Bushfire Development Report

to inform the
Ballarat North Precinct Structure Plan

Prepared for
Victorian Planning Authority

August 2025

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Terramatrix project code: VPA-2025-01 Cl1302_BPA-Ballarat North

Cover image – Looking north from Sims Road towards Mount Rowan.

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Version control

Version	Date	Comments	Distribution
1.0	2025-07-12	Draft Bushfire Development Report	To Alison Fong - VPA
1.1	2025-08-06	Amended BDR inc. VPA feedback	To Alison Fong - VPA
1.2	2025-08-28	Updated street cross section	To Alison Fong - VPA

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GLOSSARY

AS 3959:2018	AS 3959:2018 *Construction of buildings in Bushfire Prone Areas.* 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	*Bushfire Attack Level* - 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	*Bushfire Management Overlay* - 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	*Bushfire Prone Area* - An area that is subject to, or likely to be subject to, bushfire attack as determined by the Minister for Planning.
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 *Construction of buildings in bushfire prone areas*.
CFA	*Country Fire Authority*
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	*Ecological Vegetation Class* - 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	*Forest Fire Danger Index* – 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	*Fire Rescue Victoria*
PSP	*Precinct Structure Plan* – 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	*Radiant heat flux* - 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	*Victorian Planning Authority*

1 Summary

The Victorian Planning Authority are preparing the Ballarat North Precinct Structure Plan, to guide the future urban development of land to the north of the existing urban area.

The precinct is wholly within a Bushfire Prone Area (BPA) and partially covered by the Bushfire Management Overlay (BMO). The PSP constitutes settlement planning and, as such, Clause 13.02-1S *Bushfire Planning* of the Ballarat Planning Scheme requires that bushfire risk be considered (Clause 13.02-1S, Ballarat Planning Scheme).

Key points:

- The precinct is within a designated BPA, and a small area around the Ballarat North Water Reclamation Plant is covered by the BMO.
- The site is close to the established urban area of Ballarat, that includes areas that would be rated as BAL-Low using the AS 3959:2018 site assessment methodology.
- Grassland and Forest, adjacent to and within the precinct, comprises a bushfire hazard that must be considered in the development and use of the precinct.
- A future reserve along Burrumbeet Creek is likely to comprise a bushfire hazard that must be considered in the development of adjacent land.
- The terrain within and around the precinct is benign from a bushfire perspective, being in the 'Flat land and all upslopes' or 'Downslopes >0-5º' slope classes.
- To achieve the BAL-12.5 rating required by Clause 13.02-1S *Bushfire Planning* for a strategic planning document that will result in the introduction or intensification of development in a BPA, buildings will need to be setback 19 m or 22 m from classified Grassland and 48 m or 57 m from classified Forest, depending upon the effective slope.
- Large areas of the precinct are available for BAL-12.5 development.
- The BMO should be retained over the Ballarat North Water Reclamation Plant.
- Those areas covered by the BMO that are more than 48 m or 57 m from classified Forest appear suitable for application of Schedule 1 to the in the Ballarat Planning Scheme.
- Much of the precinct is likely to be rendered low threat by the planned urban development and may 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 in the Ballarat North Precinct Structure Plan (PSP) area can respond to the bushfire risk and comply with the applicable planning and building controls that relate to bushfire, especially the objectives and strategies of the Planning Policy Framework (PPF) at Clause 13.02-1S *Bushfire Planning* and, where applicable, Clause 44.06 *Bushfire Management Overlay* (BMO) and associated Clause 53.02 *Bushfire Planning* in the Ballarat Planning Scheme.

The VPA are currently developing the Ballarat North PSP to guide the future urban development of the land. A staging plan is yet to be developed but it is assumed the precinct will be developed in stages over several years. The 'core' area which is the subject of this Bushfire Development Report will comprise approximately 6,000 lots and may be supplemented by an 'expanded' area of approximately 2,600-3,500 lots immediately to the north (VPA, 2025a).

The Ballarat North precinct is zoned Urban Growth Zone (UGZ). It is currently predominantly used for grazing, except for the Ballarat Town Common, which is a large area of public open space in the south-west corner of the precinct between the residential area of Miners Rest and the Ballarat North Water Reclamation Plant. The Town Common is also zoned UGZ but intended to be retained as open space.

The remaining UGZ land within the precinct will be made available for urban development in accordance with the draft Place Based Plan (PBP) (VPA, 2024).

All the precinct is a designated Bushfire Prone Area (BPA). Approximately 50 ha of land, adjacent to the Ballarat North Water Reclamation Plant, is also covered by the BMO.

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).

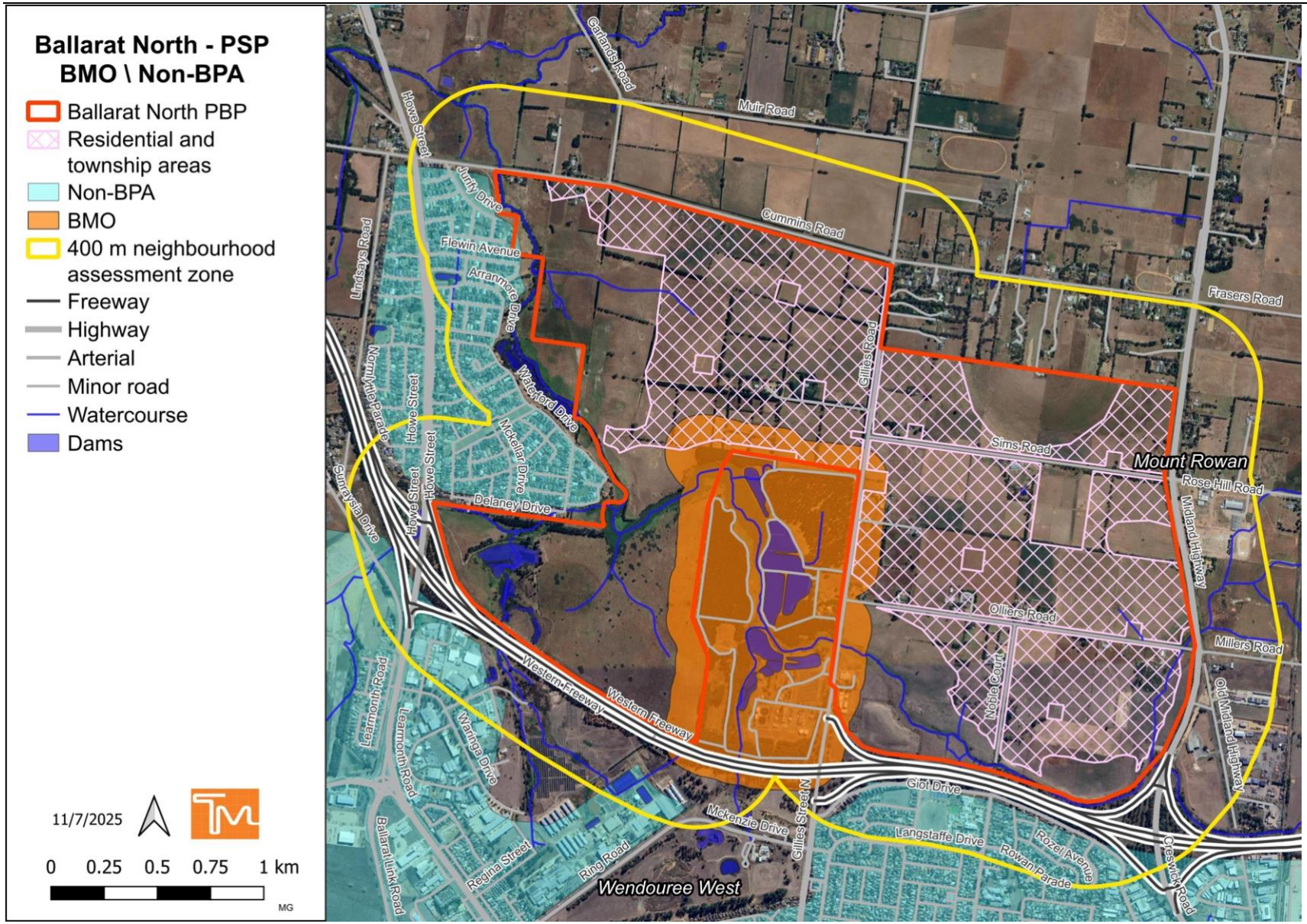
3 Overview of the precinct

The Ballarat North PSP area is located adjacent to the northern boundary of the current urban area of Ballarat (see Map 1), in the City of Ballarat local government area (LGA). The Ballarat North precinct comprises approximately 561 ha of land, generally bounded by:

- To the north - Cummins Road (western section) and residential properties south of Cummins Road (eastern section).
- To the west – Burrumbeet Creek reserve.
- To the south – Western Freeway.
- To the east – Midland Highway.

The draft PBP provides for approximately 6,000 lots, neighbourhood and local activity centres, government and non-government school sites, public open space and supporting infrastructure (VPA, 2024). The draft PBP showing the possible future urban form is shown in Figure 1.

This layout shows a linear reserve to be established along Burrumbeet Creek, that will cross the northern end of the Ballarat Town Common, and link to wetlands and pine plantations in the Ballarat North Water Reclamation Plant, before continuing to the eastern boundary of the precinct at the Midland Highway. There are likely to be drainage basins and wetlands established along Burrumbeet Creek and lesser drainage lines elsewhere in the precinct.



Map 1 - Location of the Ballarat North PSP area.

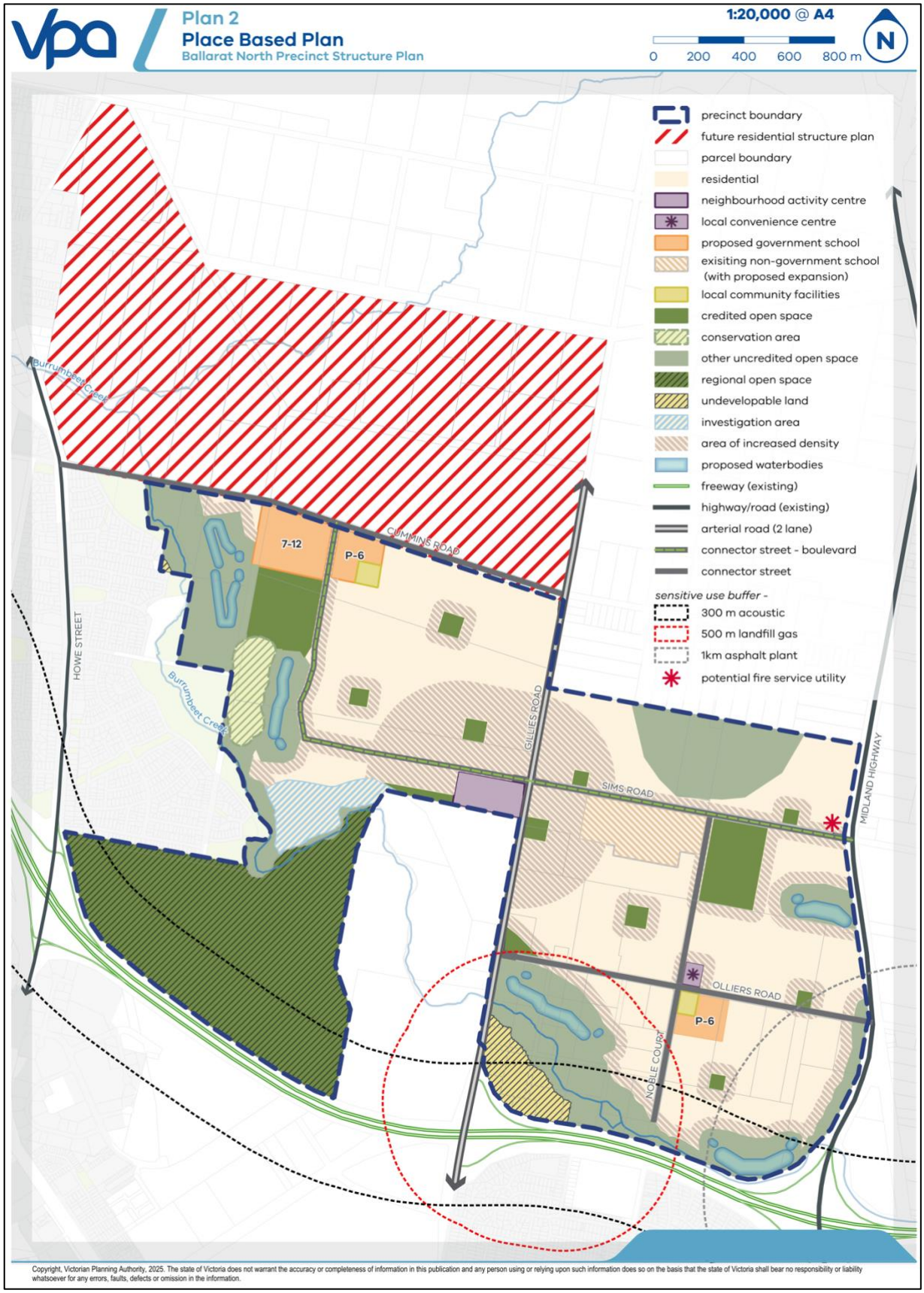


Figure 1 – Draft Place Based Plan (VPA, 2025b).

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 12.03-1S River and riparian corridors, waterways, lakes, wetlands and billabongs

As the Ballarat North precinct will incorporate a reserve along Burrumbeet Creek and considerable areas of wetland in drainage reserves adjacent to the residential areas, this Clause may have implications for the precinct. Strategies of the clause relevant to bushfire are:

- *'Retaining, enhancing and re-establishing indigenous riparian vegetation along waterway systems, ensuring it responds to the bushfire risk of a location.*
- *Retaining and re-establishing vegetation, including grasslands and canopy trees, surrounding waterway systems to enhance and connect to the landscape setting, ensuring it responds to the bushfire risk of a location'* (Clause 12.03-1S, Ballarat Planning Scheme).

4.1.2 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, Ballarat 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.

4.1.3 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, Ballarat 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, Ballarat 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 Ballarat North 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 dwellings and other development will not be exposed to radiant heat flux above 12.5 kW/m^2, which is commensurate with a BAL-12.5 construction standard.

The maximum 12.5 kW/m^2 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*' (Clause 13.02-1S, Ballarat Planning Scheme).

A detailed response to the strategies in Clause 13.02-1S and recommendations for development are provided in Section 7.

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, Ballarat Planning Scheme).

4.2 Bushfire Management Overlay

The purposes of Clause 44.06 *Bushfire Management Overlay* (BMO) 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 implemented.*
- *To ensure development is only permitted where the risk to life and property from bushfire can be reduced to an acceptable level'* (Clause 44.06, Ballarat Planning Scheme).

The BMO largely applies to patches of treed vegetation greater than 4 ha in size, where head fire intensity has been modelled to be 30,000 kW/m or more. It also extends over land 150 m around those areas, based on research into house loss from bushfires which has found that 92% of house loss occurs within 150 m of the bushfire hazard (DELWP, 2019).

The BMO requires a planning permit for all subdivision of land, and buildings and works associated with the following uses (some exemptions apply):

- Accommodation (including a small second dwelling)
- Child care or education centre

- Hospital
- Industry
- Leisure and recreation
- Office
- Place of assembly
- Retail premises
- Service station
- Timber production
- Warehouse.

A BMO application must be accompanied by:

- A *Bushfire hazard site assessment*, including a plan that describes the bushfire hazard within 150 m of the site in accordance with the site assessment methodology of *AS 3959:2018 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 150 m from the site.
- 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.

Section 5 of this report includes a bushfire hazard site and landscape assessment in accordance with the BMO application requirements.

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.

The extent of BMO coverage of the precinct is shown in Map 2. The BMO covers land within 150 m of the pine plantations at the Ballarat North Water Reclamation Plant.

