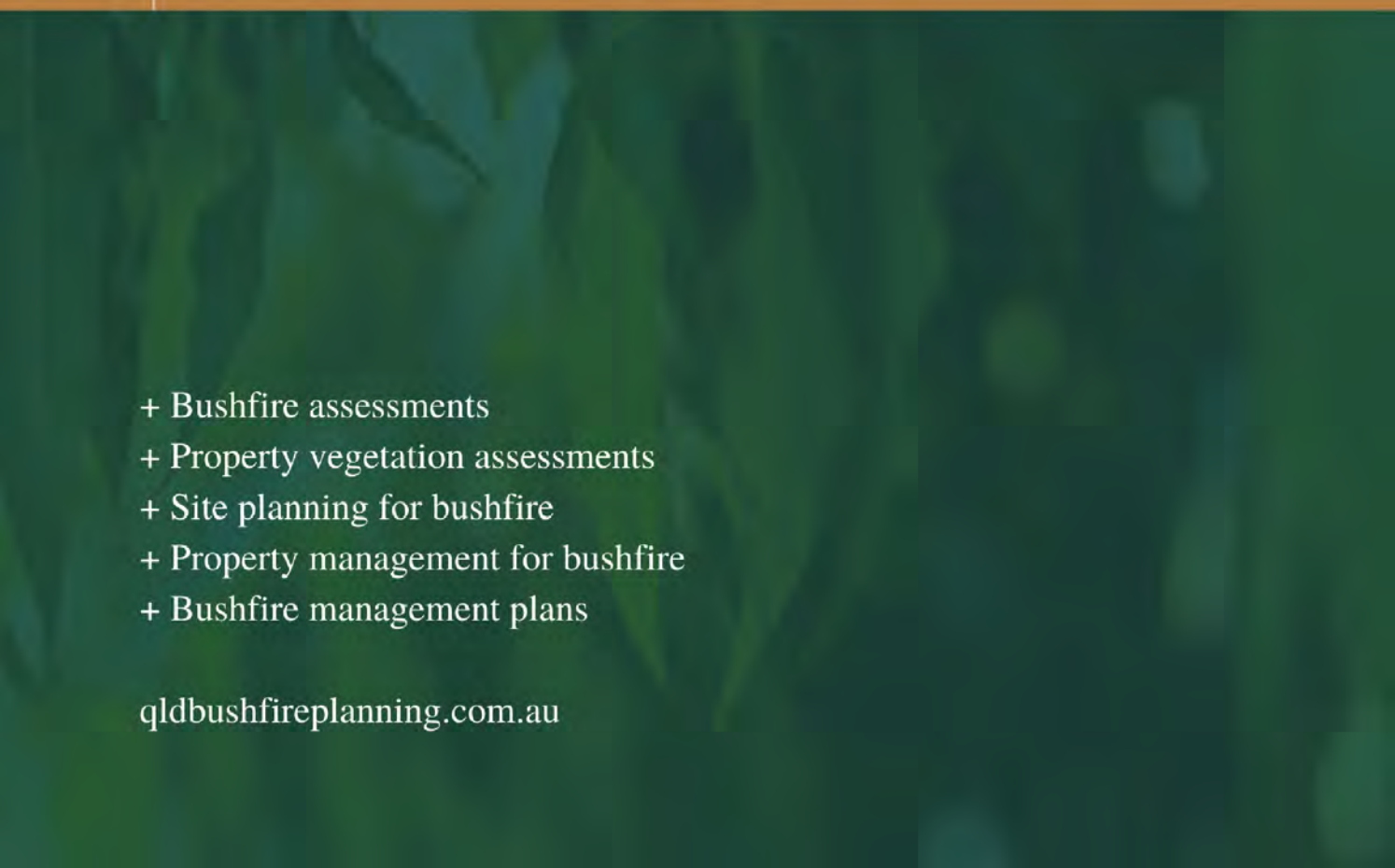
QUEENSLAND BUSHFIRE PLANNING

BUSHFIRE HAZARD ASSESSMENT (BHA)

Property

2 Karingal Drive, Pimpama
Lot 19 on RP152380

Devalign
March 2021



+ Bushfire assessments
+ Property vegetation assessments
+ Site planning for bushfire
+ Property management for bushfire
+ Bushfire management plans

qldbushfireplanning.com.au

Disclaimer

This document has been prepared for the benefit of Devalign. This report is prepared for the benefit of the named client only. No third party may rely upon any advice or work done by Queensland Bushfire Planning (QBP) in relation to the services, including this report, except to the extent expressly agreed to in writing by QBP.

It is acknowledged and agreed that the site may be subject to a degree of bushfire hazard. The client acknowledges and agrees that QBP has not created or contributed to the creation of this hazard and the client indemnifies QBP for claims arising out of or result from a bushfire event except to the extent attributable to the negligence of QBP.

The client agrees that QBP shall have no liability in respect of any damage or loss incurred as a result of bushfire. Compliance with this report shall be the responsibility of the client and/or the land-owners. This disclaimer shall apply notwithstanding the report may be made available to the relevant Local Government Authority and other persons for an application for permission or approval to fulfill a legal requirement.

EXECUTIVE SUMMARY

A Material Change of Use (MCU) for multiple dwellings (71 Townhouses) has been proposed at 2 Karingal Drive, Pimpama, Lot 19 on RP152380. The site is captured by the State Planning Policy Natural Hazards and Resilience - *Bushfire Prone Area* mapping and in accordance with the provisions of the Gold Coast CityCouncil Bushfire Hazard Overlay Code, a detailed Bushfire Hazard Assessment has been prepared.

The subject site has been identified in the Queensland State Planning Policy (2017) as being within a potential bushfire impact zone. This report includes a number of recommendations regarding bushfire risk mitigation in accordance with AS3959-2018 and Sunshine Coast Planning Scheme 2014.

Recommendation	
1	Proposed buildings will be constructed to meet the requirements of the Australian Standard AS3959- 2018 - *Construction of buildings in bushfire prone areas.*
2	The vegetation on 2 Karingal Drive, Pimpama will be managed to achieve BPZ requirements and will be maintained in managed low hazard state.
3	Fencing on 2 Karingal Drive, Pimpama will be constructed of non – combustible materials.
4	Ingress and egress for residents and emergency services will be via Karingal Drive and Imelda Way.
5	Reticulated water will be provided to the reconfiguration.
6	A bushfire information kit will be provided to residents to inform them of the bushfire risks and their roles and responsibilities for prevention, preparedness and response to any fire event.

