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Bushfire Development Report

for the development of the
W.I.L.D Centre and Pavilion Learning Space
at 19 Diamond Street
Eltham VIC 3095

Report prepared for
the Catholic Ladies College

December 2020

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Cover image: Looking southwest at the site of the proposed W.I.L.D. Centre

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| Stage | Date completed | Name | Title |
|-------------------------------|----------------|--------------|---------------------------------------|
| Site assessment | 2020-10-22 | Hamish Allan | Manager, Bushfire Planning and Design |
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Terramatrix Pty. Ltd.
 ACN 129 163 373
 ABN 44 129 163 373
 PO Box 1391
 Collingwood VIC 3066
 P: 03 9417 2626
 www.terramatrix.com.au

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1 Introduction

This Bushfire Development report has been prepared for the Catholic Ladies College, to assess how the proposed development of the W.I.L.D. Centre and Pavilion Learning Space at 19 Diamond Street, Eltham VIC 3095, can respond to the bushfire risk and the applicable Victorian planning and building controls that relate to bushfire, in particular the objective and applicable strategies of the Planning Policy Framework (PPF) at Clause 13.02 *Bushfire* in the Victoria Planning Provisions (Nillumbik Planning Scheme, 2018a). In accordance with the Victorian Building Regulations, the report includes a Bushfire Attack Level (BAL) assessment to determine the applicable BAL construction standard for the buildings. The simple 'Method 1' procedure has been used to determine the BAL for the Pavilion Learning Centre and the detailed 'Method 2' procedure has been used for the W.I.L.D. Centre.

The site is in a designated Bushfire Prone Area (BPA). BPAs are those areas subject to or likely to be subject to bushfires, as determined by the Minister for Planning. Higher hazard land within a BPA that may be subject to extreme bushfire behaviour, is covered by the Bushfire Management Overlay (BMO). No part of the development site is affected by the BMO.

The development comprises two buildings that will be adjacent or attached to existing buildings within the school grounds. Nillumbik Shire Council have requested that the development show how it responds to Clause 13.02-1S in the PPF.

Accordingly, this report assesses the bushfire hazard and identifies how the proposed development can appropriately mitigate any bushfire risk, and, respond to and comply with the applicable bushfire planning and building controls. It has been prepared in accordance with guidance for the assessment of, and response to, bushfire risk, provided in:

- *Bushfire State Planning Policy Amendment VC140*, Planning Advisory Note 68 (DELWP, 2018) and
- AS 3959-2018 *Construction of buildings in bushfire prone areas* (Standards Australia, 2019).

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2 Site overview

| | |
|-------------------------------|---|
| Address: | 19 Diamond Street, Eltham VIC 3095 |
| Property size: | 9.57 ha |
| Local Government Area: | Nillumbik Shire Council |
| Zone/s | Neighbourhood Residential Zone - Schedule1 (NRZ1) Urban Flood Zone and Schedule (UFZ) |
| Overlay/s | Environmental Significance Overlay – Schedules 1 and 4 (ESO1 and 4) Land Subject to Inundation Overlay and Schedule (LSIO) |

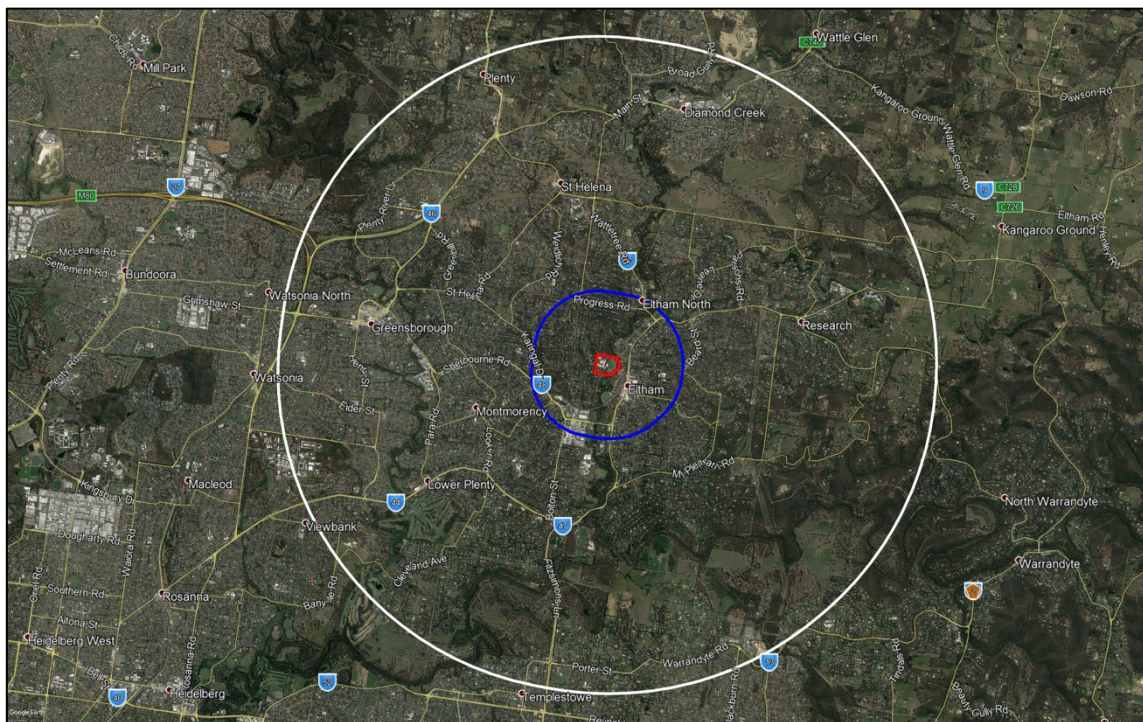


Figure 1 - Site location (site shown in red, 1km buffer of site in blue outline; 5km buffer of site in white outline. Google Earth imagery date: 2018-12-01).

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3 Bushfire planning and building controls

This section identifies the applicable planning and building controls that relate to bushfire.

3.1 Clause 13 Environmental risks and amenity

This clause in the Planning Policy Framework (PPF) has two key provisions pertinent to bushfire.

3.1.1 Clause 13.01-1S Natural hazards and climate change

The objective of this Clause is to minimise the impacts of natural hazards and adapt to the impacts of climate change through risk-based planning. Specified strategies to achieve the objective are:

- *‘Consider the risks associated with climate change in planning and management decision making processes.*
- *Identify at risk areas using the best available data and climate change science.*
- *Integrate strategic land use planning with emergency management decision making.*
- *Direct population growth and development to low risk locations.*
- *Develop adaptation response strategies for existing settlements in risk areas to accommodate change over time.*
- *Ensure planning controls allow for risk mitigation or risk adaptation strategies to be implemented.*
- *Site and design development to minimise risk to life, property, the natural environment and community infrastructure from natural hazards’ (Nillumbik Planning Scheme, 2018b).*

It should be noted that, especially in southern Australia, since the 1950s there has been an increase in the length of the fire weather season and an increase in extreme fire weather. It is projected that there will be further increase in the number of dangerous fire weather days and a longer fire season for southern and eastern Australia (CSIRO/BOM, 2020). The Australasian Fire and Emergency Service Authorities Council (AFAC) identify that a failure of building codes and land use planning to adequately adapt to climate change is a significant risk (AFAC, 2018).

3.1.2 Clause 13.02-1S Bushfire planning

Clause 13.02-1S has the objective *‘To strengthen the resilience of settlements and communities to bushfire through risk based planning that prioritises the protection of human life’* (Nillumbik Planning Scheme, 2018a). The policy must be applied to all planning and decision making under the Planning and Environment Act 1987, relating to land which is:

- Within a designated Bushfire Prone Area;
- Subject to a Bushfire Management Overlay; or
- Proposed to be used or developed in a way that may create a bushfire hazard.