A schedule to the BMO may specify substitute approved measures, additional alternative measures and additional or substitute decision guidelines. Future BAL-12.5 residential areas in the precinct that are currently within the BMO, would be suitable for application of the BMO1 'Ballarat BAL-12.5 Areas' (Schedule 1 to Clause 44.06, Ballarat Planning Scheme) (see Section

6.3).

4.3 Bushfire Prone Area (BPA)

BPAs are those areas subject to or likely to be subject to bushfire, as determined by the Minister for Planning. All land within the precinct is currently designated as a BPA, however as development occurs, much of the precinct will 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 2 shows the extent of BPA coverage in and around the precinct and 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 3[1] buildings, certain Class 9 and 4 buildings[2], and Class 10A buildings[3] or decks adjacent to, or connected with, these classes of buildings.

4.3.1 Accommodation buildings

For Class 1 buildings (dwellings) and associated Class 10A buildings or decks, the applicable performance requirement in the NCC is:

'A Class 1 building or a Class 10a building or deck associated with a Class 1 building that is constructed in a designated bushfire prone area must be designed and constructed to—

(a) reduce the risk of ignition from a design bushfire with an annual exceedance probability not more than 1:50 years; and

(b) take account of the assessed duration and intensity of the fire actions of the design bushfire; and

(c) be designed to prevent internal ignition of the building and its contents; and

(d) maintain the structural integrity of the building for the duration of the design bushfire. (ABCB, 2023).

The performance requirement for Class 1, 2 and 3 buildings and associated Class 10a buildings and decks, is deemed to be satisfied by design and construction in accordance with AS 3959:2018

[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.

Construction of buildings in bushfire prone areas and, for Class 1 buildings and associated decks, the NASH Standard – *Steel Framed Construction in Bushfire Areas* (NASH, 2021).

4.3.2 Certain Class 9 buildings

The National Construction Code (NCC) 2022 (ABCB, 2023) requires additional bushfire protection measures for certain Class 9 buildings; namely Class 9a healthcare, Class 9b early childhood centres, primary or secondary schools, Class 9c residential care and a Class 4 part of a building associated with the nominated Class 9 uses.

The draft PBP (VPA, 2025b) includes a site for a non-government school in the north-eastern corner (current site of Ballarat Grammar School – Mount Rowan Campus) and government schools in the north-western and south-western corners of the precinct. If Class 9b buildings are constructed in the future, Specification 43 of NCC 2022 applies as a 'deemed-to-satisfy' pathway for buildings with a BAL rating of no more than BAL-12.5. Specification 43 prescribes minimum standards for:

- S43C1 Scope
- S43C2 Separation from classified vegetation
- S43C3 Separation between buildings
- S43C4 Separation from allotment boundaries and carparking areas
- S43C5 Separation from hazards
- S43C6 Non-combustible path around building
- S43C7 Access pathways
- S43C8 Exposed external areas
- S43C9 Internal tenability
- S43C10 Building envelope
- S43C11 Supply of water for fire fighting purposes
- S43C12 Emergency power supply
- S43C13 Signage
- S43C14 Vehicular access.

The ability of a Class 9 building to comply with S43C2, S43C3, S43C4, S43C8 and S43C14 may be influenced by the PSP design and for building compliance additional analysis and a performance-solution may be required for this type of development.

4.3.3 Land use planning in a BPA

In a BPA, larger developments 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, Ballarat Planning Scheme).

There are no obstacles to future development in the Ballarat North precinct complying with the applicable strategies at Clause 13.02-1S and the building regulations invoked in a BPA. BAL-LOW land, where the BPA has been removed, will likely 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).

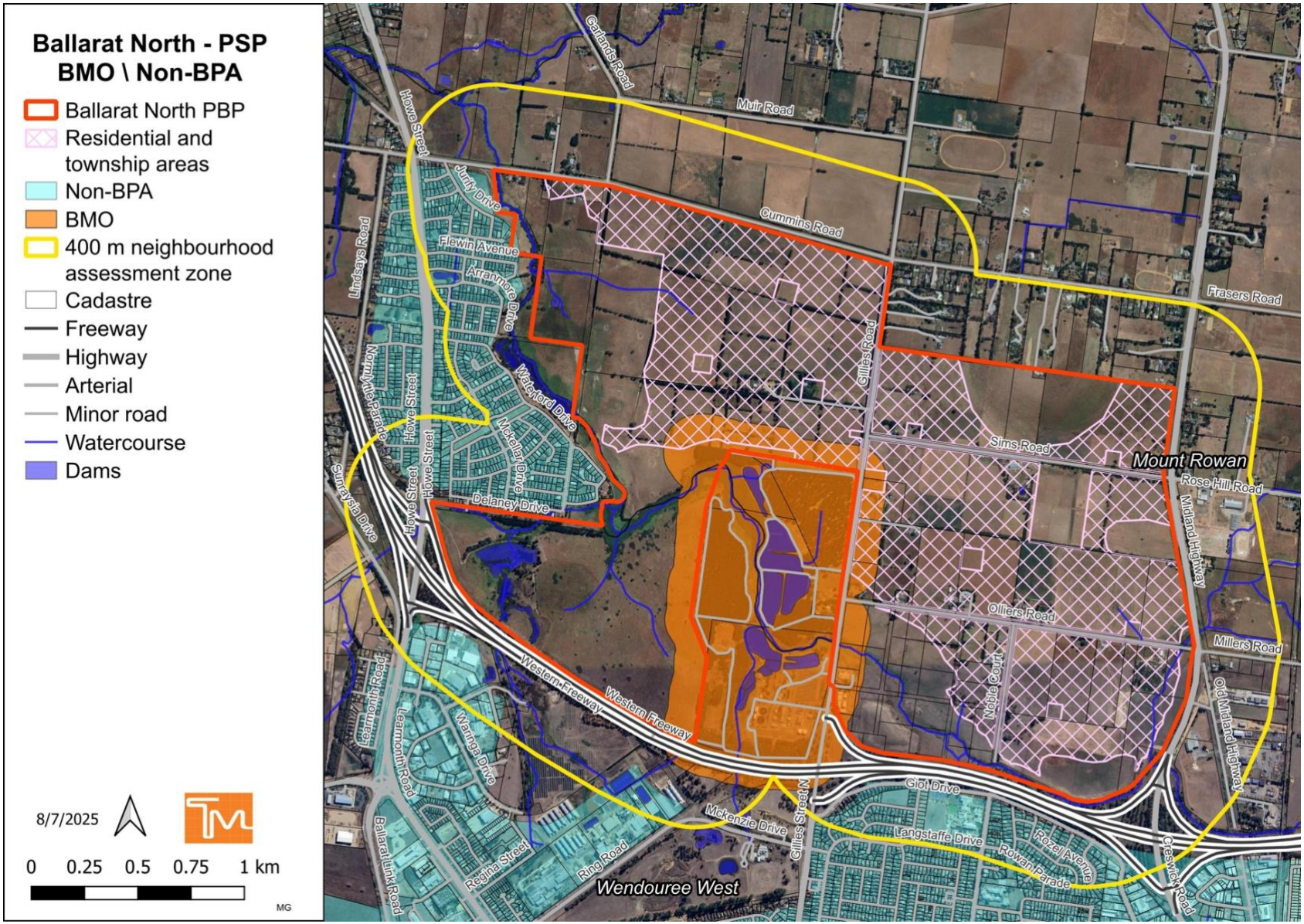
4.4 Other controls

4.4.1 Zoning

All land in the precinct is zoned UGZ and no re-zoning is proposed.

4.4.2 Overlays

Apart from the BMO, none of the existing or likely future overlay controls are anticipated to have any direct implications for bushfire safety.



Map 2 - BPA (shown as non-BPA area) and BMO coverage of the Ballarat North PSP and surrounds.

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, Ballarat Planning Scheme).

This section includes a bushfire assessment at:

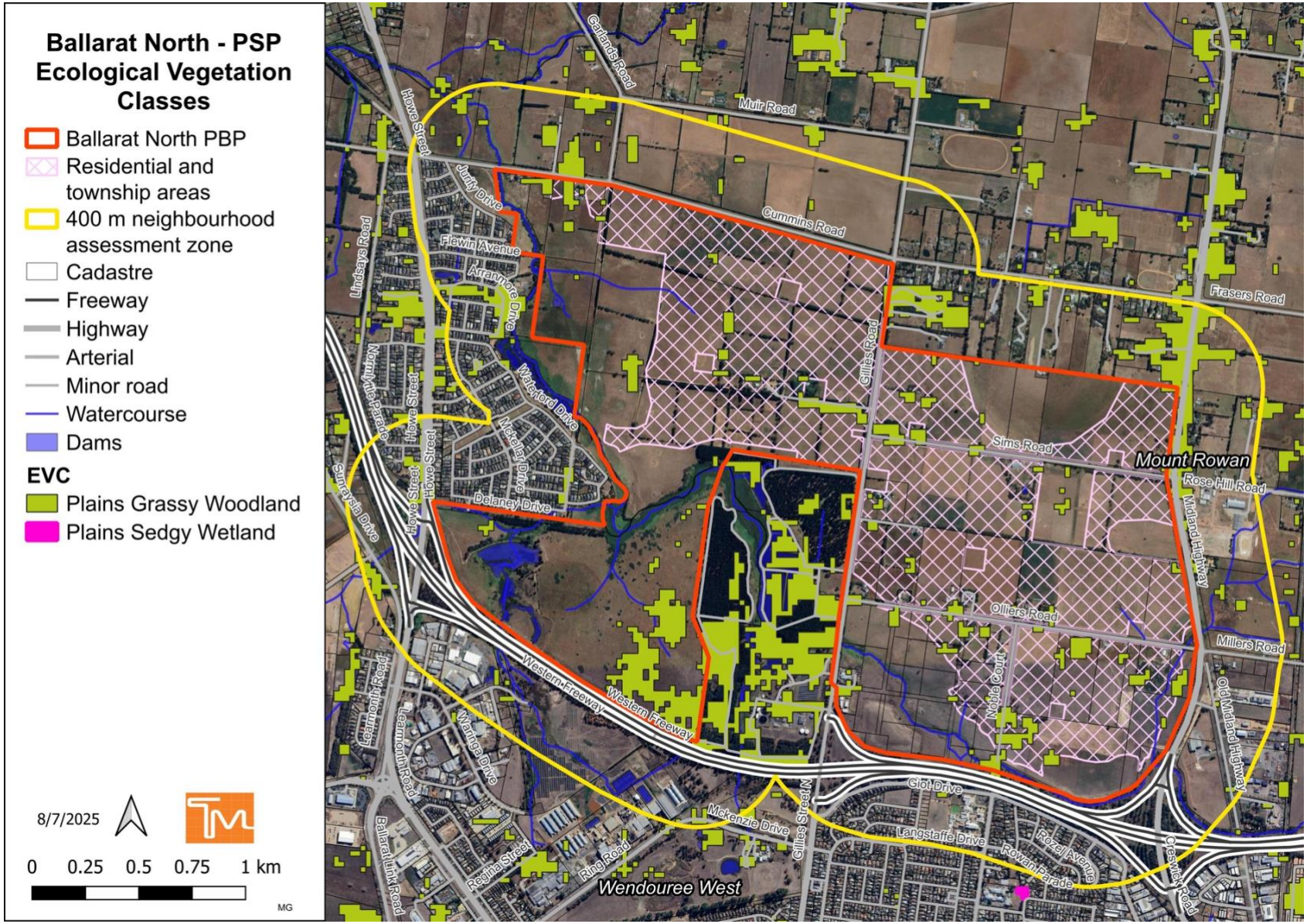
- The wider landscape scale, for up to 20 km around the site (see Map 6).
- The local and neighbourhood scales extending up to 400 m and 1 km respectively from the site (see Map 3 and Map 7).
- The site scale up to 100 m around the precinct boundary (see Map 3, Map 4 and Map 5).

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

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.



Map 3 – EVCs in and around the Ballarat North precinct (from NatureKit Victoria, 2025).

5.1.1 Grassland

Grassland is the predominant vegetation type within the Ballarat North precinct area (see Map 5), including areas to be retained at Mount Rowan as regional public open space (see Figure 2) and in the Ballarat Town Common (see Figure 3) , and in the 150 m site assessment zone adjacent to the northern and eastern boundaries of the precinct (see Figure 4 and Figure 5).

Areas of grassy vegetation greater than 100 mm high with an overstorey foliage cover of less than 10% are classifiable in the Grassland group of AS 3959:2018, which 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 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.

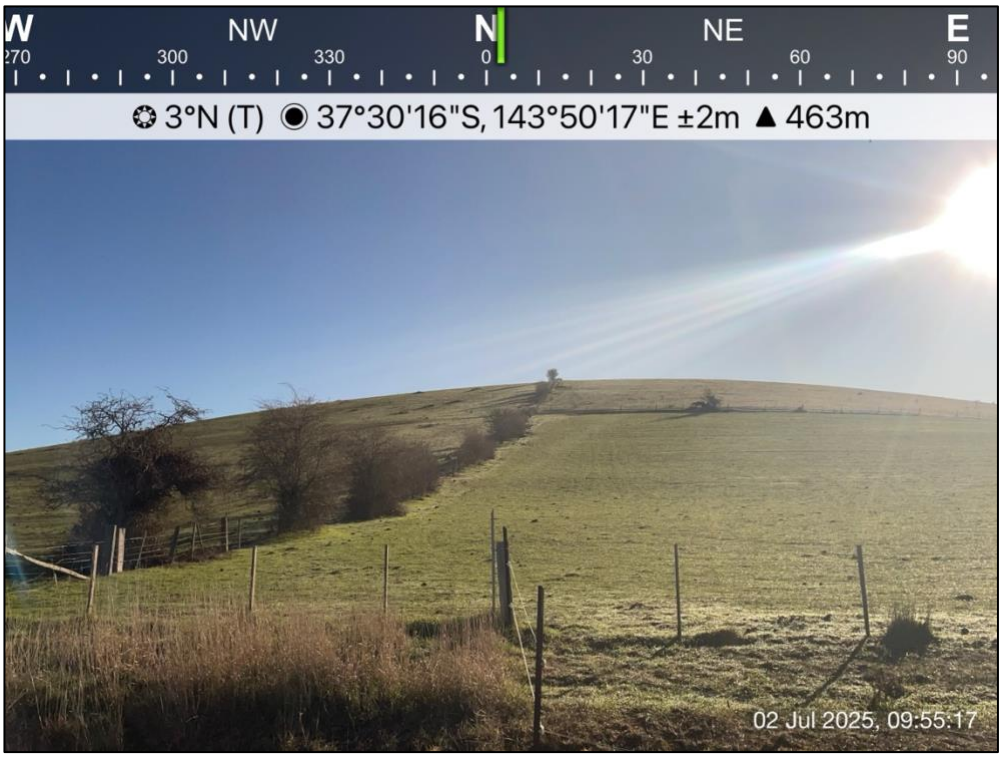


Figure 2 – Looking north up Mount Rowan at classified Grassland to be retained as regional open space under the draft PBP.

Figure 3 – *Phragmites sp.*, classified as Grassland, along Burrumbeet Creek in the Ballarat Town Common.

Figure 4 – Looking east from the Midland Highway at classified Grassland to the east of the precinct.

Figure 5 – Looking north-west from the corner of Cummins Road and Garland Road, across low threat mown road reserve, at classified Grassland to the north of the precinct.

5.1.2 Forest

Pine plantations in the Ballarat North Water Reclamation Plant (see Figure 6 and Figure 7) accords best with the BMO/AS 3959:2018 Forest group, which 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).

Small patches of planted vegetation on the Western Freeway reserve, around the Howe Street intersection, could also comprise Forest but they are separated from future residential areas by the Ballarat Town Common and have no impact on potential development.

Figure 6 – Pines north of Burrumbeet Creek in the Ballarat North Water Reclamation Plant, classified as Forest.

