

BUSHFIRE MANAGEMENT PLAN



Lot 5 on RP160313

56 – 94 Raynbird Road, Narangba

Client Reference: 001.10.21



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DOCUMENT CONTROL **Bushfire Attack Level Assessment**

Client: **Satterley**

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1.0 Introduction

This Bushfire Management Plan (BMP) has been commissioned by Satterley in order to support a DA for the subdivision of Lot 5 on RP160313 (the “Subject Lot”) into 71 Residential Lots and 1 Park area; and also in compliance with the Building Code of Australia (BCA), in respect of future construction of buildings within envelopes on proposed Lots.

(MBRC) bushfire hazard overlay mapping classifies much of the Subject Lot as “bushfire prone area” (BPA). The hazard mapping is created from data that is collected remotely to combine vegetation data with slope and aspect data, and arrive at a hazard rating based on the same modelling used by State Planning Policy- Natural Hazards, Risk and Resilience (December 2013, latest version December 2019) accompanied by *A new methodology for State-wide mapping of bushfire prone areas in Queensland* (CSIRO 2014. State bushfire hazard mapping designates less of the Subject Lot as “bushfire prone area” (BPA).

The designation by Council of land being BPA has two main implications:

1. It requires the production of a BMP which complies with the bushfire hazard overlay code of the Moreton Bay Regional Council Planning Scheme (2016) Part 9.4.1.3 – General Residential Zone Code.
2. It invokes the Building Code of Australia (BCA), requiring compliance with its bushfire related functional performance objectives and with AS3959-2018 *Construction of buildings in bushfire prone areas*. Construction implications for future residential buildings under this Standard are determined by this Plan.

This Bushfire Management Plan objectively determines the nature and severity of potential worst case bushfire in the area, and develops risk mitigation measures to be used in combination with established construction needs in accordance with AS3959-2018. It is the implementation of all these protection measures in combination, that demonstrates the viability and conformance of the proposed development in the development application process.

2.0 Site and Development Description

2.1 Property Description

Site ID:	Subdivision of Lot 5 on RP160313. Parish of WHITESIDE. County of STANLEY.
Current address of property:	56 – 94 Raynbird Road, Narangba, QLD 4504.
Local Government Area:	Moreton Bay Regional Council (MBRC).
Total Area:	42 680m ²
Zoning:	General Residential.

2.2 Proposed Development

The proposed development involves 71 new residential lots and 1 park lot created as Stage 13 of the Ridgeview Estate subdivision.

2.3 Site Location and Layout

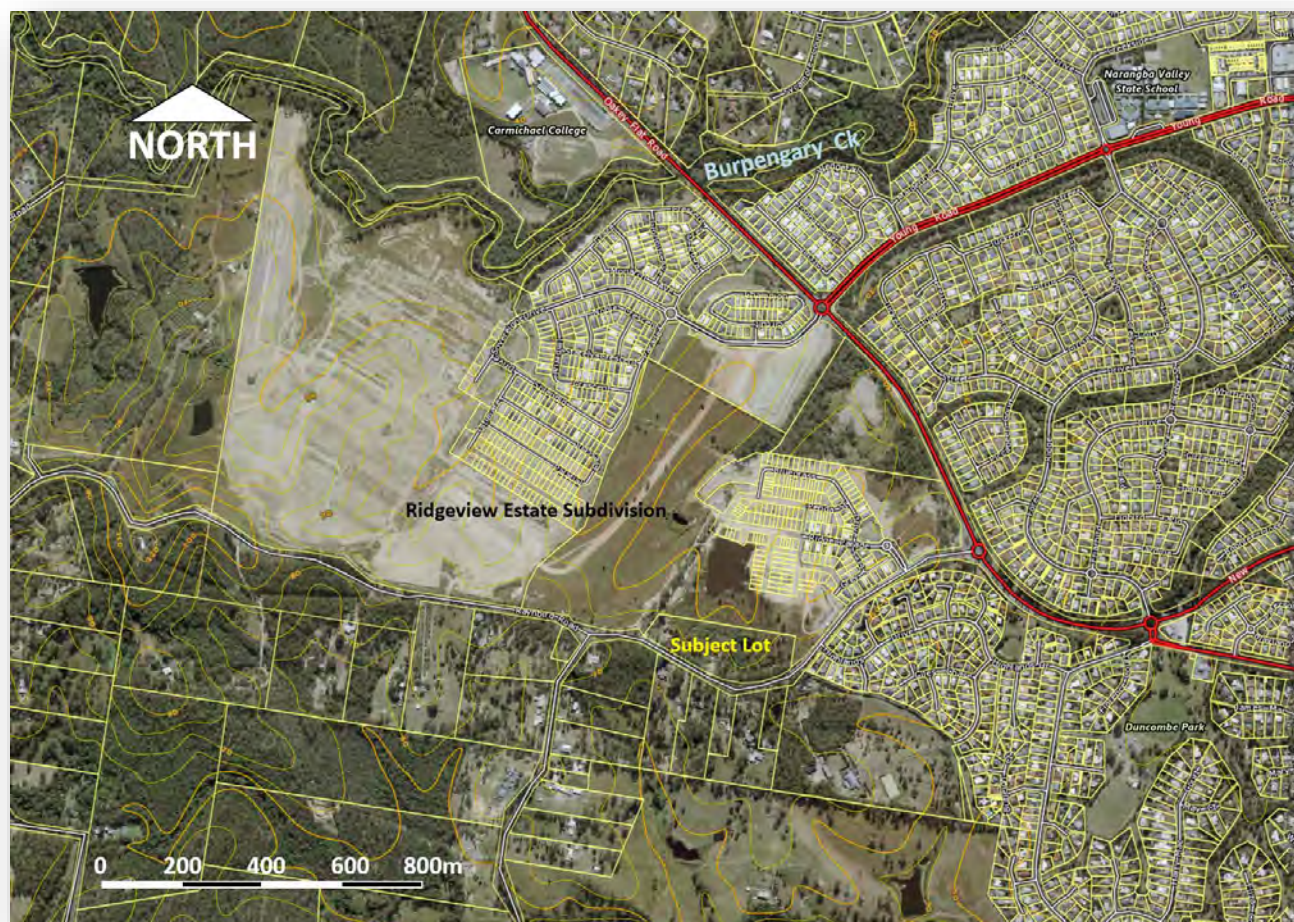


Figure 1. Broader Area showing the location of the subject lots.

The site in question is located in undulating terrain north of Raynbird Road and west of Oakey Flat Road.

South of Raynbird Road another fragment of forest vegetation is also too large to declassify as “Low hazard” and consequently this also affects new Lots in the southern part of the proposed subdivision.

Figure 2 shows a closer view of affected Lots in Stage 13.

The assessment compares both Method 1 and 2 under AS3959-2018 to determine the Bushfire Attack Level (BAL) for construction.



Figure 2. Lot layout showing location of the relevant Stages of development.

Figure 2 shows the proposed Stage of development, and the closest areas of unmanaged and potentially hazardous vegetation.

