



Bushfire Development Report

for the Joint Use Development and Regional Cricket Hub
at Catherine McAuley College, Coolock Campus
1 St Vincents Road, Junortoun VIC 3551

Report prepared for
Clarke Hopkins Clarke Architects

November 2019

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Terramatrix project code: ClarkeHopkinsClarke-2019-01 Cl1302_L_BMO-Junortoun

Cover image: Looking south-east across the oval.

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Version Control

Version	Date issued	Comments	Issued by
1.0	2019-11-22	Bushfire Development Report (BDR) to client	Jon Boura

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1 Summary

A Joint Use Development and Regional Cricket Hub (JUDRCH) is being constructed at Catherine McAuley College, Coolock Campus at 1 St Vincents Road, Junortoun VIC 3551. The JUDRCH is to be a state-of-the-art junior sporting hub, supporting educational use during school hours and community use outside of school hours.

The site is in the Special Use Zone - Schedule 1 (SUZ1) and is in a designated Bushfire Prone Area (BPA). The property, but not the development site, is partially affected by the Bushfire Management Overlay (BMO). Clause 13.02 *Bushfire* of the Greater Bendigo Planning Scheme requires that bushfire risk be considered in the planning decision; and, as a 'Specific Use Bushfire Protected Building', the JUDRCH must be built to the applicable Bushfire Attack Level (BAL) construction level.

Key points:

- *The site is within a designated BPA, and the BMO affects an area in the south-west of the property.*
- *The JUDRCH is to be sited in the lower hazard portion of the site, outside of the BMO.*
- *The site is on the Mclvor Highway, approximately 3km east of the low threat urban area of East Bendigo, which is not in a BPA.*
- *The landscape scale bushfire risk is considered to best accord with the BMO Broader Landscape Type 3, with the potential for a large fire to approach through Woodland from either the north or south-west.*
- *There is easy egress to a place of safety from bushfire within the urban area at East Bendigo or, as a last resort, at the Neighbourhood Safer Place located at Lords Raceway, immediately adjacent to the site.*
- *The JUDRCH represents intensification of development in a BPA and as such Clause 13.02 Bushfire of the Greater Bendigo Planning Scheme requires bushfire to be considered in assessing the planning permit application.*
- *As an educational facility in the BPA, the JUDRCH is a 'Specific Use Bushfire Protected Building' and will need to be constructed to a Bushfire Attack Level (BAL) determined under AS 3959-2018.*
- *Woodland on flat ground to the south-east and north comprises a bushfire hazard that is being considered in the development of the JUDRCH.*
- *The JUDRCH is to be sited a minimum of 33m from the classified Woodland and constructed to a BAL-12.5 construction standard.*
- *The use of the JUDRCH should be incorporated into the Emergency Management Plan for the site.*
- *Water supply and emergency service access requirements for bushfire should be adequately met by the requirements for structural fire safety.*

2 Introduction

This Bushfire Development report has been prepared for Clarke Hopkins Clarke Architects, to assess how the proposed Joint Use Development and Regional Cricket Hub (JUDRCH) at Catherine McAuley College, Coolock Campus at 1 St Vincents Road, Junortoun VIC 3551 can respond to the bushfire risk and the applicable Victorian planning and building controls that relate to bushfire. In particular, the report assesses the bushfire risk in accordance with and in response to, the objective and applicable strategies of the Planning Policy Framework (PPF) at Clause 13.02 *Bushfire* in the Greater Bendigo Planning Scheme (Greater Bendigo Planning Scheme, 2018a).

The JUDRCH is to be a state-of-the-art junior sporting hub, supporting educational use during school hours and community use outside of school hours. The facility will include:

- Changerooms and amenities x 10
- Umpires changerooms x 2
- External viewing area
- Storage space
- Social space
- First Aid room
- Kitchen/kiosk
- Six lane cricket training area
- Amenities
- Office administration area
- Basketball courts x 2

The site is in the Special Use Zone - Schedule 1 (SUZ1) and is in a designated Bushfire Prone Area (BPA). The property, but not the development site, is partially affected by the Bushfire Management Overlay (BMO) (see Map 1). 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).

This report assesses the bushfire hazard and identifies how the proposed JUDRCH can appropriately mitigate any bushfire risk and respond to and comply with the applicable bushfire planning and building controls. The report 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, 2018a);
- *Local Planning for Bushfire Protection*, Planning Practice Note 64 (DELWP, 2015a);
- *Planning Permit Applications – Bushfire Management Overlay*, Technical Guide (DELWP, 2017);
- AS 3959-2018 *Construction of buildings in bushfire prone areas* (Standards Australia, 2018); and
- Country Fire Authority (CFA) guidelines for bushfire hazard landscape assessment (CFA, 2018) and land use planning (CFA, 2015).