Figure 7 – Pine plantation in the Ballarat North Water Reclamation Plant, west of Gillies Road near Sims Road intersection.

5.1.3 Other classified vegetation

Small patches of Scrub (e.g. tall woody weeds in places along Burrumbeet Creek), Woodland (e.g. scattered trees with grassy understorey on private land and along Burrumbeet Creek) and Shrubland (e.g. gorse in Ballarat Town Common and on private land) occur in the precinct but are generally located in much larger areas of classified Grassland and are not the predominant bushfire hazard.

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 condition[4], 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).

Existing residential areas to the west and south of the precinct, commercial/industrial sites to the south-east and managed areas of the Ballarat North Water Reclamation Plant comprise non-vegetated or low threat areas.

The large existing residential properties south of Cummins Road are likely a mix of low threat cultivated garden and small areas of classified Grassland, but as they will be separated from future residential areas by the proposed Mount Rowan regional public open space, they will have no impact on potential development

[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).

It is reasonable to assume that all the proposed residential 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 the proposed local parks will be managed in a low threat state.

Figure 8 – Low threat mown lawns in the Ballarat North Water Reclamation Plant.

Figure 9 – Low threat mown lawns east of Gillies Road, adjacent to the northern boundary of the precinct.

5.2 Future vegetated form

It is assumed that most classified Grassland outside of the Ballarat North precinct to the east will remain in the long term. To the north, classified vegetation will remain, at least in the short term. At the time of inspection, the road reserves of Cummins Road on the northern boundary of the precinct were in a low threat condition (grass generally < 100 mm in height) and are anticipated to remain so once the precinct is developed. In the longer term, development of the 'expanded' area may render the adjacent land to the north also low threat.

It is assumed that the plantations in the Ballarat North Water Treatment Plant will remain.

Urban development in the Ballarat North precinct will result in the removal of much of the classified Grassland from within the precinct boundary. The draft PBP, however, shows significant areas, are likely to remain classified vegetation as described below.

5.2.1 Burrumbeet Creek

Burrumbeet Creek runs along the western and southern boundaries of the precinct, including through the Ballarat Town Common (see below).

Vegetation along the creek varies along its length and currently includes pasture, woody weeds and narrow strips of eucalypts (see Figure 11 and Figure 12). Under the draft PBP (see Figure 1), the creek will be within a public open space reserve. How the existing vegetation and re-vegetation within the reserve is managed will determine the setbacks required for BAL-12.5 development on adjacent lots. VPA advise that the future vegetated form is likely to comprise ponds and wetlands outside of the 1% flood extent, with mown grass parkland between the wetlands and the creek (VPA, 2025b). The overall effect may be broadly comparable to the existing conditions on the western side of the creek along Waterford Drive (see Figure 10).

Figure 10 – Perimeter road, managed parkland and ponds with fringing vegetation on the western side of Burrumbeet Creek at Waterford Drive.

The Burrumbeet Creek reserve will run through the northern end of the Ballarat Town Common, and link to Grassland at both the northern boundary of the precinct (see Figure 13) and east of the industrial sites beyond the south-eastern boundary.

For the purpose of this bushfire assessment, it is assumed that the Burrumbeet Creek reserve will contain classified Grassland or Woodland that future buildings will need to be setback from (see Section 6.1). The associated wetlands could feasibly also contain Scrub if large enough areas are re-vegetated.

The draft PBP proposes that the Burrumbeet Creek reserve and associated public open space be bordered by a bespoke local access street cross section where it interfaces with the future urban area (see Figure 18).

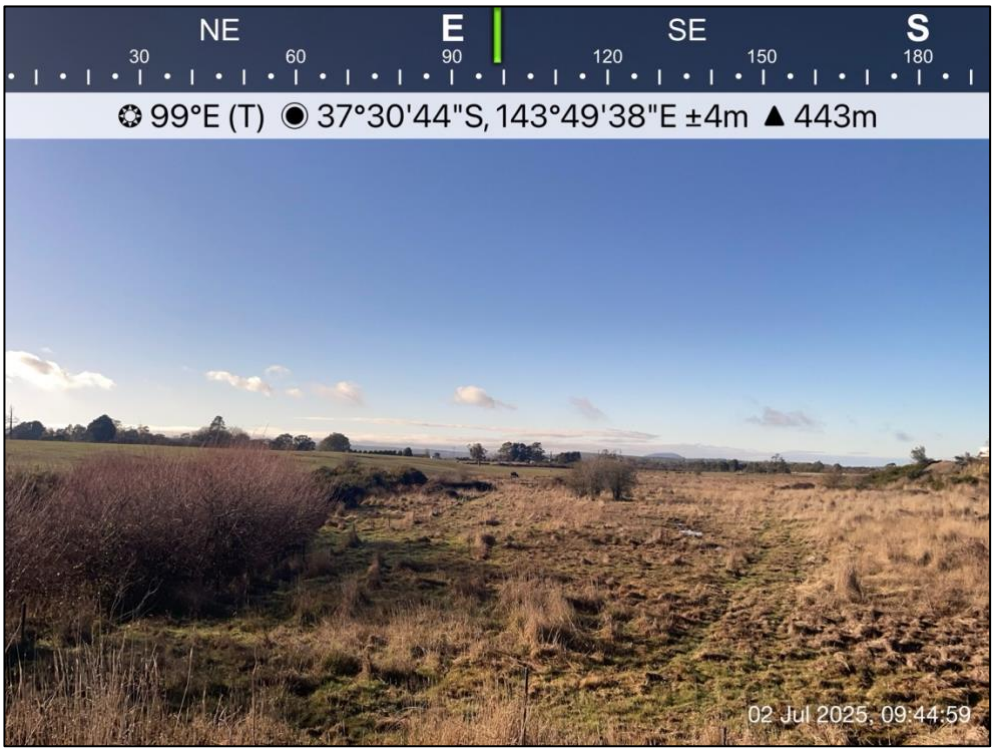


Figure 11 – Looking east along Burrumbeet Creek from Gillies Road.

Figure 12 – Looking east along Burrumbeet Creek from Gillies Road.

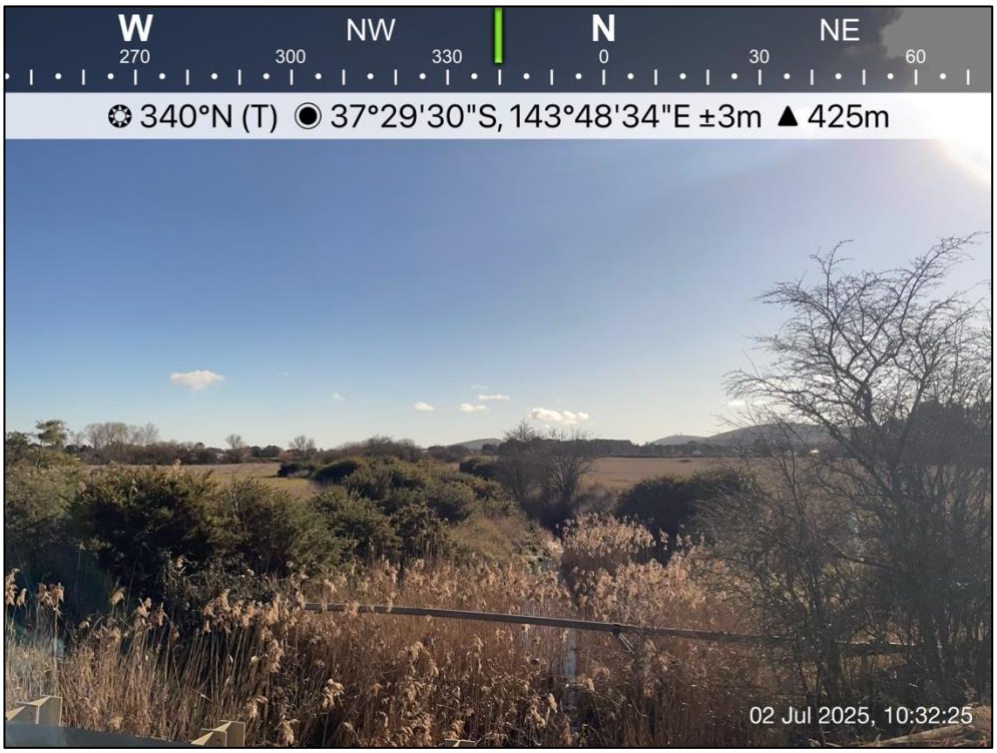


Figure 13 – Looking north along Burrumbeet Creek from Cummins Road.

5.2.2 Ballarat Town Common

The Ballarat Town Common has been classified as Grassland. It comprises larges areas of grass with scattered trees and patches of Gorse[5], with a dense sward of Phragmites along Burrumbeet Creek. VPA have advised us to assume that that the Ballarat Town Common will remain in its current condition (VPA, 2025b).

5.2.3 Mount Rowan regional open space

There are no current re-vegetation proposals for this area and VPA have advised it is to be considered remaining unmanaged Grassland (VPA, 2025b).

5.2.4 Road reserves

Road reserves were generally slashed or mown – both at the time of the initial assessment by EHP in August 2023 (EHP, 2023) and the more recent assessment by Terramatrix in July 2025 (see Figure 5, Figure 14 and Figure 15).

[5] Gorse could be classified as Shrubland pursuant to AS 3959:2018 but as the patches are relatively small and the setbacks required for Shrubland on flat ground are the same as for Grassland, it has been shown as Grassland for simplicity.

Figure 14 – Low threat mown road reserve on the Midland Highway.

Figure 15 – Slashed road reserve on Gillies Road and mown fire break around the plantation at the Ballarat North Water Reclamation Plant.

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:

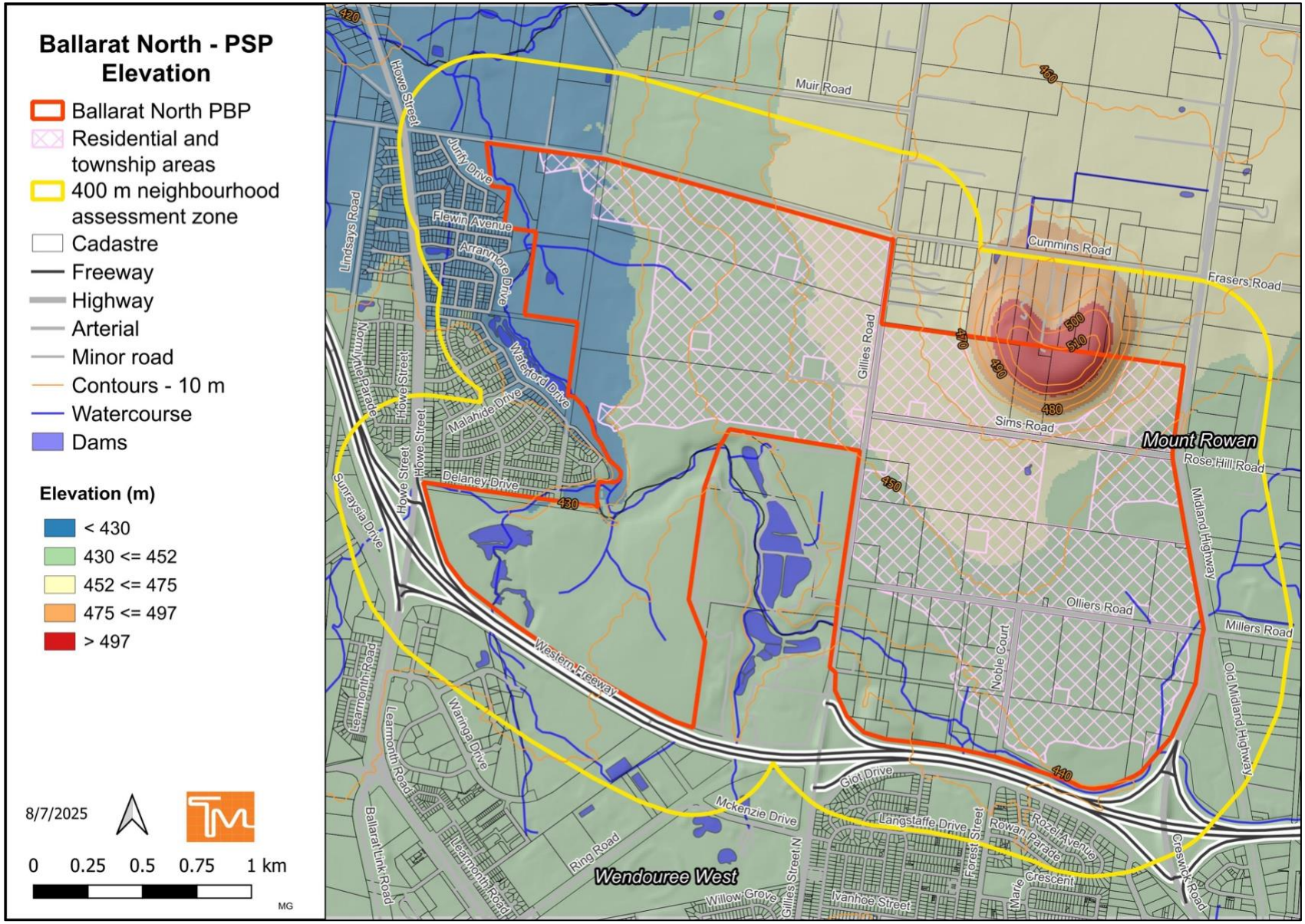
- Flat and/or Upslope - land that is flat or on which a bushfire will be burning downhill in relation to the development. Fires burning downhill (i.e. on an upslope) will generally be moving more slowly with a reduced intensity.
- Downslope - land on which a bushfire will be burning uphill in relation 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˚[6].

The terrain of the Ballarat North precinct and surrounding landscape is dominated by Mount Rowan in the north-east corner of the precinct. The remaining land is flat or gently sloping up from Burrumbeet Creek (see Map 4 and Map 5), without significant changes in elevation that would appreciably influence bushfire behaviour.