The site is within approximately 7km by road of the nearest Queensland Fire and Emergency Services (Burpengary Fire Station) with local Narangba Rural Fire Brigade (3km away) also potential responders, with a response time dependant on the availability of volunteers to turn out.

3.0 Bushfire Hazard Assessment

3.1 Bushfire hazard classification

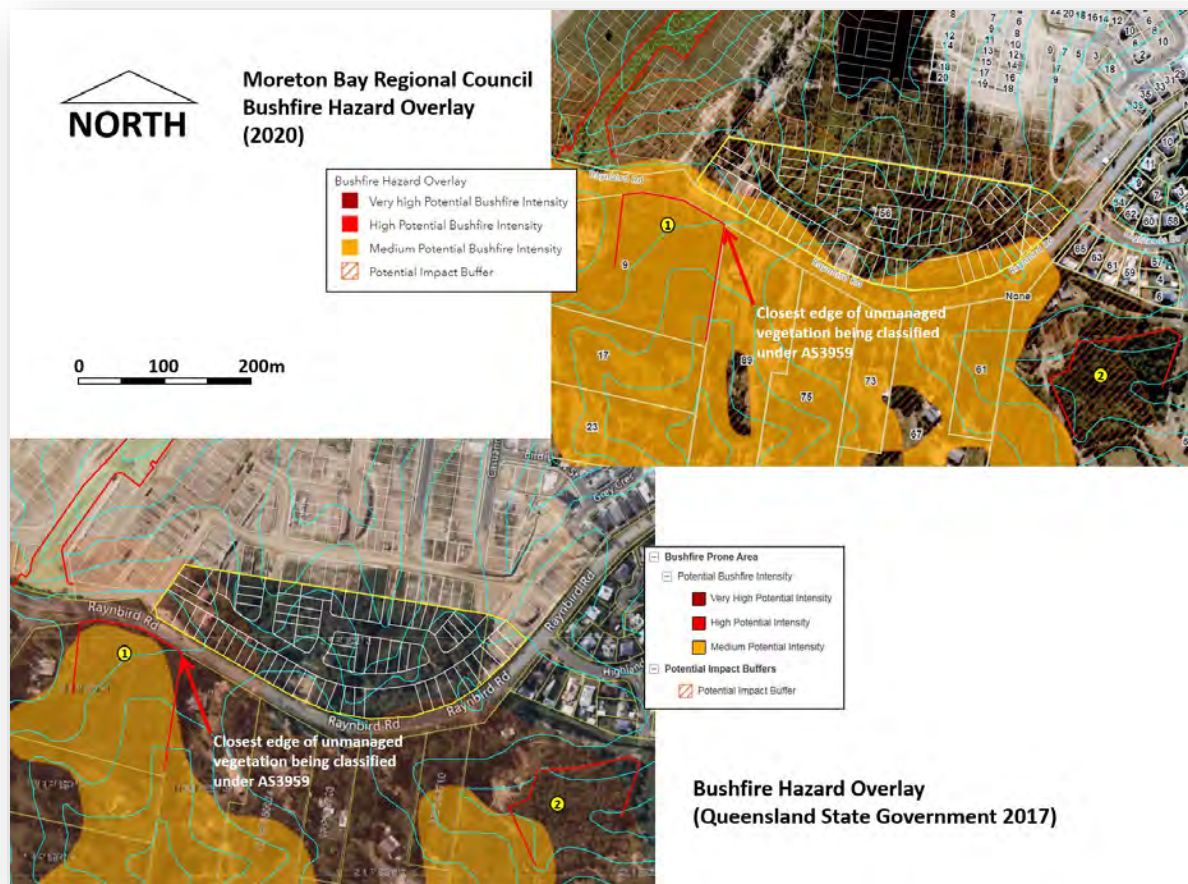


Figure 3. Council and State bushfire hazard mapping

“Bushfire Prone Land” is defined under Building Regulation 2006 and the BCA as an area **identified as such by Local Government** (in this case using a methodology outlined in *A new methodology for State-wide mapping of bushfire prone areas in Queensland* (CSIRO 2014).

Despite applying the same methodology to bushfire hazard mapping, different settings and filtering results in differences in the overlays seen in Figure 3. Neither set of mapping claims to be perfectly accurate and both are subject to ground truthing and validation by qualified and experienced bushfire practitioners.

Section 6 of the Assessment summarizes the design fire parameters and validates the BPA status of Area 1 and parts of Stage 13, as a consequence of falling within the 100 “potential impact buffer” of the hazard area.

The effect of this mapping is to trigger the BCA and its functional performance objectives for bushfire, with AS3959-2018 providing “Deemed to Satisfy” building solutions.

The BCA bushfire requirements relate to Class 1, 2 and 3 buildings constructed in a “designated bushfire prone area”.

This assessment compares Bushfire Attack Levels (BALs) using Methods 1 and 2 under AS3959.