Priority must be given to the protection of human life by:

- *‘Prioritising the protection of human life over all other policy considerations.*

- *Directing population growth and development to low risk locations and ensuring the availability of, and safe access to, areas where human life can be better protected from the effects of bushfire.*
- *Reducing the vulnerability of communities to bushfire through consideration of bushfire risk in decision-making at all stages of the planning process’ (Nillumbik Planning Scheme, 2018a).*

Key strategies are stipulated that require strategic planning documents, planning scheme amendments and development plan approvals to properly assess bushfire risk and include appropriate bushfire protection measures. This also applies to planning permit applications for:

- Subdivisions of more than 10 lots;
- Accommodation;
- Child care centre;
- Education centre;
- Emergency services facility;
- Hospital;
- Indoor recreation facility;
- Major sports and recreation facility;
- Place of assembly; and
- Any application for development that will result in people congregating in large numbers.

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Development should not be approved where ‘...a landowner or proponent has not satisfactorily demonstrated that the relevant policies have been addressed, performance measures satisfied or bushfire protection measures can be adequately implemented’ (Nillumbik Planning Scheme, 2018a).

This study assesses the hazard in accordance with the bushfire hazard identification and assessment strategies in Clause 13.02-1S and identifies the bushfire protection measures that will be required for the development. It is considered that development can appropriately prioritise the protection of human life, and meet the objectives of Clause 13.02-1S, by complying with the applicable building regulations that relate to bushfire and ensuring the new buildings are designed and constructed to an appropriate BAL construction standard (see Sections 3.2 and 4.3). Appropriate emergency management plans and procedures should also be in place to respond to any bushfire emergency that may occur in proximity to the site (see Section 5.2).

3.2 Bushfire Prone Area (BPA)

The school site is in a designated Bushfire Prone Area (BPA) (see Map 1). BPAs are those areas subject to or likely to be subject to bushfire, as determined by the Minister for Planning. Those areas of highest bushfire risk within the BPA are designated as BMO areas.

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In a BPA, the Building Act 1993 and associated Building Regulations 2018, through application of the National Construction Code (NCC), require bushfire protection standards for class 1, 2 and 3¹ buildings, 'Specific Use Bushfire Protected Buildings'² and associated class 10A buildings³ or decks. The applicable performance requirement in the NCC is:

'A building that is constructed in a designated bushfire prone area must, to the degree necessary, be designed and constructed to reduce the risk of ignition from a bushfire, appropriate to the —

- (a) *potential for ignition caused by burning embers, radiant heat or flame generated by a bushfire; and*
- (b) *intensity of the bushfire attack on the building'* (ABCB, 2019).

Compliance with AS 3959-2018 *Construction of buildings in bushfire prone areas* (Standards Australia, 2019) is 'deemed-to-satisfy' the performance requirement⁴.

The Victorian building regulations require that applicable buildings be constructed to a minimum Bushfire Attack Level (BAL)-12.5, or higher, as determined by a site assessment or planning scheme requirement. A BAL is a means of measuring the severity of a building's potential exposure to ember attack, radiant heat and direct flame contact. There are six BALs defined in AS 3959-2018, which range from BAL-LOW, which has no bushfire construction requirements to BAL-FZ (Flame Zone) where flame contact with a building is expected (see Appendix 1).

AS 3959-2018 provides a simple 'Method 1' procedure to determine a BAL, using pre-set inputs to represent the fuel hazard, vegetation attributes, fire weather conditions and flame characteristics. A detailed 'Method 2' procedure is provided for where site characteristics differ from the pre-set inputs and a different BAL outcome can be justified.

This report uses the Method 1 procedure to determine the BAL for the Pavilion Learning Centre and the Method 2 procedure for the W.I.L.D. Centre

Both buildings are classified as Class 9B structures under the NCC and due to their school use are 'Specific Use Bushfire Protected Buildings' under the Building Regulations.

Large developments and certain vulnerable uses in a BPA (see Section 3.1.2) are also required by Clause 13.02 *Bushfire* to:

- *'Consider the risk of bushfire to people, property and community infrastructure.*

¹ Class 1, 2 and 3 buildings are defined in the Building Code of Australia (BCA), and are generally those used for residential accommodation, including houses and other dwellings, apartments, hotels and other buildings with a similar function or use.

² Specific Use Bushfire Protected Buildings are defined in the Victorian *Building Regulations 2018*, they generally comprise 'vulnerable' uses and include schools, kindergartens, childcare facilities, aged care facilities and hospitals.

³ Class 10a buildings are defined in the BCA as non-habitable buildings including sheds, carports, and private garages.

⁴ For Class 1 and associated Class 10a buildings, the *NASH Standard for Steel Framed Construction in Bushfire Areas* is also deemed to satisfy the performance requirement.

- *Require the implementation of appropriate bushfire protection measures to address the identified bushfire risk.*
- *Ensure new development can implement bushfire protection measures without unacceptable biodiversity impacts' (Nillumbik Planning Scheme, 2018a).*

3.3 Other controls

Neither the zoning nor overlay controls have any intrinsic bushfire safety implications.

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4 Bushfire hazard assessment

One of the bushfire hazard identification and assessment strategies in Clause 13.02 is to use the best available science to identify the hazard posed by vegetation, topographic and climatic conditions.

The basis for the hazard assessment should be:

- *‘Landscape conditions - meaning the conditions in the landscape within 20 kilometres and potentially up to 75 kilometres from a site;*
- *Local conditions - meaning conditions in the area within approximately 1 kilometre from a site;*
- *Neighbourhood conditions - meaning conditions in the area within 400 metres of a site; and,*
- *The site for the development’* (Nillumbik Planning Scheme, 2018a).

This section includes a bushfire assessment at a range of scales:

- The broader landscape scale, for at least 20km around the site;
- The local landscape scale for 1km around and up to 5km from the site;
- The neighbourhood scale up to 400m around the site to identify any risk arising around the site beyond the BAL assessment zone; and
- The site scale, for 100m around the proposed buildings to determine BALs.

Note that the BPA coverage invokes AS 3959-2018, which requires a site assessment of the vegetation and topography up to 100m around a building⁵, for the purposes of determining the applicable BAL construction standard for that building (Standards Australia, 2019).

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⁵ In BMO areas the assessment zone extends up to 150m; and for vulnerable uses and larger developments in a BPA, a 150m assessment zone may also be required (DELWP, 2018).