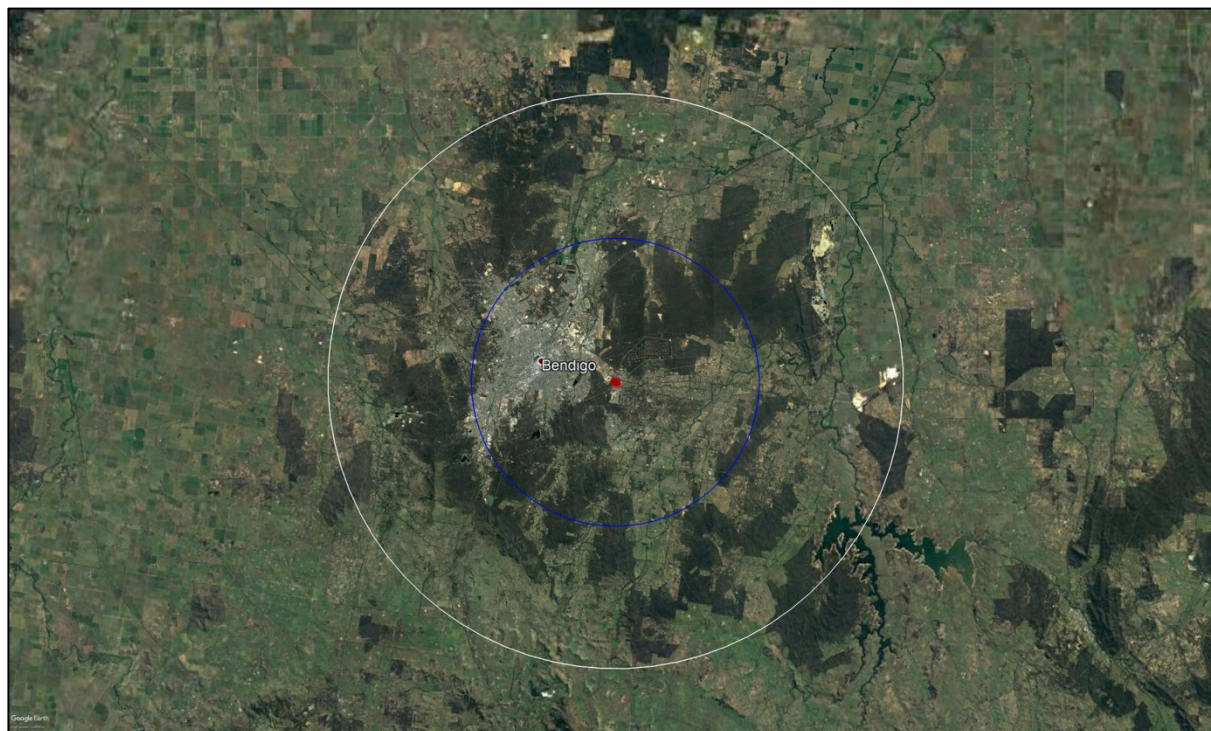
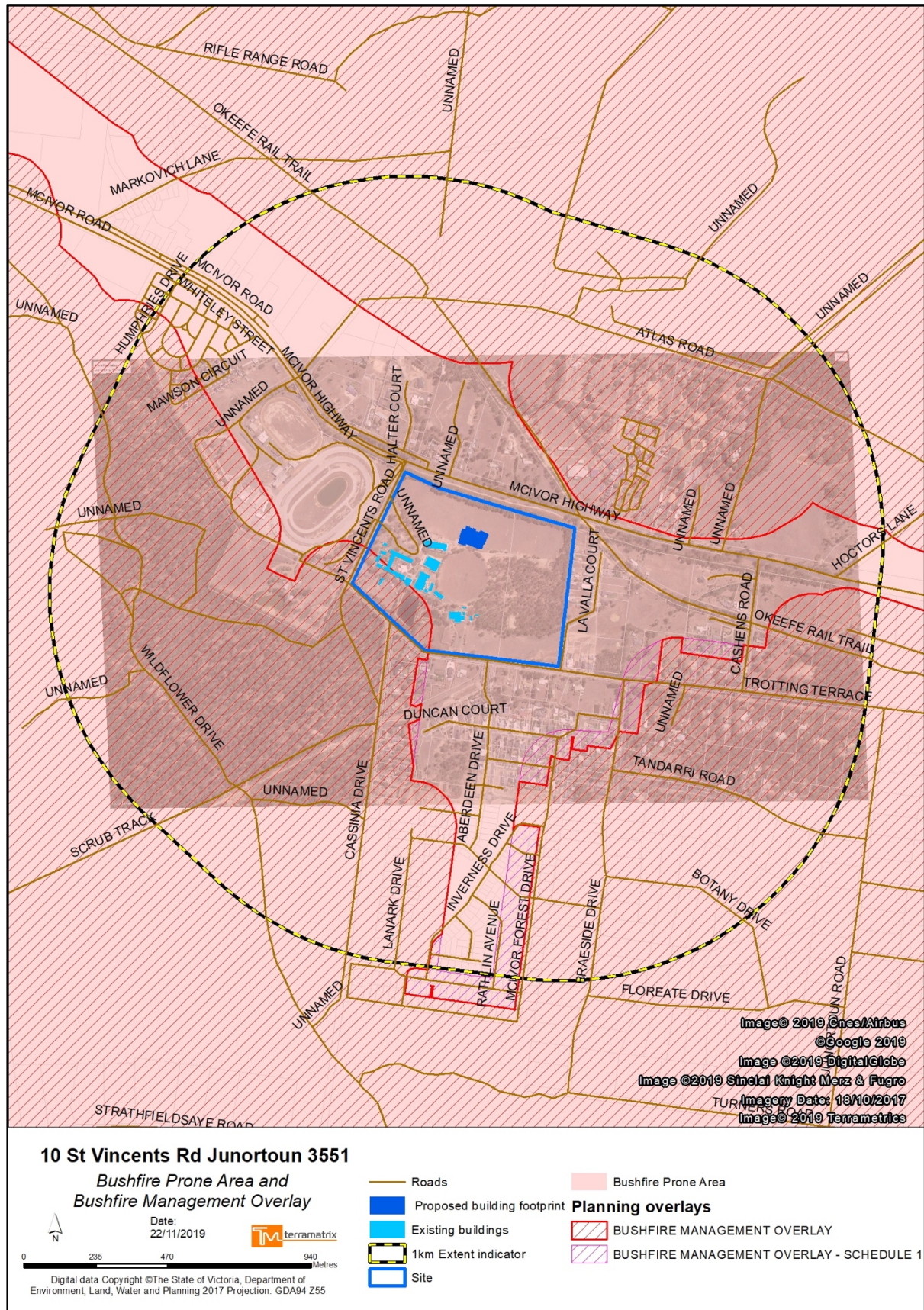