INTRODUCTION

Queensland Bushfire Planning has been engaged on behalf of Devalign to conduct a site-based Bushfire Hazard Assessment in relation to a Material Change of Use (MCU) for multiple dwellings (71 Townhouses)development at 2 Karingal Drive, Pimpama. This Report has been prepared in accordance with the Gold Coast City Plan 2016. The aim of this report is to demonstrate the level of bushfire hazard, utilising the methodology as required by Section 8.2.3 of that policy.

The focus of this Report refers to the statutory planning and building requirements as they may apply, pursuant to all relevant policies, standards and regulation, along with end-user consideration. In addition, this report seeks to ensure fire risk and evacuation for adjoining and nearby properties is not inadvertently adversely impacted. This assessment report aims to mitigate the risk to life and property from bushfire threat and the impact of bushfire attack which includes:

- Direct flame contact;
- Ember and firebrand attack;
- Radiant heat; and
- Fire-driven wind.

This assessment does not seek to remove the threat of any bushfire risk, but provide detailed siting, layout, building and/or servicing information to assist the ability of the owner(s) to manage the potential threat of this risk. This assessment report is prepared in accordance with best practice industry standards as applicable in Queensland and pursuant to both State and local government bushfire hazard policies and guidelines.

SITE DESCRIPTION AND DETAILS

Site Address	**2 Karingal Drive, Pimpama**
Local Government	Gold Coast CityCouncil
Real Property Description	Lot 19 on RP152380
Zoning	Medium Density Residential
Area of Site (square meters)	24590
Applicant	Devalign
Current Land Use	Vacant Land
Proposed Land Use	Medium Density Residential

The site is located at 2 Karingal Drive, Pimpama and is described as Lot 19 on RP152380 within Gold Coast City Council (Figure 1).



Figure 1

Lot 19 on RP152380 has an area of 24590 square metres and is aligned northwest-southeast with aneasterlyaspect (Figure 2).

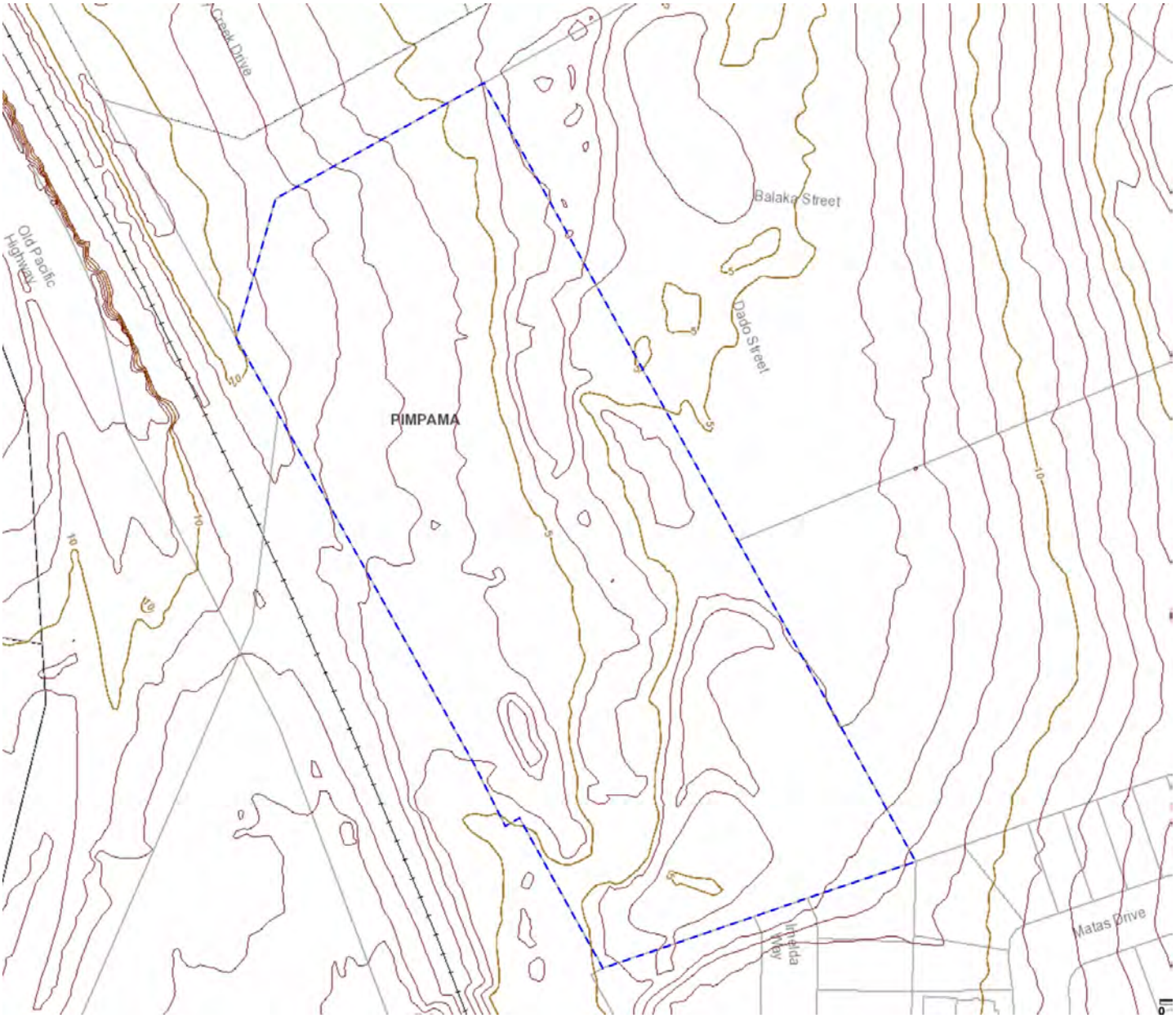


Figure 2

Lot 19 on RP152380 is currently zoned Medium Density Residential (Figure 3).



Figure 3

PROPOSED DEVELOPMENT

The proposed development is a Material Change of Use (MCU) for multiple dwellings (71 Townhouses) (Figure 4).