4.1 Broader landscape assessment

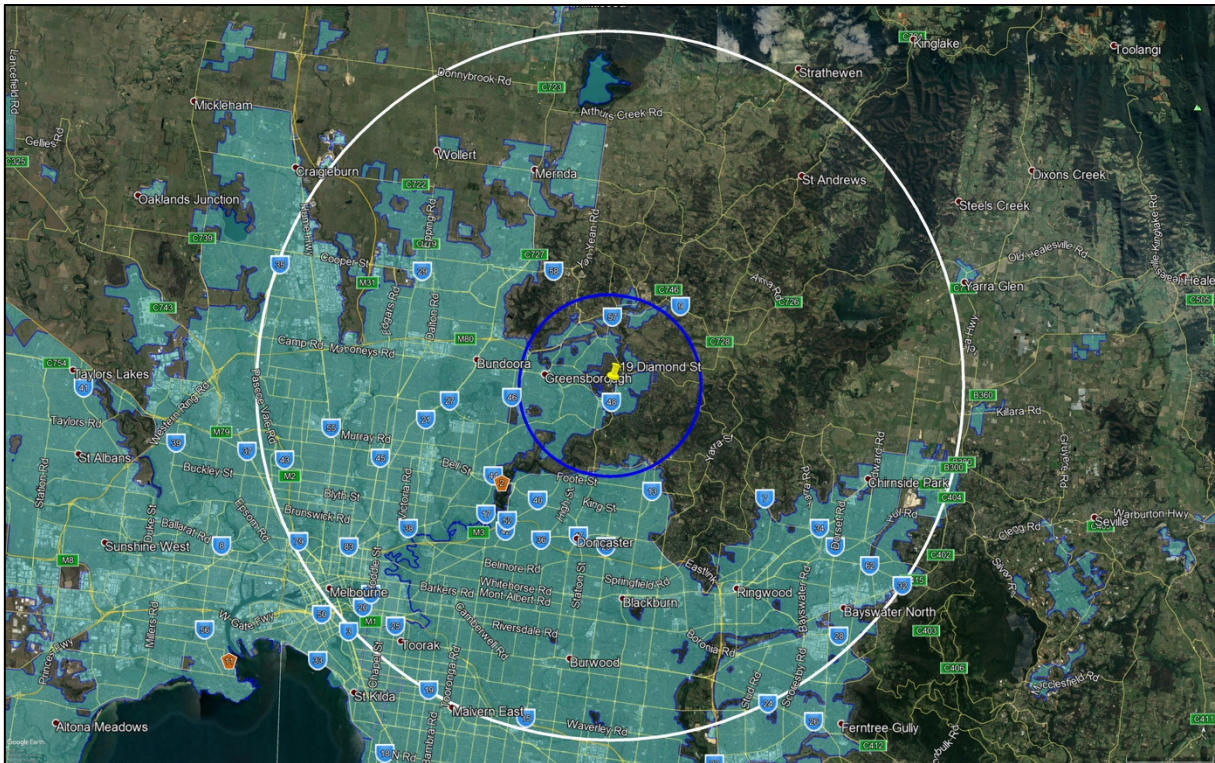


Figure 2 - Broader landscape context.

Figure 2 shows the location of the site and the overall, relatively low risk nature of the landscape around the site. Non-BPA land (i.e. land not designated as bushfire prone) is shown in semi-transparent blue shading. The site is within approximately 20km of the Melbourne CBD and just over half of land within 20km of the site, largely to the west and south, is not designated as a BPA. Within 5km of the site, much of the land to the northwest, west and southwest is also not a BPA (see also Map 1 and Map 2).

4.2 Local and neighbourhood landscape assessment

To assist in assessing landscape risk, four 'broader landscape types', representing different landscape risk levels, are described in the DELWP technical guide *Planning Applications Bushfire Management Overlay*. These are intended to streamline decision-making and support more consistent decisions based on the landscape risk (DELWP, 2017).

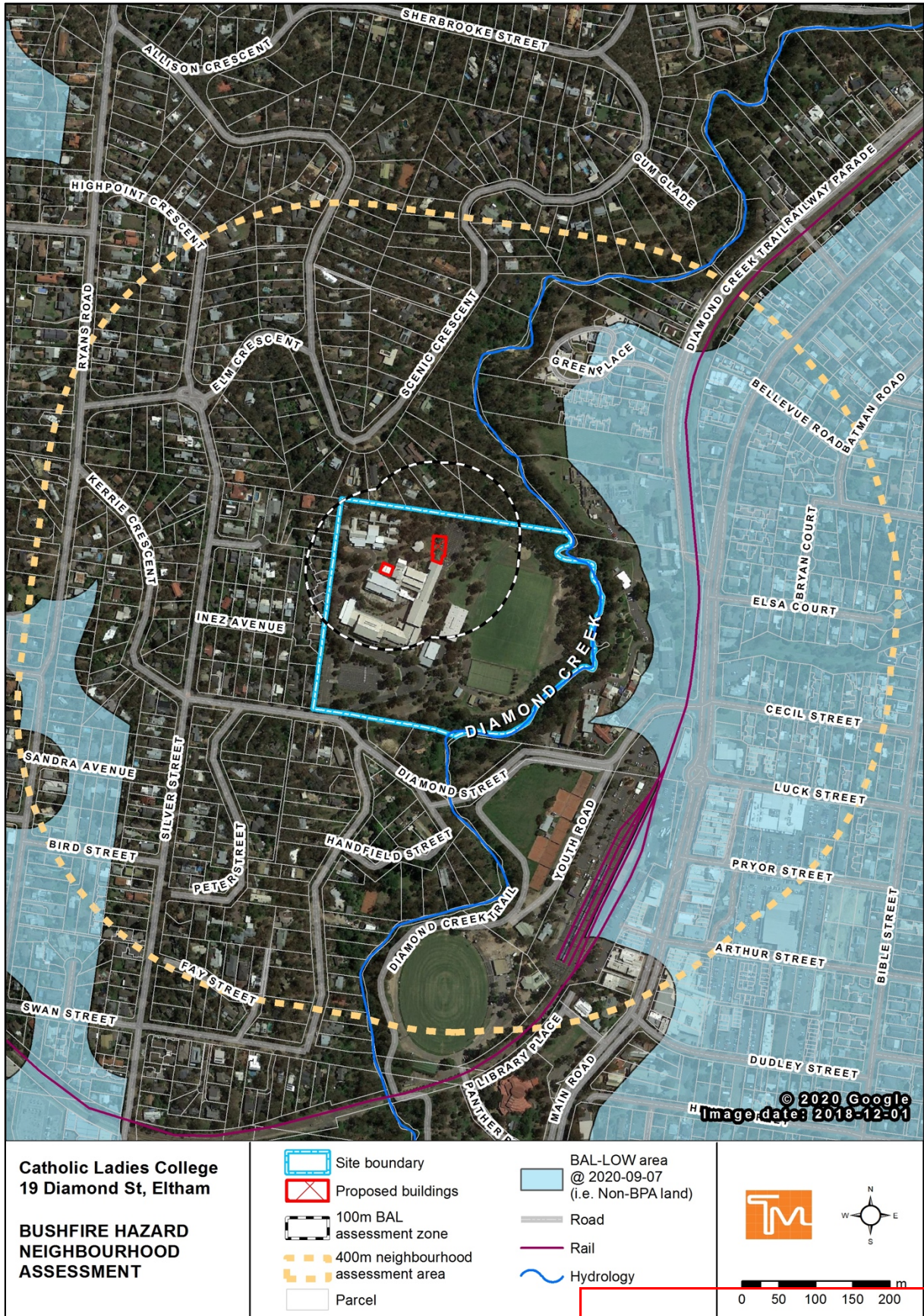
Whilst the site is not in a BMO area, the four typologies are useful landscape descriptors to assist in considering risk. They range from low risk landscapes where there is little hazardous vegetation beyond 150m of a site and extreme bushfire behaviour is not credible, to extreme risk landscapes with limited or no evacuation options, and where fire behaviour could exceed BMO/AS 3959 assumptions (see Table 1).

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Map 2 – Bushfire hazard neighbourhood assessment.

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Table 1 - Landscape risk typologies (from DELWP, 2017).

| Broader Landscape Type 1 | Broader Landscape Type 2 | Broader Landscape Type 3 | Broader Landscape Type 4 |
|--|--|--|---|
| <ul style="list-style-type: none"> • There is little vegetation beyond 150 metres of the site (except grasslands and low-threat vegetation). • Extreme bushfire behaviour is not possible. • The type and extent of vegetation is unlikely to result in neighbourhood-scale destruction of property. • Immediate access is available to a place that provides shelter from bushfire. | <ul style="list-style-type: none"> • The type and extent of vegetation located more than 150 metres from the site may result in neighbourhood-scale destruction as it interacts with the bushfire hazard on and close to a site. • Bushfire can only approach from one aspect and the site is located in a suburban, township or urban area managed in a minimum fuel condition. • Access is readily available to a place that provides shelter from bushfire. This will often be the surrounding developed area. | <ul style="list-style-type: none"> • The type and extent of vegetation located more than 150 metres from the site may result in neighbourhood-scale destruction as it interacts with the bushfire hazard on and close to a site. • Bushfire can approach from more than one aspect. • The site is located in an area that is not managed in a minimum fuel condition. • Access to an appropriate place that provides shelter from bushfire is not certain. | <ul style="list-style-type: none"> • The broader landscape presents an extreme risk. • Fires have hours or days to grow and develop before impacting. • Evacuation options are limited or not available. |
|  | | | |

At a local scale the landscape setting accords best with the lesser risk Landscape Type 2. Apart from the remnant vegetation associated with the Diamond Creek corridor, there is little hazardous vegetation around the school. In the directions from which a bushfire threat typically arises (north, northwest, west or southwest) the landscape is overall, generally developed and comprises mainly low-threat or semi-managed and ‘modified’ vegetation, or non-vegetated land. Much of the land within 1km and 5km of the site is not designated as a bushfire prone area and the nearest area of BMO coverage which denotes higher hazard areas where severe fire behaviour could eventuate, is well over 1km from the site (see Map 1).

The vegetated creek corridor is relatively small and narrow and, therefore, is unlikely to support a large, 100m wide bushfire moving at a quasi-steady-state rate of forward spread directly at buildings, as is envisaged in the AS 3959 methodology (see Map 2).

Access for site occupants is readily available to reliably low threat or non-vegetated areas in the Eltham township area that can provide shelter from bushfire.

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4.3 Site assessments and BAL determinations

4.3.1 Pavilion Learning Space

The following steps have been used to assess the hazard at the site scale and determine the BAL for the Pavilion Learning Centre, in accordance with the simplified (Method 1) procedure of Clause 2.2 in AS 3959.

A. Forest Fire Danger Index (FFDI)

As the site is in a non-alpine area of Victoria, the applicable FFDI is 100.

B. Vegetation classification

Vegetation within the 100m BAL assessment areas around the building been classified in accordance with the AS 3959 methodology. Classified vegetation is vegetation that is deemed hazardous from a bushfire perspective.

The classification system is not directly analogous to Ecological Vegetation Classes (EVCs) but uses a generalised description of vegetation based on the AUSLIG (Australian Natural Resources Atlas: No. 7 - Native Vegetation) classification system. The classification is based on the mature state of the vegetation and the likely fire behaviour that it will generate.

There is no classified vegetation within 100m of the Pavilion Learning Space (see Map 3). All vegetation within 100m around this building comprises excludable and low threat vegetation.

C. Excluded vegetation and non-vegetated areas

Areas of low threat vegetation and non-vegetated areas can be excluded from classification in accordance with Section 2.2.3.2 of AS 3959-2018, if they meet one or more of the following criteria:

- a) *'Vegetation of any type that is more than 100m from the site.*
- b) *Single areas of vegetation less than 1 ha in area and not within 100m of other areas of vegetation being classified vegetation.*
- c) *Multiple areas of vegetation less than 0.25 ha in area and not within 20 m of the site, or each other, or of other areas of vegetation being classified vegetation.*
- d) *Strips of vegetation less than 20 m in width (measured perpendicular to the elevation exposed to the strip of vegetation) regardless of length and not within 20 m of the site or each other, or other areas of vegetation being classified vegetation.*
- e) *Non-vegetated areas, that is, areas permanently cleared of vegetation, including waterways, exposed beaches, roads, footpaths, buildings and rocky outcrops.*
- f) *Vegetation regarded as low threat due to factors such as flammability, moisture content or fuel load. This includes grassland managed in a minimal fuel condition, mangroves and other saline wetlands, maintained lawns, golf courses (such as playing areas and fairways), maintained public reserves and parklands, sporting fields, vineyards, orchards, banana plantations, market gardens (and other non-curing crops), cultivated gardens, commercial nurseries, nature strips and windbreaks' (Standards Australia, 2019).*

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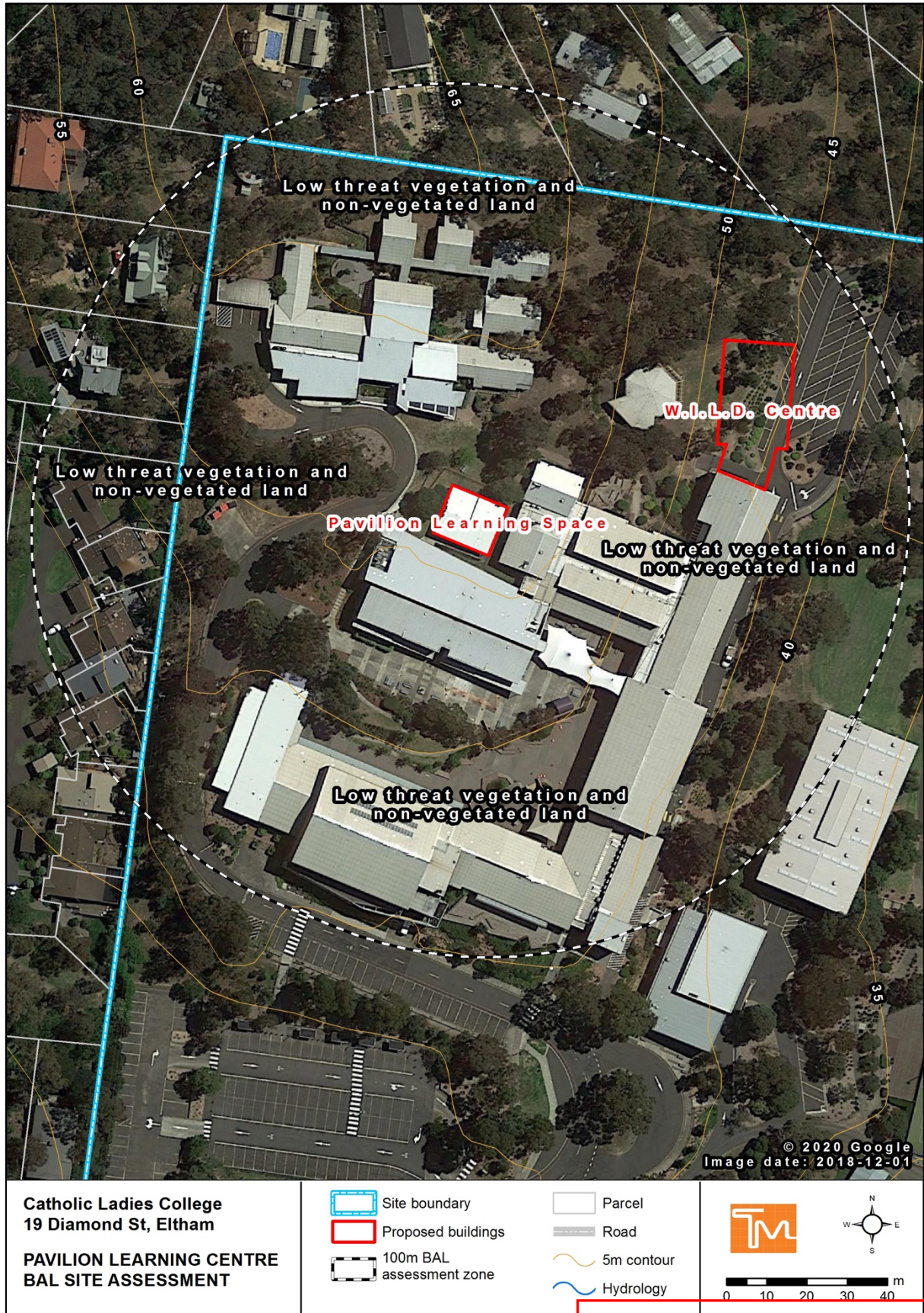
Low-threat areas excluded from classification include the managed and cultivated gardens of the school property and the surrounding properties to the north and west. Non-vegetated areas include the roads, driveways and structures within the 100m site assessment zone (see Map 3). Note that all land within 100m of the Pavilion Learning Space is low-threat or non-vegetated.

D. BAL construction standard

As there is no classifiable vegetation within 100m of the Pavilion Learning Centre, that building must be designed and constructed to the **minimum BAL-12.5** construction standard that applies in a Bushfire Prone Area in Victoria.

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Map 3 - BAL assessment map for the Pavilion Learning Space.

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4.3.2 W.I.L.D. Centre

The detailed (Method 2) procedure has been used to determine the BAL for the Pavilion Learning Centre, in accordance with Appendix B of AS 3959-2018.

A. Forest Fire Danger Index (FDI)

As the site is in a non-alpine area of Victoria, the applicable FFDI is 100.

B. Classified Vegetation

The only classifiable vegetation is an area northeast of the W.I.L.D. building that comprises remnant vegetation associated with the Diamond Creek corridor, which best accords with the Forest group of AS 3959-2018 (see Map 4). Forest vegetation comprises areas with trees to 30m high or taller at maturity, typically dominated by eucalypts, with 30–70% foliage cover (may include understorey ranging from rainforest species and tree ferns to sclerophyllous low trees or shrubs) (Standards Australia, 2019).

The default fuel loads for Forest in AS 3959-2018 are appropriately conservative and precautionary to apply for this vegetation i.e. 25t/ha understorey fuel load and 35t/ha total fuel load.

C. Effective slope under the classified vegetation

The effective slope is the slope of the land under the classified vegetation that will most significantly influence the bushfire attack on a building. Two broad types apply:

- Flat and/or Upslope - land that is flat or on which a bushfire will be burning downhill in relation to the development. Fires burning downhill (i.e. on an upslope) will generally be moving more slowly with a reduced intensity.
- Downslope - land under the classified vegetation on which a bushfire will be burning uphill in relation to the development. As the rate of spread of a bushfire burning on a downslope (i.e. burning uphill towards a development) is significantly influenced by increases in slope, downslopes are grouped into five classes in 5° increments from 0° up to 20°.

There is a 9° effective slope under the Forest vegetation, representing the slope up from the Diamond Creek flats to the edge of the Forest nearest the W.I.L.D. Centre. The site slope is the difference in elevation between the building and the nearest edge of the classified vegetation. This comprises a 7.5° slope (see Map 4). These effective and site slopes have been used consistently for each of the modelled flame width scenarios.

D. Distance from classified vegetation

The distance from the nearest classified vegetation is measured horizontally, to the nearest part of an external wall of the building (or the site in the absence of a detailed building design). For those parts of the building that do not have external walls (including carports, verandas, decks, landings, steps and ramps), the distance is measured to the supporting posts or columns (Standards Australia, 2019).

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The following parts of the building are excluded when determining the distance:

- (a) Eaves and roof overhangs.
- (b) Rainwater and domestic fuel tanks.
- (c) Chimneys, pipes, cooling or heating appliances or other services.
- (d) Unroofed pergolas.
- (e) Sun blinds.

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At its closest, the Forest vegetation will be 37m from the W.I.L.D. building (see Map 4). The setback distances for the varied flame widths modelled in the Method 2 analysis are shown in Table 2.

E. Flame length

The calculated flame length for each scenario in Table 2 is 40.5m based on a calculated 'quasi-steady state' rate of forward spread of 5.6km/h.

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F. Flame width

Five different flame widths have been modelled, representing the theoretical approach of a fire moving directly up from the Diamond Creek towards the building. Under this scenario the flame width would reduce as it approached the building, as shown in Map 4 and detailed in Table 2.

G. Elevation of receiver

As a precaution the calculated elevation of receiver has been applied as shown in Table 2. It is considered this is likely a conservative approach, and without elevation plans for the building a specific and alternative elevation has not been applied.

H. Radiant heat flux

The radiant heat flux (RHF) for each modelled flame scenario is presented in Table 2. Under no scenarios will RHF exceed 12.5kW/m². Peak RHF impacting the proposed building (11.3kW/m²) is generated by the 50m wide flame front, approximately 56m from the building. Vegetation closer to the building is narrower and results in less radiant heat impacting the building.

Table 2 – Summary of the Method 2 calculations.

| Input | |
|------------------------------|--------|
| Vegetation type | Forest |
| FFDI | 100 |
| Understorey fuel load (t/ha) | 25 |
| Total fuel load (t/ha) | 35 |
| Effective slope (°) | 9.0 |
| Site slope (°) | 7.5 |
| Heat of combustion (kJ/kg) | 18,600 |
| Flame emissivity | 0.95 |

| | | | | | |
|---|------------|------------|-------------|-------------|-------------|
| Flame temperature (K) | 1090 | | | | |
| Flame width (m) | 10 | 25 | 50 | 75 | 100 |
| Building-Vegetation setback distance (m) | 41 | 47 | 56 | 65 | 75 |
| Output | | | | | |
| Flame angle (°) | 46.5 | 53.5 | 62.5 | 68.5 | 73.5 |
| Elevation of receiver (m) | 9.3 | 10.1 | 10.6 | 10.3 | 9.5 |
| View factor | 0.0957 | 0.1593 | 0.1924 | 0.1933 | 0.1809 |
| Emissive power | 76.0 | 76.0 | 76.0 | 76.0 | 76.0 |
| Path length | 27.1 | 35.0 | 46.7 | 57.6 | 69.3 |
| Atmospheric transmissivity | 0.812 | 0.794 | 0.773 | 0.758 | 0.746 |
| Flame length (m) | 40.5 | 40.5 | 40.5 | 40.5 | 40.5 |
| Steady state ROS (km/h) | 5.6 | 5.6 | 5.6 | 5.6 | 5.6 |
| Radiant Heat Flux (kW/m²) | 5.9 | 9.6 | 11.3 | 11.1 | 10.3 |

I. BAL construction standard

Based on the 'Method 2' procedure above, as summarised in Table 2 and shown in Map 4, the W.I.L.D Centre building must be designed and constructed to a **minimum BAL-12.5** standard.