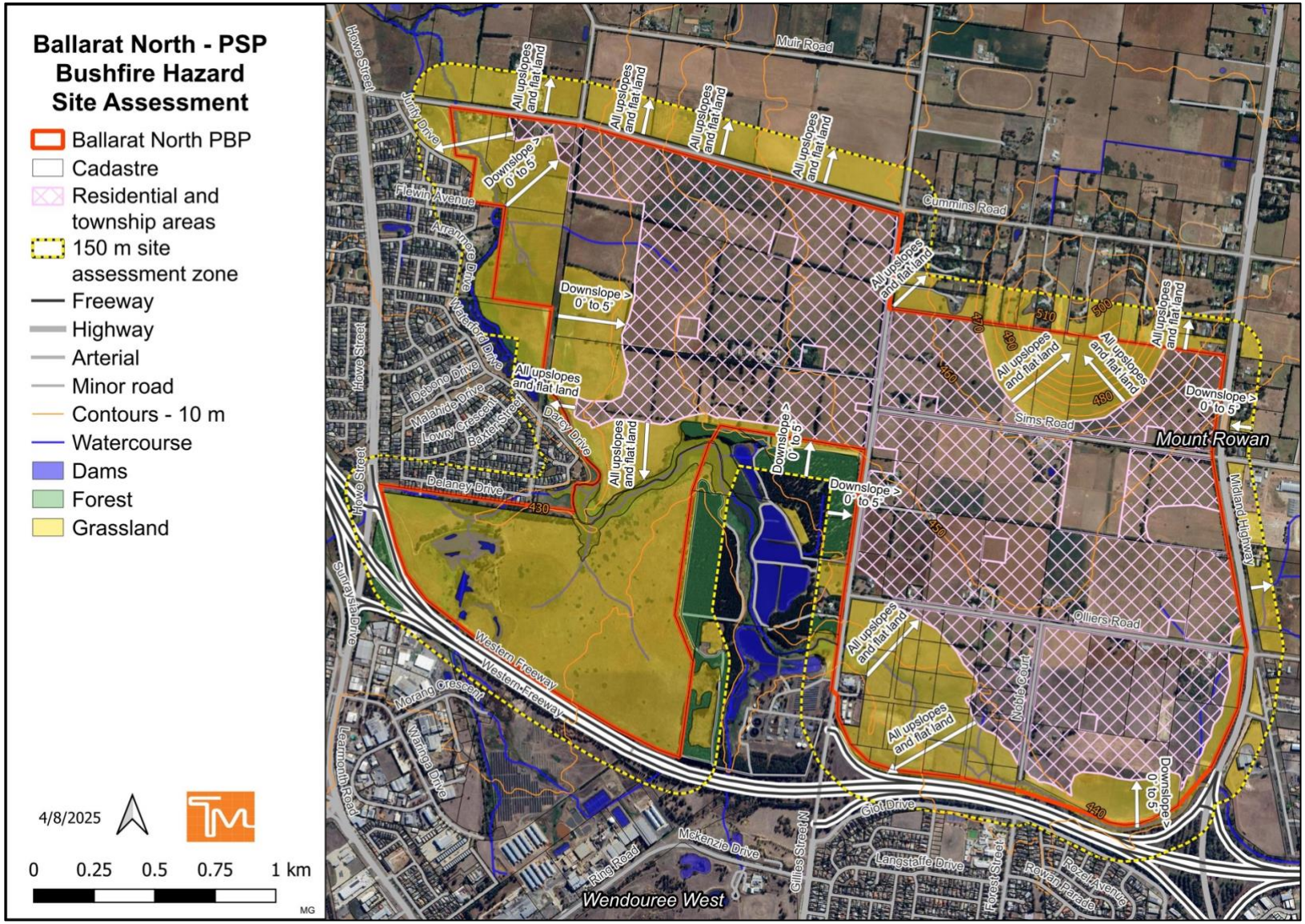
For the purposes of determining BALs and defendable space/vegetation setback distances for future development, the applicable slope class for vegetation outside the precinct boundary is 'All upslopes and flat land' or 'Downslope >0-5º'[7], 'All upslopes and flat land' or 'Downslope >0-5º' in regard to Burrumbeet Creek reserve and 'All upslopes and flat land' for the Mount Rowan regional open space.

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

[7] In our assessment of effective slopes in the Ballarat North Water Reclamation Plant we identified very slight downslopes (approx. 1º-2º) relative to the proposed urban area to the north and east, whereas the initial bushfire assessment (EHP, 2023) characterised this as flat land or upslope. In small patches of vegetation on essentially flat terrain, measurement of effective slope is influenced by assumptions made about the direction of fire approach and the contour interval or digital elevation mode used. We recommend the more precautionary downslope be used in determining the required setbacks.



Map 4 - Elevation within the Ballarat North precinct and 400 m assessment zone.



Map 5 – Bushfire hazard site assessment. Vegetation classification as per AS 3959:2018 – retained vegetation in Ballarat North precinct area and 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/GFFDI 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 4.1.2, 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 Grampians 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 system[8].

[8] 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.	○ These are the most dangerous conditions for a fire. ○ Your life may depend on the decisions on 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.	○ 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.	○ 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.	○ 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 Ballarat North precinct is located adjacent to the northern boundary of Ballarat (see Map 1 and Map 6), which comprises a low threat urban-residential landscape.

Land to the north and east of the precinct is primarily pastoral and a relatively low bushfire threat. The closest large area of forest is more than 2 km to the east, extending from Creswick in the north to the eastern outskirts of Ballarat at Brown Hill, and then continuing southwards. To the north-west the closest forest is around Mount Bolton more than 12 km from the precinct.

The Burrumbeet Creek reserve, Ballarat Town Common and adjacent Ballarat North Water Reclamation Plant will provide a large, vegetated area between development in the precinct and the existing urban area to the west and south.

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*[9]. 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 Ballarat North precinct accords best with the lower risk Landscape Type 2. A large, fully developed bushfire can only approach through Grassland from the north or north-west and would be unlikely to spread into the new urban area assuming an appropriate edge treatment is provided by the PBP design.

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

Broader Landscape Type 1	Broader Landscape Type 2	Broader Landscape Type 3	Broader Landscape Type 4
• *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.*	• *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.*	• *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.*	• *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.*
I N C R E A S I N G R I S K →			

[9] Whilst only a small part of the precinct is covered by the BMO, the broader landscape types provide a commonly used description of landscape-scale risk.

5.5.3 Local and neighbourhood scale hazard

A fire could start in the Ballarat Town Common or Ballarat North Water Reclamation Plant but there is insufficient space for it to develop fully. A fire that began in the pine plantation will develop relatively slowly due to the trees reducing the wind speed within the plantation. The worst-case scenario would be a grass fire that starts in Town Common and burns into, and through, the plantation on a relatively wide front, under the influence of a west or south-westerly wind. Even though the treatment ponds and wetlands along the Burrumbeet Creek may interrupt fire spread, flame lengths and radiant heat flux could be significant where the urban area interfaces with the north-east corner of the plantation.

Access for people in the Ballarat North precinct would be readily available to reliably low threat or non-vegetated areas, either within the precinct after development or in the existing urban area to the south, that could provide shelter from bushfire.

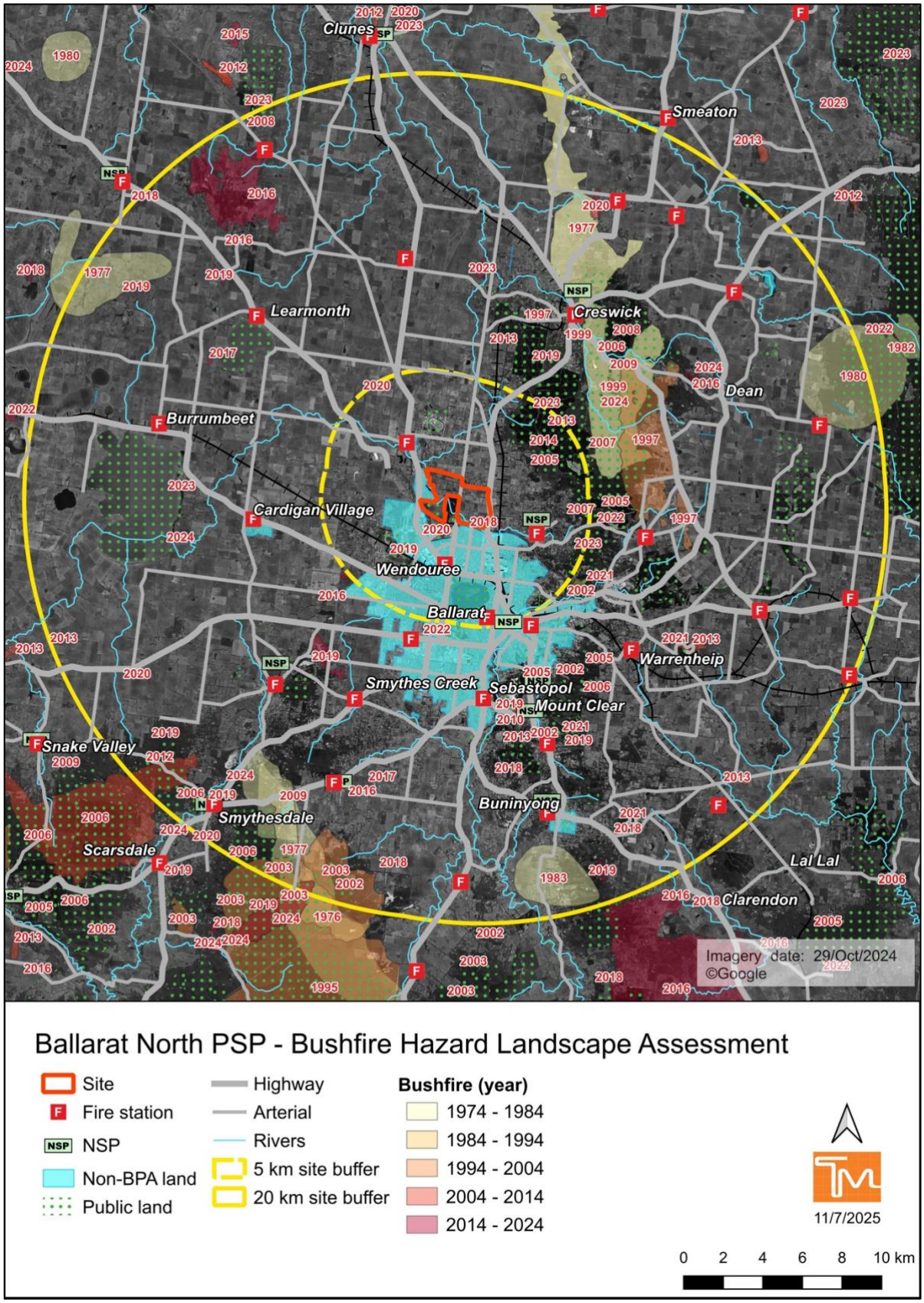
5.6 Agency strategies and plans

5.6.1 Regional Bushfire Planning Assessment (RBPA) Grampians Region

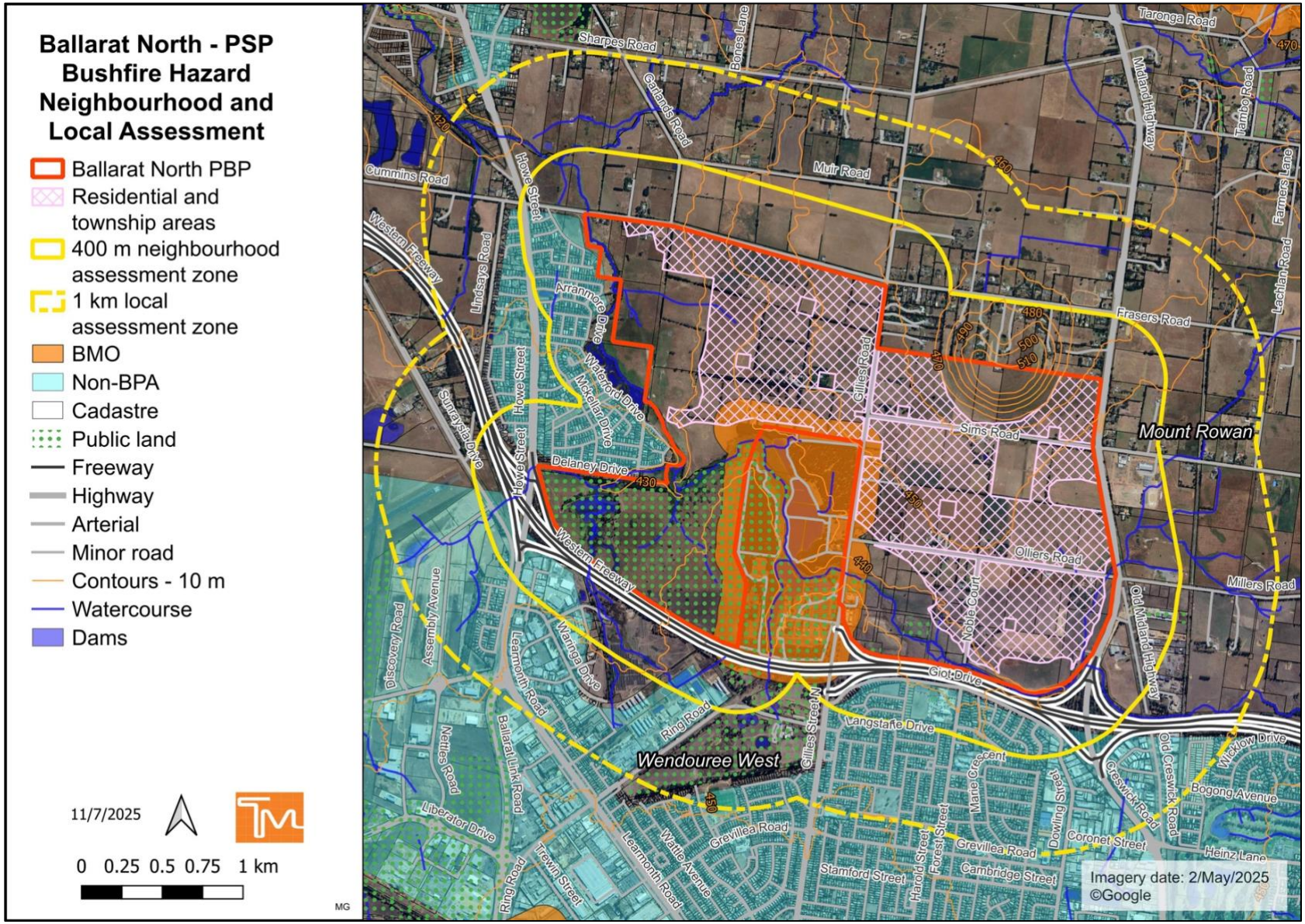
As part of the response to the 2009 Victorian Bushfires Royal Commission, Regional Bushfire Planning Assessments (RBPAs) were undertaken across six regions that covered the whole of Victoria. The RBPAs provide information about 'identified areas' where a range of land use planning matters intersect with 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 – Grampians Region* covers the City of Ballarat LGA. It does not identify any bushfire issues for the Ballarat North precinct or surrounding area.

The nearest identified bushfire issues are potential urban expansion to the east of Ballarat and rural living areas at Invermay, more than 2 km to the east of the precinct (DPCD, 2012).



Map 6 - Bushfire hazard landscape assessment.



Map 7 - Bushfire hazard neighbourhood and local assessment.

5.6.2 Grampians 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 Grampians Bushfire Management Strategy makes no specific mention of bushfire risk for the area to the north of Ballarat, whilst highlighting the hazard to the north-east around Creswick, east at Brown Hill and south of the city associated with the Wombat State Forest.

Bushfire behaviour and house loss modelling show the northern edge of Ballarat is rated as having the least risk (i.e. less than the lowest risk rating of 'Low-intermediate risk') for potential house loss in the Grampians region (DELWP, 2020b).

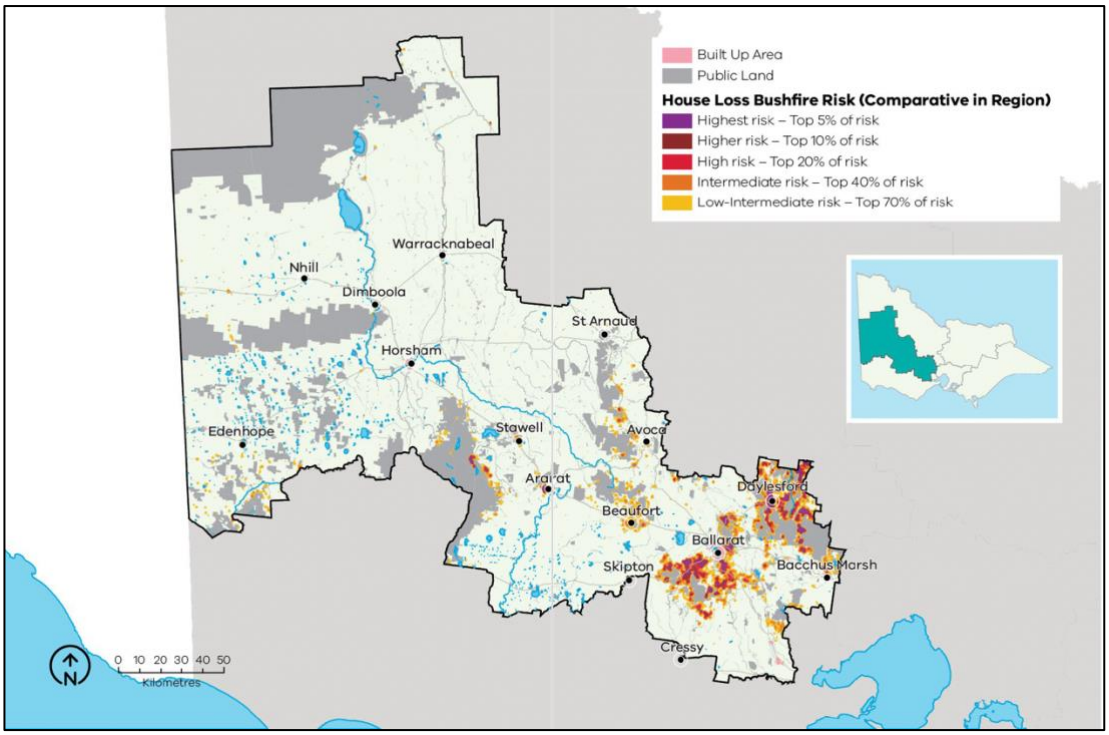


Figure 16 - Modelled risk of house loss (DELWP, 2020b).

