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Bushfire Assessment and Development Report

for the Melton East Precinct Structure Plan

Report prepared for the
Victorian Planning Authority

November 2023

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Cover image: A developed area on the boundary of the Melton East PSP.

Accountability

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Glossary

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.
BCS	*Biodiversity Conservation Strategy.*
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 AS 3959-2018 *Construction of buildings in bushfire prone areas*.
Defendable space	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.
DEECA	*Department of Energy, Environment and Climate Action.*
DTP	*Department of Transport and Planning*
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.
FDR	*Fire Danger Rating*
LGA	*Local Government Area* – municipality
MEPSP	*Melton East Precinct Structure Plan*
PBP	*Place Based Plan* – Proposed land use within the PSP.
PSP	*Precinct Structure Plan.* PSPs are strategic masterplans for local areas that usually cater for between 5,000 and 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.

Executive summary

- *This study assesses the hazard in accordance with Clause 13.02-1S and identifies the bushfire protection measures that will be required for future development in the MEPSP area.*
- *The Melton East Precinct is in a relatively low bushfire risk landscape.*
- *Bushfire behaviour with the potential for neighbourhood-scale destruction is not credible.*
- *The surrounding landscape is dominated by flat or almost flat land that will not exacerbate fire behaviour.*
- *The only appreciable landscape bushfire hazard is Grassland, which in future will be limited to a northern exposure only.*
- *No part of the study area or the land for over 7km around it is affected by the BMO or a Schedule to the BMO.*
- *To the south, west and east, much of the land around the precinct is currently, and will increasingly become, designated as non-BPA as infill development occurs.*
- *Once developed with reliably low threat and non-vegetated areas, most of the precinct will meet the criteria for future excision from the BPA, creating a large area safe from bushfire attack for existing and future residents.*
- *All hazard interfaces along the precinct boundary will comprise a perimeter road providing adequate development setbacks from Grassland utilising Melton Highway to the north, Leakes Road to the east and the Western Freeway to the south.*
- *Development setbacks in addition to those provided by Leakes Road will be required from an adjacent reserve to the east in Rockbank North comprising Forest.*
- *Areas of higher hazard vegetation likely to be retained or created in the Kororoit Creek corridor will be relatively small, isolated and narrow. They will, therefore, not pose a significant threat if new and existing development is sufficiently setback from them by the distances identified in this report.*
- *Setbacks from the proposed vegetation within the BCS Conservation Reserve, Regional Open Space reserve and Drainage reserves will provide enough separation distance to ensure development is not exposed to RHF above 12.5kW/m^2.*
- *Alternatively, part of the reserves may be managed as low threat vegetation to provide the required RHF setbacks within them for neighbouring development.*
- *Interface areas where development setbacks will be required include:*
  - *between unmanaged vegetation in the BCS Conservation Area along Kororoit Creek, and development adjacent to them;*
  - *development abutting potentially hazardous open space areas, drainage reserves and wetland features; and*
  - *the Urban Growth Boundary along the northern edge of the precinct that interfaces with the permanent Grassland hazard.*
- *Any low threat setbacks from hazardous vegetation that are not provided by roads or vegetation management within the reserves, will be provided as development setbacks.*
- *Layout and subdivision design that implements the setbacks will ensure that no BAL construction standard will result that is higher than the maximum BAL-12.5 outcome stipulated in the settlement planning strategies of Clause 13.02-1S.*

- *It should be noted that the only land use areas anticipated to contain buildings of a class that would require a BAL, are those designated residential and the areas identified for potential schools.*
- *Scaled, illustrative design cross sections for areas that interface a permanent hazard, will be prepared as part of the PSP, to show the interface layout with development setbacks, including any proposed roads and landscaping.*
- *There are no apparent biodiversity impacts particularly associated with the findings of this bushfire assessment.*
- *Development of the precinct can satisfy the objective and all strategies of Clause 13.02-1S, which aim to prioritise protection of human life.*
- *Accordingly, acceptable bushfire safety will be achieved and the state planning policy objective for bushfire in the Melton Planning Scheme will be met, if the measures identified in this report are implemented. There are no apparent barriers to this being achievable.*

1 Introduction

This preliminary Bushfire Development Report has been prepared for the Victorian Planning Authority (VPA) as an assessment of the bushfire hazard for the Melton East Precinct Structure Plan (MEPSP). The main purpose of the report is to inform how the Place Based Plan (PBP) and future development within the precinct can respond to the bushfire risk, including the applicable Victorian planning and building controls that relate to bushfire. In particular, the objective and applicable strategies of Clause 13.02-1S *Bushfire planning* in the Planning Policy Framework (PPF).

