. In addition, many communities now use tools like automated alert systems to warn residents of potential fire danger based on weather conditions.

The new Australian Fire Danger Rating System (AFDRS) improves and simplifies the reporting of fire danger. Fire danger ratings describe the potential level of danger should a bushfire starts. It is a valuable information for taking actions to protect people and property. The AFDRS has four levels, each with a distinct title, colour and key message.

5.1.3 Vegetation

The amount and type of fuel available can greatly influence the behaviour of a bushfire. Vegetation is the source of fuel of a bushfire. Vegetation that is dry and dead, or that is densely packed, can create more intense and long-lasting fires. In contrast, areas with little fuel or sparse vegetation may not support a fire at all. The arrangement of fuel can also play a role, as fires that encounter a continuous "fuel ladder" from the ground up into the canopy can become more severe. The amount of fuel surrounding a building can directly impact a buildings survival. Vegetation management, landscaping for bushfire and breaking the continuity of vegetation can limit the spread of fire.



Moderate: Plan and Prepare.
Most fires can be controlled

- Stay up to date and be ready to act if there is a fire.

High: Be Ready to Act
Fires can be dangerous

- Decide what you will do if a fire starts.
- There's a heightened risk. Be alert for fires in your area.
- If a fire starts, your life and property may be at risk. The safest option is to avoid bushfire risk areas.

Extreme: Take Action Now to protect your life and property
Fires will spread quickly and be extremely dangerous

- These are dangerous fire conditions.
- Check your bushfire plan and make sure your property is fire ready.
- If a fire starts, take immediate action.
- If you and your property are not prepared to the highest level, go to a safer location well before the fire impacts.
- Reconsider travel through bushfire risk areas.

Catastrophic: For your survival, leave bushfire risk areas
If a fire starts to take hold, lives are likely to be lost

- These are the most dangerous conditions for a fire.
- Your life may depend on the decisions you make, even before there is a fire.
- For your survival, do not be in bushfire risk areas.
- Stay safe by going to a safer location early in the morning or the night before.
- If a fire starts and takes hold, lives and properties are likely to be lost.
- Homes cannot withstand fires in these conditions. You may not be able to leave and help may not be available.

Table 4: Australian Fire Danger Rating

5.2 Potential Bushfire Impacts and Attack Mechanisms

Bushfire attack mechanisms are typically interconnected, rarely occurring in isolation. Both people and property often face a combination of bushfire attack

factors, each operating across different spatial scales. Nevertheless, strategies aimed at mitigating the impacts of direct flame contact, radiant heat exposure, and ember attack can be effectively addressed within the framework of land use planning and development assessments, conducted at manageable scales.

The main sources of direct bushfire attack that give rise to loss of life, and damage to property and infrastructure are as follows:

5.2.1 Direct Flame Contact

Direct flame contact occurs when flames from a bushfire come into direct contact with a building, structure, or individuals. When this happens, the flames can ignite any flammable material present and cause fires to spread rapidly. Direct flame contact can also cause burns and other heat-related injuries to people who are in the path of the flames.

Direct flame contact is a significant concern during a bushfire, especially for buildings and structures that are located in close proximity to the fire. The intensity of the flames and the duration of the exposure can have a significant impact on the severity of the damage.

To reduce the risk of direct flame contact during a bushfire, it's essential to create a defensible space around buildings and structures, clear flammable materials from the area, and use fire-resistant building materials when constructing or renovating buildings. Additionally, it's crucial to follow evacuation orders and stay informed about the fire's behaviour and movement to ensure personal safety.

5.2.2 Radiant Heat Exposure

Radiant heat exposure is a significant danger during a bushfire. When a bushfire occurs, the heat generated by the flames causes the air surrounding the fire to heat up, and this heat energy is then radiated out in the form of electromagnetic waves. These waves can travel a considerable distance from the fire and can cause surfaces that are not in direct contact with the flames to heat up.

During a bushfire, radiant heat exposure can be intense, and the effects can be severe. Radiant heat can ignite flammable materials, such as dry vegetation or wooden structures, and cause them to catch fire. It can also cause buildings and structures to overheat, leading to structural damage or collapse. Additionally, people who are too close to the flames can suffer from heat stress, dehydration, and serious burns.