5.6.3 Ballarat City Council Municipal Emergency Management Plan

A current version of the City of Ballarat Municipal Emergency Management Plan is not available online.

5.6.4 Ballarat City Council Municipal Fire Management Plan

A current version of the City of Ballarat Municipal Fire Management Plan is not available online.

5.6.5 Joint Fuel Management Program

Due to the absence of public land, there are no Fire Management Zones or mechanical fuel management scheduled in the vicinity of the Ballarat North precinct (FFMVic, 2025). The public land to the east of Ballarat contains a range of zones and scheduled mechanical work (see Figure 17).

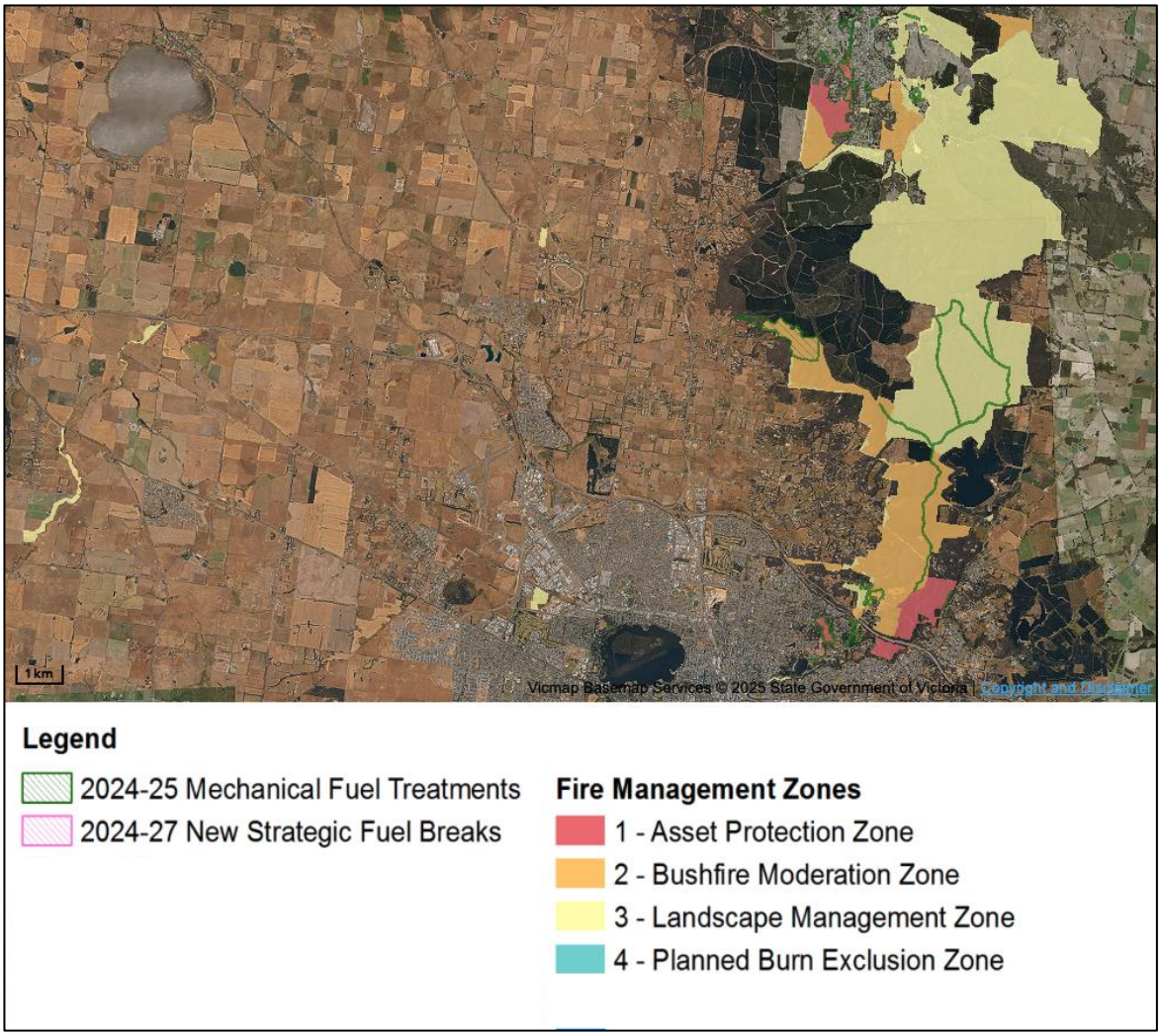


Figure 17 - Fire Management Zones in the vicinity of the Ballarat North PSP (FFMVic, 2025).

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, Clause 44.06 and associated Clause 53.02 in BMO areas, published CFA and DTP guidance and the building regulations applicable to construction in a BPA.

6.1 Building setbacks

6.1.1 BAL-12.5 setback distances

Future dwellings, and other buildings requiring a BAL, will need to be sufficiently setback[10] from classified vegetation to enable a BAL-12.5 construction standard. The setbacks required for Grassland, Shrubland, Woodland, Scrub[11] 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 and Map 8, Map 9, Map 10 and Map 11.

The setbacks have been measured from an 'assumed' edge of the classified vegetation, and the setback area (pink shading) and the distances shown on the maps are the amount of overlap into development area (and not the total setback required[12]). The actual location of the setbacks will depend on where the edge of the classified vegetation is in the final design of the reserves/open space, e.g. if the reserves include a reliably low threat managed strip the setback would include that strip and there would be less overlap into the development area. We understand this detailed design will occur subsequent to the PSP gazettal.

Note that for determining BALs, no setbacks apply from areas of unmanaged vegetation that meet one or more of the exclusion criteria for low threat vegetation (see Section 5.1.3), including:

[10] 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).

[11] Woodland and Scrub are not currently significant vegetation types in the study area but are possible outcomes of revegetation of the Burrumbeet Creek and associated wetlands.

[12] E.g. the 17 m north of the Ballarat North Water Reclamation Plant is how much of the 57 m Forest setback overlaps into the development area.

- Single areas of vegetation less than 1 ha in area and at least 100 m from other areas of classified vegetation
- Multiple areas less than 0.25 ha (2,500 m^2) in area that are at least 20 m from a building or each other
- Strips of vegetation less than 20 m wide that are at least 20 m from a building, other strips or any other area of classified vegetation.

In parts of the Ballarat North precinct around the Ballarat North Water Reclamation Plant that are covered by the BMO, the setbacks comprise defendable space[13] that would need to be managed to the standards stipulated in Table 6 to Clause 53.02-5, as detailed in Appendix A of this report. In the BPA, the setbacks would need to comprise low threat vegetation or non-vegetated areas.

Table 3 - Building setbacks for BAL-12.5.

Slope class	Vegetation	BAL-12.5 setback distance (defendable space)
All upslopes and flat land	Grassland	19 m
	Shrubland	19 m
	Scrub	27 m
	Woodland	33 m
	Forest	48 m
Downslope >0-5°	Grassland	22 m
	Shrubland	22 m
	Scrub	31 m
	Woodland	41 m
	Forest	57 m

6.1.2 Vegetation beyond the Ballarat North precinct boundary

Development close to the perimeter of the Ballarat North precinct will need to respond to classified vegetation beyond the precinct boundary, including providing the requisite setbacks to achieve BAL-12.5 (see Section 6.1.1).

Grassland to north and east

The Ballarat North precinct is exposed to classified Grassland (pasture) to the north and east beyond the precinct boundary. A 19 m or 22 m setback is required, depending on effective slope,

[13] Defendable space is defined in the Ballarat Planning Scheme as *'An area of land around a building where vegetation is modified and managed to reduce the effects of flame contact and radiant heat associated with bushfire'* (Clause 73.01, Ballarat Planning Scheme).

to achieve a BAL-12.5 rating. In most places the setback is provided by the existing roads that border the precinct.

Ballarat North Water Reclamation Plant

The pine plantation in the Ballarat North Water Reclamation Plant is classified as Forest and will require future buildings to be setback a minimum of 57 m.

Gillies Road provides perimeter road between the plantation and the residential area to the east. There is also a mown fire break of approximately 10 m maintained along the northern and eastern boundary of the property, that might be included in the low threat setback if there is assurance that it will be maintained. Combined, Gillies Road (as it is currently configured) and the mown fire break provide an approximate 40 m setback.

6.1.3 Burrumbeet Creek and associated wetlands

As identified in Section 5.2, the Burrumbeet Creek reserve and associated wetlands and drainage areas, may not be low threat and could potentially comprise classified vegetation if they do not meet one or more of the exclusion criteria of AS 3959:2018. Their size and 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.

Ponds with reliably open water or wet areas and little or no vegetation may be deemed low threat. However, seasonally inundated wetlands that may be dry and vegetated during the fire danger period will comprise classified vegetation.

The draft PBP (see Figure 1) shows the creek within a public open space reserve. How the existing vegetation and re-vegetation within the reserve is managed will determine the setbacks required for BAL-12.5 development on adjacent lots. The creek reserve will likely comprise a mosaic of mown parkland, and natural and artificial wetlands with areas of native vegetation.

For the purpose of this bushfire assessment, it is assumed that the Burrumbeet Creek reserve and associated wetlands will contain classified Grassland, Scrub or Woodland that future buildings will need to be setback from. Setback distances are provided for all these vegetation types (see Table 3), with the applicable distance to be determined by the type and distribution of re-vegetation that takes place.

The draft PBP proposes that the Burrumbeet Creek reserve and associated public open space be bordered by a bespoke local access street cross section where it interfaces with the future urban area (see Figure 1). The requisite low threat setback can be achieved by a combination of:

- Setback of buildings within adjacent residential lots
- The local street along the perimeter of the reserve

- A managed low threat strip within or adjacent to the reserve.

Figure 18 provides an example of the interface treatment to be applied to the Burrumbeet Creek reserve and associated wetlands.

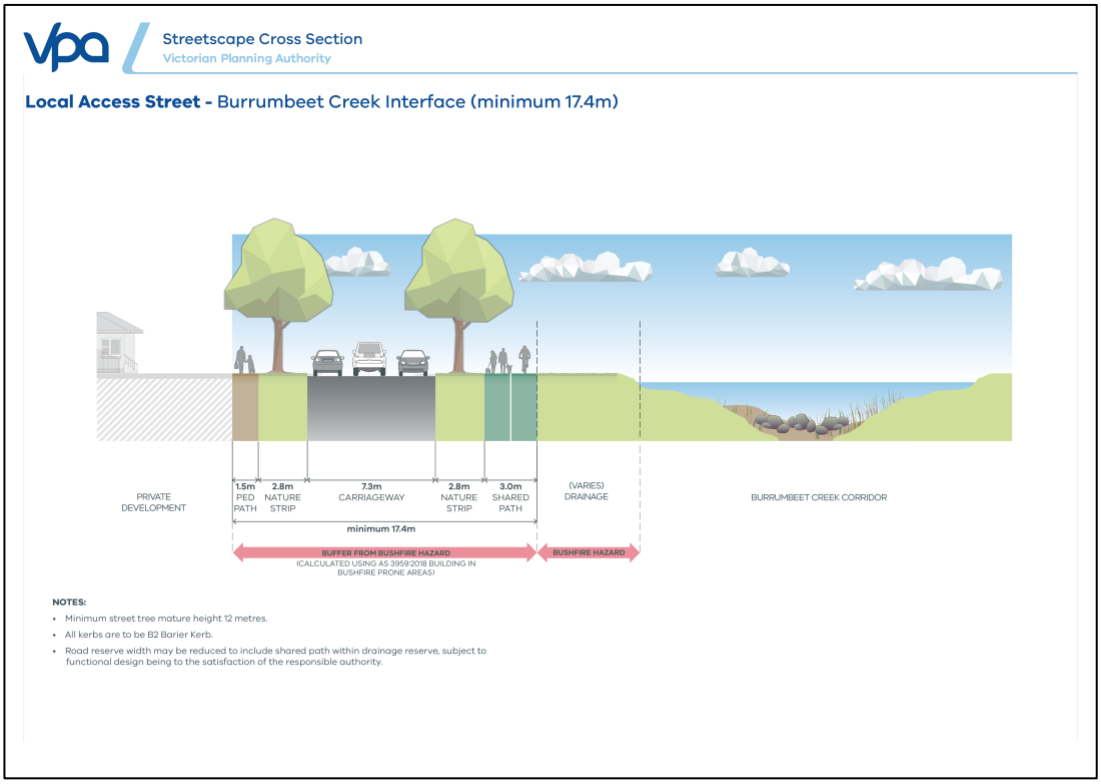


Figure 18 - Example of interface treatment for Burrumbeet Creek reserve (VPA, 2025d).

6.1.4 Ballarat Town Common

The Ballarat Town Common will not directly interface with the developable area of the precinct, so low threat setbacks are not required[14].

6.1.5 Perimeter roads

Perimeter roads are a useful bushfire protection measure to provide a firm edge to the urban area and to facilitate property protection and fire fighting (see Figure 19). Perimeter roads should meet the guidelines detailed in *Vehicle Access and Water Supply Requirements in Residential Developments* (CFA, 2022b).

[14] Setbacks will be provided as part of the Burrumbeet Creek interface, which lies between the Ballarat Town Common and the developable area.

Cummins Road provides a perimeter road between the Grassland to the north and the western part of the northern boundary of the precinct. The Midland Highway provides a perimeter road along the eastern boundary of the precinct.

The Western Freeway provides a substantial break between the southern edge of the Ballarat Town Common and the existing urban area of Ballarat.

Gillies Road provides a perimeter road along the eastern side of the Ballarat North Water Reclamation Plant.

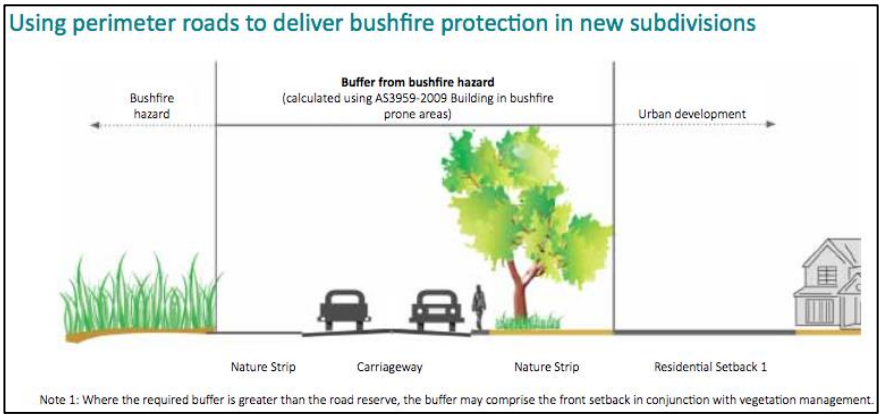


Figure 19 - Illustration of a perimeter road to provide required development setbacks (DELWP, 2015).

Within the Ballarat North precinct, perimeter roads around significant areas of retained vegetation should be incorporated into subdivision design where possible, to achieve BAL-12.5 separation distances for future development from any potentially hazardous vegetation, and to facilitate property protection and firefighting (see Figure 19). VPA inform us that a local access street will separate the Burrumbeet Creek reserve and most of the northern boundary of the Ballarat North Water Reclamation Plant from the future urban areas. A local access street will also form the interface with the Mount Rowan regional open space reserve.