The precinct comprises 1,005 hectares of land located just to the east of the Melton township area, approximately 35 km north-west of Melbourne's CBD (VPA, 2023) (see Map 1 and Map 6). A northern part of the precinct (along Melton Highway) is part of the Melton Urban Growth Boundary (UGB). The precinct is generally bounded by the Western Freeway to the south, Kororoit Creek to the north-east, Melton Highway to the north-west, Leakes Road to the east (a small part extends over Leakes Road to the north-east) and an industrial zone of Melton to the west. (see Figure 1).

The VPA, in conjunction with Melton City Council, service authorities, major stakeholders and the community, is preparing a draft PSP for the land. The vision for the precinct is *'an innovative and sustainability-focused precinct delivering a network of 20-minute neighbourhoods, uniting the surrounding precincts as the missing piece to the West Growth Corridor, and providing key connections to Kororoit Creek as an attractive destination... Important natural landmarks such as Kororoit Creek and the Seasonal Herbaceous Wetland conservation area will be key features of the community. Public open space, active transport routes and community facilities will be centred around these resources providing the link between the natural and built environments. Incorporation of best-practice urban design principles in natural settings will provide innovative opportunities for a green, climate resilient precinct with a strong sense of place.'* (VPA, 2022a) (see Figure 1).

The precinct is identified as predominately residential in the West Growth Corridor Plan and the Western Metro Land Use Framework Plan, and is expected to have a residential yield of approximately 11,000 lots and 2,000 jobs, with a forecast population of 34,100 people (VPA, 2023a).

This report assesses the bushfire hazard in and around the precinct, and identifies how planning for the design and layout of the precinct and future development that will occur within it, can appropriately mitigate any bushfire risk; including responding to and complying with the applicable bushfire planning and building controls. It has been prepared in accordance with guidance for the assessment of and response to bushfire risk provided in:

- *Design Guidelines Settlement Planning at the Bushfire Interface* (DELWP, 2020);
- *Bushfire State Planning Policy Amendment VC140*, Planning Advisory Note 68 (DELWP, 2018);
- *Local planning for bushfire protection*, Planning Practice Note 64 (DELWP, 2015);
- AS 3959-2018 *Construction of buildings in bushfire prone areas* (Standards Australia, 2020); and
- In relation to the classification of landscape risk, *Planning Permit Applications Bushfire Management Overlay* Technical Guide (DELWP, 2017a).