The risk of radiant heat exposure during a bushfire can be mitigated by creating a defensible space around buildings and structures, clearing flammable materials from the area, and using fire-resistant building materials when constructing or renovating buildings. It's also important to follow evacuation orders and stay informed about the fire's behaviour and movement to ensure personal safety.

5.2.3 Ember Attack

Ember attack, often referred to as spot fires, represents a prominent hazard during bushfires. This phenomenon occurs when burning embers, also known as firebrands or spot fires, are carried by the wind and land in different locations, potentially igniting new fires.

In the midst of a bushfire, the combination of hot air and flames generates updrafts capable of lifting burning embers over considerable distances. These embers can alight on rooftops, in gutters, or on flammable materials near buildings and structures, leading to ignition and the potential initiation of new fires.

Ember attack poses a unique danger because it can manifest hours or even days after the primary fire front has passed, and it has the capacity to ignite fires in areas previously unaffected by the bushfire. Consequently, it is imperative to prepare for ember attack through measures such as establishing a defensible space around buildings and structures, removing flammable materials from the vicinity, and sealing gaps and openings in buildings to prevent ember ingress.

5.2.4 Wind and Smoke Attack

Strong winds can cause a bushfire to spread more rapidly and can also increase the likelihood of ember attack, as burning embers can be carried by the wind over long distances. Wind can also push flames and radiant heat towards buildings and structures, increasing the risk of direct flame contact and radiant heat exposure.

Smoke from a bushfire can also pose a danger to people's health, particularly for those with respiratory problems. Smoke can contain particulate matter, carbon monoxide, and other harmful pollutants that can irritate the lungs and worsen respiratory conditions. In addition to health effects, smoke can reduce visibility, making it more difficult for firefighters to contain the fire and for people to evacuate safely.

5.2.5 Convection and Conduction

Both convection and conduction can play a significant role in the spread and intensity of a bushfire. To reduce the risk of a bushfire spreading through convection and conduction, it's important to create a defensible space around buildings and structures, clear flammable materials from the area, and use fire-resistant building materials when constructing or renovating buildings. It's also crucial to follow evacuation orders and stay informed about the fire's behaviour and movement to ensure personal safety.

5.3 Bushfire Protection Measures

This section identifies the bushfire protection measures that will be implemented as part of the proposed development to comply with the requirements of both the State

and local council's Bushfire Prone Area code and to minimise the impact of potential bushfires on people and property.

The proposed measures are prepared in accordance with Queensland State Government State Planning Policy - Part E (SPP 2017), the Bushfire Resilient Communities Technical Reference Guide (QFES, 2019), the local council's Bushfire Overlay Code, and the Australian Standard (AS 3959:2018) for Construction of buildings in bushfire prone areas.

The legislation mentioned above aims to protect individuals and buildings from bushfires by ensuring that new developments meet specific Performance Outcomes that are appropriate for the identified bushfire hazard. These Performance Outcomes are typically achieved by properly separating the development from the bushfire hazard, providing adequate access for firefighting vehicles, and constructing buildings to the appropriate standards. Additionally, the legislation includes other relevant factors that are deemed necessary for ensuring the safety of individuals and buildings during a bushfire emergency.

5.3.1 Asset Protection Zone (APZ)

An Asset Protection Zone (APZ) is the most important bushfire protection measure. An APZ is a designed area surrounding a building or structure that has been well managed to reduce the risk of a bushfire impacting the building or structure. An APZ provides:

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

A correctly designed and regularly maintained APZ will reduce the risk of:

- Direct flame contact on the asset
- Damage to the build asset from intense radiant heat
- Ember attack on the asset

An APZ is typically designed and created by removing vegetation and other combustible materials from around the building or structure, reducing the fuel available for a bushfire. The width of the APZ and the level of vegetation removal required depend on a number of site-specific factors, including the slope of the land, the hazardous vegetation type, and the intensity of the bushfire hazard. The property owner is responsible for creating and maintaining regularly the designed APZ.