Figure 4

SCOPE OF BUSHFIRE HAZARD ASSESSMENT

A reconfiguration of a lot has been proposed at 2 Karingal Drive, Pimpama, Lot 19 on RP152380. The site is captured by the State Planning Policy Natural Hazards and Resilience - *Bushfire Prone Area* mapping and in accordance with the provisions of the Gold Coast City Council Bushfire Hazard Overlay Code, a detailed Bushfire Hazard Assessment has been prepared.

UNDERSTANDING BUSHFIRE HAZARD

Bushfires are an intrinsic part of Australia's environment. Natural ecosystems have evolved with fire and the landscape, along with its biological diversity, has been shaped by both historic and recent fires. Many of Australia's native plants are fire prone and very combustible, while numerous species depend on fire to regenerate. Indigenous Australians have long used fire as a land management tool and it continues to be used to clear land for agricultural purposes and to protect properties from intense, uncontrolled fires. Historically, bushfires have caused loss of life and significant damage to property. While naturally occurring bushfires cannot be averted, their consequences can be minimised by implementing mitigation strategies and reducing the potential impact to areas which are most vulnerable.

Bushfire Attack

Bushfire attack refers to the various methods in which bushfire may impact upon life and property and principally encompass:

- Direct flame contact;
- Ember and firebrand attack;
- Radiant heat; and
- Fire-driven wind (Figure 5).

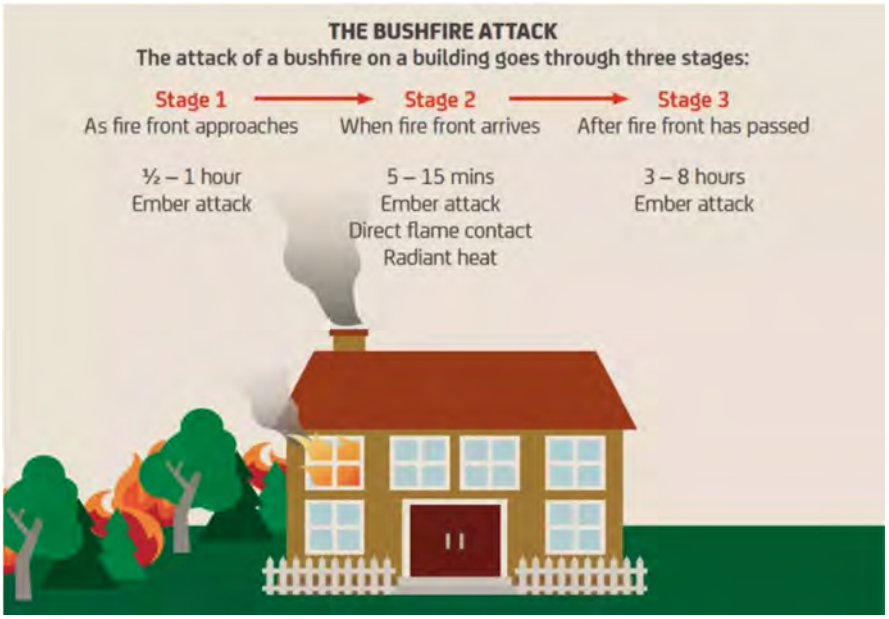


Figure 5

Direct Flame Contact

Direct flame attack refers to flame contact from the main fire front, the flame that engulfs burning vegetation is the same flame that contacts the building. It is estimated that only 10 to 20 per cent of buildings lost to bushfire occur as a direct result of flame attack.

Ember and Firebrand Attack

CSIRO research has shown that ember attack is the cause of up to 80% of house loss in Australia. The convective forces of bushfire raise burning embers into the atmosphere on prevailing winds and deposit them to the ground ahead of the fire front. Typically, ember attack occurs approximately 30 minutes prior to the arrival of the fire front and continues during the impact of the fire front and for several hours afterwards. Building loss via ember attack relates largely to the vulnerabilities and peculiarities of each building, its distance from the classifiable vegetation and whether someone is present to actively defend the building.

Radiant Heat

Measured in kilowatts per m2, radiant heat is the heat energy released from the fire front which radiates to the surrounding environment, deteriorating rapidly over distance. In terms of impacts on buildings, radiant heat can pre-heat materials making them more susceptible to ignition. Radiant heat can also damage building materials such as window glazing, allowing openings into a building through which embers may enter.

Fire Driven Wind

The convective forces of a bushfire typically result in strong fire-driven winds, which can lead to building damage. The typical effects of fire driven wind include conveyance of embers, damage from branches and debris hitting the building, as well as direct damage to vulnerable building components, such as lifting roofs and the breakage of windows.

Vegetation

The Australian bush varies greatly around the country. There are regions of open woodlands, grassland savannas, dense rainforest. Different types of vegetation burn differently. Generally, fuel is classified as being fine (grasses and twigs that are less than 6 millimetres in diameter) or heavy (branches, logs or stumps). Finer fuels burn more easily, increasing the spread of the fire. Another key factor is fuel moisture content, or how dry the fuel is. The drier the fuel, the more easily it will burn. The dryness of the fuel depends on seasonal rainfall and temperatures.

Topography

Fires burn faster uphill. This is due to the radiation and convection a fire creates preheating the fuel. A 10-degree increase in slope results in a doubling of the speed of the fire. Fire will spread up a 10-degree slope two times as fast as it will along flat ground (Figure 6). The aspect of a slope (direction that a sloping piece of land is facing) influences a fire's behaviour. Northern and western aspects receive more direct heat from the sun, drying both the soil and the vegetation more than on southern or eastern slopes. The fuels on northern and western aspects are often drier and less dense than fuels on slopes with a different aspect.