3.2 Vegetation Assessment, Slope and Separation Distances from Proposed Development

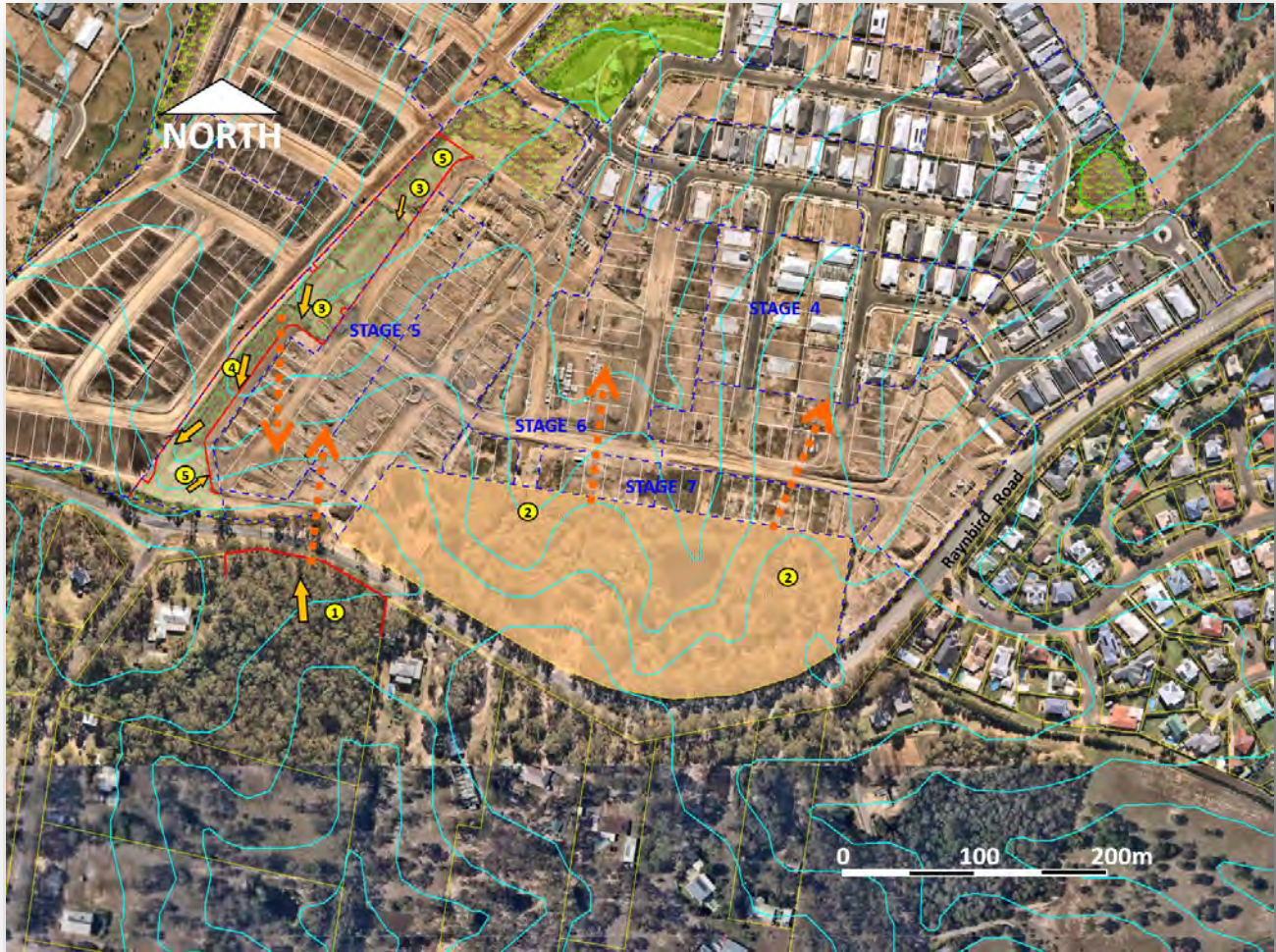


Figure 4. Fuel accumulation, slopes and setback. Solid arrows show most likely direction of bushfire attack.

The yellow numbered circles in Figure 4 represent potentially hazardous vegetation communities. The future edge of hazardous vegetation is taken to be the solid red line in Figure 4.

The vegetation type in terms of AS3959-2018 is “Forest” and the effective slope beneath vegetation being classified is taken as 4° downslope for Fuel Area 1.

Section 6 objectively calculates and determines the potential nature and severity of bushfire attack more thoroughly. This serves as a basis for determining the construction and other bushfire protection measures outlined in this BAL Assessment.

Fuel assessments were undertaken using the Overall Fuel Hazard Assessment - DSE Victoria (Oct 2010), although the fuel values applied to fire modelling in Section 6.3 are taken from the Queensland Government (QFES) dataset, as required under AS3959-2018).

3.3 Fuel Accumulation Assessment - Fuel Area 1



Figure 5. Fuel Accumulation Assessment Area 1

Fuel hazard estimate	Assessment according to Hines et al 2010		
Date: 16 th July 2018	Area 1		
Layer	Rating	Description / Comments	Equivalent fuel load t/ha
Surface and near surface	High	High litter bed average 30mm with High near surface fuels, largely <i>Cymbopogon sp</i> , <i>Imperatur sp</i> , <i>Panicum sp</i> , <i>Lomandra sp</i> , <i>Themeda sp</i> .	10
Elevated	High	Canopy recruiters and <i>Acacia spp</i> spindly with most fuel at top of layer.	2 - 3
Bark	High	Some ribbon barks (<i>E.molluccana</i>) Some fibrous barks (<i>E.carnea</i>) with lower bark hazard species – <i>C.citriodora</i> , <i>E.siderophloia</i> , <i>L.confertus</i> , <i>Casuarina sp</i> .	2
Overall rating	High		14 - 15t/ha

Table 1. Fuel Assessment Area 1

The vegetation community present is generally most representative of RE 12.11.18 (mapped by DNRME along with RE 12.11.25) and has fuel levels consistent with mapped RE12.11.18, for which the State Government (Queensland Fire and Emergency Services – QFES dataset) attributes a default value of 21.8t/ha to total available fuel.

For the purpose of site specific fire modelling in Section 6, 21.8t/ha to total available fuel, of which 19.4t/ha is surface and near surface fuel, is considered reasonable and consistent with the requirements of AS3959.

3.4 Fuel Accumulation Assessment – Vegetation Community / Area 2

Area 2 is regrowth vegetation, barely 1 hectare in extent, and just over 100m from the site in question. As a result, under the patch and corridor filtering methodology applied in Council and State mapping, this fragment should be downgraded to Low hazard. Being more than 100m from the closest new lot and dwelling it exerts only a BAL LOW influence under AS3959-2018.

4.0 Site constraints and environmental values which may limit mitigation options

The Queensland Department of Natural Resources, Mines and Energy (DNRME) shows mapped remnant vegetation of “Of Concern” RE12.11.18 / “Of Least Concern” RE 12.11.25 south of the site. Vegetation assessment supports the vegetation community being predominantly RE12.11.18.