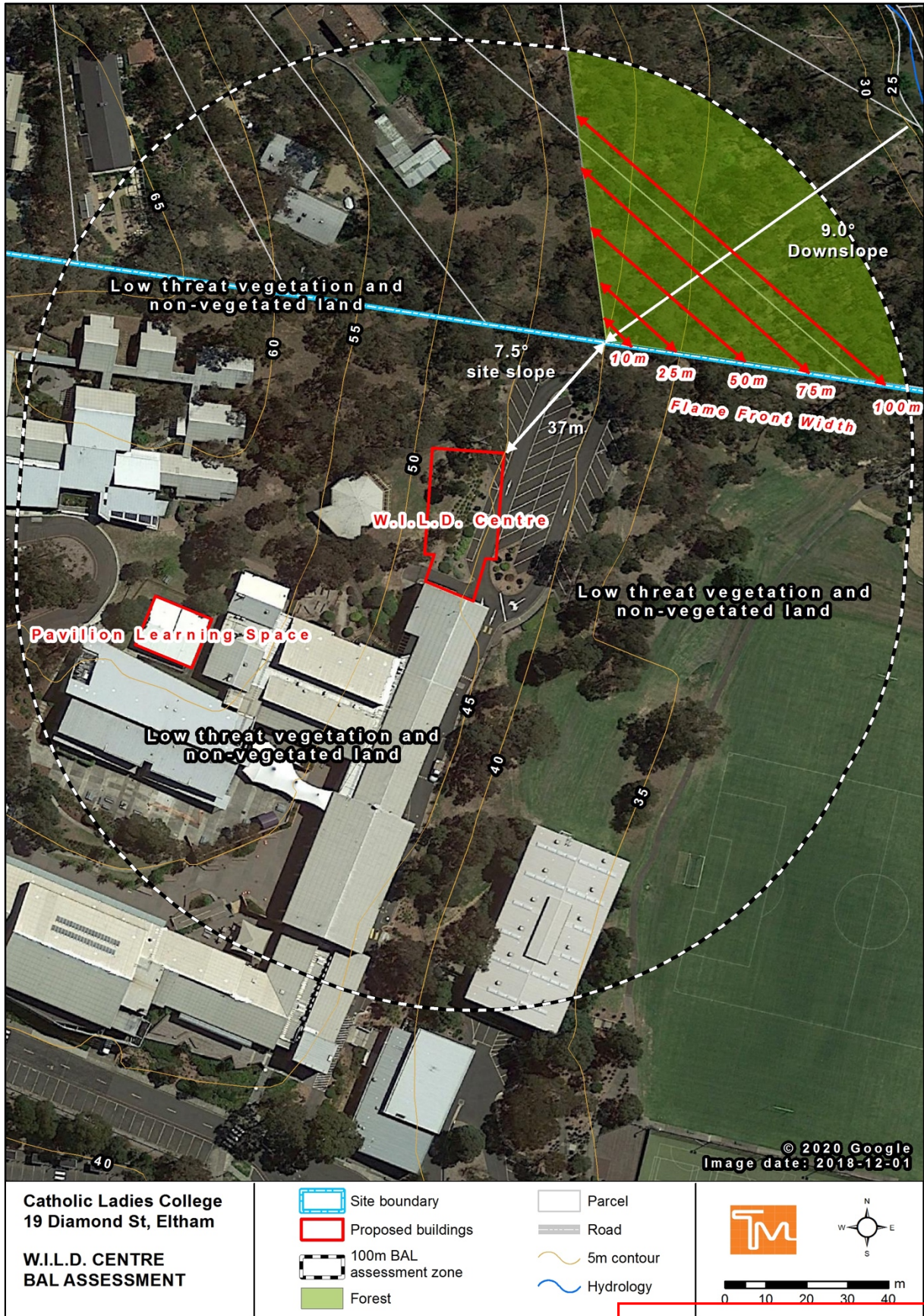
Note that as assumed in the AS 3959 methodology, the scenarios are predicated on a fire moving directly up the slope from the Diamond Creek towards the building, under the influence of a north-easterly wind.

Other possible fire scenarios could eventuate, including the more probable scenario of a fire moving in a southerly direction along the creek corridor under the influence of northerly or north-westerly winds that are typically associated with days of elevated fire danger. A southerly approach along the creek corridor is also possible but is less likely to be associated with elevated fire weather conditions. It is considered that the flame and radiant heat impacts associated with these alternative fire scenarios would not exceed those in the modelled scenarios due largely to the fact that a fire moving along the creek corridor in either direction would be a flanking fire in relation to the building and would not directly expose the building to a 100m wide flame front at a 37m setback, moving at a steady state rate of forward spread directly towards the building.

The modelled scenarios and Method 2 BAL determination is considered appropriately conservative and precautionary, mainly as the the quasi-steady state rate of forward spread applied is not likely to be achieved in the short (approx. 90m) direct fire runs that have been modelled.

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Map 4 – BAL site assessment and analysis map for the W.I.L.D. centre.

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Figure 3 – Forest northeast of the W.I.L.D. building.



Figure 4 – Forest along the Diamond Creek flats to the northeast.

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Figure 5 – Low threat vegetation on the school property northeast of the W.I.L.D. building, between the Forest and the building. The Forest edge can be seen along the left hand border of the image.

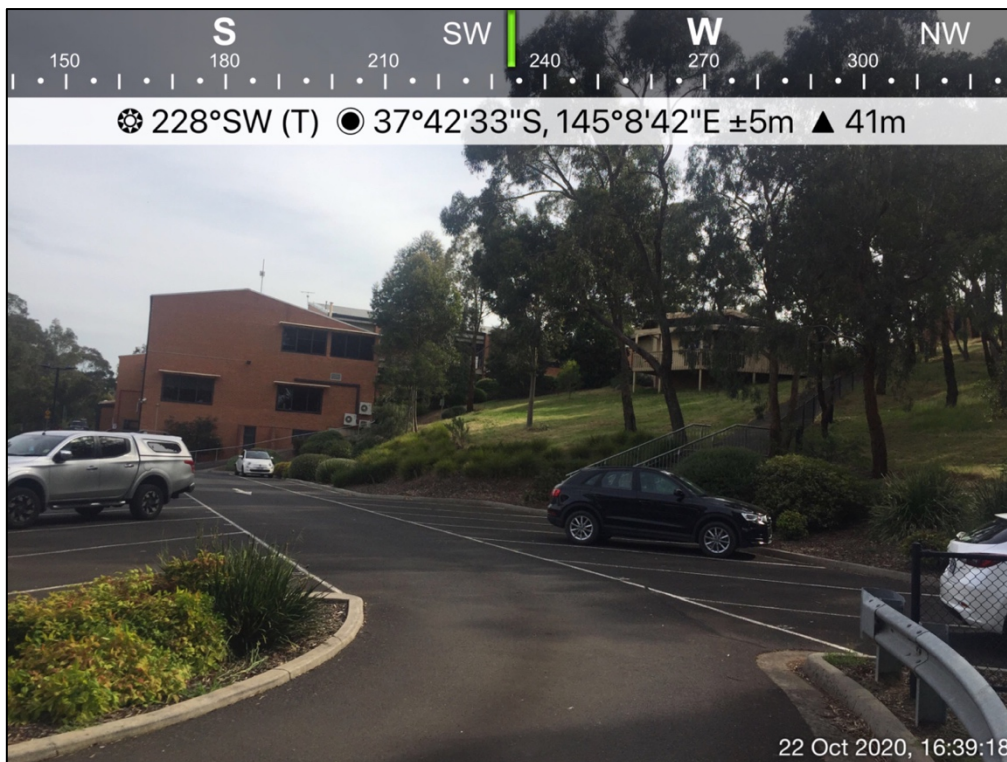


Figure 6 – Looking southwest towards the site of the W.I.L.D. building showing the low threat and non-vegetated nature of the site.

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Figure 7 - Properties to the north of the school are low threat.

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5 Development response

This section identifies how the development can respond to the bushfire risk, including the requirements of Clause 13.02 and the building regulations applicable to construction in a BPA.

5.1 BAL construction standard

As identified in Section 4.3, the W.I.L.D building and Pavilion Learning Centre building must be designed and constructed to the minimum BAL-12.5 construction standard that applies in a Bushfire Prone Area in Victoria.