Figure 1 – Catherine McAuley College, Coolock campus (in red outline, 10km buffer in blue outline and 20km buffer in white outline)(©2018 Google, Image ©2019 CNES/Airbus & 2019 Maxa Technologies, Imagery date: 2019-02-22).



Map 1 – BPA and BMO coverage of the site and surrounding area.

3 Bushfire planning and building controls

This section summarises the applicable planning and building controls that relate to bushfire. Section 5 describes how planning and design for the proposed development can respond to and comply with the controls.

3.1 Clause 13.02 Bushfire

Clause 13.02 has the objective '*To strengthen the resilience of settlements and communities to bushfire through risk based planning that prioritises the protection of human life*' (Greater Bendigo 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.

Clause 13.02 requires priority to 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*' (Greater Bendigo Planning Scheme, 2018a).

Key strategies are stipulated in Clause 13.02, which require that strategic planning documents, planning scheme amendments and development plan approvals 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.

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' (Greater Bendigo Planning Scheme, 2018a).

This study assesses the hazard and identifies the bushfire protection measures that will be required for future development of the JUDRCH. It is considered that development can appropriately prioritise the protection of human life and meet the objectives of Clause 13.02, including by ensuring that the siting of the JUDRCH will result in an exposure to RHF not exceeding 12.5kW/m^2 , which is commensurate with a BAL-12.5 construction standard.

A detailed response to the strategies in Clause 13.02 is provided in Section 6.

3.2 Clause 71.02-3 Integrated Decision Making

Clause 71.02-3 states that planning and responsible authorities should endeavour to integrate policies and balance conflicting objectives in favour of net community benefit and sustainable development. However, in bushfire affected areas, the protection of human life must be prioritised over all other policy considerations (Greater Bendigo Planning Scheme, 2018d).

3.3 Local Planning Policy Framework (LPPF¹)

Clause 21.01 *Municipal Profile* in Greater Bendigo's Municipal Strategic Statement (MSS), highlights that Bendigo is the 'city in the forest' with an urban area that is virtually encircled by box ironbark forest that is both publicly and privately owned (Greater Bendigo Planning Scheme, 2016a).

Bushfire is identified as a key environmental risk at Clause 21.02 *Key Issues and Influences* (Greater Bendigo Planning Scheme, 2018e).

Clause 22.01 *Development at the Urban-Forest Interface Policy*, which requires preparation of a fire management plan, applies to land in the General Residential Zone, Low Density Residential Zone and proposed new development areas that abuts forested areas (Greater Bendigo Planning Scheme, 2016b) and does not appear to be applicable to the JUDRCH.

3.4 Bushfire Management Overlay (BMO)

The purposes of the BMO, which affects a small area in the south-west corner of the site (see Map 1), are:

- *'To implement the Municipal Planning Strategy and the Planning Policy Framework.*
- *To ensure that the development of land prioritises the protection of human life and strengthens community resilience to bushfire.*
- *To identify areas where the bushfire hazard warrants bushfire protection measures to be*

¹ It is noted that the LPPF will be translated into the PPF as the Municipal Planning Strategy, as proposed by VC148 (DELWP, 2018b). However, at the time of preparing this report the LPPF and MSS are components of the Greater Bendigo Planning Scheme.

implemented.

- *To ensure development is only permitted where the risk to life and property from bushfire can be reduced to an acceptable level’ (Greater Bendigo Planning Scheme, 2018b).*

The BMO largely applies to patches of treed vegetation greater than 4ha in size, where head fire intensity has been modelled to be 30,000kW/m or more. It also extends over land 150m around those areas, based on research into house loss from bushfires which has found that 92% of house loss occurs within 150m of the bushfire hazard (DTPLI, 2013).

The BMO requires a planning permit for all subdivision of land, and buildings and works associated with the following uses: accommodation (including a dependent person’s unit), child care or education centre, hospital, industry, leisure and recreation, office, place of assembly, retail premises, service station, timber production or warehouse. Some exemptions apply.

An application must be accompanied by:

- *A bushfire hazard site assessment*, including a plan that describes the bushfire hazard within 150m of the site in accordance with the site assessment methodology of AS 3959-2009 Construction of buildings in bushfire-prone areas and Clause 44.06;
- *A bushfire hazard landscape assessment*, including a plan that describes the bushfire hazard of the general locality more than 150m from the site; and
- *A bushfire management statement*, detailing how the development responds to the bushfire risk and the requirements and objectives of Clauses 44.06 and 53.02.

