



Bushfire Development Report

to inform the
Bendigo Regional Employment Precinct

Prepared for
Victorian Planning Authority

November 2025

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Terramatrix project code: VPA-2025-03 CI1302_BMO-Bendigo Regional Employment Precinct
Report prepared by Terramatrix for Victorian Planning Authority

Cover photo – Aerial image of the land intended for the BREP and surrounds.

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Version control

Version	Date	Comments	Distribution
1.0	2025-11-14	Draft BDR to client.	Kelvin Li, DTP
1.1	2025-11-19	Updated draft BDR to client.	Kelvin Li, DTP

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Glossary

AS 3959:2018	<i>AS 3959:2018 Construction of buildings in Bushfire Prone Areas.</i> Australian standard invoked by the National Construction Code and Victorian building regulations for the assessment of BALs and the design and construction of defined building classes in a BPA.
BAL	<i>Bushfire Attack Level</i> - A means of measuring the severity of a building's potential exposure to ember attack, radiant heat and direct flame contact, using increments of radiant heat expressed in kilowatts per metre squared, and the basis for establishing the requirements for construction to improve protection of building elements from attack by bushfire e.g. a building constructed to a BAL-12.5 standard is designed to be exposed to radiant heat not exceeding 12.5 kW/m ² .
BMO	<i>Bushfire Management Overlay</i> - A planning scheme provision used to guide the development of land in areas of high bushfire hazard. The BMO applies to areas where there is potential for extreme bushfire behaviour, such as a crown fire and extreme ember attack and radiant heat
BPA	<i>Bushfire Prone Area</i> - An area that is subject to, or likely to be subject to, bushfire attack as determined by the Minister for Planning.
BREP	<i>Bendigo Regional Employment Precinct</i>
Bushfire	An unplanned fire burning in vegetation; sometimes referred to as wildfire. A generic term which includes grass fires, forest fires and scrub fires.
Bushfire attack	Attack by wind, burning embers, radiant heat or flame generated by a bushfire.
Bushfire hazard	A specific source of potential damage or harm, typically consisting of three key elements; vegetation, weather and topography.
Bushfire risk	The chance or probability of damage or harm if exposed to a bushfire hazard and the severity of the impact i.e. consideration of the likelihood and consequences of impacts from bushfire.
Classified vegetation	Vegetation deemed to be a bushfire hazard in accordance with the Bushfire Management Overlay (BMO) and/or AS 3959:2018 <i>Construction of buildings in bushfire prone areas</i> .
CFA	<i>Country Fire Authority</i>
DTP	<i>Department of Town Planning</i>
Effective slope	The slope of the land (gradient, measured in degrees) under the classified vegetation which most influences the bushfire attack. The slope is determined on the basis of the fire moving towards the building and the rate

of spread of the fire and not solely on the basis of the relative elevation of the vegetation.

Ember attack	Attack by smouldering or flaming windborne debris that is capable of entering or accumulating around a building, and that may ignite the building or other combustible materials and debris.
EVC	<i>Ecological Vegetation Class</i> - The standard unit for classifying vegetation types in Victoria. EVCs are described through a combination of floristics, lifeforms and ecological characteristics, and through an inferred fidelity to particular environmental attributes. Each EVC includes a collection of floristic communities (i.e. lower level in the classification) that occur across a biogeographic range and, although differing in species, have similar habitat and ecological processes operating.
FFDI	<i>Forest Fire Danger Index</i> – A numerical index representing the chance of a fire starting, its rate of spread, its intensity and the difficulty of its suppression, according to various combinations of air temperature, relative humidity, wind speed and both the long- and short-term drought effects.
FRV	<i>Fire Rescue Victoria</i>
PSP	<i>Precinct Structure Plan</i> – Strategic masterplans for local areas that usually cater for between 5,000 to 30,000 people, 2,000 to 10,000 jobs or a combination of both. They are the ‘blueprint’ for localised development and investment that will occur over many years, and will incorporate any relevant directions already outlined in a higher level Framework Plan.
RHF	<i>Radiant heat flux</i> - The heat transfer rate per unit area from thermal (electromagnetic) radiation, expressed as kilowatts per metre squared. Calculated or measured for a specific surface to determine the radiant heat received by that surface from flames associated with a bushfire.
VPA	<i>Victorian Planning Authority</i>

1 Summary

The Victorian Planning Authority are planning the Bendigo Regional Employment Precinct (BREP), to guide the future urban development of land within the precinct. The land will be rezoned from Farming Zone (FZ) to Industrial 1 Zone (IN1Z) and a Development Plan Overlay (DPO) applied to facilitate development as a predominantly industrial area.

The precinct is within a designated Bushfire Prone Area (BPA) with two very small areas of Bushfire Management Overlay (BMO) coverage. The re-zoning and DPO require a planning scheme amendment and constitute settlement planning and, as such, Clause 13.02-1S *Bushfire Planning* of the Greater Bendigo Planning Scheme requires that bushfire risk be considered (Clause 13.02-1S, Greater Bendigo Planning Scheme).

Key points:

- The precinct is within a designated BPA with very minor BMO coverage.
- The precinct is less than 1 km from Marong and 7 km from the established urban areas of Bendigo, which include land that would be rated as BAL-LOW using the AS 3959:2018 site assessment methodology.
- Grassland, Woodland and Forest, adjacent to (and currently within) the precinct, comprises a bushfire hazard that must be considered in the staged development and use of the precinct.
- Wilsons Hill Bushland Reserve just beyond the north-west boundary of the precinct, comprises a Woodland hazard, resulting in the BMO coverage of that area and two small slivers of land in the north-west of the precinct.
- Future conservation reserves and drainage reserves may comprise a bushfire hazard that would need to be considered in the development.
- The terrain within and around the precinct is benign from a bushfire perspective, being in the 'All upslopes and flat land' slope class.
- To reduce radiant heat flux to less than 12.5 kW/m², in accordance with key settlement planning strategies of Clause 13.02-1S *Bushfire Planning*, development would need to be setback 19 m from classified Grassland, 33 m from Woodland and 48 m from classified Forest.
- Note that large areas of the precinct will achieve BAL-LOW upon the completion of development.
- The draft DPO specifically requires bushfire hazards be identified and responded to, consistent with existing bushfire controls in the planning and building system, which will facilitate appropriate mitigation of the relatively low bushfire risk.
- The necessary bushfire protection measures can be achieved through inclusion of a Bushfire (Site) Management Plan for subsequent development proposals.
- Much of the precinct will be rendered low threat by the planned development and could become eligible for excision from the BPA as development proceeds.

2 Introduction

This Bushfire Development Report has been prepared for the Victorian Planning Authority (VPA) to assess how development of the Bendigo Regional Employment Precinct (BREP) can respond to the bushfire risk and comply with the applicable planning and building controls that relate to bushfire, especially the objective and strategies at Clause 13.02 *Bushfire* in the Greater Bendigo Planning Scheme.

The VPA are currently planning the Bendigo Regional Employment Precinct to guide the future urban development of the land. The precinct comprises land that is currently zoned Farming Zone (FZ). The intent is to re-zone the precinct to Industrial 1 Zone (IN1Z) and apply a Development Plan Overlay (DPO) to facilitate development as predominantly industrial areas.

The draft DPO specifically requires bushfire hazards be identified and responded to, consistent with existing bushfire controls in the planning and building system, which will facilitate appropriate mitigation of the relatively low bushfire risk. The precinct will be developed in stages over several years.

The precinct is in a designated Bushfire Prone Area (BPA). Two very small parts of the site are covered by the Bushfire management Overlay (BMO), which denotes areas of higher bushfire hazard. The BMO coverage relates to Wilsons Hill Bushland Reserve just beyond the north-western boundary.

This report has been prepared in accordance with guidance for the assessment of, and response to, bushfire risk, provided in:

- *Local planning for bushfire protection*, Planning Practice Note 64 (DELWP, 2015)
- *Design Guidelines, Settlement Planning at the Bushfire Interface* (DELWP, 2020a)
- *Planning Permit Applications – Bushfire Management Overlay*, Technical Guide (DELWP, 2017)
- *Bushfire State Planning Policy Amendment VC140*, Planning Advisory Note 68, (DELWP, 2018).
- *Applying the Bushfire Hazard Landscape Assessment in a Bushfire Management Overlay* (CFA, 2022a).

3 Overview of the precinct

The Bendigo Regional Employment Precinct is located 7 km west of Bendigo (see Map 1), in the City of Greater Bendigo local government area. The precinct comprises approximately 294 ha of land, generally bounded by:

- To the north – Wilsons Hill Road.
- To the west – Wimmera Highway (not including the part of Wilsons Hill Bushland Reserve that is on the south-east side of the road).
- To the south – Cemetery Road
- To the east – Calder Alternative Highway

Development plans will be prepared by applicants once the planning scheme amendment is gazetted. The precinct will be developed with industrial and commercial buildings. We understand the precinct will contain conservation and drainage reserves, however, the location, size and nature of the vegetation they will contain is not known at the time of this report. Thus, this Bushfire Development Report provides a high-level assessment of how industrial or commercial development in the precinct can respond to the bushfire hazard in accordance with Clause 13.02 in the Greater Bendigo planning scheme.

A draft concept plan has been provided to TerraMatrix, identifying the proposed layout of the BREP. It shows the location of proposed development areas divided into public (south) and private (north) ownership, roads, conservation/open space reserves, drainage reserves and vegetation with a retention value within the precinct.



Figure 1 – Concept plan for the Bendigo Regional Employment Precinct. From the draft DPO (VPA,2025).



Map 1 – Location of the Bendigo Regional Employment Precinct.

4 Bushfire planning and building controls

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

4.1 Planning provisions

4.1.1 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. Strategies to achieve the objective are:

- *‘Respond to 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 and climate change adaptation strategies to be implemented.*
- *Site and design development to minimise risk to life, health, property, the natural environment and community infrastructure from natural hazards’ (Clause 13.01-1S, Greater Bendigo Planning Scheme).*

Especially in southern and eastern Australia, since the 1950’s there has been an increase in the length of the fire weather season and a greater number of higher risk days associated with climate change (CSIRO/BOM, 2024). The Australian and New Zealand Council for Fire and Emergency Services identify that a failure of building codes and land use planning to adequately adapt to climate change is a significant risk (AFAC, 2020).