Map 1 – Melton East PSP Overview

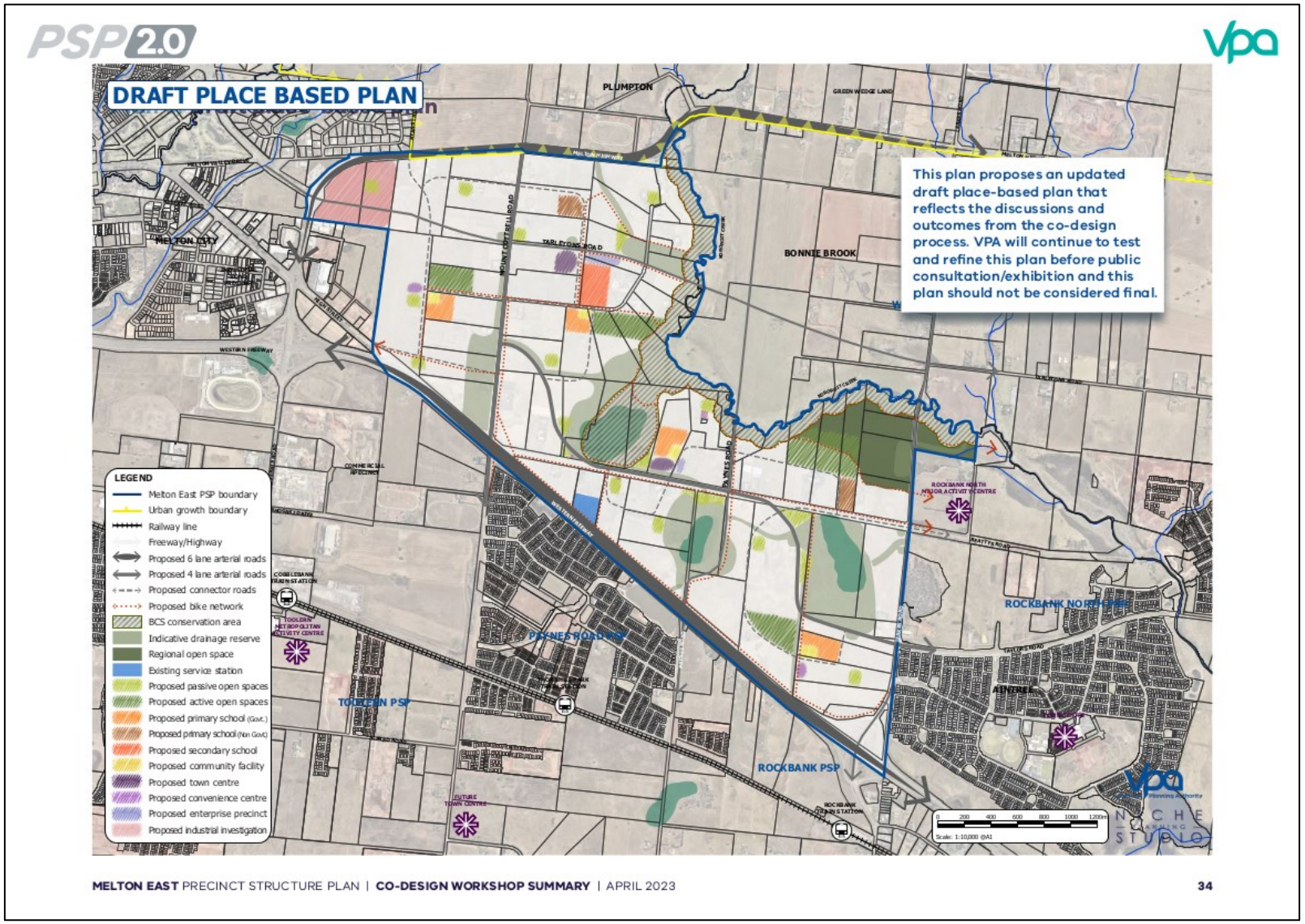


Figure 1 - Draft Place Based Plan (VPA, 2023b). Note elements of this design are also integrated into Map 2 and Map 7.

2 Bushfire planning and building controls

This section summarises the applicable planning and building controls that relate to bushfire. Section 4 describes how planning and design for the PSP can respond to and comply with the controls.

2.1 Clause 13 Environmental risks and amenity

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

2.1.1 Clause 13.01-1S Natural hazards and climate change

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

- *'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.'* (Melton Planning Scheme).

Especially in southern and eastern Australia, since the 1950s there has been an increase in the length of the fire weather season and an increase in extreme fire weather (CSIRO/BOM, 2022). 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, 2022). The Australasian Fire and Emergency Service Authorities Council (AFAC) identify that a failure of building codes and land use planning to adequately adapt to climate change is a significant risk (AFAC, 2018).

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. Climate change in relation to fire weather is discussed further in the hazard assessment in Section 3.4 of this report.

2.1.2 Clause 13.02-1S Bushfire planning

Clause 13.02-1S has the objective '*To strengthen the resilience of settlements and communities to bushfire through risk based planning that prioritises the protection of human life*' (Melton 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 Bushfire Prone Area (BPA);
- Subject to a Bushfire Management Overlay (BMO); or
- Proposed to be used or developed in a way that may create a bushfire hazard.

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

- *'Prioritising the protection of human life over all other policy considerations.*
- *Directing population growth and development to low risk locations and ensuring the availability of, and safe access to, areas where human life can be better protected from the effects of bushfire.*
- *Reducing the vulnerability of communities to bushfire through consideration of bushfire risk in decision-making at all stages of the planning process'* (Melton Planning Scheme).

Key strategies are stipulated that require strategic planning documents, planning scheme amendments and development approvals to properly assess bushfire risk and include appropriate bushfire protection measures. In a BPA this also applies to planning applications for uses and developments that are:

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

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

This study assesses the hazard in accordance with the hazard identification strategies of Clause 13.02-1S and identifies the bushfire protection measures that will be required for future development in the MEPSP area. It is considered that development can appropriately prioritise the

protection of human life, and meet the objectives of Clause 13.02-1S, by an appropriate design and layout that amongst other things, ensures future dwellings will not be exposed to Radiant Heat Flux (RHF) above 12.5kW/m^2, which is commensurate with a BAL-12.5 construction standard.