Clause 53.02 *Bushfire Planning* applies to BMO applications and contains:

- **Objectives:** An objective describes the outcome that must be achieved in a completed development.
- **Approved measures:** An approved measure meets the objective.
- **Alternative measures:** An alternative measure may be considered where the responsible authority is satisfied that the objective can be met. The responsible authority may consider other unspecified alternative measures.
- **Decision guidelines:** The decision guidelines set out the matters that the responsible authority must consider before deciding on an application, including whether any proposed alternative measure is appropriate (Greater Bendigo Planning Scheme, 2018c).

As the JUDRCH is not located within the BMO, a planning response pursuant to Clause 44.06 is not required.

3.5 Bushfire Prone Area (BPA)

All of the site, and the surrounding landscape for approximately 3km to the west and for many kilometres in all other directions, is designated as bushfire prone (see Map 3). 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.

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 3² buildings, 'Specific Use Bushfire Protected Buildings'³ and associated class 10A buildings⁴ 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, 2018) is 'deemed-to-satisfy' the performance requirement⁵.

In a BPA, applicable buildings must 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 A for an explanation of each BAL).

As the JUDRCH is part of an educational facility and will be used for educational purposes, we anticipate it will be deemed to be a 'Specific Use Bushfire Protected Building' and will need to be constructed to a BAL.

² 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.

³ 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.

⁴ Class 10a buildings are defined in the BCA as non-habitable buildings including sheds, carports, and private garages.

⁵ The NASH Standard - *Steel Framed Construction in Bushfire Areas* is also deemed to satisfy the performance requirement for Class 1 dwellings and associated Class 10a buildings and decks.

3.6 Other development controls

3.6.1 Zoning

The Special Use Zone and Schedule 1 (Greater Bendigo Planning Scheme, 2006) provides for areas to be used for private educational and religious institutions. The educational use of the proposed JUDRCH facilities makes them 'Specific Use Bushfire Protected Buildings' that will require a BAL under the Building Regulations.

3.6.2 Overlays

The overlays that apply are listed below and a summary is provided of their implications for bushfire protection measures for the JUDRCH.

Environment Significance Overlay – Schedule 1 (ESO1)

The ESO1 *Watercourse Protection* (Greater Bendigo Planning Scheme, 2008) applies to a narrow strip adjacent to the northern boundary of the site. It has no implications for bushfire risk or protection measures for the proposed development.

Land Subject to Inundation Overlay – Schedules 1 and 2 (LSIO1, LSIO2)

The LSIO1 *Flooding from Waterways (Depths up to and including 350 millimetres)* and LSIO 2 *Flooding from Waterways (Depths greater than 350 millimetres)* (Greater Bendigo Planning Scheme, 2018f, 2018g) apply to the watercourses on the property. Neither Schedule has implications for bushfire risk or protection measures for the proposed development.

Vegetation Protection Overlay – Schedule 2

The VPO2 *Significant Vegetation* affects an area of Woodland within the property. VPO2 has the objective:

- *'To protect remnant native vegetation and habitat, including understorey, and facilitate natural revegetation.*
- *To promote the maintenance of ecological processes and genetic diversity.
To encourage maintenance and development of linkages between existing remnant vegetation.*
- *To recognise the catchment-wide land and water management benefits resulting from vegetation retention.*
- *To maintain and enhance Bendigo's scenic and recreational landscape assets'* (Greater Bendigo Planning Scheme, 2014).

A permit would be required to remove, destroy or lop native vegetation. However, the JUDRCH is sited sufficiently far from the Woodland so that there is no requirement to manage vegetation to achieve a BAL-12.5 rating.

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’* (Greater Bendigo Planning Scheme, 2018b).

This section includes a bushfire hazard assessment at:

- The broader landscape scale, for at least 20km around the site (see Figure 1 and Map 3);
- The local and neighbourhood scale extending up to 1km from the site (see Map 4);
- The site scale, for 100m around the site and development envelopes (see Map 2).

4.1 Vegetation

Vegetation within a 100m assessment zone around the site and individual development areas, has been classified in accordance with the AS 3959-2018 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 largely based on the structural characteristics of the vegetation at maturity, but the key determinant should be the likely fire behaviour that it will generate.

The classification is based on the current and likely future state of the vegetation.

4.1.1 Woodland

Areas of remnant treed vegetation to the south-east of the JUDRCH and along the northern boundary of the campus, have been classified as Woodland. Woodland is defined as *‘trees 10-30m tall, 10–30% foliage cover dominated by eucalypts (and/or callitris) with a prominent grassy understorey. May contain isolated shrubs’* (Standards Australia, 2018).

DELWP mapping of Ecological Vegetation Classes (EVCs)⁶ identifies that remnant vegetation on the site and within the 400m local assessment area around it, is dominated by two EVCs:

⁶ Extant DELWP EVC mapping has been undertaken at state-wide scale and is based on a modelled extent of native vegetation. It may not therefore, accurately represent actual EVCs present in the study area. The site visit and hazard

- Grassy Woodland (EVC No. 175); and
- Grassy Woodland/Alluvial Terraces Herb-rich Woodland mosaic (EVC 76).

Map 2 comprises a Bushfire Hazard Site Assessment plan, in accordance with the BMO application requirements, which shows the 150m assessment area around proposed building envelopes.



Figure 2 –Looking east parallel to the northern boundary of the campus, showing strip of Woodland.

assessment confirmed, however, that any more accurate, site specific mapping of native vegetation will not change the bushfire hazard assessment.



Figure 3 –Woodland south-east of the proposed site for the JUDRCH.



Figure 4 – Looking west through classified Woodland, to the south of the proposed site of the JUDRCH.

4.1.2 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 100m⁷ 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 0.25ha in area and not within 20m of the site, or each other, or of other areas of vegetation being classified vegetation.*
- d) *Strips of vegetation less than 20m in width (measured perpendicular to the elevation exposed to the strip of vegetation) regardless of length and not within 20m 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, 2018).*

Low threat vegetation excluded from classification includes the sports fields, lawns and cultivated gardens within the site (see Figure 5, Figure 6 and Figure 7). Non-vegetated land includes the roads, car parks and buildings within the 100m site assessment zone (see Figure 8).

⁷ The exclusion distance is 150m in BMO areas.



Figure 5 – Looking south-east from the north-west corner of the campus, across the sports grounds towards the site of the JUDRCH.



Figure 6 – Looking south-west from the north-east corner of campus, across sports fields towards the site of the JUDRCH.



Figure 7 – Looking south across low threat sports fields, towards strip of Woodland near the western boundary of the campus.



Figure 8 – Looking east from St Vincent Road at low threat vegetation and non-vegetated areas.

4.2 Topography

The AS 3959/BMO method requires that the 'effective slope' be identified to determine the BAL and applicable defendable space distances. This is the slope of the land under the classified vegetation⁸ 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°.

The terrain on the site and in the surrounding landscape is benign from a bushfire perspective. For the purposes of determining BALs and commensurate setback from classified vegetation for the JUDRCH building, the applicable slope classes are 'All upslopes and flat land' (see Map 2).

⁸ The slope of the land between the classified vegetation and the building is called the site slope, which in the Method 1 procedure of AS 3959-2018, is assumed to be the same as the effective slope.



Map 2 - Bushfire Hazard Site Assessment plan.

4.3 Fire weather

The Forest Fire Danger Index (FFDI) and the Grassland Fire Danger Index (GFDI) represent the level of bushfire threat based on weather (and fuel) conditions. An FFDI 100/GFDI 130 is applied in non-alpine areas of Victoria by the planning and building system in accordance with the AS 3959/BMO methodology, as one of the inputs for calculating defendable space/building setback distances from classified vegetation.

The indices are also used for predicting fire behaviour including the difficulty of suppression, forecasting Fire Danger Ratings (FDRs) and determining an appropriate level of preparedness for emergency services. Table 1 displays the FDRs, their FFDI range⁹ and the description of conditions for each FDR. The table shows that the FFDI 100 used in determining defendable space distances is equivalent to the threshold for 'Code Red' fire conditions.

Note that the benchmark of an FFDI 100 represents a 'one size fits all' model of extreme fire weather conditions for the state, which has been exceeded during some significant fire events, including at some locations in Victoria on 'Black Saturday' 2009. Therefore, it is important to note that this is not necessarily the *worst-case* conditions for any particular location, including the Bendigo area.

It should also be noted that under various climate change scenarios, the frequency and severity of elevated fire danger days across south-east Australia is forecast to increase (Lucas *et al.*, 2007). Especially in eastern and southern Australia, there has been an increase in the length of the fire weather season and a greater number of higher risk days (CSIRO/BOM, 2018). There is a 'high confidence' that climate change will result in a harsher fire weather climate for the Murray Basin sub-region that the Bendigo area is in; but less confidence in the magnitude of the expected change (CSIRO/BOM, 2019).

Currently CFA and DELWP have no published policy on FFDI recurrence intervals. There is, therefore, no compelling reason to apply a different FFDI/GFDI from the FFDI 100/GFDI 130 threshold used throughout non-Alpine areas of Victoria in the planning and building system¹⁰.

⁹ The GFDI ranges for each FDR in Table 1 may vary in some jurisdictions.

¹⁰ In alpine areas of Victoria an FFDI 50 applies for determining BALs using Method 1 of AS 3959-2018.

Table 1 - Fire Danger Ratings (Source: AFAC, 2017; CFA 2017b).

Forest Fire Danger Index	Grassland Fire Danger Index	Fire Danger Rating (FDR)	Description of conditions
100+	150+	Code Red	The worst conditions for a bush or grass fire. Homes are not designed or constructed to withstand fires in these conditions. The safest place to be is away from high risk bushfire areas.
75-99	100-149	Extreme	Expect extremely hot, dry and windy conditions. Fires will be uncontrollable, unpredictable and fast moving. Spot fires will start, move quickly and will come from many directions. Homes that are situated and constructed or modified to withstand a bushfire, that are well prepared and actively defended, may provide safety. You must be physically and mentally prepared to defend in these conditions.
50-74	50-99	Severe	Expect hot, dry and possibly windy conditions. If a fire starts and takes hold, it may be uncontrollable. Well prepared homes that are actively defended can provide safety. You must be physically and mentally prepared to defend in these conditions.
25-49		Very High	If a fire starts, it can most likely be controlled in these conditions and homes can provide safety. Be aware of how fires can start and minimise the risk. Controlled burning off may occur in these conditions if it is safe – check to see if permits apply.
12-24		High	
0-11		Low – Moderate	

4.4 Landscape assessment

4.4.1 Location description and context

The Catherine McAuley College, Coolock campus is located in Junortoun, approximately 6km east of the Bendigo CBD, in north central Victoria.


Junortoun is in a gentle valley to the east of the established suburbs of Strathdale and East Bendigo. To the north is a large area of Woodland, some of which is managed by the Department of Defence. To the south-west is the Greater Bendigo National Park, comprising another large area of Woodland. To the south and south-east are the bush blocks and then the suburban area of Strathfieldsaye, and to the east is a mosaic of rural living, agricultural properties and bush blocks.