Clause 13.01-1S supports the adoption of a precautionary and conservative approach to assessing and responding to bushfire risk. Fire weather is discussed further in Section 5.4.

4.1.2 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’* (Clause 13.02-1S, Greater Bendigo Planning Scheme). 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 BPA
- Subject to a BMO
- Proposed to be used or developed in a way that may create a bushfire hazard.

The policy 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’* (Clause 13.02-1S, Greater Bendigo Planning Scheme).

Key strategies are stipulated in Clause 13.02-1S, which require regional growth plans, precinct structure plans and planning scheme amendments to assess the bushfire hazard and respond with 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
- Any application for development that will result in people congregating in large numbers.

This study assesses the bushfire hazard in accordance with hazard identification and assessment strategies of Clause 13.02-1S and identifies the bushfire protection measures that will be required for future development in accordance with the settlement planning strategies. It is considered that development in the Bendigo Regional Employment Precinct can appropriately prioritise the protection of human life and meet the objective of Clause 13.02-1S. Key features to achieve this are appropriate subdivision design, including lot layout, perimeter roads and separation from hazardous vegetation during and after development. Minimum separation distances should ensure future development will not be exposed to radiant heat flux above 12.5 kW/m².

The maximum 12.5 kW/m² safety threshold is required in settlement planning as the upper limit for acceptable risk. Responsible authorities must *‘Not approve 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 3959:2018 Construction of buildings in bushfire prone areas (Standards Australia, 2018)’* (Clause 13.02-1S, Greater Bendigo Planning Scheme).

A detailed response to the strategies in Clause 13.02-1S and recommendations for development are provided in Section 1.

4.1.3 Clause 13.02-1L Bushfire Planning – Greater Bendigo

The Greater Bendigo Planning Scheme at Clause 13.02-1L specifies policy to:

'Design the settlement interface of the new residential development areas at Marong to create a 'hard edge' via outer perimeter roads, other hard surfaces and public open space without buildings, particularly in the east.

Support an increased separation distance between development and bushfire hazard at the eastern settlement interface.

Encourage a combined larger separation distance and higher building construction standards at the settlement interface of Precincts 3 and 4 as shown on the Marong framework plan at Clause 11.01-1L Settlement - Marong.' (Clause 13.02-1L, Greater Bendigo Planning Scheme).

This local policy is not directly relevant to the BREP, but it pertains to the Marong township less than 1 km to the north-east of the site.

4.1.4 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. However, in bushfire affected areas, it states that the protection of human life must be prioritised over all other policy considerations (Clause 71.02-3, Greater Bendigo Planning Scheme).

4.2 Bushfire Prone Area (BPA)

BPAs are those areas subject to or likely to be subject to bushfire, as determined by the Minister for Planning. The FZ land within the precinct is currently designated as a BPA, however as development occurs, much of it will likely become eligible for excision from the BPA.

Note that land not within the BPA is defined as an area of low bushfire hazard, where the extent, configuration and/or management of vegetation results in low potential for bushfire spread (DELWP, 2019).

Map 4 indicates the extent of BPA coverage (by showing the inverse i.e. non-BPA land) in the surrounding broader landscape. In a BPA, the Building Act 1993 and associated Building Regulations 2018, through application of the National Construction Code 2022 (NCC), require specific design and construction standards for Class 1, 2 and 3¹ buildings, certain Class 9 and 4 buildings², and Class 10A buildings³ or decks adjacent to, or connected with, these classes of buildings.

¹ Class 1, 2 and 3 buildings are defined in the NCC 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 Applicable Class 9 buildings are Class 9a health-care buildings, Class 9b early childhood centres, primary and secondary schools, Class 9c residential care buildings, and any Class 4 parts of a building associated with these Class 9 buildings.

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

We understand that the precinct will contain industrial and/or commercial buildings that will likely be of a class that does need to be built to a BAL construction standard under the Victorian Building Regulations.

In a BPA, developments that will result in people congregating in large numbers, and certain vulnerable uses including applications for subdivision of more than 10 lots, are required by Clause 13.02-1S to:

- *‘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’* (Clause 13.02-1S, Greater Bendigo Planning Scheme).

There are no obstacles to future development in the Bendigo Regional Employment Precinct complying with the applicable strategies at Clause 13.02-1S and the building regulations invoked in a BPA. BAL-LOW land, including land where the BPA could be removed, will be created within the precinct as reliably low threat and non-vegetated areas are created as development progresses.

DTP review and excise areas from the BPA approximately every 6 months, particularly in growth areas where the hazard is removed as urban development occurs.

Land becomes eligible for excision if it satisfies statewide hazard mapping criteria, including that the land needs to be:

- At least 300 m from areas of classified vegetation (except grassland) larger than 4 ha in size; and
- At least 150 m from areas of classified vegetation (except grassland) 2 to 4 ha in size; and
- At least 60 m from areas of unmanaged grassland more than 2 ha in size (DELWP, 2019).

For isolated areas of vegetation greater than 1 ha but less than 2 ha, the shape of the area and connectivity to any other hazardous vegetation is a further consideration (DELWP, 2019).

4.3 Other controls

4.3.1 Zoning

Land on the site is currently zoned Farming Zone (FZ) and the intent is to re-zone it to Industrial 1 Zone (IN1Z). Neither zoning carries an inherent bushfire risk, however it is noted that a net reduction in hazard on the site is likely to be a result of the development associated with the proposed IN1Z.

4.3.2 Overlays

Clause 44.06 (the BMO) is the only overlay currently applicable to the site, which covers two narrow strips of land along the north-west boundary interfacing the Wilsons Hill Bushland Reserve. A response to the BMO is covered in Section 6.7 of this report.

The Development Plan Overlay - Schedule 34 (DPO34) is proposed for the site to facilitate development in the BREP by formalising planning application requirements that address a range of issues including bushfire, as detailed in the ordinance and this report (VPA, 2025).

4.3.3 Ministerial Direction No. 22

Direction No. 22 from the Minister of Planning comprises the aim of ensuring planning schemes and amendments respond to climate change by minimising greenhouse gas emissions and increasing resilience to climate change risks (including bushfire). It states that a planning authority:

‘...must have regard to the need to increase resilience to climate change when decisions are made about the use and development of land, considering as relevant:

- a) the impact of climate change on natural hazards, including but not limited to risks related to bushfire and flood (riverine, drainage, overland flow, coastal), erosion, landslide and landslide, heatwave and drought;*
- b) how the use and development of land envisaged by the planning scheme or amendment will be resilient to the impact of, or likely impact of, climate change on natural hazards, including through:*
 - i. avoiding exposure of new use and development to risks posed by natural hazards;*
 - ii. ensuring new use and development does not exacerbate risk to existing residents, property, infrastructure and the natural environment;*
 - iii. ensuring new use and development will be located and appropriately designed inclusive of protection measures, to minimise exposure to risks posed by natural hazards; and*
 - iv. ensuring identified protection measures are proportionate to the risk and practical.*
- c) the provisions of the planning scheme, including State and regional planning policies in the Planning Policy Framework that relate to those natural hazards and climate change risks; and*
- d) the advice and views of applicable emergency management and natural resource management agencies about the risks posed by climate change impacts.’ (Minister for Planning, 2025).*

The increased resilience requirements of Direction No. 22 can be met by ensuring that relevant bushfire planning and building controls are applied where required in the BPA and BMO. This will include, among other points, creating low threat setbacks between any identified area of bushfire hazard, bushfire resilient design and construction of buildings to an appropriate BAL standard where required under the BPA. The bushfire protection measures in Clause 53.02 of the Greater Bendigo

Planning Scheme are applicable to buildings and works (including subdivision) in the BMO. The applicable bushfire protection measures are identified in Section 6 of this report.

5 Bushfire hazard assessment

One of the bushfire hazard identification and assessment strategies in Clause 13.02-1S 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 within approximately 1 kilometre from a site;*
- *Neighbourhood conditions - meaning conditions within 400 metres of a site; and,*
- *The site for the development'* (Clause 13.02-1S, Greater Bendigo Planning Scheme).

This section includes a bushfire assessment at:

- The wider landscape scale, for up to 10 km around the site (see Map 3).
- The local and neighbourhood scales extending up to 400 m and 1 km respectively from the site (see Map 4).
- The site scale up to 150 m around the precinct boundary (see Map 2).

The BPA invokes AS 3959:2018 *Construction of buildings in bushfire prone areas*, which requires a site assessment of the vegetation and topography up to 100 m around a building (Standards Australia, 2020). In BMO areas a 150 m assessment zone is required and has been applied in this bushfire assessment.

5.1 Vegetation

Classified vegetation is vegetation that is deemed hazardous from a bushfire perspective and is classified in accordance with the AS 3959:2018 methodology.

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 should be based on the likely fire behaviour that it will generate and, for settlement planning purposes, the long-term structure of the vegetation in its mature state.

5.1.1 Grassland

Grassland is the predominant vegetation type in and around the BREP (see Map 3, Figure 4 and Figure 5). Grassland is defined as *'All forms (of vegetation) including areas with shrubs and trees, if overstorey foliage cover is less than 10%'* (Standards Australia, 2020).

Grassland within the BREP is considered an interim hazard, as it is will be removed in stages during the process of development.

Grassland vegetation is considered hazardous, and therefore classifiable, when it is unmanaged, i.e. more than 100 mm tall. Settlement planning should apply a conservative and precautionary approach, and assume Grassland areas will be unmanaged and classifiable, unless there is reasonable assurance they will be managed in a low threat state, no more than 100 mm high, in perpetuity.



Figure 2 – Paddocks south of Cemetery Road, classified as Grassland.



Figure 3 – Paddocks within the site to the east of Osullivans Road, classified as Grassland. *N.B.* likely to be an interim hazard, as vegetation will be replaced by industrial/commercial development.