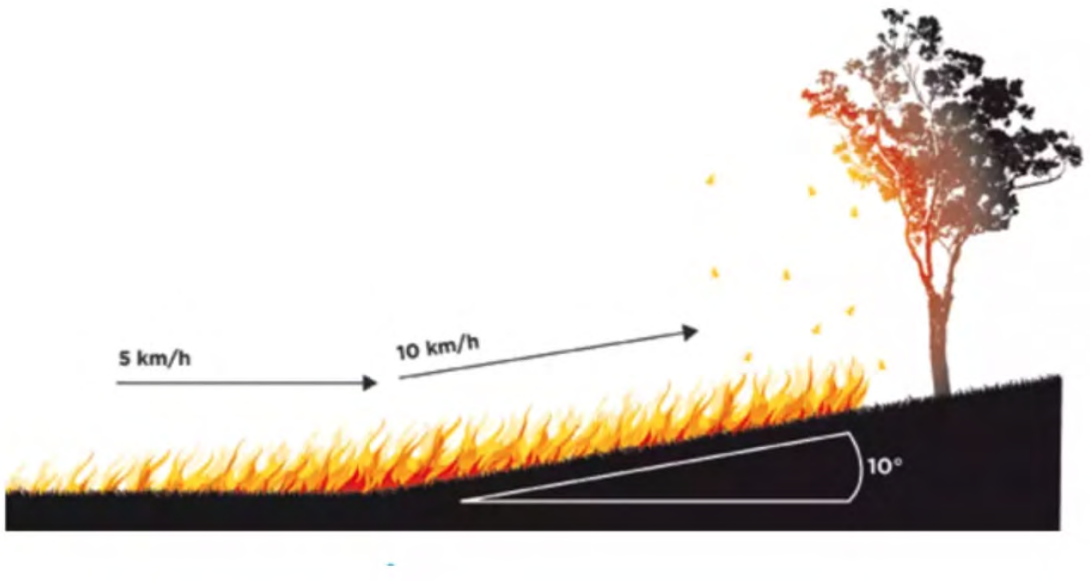


Figure 6

Fire Weather

Fire weather affects bushfire risk levels on a daily, weekly or seasonal basis. The South-east Queensland weather pattern is dominated by a maritime effect. The most common winds are southeast and northeast, the latter being very common during the summer months as an afternoon sea breeze. The most severe fire weather in the area is associated with a northwest wind generated on the back of a high pressure system moving slowly from west to east or from a situation where there is intense low pressure activity in the southeast of Australia extending a trough into southern Queensland (Just, 1978). However, the frequency of these situations in the region is low, being generally of the order of one to two days or fewer per year. The exception can occur in bad fire seasons when fuel conditions are very dry as a result of prolonged dry periods. In Queensland, these bad fire seasons occur about once a decade and are infrequent when compared with the fire situation that prevails frequently in southern Australia.

Whilst an assessment of vegetation types, fuel loads, effective slope and other factors can be readily undertaken, fire weather can fluctuate across days, weeks and seasons and can have a significant impact on the potential for bushfire threat, as well as influence bushfire behaviour and intensity. The Forest Fire Danger Index (FFDI) is a commonly used method to readily advise the community of the likely ability of fire suppression based on fire weather, which is used to inform the Fire Danger Rating (FDR) System (Figure 7). It is important to maintain awareness as to the level of local fire danger during the fire season.



Figure 7

BUSHFIRE HAZARD ASSESSMENT

The State Government Single State Planning Policy (SPP) released in 2017, includes mapping that is an outcome of the new bushfire hazard mapping methodology, developed by the CSIRO and the Queensland Government. The new Bushfire Prone Area mapping was found to have an average reliability of 85%. The new methodology provides a major improvement in bushfire hazard mapping. The new modified approach calculates potential fire line intensity using total fuel loads, landscape slope and fire weather severity. A default 100-metre buffer was determined from analysis of heat and radiation decay curves and research that indicates 80% of housing loss and 80% of life loss occurred within 100 metres of bushland.

The subject site is identified on the State Planning Policy Natural Hazards Risk and Resilience mapping and the Gold Coast City *Bushfire Hazard Overlay Ma*p as being within a potential bushfire impact zone, requiring the bushfire hazard impacts be addressed (Figure 8).



Figure 8

Very High Potential Bushfire Intensity
High Potential Bushfire Intensity
Medium Potential Bushfire Intensity
Potential Impact Buffer

LOCAL GOVERNMENT PROVISIONS

The Gold Coast Planning Scheme 2016 came into effect on 2 February 2016 and incorporated Bushfire Hazard Overlay Mapping, Overlay Code and Bushfire Hazard Planning Scheme Policy. An Assessment has also been conducted against the applicable Overlay Code.

SITE ASSESSMENT

An onsite inspection and assessment were conducted at 2 Karingal Drive, Pimpama on 9 March, 2021 to observe and record the relevant information to determine the bushfire hazard in accordance with the requirements of the Gold Coast Planning Scheme 2016.

Fire Weather Severity

The Fire weather severity (FFDI) has ben identified by the SPP Bushfire Prone Area mapping as 53.

Vegetation

The *Public Safety Business Agency (PSBA) State-wide Bushfire Hazard (Bushfire Prone Area)* mapping identifies the original vegetation on and about this site as Regional Ecosystem (RE) 12.3.11. Vegetation Hazard Class (VHC) 16.1 , Eucalyptus tereticornis Â± Eucalyptus siderophloia, Corymbia intermedia open forest on alluvial plains usually near coast, fringing the included drainage line and RE 12.11.24 (VHC 9.2) Eucalyptus tindaliae, E. carnea, Corymbia intermedia Â± E. siderophloia or E. crebra, Corymbia citriodora subsp. variegata woodland on metamorphics Â± interbedded volcanics (Photo 1).



Photo 1

Slope

The slope under the Classified Vegetation has been assessed as 3 degrees.

Classified Vegetation

Australian Standard, *Construction of Buildings in Bushfire Prone Areas* (AS 3959–2018*)* requires any classified vegetation within 100 metres of the proposed works must be assessed. The vegetation on Lot 19 on RP152380and surrounding properties as non - remnant woodland (Photo 2)



Photo 2

Risk Analysis

The potential for an unplanned vegetation fire to occur within retained vegetation is a function of the level of hazard and the opportunity for ignition and fire development. The risk can be quantified in two parts:

- Internal
- External

Internal

No hazardous vegetation will remain or be established on Lot 19. The proposed rehabilitation zones along the internal watercourse can be excluded due to their linear nature and size.

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External

The proposed development site is within a precinct that is undergoing a transition from large Lots to medium density living. Lot 18 on RP152381 to the north of Karingal Drive is currently under development (Photo 3).