The maximum 12.5kW/m^2 safety threshold is required in settlement planning as the upper limit for acceptable risk including '*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 Construction of Buildings in Bushfire Prone Areas..'* (Melton Planning Scheme).

How the Melton East PSP can respond to the strategies in Clause 13.02-1S is detailed in Section 4, including an appropriate response to the guidelines for settlement planning on the bushfire interface.

2.2 Clause 71.02-3 Integrated Decision Making

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

2.3 Bushfire Prone Area (BPA)

BPAs are those areas subject to, or likely to be subject to bushfire, as determined by the Minister for Planning. Those areas of highest bushfire risk within the BPA are designated as BMO areas, however no part of the precinct is affected by the BMO. The nearest areas of BMO coverage are 7 km to the west and north, associated with patches of vegetation that extend southward from Lerderderg State Park (see Map 5).

Whilst the precinct, and much of the land within 5km to the south and north is in a designated BPA, nearly half of the land within 5km, including large areas to the west, south and south-east, is not (see Map 4 and Map 5).

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.

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 *Construction of buildings in bushfire prone areas*. For Class 1 buildings and associated decks, the NASH Standard – *Steel Framed Construction in Bushfire Areas* (NASH, 2021) is also deemed to satisfy the performance requirement.

More onerous performance measures apply to certain Class 9 buildings.

In Victoria, buildings in a BPA must be constructed to a minimum BAL-12.5, or higher as determined by a site assessment, planning scheme requirement or other NCC requirement[4].

A BAL is a means of measuring the severity of a building's potential exposure to ember attack, radiant heat and direct flame contact. There are six BALs defined in AS 3959-2018; which range from BAL-LOW, which has no bushfire construction requirements, to BAL-FZ (Flame Zone) where flame contact with a building is expected (see Appendix A).

There are no obstacles to future development in the MEPSP complying with the applicable building regulations invoked by the BPA coverage. Further, as development progresses, reliably

[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.

[4] Class 9 buildings are typically required to meet an enhanced BAL-19 construction standard, as well as comply with other bushfire protection specifications.

low threat or non-vegetated areas will be created, which will result in large parts of the precinct being able to be excised from the BPA and connecting the low threat urban areas in Melton and Aintree along the growth corridor. DTP review and excise areas from the BPA approximately every 6 months, particularly in growth areas where the hazard will be removed as urban development occurs.

Land becomes eligible for excision from the BPA if it satisfies state-wide hazard mapping criteria, including that the land needs to be:

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

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

2.4 Other controls

2.4.1 Zoning

Except for the Kororoit Creek corridor along the north-east boundary of the precinct, almost all of the rest of the land in the precinct is zoned Urban Growth Zone (UGZ), which has no intrinsic bushfire risk implications, other than that it facilitates intensive development in a BPA.

It is noted that in many PSP growth areas, UGZ schedules include a requirement that an application for residential subdivision includes a Site Management Plan to be approved by the responsible authority, which addresses bushfire risk during, and where necessary, after construction, including specifying:

- The staging of development and the likely bushfire risks at each stage;
- An area of land between the development edge and non-urban areas consistent with the separation distances specified in AS 3959-2018, where bushfire risk is managed;
- The land management measures to be undertaken by the developer to reduce the risk from fire within any surrounding rural or undeveloped landscape to protect residents and property from the threat of grassfire and bushfire; and
- How adequate opportunities for access and egress will be provided for early residents, construction workers and emergency vehicles.

This requirement will be considered for the MEPSP as it will help to ensure that bushfire risk is managed during the pre-development and construction phases, when areas of interim hazard may

be retained in proximity to new or existing development. It also supports subdivision applications to demonstrate how bushfire risk will be mitigated in a Clause 13.02-1S response/application.

2.4.2 Overlays

The Environmental Significance Overlay - Schedules 2 and 5 (ESO2 and ESO5), which apply to the Kororoit Creek corridor, have no intrinsic implications for bushfire risk, though their objectives to protect biodiversity values and the key issues in the draft PBP will result in the corridor comprising some hazardous vegetation. The riparian corridor and associated wetlands are part of Bioregional Conservation Strategy (BCS) Area 15 (VPA, 2023).