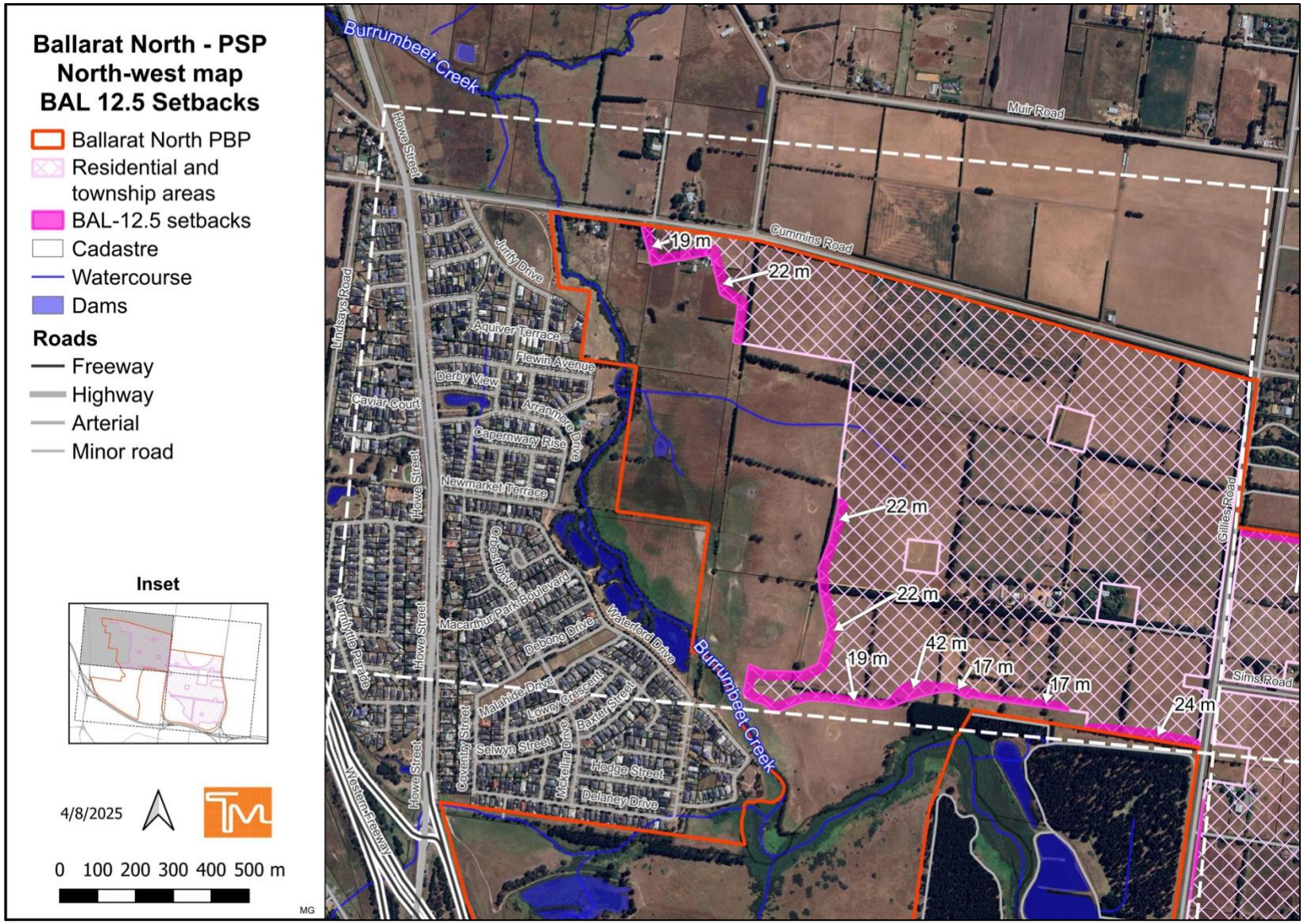
If the perimeter roads are to form part of the low threat setback required to achieve a BAL-12.5 rating for dwellings adjacent to the growth area boundary, the roadsides will need to be maintained in a low threat state.

6.2 Excision of areas from the BPA

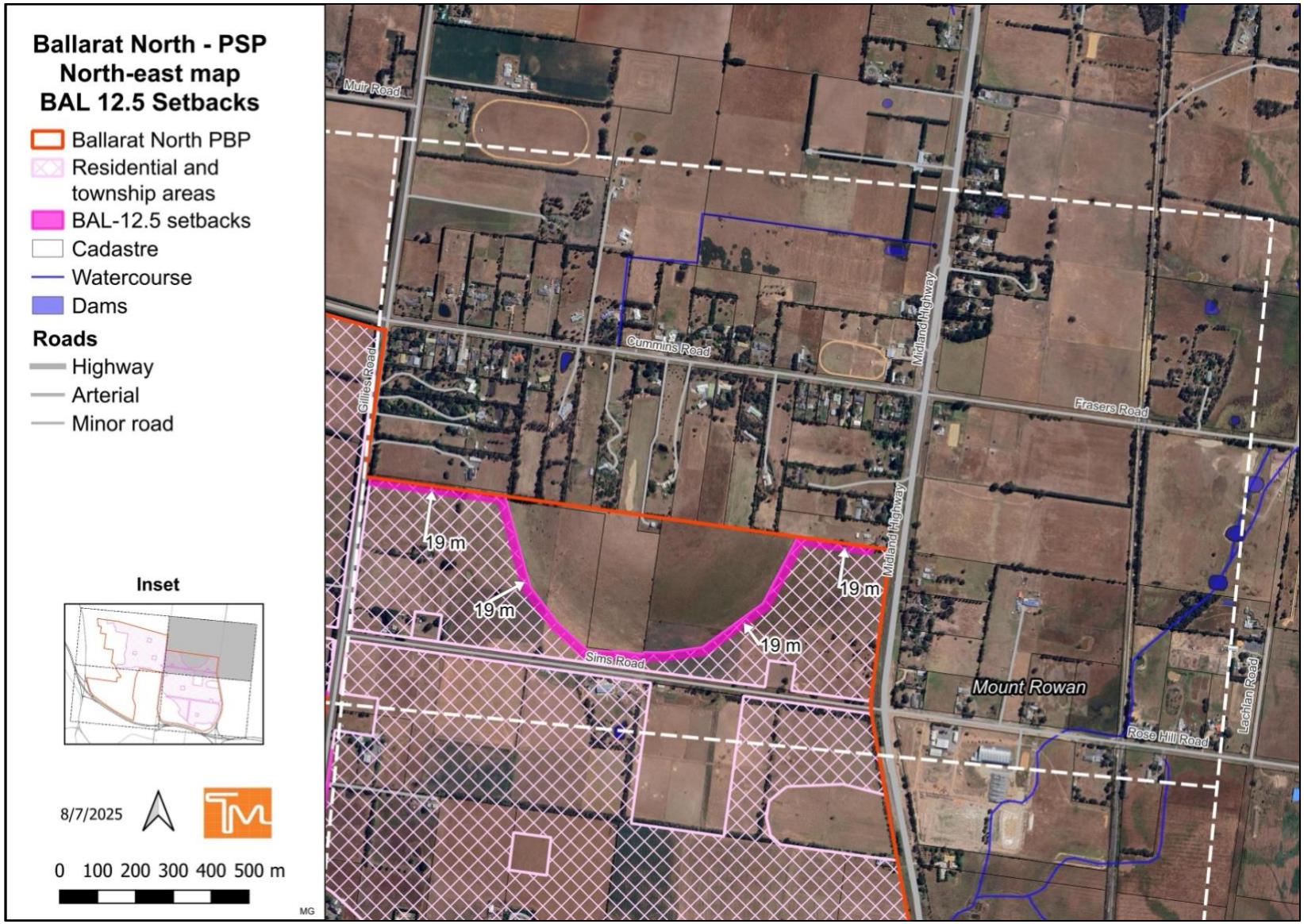
It is likely that as development progresses, much of the land within the Ballarat North precinct will become eligible to be excised from the BPA. DTP review and excise areas from the BPA approximately every 6 months, particularly in growth areas where the hazard is removed as urban development occurs.

Excision from the BPA would enable BAL-LOW construction in these areas. Areas of the Ballarat North precinct that may be eligible for excision as urban development progresses are:

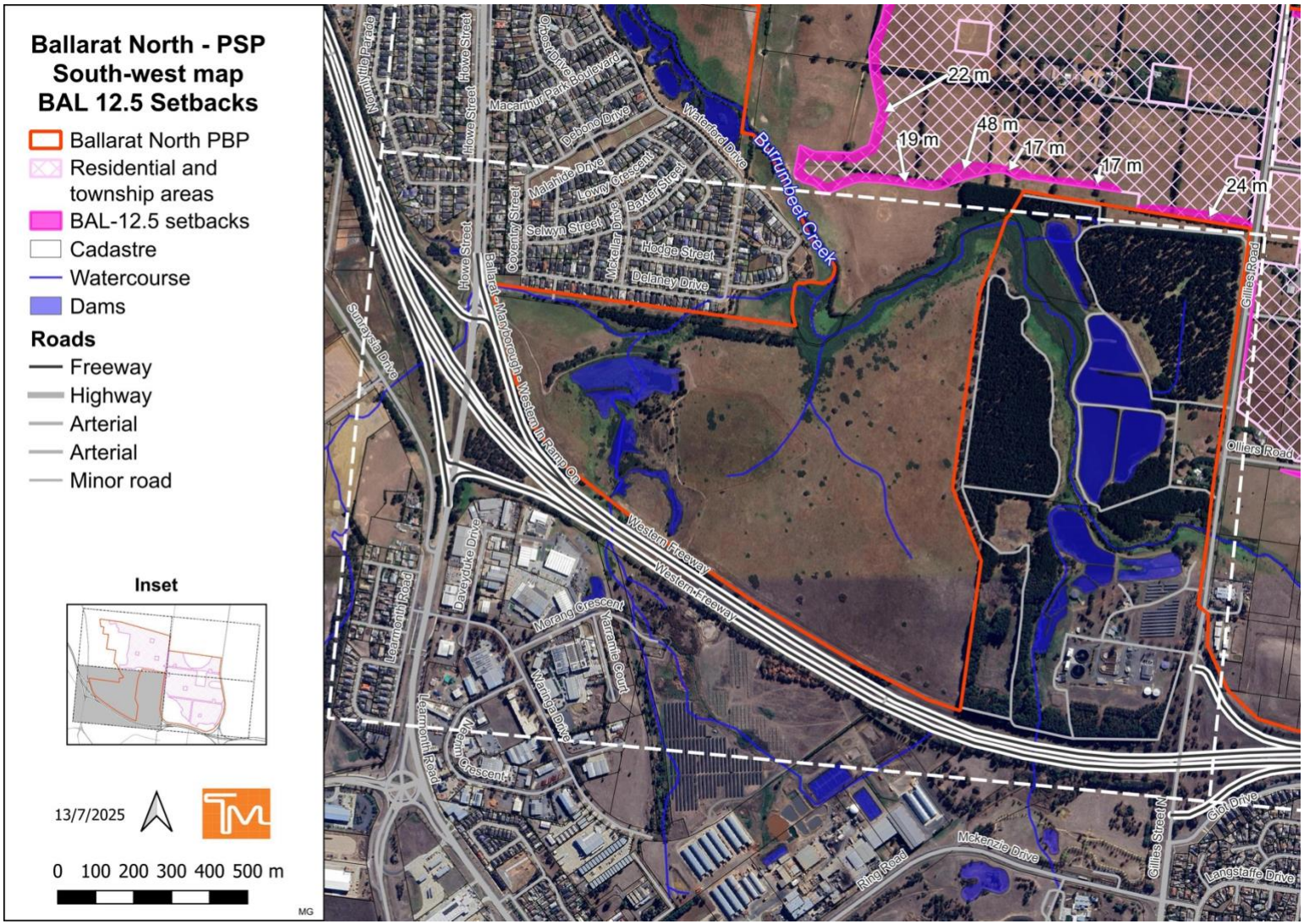
- Land more than 60 m from classified Grassland, e.g. from the pasture outside precinct or grassland in the Burrumbeet Creek reserve and Mount Rowan regional open space; and
- Land more than 300 m from classified Forest or Woodland, e.g. in the Ballarat North Water Reclamation Plant.



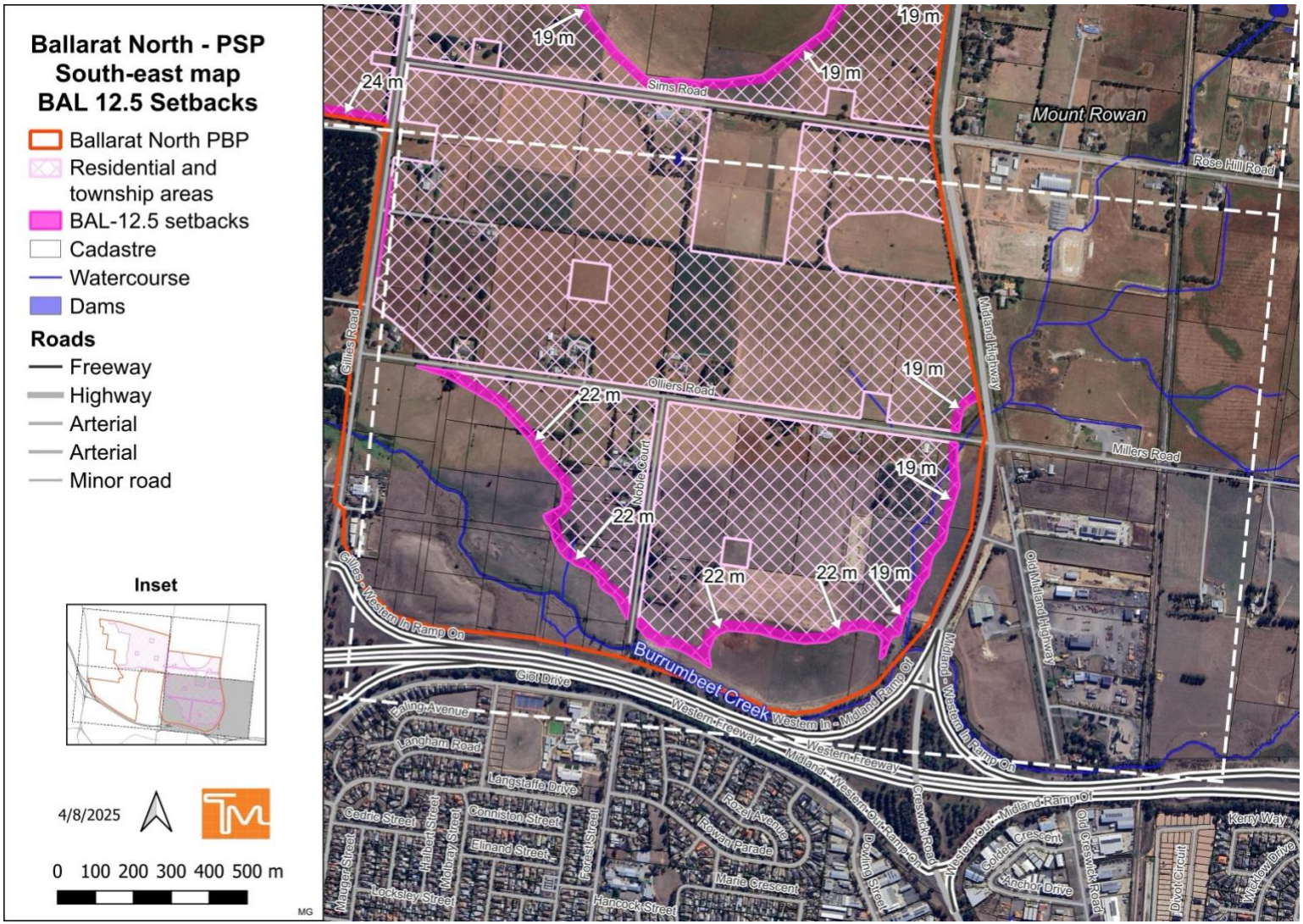
Map 8 –Low threat setbacks required from potentially classified vegetation to reduce radiant heat flux on development area to less than 12.5 kW/m² – north-west of precinct. Distance shown on map is the amount of overlap into development area.