Photo 3

Lot 21 RP152380 adjoining to the east is an isolated and discrete area of non - remnant regrowth of < 2 ha. Patches less than 3 ha are less likely to develop into a fully developed fire front due to the size and distance required for a significant fire front of high intensity. Where 0.5-2 ha, the effective fuel load is assumed to be decreased by 66% i.e. Fuel load (t/ha) X 0.34, fireline intensity <4,000 kW/m, LOW HAZARD. Lot 21 would have a calculated Fireline intensity of 1 311 kW/m and is therefore assessed as LOW hazard. Lot 20 RP152380 adjoining to the northeast carries no significant contiguous vegetation and is not mapped as hazardous. This has been confirmed by an onsite inspection and is therefore assessed as LOW. Lot 2 on RP22945 a narrow strip of non - remnant vegetation between the Gold Coast railway line and the old Pacific Highway and is an area of approximately 8 ha. The area is identified in the City Plan as Low Impact Industry Zone. The hazard from this area would be considered transitional only. The potential impact has been assessed on the proposed MCU on Lot 19. Lot 1 on WD1188 to the northwest is greater than 100 metres distant from Lot 19 and therefore excluded by *section 2.2.3.2 Exclusions* of the AS3959 - 2018 - Construction of buildings in bushfire prone areas (Figure 9).


Lot 1 WD1188
Lot 20 RP152380
Lot 19
Lot 21 RP152380
Lot 2 RP22945

Figure 9

ASSESSMENT OF BUSHFIRE HAZARD

Australian Standard - *Construction of Buildings in Bushfire Prone Areas (AS 3959–2018)* requires that any classified vegetation within 100 metres of the proposed works must be assessed. Figure 10 identifies the extent of the 100-metre separation zone (BAL Impact Zone).

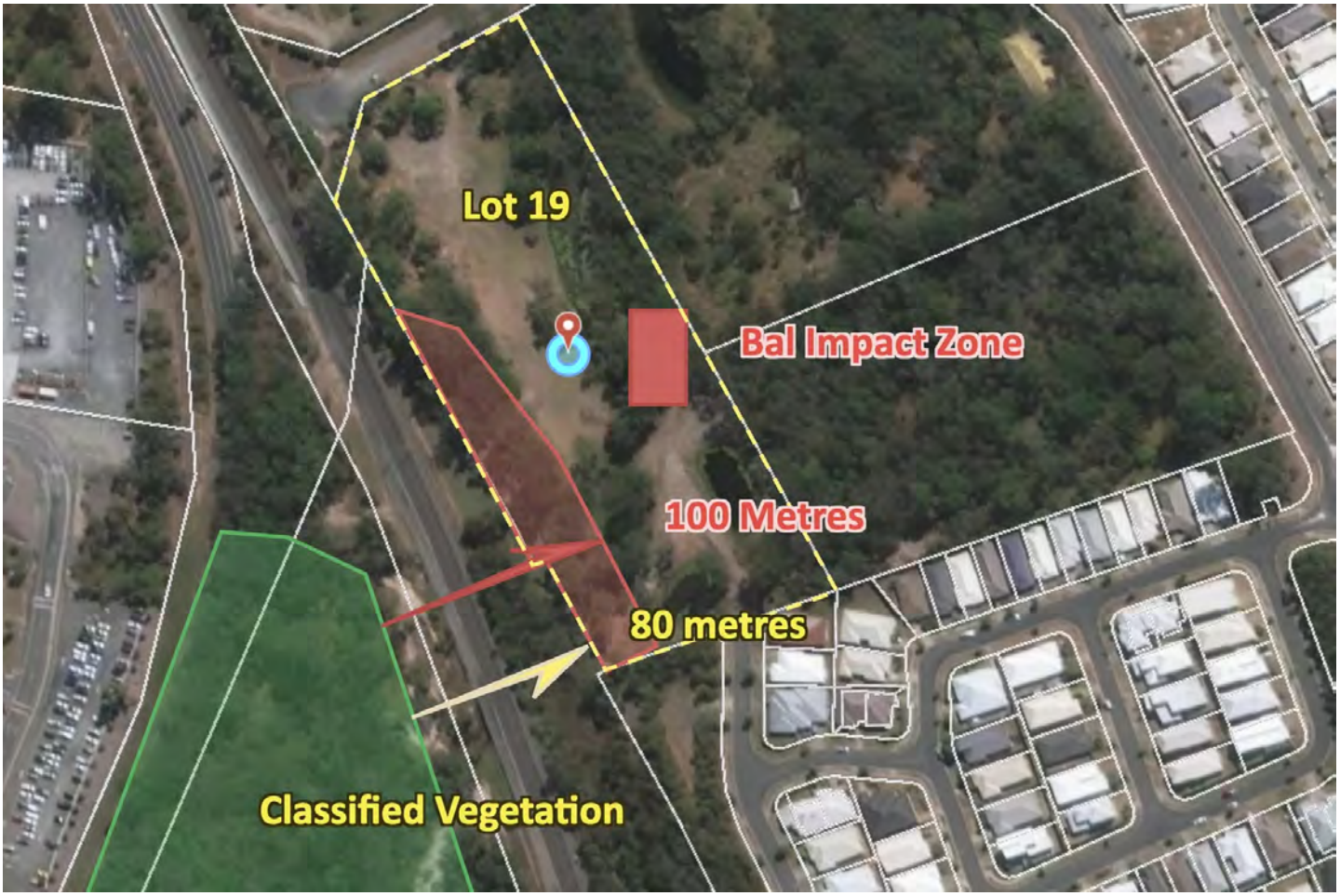


Figure 10

Potential Radiant Heat Flux

The Australian Standard, Construction of Buildings in Bushfire Prone Areas (AS 3959-2018), provides a suitable methodology for identifying assessable vegetation and determining the requirements for the construction of buildings in order to improve their resistance to bushfire attack from burning embers, radiant heat, flame contact and a combination of the three attack forms.

Calculations using AS 3959-2018, in accordance with Appendix B - *Detailed Method for Determining the Bushfire Attack Level (BAL) – Method 2 (Normative)*, indicate that at a separation distance of 80 metres a building located on the proposed site will be exposed to a radiant heat flux of 2.31 kW/M2 equating to a Bushfire Attack Level (BAL) of 12.5 (Appendix 1).

Bushfire Protection Measures in Combination

Figure 11 illustrates that effective protection against bushfire can only be achieved by the integration of multiple measures. Removing the bushland (hazard) will remove the risk but this option is neither necessarily possible nor desirable. An acceptable level of protection of life and property can be achieved while still retaining and protecting biodiversity and the natural values of the bushland.