Areas of existing vegetation that are proposed to be retained, and areas to be revegetated or regenerated, which may comprise a bushfire hazard, have been classified (see Map 2 and Map 7). Development will then need to be adequately setback from this hazardous vegetation to ensure RHF exposure for the development does not exceed 12.5kW/m^2. Applicable setbacks are identified in Section 4.

Retained vegetation in more managed parklands such as the Open Space reserves in Map 7 will be low threat and non-hazardous.

The minor areas of Heritage Overlay have no implications for bushfire safety.

It is not known if new overlay controls are proposed, however it is unlikely that any new overlays would have appreciable bushfire risk implications.

It is noted that there is no BMO coverage of the precinct, and that the nearest areas of BMO coverage are 7 km away (see Map 5).

3 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 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'* (Melton Planning Scheme).

This section includes an assessment of vegetation, topography and climate/weather considerations including, as applicable, at:

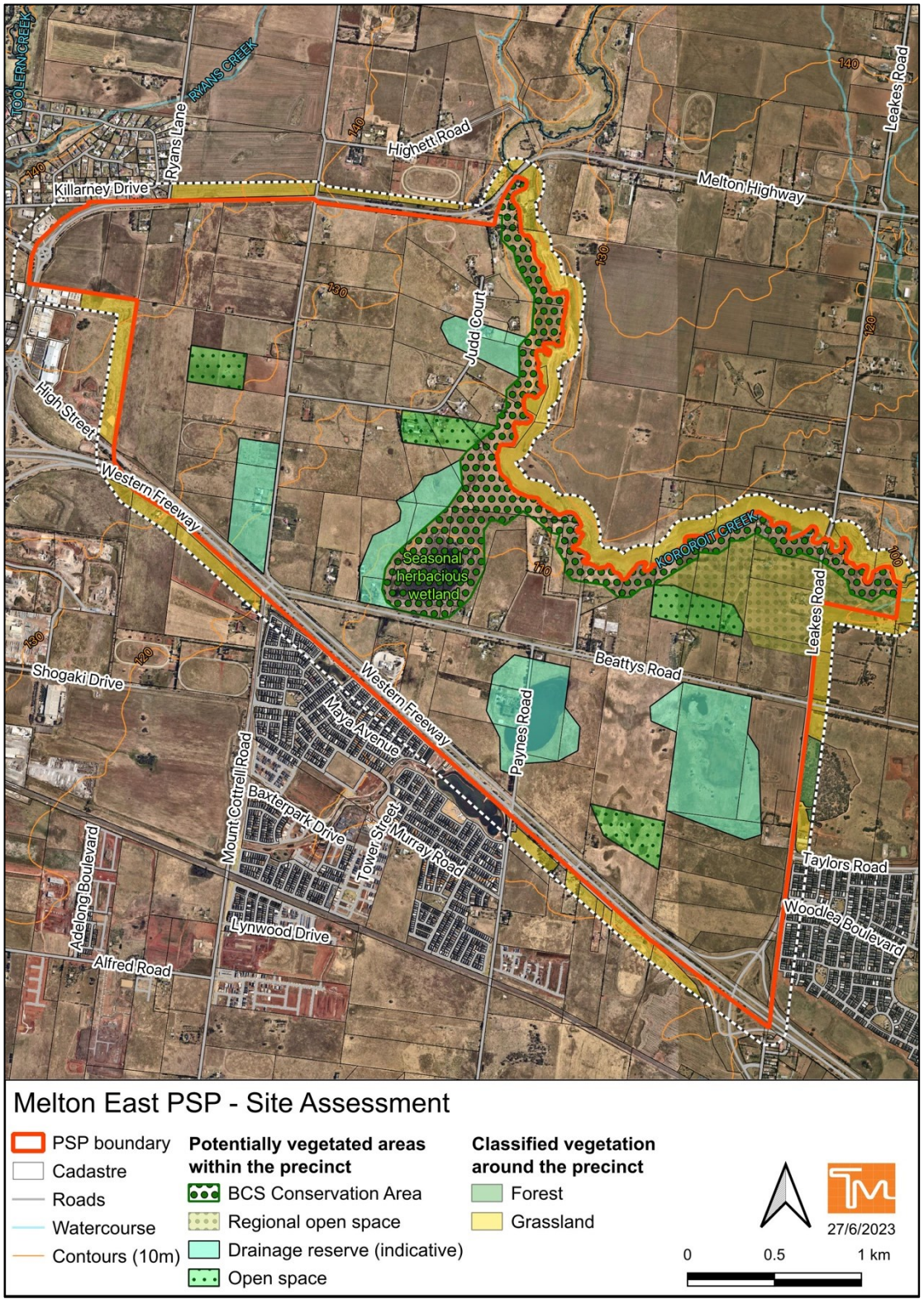
- The site scale, for 100m around the precinct to determine areas of likely future classified vegetation, effective slopes and hence, applicable RHF setbacks (see Map 2);
- The local landscape (1km) and neighbourhood (400m) scales (see Map 4); and
- The broader landscape scale, for up to 5km and at least 20km around the site (see Map 5).