(1) Creating APZ by reducing bushfire fuel

The intensity of bush fires can be greatly reduced where there is little to no available fuel for burning. To effectively manage bushfire fuels, there are several approaches to reduce, remove, or change the condition of the fuel.

- Raking or manual removal of fine fuels
- Mowing or grazing of grass
- Removal or pruning of trees, shrubs and understorey
- Slashing and trittering

It is important to note that reducing fuel does not always require removal of all vegetation, which would cause environmental damage. Trees and plants also provide protection against bushfires by mitigating the impact of strong winds, intense heat and flying embers (by filtering embers) and changing wind patterns. Some ground cover vegetation is also needed to prevent soil erosion.

(2) Ongoing management for APZ

The creation of an Asset Protection Zone (APZ) establishes a controlled fuel-managed area that serves to reduce the potential impact of direct flame contact and radiant heat on property development, effectively acting as a defensible space. It is crucial to emphasize that the management of vegetation and landscaping within the APZ is of paramount importance and should maintain a minimal fuel load.

An APZ should be maintained in perpetuity to ensure ongoing protection from the impact of bushfires, and maintenance of the APZ should be regularly undertaken, especially in advance of the bushfire season. The requirements are set out as follows.

(i) Inner Protection Area

The Inner Protection Area 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 proposed development and act as an important space. Vegetation within this area should be kept below 100 mm in height and be discontinuous.

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

When establishing and maintaining the inner protection zone, the following requirements apply:

- General
  - A minimum 1m wide area, suitable for pedestrian traffic, must be provided around the immediate curtilage of the building
  - Planting is limited in the immediate vicinity of the building
  - All leaves and vegetation debris must be removed at regular intervals during the declared fire danger period
  - Planting does not provide a continuous canopy to the building
  - Within 10 m of a building, flammable objects must not be located close to the vulnerable parts of the building
  - Plants greater than 10 cm in height must not be placed within 3 m of a window or glass feature of the building

- Low flammability vegetation species are used

- Trees
  - Tree canopy cover should be less than 15% at maturity
  - Trees at maturity should not touch or overhang the building
  - Lower limbs should be removed up to a height of 2 m above the ground
  - Tree canopies should be separated by 2 to 5 m
  - Preference should be given to smooth barked and evergreen trees
- 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
  - 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 regularly (as a guide grass, should be kept to no more than 100 mm in height)
  - Leaves and vegetation debris should be removed regularly

(ii) Outer Protection Area

The Outer Protection Area is located between the Inner Protection Area and 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 inner protection zone.

- Trees
  - Tree canopy cover should be less than 30% at maturity
  - Tree canopies should be separated by 2 to 5 m
- Shrubs
  - Shrubs should not form a continuous canopy, and
  - Shrubs should not form more than 20% ground cover
- Grass
  - Grass should be kept mown regularly to height of less than 100 mm
  - Leaves and other debris should be removed regularly.