Map 9 – Low threat setbacks required from potentially classified vegetation to reduce radiant heat flux on development area to less than 12.5 kW/m² – north-east of precinct. Distance shown on map is the amount of overlap into development area.



Map 10 –Low threat setbacks required from potentially classified vegetation to reduce radiant heat flux on development area to less than 12.5 kW/m² – south-west of precinct. Distance shown on map is the amount of overlap into development area.



Map 11 –Low threat setbacks required from potentially classified vegetation to reduce radiant heat flux on development area to less than 12.5 kW/m² – south-east of precinct. Distance shown on map is the amount of overlap into development area.

6.3 BMO coverage and BMO1 schedule

The BMO affects a small area of the precinct, within approximately 150 m of the pine plantation in the Ballarat North Water Reclamation Plant. The BMO coverage should be retained over the area as whilst the plantation is not extensive, it is contiguous to the classified Grassland in the Ballarat Town Common and potentially to classified vegetation along the Burrumbeet Creek to the east.

Future dwellings and other buildings are to be located where a BAL-12.5 construction standard (or BAL-LOW) can 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/m^2 in accordance with the 'Settlement planning' strategies at Clause 13.02-1S). Therefore, the small area of future residential development that would be affected by the BMO should be suitable for application of the existing BMO1 schedule in the Ballarat Planning Scheme.

This potential BMO1 area comprises land in the BMO that is setback at least 57 m from the classified Forest on a 'Downslope >0-5°' (i.e. to the north and east of the Ballarat Water Reclamation Plant).

These areas are considered appropriate for BMO1 coverage as:

- The bushfire hazard in the Ballarat North Water Reclamation Plant will remain, and require a planning response, following development of the precinct.
- The simplified application requirements of the BMO1 apply to applications to construct or extend one dwelling on a lot, which is therefore applicable to the proposed residential area in the precinct (but not to the neighbourhood activity centre shown on the draft PBP).
- Future dwellings and other buildings are to be located where a BAL-12.5 construction standard applies, hence the BMO1 protection measures (which include a BAL-12.5 construction standard) are appropriate.

The land within 57m of the Forest would remain covered by the BMO parent provision.

Under the BMO1, a simplified application process is provided for single dwellings on a lot, that meet the BMO1 requirements. The application requires a Bushfire Management Plan rather than a full Bushfire Management Statement. The BMO1 bushfire protection measures are:

- The dwelling must be constructed to BAL-12.5.
- Defendable space is to be provided for a distance of 30 m around the dwelling or to the property boundary, whichever is the lesser and maintained in accordance with the vegetation management requirements of Clause 53.02 with the following variation:
    - The canopy of trees must be separated by at least 2 m.
- A static water supply must be provided in accordance with Clause 53.02.

- Vehicle access must be provided in accordance with Clause 53.02.

If these requirements are not met, the requirements of Clause 53.02 apply.

6.4 Construction Management Plan

If the precinct is to be developed in stages, a Construction Management Plan or similar could be required to ensure that undeveloped land adjacent to areas being developed is managed in a low threat state (i.e. grass cut to less than 100 mm in height during the declared Fire Danger Period) until it in turn is rendered permanently low threat through urban development.

7 Design Guidelines Settlement Planning at the Bushfire Interface

In this section the development of the Ballarat North precinct is assessed against the relevant parts of the *Design Guidelines: Settlement Planning at the Bushfire Interface* (DELWP, 2020a).

7.1 Form and structure of settlements

The Guidelines identify four key considerations for the form and structure of settlements at the bushfire interface:

1. The bushfire hazard in directing settlement growth.
2. The distribution of land uses in the settlement.
3. Lot sizes in settlement layout.
4. Vegetated areas within a settlement (DELWP, 2020a).

7.1.1 The bushfire hazard in directing settlement growth

The Ballarat North precinct is on the northern edge of Ballarat, close to the existing urban area.

The Guidelines advocate:

- Directing growth to the east of existing settlements so that the existing township provides protection to the new development; and/or
- Directing growth away from areas of greater bushfire hazard; and/or
- In lower risk landscapes, directing settlement growth to the higher risk areas so that the new development, with contemporary bushfire protection measures, provides protection to the older, less well protected existing settlement (DELWP, 2020a).

The northern edge of Ballarat is less exposed to higher hazard Forest than are the eastern or southern edges.

The Ballarat North precinct is in a lower risk landscape (see Section 5.5). The development of the precinct with contemporary bushfire protection measures will provide enhanced bushfire protection to the existing urban area by separating the classified vegetation in the Ballarat Town Common and Ballarat North Water Reclamation Plant from a grass fire approaching from the north.

The level of bushfire hazard is not considered sufficient to preclude well-planned development.

7.1.2 The distribution of land uses in the settlement

The Guidelines advocate:

- Locating vulnerable uses (such as education, child care, residential aged care, hospital, leisure and recreation facility or place of assembly) away from the settlement interface.
- Locating hazardous uses (such as a petrol station) away from the settlement interface and to the east of residential areas if possible so that prevailing winds will blow any toxic smoke away from the settlement (DELWP, 2020a).

The draft PBP shows a government school(s) in the north-western corner of the precinct (VPA, 2025b). This will be on the interface with the Grassland to the north until/unless the 'expanded' area is developed. If this is not assured, there appear to be more suitable sites for a school to be sited in lower risk, more central parts of the precinct, away from this boundary.

Vulnerable uses (such as schools, residential aged care, healthcare etc.) should not be sited within the BMO coverage.

7.1.3 Lot sizes in settlement layout

The Guidelines advocate a residential lot size of 800-1,200 sqm to be optimal on the bushfire interface.

Small lot sizes can offer bushfire safety advantages, if the lot size is small enough that it creates a 'dense' urban area that contains only low threat vegetation and non-vegetated areas with a resultant limited potential for bushfire to spread through it (March *et al.*, 2011).

Conversely, studies have found a correlation between house loss in a bushfire and proximity to other houses, due to the potential for heavy 'urban' fuels (such as houses, sheds, other structures, garden vegetation, landscape elements and woodpiles) to increase flame, radiant heat and ember attack on adjacent or nearby dwellings (Price and Bradstock, 2013; Blanchi and Leonard, 2005).

The Guidelines consider lot sizes between 800 sqm and 1,200 sqm provide a balance between the risk of larger lots retaining more vegetation within a residential area, and smaller lots providing an increased risk of house-to-house ignitions or increased house losses from ember attack due to the higher housing density (DELWP, 2020a). We recommend that consideration be given to lots within the BMO coverage around the Ballarat North Water Reclamation Plant being within the 800-1,200 sqm range advocated by the Guidelines. Lot size is less important elsewhere given the low landscape scale risk and the perimeter road that will separate the residential area from the areas of Grassland.

7.1.4 Vegetated areas within a settlement

The Guidelines identify that vegetated areas within a settlement, such as parks and nature reserves, can create a bushfire hazard (DELWP, 2020a). Areas of potentially hazardous vegetation within a settlement can be responded to through:

- The provision of low threat setbacks of buildings from them; and/or
- Management of the vegetation they contain in a low threat state (DELWP, 2020a).

The implications of vegetation in the Burrumbeet Creek reserve, Mount Rowan regional open space, Ballarat Town Common and Ballarat North Water Reclamation Plant have been discussed at Section 6.1 of this report.

7.2 The settlement interface

The Guidelines identify three key considerations for the settlement interface:

1. Apply the required setback.
2. Design the settlement interface.
3. Design access and egress (DELWP, 2020a).

7.2.1 Apply the required development setback

As a strategic planning document, the 'Settlement Planning' strategies at Clause 13.02-1S apply. These strategies 'aim to strengthen the resilience of settlements and communities and prioritise protection of human life, including by:

- *'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*[15] *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 3959-2009 Construction of Buildings in Bushfire-prone Areas (Standards Australia, 2018)'* (Clause 13.02-1S, Ballarat Planning Scheme).

The setbacks required for future dwellings and other buildings requiring a BAL to enable a BAL-12.5 construction standard have been established for:

- Forest in the Ballarat North Water Reclamation Plant

[15] Note that the first strategy is to ensure RHF is less than 12.5 kW/m^2 (author's emphasis). The second strategy stipulates a maximum BAL-12.5 construction standard (which requires that RHF not exceed 12.5 kW/m^2). It is assumed the intent of both strategies to ensure that BAL-12.5 is a maximum construction standard for settlement planning, which is consistent with the wording of the latter strategy and the criteria and setback distances for BAL-12.5 in AS 3959:2018.

- Potential Grassland, Scrub or Woodland in the Burrumbeet Creek Reserves
- Grassland in the pasture adjacent to the precinct.

We recommend that thought be given to a planning mechanism that requires development to respond to the enduring bushfire hazard external to the precinct by precluding construction within the setback area.

7.2.2 Design the settlement interface

The requisite setbacks can be provided through a combination of:

- The provision of perimeter roads.
- The provision of low threat public open space on the interface.
- Excluding development from the setback area, i.e. the setback of building envelopes within lots adjacent to the precinct boundary.
- The creation of a low threat buffer on adjoining land through a formal agreement with the landowner.

Perimeter roads

Cummins Road provides a perimeter road between the Grassland to the north and the western part of the northern boundary of the precinct. The Midland Highway provides a perimeter road along the eastern boundary of the precinct.

The Western Freeway provides a substantial break between the southern edge of the Ballarat Town Common and the existing urban area of Ballarat.

Gillies Road provides a perimeter road along the eastern side of the Ballarat North Water Reclamation Plant.

The draft PBP indicates a bespoke local access street cross section will separate the Burrumbeet Creek reserve and most of the northern boundary of the Ballarat North Water Reclamation Plant from the future urban areas.

Open space on the settlement interface

There is potential for the Burrumbeet Creek reserve to provide part of the low threat setback, if managed in a reliably low threat state.

Consideration should be given to incorporating additional open space adjacent to the classified Forest in the Ballarat North Water Reclamation Plant where significant (57 m) low threat setbacks are quired.

Exclude development from the setback area

Lots adjacent to the northern and eastern boundary of the precinct exposed to classified Grassland will need to be setback sufficiently within their lots to enable BAL-12.5 construction. This requires a minimum 19 m setback from classified Grassland. The setbacks are provided by the existing perimeter roads (assuming the road reserve continue to be low threat).

Lots adjacent to the Burrumbeet Creek reserve, Ballarat North Water Reclamation Plant, and possibly the Mount Rowan regional open space, will also need to be setback as previously discussed.

7.2.3 Design access and egress

The Guidelines 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 draft PBP shows two multiple lane north-south roads (Gillies Road and Midland Highway) connecting the precinct to the existing urban area to south, as well as connection to Miners Rest to the west (VPA, 2024).

The internal road network will need to provide adequate emergency vehicle access (CFA, 2022b) and should meet the requirements for roads in a residential subdivision (Clause 56.06, Ballarat Planning Scheme) as a minimum.

7.3 Vegetation management within the settlement

The requirement under Clause 13.02-1S for all dwellings to achieve a BAL-12.5 rating means that vegetation throughout the precinct will need to be maintained in a low threat state on private property. Given the size of most of the proposed lots this will likely occur without the need for a planning control, such as a Design and Development Overlay or similar, to regulate vegetation management. The exception may be any lots greater than 1,000 sqm.

8 Clause 13.02-1S Bushfire Planning

The following sub-sections provide a summary response about how development in the Ballarat North precinct can respond to the objectives and strategies for bushfire safety in the Policy Planning Framework at Clause 13.02-1S.

8.1.1 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 Ballarat North precinct is in a low-moderate bushfire risk location. The protection of human life can be prioritised by:

- Applying the existing building regulations for construction in a BPA.
- Complying with the requirements of Clause 53.02 for any development in the BMO.
- Ensuring future dwellings and other buildings are located where a BAL-12.5 construction standard (or BAL-LOW) can 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/m^2).

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 future buildings are setback sufficiently from any hazardous vegetation such that they achieve a BAL-12.5, or lower, the risk can be deemed to be acceptably mitigated.
The nearest *lowest* risk location is the urban-residential area of Ballarat to the south of the precinct that is not in the BPA (see Map 2).

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

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

The CFA consider that community resilience to bushfire will be strengthened (and hence, presumably, vulnerability to bushfire will be reduced) when a strategic planning proposal demonstrates that Clause 13.02-1S 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 13.02-1S 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, such as wetlands along Burrumbeet Creek.

It is considered that development of the Ballarat North precinct can appropriately implement the strategies in Clause 13.02-1S that aim to prioritise protection of human life and will, therefore, meet the CFA strategic planning principles for bushfire.

8.1.2 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 Ballarat North 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 4.3) and is shown in Map 2. 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 BMO mapping introduced into the Ballarat Planning Scheme by amendment GC13, which was gazetted on 3rd October 2017 (see Map 2).

As discussed in Section 6.3, the small future residential area in the precinct affected by the BMO may be suitable for application of Schedule 1 to 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 regional, municipal and local (site and neighbourhood) scale (see Section 5).

At the local scale, the assessment follows the BMO methodology for classifying vegetation and topography within a 150 m assessment zone.

At the landscape scale a 20 km and 5 km radius of the site has been applied (see Map 6) 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.

CFA have not been consulted on the development of this report. It is recommended that they be provided with this report and their recommendations can be incorporated into an updated report as appropriate.

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, Clause 44.06, Clause 53.02 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 can be deemed to be acceptably mitigated such that development can proceed if the objectives and strategies of Clause 13.02-1S are successfully implemented as identified in this report, including BMO compliance where applicable and, in the BPA, the building regulations.

8.1.3 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 dwellings or other buildings to be setback from classifiable vegetation, such that RHF is calculated to be below 12.5 kW/m^2 and BAL 12.5 dwellings could potentially be sited, 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 *lowest* risk locations, where BAL-LOW can be achieved, are the urban areas of Ballarat to the south of the precinct that are not a designated BPA (see Map 2). It is likely that upon completion of the proposed development of the Ballarat North precinct areas within the precinct would also 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:

- Future buildings are setback from hazardous vegetation to enable BAL-12.5 construction, an appropriate water supply for fire fighting is provided via a conventional reticulated hydrant system, and appropriate access/egress for emergency vehicles and residents is provided via a conventional residential road network.
- Development in the BMO complies with the applicable requirements of Clause 53.02 of the Ballarat Planning Scheme.
- It is ensured that any hazardous vegetation retained or re-established, does not create an increase in the hazard exposure for existing residents.

The risk to existing residents, either within the Ballarat North precinct or on the current northern edge of Ballarat, is likely to be reduced by the development of additional low threat or non-vegetated land that separates the Ballarat Town Common and Ballarat North Water reclamation Plant from the Grassland north of the precinct.

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 appropriately assesses and addresses 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 construction can achieve a BAL not exceeding BAL-12.5.

If, in the future, parts of the Ballarat North precinct are excised from the BPA, then buildings in non-BPA parts of the precinct could be constructed to BAL-LOW.

8.1.4 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

WSP (2024) assessed biodiversity values in the precinct and made recommendations to protect higher quality areas, particularly wetlands associated with the Burrumbeet Creek. The draft PBP has incorporated these areas in reserves protected from development. The design of the adjacent urban area can provide BAL-12.5 setbacks that do not encroach onto the high-quality vegetation or habitat.

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

8.1.5 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, Ballarat 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, Ballarat Planning Scheme).