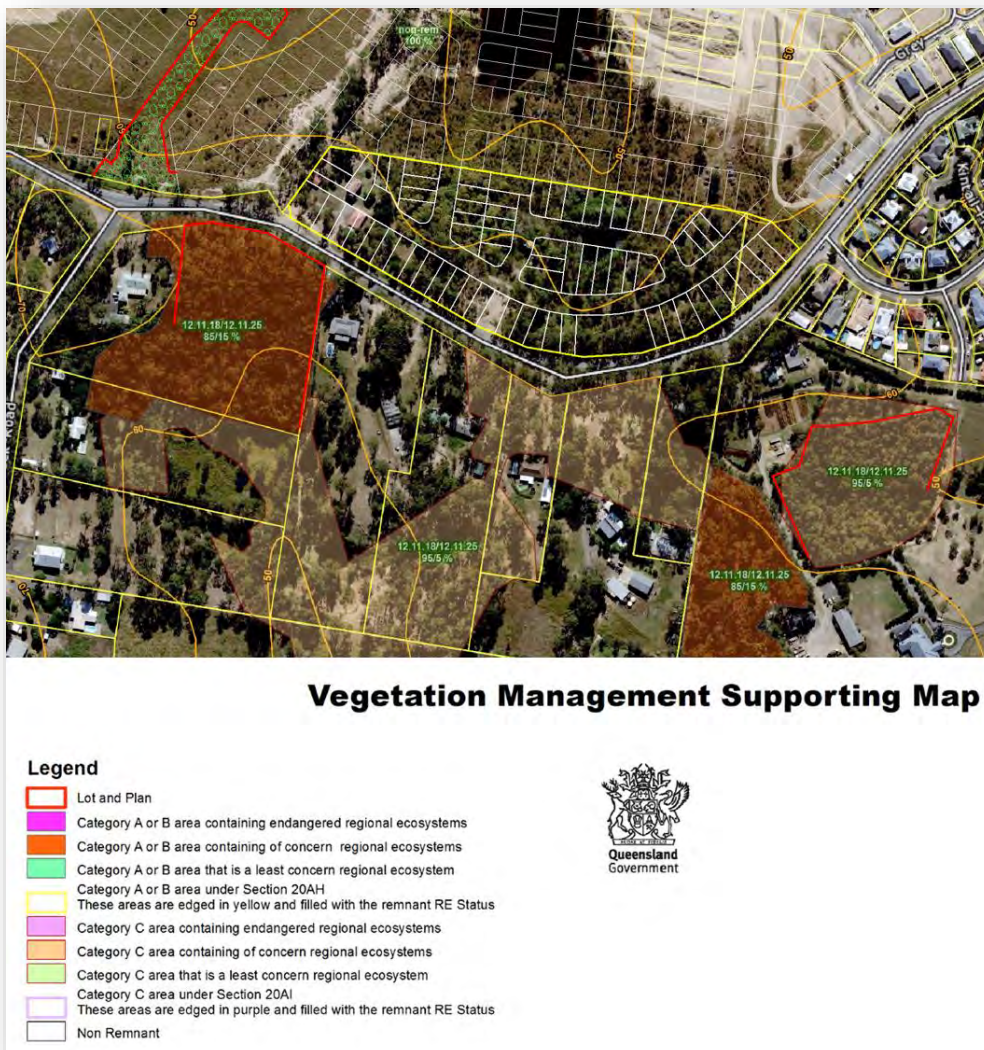


Figure 6. Regional Ecosystem Mapping

DNRME provides the following Description and recommended fire guidelines for the vegetation communities mapped.

Regional Ecosystem	Description	Fire Guidelines
<p>RE 12.11.18 Of Least Concern</p>	<p><i>Eucalyptus moluccana</i> woodland +/- <i>Corymbia citriodora</i> subsp. <i>variegata</i>, <i>E. tereticornis</i>, <i>E. siderophloia</i> or <i>E. crebra</i>, <i>E. longirostrata</i>, <i>C. intermedia</i>, <i>E. carnea</i>.</p> <p>Occurs on Palaeozoic and older moderately to strongly deformed and metamorphosed sediments and interbedded volcanics.</p> <p>Occurs as scattered occurrences in a range of topographic positions from ridgetops to lower slopes. (BVG1M: 13d)</p> <p>Vegetation Hazard Class (VHC) 13.2 14.4t/ha Total Available Fuel Load (State Default Value)</p>	<p>As above.</p>
<p>RE 12.11.25 Of Concern</p>	<p><i>Corymbia henryi</i> and/or <i>Eucalyptus fibrosa</i> subsp. <i>fibrosa</i> woodland. Other frequently occurring canopy species may include <i>Eucalyptus crebra</i>, <i>E. carnea</i>, <i>E. tindaliae</i>, <i>E. siderophloia</i>, <i>C. citriodora</i> subsp. <i>variegata</i>, <i>Angophora leiocarpa</i>, <i>E. acmenoides</i>, <i>E. helidonica</i>, <i>E. propinqua</i>, <i>C. intermedia</i> and <i>E. seeana</i>. Rarely includes patches of <i>E. dura</i>. Usually occurs on low hills, hills and footslopes of mountains in near coastal areas on Palaeozoic and older moderately to strongly deformed and metamorphosed sediments and interbedded volcanics. (BVG1M: 10b)</p> <p>Vegetation Hazard Class (VHC) 10.2 18t/ha Total Available Fuel Load (State Default Value)</p>	<p>SEASON: Summer to winter. INTENSITY: Low to moderate. INTERVAL: 4-25 years. STRATEGY: Aim for 40-60% mosaic burn. Burn with soil moisture and with a spot ignition strategy so that a patchwork of burnt/unburnt country is achieved. ISSUES: The fire regime should maintain a mosaic of grassy and shrubby understoreys. Control of weeds is a major focus of planned burning in most areas. Careful thought should be given to maintaining ground litter and fallen timber habitats by burning only with sufficient soil moisture. Burning should aim to produce fine scale mosaics of unburnt areas. Variability in season and fire intensity is important, as well as spot ignition in cooler or moister periods to encourage mosaics.</p>

Table 2. Regional Ecosystems Descriptions and Fire Guidelines

The retained areas of forest vegetation are unlikely to be provided with managed fire, along with the temporary hazard reduction benefits this brings.

Planning is not based on any assumptions regarding hazard reduction; and has to be based on fuel levels reaching a long term maximum stable state, coinciding with ignition under worst case foreseeable fire weather conditions.

4.1 Fire History and Frequency

This study found several indicators of prior fire, dating back more than 10 years. Recurrence of fire at some time has to be regarded as possible, potentially coinciding with maximum fuel accumulation and worst case fire weather conditions.

5.0 Specific risk factors associated with the development proposal

5.1 Nature of activities anticipated on site

Normal residential activities are anticipated to occur in the area, which includes the potential inclination of juveniles and others to make temporary “camps” in bushland, and others to undertake acts of deliberate arson. The number of fire incidents expected by QFES varies in direct proportion to the numbers of people present. The proposed development makes a considerable addition to the number of people living in the area and potentially exposed to unplanned fire and its effects.

No storage or handling of hazardous materials in bulk is envisaged.

5.2 Numbers of people likely to be present

Many more people can be expected to be present in the area depending on the time of day and day of the week, however bushfire protection measures required under this Plan serve to reduce the associated risk to levels that should be deemed acceptable.

6.0 Nature and Severity of Potential Bushfire Attack

6.1 Bushfire season and Fire Weather

The “typical fire season” in this area peaks between September and November. The predominant winds in the area are south easterly, however during the fire season, hot gusty westerlies of over 30 kph can be expected, with Relative Humidity falling to 10% and less. Temperatures on these days can climb over 35°C , and for two or three days a year, fire weather conditions equivalent to FDI levels of around 60 can be anticipated. (Note that this is in contrast to the value of 40 which is being used in the recently revised AS3959 - 2018).

A new methodology for State-wide mapping of bushfire prone areas in Queensland (CSIRO, 2014) defines new regional FDI values for planning purposes, as shown in Figure 7 below, attributing an FDI value of 60 to the area in question. A FDI value of 55 is currently being applied to the greater Brisbane area.

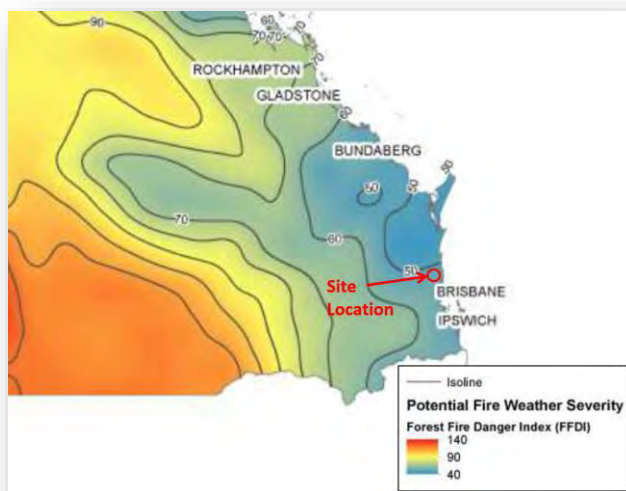


Figure 7. State based indications of a revision of “worst case” FDI values to FDI 55 for the area involved.