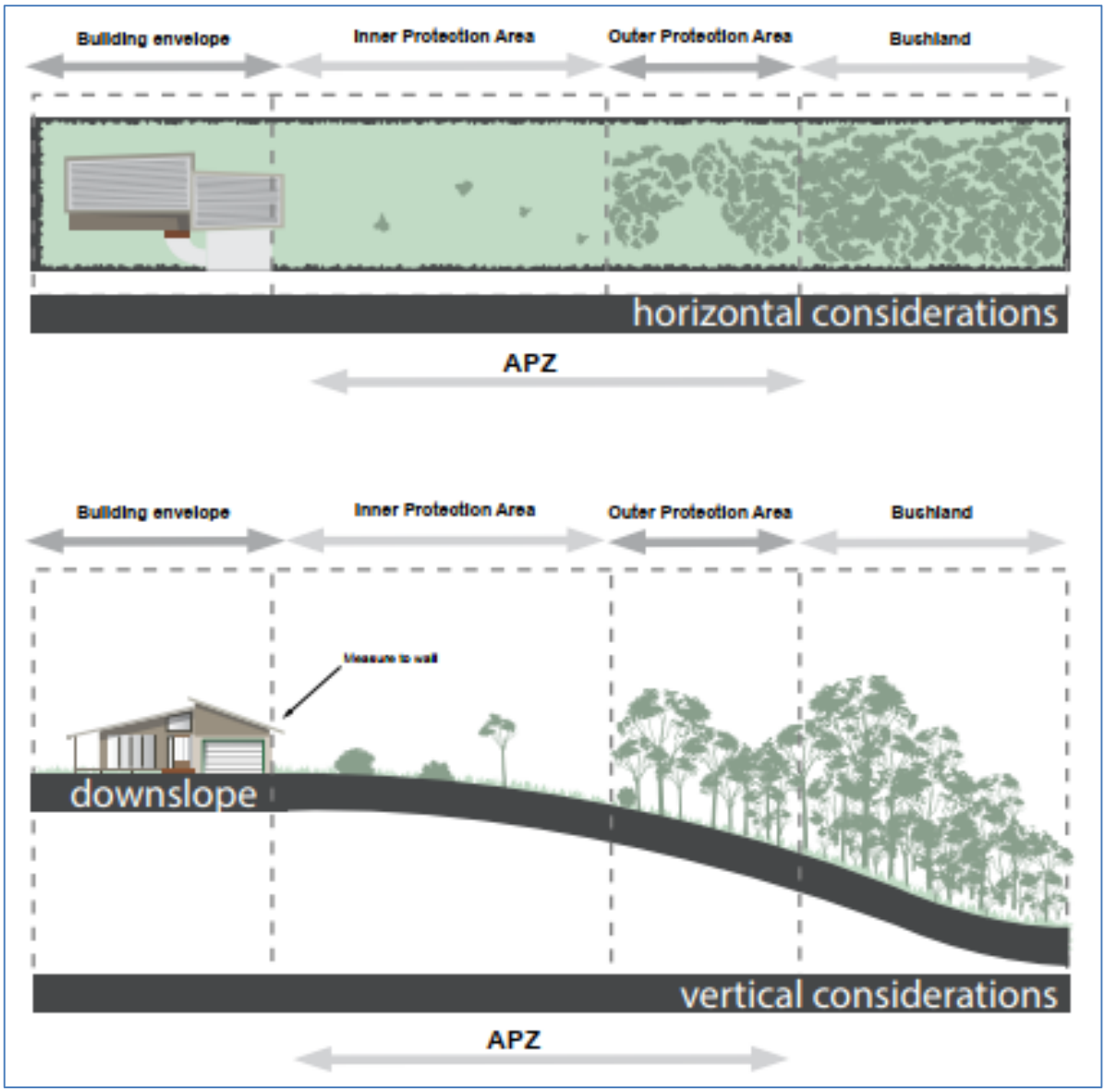


Figure 5-1: Inner protection area and Outer protection area

5.3.2 Building Construction, Siting and Design

The appropriate design and construction of buildings enhance their survivability from bushfires. Construction measures should not be applied as a stand-alone mitigation solution but should form part of a suite of measures. This should also include APZ, appropriate access, water supply and landscaping. Building design needs to ensure adequate protection of vulnerable building elements. Construction standards are outlined in AS 3959:2018 and the NASH Standard to provide various levels of protection for different building elements.

The outcome of the BAL assessment is BAL-29 in accordance with AS 3959:2018 and the Bushfire Resilient Communities.

It should be noted the Building Code of Australia only requires Classes 1, 2 and 3 and certain Class 9 buildings and Class 10a building associated with those buildings to comply with the bushfire provisions of the NCC 2022.

5.3.3 Access and Egress Arrangement

Access and driveway design and construction are critical components of bushfire risk management. In a bushfire hazard area, vehicular access, including public roads, private driveways and internal accessways, should be designed to mitigate bushfire risk by ensuring adequate access and egress for:

(a) fire-fighting and other emergency vehicles; and
(b) the safe evacuation of residents, occupants and emergency personnel during a bushfire event.