4.4.2 Landscape risk

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 JUDRCH is not covered by the BMO, the landscape typology provides a useful framework for considering landscape scale hazard and risk.

The four types 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 2).

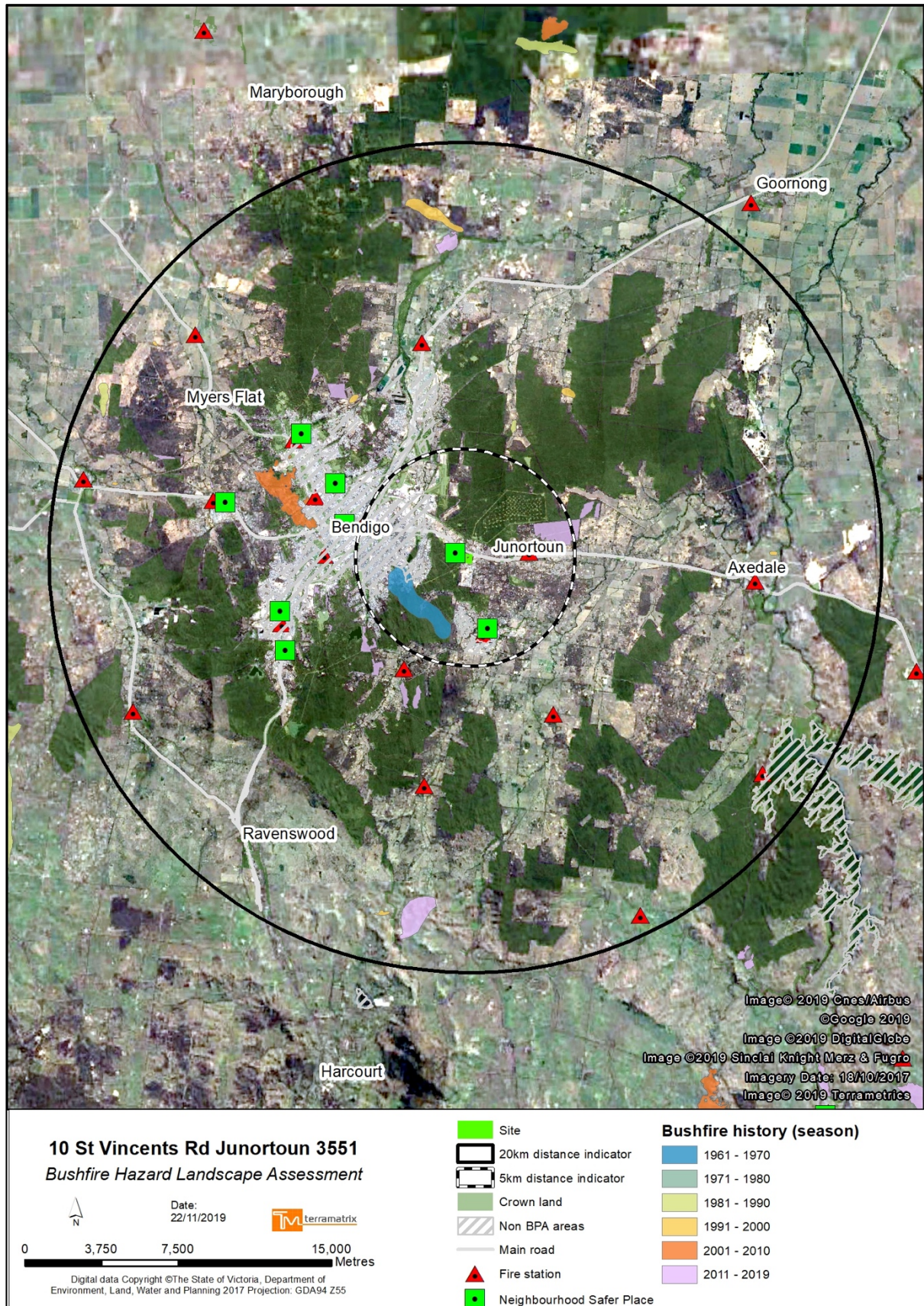
Table 2 - Landscape risk typologies (from DELWP, 2017).

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

The broader landscape best accords with Landscape Type 3, in that a large fire could approach Junortoun from multiple directions and the closest 'reliably safer' area is the urban area of East Bendigo approximately 3km to the west.

There is potential for a large established bushfire to impact Junortoun from the north or north-west, from the Ascot or Huntly areas. There is also potential for an established fire burning in the vicinity of Mandurang or Strathfieldsaye to be driven towards the site by the south-west wind change associated with the passage of a cold front across the State, which is typical of many days of extreme fire danger. In both scenarios the fire would be approaching the study site through Woodland but down gentle slopes.

It is considered that the risk can be mitigated to a level deemed acceptable through prudent siting of development to provide BAL-12.5 setbacks from hazardous vegetation; appropriate BAL construction standards; and other bushfire protection measures including a water supply for fire fighting and adequate access to the facility for emergency services.



Map 3 - Bushfire hazard assessment plan - broader landscape.



Map 4 - Bushfire hazard assessment plan - local and neighbourhood landscape.

4.4.3 Regional bushfire risk assessments and plans

Regional Bushfire Planning Assessment (RBPA) Loddon Mallee Region

As part of the response to the 2009 Victorian Bushfires Royal Commission, Regional Bushfire Planning Assessments (RBPAs) were undertaken across six regions that covered the whole of Victoria. The RBPAs provide information about ‘identified areas’ where a range of land use planning matters intersect with a bushfire hazard to influence the level of risk to life and property from bushfire. The RBPAs state that *‘This information should be addressed as part of strategic land use and settlement planning at the regional, municipal and local levels’* (DPCD, 2012).

The *Regional Bushfire Planning Assessment – Loddon Mallee Region* covers the City of Greater Bendigo local government area and identified multiple bushfire hazard matters for Junortoun – Strathfieldsaye area:

- Clusters of small and medium rural-residential lots in or in close proximity to bushfire hazard area.
- Development pressure is being experienced north of McIvor Highway between Junortoun and Longlea settlements which are in close proximity to high bushfire hazard areas.
- Sheepwash and Emu Creeks contain riparian vegetation and bushfire hazard corridors with direct interface to small and rural-residential lots.
- Includes vegetation of high and very high conservation significance (Identified Area Code 25-009) (DPCD, 2012).

More generally, the RBPA notes that the areas adjoining the urban fringes of Bendigo contain vegetation susceptible to bushfire at the interface between rural- residential settlements and the broader landscape (DPCD, 2012).

Loddon Mallee Regional Strategic Fire Management Plan (LMRSFMP) 2011

The Greater Bendigo LGA is in the Loddon Mallee Strategic Fire Management Planning Region. The Loddon Mallee Strategic Fire Management Planning Committee (LMSFMPC) has prepared a ten-year strategic plan, covering both public and private lands, which identifies high level goals and strategies for fire management and building community resilience.

One of the outcomes sought is a prosperous economy *‘in which settlement is made safer by appropriate development planning’* (LMSFMPC, 2011).

The Box Ironbark Forests are recognised as an important bushfire landscape, but Junortoun is not specifically mentioned in the plan.

City of Greater Bendigo Municipal Fire Management Plan (MFMP)

The MFMP notes that Junortoun is listed in the Victorian Risk Register with a risk rating of High or above for Extreme or Code Red fire danger days (CoGBMFMPC, 2019).

The Junortoun Neighbourhood Safer Place (NSP) is located at Lords Raceway (centre of race track), which is immediately adjacent to the western boundary of Catherine McAuley College, Coolock Campus.

The MFMP notes the requirement for strategic land use planning to accord with the State planning policy for bushfire at Clause 13.02.

5 Planning and design response

This section identifies how future development can respond to the bushfire risk. It includes a Bushfire Management Statement addressing the requirements of Clause 44.06 BMO and associated Clause 53.02 Bushfire Planning; and a summary response to the strategies in Clause 13.02 Bushfire.

5.1 Proposed bushfire protection measures

5.1.1 Siting

The siting of the JUDRCH is constrained by the need to effectively service the surrounding sporting facilities. The siting provides sufficient setback from the Woodland to the north and south-east to allow BAL-12.5 construction.

5.1.2 BAL construction standards and defensible space

As the JUDRCH is part of an educational facility and will be used for educational purposes, we anticipate it will be deemed to be a 'Specific Use Bushfire Protected Building' and will need to be constructed to a BAL.

The JUDRCH will be sufficiently setback¹¹ from the classified Woodland to enable a BAL-12.5 construction standard. The setback required is shown in Table 3 below and Map 2. Vegetation within the setback is to be maintained as low threat vegetation in accordance with the AS 3959-2018 criteria listed at 4.1.2.

Table 3 – Setback of JUDRCH required for BAL-12.5 construction.

Slope class	Vegetation	Vegetation setback distance
All upslopes and flat land	Woodland	33m

5.1.3 Access to a safer location

The site is approximately 3km by road from the safer urban areas of East Bendigo and Strathdale.

¹¹ The setback distance is measured from the edge of the classified vegetation to the external wall of the building, or for parts of the building that do not have external walls (including carports, verandas, decks, landings, steps and ramps), to the supporting posts or columns. The following parts of a building are excluded:

- Eaves and roof overhangs.
- Rainwater and domestic fuel tanks.
- Chimneys, pipes, cooling or heating appliances or other services.
- Unroofed pergolas.
- Sun blinds (Standards Australia, 2018).

As a last resort, the Junortoun NSP is located at the Lords Raceway, immediately adjacent to the western boundary of the site.

5.1.4 Water supply for fire fighting

It is considered that the existing reticulated water supply, and any additional static water supply required for structural fire safety compliance, will be adequate for bushfire protection.

5.1.5 Bushfire emergency management plan

The use of the JUDRCH should be incorporated into emergency management arrangements for the Catherine McAuley College, Coolock campus.

6 Clause 13.02 Bushfire

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 strategies.

6.1 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 not in an extreme bushfire risk location. The development of the JUDRCH enhances the existing use of the site as an educational and sporting facility and does not fundamentally change the existing level of bushfire risk.

The proposed development is sited to avoid those higher hazard areas where the BMO applies and can achieve a BAL-12.5 construction standard (i.e. will be setback unmanaged vegetation, such that radiant heat can be expected to not exceed the key RHF safety threshold of 12.5kW/m²).

The use of the JUDRCH can be incorporated into the existing emergency management arrangements for the school.

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 4.4, the site is not in an extreme risk landscape. Development has been sited in the lesser risk part of the site, identified as that area not subject to the BMO.