Figure 11

BUSHFIRE RISK MITIGATION

A range of strategies can be applied to mitigate the potential impacts of bushfire:

- Vegetation management
- Access and egress
- Fencing
- Water supply
- Awareness and education
- Building construction.

Vegetation Management

Onsite vegetation and landscape management are important to maintaining low hazard conditions by:

- Limiting fuel accumulation;
- Reducing connectivity of fuels;
- Establishing and maintaining defendable space;
- Appropriate landscaping; and
- The proposed lot size of the development will constrain the development of any additional bushfire hazard.

Clearing

The site will be cleared to facilitate the proposed development.

Landscaping

Established landscaping will be low hazard.

Site Access and Egress

The intent of design requirements for roads is to provide safe egress for residents and access for attending firefighting vehicles. A road system that is compliant with guideline measures provides fire services with easier access to buildings, a safe retreat for firefighters and residents, and can provide a fire control line where hazard reduction and back burning can take place. In determining safe access to a site, consideration is given to the fire brigade vehicles which are required to access public and private roads. Given the size of these vehicles and the poor visibility in which they often operate, roads need to be designed to specific requirements, including road width, grade, cross-fall, weight capacity, passing bays and turnaround areas, all of which may vary depending on whether it is a perimeter, access, cul-de-sac or battle-axe road type. Ingress and Egress for Emergency Services and residents will be via Karingal Drive and Imelda Way.

Fencing

Fencing materials have the capacity to contribute to fire spread and intensity. It is recommended that non-combustible fencing materials should be used.

Water Supply

Providing a sufficient water supply provides firefighters and residents with the appropriate levels of water to undertake building defense. There are two options in which a house site can be supplied with a sufficient water supply; from either reticulated water accessible via a hydrant, or a dedicated static water supply. Reticulated water will be supplied to the development meeting the required statutory standards.

Community Awareness

Property owners are responsible for developing their own knowledge and understanding of the level of bushfire risk specific to their respective properties. A household bushfire plan is required and must take account of matters such as where occupants are during the day (at home, work or school), if any occupants require special assistance (i.e. infants, the elderly or the ill), evacuation routes available, evacuation destinations, property maintenance and preparation and arrangements for pets. Planning ahead of any perceived bushfire event is essential. The warning systems now implemented by Emergency Services and Local Authorities provide timely information and advice to occupants. Understanding what to do in the event of bushfire emergency is critical. Prior knowledge as to the steps to take during the lead up to a fire event, during the passage of bushfire, and what to do immediately after the fire front has passed is critical.

The Rural Fire Service Queensland (RFSQ) 'Bushfire Survival Plan' provides detailed information on how to prepare for the bushfire season and how to take action to survive in the event of bushfire. A copy of this publication can be obtained from the RFSQ website. (https://ruralfire.qld.gov.au/Fire_Safety_and_You/Bushfire_Survival_Plan/)

SUMMARY OF RECOMMENDATIONS

This report includes a number of recommendations regarding bushfire risk mitigation in accordance with AS3959-2018 and Gold Coast Planning Scheme 2016. A summary of recommendations made by this report is included below.

RECOMMENDATIONS
1. Proposed buildings within the identified BAL Impact Zone, will be constructed to meet the requirements of the Australian Standard AS3959- 2018 - *Construction of buildings in bushfire prone areas.*
2. Fencing on Lot 19 on RP152380 where adjacent to vegetation will be constructed of non – combustible materials.
3. Ingress and egress for residents and emergency services will be via Karingal Drive and Imelda Way.
4. Reticulated water will be provided to the reconfiguration.
5. Rehabilitation and amenity landscaping to be Low hazard design
6. A bushfire information kit will be provided to residents to inform them of the bushfire risks and their roles and responsibilities for prevention, preparedness and response to any fire event.

CONCLUSIONS

This report considers the bushfire mitigation measures required for 2 Karingal Drive, Pimpama, Lot 19 on RP152380. Based upon detailed analysis of the potential future bushfire hazard associated <insert detail>.

Based on this assessment, a range of recommendations has been derived. In addition, it is significant to note that bushfire remains a natural process which is endemic to the Australian bush and it remains subject to a range of contributing factors which are variable on a daily and hourly basis. It is extremely difficult to predict the behaviour and intensity of a fire event at any given time. Therefore, it remains of the upmost importance that residents within identified bushfire prone areas obtain knowledge and remain aware of their options in the event of a bushfire to ensure the preservation of both life and property.

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Appendices

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APPENDIX 1

POTENTIAL BUSHFIRE ATTACK LEVEL

The Australian Standard, Construction of Buildings in Bushfire Prone Areas (AS 3959-2018) provides a suitable methodology for identifying assessable vegetation and determining the requirements for the construction of buildings in order to improve their resistance to bushfire attack from burning embers, radiant heat, flame contact and a combination of the three attack forms.

Method for Determination of BAL

The BAL was determined in accordance with Appendix B of *AS 3959-2018, Detailed Method for Determining the Bushfire Attack Level (BAL) – Method 2 (Normative):*

Step 1: Determine the relevant FDI.

Step 2: Determine the vegetation classification, fuel loads.

Step 3: Determine the effective slope in degrees under the classified vegetation.

Step 4: Determine the slope in degrees of the land between the site and the classified vegetation.

Step 5: Determine the distance of the site from classified vegetation.

Step 6: Calculations.

Determination of BAL

Step 1. Relevant Fire Danger Index

The PSBA bushfire hazard mapping identifies the FFDI as 53.

Step 2. Vegetation Classification - Fuel Loads

The vegetation type was classified as non - remnant woodland. Available fuel weights were derived from *PSBA State – Wide Bushfire Hazard (Bushfire Prone Area) Mapping. Fuel weight was determined as: 17.2 tonne/hectare.*

Fuel weights were determined as:

- 11.4 tonne/hectare surface fuels
- 3.5 tonne/hectare near surface fuels
- 1.3 tonne/hectare elevated fuels
- 1.0 tonne/hectare bark fuels
- Total fuel weight = *17.2 tonne/hectare.*

Step 3. Determine the effective slope in degrees under the classified vegetation

The classified vegetation is downslope at 3 degrees, calculated using a Nikon Forestry Pro Range Finder and Inclinometer.

Step 4. Determine the slope in degrees of the land between the site and the classified vegetation

The slope between the site and the classified vegetation is with an average slope of 3 degrees.