The design and construction of the accessway are to comply with the State Government's Fire Hydrant and Vehicle Access Guidelines for Residential, Commercial and Industrial Lots (QFES, 2015), together with the relevant requirements of the local council planning scheme and applicable guidelines.

These guidelines identify key design considerations, including trafficable width, horizontal and vertical clearance, all-weather access, load-bearing capacity, grades, dips, exit angles, turning areas and passing bay requirements. These matters should be addressed having regard to both the relevant Acceptable Outcomes and Performance Outcomes.

The accessway should be designed or certified by a suitably qualified person, such as a RPEQ civil engineer, traffic engineer or pavement engineer, and constructed in accordance with the relevant Australian Standards and applicable authority requirements.

The proposed development will provide with vehicular access that enables safe evacuation for occupants and easy access by firefighting appliances. Consequently, the proposed development is in compliance with the Council Bushfire Hazard Overlay.

5.3.4 Water Supply

It is noted that AS 3959:2018 – Construction of buildings in bushfire prone areas does not include requirements for water supply for firefighting purposes; nor is water supply a factor in determining a building's Bushfire Attack Level (BAL) rating. Accordingly, the building certifier should not impose conditions on the building approval relating to water supply for firefighting purposes, unless such conditions are required under a development permit issued by the local council or are specified in the applicable local planning scheme.

An adequate supply of water is essential for firefighting purposes and suitable water supply arrangements shall be provided. The proposed development should provide an appropriate water supply to support effective emergency services response includes reticulated water and/or appropriate static water supply.

(1) If the development is serviced by public fire hydrant, this is considered an accepted solution, as the infrastructure is maintained by the local authority and no further assessment or testing, such as pressure test, by the client is required.
(2) Where a private fire hydrant system is proposed, the reticulated hydrant network must be designed, installed, and certified in accordance with the Queensland Fire and Emergency Services (QFES) Fire Hydrant and Vehicle Access Guidelines.
(3) Where reticulated water is unavailable, an appropriate static water supply should consist of a dedicated water tank specifically for firefighting purposes, with suitable access for firefighting appliances.

    It is recommended that the tank be located within 10 m of the building. To ensure durability and compliance with safety standards, it is strongly recommended that the tank be constructed underground or from non-combustible materials, such as steel or concrete. The tank must include a take-off connection providing a minimum of 10,000 litres of static water exclusively for firefighting access.

    The site must permit clear access for a medium rigid fire appliance (15 tonnes) to within 6 m of the tank. Tanks and associated pumps must be protected from bushfire impact in accordance with AS 2304:2011 – Water storage tanks for fire protection systems. Where the site is serviced by a rural fire brigade, the tank shall be fitted with brigade-compatible fittings, including a 50-millimetre ball valve and a male camlock coupling. If the tank is underground, a minimum 200-millimetre access hole must be provided to allow suction line access. Directional signage must clearly indicate the tank's location at the street frontage.

5.3.5 Emergency Response Procedures

A site-based fire management and evacuation strategy should be developed, maintained and made available for implementation in the event of an emergency.

In the event of an actual or imminent fire emergency, the strategy should be activated immediately, and emergency assistance should be obtained by calling 000.

5.3.6 Landscaping Management Plan

The type, location and ongoing maintenance of landscaping are considered a necessary bushfire protection measure. Landscaping management for bushfire is the process of designing, constructing, and maintaining a landscape in a way that reduces the risk of bushfire. The management strategies typically involve creating fire breaks, reducing fuel loads, and selecting vegetation that is less flammable.

Appendix A provides a list of less flammable plants.

The landscaping management shall be carried out as the requirements set out for Asset Protection Zone in Section 5.3.1.

5.3.7 Reducing Fuel Load and Weed Management

Removing excess ground fuels and combustible material is a crucial aspect of effective fire prevention and management. This process involves the careful clearance of various flammable materials, including long dry grass, accumulated dead leaves, and fallen branches. By systematically reducing these fuel sources, the risk of fire ignition and spread is significantly mitigated. Regular maintenance of such clearance efforts is essential to ensure ongoing fire safety and resilience within the environment.