The nearest *lowest* risk locations are considered to be the urban-residential areas of East Bendigo and Strathdale approximately 3km to the west, that are not in the BPA (see Map 3). The Junortoun NSP is at Lords Raceway immediately west of the site.

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 the proposal.

The CFA consider that community resilience to bushfire will be strengthened (and hence, presumably, vulnerability to bushfire will be reduced) when a planning proposal demonstrates that Clause 13.02 strategies have been applied, and where a proposal takes

advantage of existing settlement patterns so that new development will not expose the community to increased risk from bushfire.

The CFA provide principles to respond to Clause 13.02 including that settlement planning decisions should:

- *'Direct development to locations of lower bushfire risk.*
- *Carefully consider development in locations where there is significant bushfire risk that cannot be avoided.*
- *Avoid development in locations of extreme bushfire risk.*
- *Avoid development in areas where planned bushfire protection measures may be incompatible with other environmental objectives'* (CFA, 2015).

It is considered that development of the JUDRCH can appropriately implement the strategies in Clause 13.02 that aim to prioritise protection of human life and will, therefore, meet the CFA strategic planning principles for bushfire. The development is sited in the lower bushfire risk part of the site and protection measures in accordance with the building regulations in a BPA are proposed.

Bushfire protection measures for the proposed development do not affect Woodland on the site.

6.2 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 AS 3959/BMO methodology and, as appropriate, additional guidance provided in *Planning Practice Note 64 Local planning for bushfire protection* (DEWLP, 2015a) and *Planning Advisory Note 68 Bushfire State Planning Policy Amendment VC140* (DEWLP, 2018a).

The type and extent of (hazardous) vegetation within, and up to 400m around, the site has been identified and classified based on the anticipated long-term state of the vegetation, EVC mapping, 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.

The site assessment and GIS analysis of publicly available 10m contour data for the area, was used to determine effective slopes in relation to the building (see Map 2).

In relation to climatic conditions and fire weather, the AS 3959 default FFDI 100/GFDI 130 benchmark used in the Victorian planning and building system, has been applied as discussed in Section 4.3.

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 Section 3.5) and is shown in Map 1, Map 3 and Map 4. This is based on the most recent BPA mapping for the area, which was published on 10th September 2019.

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

As identified in Section 3.4, some of the Catherine McAuley College Coolock campus is covered by the BMO (see Map 4). This reflects statewide BMO mapping introduced into the Greater Bendigo Planning Scheme by amendment GC13, which was gazetted on 3rd October 2017.

The proposed site of the JUDRCH facility is not 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 site, neighbourhood and local scale (see Section 4, Map 2, Map 3 and Map 4).

At the site scale, the assessment follows the AS 3959-2018 methodology of classifying vegetation and topography within 100m of a building or site.

At the broader landscape scale a 20km, 10km and 5km radius of the site has been applied (see Section 4.4, Figure 1 and Map 3) in accordance with guidance about assessing risk for planning scheme amendments in the Planning Advisory Note 68 (DEWLP, 2018a) and Planning Practice Note 64 (DELWP, 2015).

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

Terramatrix are not aware of any consultation with CFA regarding this proposal.

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 planning and 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:

- *'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 JUDRCH development proposal.

6.3 Settlement planning strategies

The JUDRCH does not comprise settlement planning and, hence, the settlement planning strategies are not applicable to the proposal. Settlement planning must strengthen the resilience of settlements and communities and prioritise protection of human life.

6.4 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

Bushfire protection measures for the proposed development do not affect Woodland on the site and there are no apparent biodiversity impacts associated with the findings of this bushfire assessment.

6.5 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'*(Greater Bendigo Planning Scheme, 2018a).

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'* (Greater Bendigo Planning Scheme, 2018a).

This report demonstrates the risk of bushfire to people, property and community infrastructure has been properly considered and bushfire protection measures have been specified, commensurate with the proposed use and assessed level of risk. There are no apparently unacceptable impacts on biodiversity from the proposed bushfire protection measures.

7 Conclusion

This report has assessed the bushfire hazard in and around the proposed JUDRCH at Catherine McAuley College Coolock campus, in accordance with Clause 13.02 in the Greater Bendigo Planning Scheme. Additional guidance has been incorporated where appropriate, as provided in *Planning Practice Note 64 Local planning for bushfire protection* (DEWLP, 2015a), *Planning Advisory Note 68 Bushfire State Planning Policy Amendment VC140* (DEWLP, 2018a) and the DELWP technical guide *Planning Permit Applications Bushfire Management Overlay* (DELWP, 2017).

The site is located adjacent to the Mclvor Highway in Junortoun, approximately 3km east of the centre of the urban area of East Bendigo.

The broader landscape best accords with the BMO 'Landscape Type 3'. Long fire runs of many kilometres could result in the development of a large destructive fire in Woodland to the north and south.

Development has been located in the lesser risk part of the site, identified as that area not covered by the BMO. It is considered that the risk can be mitigated to a level deemed acceptable, through siting of the JUDRCH to achieve a BAL-12.5 setback from the classified Woodland within the site.

The BAL-12.5 construction standard, required because the JUDRCH is a 'Specific Use Bushfire Protected Building', and commensurate 33m setback from the Woodland will ensure acceptable safety from RHF and ember attack associated with a bushfire front.

The use of JUDRCH could be included in the existing emergency management arrangements for the Catherine McAuley College, Coolock campus.

8 Appendices

8.1 Appendix A: 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, 2018)

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