6.2 Anticipated direction of bushfire attack

The most likely direction of attack is from the south, not aligned with the direction of traditionally worst case fire weather conditions for the region, these being from the west, through north west to north.

Anticipated directions of attack are reflected in Figure 4.

Bushfire attack comes in a number of forms: direct flame, radiant heat, embers, smoke and wind. Research shows that over 80% of houses lost to bushfire in Australia can be attributed to ember attack, within 100m of bushland. The proposed buildings would be expected to face some radiant heat along with minor ember attack.

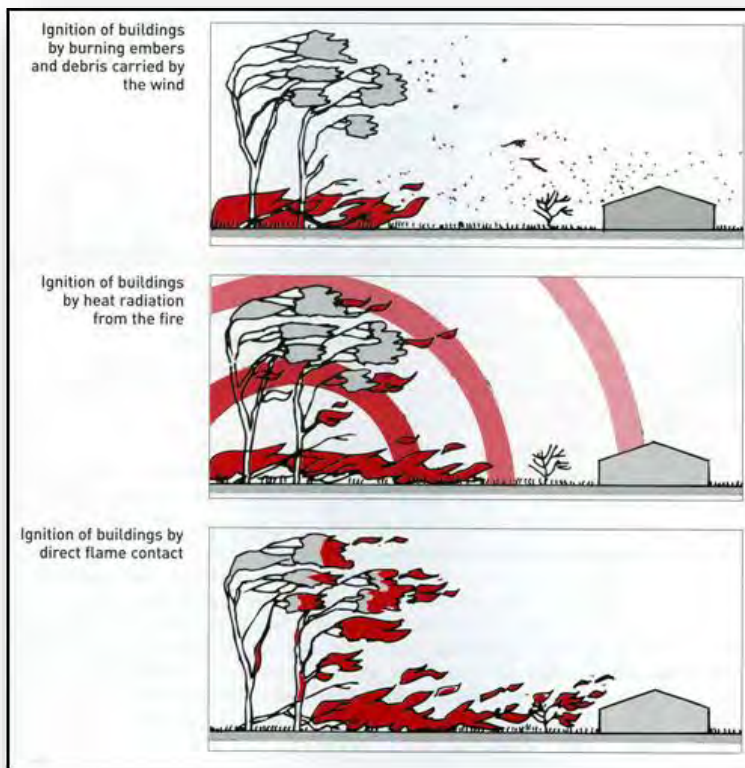


Figure 8. Main Bushfire Attack mechanisms (Image courtesy of Ramsay & Rudolf 2003)

6.3 Anticipated severity of bushfire attack

Values for vegetation type, fuel load and slope are carried forward to Table 3 to predict the key fire parameters for the potential worst case fire scenarios.

Fire Scenario – Area 1	Fire Scenario – Area 1
Method 2 AS3959 FDI 55 Forest @ 19.4/21.8t/ha. Effective Slope under vegetation 4° Down	Method 1 AS3959 FDI 40 Forest Effective Slope under vegetation >0 - 5° Downslope
Fire Intensity (Byram, 1959) 12 564kW/m ("MEDIUM")	
Rate of Spread (Noble et al, 1980) 1.41kph	
Flame Height (modified Mc Arthur V equation, NSW RFS 2001) 11.25m	
Flame Width 100m	
Elevation of Receiver 2.4m	
BAL FZ within <10m of intact unmanaged vegetation BAL 40 from 10 - <13m BAL 29 from 13 - <19m BAL 19 from 19 - <27m BAL 12.5 from 27 – 100m	BAL FZ within <12m of intact unmanaged vegetation BAL 40 from 12 - <16m BAL 29 from 16 - <24m BAL 19 from 24 - <34m BAL 12.5 from 34 – 100m

Table 3. Calculated values for potential bushfire characteristics, and methods used.

Projected fireline intensity in terms of latest State bushfire hazard assessment methodology is “Medium” as indicated in Council and State bushfire hazard mapping. This validates the BPA status of Areas 1 and its associated 100m potential impact buffer.

The Radiant Heat Flux curves for the worst case design fire scenario is plotted in Figure 9.

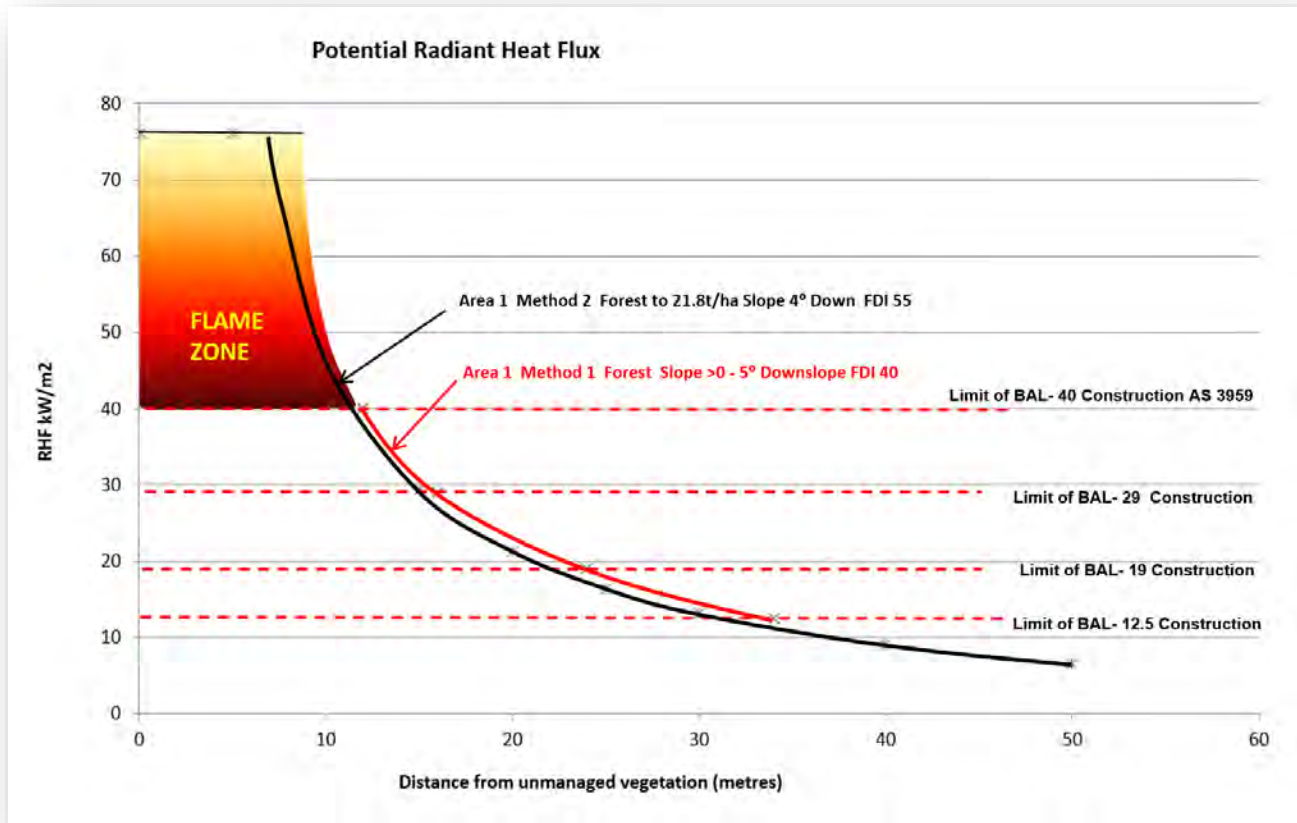


Figure 9. Radiant Heat Flux Predicted by Methods 1 and 2 under AS3959 - 2018.

Tables 3 and Figure 9 provide the basis for the Bushfire Attack Level (BAL) contours for the site under AS3959-2018, shown in Figure 11.

Table 4 below shows the significance of various levels of radiant heat flux.

Radiant Heat Flux (kW/m ²)	Likely Effects
> 40 - 110	Flame Zone. Even the strongest toughened glass fails.
29 - 40	Latest technology in toughened glass may survive. Most will not. Timber ignites without pilot flame. Limit of BAL-40 Construction AS3959 - 2009.
29	Ignition of timbers without piloted ignition (3 minutes exposure) during the passage of a bushfire. Most types of toughened glass could fail. Limit of BAL-29 Construction AS3959 - 2009.
19	Screened float glass could fail during the passage of a bushfire. Limit of BAL-19 Construction AS3959 - 2009.
12.5	Standard float glass could fail during the passage of a bushfire. Limit of BAL-12.5 Construction AS3959 - 2009. Some timbers can ignite with prolonged exposure and with pilot ignition sources (eg embers)
10	Critical conditions. Firefighters not expected to operate in these conditions. Considered life threatening in under a minute in protective equipment. Fabrics inside a building could ignite spontaneously with long exposures.
7	Likely fatal to unprotected persons after exposure of several minutes.
4.7	Extreme conditions. Firefighter in protective clothing will feel pain after 60 seconds exposure.
3	Hazardous conditions. Firefighters expected to operate for a short period (10 minutes).
2.1	Unprotected person will feel pain after 1 minute exposure - non fatal.

Table 4. Significance of various RHF levels (Source: NSW RFS, 2006)

7.0 Bushfire Protection Measures in Combination

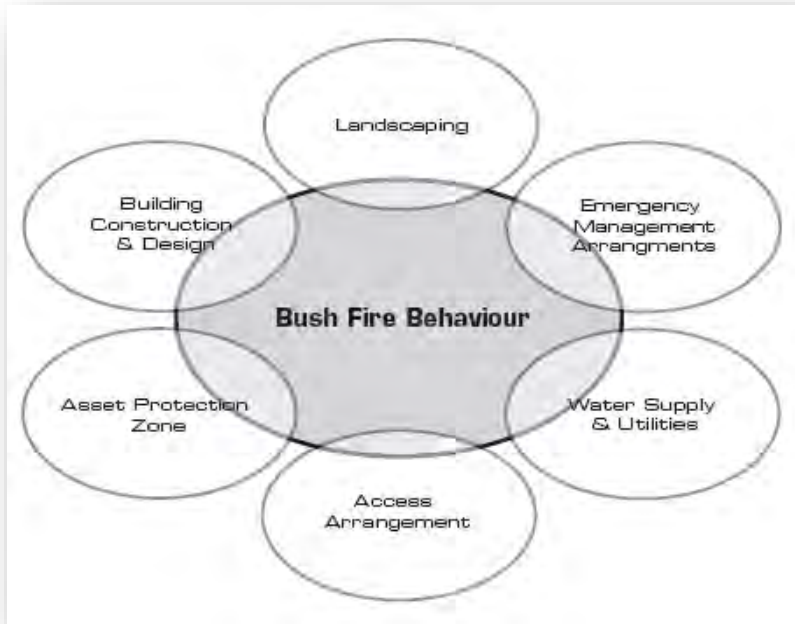


Figure 10. Bushfire Planning Measures in Combination (Source: NSW RFS, 2006)

Figure 10, taken from *Planning for Bushfire Protection* (NSW Rural Fire Service, 2006) illustrates that there are other factors and measures which need to be integrated to mutually support one another to provide protection against bushfire.

Simply removing the hazard is one possible way of removing risk to life and property, but this approach is not desirable. The safety of life and property can be achieved whilst retaining the natural amenity and value of bushland areas, provided these integrated bushfire protection measures are applied.

7.1 Building Construction and Design

Figure 11 shows the BAL contours for the site, and based on the final location of dwelling footprints, determines the minimum BAL rating for construction under AS3959-2018.

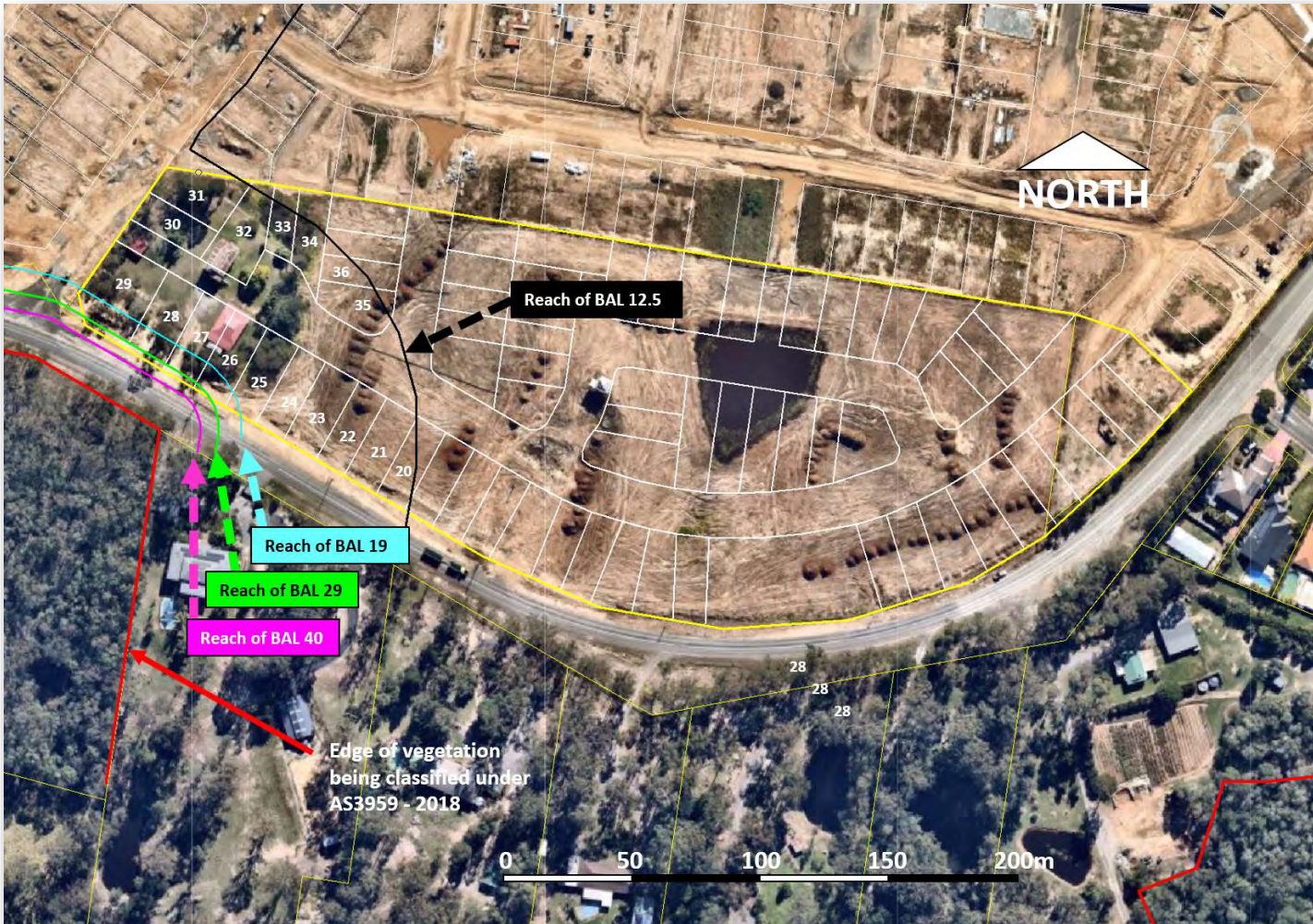


Figure 11. BAL contours for Stage 13. (Lots 20 – 35 are affected under AS3959-2018).

7.2 Asset Protection Zones and Landscaping

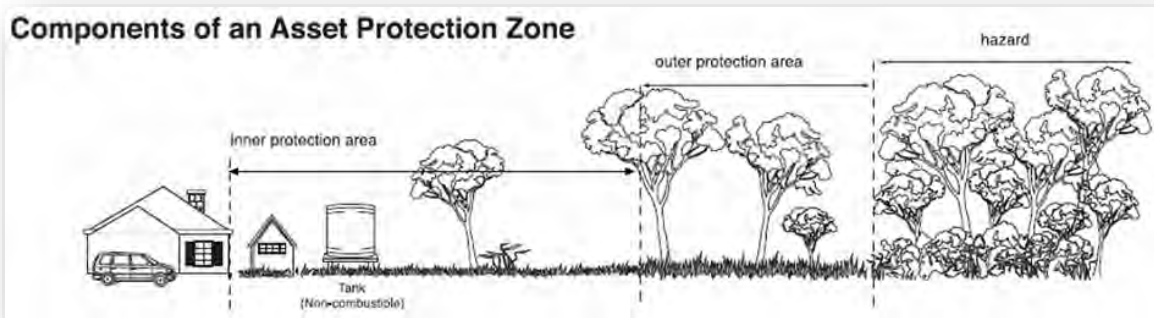


Figure 12. Components of an Asset Protection Zone (APZ)

Asset protection zones provide the most strategically valuable defense against radiant heat and flame, and to a lesser extent embers. As shown in Figure 9, the relationship between radiant heat level and distance is not linear, and great reductions in radiant heat exposure can be gained with separation distance from unmanaged fuels.

The function of the Inner Protection Area (IPA) is to distance the Asset from Flame and Radiant Heat. The Outer Protection Area (OPA) separates ground fuels from canopy fuels, causing canopy fires to collapse and become ground fires.

The IPA should be maintained as free as possible of available fuel, through short mowing of grass and removal of fine flammable debris. Plants retained in or introduced into the IPA should be selected based on low combustibility, by virtue of high moisture content, low volatile oil content, high leaf mineral levels, large fleshy leaves, absence of shedding bark. Plant arrangement is just as important as low combustibility. Plants should be placed so as to not provide either vertical or horizontal connectedness of plant material. Appendix 1 provides examples of less hazardous plant species. Combustible vegetation shall not be allowed to come into contact with combustible parts of buildings. Trees shall not be allowed to directly overhang roof lines.

In this case the APZ on each Lot affected under AS3959 (identified in Figure 11) is to be entirely constructed and maintained as IPA.

The Park lot shall be managed in a low hazard state, with a predominantly mown surface.

7.3 Access and Egress Management

The site is within approximately 7km by road of the nearest Queensland Fire and Emergency Services (Caboolture Fire Station).

Access and egress for fire fighters will be provided in accordance with the Queensland Fire and Emergency Services Guideline (*Fire Hydrant and Vehicle Access Guidelines for Residential, Commercial and Industrial Lots, 2015*). The guideline is attached as Appendix 2.

The proposed roadways and driveways for the subdivision provide a suitable access for emergency services vehicles and there are multiple options for access and egress in a safe direction.

7.4 Water Supplies and Utilities

Water supply for the development will be connected to Council mains reticulated supply, with hydrants installed in accordance with AS2419.1-2005 and with volumes and pressure under the control of Council water utilities provider. Fire fighting water supply and fire hydrants will be provided in accordance with the Queensland Fire and Emergency Services Guideline (*Fire Hydrant and Vehicle Access Guidelines for Residential, Commercial and Industrial Lots, 2015*).

Electricity supply to the site shall be supplied underground.

Any reticulated or bottled gas shall be installed and maintained in accordance with AS1596 – 2002. Metal piping is to be used. Any fixed LPG tanks shall be kept clear of flammable materials, and located on the non hazard side of the building. Any gas cylinders which need to be kept close to a building shall have release valves directed away from the building. Polymer sheathed flexible gas supply lines to gas meters adjacent to buildings are not to be used.

7.5 Fire Fighting and Emergency Management Arrangements

The development is serviced by the existing roads and proposed driveways for Emergency Services use. Asset Protection Zone maintenance will prevent the development of hazard within the proximity of dwellings so that defense of properties can be conducted with safety.

Obstructions to access onto individual Lots and the rear of buildings should be avoided.

Residents shall be made aware of the existence of this Plan, and their need to comply with the relevant provisions, in particular building construction, APZ maintenance, optimizing access around buildings and emergency response preparations.

Residents shall decide on their Stay and Defend / or Go Early strategy before each fire season so as to ensure this decision is not made too late, when smoke and emergency vehicles prevent an orderly evacuation. Staying to defend is a viable and preferable option for the proposed development.

Residents staying to defend should ensure that they have adequate protective clothing, including full length cotton or denim garments, sturdy boots, gloves, smoke mask (minimum P2 with valves) and smoke goggles.

Appendix 2 provides guidance for Residents' Emergency Management Planning in relation to bushfire.

8.0 Assessment of proposal against Moreton Bay Regional Planning Scheme (2020) Table 9.4.1.6

General Residential Zone Code (PO53 - 56)

Performance Outcome	Assessment / Acceptable Outcomes
<p>8.1 (PO 53) Lots are designed to:</p> <ul style="list-style-type: none"> a. minimise the risk from bushfire hazard to each lot and provide the safest possible siting for buildings and structures; b. limit the possible spread paths of bushfire within the reconfiguring; c. achieve sufficient separation distance between development and hazardous vegetation to minimise the risk to future buildings and structures during bushfire events; d. maintain the required level of functionality for emergency services and uses during and immediately after a natural hazard event. 	<p>E53 is applied in that: Reconfiguring the lot ensures that all new lots are an appropriate size, shape and layout to allow for the siting of future buildings being located:</p> <ul style="list-style-type: none"> a. within an appropriate development footprint; b. within the lowest hazard locations on the lots; c. to achieve a minimum separation between the development footprint and the source of bushfire hazard by a distance sufficient to avoid construction above BAL 29 under AS3959-2018; d. to achieve a minimum separation between the development footprint and any retained vegetation strips or small areas of vegetation by a distance sufficient to avoid construction above BAL 29 under AS3959-2018; e. away from ridgelines and hilltops; f. on land with a slope of less than 15%; g. away from north to west facing slopes.
<p>8.2 (PO 54)</p> <ul style="list-style-type: none"> a. Lots provide adequate water supply and infrastructure to support fire-fighting. 	<p>E54 is applied in that:</p> <ul style="list-style-type: none"> a. Lots have access to a reticulated water supply provided by a distributor retailer for the area.
<p>8.3 (PO 55) Lots are designed to achieve:</p> <ul style="list-style-type: none"> a. safe site access by avoiding potential entrapment situations; b. accessibility and manoeuvring for fire-fighting during bushfire. 	<p>E55 is applied in that: Reconfiguring the lot ensures new lots are provided with:</p> <ul style="list-style-type: none"> a. direct road access and egress to public roads; b. private driveways do not exceed 100m and the route is safe for access and egress in the event of bushfire; c. driveway gradients are less than 12.5%; d. driveway widths are a minimum of 3.5m.
<p>8.4 (PO 56) The road layout and design supports:</p> <ul style="list-style-type: none"> a. safe and efficient emergency services access to all lots and manoeuvring within the subdivision; b. availability and maintenance of access routes for the purpose of safe evacuation. 	<p>E56 is applied in that reconfiguring a lot provides a road layout which:</p> <ul style="list-style-type: none"> a. interfaces with an existing road that separates the new lots from hazardous vegetation, with: <ul style="list-style-type: none"> i. a cleared width of 20m; ii. road gradients less than 12.5%; iii. pavement and surface treatment capable of being used by emergency vehicles; iv. Turning areas for fire appliances in accordance with Qld Fire and Emergency Services' Fire Hydrant and Vehicle Access Guidelines.

	<ul style="list-style-type: none"> c. Excludes cul-de-sacs. d. Excludes dead end roads.
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9.0 Assessment of proposal against State Planning Policy 2019

State Planning Policy – Natural hazards, risk and resilience (SPP, December 2013, latest version December 2019) replaces State Planning Policy 1/03 *Mitigating the Adverse Impacts of Flood, Bushfire and Landslide*. The SPP Guideline – Natural hazards, risk and resilience provides a methodology for determining Bushfire Hazard based on Potential Fireline Intensity. The methodology and hazard mapping has been included in Section 3.1 of this Plan in establishing the adjacent area as potentially hazardous and as a bushfire prone area.

The SPP guideline provides development assessment benchmarks to ensure that State interests are appropriately considered in relation to natural hazards, including bushfire hazard areas. These provisions serve as general guidelines to either avoid or otherwise adequately mitigate bushfire risk. Specific guidelines for bushfire hazard overlay codes are yet to be provided, and this detail is addressed by this Plan in terms of meeting the current requirements of Local Government in Section 8 above.

Interim Development Assessment Benchmarks	Solutions Provided
(3) Development avoids natural hazard areas or where it is not possible to avoid the natural hazard area, development mitigates the risks to people and property to an acceptable or tolerable level, and	This Plan establishes the nature and potential severity of the adjacent hazard and provides a combination of bushfire protection measures to mitigate risk including park management, building construction, asset protection zones, access, water supplies and utilities, and emergency management arrangements.
(4) Development supports, and does not unduly burden, disaster management response or recovery capacity and capabilities, and	The combined effect of the bushfire protection measures specified by this Plan serves to reduce risk to a low level and ensure resilience and preparedness for unplanned fire so that the response or recovery capacity and capability of emergency services is not unduly burdened or impeded. This Plan serves to protect life and property from bushfire without depending on emergency services for protection.
(5) Development directly, indirectly and cumulatively avoids an increase in the severity of the natural hazard and the potential for damage on the site or to other properties, and	The development decreases the nature of the existing hazard, and the site layout and landscaping on the site is designed to moderate the exposure of buildings. The potential for damage to other properties is decreased as a consequence of the proposed development.
(6) Risks to public safety and the environment from the location of	Hazardous materials are not stored in quantities or locations on the site which would pose a risk to the public or the environment.

hazardous materials and the release of these materials is avoided, and	
(7) The natural processes and the protective function of landforms and the vegetation that can mitigate risks associated with the natural hazard are maintained or enhanced.	The development maintains the natural processes and protective function of vegetation that previously existed for the site.

10.0 Recommendations

1. That any new residential building and any other Class 10a structure within 6m of it, shall be constructed in accordance with AS3959-2018 and the guidelines provided in Section 6.3 of this BMP, and in particular Table 3 and Figure 11. Builders shall warrant that they have a copy of this Standard, and that it shall be used consistently throughout the design and construction of any residential building.
2. The Asset Protection Zones described in Sections 6.3 and 7.2 of this report shall be constructed and maintained in perpetuity.
3. Reticulated water supplies shall be fully installed in accordance with the requirements of Section 7.4 of this Plan.
4. Lot buyers within 100m of future hazard should be made aware of the existence of this Plan and their responsibilities outlined within it, in particular construction, asset protection zone and emergency management.
5. Deviation from the actions or recommendations outlined in this Plan will require notification of the Author and potentially reworking bushfire protection measures accordingly. Should the area be impacted by unplanned bush fire, this Plan should be reviewed for adequacy, and potentially be revised to account for conditions that are different to those existing at the time of preparing this Plan.

11.0 Summary

The area of “hazard” faced by the proposed development is marginal, but slightly too large to downgrade as “Low hazard”. The likelihood of bushfire regarded as possible over the long term. The likely adverse consequences of bushfire are minimised as a result of this Plan, and the current design of the proposal.

Along with adequate water supply and emergency management arrangements, compliant construction under AS3959-2018 and APZs to reduce the exposure of life and property to bushfire, these combined measures assist prepare residents for the possibility of fire in the area.

12.0 References

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Appendix 1

Less combustibile native plants list

Source: Bowden, J (1999)