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5.2 Emergency Management

In addition to the BAL construction standards, as part of an integrated approach to risk management, the school should have an approved Bushfire Emergency Management Plan (BEMP) as is required by the Victorian Registration and Qualification Authority (VRQA). The VRQA requirements to address bushfire risk include the following:

- a) *Schools listed on the Bushfire At-Risk Register must have an EMP that details the school's response to managing bushfire risk including:*
 - *closing the school on days declared Code Red*
 - *on non-Code Red days in the event of bushfire or elevated risk:*
 - *maintain a heightened state of readiness*
 - *ensuring open lines of communication from local emergency services*
 - *be prepared/on standby to enact their EMP by:*
 - *relocating students and staff to a nominated 'shelter-in-place' within the school site that is compliant with relevant regulations, and/or*
 - *evacuating students and staff to an off-site safe area*
 - *responding appropriately to instructions from emergency services.*
- b) *Schools listed on the Bushfire At-Risk Register must inform students, staff and parents/guardians about their specific bushfire preparedness arrangements and train relevant staff in their bushfire preparedness roles.*
There must be records of:
 - *the provision of information on bushfire preparedness policy and procedures to staff (including relief staff) and parents/guardians*
 - *the school's closure arrangements for Code Red days as per the schools EMP*
 - *training of staff with specific roles and responsibilities in preparing for, monitoring and executing emergency bushfire procedures including the effective operation of relevant emergency equipment*
 - *the practice of evacuation drills at least once per term during the October–April bushfire season. School evacuation drills must involve all students and staff moving to either a nominated on-site 'shelter-in-place' or an off-site evacuation point as per the school's EMP.*
- c) *Schools listed on the Bushfire At-Risk Register must maintain a register updated at least once per school term during the October–April bushfire season of bushfire emergency equipment and ensure it is in working order.*

Required evidence to be compliant or maintain compliance:

- an updated register of bushfire emergency equipment, in working order, which may include water supplies and equipment; fire hydrants, hose reels and extinguishers; sprinkler systems, alarms; first aid materials and medical equipment; fire blankets and; communication systems.

- d) Schools listed on the Bushfire At-Risk Register must maintain notices of bushfire evacuation procedures and bushfire emergency contact numbers and locate them appropriately around the school.

Required evidence to be compliant or maintain compliance:

- notices of bushfire evacuation procedures and updated bushfire emergency contact numbers are appropriately located around the school.

School infrastructure:

In relation to bushfire preparedness, and in addition to specified requirements for schools to ensure that their school buildings, facilities and grounds meet all legal standards and fully comply with health and safety requirements, schools, including their campuses and off-site facilities, must meet the following guidelines:

- e) All schools must regularly manage materials that may easily be ignited around buildings and facilities.

Required evidence to be compliant or maintain compliance:

- a schedule for monitoring and removal of materials that may be easily ignited including branches overhanging buildings, debris and rubbish around and under buildings including gutters and dry grass and vegetation
- safe storage of flammable materials.

- f) All schools must regularly monitor emergency access to buildings and grounds.

Required evidence to be compliant or maintain compliance:

- building exits are continuously kept clear of obstructions
- assembly points are designated and have appropriate access to emergency equipment
- there is access to facilities and grounds for emergency vehicles.

- g) Schools listed on the Bushfire At-Risk Register must consult local agencies, where relevant, (the Country Fire Authority, Metropolitan Fire and Emergency Services Board, local Council) on their bushfire preparedness and compliance with local bushfire regulation of buildings, facilities and grounds.

Required evidence to be compliant or maintain compliance:

- a record of annual visitation or consultation with relevant local agencies.

- h) Schools listed on the Bushfire At-Risk Register with an on-site 'shelter in place' must consult with the relevant agency on the building's compliance with relevant regulations.

Required evidence to be compliant or maintain compliance:

- documentation certifying that any on-site 'shelter-in-place' is compliant with relevant agency minimum standards (VRQA, 2017).

The Department of Education and Training (DET) also requires every school, regardless of whether they are listed on the Bushfire At-Risk Register (BARR), to nominate a Shelter-in-Place (SIP) building or buildings on the school site that can provide a last resort, temporary shelter option until either an emergency has passed or people can be moved to an appropriate off-site location.

A number of performance requirements apply for SIP buildings, including the following additional requirements for schools that are at risk of bushfire or grassfire. The additional requirements stipulate that the SIP must:

- *‘Be positioned as far away as practicable from locations most at risk of bushfire (for example, forests, bushland and trees) both within the school and beyond the school boundary*
- *Have adequate building surroundings that allow safe evacuation from the SIP to the next safe shelter option identified in the EMP*
- *Not present an unacceptably high risk of catching fire*
- *Not provide an unacceptably high level of toxic smoke into the SIP building or SIP exit or evacuation routes*
- *Minimise flammable elements including combustible material within 10 metres of the building, such as plastic equipment, rubbish skips, recycling bins, wood piles, gas cylinders and plants with the potential to produce localised flame contact with any vulnerable part of the building and*
- *Have access to a static water supply, that is, properly maintained hydrant, booster systems or tank water supply that ensures fire crews have adequate means to defend the SIP if they can attend*

Where the SIP does not meet these criteria, the school's EMP must include alternate bushfire safety actions within their bushfire or grassfire response procedure, developed in consultation with the local fire brigade’ (DET, 2020).

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5.3 Clause 13.02-1S Bushfire Planning

The applicable strategies stipulated in Clause 13.02, are detailed in the following sub-sections, and a summary response is provided about how the proposed development responds to the relevant strategies.

5.3.1 Protection of human life strategies

Priority must be given to the protection of human life.

Prioritising the protection of human life over all other policy considerations

The site is in a relatively low risk location. The protection of human life can be prioritised by application of the existing building regulations for construction in a BPA i.e. designing and constructing the buildings to the specified BAL construction standard. This will be supplemented by the emergency management planning and processes for schools in a bushfire prone area.

Directing population growth and development to low risk locations and ensuring the availability of, and safe access to, areas where human life can be better protected from the effects of bushfire.

As identified in Section 4, the site is in a relatively low risk landscape. Therefore, if the buildings are built to an appropriate BAL as specified in this report, and the emergency

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management planning required for schools in a bushfire prone area is compiled with, then the risk can be deemed to be acceptable.

The nearest *lowest* risk locations are the urban-residential and township areas of Eltham that are easily accessible immediately to the east and not in the BPA (see Map 1 and Map 2).

Reducing the vulnerability of communities to bushfire through consideration of bushfire risk in decision-making at all stages of the planning process

This report provides the basis for incorporating bushfire risk into decision making associated with planning development in the precinct.

5.3.2 Bushfire hazard identification and assessment strategies

The bushfire hazard must be identified and an appropriate risk assessment be undertaken.

Applying the best available science to identify vegetation, topographic and climatic conditions that create a bushfire hazard.

This report identifies the hazard in accordance with the commonly accepted methodologies of AS 3959-2018 and, as appropriate, additional guidance provided in *Planning Advisory Note 68 Bushfire State Planning Policy Amendment VC140* (DEWLP, 2018).

The type and extent of (hazardous) vegetation within 100m around the buildings has been identified and classified into AS 3959-2018 vegetation groups. Classification was based on the anticipated long-term state of the vegetation, aerial imagery, site assessment, published guidance on vegetation assessment for bushfire purposes and experience with the fuel hazard posed by the vegetation types that occur within the region.

GIS analysis of publicly available 1m contour data for the area was undertaken and supported by onsite assessment of slopes.

In relation to climatic conditions and fire weather, the AS 3959-2018 default FFDI 100/GFDI 130 benchmark used in the Victorian planning and building system, has been applied as identified in Section A.

Considering the best available information about bushfire hazard including the map of designated bushfire prone areas prepared under the Building Act 1993 or regulations made under that Act.

The extent of BPA coverage has been considered (see Map 1 and Map 2). This is based on the most recent BPA mapping for the area, which was published 7th September 2020.

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Applying the Bushfire Management Overlay in planning schemes to areas where the extent of vegetation can create an extreme bushfire hazard.

As shown in Map 1, no part of the site or the land for at least 1km from it, is covered by the BMO.

Considering and assessing the bushfire hazard on the basis of:

- ***Landscape conditions - meaning the conditions in the landscape within 20 kilometres and potentially up to 75 kilometres from a site;***
- ***Local conditions - meaning conditions in the area within approximately 1 kilometre from a site;***
- ***Neighbourhood conditions - meaning conditions in the area within 400 metres of a site; and***
- ***The site for the development.***

The hazard has been assessed and described at the landscape, local, neighbourhood and site scales (see Section 4).

Consulting with emergency management agencies and the relevant fire authority early in the process to receive their recommendations and implement appropriate bushfire protection measures.

The author is not aware of any consultation with CFA and it is not considered necessary as no referral trigger or requirement for consultation applies.

Ensuring that strategic planning documents, planning scheme amendments, planning permit applications and development plan approvals properly assess bushfire risk and include appropriate bushfire protection measures.

DELWP advisory and practice notes, Clause 13.02, and the building regulations invoked by the BPA coverage, including the bushfire hazard landscape assessment, specify the general requirements and standards for assessing the risk. These have been used in this report as appropriate and bushfire protection measures have been identified commensurate with the risk.

Not approving development where a landowner or proponent has not satisfactorily demonstrated that the relevant policies have been addressed, performance measures satisfied or bushfire protection measures can be adequately implemented.

If the objectives and strategies of Clause 13.02 are successfully implemented, as discussed in this report, and the building regulations for construction in a BPA are complied with, then the risk can be deemed to be acceptably mitigated such that development can proceed.

The CFA specify that areas where development should not proceed could include:

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- *'Isolated settlements where the size and/or configuration of the settlements will be insufficient to modify fire behaviour and provide protection from a bushfire.*
- *Where bushfire protection measures will not reduce the risk to an acceptable level.*
- *Where evacuation (access) is severely restricted.*
- *Where the extent and potential impact of required bushfire protection measures may be incompatible with other environmental objectives or issues, e.g. vegetation protection, land subject to erosion or landslip' (CFA, 2015).*

None of these criteria or characteristics are applicable to the site.

5.3.3 Settlement planning strategies

As the development does not comprise settlement planning these strategies are not applicable and are listed below but a response is not provided.

Directing population growth and development to low risk locations, being those locations assessed as having a radiant heat flux of less than 12.5 kilowatts/square metre under AS 3959-2009 Construction of Buildings in Bushfire-prone Areas (Standards Australia, 2009).

Ensuring the availability of, and safe access to, areas assessed as a BAL-LOW rating under AS 3959-2009 Construction of Buildings in Bushfire-prone Areas (Standards Australia, 2009) where human life can be better protected from the effects of bushfire.

Ensuring the bushfire risk to existing and future residents, property and community infrastructure will not increase as a result of future land use and development.

Achieving no net increase in risk to existing and future residents, property and community infrastructure, through the implementation of bushfire protection measures and where possible reduce bushfire risk overall.

Assessing and addressing the bushfire hazard posed to the settlement and the likely bushfire behaviour it will produce at a landscape, settlement, local, neighbourhood and site scale, including the potential for neighbourhood-scale destruction.

Assessing alternative low risk locations for settlement growth on a regional, municipal, settlement, local and neighbourhood basis.

Not approving any strategic planning document, local planning policy, or planning scheme amendment that will result in the introduction or intensification of development in an area that has, or will on completion have, more than a BAL-12.5 rating under AS 3959-2009'

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5.3.4 Areas of high biodiversity conservation value

Ensure settlement growth and development approvals can implement bushfire protection measures without unacceptable biodiversity impacts by discouraging settlement growth and development in bushfire affected areas that are of high biodiversity conservation value

There are no apparent additional biodiversity impacts associated with the findings of this bushfire assessment.

5.3.5 Use and development control in a Bushfire Prone Area

Clause 13.02 requires that *'In a bushfire prone area designated in accordance with regulations made under the Building Act 1993, bushfire risk should be considered when assessing planning applications for the following uses and development:*

- *Subdivisions of more than 10 lots.*
- *Accommodation.*
- *Child care centre.*
- *Education centre.*
- *Emergency services facility.*
- *Hospital.*
- *Indoor recreation facility.*
- *Major sports and recreation facility.*
- *Place of assembly.*
- *Any application for development that will result in people congregating in large numbers'* (Nillumbik Planning Scheme, 2018a).

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It further states that:

'When assessing a planning permit application for the above uses and development:

- *Consider the risk of bushfire to people, property and community infrastructure.*
- *Require the implementation of appropriate bushfire protection measures to address the identified bushfire risk.*
- *Ensure new development can implement bushfire protection measures without unacceptable biodiversity impacts'* (Nillumbik Planning Scheme, 2018a).

The risk has been appropriately assessed and considered as identified in this report. The bushfire protection measures of applying an appropriate BAL construction standard, supplemented by the emergency management planning and processes, can be implemented without any unacceptable, biodiversity impacts.

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6 Conclusion

This report has assessed the bushfire hazard for the development in accordance with Clause 13.02 in the Nillumbik Planning Scheme and the AS 3959-2018 methodology as invoked by the Victorian building regulations.

The site is in a designated BPA but no part of the site, or land within 1km of it, is covered by the BMO.

The landscape is one of lesser bushfire risk. Bushfire behaviour can reasonably be expected to be within AS 3959-2018 presumptions and design parameters.

Accordingly, it is considered that the risk can be mitigated to an acceptable level and that the proposed development is appropriate, if the specified BAL-12.5 construction standard for both the Pavilion Learning Centre and the W.I.L.D. building are applied. This will be supplemented by the emergency management planning required for schools in a bushfire prone area.

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7 Appendix 1 - BALs explained

| Bushfire Attack Level (BAL) | Risk Level | Construction elements are expected to be exposed to... | Comment |
|-----------------------------|--|---|--|
| BAL-Low | VERY LOW: There is insufficient risk to warrant any specific construction requirements but there is still some risk. | No specification. | At 4kW/m ² pain to humans after 10 to 20 seconds exposure. Critical conditions at 10kW/m ² and pain to humans after 3 seconds. Considered to be life threatening within 1 minute exposure in protective equipment. |
| BAL-12.5 | LOW: There is risk of ember attack. | A radiant heat flux not greater than 12.5 kW/m ² | At 12.5kW/m ² standard float glass could fail and some timbers can ignite with prolonged exposure and piloted ignition. |
| BAL-19 | MODERATE: There is a risk of ember attack and burning debris ignited by windborne embers and a likelihood of exposure to radiant heat. | A radiant heat flux not greater than 19 kW/m ² | At 19kW/m ² screened float glass could fail. |
| BAL-29 | HIGH: There is an increased risk of ember attack and burning debris ignited by windborne embers and a likelihood of exposure to an increased level of radiant heat. | A radiant heat flux not greater than 29 kW/m ² | At 29kW/m ² ignition of most timbers without piloted ignition after 3 minutes exposure. Toughened glass could fail. |
| BAL-40 | VERY HIGH: There is a much increased risk of ember attack and burning debris ignited by windborne embers, a likelihood of exposure to a high level of radiant heat and some likelihood of direct exposure to flames from the fire front. | A radiant heat flux not greater than 40 kW/m ² | At 42kW/m ² ignition of cotton fabric after 5 seconds exposure (without piloted ignition). |
| BAL- FZ (i.e. Flame Zone) | EXTREME: There is an extremely high risk of ember attack and a likelihood of exposure to an extreme level of radiant heat and direct exposure to flames from the fire front. | A radiant heat flux greater than 40 kW/m ² | At 45kW/m ² ignition of timber in 20 seconds (without piloted ignition). |

Source: derived from AS 3959-2018 (Standards Australia, 2019).

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