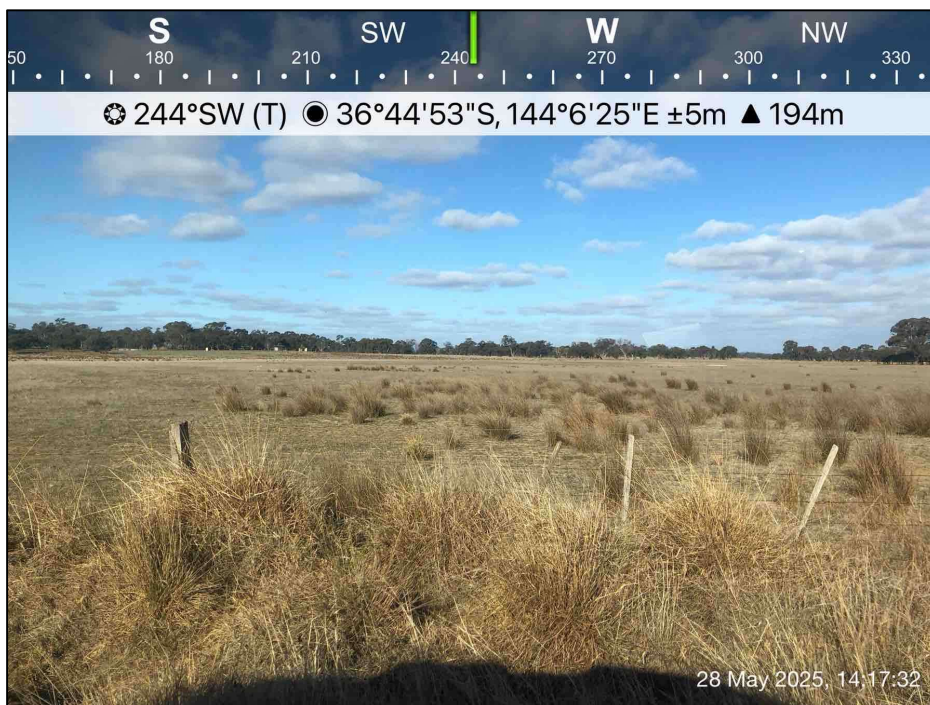


Figure 4 – Paddocks to the west of Wimmera Highway, classified as Grassland.



Figure 5 – Paddocks to the north of Wilsons Hill Road, classified as Grassland.

5.1.2 Woodland

Treed vegetation to the north-west in Wilsons Hill Bushland Reserve and fragmented patches of trees within and around the site best accords with the Woodland group of AS 3959:2018. Woodland vegetation typically comprises areas with trees up to 30 m tall, with 10–30% foliage cover dominated by eucalypts (and/or callitris) with a prominent grassy understorey, may contain isolated shrubs (Standards Australia, 2020).

Woodland in Wilsons Hill Bushland Reserve comprises eucalypts with a predominantly grassy understorey and some scattered shrubs. Part of the reserve (approximately 12 ha) is adjacent to the site, while the majority of vegetation is further to the north-west and separated from the site by the Wimmera Highway. Part of this section of the reserve to the north-west is also called Wilsons Hill Nature Conservation Reserve.

Three distinct patches of bushland within the site (*n.b.* the southernmost patch slightly extends onto a road reserve) have been classified as Woodland, as they are likely to be considered high retention value. As such, the Woodland classification applies, which may have a different distribution in the long term as native vegetation is retained and/or proposed as part of the BREP.

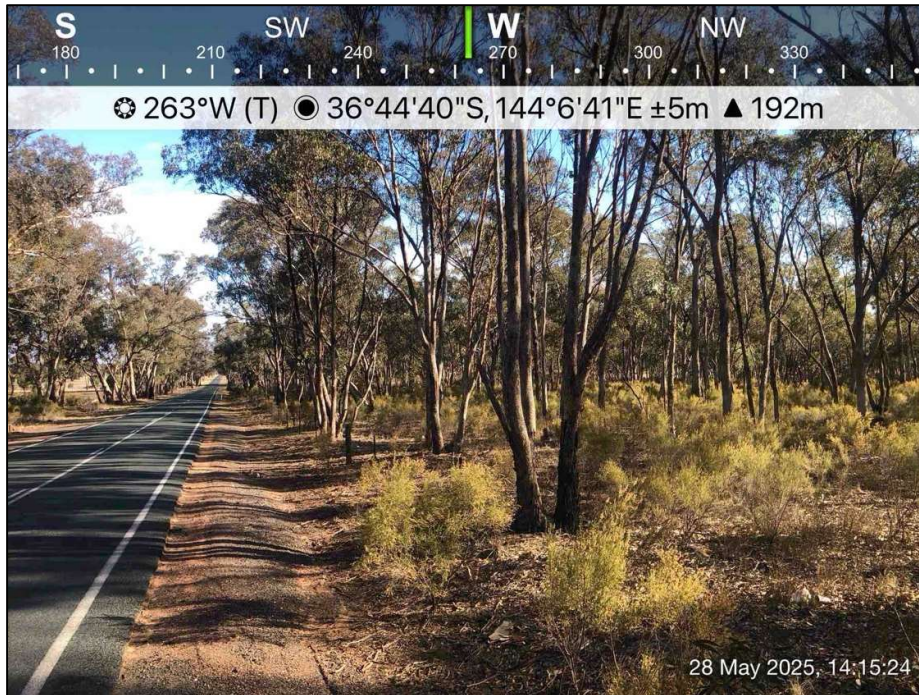


Figure 6 – Woodland in Wilsons Hill Bushland Reserve next to Wimmera Highway.



Figure 7 – Woodland in Wilsons Hill Bushland Reserve to the south of Wimmera Highway at the boundary of the BREP.



Figure 8 – Woodland on private land and on Cemetery Road reserve near Dry Creek at the south-western corner of the BREP.



Figure 9 – Woodland in Malone Park Recreation Reserve to the north-east of the BREP.

5.1.3 Forest

A small eucalyptus plantation on private land to the south of the site best accords with the Forest group of AS 3959:2018. Forest vegetation comprises areas with trees to 30 m high or taller at

maturity, typically dominated by eucalypts, with 30% to more than 70% foliage cover (may include understorey ranging from rainforest species and tree ferns to sclerophyllous low trees or shrubs). Includes pine and eucalypt plantations (Standards Australia, 2020).

Canopy coverage at maturity in the plantation is likely to exceed the 30% threshold required for the definition of Woodland, despite a lack of understorey and as such, has been classified as Forest as a precaution, but this area currently poses no more than a Woodland hazard (see Figure 10).



Figure 10 – Plantation to the south of the site near Marong Cemetery, classified as Forest.

5.1.4 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 100 m from the site.*
- (b) *Single areas of vegetation less than 1 ha in area and not within 100 m 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 condition⁴, 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, 2020).'* (Standards Australia, 2020).

The curtilage of some residential properties on the site and to the north, south and east of the BREP, the golf course to the north and Marong Cemetery to the south comprise non-vegetated or low threat areas. These areas can likely be excluded from classification as low threat vegetation under point (f) above.

It is reasonable to assume that all the proposed industrial/commercial areas will be either non-vegetated or comprise low threat vegetation such as maintained lawns, roadsides or cultivated gardens. It is also reasonable to assume that any local parks will be managed in a low threat state.



Figure 11 – Marong Cemetery, comprising low threat vegetation excluded pursuant to Section 2.2.3.2 (f) of AS 3959:2018.

⁴ Minimal fuel condition means there is insufficient fuel available to significantly increase the severity of the bushfire attack, recognisable as short-cropped grass for example, to a nominal height of 100 mm (Standards Australia, 2020).

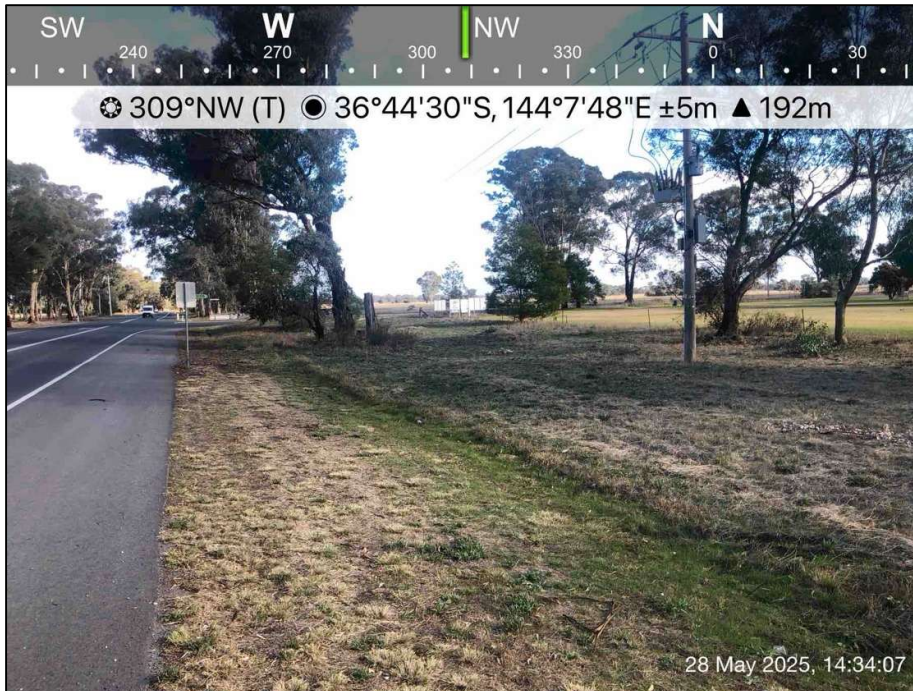


Figure 12 – A managed road reserve along Calder Alternative Freeway and the golf course comprising low threat vegetation to the north of the BREP. Both excluded pursuant to Section 2.2.3.2 (f) of AS 3959:2018.

5.2 Future vegetated form

It is assumed that classified Grassland on private property outside of the precinct will remain in the long term. It is assumed the road reserves within, and around the perimeter of, the precinct will be maintained in a low threat condition (grass generally < 100 mm in height), as per Figure 12 above.