Unmanaged invasive pest plants can swiftly amplify fuel loads, comprising fast-growing introduced grasses, dense woody weeds, and invasive climbing vines. These factors collectively escalate fuel loads, fostering a "laddering" effect, intensifying fire spread and allowing it to transition from ground to canopy. Effective weed management markedly diminishes bushfire risk to the site and surrounding properties.

5.3.8 Importance of Ongoing Vegetation Management

Ongoing vegetation management is essential to maintain the effectiveness of bushfire protection measures and ensure the site continues to meet relevant performance requirements. Without regular maintenance, vegetation can quickly regenerate, resulting in increased fuel loads, higher flame heights, and elevated radiant heat exposure to buildings and access routes.

Routine activities such as mowing, slashing, mulching, weed control, and the removal of fallen branches or debris should be undertaken on a regular basis. The maintenance program should be implemented on an ongoing and scheduled cycle, taking into account seasonal growth patterns, rainfall, and local climatic conditions. Regular monitoring and prompt intervention are critical to ensure that vegetation conditions remain consistent with the prescribed bushfire protection objectives.

6. Conclusion

The following recommendations are provided in relation to the requirements of Council's Bushfire Hazard Overlay Code.

- An asset protection zone has been designed and shall be established and managed.
- Provision of water and service to be in accordance with the requirements.
- The location of the proposed dwelling maximizes the use of existing cleared and open space while minimizing the clearing of native vegetation and its impact on the environment.
- The building location envelope on all Lots will achieve a radiant heat flux of < 29 kW/m² with proper separation from the classified bushfire hazard vegetation. Therefore, the proposed development is considered to meet the requirement of radiant heat flux level of the SPP bushfire prone area code.

In conclusion, the proposed development has been designed and managed to ensure that the exposure of people and property to unacceptable bushfire hazard risks has not increased. The development will mitigate bushfire risk through appropriate siting, design, and management measures. It provides suitable access and evacuation routes for both private and emergency service vehicles, in line with the nature of the development and the level of bushfire risk. An adequate water supply for firefighting purposes will be provided, and no hazardous goods will be stored on-site. Overall, the development meets all necessary requirements to minimise the risk of bushfires to people, property, public health, and the environment.

This assessment assumes that vegetation on the site will be maintained according to the client's outlined plans. Should the proposed development require the removal of site vegetation to meet specific BAL requirements set by either the developer or the client, it is the client's responsibility to comply with relevant regulations regarding native vegetation clearing.



Henry (Hongxi) Liang

BEng, GradDip (Bushfire Protection), MBA

Senior Bushfire Consultant

Max Bushfire Protection Consulting

Mobile: 0432 89 82 82

Email: service@maxbp.com.au

7. References

Australian Standard, 2018. Construction of Buildings in Bushfire prone Areas (AS3959–2018).

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

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

Queensland Government SPP Interactive Mapping System; 2022. http://www.dilgp.qld.gov.au/planning/state-planning-instruments/spp-interactive-mappingsystem.html.