The BPA coverage invokes AS 3959-2018, which requires a site assessment of the vegetation and topography up to 100m around a site or building, for the purposes of determining the applicable BAL construction standard for that building (Standards Australia, 2020). Clause 13.02-1S also requires application of the AS 3959-2018 assessment method to ensure RHF will not exceed 12.5kW/m^2 in accordance with two key settlement planning strategies:

- *'Directing population growth and development to low risk locations, being those locations assessed as having a radiant heat flux of less than 12.5 kilowatts/square metre under AS 3959-2018 Construction of Buildings in Bushfire-prone Areas (Standards Australia, 2018).*
- *Not approving any strategic planning document, local planning policy, or planning scheme amendment that will result in the introduction or intensification of development in an area that has, or will on completion have, more than a BAL-12.5 rating under AS 3959-2018 Construction of Buildings in Bushfire-prone Areas (Standards Australia, 2018)'* (Melton Planning Scheme).

3.1 Site assessment

The vegetation assessment identifying existing and future land uses and hence, areas of future classified vegetation, is shown in Map 2.



Map 2 - Bushfire Hazard Site Assessment.

3.1.1 Classified vegetation around the precinct

Classified vegetation is vegetation that is deemed hazardous from a bushfire perspective. The vegetation classification system is not directly analogous to Ecological Vegetation Classes (EVCs) but uses a generalised description of vegetation based on the AUSLIG (Australian Natural Resources Atlas: No. 7 - Native Vegetation) classification system. The classification is largely based on the structural characteristics of the vegetation at maturity, but the key determinant should be the likely fire behaviour that it will generate.

The MEPSP is in the Volcanic Plains Bioregion, and whilst Ecological Vegetation Classes (EVCs) are not directly analogous to the AS 3959-2018 vegetation classifications, the EVC descriptors provide some information about the hazard the 'natural' state of vegetation in the precinct may pose. In addition, they will be used as a management benchmark for conservation areas within the precinct (Melbourne Water, 2023). The EVCs listed below are identified as potentially occurring within the West Growth Corridor according publicly available EVC data (see Map 4).

Below is a summary and description of the vegetation classes (and potential EVCs) that affect the MEPSP:

Grassland

The predominant hazard within the 100m BAL assessment area, and up to and beyond the 400m neighbourhood area around the precinct, is Grassland. Grassland is defined as all forms of vegetation (except Tussock Moorlands) including situations with shrubs and trees, if overstorey foliage cover is less than 10% (includes pasture and cropland) (Standards Australia, 2020).

Grassland is considered hazardous, and therefore classifiable when it is not managed in a minimal fuel condition. Minimal fuel condition means there is insufficient fuel available to significantly increase the severity of the bushfire attack (e.g. short-cropped grass, to a nominal height of 100 mm) (Standards Australia, 2020). Grassland areas are assumed to be unmanaged and classifiable unless there is 'reasonable assurance' that they will be managed in perpetuity, in a low threat state, no more than 100mm high. The following EVCs shown in Map 4 are typically classified as Grassland.

- *"**EVC 132: Plains Grassland** - Treeless vegetation mostly < 1 m tall dominated by largely graminoid and herb life forms. Occupies cracking basalt soils prone to seasonal waterlogging in areas receiving < 500 mm annual rainfall.*
- ***EVC 125: Plains Grassy Wetland** - This EVC is usually treeless, but in some instances can include sparse River Red Gum Eucalyptus camaldulensis or Swamp Gum Eucalyptus ovata. A sparse shrub component may also be present. The characteristic ground cover is*

dominated by grasses and small sedges and herbs. The vegetation is typically species-rich on the outer verges but is usually species-poor in the wetter central areas.

Pastures around the site to the north will remain the dominant hazard to the precinct, as land in this direction is beyond the Urban Growth Boundary (see Map 2 and Map 4).