Industrial development in the Bendigo Regional Employment Precinct will result in the removal of much of the classified Grassland from within the precinct boundary. We understand, however, that some conservation and drainage reserves will be created that may comprise classified vegetation. As development plans have not yet been prepared and in the absence of knowledge of what vegetation each reserve may contain, we provide general advice on the setbacks that might be required at Section 6.1 below.

Treed vegetation beyond the site in Wilsons Hill Bushland Reserve to the north-west and in Malone Park Recreation Reserve to the north-east are likely to remain in the long term and as such must be addressed regarding setbacks from the present Woodland hazard.

Treed vegetation within the BREP on private land may be an ongoing Woodland hazard if vegetation is retained in a conservation reserve. This will necessitate development setbacks from the edge of the classified vegetation, which can be identified and provided in the Bushfire Management Plan (BMP) that is one of the requirements for a development plan under the draft DPO ordinance (VPA, 2025).

5.3 Topography

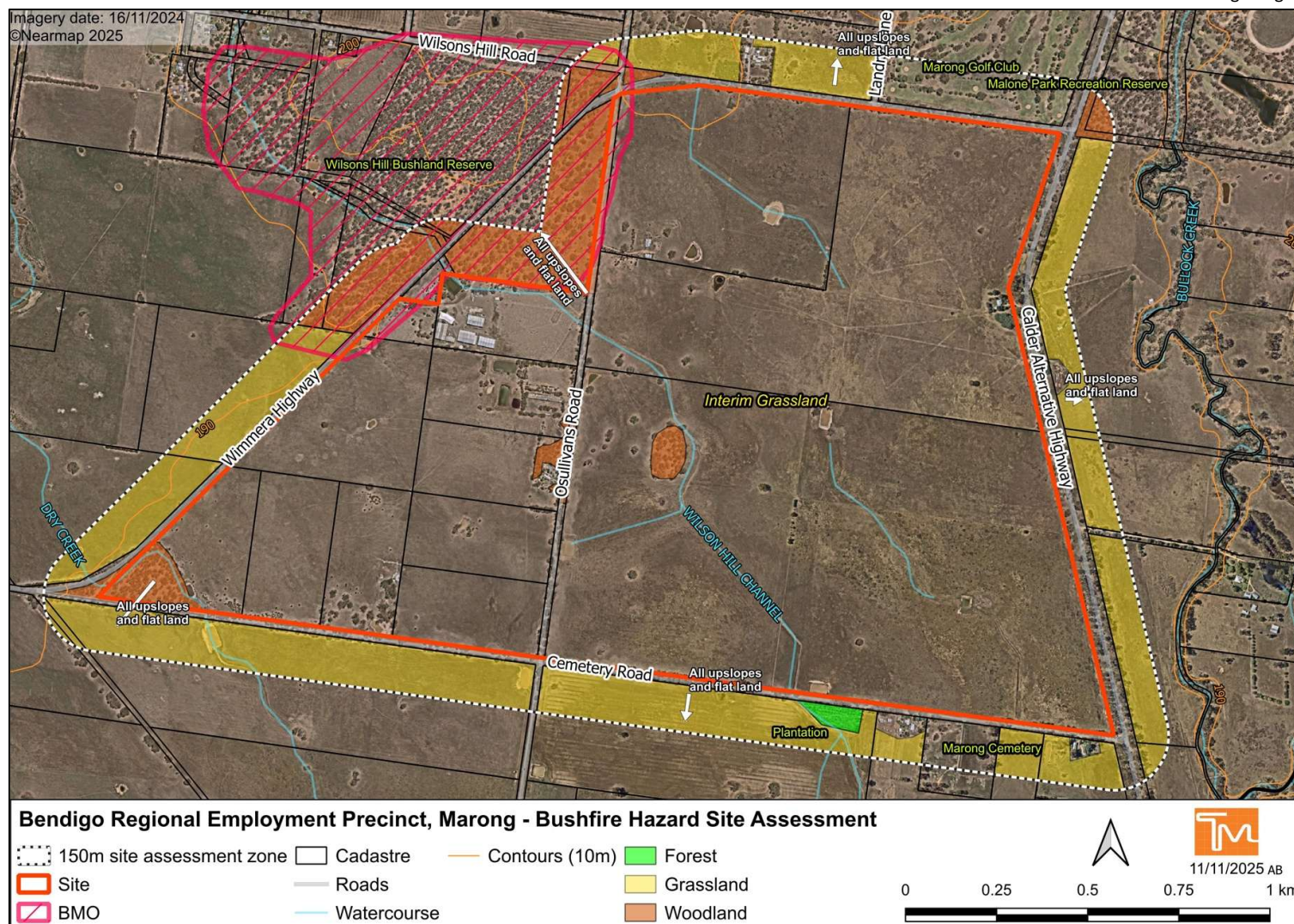
AS 3959:2018 requires that the 'effective slope' be identified to determine the BAL and applicable development setback distances from classified vegetation. This is the slope of the land under classified vegetation that will most significantly influence the bushfire attack on a building. Two broad types 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 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°⁵.

The Bendigo Regional Employment Precinct and immediately surrounding landscape is essentially flat (see Map 2), without significant changes in elevation that would appreciably influence bushfire behaviour. The Woodland in Wilsons Hill Bushland Reserve to the north-west, is on an upslope in relation to the BREP.

For the purposes of determining BALs and defensible space/vegetation setback distances for future development, the applicable slope class for vegetation outside the precinct boundary is 'All upslopes and flat land'.

⁵ For downslope gradients over 20° and up to 30°, the detailed 'Method 2' procedure of AS 3959:2018 is used to determine the BAL.



Map 2 – Bushfire hazard site assessment. Vegetation classification as per AS 3959:2018 – existing classified vegetation within 150 m site assessment zone.

5.4 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 building system, to establish a BAL based on building setback distances from classified vegetation in accordance with AS 3959:2018.

The indices were 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. However, since September 2022 the FFDI/GFDI have been replaced by the Fire Behaviour Index (FBI) as a new Australian Fire Danger Rating System (AFDRS) for determining FDRs in all jurisdictions. Table 1 displays the new FDRs, their FBI range, the anticipated fire behaviour and recommended actions for each FDR.

Note that the AFDRS and FBIs do not correlate directly with the FFDI/GFDI indices applied in the planning and building system. However, the benchmark FFDI 100 used to represent a 'one size fits all' model of extreme fire weather conditions (and the threshold for the previous 'Code Red' FDR), can be considered analogous to the FBI 100 'Catastrophic' FDR. Note that these extreme conditions have been exceeded during significant fire events, including at some locations in Victoria on 'Black Saturday' 2009. Therefore, it is important to note that this FDR threshold is not necessarily the *worst-case* conditions for any particular location.

Additionally, as identified in Section 4.1.1, in southern and eastern Australia since the 1950's there has been an increase in the length of the fire weather season and an increase in extreme fire weather (CSIRO/BOM, 2024). The trend of a longer fire season and increased number of dangerous fire weather days is projected to continue. Climate change is contributing to these changes in fire weather including by affecting temperature, relative humidity and associated changes to the fuel moisture content (CSIRO/BOM, 2024).

The Loddon Mallee Bushfire Management Strategy also states that in Victoria, climate change is forecast to extend the length of the fire danger period, make bushfires larger, more severe and frequent, and increase the frequency of days of elevated fire danger (DELWP, 2020b).

Climate change trends associated with the risk of bushfire, support the adoption of a precautionary and conservative approach in identifying and responding to the risk. However, as CFA and DTP have no published policy on FFDI recurrence intervals there is 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 system⁶.

⁶ In Alpine areas of Victoria an FFDI 50 applies for determining BALs using Method 1 of AS 3959:2018.

Table 1 - Fire Danger Ratings (AFDRS, 2022).

Forest Behaviour Index	Fire Danger Rating (FDR)	Fire Behaviour	Action
>=100	Catastrophic	If a fire starts and takes hold, lives are likely to be lost.	<ul style="list-style-type: none"> ○ These are the most dangerous conditions for a fire. ○ Your life may depend on the decisions you make, even before there is a fire. ○ For your survival, do not be in bushfire risk areas. ○ Stay safe by going to a safer location early in the morning or the night before. ○ If a fire starts and takes hold, lives and properties are likely to be lost. ○ Homes cannot withstand fires in these conditions. You may not be able to leave and help may not be available.
50-99	Extreme	Fires will spread quickly and be extremely dangerous.	<ul style="list-style-type: none"> ○ These are dangerous fire conditions. ○ Check your bushfire plan and that your property is fire ready. ○ If a fire starts, take immediate action. If you and your property are not prepared to the highest level, go to a safer location well before the fire impacts. ○ Reconsider travel through bushfire risk areas. ○ Expect hot, dry and windy conditions. ○ Leaving bushfire risk areas early in the day is your safest option.
24-49	High	Fires can be dangerous.	<ul style="list-style-type: none"> ○ There is a heightened risk. Be alert for fires in your area. ○ Decide what you will do if a fire starts. ○ If a fire starts, your life and property may be at risk. The safest option is to avoid bushfire risk areas.
12-23	Moderate	Most fires can be controlled.	<ul style="list-style-type: none"> ○ Stay up to date and be ready to act if there is a fire.

5.5 Landscape assessment

5.5.1 Location description and context

The Bendigo Regional Employment Precinct is located in an agricultural landscape 1 km south-west of Marong and 7 km west of Bendigo.

To the east is a significant area of bushland comprising the Bendigo Regional Park and Greater Bendigo National Park (see Map 1 and Map 3). These areas of bushland continue in a fragmented shape to the south including the larger Shelbourne Nature Conservation Reserve 3 km from the site. Land to the north and west is predominantly cleared farmland for 20 km except for Wilsons Hill Bushland Reserve closer to the site. Bendigo, 7 km east of the precinct largely comprises low threat urban-residential land.

5.5.2 Broader landscape scale hazard

To assist in assessing landscape risk, four 'broader landscape types', representing different landscape risk levels, are described in the technical guide *Planning Applications Bushfire Management Overlay*⁷. These descriptors are intended to streamline decision-making and support more consistent decisions based on the landscape risk (DELWP, 2017).