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

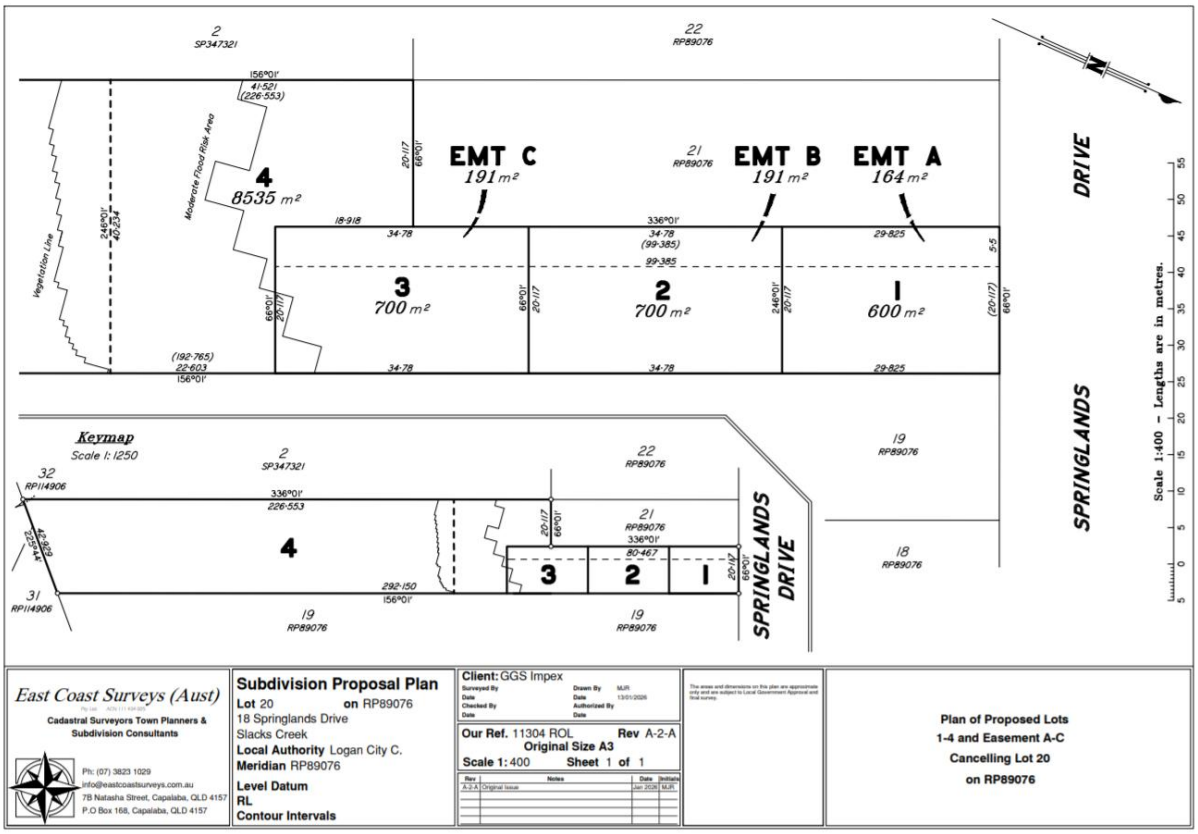
The State of Queensland, October 2019. Bushfire Resilient Communities Technical Reference Guide for the State Planning Policy State Interest 'Natural Hazards, Risk and Resilience – Bushfire.

8. Appendix

Appendix A Site Plan

Appendix B Low Flammability Plant Species List

Appendix A Site Plan



Appendix B Low Flammability Plant Species List

This list is intended as a general guide. It is essential to conduct independent research to identify fire-resistant species specific to the region of the subject site, as suitability varies across Queensland. Notably, all plants, whether native or exotic, will combust when exposed to extreme heat or flame; therefore, additional precautions may be required.

Ground covers and creeping plants
• Casuarina glauca prostrate, commonly known as grey she oak or marsh she oak
• Anigozanthos, commonly known as kangaroo paw
• Carpobrotus glaucescens, commonly known as pigface
• Hardenbergia violacea, commonly known as sarsparilla or purple coral pea
• Liriope muscari, commonly known as lilyturf
• Lomandra longifolia, commonly known as spiny-headed mat-rush
• Lomandra hystrix, commonly known as mat-rush
• Varieties of Brachyscome
• Varieties of Dampiera
• Dianella caerulea, commonly known as blue berry lily
• Varieties of Dianella prunina
• Dianella revoluta, commonly known as blue berry lily or spreading flax lily
• Dichondra repens, commonly known as kidney weed
• Einadia nutans, commonly known as climbing saltbush
• Hardenbergia violacea, commonly known as false sarsaparilla, purple coral pea, happy wanderer, native lilac or waraburra
• Scaevola aemula, commonly known as fairy fan flower
• Scaevola humilis, commonly known as sandplain fan flower
• Varieties of Cotyledon
• Myoporum insulare, commonly known as boobialla, native juniper or blueberry tree
• Eremophila glabra, commonly known as kalbarri carpet
• Eremophila debilis, commonly known as winter apple
• Elaeocarpus eumundi, commonly known as eumundi quandong
• Elaeocarpus prima donna, commonly known as blueberry ash
• Kennedia rubicunda, commonly known as Dusky coral pea or red kennedy pea
• Rhododendron hybrid, commonly known as azalea
• Varieties of Arctotis
• Varieties of Photinia
• Westringia fruticosa, commonly known as native rosemary

Shrubs
• All varieties of Aloe
• Correa reflexa, commonly known as nativefuchsia
• Varieties of Acacia
• Nerium oleander, commonly known as oleander
• Varieties of Atriplex, commonly known as saltbushes
• Varieties of Escallonia
• Varieties of Maireana, commonly known as cottonbush
• Varieties of Eremophila, commonly known as emu bushes or fuchsia bushes
• Varieties of Grevillea
• Melaleuca nodosa, commonly known as prickly leaf paperbark
• Varieties of Syzygium
• Varieties of Photinia
• Varieties of Rhagodia
• Rhaphiolepis indica, commonly known as india hawthorn
• Strelitziacae hutch
• Strelitzia banks
• Strelitzia nicolai
• Sambucus australasica, commonly known as yellow elderberry or native elderberry
• Varieties of Coprosma
• Varieties of Plectranthus
• Senna artemisioides, commonly known as silver cassia

Deciduous trees
• Brachychiton acerifolius, commonly known as the flame kurrajong
• Ulmus parvifolia, commonly known as chinese elm
• Morus alba, commonly known as the mullberry tree
• Eriobotrya japonica, commonly known as loquot
• Gleditsia triacanthos, commonly known as honey locust
• Trees from the genus Prunus, including ornamental cherries, plums and peaches
• Trees from the genus Malus, including apples and crab apples

Evergreen trees
• Grevillea robusta, commonly known as silky oak
• Melia azedarach, commonly known as cape lilac, white cedar, persian lilac or chinaberry
• Lophostemon confertus, commonly known as brush box, queensland box, brisbane box or pink box
• Tristaniopsis laurina, commonly known as water gum, kanooka or kanuka
• Rapanea variabilis, commonly known as muttonwood
• Varieties of Acacia
• Varieties of Acmena
• Varieties of Magnolia
• Cupaniopsis anacardioides, commonly known as tuckeroo or beach tamarind
• Elaeocarpus reticulatus, commonly known as blueberry ash
• Alectryon subcinereus, commonly known as native quince
• Callicoma serratifolia, commonly known as black wattle
• Canthium coprosmoides, commonly known as supple jack or sweet susie
• Cassine australis, commonly known as red olive berry or red olive plum
• Croton insularis, commonly known as Queensland cascarilla, native cascarilla bark or silver croton
• Cuttsia viburnea, commonly known as native elderberry
• Varieties of Citrus
• Denhamia celastroides, commonly known as denhamia or orange boxwood
• Diospyros australis, commonly known as black plum or yellow persimmon
• Eupomatia laurina, commonly known as bolwarra, grey beech or native guava
• Glochidion ferdinandi, commonly known as the cheese tree or buttonwood
• Guioa semiglauca, commonly known as guioa or wild quince
• Hodgkinsonia ovatiflora, commonly known as golden ash
• Hymenosporum flavum, commonly known as native frangipani or Queensland frangipani
• Petalostigma triloculare, commonly known as quinine berry, forest quinine or bitter bark
• Podocarpus elatus, commonly known as she pine
• Rhodosphaera rhodanthema, commonly known as yellow cedar, tulip satinwood or deep yellow wood
• Sarcopteryx stipata, commonly known as corduroy
• Scolopia braunii, commonly known as scolopia or brown birch
• Stenocarpus sinuatus, commonly known as white silky oak, tulip flower, white beefwood Or wheel of flower tree
• Streblus brunonianus, commonly known as the whalebone tree, axehandle wood or white handlewood
• Symplocos stawellii, commonly known as white hazelwood
• Symplocos thwaitesii, commonly known as buff hazelwood
• Varieties of Ficus (fig trees)