Step 5. Determine the distance of the site from classified vegetation

Distance is calculated from the closest edge of the classified vegetation. Classified vegetation under AS 3959-2018 does not include low threat vegetation. The distance to the classified vegetation was calculated using a Nikon Forestry Pro Range Finder and Inclinometer at 80 metres.

Step 6. Calculations

Effective slope (°) - 3

Site slope (°) - 3

Distance (m) - 80

Vegetation classification — non - remnant woodland

Forest Fire Danger Index (FFDI) – 53

Surface fuel load (t/ha) – 11.4

Overall fuel load (t/ha) – *17.2*

Heat of combustion (kj/kg) – 18 600

Flame temperature (K) – 1 090

Outcomes

Intensity (kW/m2) – 11 261

Radiant heat flux (kW/m2) – 2.31

Bushfire Attack Level (BAL) - 12.5

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APPENDIX 2

CODE COMPLIANCE ASSESSMENT

Bushfire Hazard Overlay Code - Gold Coast City Planning Scheme 2016

PART B – ASSESSABLE DEVELOPMENT BENCHMARKS

Performance Outcomes	Acceptable Outcomes	Compliance
PO1 In a bushfire hazard area, the fire mitigation methods used at the site are adequate for the bushfire hazard of the individual site, having regard to: (a) vegetation type; (b) slope; (c) aspect; (d) bushfire history; (e) conservation values of the site; (f) ecological restoration, including forest succession; (g) ongoing maintenance; (h) climate change; and (i) on site and off-site1 fire hazard implications.	**AO1** A written assessment by a suitably qualified and experienced bushfire management consultant confirms that the site is not in a bushfire hazard area. OR The development complies with an approved Bushfire management plan prepared in accordance with SC6.3 City Plan policy – Bushfire management plans. OR The development complies with an existing approved Bushfire management plan as referenced within the approved reconfiguration of a lot.	**Bushfire Hazard Assessment prepared by Qld Bushfire Planning.**
PO2 In a bushfire hazard area, development: (a) does not result in a high concentration of people living, working or congregating in a bushfire hazard area; (b) does not result in the bulk manufacture or storage of hazardous materials; and (c) 'essential' community infrastructure is able to function effectively during and immediately after a bushfire event.	**AO2** The following land uses are not located in a bushfire hazard area: (a) Child care centre; (b) Community care centre; (c) Community use; (d) Development involving the manufacture or storage of hazardous material in bulk; (e) Educational establishment; (f) Hospital; (g) Residential care facility; (h) Retirement facility; (i) Rooming accommodation; (j) Sport and recreation uses; (k) Tourist attraction;	**Complies**

Performance Outcomes	Acceptable Outcomes	Compliance
	(l) Tourist park; and (m) Utility installation (waste management facilities). AND In a bushfire hazard area permitted essential community infrastructure is designed to function effectively during and immediately after bushfire events, as demonstrated in a Bushfire management plan.	
PO3 In a bushfire hazard area, developments, including lot layout are designed to avoid bushfire hazard and provide safe sites for people, property and buildings.	AO3 Development, Lots and/or building envelopes are not located within bushfire hazard areas. OR The development is located in accordance with the approved Bushfire management plan as referenced within the approved reconfiguration of a lot. OR The development is designed to adequately demonstrate that the risk to life and property is minimised to achieve acceptable levels and ensure ongoing site management. AO3.2 The development design incorporates bushfire radiation zone/s that: (a) use existing or natural fire breaks & minimise the need to clear native vegetation; (b) do not impact matters of environmental significance;	**The proposed MCU is not located in a Bushfire Hazard area.** **Complies**

Performance Outcomes	Acceptable Outcomes	Compliance
	(c) are located entirely within the boundaries of the private property of the development site; and (d) incorporates landscaping species that are less likely to exacerbate a bushfire event.	
PO4 In a bushfire hazard area, when designing for bushfire hazard mitigation the lot layout must avoid impacts on matters of environmental significance.	**AO4** Development design, Lot size, and layout avoids impact on matters of environmental significance and minimises impacts such as fragmentation, habitat loss and edge effects for any matters of environmental significance.	**No areas of environmental significance nor fragmentation of areas of environmental significance.**
PO5 Development uses fencing that: (a) does not contribute to the spread of bushfire; (b) facilitates the safe movement of fauna; and (c) provides access for fire-fighting purposes.	**AO5** Fences are constructed: (a) using non-combustible or fire retardant materials within 20m of any building used for accommodation; (b) that do not impede the safe movement of fauna (where applicable); and has gates that can be freely accessed for fire-fighting purposes (if applicable).	**Will comply where necessary.**

Performance Outcomes	Acceptable Outcomes	Compliance
PO6 In a bushfire hazard area, vehicular access (including internal roads) is designed to mitigate against bushfire hazard by ensuring adequate access for: (a) fire-fighting and other emergency vehicles, and (b) the evacuation of residents and emergency personnel, during a bushfire event.	**AO6.1** The development design incorporates a perimeter road that: (a) is located between the boundary of the lots and/or buildings and the adjacent natural area and/or bushfire hazard area; (b) has a minimum cleared width of 20m; (c) has a constructed minimum road width of 6m; (d) has a maximum gradient of 12.5%; (e) is constructed to an all-weather standard; and (f) is constructed to ensure all culverts and bridges have a minimum load bearing of 15 tonnes (if applicable). (refer Figure 8.2.3-2b**).** **AO6.2** The road design is capable of providing access for fire-fighting and other emergency vehicles, in accordance with SC6.11 City Plan policy – Land development guidelines, Section 2 – Transport network standards. **AO6.3** The road design does not include dead end roads (refer Figure 8.2.3-2a).	**N/A** **Complies**
PO7 In a bushfire hazard area, the development layout is designed to avoid the requirement to clear vegetation to achieve risk reduction.	**AO7** The Bushfire management plan details the required extent of vegetation clearing and landscaping and where required modify development design and/or lot layout to minimise clearing of vegetation.	**N/A**