Future development applications in the BPA, can achieve acceptable bushfire safety if:

- Setbacks for future development from classified vegetation are provided to enable BAL-12.5 construction.
- Adequate access and egress for emergency management vehicles is provided by a residential road network, including where possible, a perimeter road between the urban area and unmanaged vegetation to assist property defence and fire fighting.
- A reliable water supply for fire fighting is provided via a conventional reticulated hydrant system, in accordance with the hydrant objective for residential subdivision at Clause 56.09-3.

Note that access standards for driveways and static water supplies apply in BMO areas (see details in Appendix B and C).

9 Conclusion

This study has assessed the bushfire hazard in and around the Ballarat North precinct, in accordance with Clause 13.02-1S in the Ballarat 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).

All land within the precinct is currently a designated BPA. Land within approximately 150 m of the Ballarat North Water Reclamation Plant is also covered by the BMO.

The precinct is in a low bushfire risk landscape. In the directions from which a bushfire threat typically arises (north, north-west, west or south-west (Long, 2006)) the landscape is generally pastoral or comprises the existing urban area.

If future buildings are setback sufficiently from any hazardous vegetation, such that they achieve a construction standard of BAL-12.5 or lower, then the bushfire risk can be deemed to be acceptably mitigated.

There are low risk urban-residential and township areas to the south of the precinct that are not in the BPA, and which offer a place of shelter from any bushfire that may occur.

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

BALs and commensurate setbacks from classified vegetation, the applicable slope class is 'All slopes and flat land' or 'Downslope >0°-5°'.

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. Vegetation in the Ballarat North Water Reclamation Plant is classifiable as Forest, whilst areas of open pasture more than 100 mm in height, with less than 10% overstorey foliage cover, comprise Grassland.

In their current state, Burrumbeet Creek reserve and associated wetlands and Mount Rowan regional open space comprise classified Grassland but could be Woodland or Scrub if they were to be re-vegetated. Urban development adjacent to these areas will be required to provide setbacks commensurate to enable a BAL-12.5 construction standard for future buildings.

Applicable setbacks for BAL-12.5 construction in BPA and BMO parts of the precinct are shown in the following table.

Slope class	Vegetation	BAL-12.5 setback distance (defendable space)
All upslopes and flat land	Grassland	19 m
	Scrub	27 m
	Woodland	33 m
	Forest	48 m
Downslope >0-5°	Grassland	22 m
	Scrub	31 m
	Woodland	41 m
	Forest	57 m

If parts of the Ballarat North precinct become eligible for excision from the BPA as urban development permanently removes the bushfire hazard, BAL-LOW would apply, i.e. no specific construction requirements for bushfire protection.

Schedule 1 to the BMO (BMO1) would be appropriate for BAL-12.5 parts of the precinct that are affected by the BMO. The BMO1 bushfire protection measures include a BAL-12.5 construction standard for a dwelling, with defendable space for 30 m or to the property boundary, whichever is the lesser distance. Design of future subdivisions in this area should ensure building envelopes are sufficiently setback from the classified vegetation to enable BAL-12.5 construction.

The proposed interface roads are supported and should be incorporated where possible, to contribute to the BAL-12.5 separation distances for future development from any potentially hazardous vegetation, and to facilitate property protection and fire fighting.

Good access and egress for emergency management vehicles and residents, in the event of a bushfire, can be achieved via a conventional residential road network with multiple links to the existing urban areas to the south and west. Most of the perimeter of the precinct is bounded by existing roads.

A reliable water supply for fire fighting can be provided via a conventional reticulated hydrant system in accordance with the hydrant objective for residential subdivision at Clause 56.09-3. In BMO parts of the precinct an additional static water supply will be required.

The risk to existing residents of Ballarat will be reduced by the development of additional low threat or non-vegetated land and the presence of a new residential area with contemporary bushfire protection measures on the northern interface of the town, which separates the Ballarat Town Common and Ballarat North Water Reclamation Plant from a potential grassfire approaching through the agricultural areas to the north.

The application of the existing bushfire controls in the planning and building system can be deemed adequate to address bushfire risk.

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11 Appendices

11.1 Appendix A: Defendable space vegetation management standards

Table 6 Vegetation management requirements (Clause 53.02-5, Ballarat Planning Scheme).

'Defendable space is provided and is managed in accordance with the following requirements:

- *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.*
- *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.*

Unless specified in a schedule or otherwise agreed in writing to the satisfaction of the relevant fire authority'.

11.2 Appendix B: BMO Water supply requirements

Table 4 Water supply requirements - Capacity, fittings and access (Clause 53.02-5, Ballarat Planning Scheme).

Capacity, fittings and access

Lot sizes (square meters)	Hydrant available	Capacity (litres)	Fire authority fittings and access required
Less than 500	Not applicable	2,500	No
500-1,000	Yes	5,000	No
500-1,000	No	10,000	Yes
1,001 and above	Not applicable	10,000	Yes

Note 1: A hydrant is available if it is located within 120 metres of the rear of the building

Fire Authority Requirements

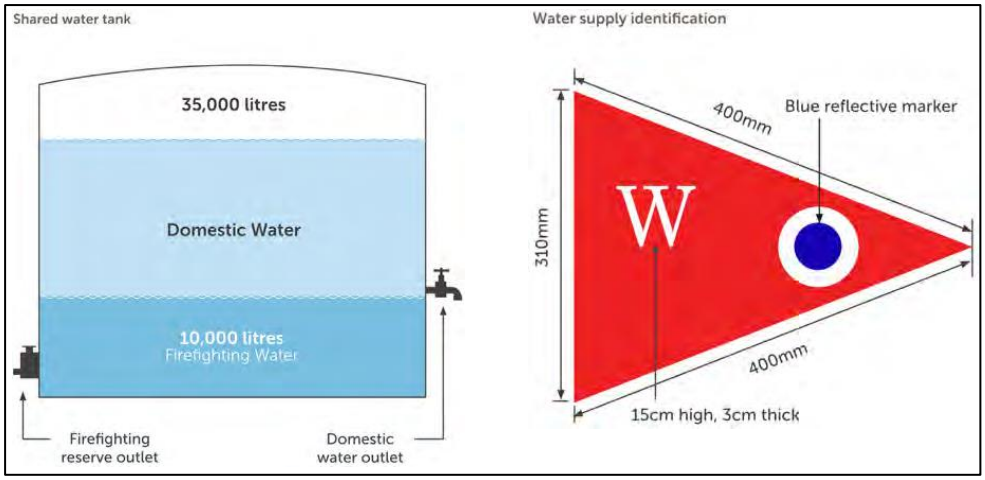
'Unless otherwise agreed in writing by the relevant fire authority, the water supply must:

- *Be stored in an above ground water tank constructed of concrete or metal.*
- *Have all fixed above ground water pipes and fittings required for firefighting purposes made of corrosive resistant metal.*
- *Include a separate outlet for occupant use.*

Where a 10,000 litre water supply is required, fire authority fittings and access must be provided as follows:

- *Be readily identifiable from the building or appropriate identification signage to the satisfaction of the relevant fire authority.*
- *Be located within 60 metres of the outer edge of the approved building.*
- *The outlet/s of the water tank must be within 4 metres of the accessway and unobstructed.*
- *Incorporate a separate ball or gate valve (British Standard Pipe (BSP 65 millimetre) and coupling (64 millimetre CFA 3 thread per inch male fitting).*
- *Any pipework and fittings must be a minimum of 65 millimetres (excluding the CFA coupling)'* (Clause 53.02-5, Ballarat Planning Scheme).

The water supply may be provided in the same water tank as other water supplies, provided they are separated with different outlets. See figure below illustrating signage and an example of outlets where fire fighting water will be in the same tank as water for other use.



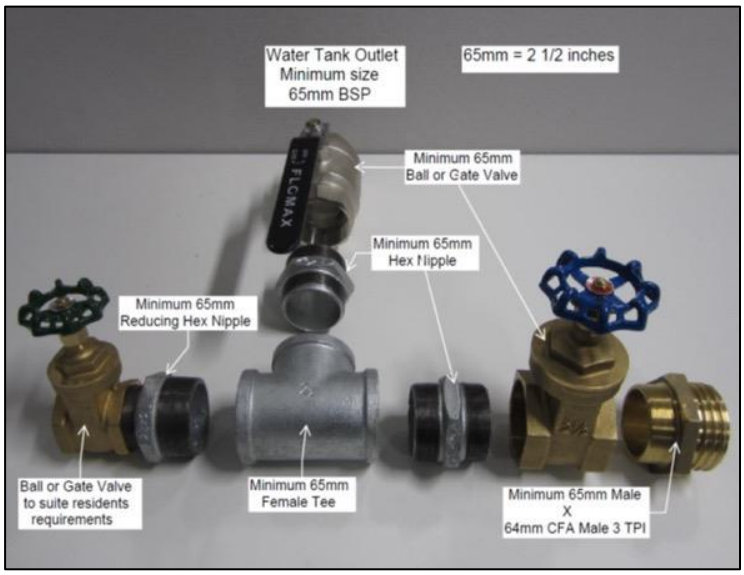
(DELWP, 2017).

CFA Fittings

'If specified within Table 4 to Clause 53.02-5 (if fire brigade access to your water supply is required), CFA's standard BMO permit conditions require the pipe work, fittings and tank outlet to be a minimum size of 64 mm.

65 mm BSP (British Standard Pipe) is the most common size available. A 65 mm fitting is equivalent to the old 21/2 inch. A 65 mm BSP (21/2 inch) fitting exceeds CFA's requirements and will therefore comply with CFA's standard permit conditions for the BMO.

The diagram below shows some common tank fittings available at most plumbing suppliers which meet the connection requirements. It includes a 65 mm tank outlet, two 65 mm ball or gate valves with a 65 mm male to 64 mm CFA 3 threads per inch male coupling. This is a special fitting which allows the CFA fire truck to connect to the water supply. An additional ball or gate valve will provide access to the water supply for the resident of the dwelling' (CFA, 2022b).



11.3 Appendix C: BMO Access requirements

Table 5 Vehicle access design and construction (Clause 53.02-5, Ballarat Planning Scheme)

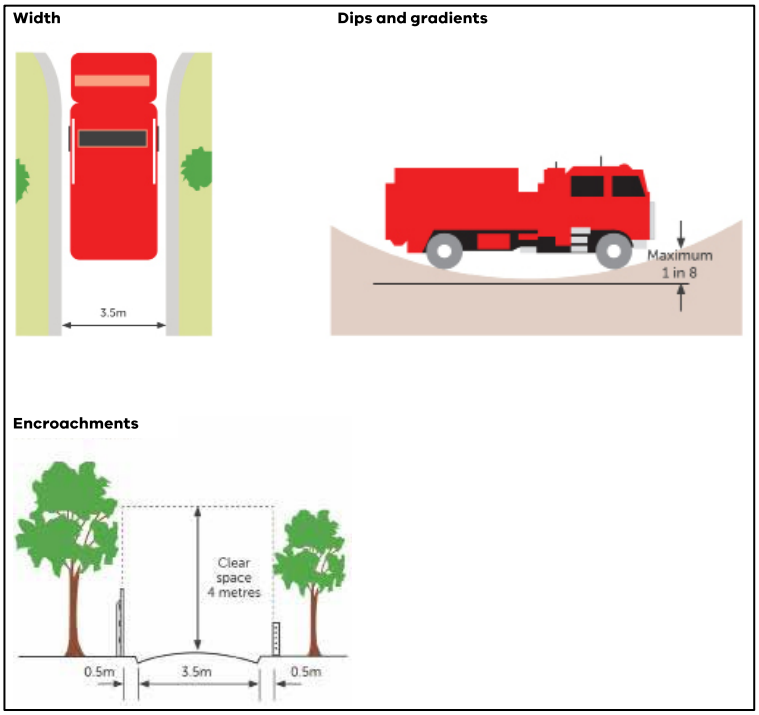
Length of access is less than 30 m

Driveways less than 30 m long have no specific requirements unless access to the water supply outlet is required, in which case the following apply as appropriate.

Length of access is between 30 m and 100 m

Where the length of access is greater than 30 m the following design and construction requirements apply (n.b. the length of access should be measured from a public road to either the building or the water supply outlet, whichever is longer):

- Curves must have a minimum inner radius of 10 m.
- The average grade must be no more than 1 in 7 (14.4%) (8.1°) with a maximum of no more than 1 in 5 (20%) (11.3°) for no more than 50 m.
- Dips must have no more than a 1 in 8 (12.5%) (7.1°) entry and exit angle.
- A load limit of at least 15 T and be of all-weather construction.
- Provide a minimum trafficable width of 3.5 m.
- Be clear of encroachments for at least 0.5 m on each side and at least 4 m vertically.
- A cleared area of 0.5 m is required to allow for the opening of vehicle doors along driveways.
- Dips must have no more than a 1 in 8 (12.5 per cent) (7.1 degrees) entry and exit angle.

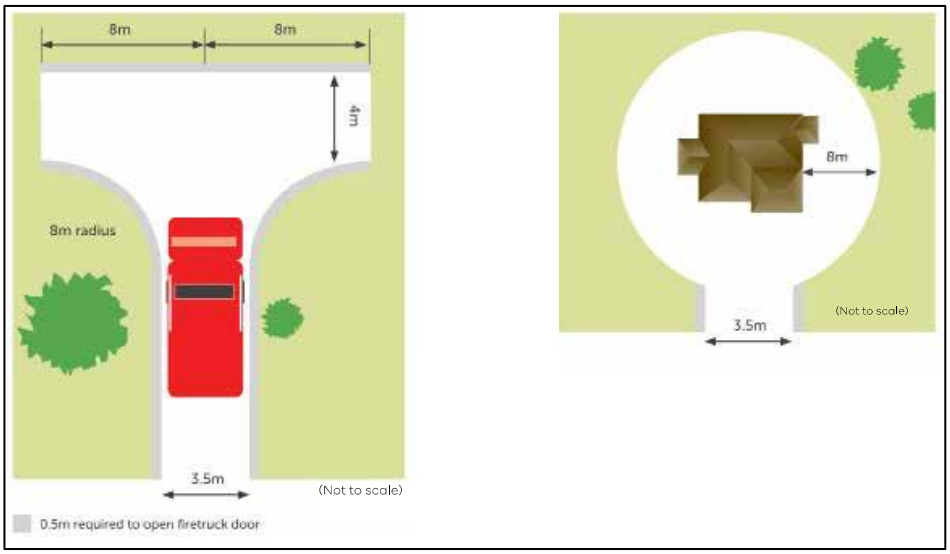


(DELWP, 2017).

Length of access is between 100 m and 200 m

In addition to the 30 m-100 m requirements above, a turning area for fire fighting vehicles must be provided close to the building by one of the following:

- A turning circle with a minimum radius of 8 m.
- A driveway encircling the dwelling.
- Other vehicle turning heads such as a T or Y head which meet the specification of Austroad Design for an 8.8 m service vehicle.

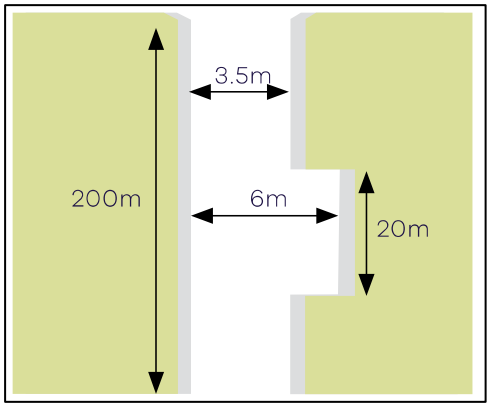


(DELWP, 2017).

Length of access is greater than 200 m

In addition to the requirements above, passing bays are required at least every 200 m that are:

- A minimum of 20 m long.
- With a minimum trafficable width of 6 m.



(DELWP, 2017).

11.4 Appendix D: 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).