The four types range from low risk landscapes, where there is little hazardous vegetation beyond 150 m 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 3959:2018 presumptions (see Table 2).

The landscape setting of the Bendigo Regional Employment Precinct accords best with the lower risk Landscape Type 2 with some elements of Landscape Type 3 given the potential for a fully developed Grassfire to threaten from the northwest, west or southwest of the Precinct.

The overall bushfire landscape hazard is considered low-moderate.


The bushfire history in the region is shown in Map 3, which shows that the site has not been affected by bushfire in recent history. The most significant fire in the Bendigo area was 9 km to the east of the site and occurred as part of the 2009 'Black Saturday' fires. The closest bushfire recorded to have occurred was in the 1990 fire season 5 km to the north. A large grassfire in the 2006 season impacted farmland 5 km to the west and in the 1981 season 10 km to the south.

The land tenure within the BREP has been identified as 'freehold – moderate risk' in the FFMV risk mapping of the region and in the Marong Township Structure Plan. Wilsons Hill Bushland Reserve to the north-west of the BREP is identified as 'freehold – high risk' (TerraMatrix, 2023).

The development of the precinct will provide a large, reliably low threat area that could provide a place of safety during bushfire. Maiden Gully, which has a Neighbourhood Safer Place (NSP) at the primary school and residential areas not in a designated BPA (non-BPA land in Map 3) is the nearest existing place of relative safety, with Marong township offering smaller areas of relative safety less than 1 km to the north-east.

⁷ Only two small areas of the precinct are covered by the BMO, but the broader landscape types provide a useful description of landscape-scale risk.

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

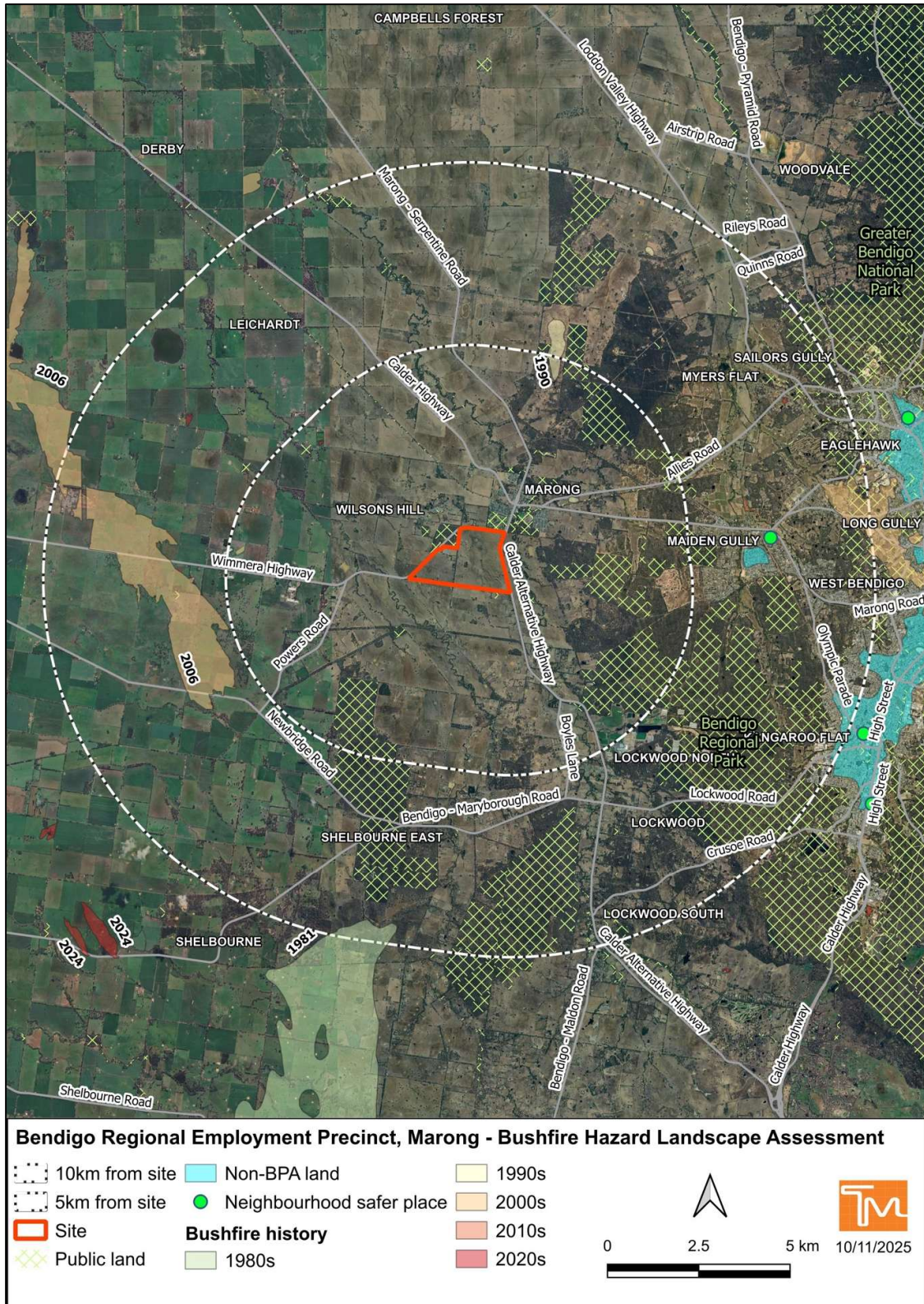
Broader Landscape Type 1	Broader Landscape Type 2	Broader Landscape Type 3	Broader Landscape Type 4
<ul style="list-style-type: none"> • There is little vegetation beyond 150 metres of the site (except grasslands and low-threat vegetation). • Extreme bushfire behaviour is not possible. • The type and 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. • Evacuation options are limited or not available. • Fires have hours or days to grow and develop before impacting.
			

5.5.3 Local and neighbourhood scale hazard

A bushfire could develop in Wilsons Hill Bushland Reserve and approach the BREP through treed vegetation, or burn through the reserve as part of a larger grassfire threatening the precinct. While Wimmera Highway and Osullivans Road provide some non-vegetated land in this direction for parts of the precinct, but a bushfire could cross these breaks and directly impact the site under a north-westerly, westerly or southwesterly wind scenario.

Most of the remaining land within the local landscape up to 1 km from the site comprises paddocks and a grassfire risk in most directions, however, perimeter roads on all boundaries protect the precinct somewhat, and once the BREP is developed, large areas of relative safety from grassfire will be available within the precinct.

Good access for people in the Bendigo Regional Employment Precinct will be available to other low threat or non-vegetated areas in Marong, or further afield, the low threat and non-BPA locations of Bendigo.



Map 3 - Bushfire hazard landscape assessment.



Map 4 - Bushfire hazard neighbourhood and local assessment.

5.6 Agency strategies and plans

5.6.1 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. The RBPA does not identify any specific issues for Marong or the Precinct.

5.6.2 Loddon-Mallee Bushfire Management Strategy 2020

Strategic bushfire management planning in Victoria is jointly delivered by FFMVic, CFA, FRV, EMV and local government. A key output is a Bushfire Management Strategy for each of the six planning regions that cover the state. Each strategy informs more detailed operational-level planning, including municipal fire prevention planning, the Joint Fuel Management Program, and readiness and response planning.

The CoGB is in the region covered by the Loddon-Mallee Bushfire Management Strategy. No specific issues in the strategy are identified pertaining to the Precinct or Marong. House loss modelling shows that the study area is in a least risk part of the region (DELWP, 2020b).

The strategy does, however, note that the hot, dry climate of the region means destructive bushfire events can occur under lower fire danger conditions, such as days with a fire danger rating of low to moderate (with temperatures of 20° C, surface winds at 20 km/hr and relative humidity of 20%) that can often support fast-running grass and scrub fires (DELWP, 2020b).

5.6.3 City of Greater Bendigo Municipal Fire Management Plan

A Municipal Fire Management Plan (MFMP) has been prepared for the City of Greater Bendigo (City of Greater Bendigo MEMPC, 2023).

The MFMP identifies the risk profile of the City of Greater Bendigo and the extensive areas of box/ironbark trees and grazing/cropland around Bendigo, which carry bushfire and grassfire risks to the communities respectively (City of Greater Bendigo MEMPC, 2023).

5.6.4 Joint Fuel Management Program

There are no Fire Management Zones or mechanical fuel management scheduled in the immediate vicinity of the Bendigo Regional Employment Precinct (FFMVic, 2025) other than a small area of

Landscape Management Zone in Wilsons Hill Bushland Reserve, which indicates the relative low risk nature of the location.

Further afield, public land in Bendigo Regional Park and Greater Bendigo National Park comprises all four types of Management Zones (see Figure 13), where planned burning will focus on maintaining and improving ecosystem resilience, and fuel management will also be undertaken for risk reduction (FFMVic, 2025).

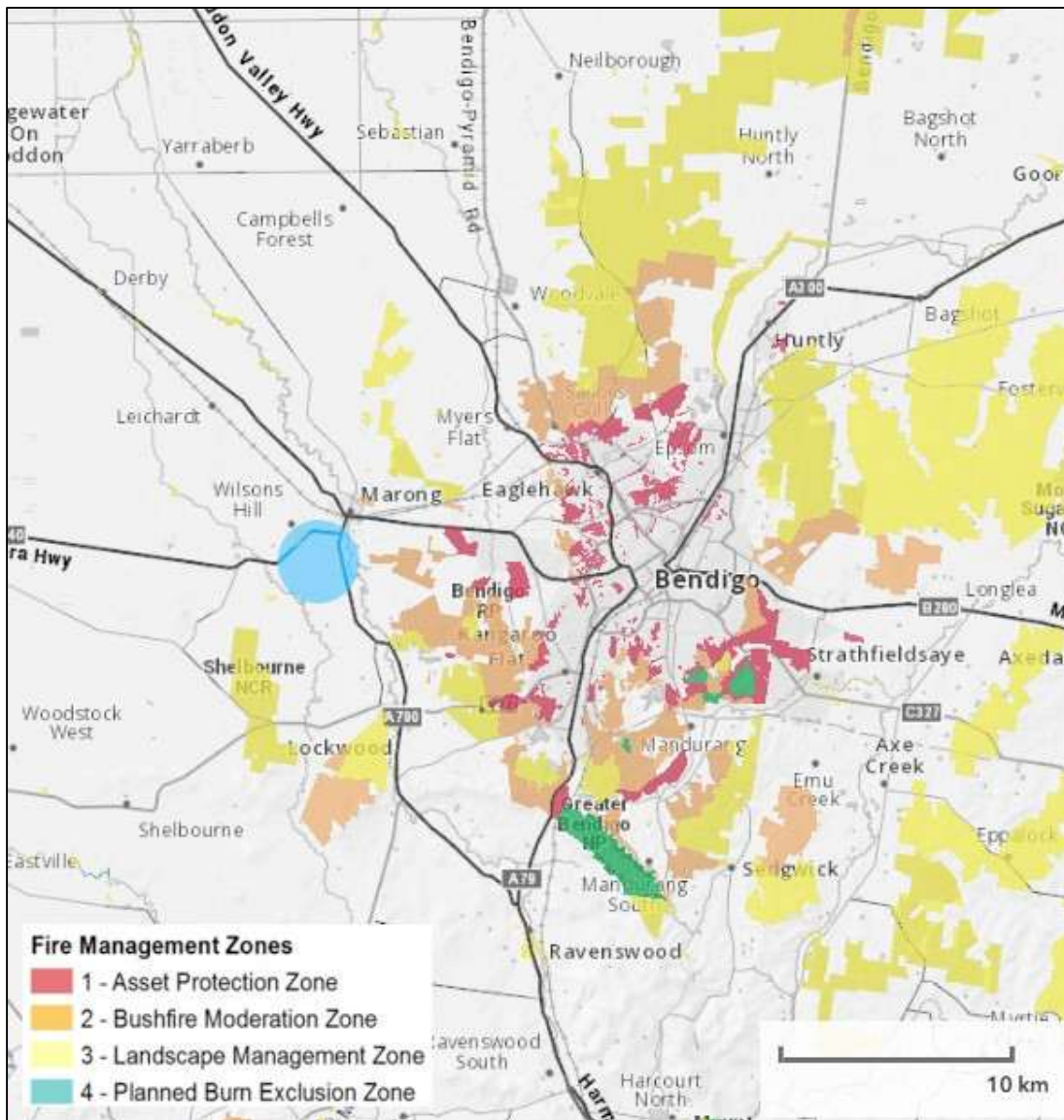


Figure 13 - Fire Management Zones in the vicinity of the Bendigo Regional Employment Precinct (FFMVic, 2025). Approximate location of the BREP shown in blue circle.

6 Planning and design response

This section identifies how future development can respond to the bushfire risk, including the requirements of Clause 13.02-1S, published CFA and DTP guidance and the building regulations applicable to construction in a BPA.

6.1 Building setbacks

6.1.1 Setback distances

The 'Settlement planning' strategies at Clause 13.02-1S include:

- *'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 3959-2018 Construction of Buildings in Bushfire-prone Areas (Standards Australia, 2018).*
- *'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 3959-2018'* (Clause 13.02-1S Greater Bendigo Planning Scheme).

All future buildings, regardless of whether they are a building class that requires construction to a BAL under the Victorian building regulations, should be sufficiently setback⁸ from classified vegetation so that radiant heat flux will be less than 12.5 kW/m². The setbacks required for Grassland, Woodland and Forest, based on the hazard assessment in Section 5 and determined using the simple Method 1 procedure of AS 3959:2018, are shown in Table 3.

Potential low threat setbacks from existing and potential future hazardous vegetation are shown in Map 5, within which any vegetation must be maintained in a low threat state or be non-vegetated (e.g. road). The setbacks need to be measured from the edge of any classified vegetation.

Classified vegetation outside of the precinct includes:

- Dry crops and pasture (classified as Grassland) in all directions.
- Areas of treed vegetation with an unmanaged understory on private land and in Wilsons Hill Bushland Reserve and Marong Recreation Reserve (classified as Woodland)
- A eucalyptus plantation to the south of the BREP (classified as Forest).

⁸ 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:

- 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 (Standards Australia, 2020).

Classified vegetation within the precinct could comprise conservation reserves and drainage reserves, including:

- Woodland (e.g. patches of trees in the precinct shown in Map 2 or unmanaged treed vegetation within conservation/open space reserves shown in Figure 1 and Map 5).
- Grassland (e.g. where left unmanaged in undeveloped stages or within drainage reserves).

The size of the reserves, their setback from buildings and other patches of classified vegetation, and how the naturally occurring and/or planted vegetation within them is managed during the fire danger period, will determine whether they are excludable as non-hazardous vegetation.

Classified vegetation outside and within the BREP is likely to all be in the 'All upslopes and flat land' slope class, however, this will be determined at the applicable stage for each development application as required by the draft DPO ordinance.

The setbacks would need to comprise low threat vegetation or non-vegetated areas.

Table 3 - Setbacks for BAL-12.5.

Slope class	Vegetation	BAL-12.5 setback distance (defendable space)
All upslopes and flat land	Grassland	19 m
	Woodland	33 m
	Forest	48 m

6.1.2 Interface design

The low threat setback can be achieved by a one or more of:

- Setbacks within lots.
- Perimeter roads around the precinct or around internal reserves/development stages.
- Managed low threat or non-vegetated land within or adjacent to reserves.

6.1.3 Perimeter roads

Perimeter roads are a useful feature to provide non-vegetated separation of development from an enduring hazard and to facilitate property protection and fire fighting (see Figure 14). Perimeter roads should meet the guidelines detailed in *Vehicle Access and Water Supply Requirements in Residential Developments* (CFA, 2022b).

Existing perimeter roads are in place along most of the northern (Wilsons Hill Road), western (Wimmera Highway and Osullivans Road), eastern (Calder Alternative Highway) and southern (Cemetery Road) boundaries. The only section not currently provided with a perimeter road is the southern interface of Wilsons Hill Bushland Reserve where it intersects the hydrology line marked as Wilsons Hill Channel (see watercourse in Map 2). This interface would benefit from the addition of a perimeter road. The provision of perimeter roads between development and permanent bushfire hazards should be a requirement in the DPO ordinance.

Perimeter roads should also be considered for any substantial conservation or drainage reserves to be created within the precinct and could provide most (or all) of the low threat development setback required in response to Grassland or Woodland. If the perimeter roads are to form part of the low threat setback, the roadsides will need to be maintained in a low threat state.

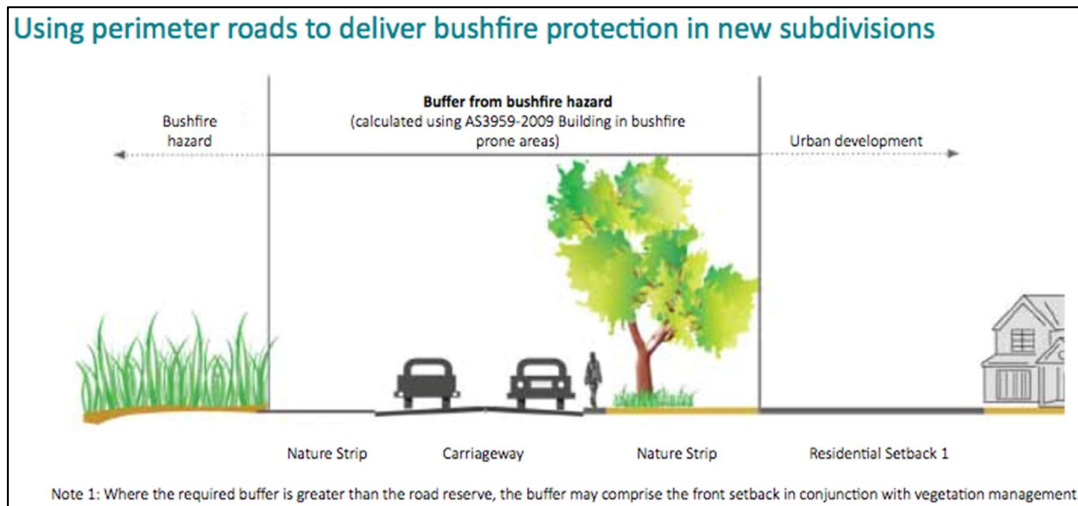


Figure 14 - Illustration of a perimeter road to provide required development setbacks (DELWP, 2015).

6.2 Bushfire Attack Level (BAL) construction standard

6.2.1 Industrial or commercial buildings

Industrial and commercial buildings are typically not of a building class that is required by the Victorian building regulations to be built to a BAL construction standard⁹. Thus, whilst they need to be sufficiently setback from classified vegetation (see Section 6.1), they will not need to be built to a BAL.

6.2.2 Accommodation buildings

We understand that the precinct is not intended for residential use. If, however, any Class 1, 2 or 3 buildings are to be built, they will need to be setback the required distance from classified vegetation (see Section 6.1.1) and constructed to a minimum BAL-12.5 in accordance with AS 3959:2018 *Construction of buildings in bushfire prone areas* or, for Class 1 buildings and associated decks only, the NASH Standard – *Steel Framed Construction in Bushfire Areas* (NASH, 2021).

⁹ Unless they are covered by the Bushfire Management Overlay (BMO) and trigger the requirement for a planning permit. *N.B.* Terramatrix recommends the BMO affected areas on the site be a 'building exclusion zone' and be prioritised for uses that will serve as low threat or non-vegetated development setbacks (see Section 6.7).

6.3 Access and egress

The *Design Guidelines: Settlement Planning at the Bushfire Interface* (DELWP, 2020a) list the elements of an effective road network as:

- Ensuring the spacing of roads leading away from the hazard are no more than 120 m apart on average.
- Designing road widths to meet planning scheme requirements and those of the relevant fire authority.
- Providing multiple roads leading away from the hazard edge.
- Ensuring travel to and from a location is not alongside a bushfire hazard and providing multiple access and egress routes within developed areas to minimise the use of perimeter roads during bushfire.
- Effectively connecting roads to the broader road network within the settlement (DELWP, 2020a).

The precinct is adjacent to multiple existing roads connect to it to the perimeter of the precinct (Wilsons Hill Road, Wimmera Highway, Cemetery Road and Calder Alternative Highway) and Osullivans Road intersects the precinct, providing access to areas within it. It is anticipated that development of the BREP will create additional corridors of access within and around the precinct for occupants and emergency services.

Future subdivisions should be designed to achieve the relevant characteristics outlined above¹⁰ and provide adequate emergency vehicle access (see CFA, 2022b). This requirement should be included in the DPO intended to guide development in the precinct.

6.4 Vegetation management within the precinct

Vegetation on private property throughout the precinct should be maintained in a low threat state. This requirement has not been included in the draft DPO, however, it states that existing controls in a BPA and the BMO will apply to guide development in the precinct. These controls include management of vegetation in areas set aside for low threat development setbacks.

Table 6 to Clause 53.02-5 in the Greater Bendigo planning scheme can be used as a guide to managing vegetation in a low threat condition:

- Grass must be short cropped and maintained during the declared fire danger period.
- All leaves and vegetation debris must be removed at regular intervals during the declared fire danger period.
- Within 10 metres of a building, flammable objects must not be located close to the vulnerable parts of the building.
- Plants greater than 10 centimetres in height must not be placed within 3 metres of a window or glass feature of the building.
- Shrubs must not be located under the canopy of trees.

¹⁰ The first dot point relating to the frequency of roads leading away from the hazard is intended for residential areas and may be more than is required for an industrial/commercial area.

- Individual and clumps of shrubs must not exceed 5 square metres in area and must be separated by at least 5 metres.
- Trees must not overhang or touch any elements of the building.
- The canopy of trees must be separated by at least 5 metres.
- There must be a clearance of at least 2 metres between the lowest tree branches and ground level (Clause 53.02-5, Greater Bendigo Planning Scheme).

Note these requirements apply within the BMO affected parts of the site and could be varied elsewhere within the BREP where they relate to the required development setbacks within a BPA only.

6.5 Bushfire (Site) Management Plan

The draft DPO states that a Bushfire Management Plan is required for any development plan ‘to demonstrate where the required bushfire protection measures apply, how they will be met and implemented on an ongoing basis for lots outside of the Bushfire Management Overlay.’ (VPA, 2025).

As the precinct is to be developed in stages, the Bushfire Management Plan must show non-vegetated or low threat setbacks (e.g. grass cut to less than 100 mm in height during the declared Fire Danger Period) around BAL-12.5 development areas.

6.6 Excision of areas from the BPA

As development progresses and the hazard (vegetation) is removed, some land within the Bendigo Regional Employment Precinct will become eligible to be excised from the BPA. DTP review and excise areas from the BPA approximately every 6 months, particularly in growth areas where the hazard is removed as urban development occurs.

Areas that may be eligible for excision as urban development progresses are:

- Land more than 60 m from classified Grassland, e.g. from the pasture and cropping outside precinct or grassland drainage or conservation reserves; and
- Land more than 300 m from classified Forest or Woodland, e.g. from bushland reserves.

6.7 Areas covered by the BMO

Two small areas of land within the BREP and adjacent to the north-west boundary of the precinct are covered by the BMO. Any development application for buildings and works and/or subdivision of future lots impacted by the BMO are required to meet the objectives in Clause 44.06 by applying the bushfire protection measures at Clause 53.02 in the Greater Bendigo Planning Scheme.

This will necessitate that relevant development planning applications within the BREP that are covered by the BMO include the following:

- a **bushfire hazard site assessment** – determining the hazard within 150 m of the site.

- a **bushfire hazard landscape assessment** – determining the hazard beyond 150 m and up to 20 km from the site.
- a **Bushfire Management Statement** – demonstrating how the application meets all the objectives of the BMO via the approved and/or alternative measures of Clause 53.02 in the Bendigo Planning Scheme.
- a **Bushfire Management Plan** – demonstrating how the water supply, access, defensible space and construction requirements are met on the site (*n.b.* this should not be confused with the DPO requirement to provide a Bushfire (Site) Management Plan).

6.8 Incorporating bushfire protection measures in the DPO

Requirements in the DPO are intended to address bushfire risk early in the planning process and control development at the planning permit stage. The proposed bushfire requirements in the draft ordinance include:

- *‘A site master plan... that identifies bushfire hazard areas and relevant setbacks.*
- *A bushfire management plan to demonstrate where the required bushfire protection measures apply, how they will be met and implemented on an ongoing basis for lots outside of the Bushfire Management Overlay.*
- *Implementation of bushfire protection measures as identified in the relevant bushfire management plan along the Wimmera Highway on the western boundary... and in the nature strips fronting the Wilsons Hill Bushland Reserve.’ (VPA, 2025)*

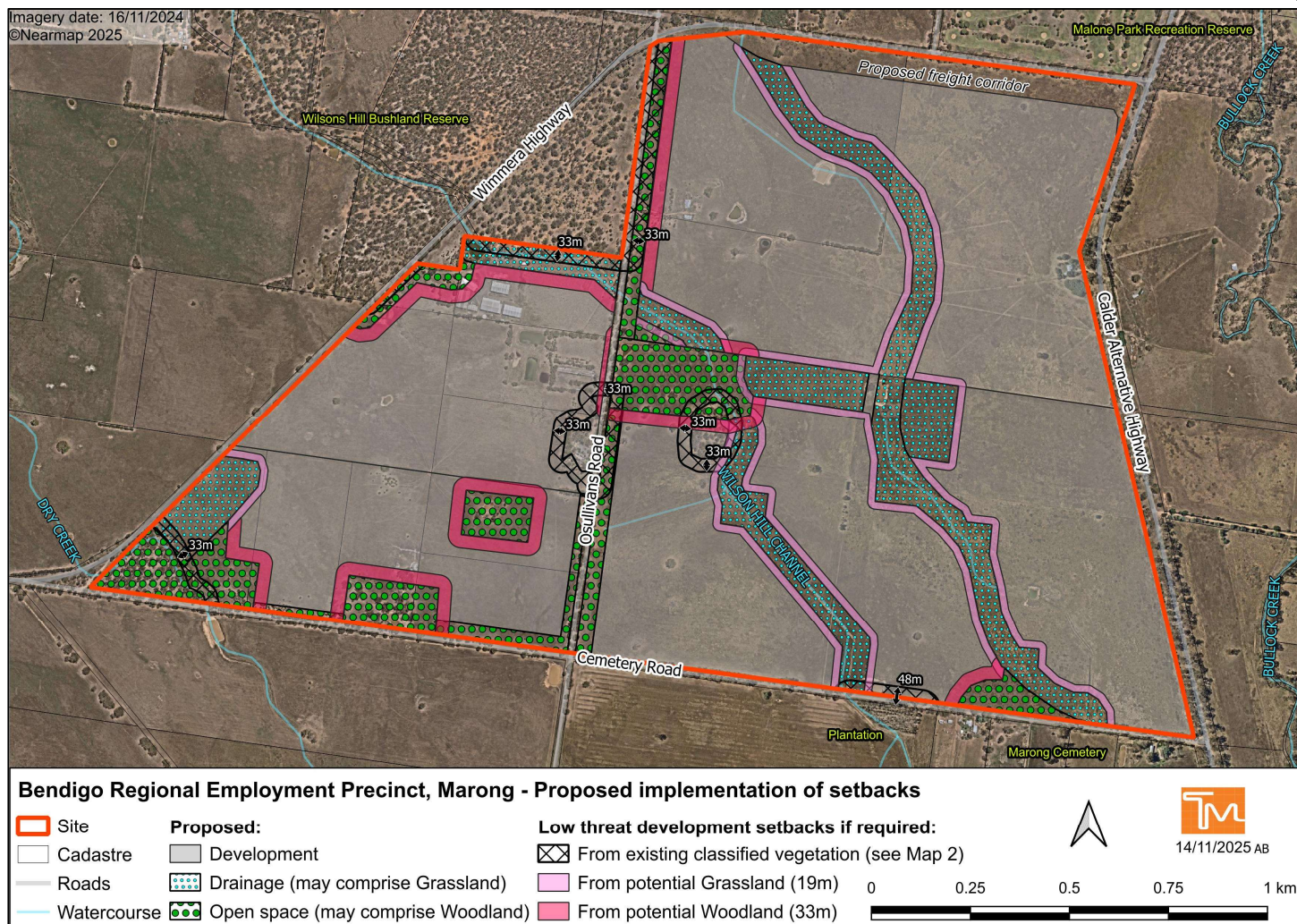
The bushfire protection measures in the draft DPO call for special consideration of the interface with Wilsons Hill Bushland Reserve, which has been identified as comprising a Woodland hazard in Section 5. In response, low threat development setbacks for 33 m will be required from any classified vegetation within the proposed reserves abutting Wilsons Hill Bushland Reserve, which is shown in Map 5.

Setbacks will also apply from the edge of hazardous (unmanaged) vegetation within the precinct, which may include Woodland in the proposed open space reserves (for 33m) and Grassland in the proposed drainage reserves (for 19 m). The setbacks can be managed within the reserve, provided over a perimeter road along the hazard interface, or provided as low threat development setback within individual lots (see Map 5). Setbacks need not apply from vegetation that is managed in a low threat state (see Section 6.4) and/or is excludable under Section 2.2.3.2 of AS 3959:2018.

Additional bushfire protection measures that should be considered in the DPO are:

- Provision of perimeter roads along the interface with areas of enduring bushfire hazard.
- Vegetation on private property to be maintained in a low threat condition.
- Requirement for the Bushfire Management Plan to identify and confirm:
 - The design and layout of the subdivision, including lot layout, road design and access points, both vehicular and pedestrian
 - The staging of development.

- Management of interim bushfire hazards that occur between completed stages and land that has yet to be developed.
- The identification of any areas to form the setback between a bushfire hazard and built form.
- Notation that indicated what authority is responsible for managing vegetation within open space areas and public realms.
- The details of any bushfire protection measures required for individual lots.
- Multiple points of access and egress for occupants and emergency services at all stages of construction and after completion.



Map 5 – Proposed setbacks from ongoing hazards within and around the BREP. N.B. the setbacks to be implemented will depend on the final form of vegetation within the precinct; if managed as low threat (see Section 6.4) and/or excludable under Section 2.2.3.2 of AS 3959:2018, development setbacks need not apply.

7 Clause 13.02-1S Bushfire Planning

The following sub-sections provide a summary response about how the planning scheme amendment responds to the objective and strategies for bushfire safety in the Policy Planning Framework at Clause 13.02-1S.

7.1 Protection of human life strategies

Clause 13.02-1S requires that the priority be given to protection of human life.

Prioritising the protection of human life over all other policy considerations

As identified in Section 5.5, the Bendigo Regional Employment Precinct is in a low-moderate bushfire risk location. The protection of human life can be prioritised by:

- Ensuring development is located where a BAL-12.5 or BAL-LOW could be achieved (i.e. providing setbacks for future buildings from unmanaged vegetation, such that radiant heat impacting upon the buildings can be expected to be below 12.5 kW/m², as shown in Map 5).
- Applying the existing building regulations for construction in a BPA.
- Applying the bushfire protection measures at Clause 53.02 for areas of the site that are covered by the BMO.
- Providing access and water supplies for fire fighting.

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.

If development is setback sufficiently from any hazardous vegetation such that it achieves no more than a BAL-12.5 rating, the risk can be acceptably mitigated. The nearest *lowest* risk locations are the urban-residential areas of Marong and Bendigo to the west of the precinct (see Map 1). Areas within the precinct will be able to offer places of relative safety once developed.

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 for development in the precinct.

7.2 Bushfire hazard identification and assessment strategies

Clause 13.02-1S requires that the bushfire hazard be identified, and 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 Practice Note 64 Local planning for bushfire protection* (DELWP, 2015), *Planning Advisory Note 68 Bushfire State Planning Policy Amendment VC140* (DELWP, 2018) and *Planning Permit Applications – Bushfire Management Overlay, Technical Guide* (DELWP, 2017).

The type and extent of (hazardous) vegetation within and around the precinct has been identified. Classification is 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.

Publicly available contour data for the area was accessed which, along with the site assessment, determined that the topography is benign from a bushfire perspective.

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 discussed in Section 5.4.

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 4.2) and is shown in Map 3. This is based on the most recent BPA mapping for the state.

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

BMO coverage reflects the extant BMO mapping in the City of Bendigo.

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 regional, municipal and local (site and neighbourhood) scale (see Section 5).

At the site scale, the assessment classified vegetation and topography within a 150 m assessment zone around the precinct.

At the neighbourhood and local landscape scale a 400 m and 1 km buffer has been applied within which the hazard has been assessed (see Map 4).

A 10 and 20 km radius of the precinct has been applied (see Map 3) in accordance with guidance about assessing risk for planning scheme amendments provided in the Planning Advisory Note 68 (DELWP, 2018) 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.

The CFA were contacted prior to the drafting of the DPO and provided an emailed response on 10/04/2025, which informed the Preliminary Advice provided to the VPA by Terramatrix. The DPO draft was then provided to Terramatrix to inform the writing of this report. The relevant fire authority are expected to provide comments during public consultation.

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.

DTP and CFA advisory and practice notes, Clause 13.02-1S and the building regulations invoked by the BPA coverage, 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. Relevant regional bushfire plans have been identified, reviewed and incorporated into this assessment as appropriate.

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.

The risk will be acceptably mitigated by the proposed ordinance if the bushfire protection measures are implemented (see Section 6.8) via a Bushfire (Site) Management Plan for each development proposal, which should include:

- Identification of hazards.
- Low threat setbacks so that development will not be exposed to an RHF greater than 12.5 kW/m². Provisions should be made for how the setbacks will be implemented during the construction phase and in the long term.
- Access and egress for occupants and emergency service personnel.
- How vegetation will be managed on private and/or private land where it relates to the provision of low threat setbacks.

7.3 Settlement planning strategies

Clause 13.02-1S requires that settlement planning must strengthen the resilience of settlements and communities and prioritise protection of human life.

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 3959-2018 Construction of Buildings in Bushfire-prone Areas (Standards Australia, 2018).

The applicable distances for development to be setback from classifiable vegetation, such that RHF is calculated to not exceed 12.5 kW/m² have been identified. Taking into consideration the assessment of landscape risk, implementation of these can be deemed to acceptably mitigate the risk.

Ensuring the availability of, and safe access to, areas assessed as a BAL-LOW rating under AS 3959-2018 Construction of Buildings in Bushfire-prone Areas (Standards Australia, 2018) where human life can be better protected from the effects of bushfire.

The nearest existing low risk locations are the urban areas of Marong and Maiden Gully (7 km east of the precinct) that are not a designated BPA (see Map 3). Upon completion of development, areas within the precinct would be able to be assessed as BAL-LOW.

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.

There will be no increase in risk to existing residents or community infrastructure if:

- Development is setback from hazardous vegetation such that RHF is calculated to not exceed 12.5 kW/m², an appropriate water supply for fire fighting is provided via a reticulated hydrant system (supplemented by static water supplies if required under NCC 2022), and appropriate access/egress for emergency vehicles and workers is provided via a conventional road network.
- It is ensured that any hazardous vegetation retained or re-established, does not create an increase in the hazard exposure for neighbouring properties.
- Development of the precinct will create a large area of low threat and non-vegetated land in a regional area, which will be consistent with the planning definition of 'low risk' (where RHF is calculated to be below 12.5 kW/m²).

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.

This report assesses the risk at a range of scales.

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

No alternative low risk development locations have been identified or assessed as part of this study.

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 3959:2018

If the setback distances from any hazardous vegetation, as identified in this report, are implemented, then a BAL rating not exceeding BAL-12.5 will be achieved.

In the future, parts of the Bendigo Regional Employment Precinct may be excised from the BPA, in which case buildings in non-BPA parts of the precinct would be rated BAL-LOW.

7.3.1 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 biodiversity impacts associated with the findings of this bushfire assessment.

7.3.2 Use and development control in a Bushfire Prone Area

Clause 13.02-1S 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'* (Clause 13.02-1S, Greater Bendigo Planning Scheme).

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' (Clause 13.02-1S, Greater Bendigo Planning Scheme).*

The DPO requirement for a BMP will ensure bushfire risk is considered and responded to in future development applications.

8 Conclusion

This study has assessed the bushfire hazard in and around the Bendigo Regional Employment Precinct, in accordance with Clause 13.02-1S in the Greater Bendigo Planning Scheme, the BMO/AS 3959:2018 methodology invoked by the Victorian planning and building system, and additional guidance provided in DTP planning and advisory notes, including:

- *Local planning for bushfire protection, Planning Practice Note 64 (DELWP, 2015).*
- *Planning Permit Applications – Bushfire Management Overlay, Technical Guide (DELWP, 2017)*
- *Bushfire State Planning Policy Amendment VC140, Planning Advisory Note 68, (DELWP, 2018).*

The precinct is in a designated BPA and has two small areas of BMO coverage.

The precinct is in a low-moderate bushfire risk landscape. In the directions from which a bushfire threat typically arises (north, north-west, west or south-west) the landscape is generally pastoral with the exception of Wilsons Hill Bushland Reserve.

If future development can be setback sufficiently from any hazardous vegetation so that radiant heat flux will not exceed 12.5 kW/m², and other bushfire protection measures are applied as outlined in this report, the bushfire risk can be acceptably mitigated.

There are low risk urban-residential and township areas in Marong and Maiden Gully 7 km east of the precinct, which offer places of relative safety from any bushfire. Large parts of the precinct will comprise low threat land that also offers safety.

The topography within and around the precinct is benign, with no significant changes in elevation or slopes that would significantly exacerbate the bushfire attack. For the purpose of determining setbacks from classified vegetation, the applicable slope class is 'All slopes and flat land'.

The type and extent of (hazardous) vegetation within and around the precinct has been identified and classified into AS 3959:2018 vegetation groups, based on EVC mapping, aerial imagery and site assessment. The classification is based on the current and likely future state of the vegetation. The

hazard assessment identified Grassland, Woodland and Forest within the 150 m site assessment zone.

If any conservation and drainage reserves are proposed, they could comprise classified Grassland or Woodland, depending on what vegetation is retained or re-established and how it is managed into the future. Development adjacent to these areas will be required to provide setbacks commensurate with no more than BAL-12.5.

Parts of the precinct will be able to be excised from the BPA as development permanently removes the bushfire hazard.

Perimeter roads around the precinct and around large conservation and drainage reserves containing classified vegetation should be incorporated to contribute to the setbacks for future development from any potentially hazardous vegetation, and to facilitate property protection and fire fighting. Much of the perimeter of the precinct is bounded by existing roads.

Good access and egress for emergency management vehicles and residents, in the event of a bushfire, can be achieved via a conventional road network with multiple links to existing roads.

A reliable water supply for fire fighting can be provided via a reticulated hydrant system.

The proposed DPO34 does not compromise or duplicate the existing bushfire controls in the planning and building system applicable within the precinct, as detailed in this report. It will enable the responsible authority to consider the bushfire risk early on at the development planning application stage. It is therefore also deemed to adequately address the bushfire risk in accordance with Clause 13.02-15 of the Greater Bendigo Planning Scheme.

9 References

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10 Appendix: BAL construction standards

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 4 kW/m ² pain to humans after 10 to 20 seconds exposure. Critical conditions at 10 kW/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 12.5 kW/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 19 kW/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 29 kW/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 42 kW/m ² ignition of cotton fabric after 5 seconds exposure (without piloted ignition).
BAL- FZ (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 45 kW/m ² ignition of timber in 20 seconds (without piloted ignition).

Adapted from Standards Australia (2020).