Performance Outcomes	Acceptable Outcomes	Compliance
PO8 For areas to be dedicated to Council as open space, management strategies to mitigate bushfire risk must be identified.	**AO8** The Bushfire management plan contains a separate section detailing management strategies for areas to be dedicated to Council that can be included within the Open space management plan.	**N/A**
PO9 **In a bushfire hazard area, fire trails must be provided to:** **(a) enable access for fire fighters, residents and equipment;** **(b) contribute to (where required) bushfire radiation zone(s);** **(c) mitigate against bushfire hazard; and** **allow access for hazard reduction management programs.**	**AO9.1** Fire trails are located on public land (including public open space areas) to facilitate access for fire brigades. OR Fire trails located on private property are located as close as possible to the property boundaries and the adjoining bushfire hazard area, and an access easement is granted in favour of City of Gold Coast and Queensland Fire and Emergency Services. **AO9.2** The fire trail has: (a) a minimum cleared width of 6m; (b) a minimum of 4.8m vertical clearance; (c) a cross fall of no greater than 10 degrees; (d) a minimum formed width of 4m; (e) a maximum gradient of 12.5%, with adequate drainage to prevent soil erosion and minimise ongoing trail maintenance; and (f) culverts and/or bridges with a minimum load bearing of 8 tonnes (if applicable)	**N/A**

Performance Outcomes	Acceptable Outcomes	Compliance
	AO9.3 Vehicular links are provided along the fire trail either to existing fire trails or roads, and these links are designed having regard to the topography of the site, fire fighter safety and the need to regularly access water supplies. **AO9.4** The fire trail has vehicular access at each end, and links either to existing fire trails or public roads. **AO9.5** The fire trail provides turning areas for fire-fighting appliances. The turning bay can be either: a turning circle; a 'T' shaped turning bay; or a 'Y' shaped turning bay. **AO9.6** The fire trail provides areas for vehicles to pass or turn at intervals of not more than 200m and with a maximum grade of 5% (1 in 20).	
PO10 In a bushfire hazard area, the development maintains the safety of people and property by ensuring that the water supply is reliable and has sufficient flow and pressure requirements for fire-fighting purposes at all times.	**AO10.1** The development is proposed in a bushfire hazard area, and reticulated water is supplied in accordance with SC6.11 City Plan policy – Land development guidelines, Section 6 – Water supply and sewerage reticulation standards.	**N/A**

Performance Outcomes	Acceptable Outcomes	Compliance
	AO10.2 Development involving new or existing buildings with a gross floor area of greater than 50m2, each lot has a reliable reticulated water supply that has sufficient flow and pressure characteristics for fire-fighting purposes at all times. It must have a minimum pressure and flow of 10 litres a second at 200 kPa.	
PO11 In a bushfire hazard area, the development maintains the safety of people and property by ensuring that an adequate water supply for fire-fighting purposes is provided.	**AO11.1** For development with a combined GFA less than 500m2 where one or more buildings are proposed, dedicated fire-fighting water storage is provided to protect each individual building. Each dedicated fire-fighting water storage must have a volume of water not less than 10,000 litres for each building, be provided within 10m of each building and be: (a) a separate tank that is either below ground level or of non-flammable construction; or (b) a reserve section in the bottom part of the main water supply tank that is either below ground level or of non - flammable construction. **AO11.2** For development that proposes one or more buildings with a combined GFA greater than 500m2 there is no acceptable outcome provided.	**N/A**

Performance Outcomes	Acceptable Outcomes	Compliance
PO12 In a bushfire hazard area, all fire-fighting water storage tanks, including domestic water supply tanks, are fitted with the standard rural fire brigade fittings.	**AO12** The outlet pipe is 50mm in diameter, fitted with a 50mm male camlock (standard rural fire brigade fitting) and an isolating valve.	**N/A**
PO13 In a bushfire hazard area, water storage provided for fire-fighting purposes is safely located and accessible at all times.	**AO13.1** The water supply outlet is located at least 9m from any potential fire hazards, such as venting gas bottles and combustible structures. **AO13.2** A safe and accessible hard stand area capable of accommodating a fire fighting vehicle is provided not more than 3m from the water supply outlet.	**N/A**
PO14 Development in a bushfire hazard area must provide adequate fire-fighting water storage. This infrastructure must be provided on public land so as to be readily accessible to fire brigades for hazard reduction and fire-fighting purposes.	**AO14.1** Where public water supplies (e.g. fire hydrants or public water storage) do not exist, water supply tanks are provided for fire-fighting purposes on public land within the development. The water tanks must: (a) Be installed on land dedicated to Council; (b) hold a volume of at least 22,500 litres per every 20 dwellings; (c) be of concrete construction; and (d) have an outlet pipe of 50mm in diameter, fitted with a 50mm male camlock (standard rural fire brigade fitting) and an isolating valve.	**N/A**

Performance Outcomes	Acceptable Outcomes	Compliance
	AO14.2 Development on public land provides a safe and accessible hardstand area capable of accommodating a fire fighting vehicle not more than 3m from the water supply outlet.	
PO15 Development does not cause: (a) an unacceptable risk to people, property and the environment due to the impact of bushfire on hazardous chemicals; excess danger or difficulty to emergency services for emergency response or evacuation.	**AO15** Development involving the storage, handling or manufacture of hazardous chemicals is not located within a Bushfire hazard area.	**N/A**
PO16 In a bushfire hazard area, new residents/occupants of a development in a bushfire hazard area are informed about: **(a)** the potential bushfire hazard on their site; **(b)** their responsibility for fire management; **(c)** the measures required for ongoing fire hazard mitigation; and emergency procedures during a bushfire or on bad fire weather days.	**AO16** A copy of the Bushfire management plan, complete with the Queensland Fire and Emergency Services cover sheet and any other addendums is provided to each resident/occupant for their information.	**N/A**

QUEENSLAND BUSHFIRE PLANNING

Appendix 3

About the Report Author



This Report was prepared by Bushfire Specialist Bernard Trembath. Bernard has extensive practical knowledge and experience in bushfire planning and management and an intimate working knowledge of Queensland vegetation and climate, particularly in relation to fire prediction and behaviour.

Prior to establishing Queensland Bushfire Planning in 2014, Bernard was the Regional Manager Rural Operations, Brisbane Region, for Queensland Fire and Emergency Services (QFES). As Regional Manager, Bernard was responsible for bushfire mitigation within the Brisbane Region, working with Local Governments and many other organisations to help reduce the impacts of bushfires. Bernard was also the QFES bushfire planning specialist, providing specialist bushfire planning and management advice on behalf of QFES.
Since 2014, Bernard has provided his specialist bushfire planning knowledge to advise and assist a large number of individuals, companies and government agencies. His happy clients include: