

# Attachment E

## Bushfire Hazard Plan

# BUSHFIRE HAZARD ASSESSMENT

81, 83, 85 School Road, Logan Reserve  
Lots 18, 19, 20 on RP 97736

October 2017



bushfire assessments  
property vegetation assessments  
site planning for bushfire  
property management for bushfire  
bushfire management plans

## INTRODUCTION

Lacuna Resolve has been engaged to conduct a site based bushfire hazard assessment in relation to a reconfiguration of a Lot for the purpose of urban residential development at 81 – 85 School Road, Logan Reserve. A report has been prepared in accordance with the Logan City Council Sc6.2.6 *Planning Scheme policy 6 – Management of Bushfire Hazard Logan Planning Scheme 2015 version 2.1*. The aim of this report is to demonstrate the level of bushfire hazard, utilising the methodology as required by Part 2 of that policy.

## SITE DETAILS

<b>Site Address</b>	<b>81 – 85 School Road. Park Ridge</b>
<b>Local Government</b>	Logan City Council
<b>Real Property Description</b>	Lot 18,19, 20 on RP97736
<b>Area of Site</b>	104 120m <sup>2</sup>
<b>Tenure</b>	Freehold
<b>Applicant</b>	LEXCEN No.2 Pty Ltd
<b>Current Land Use</b>	Detached dwelling
<b>Proposed Land Use</b>	Reconfiguration of Lots for urban residential purposes and including detention basins.

## Location and Legal Description

The site is located at 81,83,85 School Road, Logan Reserve and is described as Lot 18,19,20 on RP 97736 (Figure 1). It is within Logan City Council and is zoned Emerging Community.

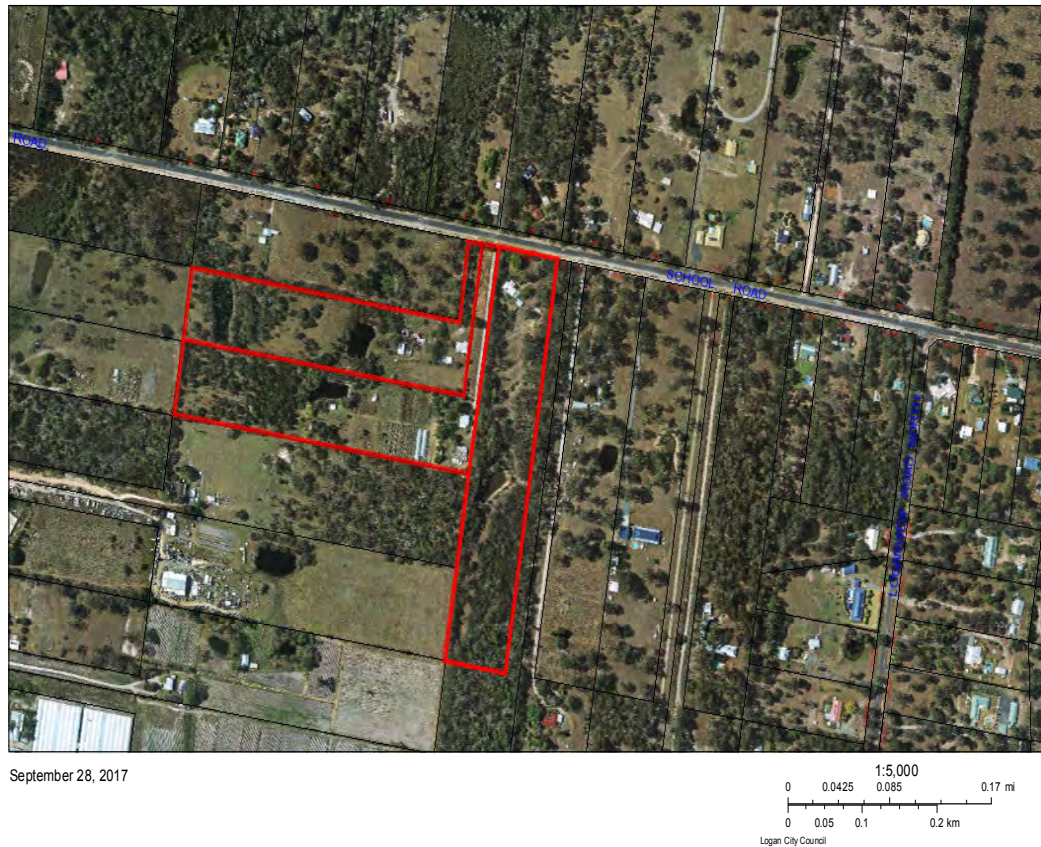


Figure 1

### SCOPE OF BUSHFIRE HAZARD ASSESSMENT

A reconfiguration of Lots has been proposed at 81–85 School Road, Logan Reserve on Lots 18,19,20 on RP 97736. The site is identified in the Logan City Council Bushfire Hazard Overlay map and in accordance with the provisions of the Planning Scheme Policy 6 a detailed Bushfire Hazard Assessment has been prepared.

### BUSHFIRE HAZARD

The combination of vegetation, topography and climate make Australia one of the most bushfire prone areas of the world. A bushfire hazard exists where there is vegetation- grass, scrub, bushes and trees. The hazard is not restricted to rural areas but also exists in the rural urban interface where the areas of included bushland within rural and rural residential development are increasing.

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## MODES OF BUSHFIRE ATTACK

There are four modes of bushfire attack:

- Burning debris;
- Radiant heat;
- Flame contact;
- Wind (Figure 2).

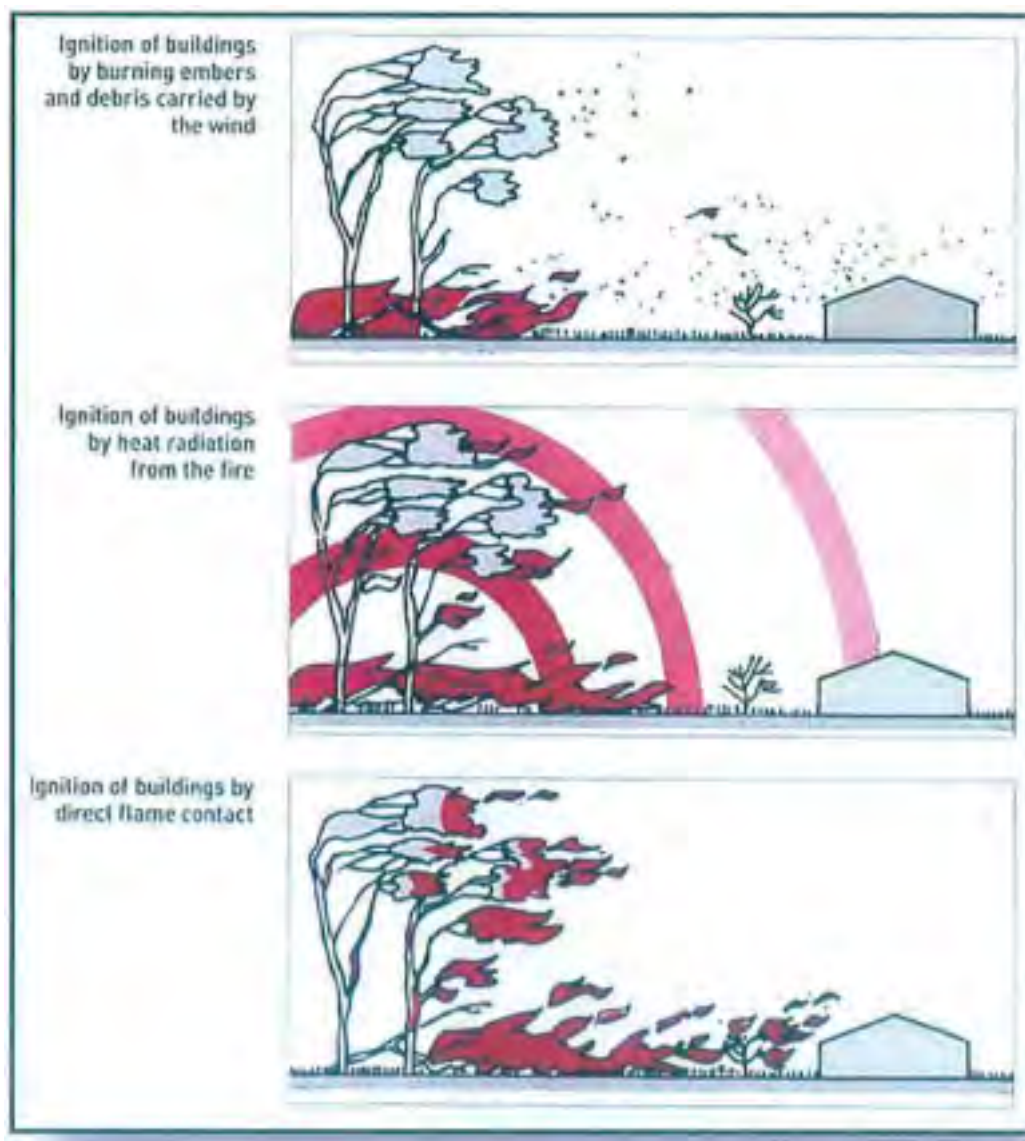


Figure 2

### **Burning Debris**

All bushfires will produce burning debris (embers) that is carried before the fire front by prevailing winds and convective forces. Ember attack occurs before and after the passage of the active fire front.

### **Radiant Heat**

Radiant heat will assist with ignition by preheating fuels and structures. Radiant heat is a measure of the heat energy released from the fire front that impact on the surrounding environment. Radiant heat impact reduces as a square of distance.

### **Flame contact**

Direct flame contact is a function of fuel load and the proximity of the fuel to structures. The risk is increased when in combination with high winds.

### **Wind**

Strong winds can intensify a fire, convey burning embers and debris and compromise the integrity of structures.

### **Other factors**

Vegetation structure and density is also an important factor and when allied with topography can have significant effect on fire intensity and behaviour.

### **Landscape and Localised Fire Hazard**

There are two risk types to be considered when evaluating bushfire hazard within a specific locality:

- Landscape hazard – large areas of vegetation close to and encroaching on residential areas;
- Localised hazard – fragmented and linear areas of vegetation that may be included within developments.

The two types of hazard present very different wildfire scenarios specifically in regard to fire behaviour, fire intensity, and rate of spread.

Landscape fires generally have the following dynamics:

- Higher fuel loads;
- Steeper topography;
- Difficult access;
- Continuity of fuel; and
- Induced fire weather conditions.

Localised bushfire risk generally consists of fragmented and disturbed areas of vegetation, including green corridors and retained green space. Fires that originate in the area would be constrained by the physical size of the vegetation, lighter fuel loads and opportunities for suppression.

### Proposed Development

Lots 18,19, 20 on RP97736 located at 81, 83, and 85 School Road, Logan Reserve are proposed for a reconfiguration for residential purposes. The site is located in Logan Reserve in Logan City, an area that is undergoing a significant transition from large rural properties to urban residential development. The proposal will establish urban residential allotments

The development proposes a reconfiguration of Lots from 3 into 142 lots. Two transitional stormwater basins will be established within the western extent of the development, whilst regional stormwater infrastructure is established (Figure 3).

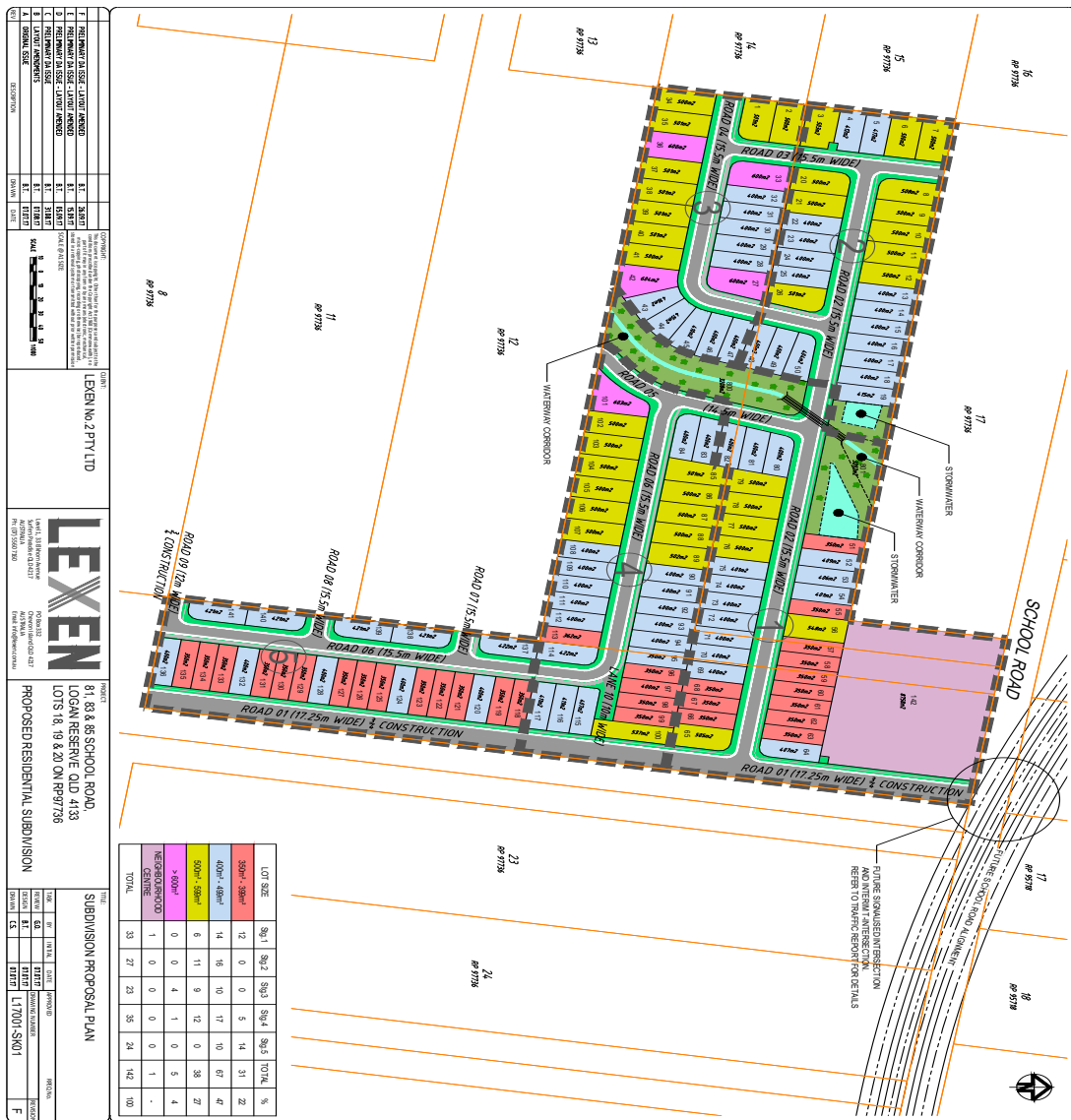


Figure 3

Internal 15.5 metre roads will converge to exit onto a 23metre road to be established along the eastern extent of the proposal, to connect to School Road.

## SITE LOCATION AND DESCRIPTION

### Location and Legal description

Lots 18,19,20 on RP 97736 are located at 81,83,85 School Road Park Ridge (Figure 4).

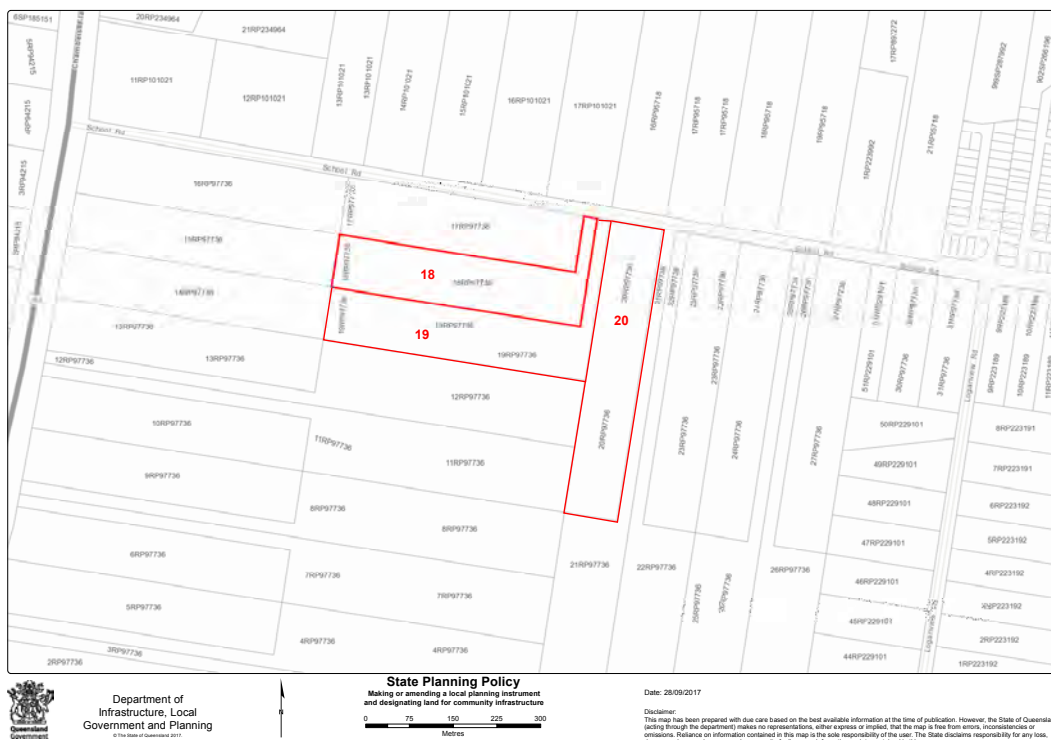


Figure 4

### Site Description

Lot 18,19, 20 have a total combined area of 104 120 square metres and have a predominantly northwesterly aspect and a slope of 2 degrees (3%). Lot 18,19, 20 are within an Emerging Community Zone of Logan City. The site is in an area of Logan City that is undergoing a significant transition from rural properties to urban residential development. Significant development has occurred to the west along Chambers Flat Road and further development is being progressed north of the proposed development (Figure 5).



Figure 5

## BUSHFIRE HAZARD ASSESSMENT

The State Government Single State Planning Policy (SPP) released in 2013 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-wide mapping and the Logan City Bushfire Hazard overlay as being within the 100meter buffer zone, requiring the bushfire hazard impacts be addressed.

## LOCAL GOVERNMENT PROVISIONS

The Logan City Plan 2015 came into effect on December 9, 2016 and incorporates Bushfire Overlay Mapping, Overlay Code and Bushfire Hazard Planning Scheme Policy.

A Bushfire Hazard Assessment has been conducted as per the Logan City Bushfire Planning Scheme Policy, Schedule 6. Assessment has also been conducted against the overlay code.

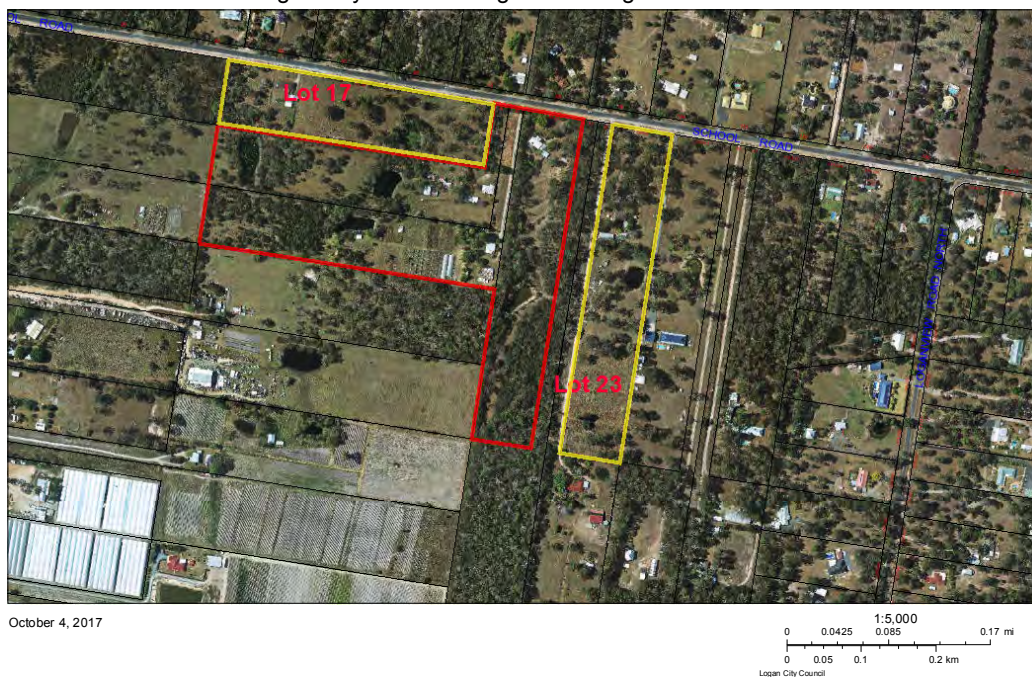
## SITE ASSESSMENT

### Vegetation

An onsite inspection and assessment was conducted at 81, 83, 85 School Road, Logan Reserve to observe and record the relevant information to determine the Bushfire Hazard in accordance with the requirements of the Logan City Plan 2016.

The vegetation on Lots 18, 19, 20 will be removed as part of development. Lot 17 on RP97736 adjoining the site at the northwest and Lot 23 on RP97736 adjoining the site at the east are Low hazard (Figure 6).

Logan City Council - Logan Planning Scheme 2015



**Figure 6**

There are two areas of possibly hazardous (bushfire) vegetation that require consideration as part of this proposal (Figure 7).



Figure 7

**Lot 12 on RP97736** - adjoining Lot to the south of the site, has an area of woodland at the eastern extent. The non-remnant vegetation on Lot 12 on RP97736 has been disturbed and modified by past land management practices. The vegetation is primarily grassy understorey, casuarina regrowth and scattered remnant eucalyptus. The ground fuels are light leaf litter and scattered grasses, consistent with grassy woodland (Photo 1 and 2).



**Photo 1**



**Photo 2**

The nature of the vegetation required a subjective assessment to determine the representative fuel loads. Available fuel weights were calculated using the Field Guide - Fuel Assessment and Fire Behaviour Prediction in Dry Eucalypt Forests (J.s Gould et al (2007), Ensis-CSIRO).

### Surface Fuel Layer (SF)

Hazard rating	Description	Hazard score	Litter (mm)	Depth	Av.Fuel Tonne/ha
Low	Thin layer, no decomposition discontinuous	1	<10		4

### Near Surface Fuel layer

Hazard rating	Description	Hazard score	Av.Fuel Tonne/ha
Low	Sparse dispersed fuel. Dead material virtually absent	1	1

### Elevated fuel hazard

Hazard rating	Description	Fraction dead	Hazard score	Av.Fuel Tonne/ha
Low	Sparse and dispersed	<5%	1	1

### Intermediate and overstorey Bark Fuels

Hazard rating	Description	Hazard score	Av.Fuel Tonne/ha
Moderate	Smooth bark and tightly held fibrous & platy bark Sp.	1	1
<b>Available Fuel</b>			<b>7 TONNE/HA</b>

**Lot 21 on RP97736** - adjoining the southern end of Lot 20, is an area of disturbed and modified woodland consisting of sparse regrowth eucalypts and acacia (Photo 3 and 4).



**Photo 3**



**Photo 4**

Available fuel weights were calculated using the Field Guide - Fuel Assessment and Fire Behaviour Prediction in Dry Eucalypt Forests (J.s Gould et.al (2007), Ensis-CSIRO).

### Surface Fuel Layer (SF)

Hazard rating	Description	Hazard score	Litter Depth (mm)	Av.Fuel Tonne/ha
Low	Thin layer, no decomposition discontinuous	1	<10	4

### Near Surface Fuel layer

Hazard rating	Description	Hazard score	Av.Fuel Tonne/ha
Low	Sparse dispersed fuel. Dead material virtually absent	1	1

### Elevated fuel hazard

Hazard rating	Description	Fraction dead	Hazard score	Av.Fuel Tonne/ha
Moderate	Sparse and dispersed	<20%	2	2

### Intermediate and overstorey Bark Fuels

Hazard rating	Description	Hazard score	Av.Fuel Tonne/ha
Moderate	Smooth bark and tightly held fibrous & platy bark Sp.	<b>1</b>	<b>1</b>
<b>Available Fuel</b>			<b>8 TONNE/HA</b>

### 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:** No hazardous vegetation will be retained on Lots 18, 19, 20 on RP97736. The site will be Low Hazard.
- **External:** The vegetation on Lot 12 RP97736 and Lot 21 RP 97736 has been disturbed and modified by past land management practices.

## Classified Vegetation

The *Australian Standard: Construction of Buildings in Bushfire Prone Areas (AS 3959–2009)* requires that any classified vegetation within 100 metres of the proposed works must be assessed.

The Logan Reserve area is not exposed to landscape bushfire events that are associated with significant landscape areas of contiguous forest types that impact urban areas. Discrete, fragmented areas of remnant and regrowth woodlands present the risk in this location. The opportunity for large-scale fire events is limited by the fragmented landscape and the access for and the proximity of suppression opportunities

## Assessment of Bushfire Hazard

The *Australian Standard: Construction of Buildings in Bushfire Prone Areas (AS 3959–2009)* requires that any classified vegetation within 100 metres of the proposed works must be assessed. Figure 8 shows the extent of the 100-metre separation zone.

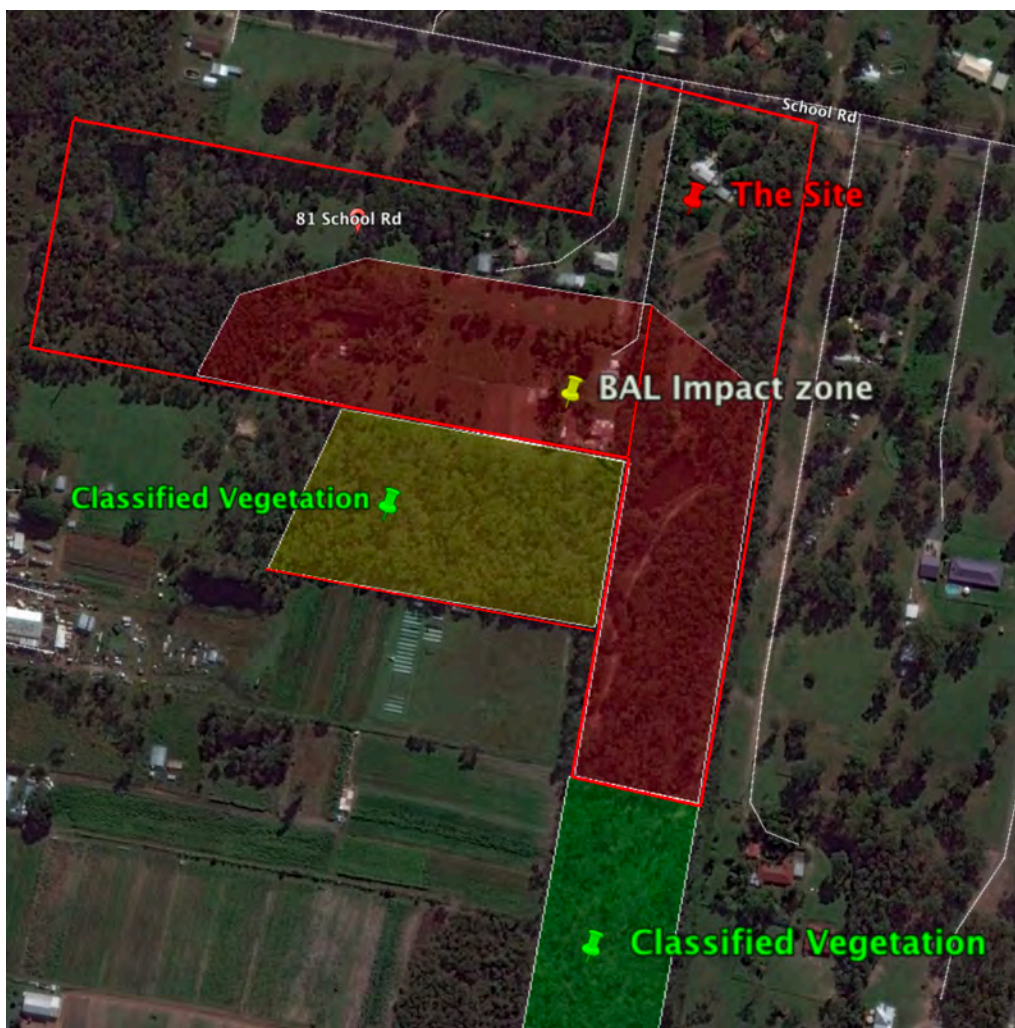


Figure 8

Calculations using the Australian Standard in accordance with Appendix B of AS 3959-2009, *Detailed Method for Determining the Bushfire Attack Level (BAL) – Method 2 (Normative)* determine the following impacts (Appendix 1).

**Lot 12 on RP97736**

Bushfire Attack Level impacts as a function of distance from classified vegetation. Table 1 shows the Heat Flux Exposure ratings, as calculated using Method 2 of the Australian Standard AS 3959 – 2009.

Minimum distance to < 40 kW/m <sup>2</sup>	2.4 m
Minimum distance to < 29 kW/m <sup>2</sup>	3.3 m
Minimum distance to < 19 kW/m <sup>2</sup>	5 m
Minimum distance to < 12.5 kW/m <sup>2</sup>	7.5 m

**Table 1**

**Lot 21 RP97736**

Bushfire Attack Level impacts as a function of distance from classified vegetation. Table 2 shows the Heat Flux Exposure ratings as calculated using Method 2 of the Australian Standard AS 3959 – 2009.

Minimum distance to < 40 kW/m <sup>2</sup>	2.2 m
Minimum distance to < 29 kW/m <sup>2</sup>	3 m
Minimum distance to < 19 kW/m <sup>2</sup>	4.5 m
Minimum distance to < 12.5 kW/m <sup>2</sup>	6.8 m

**Table 2**

The Lots to be exposed to a Heat Flux Exposure (BAL) of greater than 12.5 are shown in Figure 9.



Figure 9

## Bushfire Management and 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

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

- Limiting fuel accumulation;
- Reducing connectivity of fuels;
- Establishing and maintaining defensible space;
- Appropriate landscaping.

## Access and Egress

The proposed current and future access will provide access and egress to School Road for residents and emergency services.

## Fencing

Fencing materials have the capacity to contribute to fire spread and intensity. For properties subject to BAL impacts it is recommended that non-combustible fencing materials be used.

## Water Supply

Reticulated water will be supplied to the development meeting the required statutory standards.

## Bushfire Preparedness

The affected residents will be provided with a bushfire information kit containing all the necessary information to inform them of the bushfire risks and their roles and responsibilities for prevention, preparedness and response to any fire event.

[https://ruralfire.qld.gov.au/Fire\\_Safety\\_and\\_You/Bushfire\\_Survival\\_Plan/](https://ruralfire.qld.gov.au/Fire_Safety_and_You/Bushfire_Survival_Plan/)

## Bushfire Overlay Code (8.2.3.3.1)

Performance outcomes	Acceptable outcomes
<b>PO1</b> Development is designed to: (a) Minimise risk of bushfire hazard; (b) Provide safe premises; (c) create efficient emergency access for fire fighting and other emergency vehicles. Note—Planning scheme policy 6—Management of bushfire hazard provides guidelines on how to achieve this outcome	The proposed reconfiguration will establish sufficient separation from hazardous vegetation to minimise bushfire risk.  The proposed and future access/egress will provide efficient access for emergency services.
<b>PO2</b> Development is sited and constructed to minimise the bushfire hazard and maximise the protection of life and property from bushfire.	The proposed urban design has the capacity to accommodate a range of bushfire mitigation measures to protect life and property.

<p><b>PO3</b> Reconfiguring a lot ensures that lots are designed to minimise bushfire hazard and provide safe sites for people, property and buildings.</p>	<p>The Heat flux exposure ratings (BAL) have been established for the classified vegetation on Lots 12 and Lot 21. BAL ratings for individual Lots will be established in the final design stage. The implementation of construction standards as determined by the AS 3959 – 2009; construction of buildings in bushfire prone areas, will provide acceptable outcomes.</p>
<p><b>PO4</b> Access for fire management and evacuation is provided by access that:</p> <ul style="list-style-type: none"> <li>(a) Separates premises from adjoining Vegetation;</li> <li>(b) is safely accessible by fire fighting vehicles;</li> <li>(c) has regular vehicular access points for bushfire management, response and evacuation;</li> <li>(d) has regular vehicle passing and turning areas for bushfire management, response and evacuation;</li> <li>(e) allows access at all times for fire fighting vehicles;</li> <li>(f) allows for maintenance, burning off and bushfire response;</li> <li>(g) Has vehicular links to an alternative through road;</li> <li>(h) is readily maintained.</li> </ul> <p><i>Editor's note—Planning scheme policy 6– Management of bushfire hazard provides details on alternative solutions for providing fire management access and evacuation.</i></p>	<p><b>AO4</b> The proposed 15.5metre wide internal access roads and the proposed 23metre wide road at the eastern extent will provide residents and emergency services direct egress and ingress from School Road.</p> <p>The roads provide safe egress away from any threat.</p> <p>Emergency services have alternate emergency access to Lot 12 and lot 21 via the constructed roads in the development.</p>

As a function of the location and design of this reconfiguration and the anticipated low fire line intensity of a fire event on Lot 12 and Lot 21, the option for residents to remain within their homes would be a considered alternative. This option would avoid putting residents at risk as a result of smoke, traffic congestion and the movements of emergency vehicles and fire fighters. The warning systems now implemented by Emergency Services and Local Authorities provide timely information and advice to residents.

## RECOMMENDATIONS

1. Proposed buildings will be constructed to meet the requirements of the Australian Standard – Construction of buildings in bushfire prone areas.
2. The vegetation within the reconfiguration will be maintained as typical urban managed low hazard vegetation (lawns and gardens) Any revegetation planting will implemented to allow management to maintain low hazard state.
3. Fencing on the alignment of the reconfiguration adjoining Lot 12 and Lot 21 will be constructed of non-combustible materials and the constructed roads will have suitable access for emergency services personnel.
4. Ingress and egress for residents and emergency services will be along the dedicated access road from School Road and the internal constructed roads.
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.

[https://ruralfire.qld.gov.au/Fire\\_Safety\\_and\\_You/Bushfire\\_Survival\\_Plan](https://ruralfire.qld.gov.au/Fire_Safety_and_You/Bushfire_Survival_Plan)

**Bernard Trembath, GC APP MGT, FRAFAQ**



## Appendix 1

### Method for Determination of BAL

BAL was determined in accordance with Appendix B of AS 3959-2009, *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.