The future state of vegetation in wetland areas on the site have been identified as 'unmanaged grassland' (Melbourne Water, 2023) and have therefore been classified as Grassland.

Except in areas where development has already occurred, there is a temporary Grassland exposure around the precinct to the south, east and west. The Grassland in these directions is considered, however, to be a lesser hazard than that to the north, as when land is subsequently developed as part of the West Growth Corridor Plan, the Grassland hazard will be removed, or at least significantly reduced in these directions. This is evidenced by the growth and development of neighbouring precincts such as the Warrensbrook and Rockbank North PSPs to the east and the Rockbank, Paynes Road and Toolern PSPs to the south and west. Additionally, the Western Freeway buffers the southern boundary of the MEPSP from the wider Grassland hazard to the south.

Woodland

Woodland vegetation typically comprises areas with trees 10 m - 30 m tall, 10% - 30% foliage cover dominated by eucalypts (and/or callitris) with a prominent grassy understorey which may contain scattered shrubs (Standards Australia, 2020). Areas of revegetation or natural regeneration along the creek corridor or elsewhere in the BCS area, are anticipated to reach this state (see Appendix B) (Melbourne Water, 2023).

- ***EVC 68: Creekline Grassy Woodland*** *- Eucalypt-dominated woodland to 15 m tall with occasional scattered shrub layer over a mostly grassy/sedgy to herbaceous ground-layer. Occurs on low-gradient ephemeral to intermittent drainage lines, typically on fertile colluvial/alluvial soils, on a wide range of suitably fertile geological substrates. These minor drainage lines can include a range of graminoid and herbaceous species tolerant of waterlogged soils, and are presumed to have sometimes resembled a linear wetland or system of interconnected small ponds.*
- ***EVC 55_61: Plains Grassy Woodland*** *- An open, eucalypt woodland to 15 m tall. Occupies poorly drained, fertile soils on flat or gently undulating plains at low elevations. The understorey consists of a few sparse shrubs over a species-rich grassy and herbaceous ground layer. This variant occupies areas receiving approximately 500 – 700 mm annual rainfall." (DSE, 2004).*

Forest

A small patch of treed vegetation with a developed understory to the east of the precinct, over Leakes Road, has been classified in the AS 3959-2018 Forest group, as it is likely to remain in a hazardous state. It is listed as a Conservation Area in the adjacent Rockbank PSP (VPA, 2012). Forest vegetation typically comprises trees with an overall tree canopy cover greater than 30%. The Forest class comprises the Open Forest or Low Open Forest vegetation types, which typically have a canopy of trees to 30 m high, with 30-70% overall foliage cover including an understorey of sclerophyllous low trees and tall scrubs (Standards Australia, 2020).

Figure 2 – Cropland north of the precinct over Melton Highway, which is classified as Grassland.

Figure 3 – Grassland and roadside vegetation along the precinct's northern boundary near the intersection of Melton Highway with Kororoit Creek, which will be an ongoing hazard.

Figure 4 – Grassland north of the precinct near Leakes Road, beyond the UGB, which will be an ongoing hazard.

Figure 5 – Grassland east of the precinct near the intersection of Leakes Rd and Beattys Rd, which will be removed during development of the Rockbank North PSP.

Figure 6 – Forest east of the precinct over Leakes Road.

3.1.2 *Proposed land use and vegetation within the precinct*

Vegetation classification is based on the current and anticipated likely future long-term state of the vegetation as anticipated by the draft PBP for the MEPSP (see Figure 1, Map 2 and Map 7). It must be noted that this necessarily involves making assumptions about the future state and extent of vegetation within the precinct, in particular, in the proposed reserves (see Section 4.1.4). These assumptions are specified in this report and have been confirmed where possible, by relevant stakeholders. A letter from Melbourne Water is shown as Appendix B, stating the future vision for vegetation management in some of the reserves. Areas where vegetation will or will likely be retained as a potential bushfire hazard, have been identified in the PBP and in Map 7 and appropriate development setbacks adopted.

Temporary pasture and cropland

The extensive areas of Grassland that currently occur within the precinct as pasture and cropland are likely to be a short to medium-term hazard, as they will be transformed into low threat vegetation (i.e. domestic lawns, gardens, local parks and streetscapes) or will become non-vegetated land, as the precinct is developed.

Figure 7 – Pasture (Grassland) within the precinct along Judd Court, which will be removed as development of the precinct progresses.

BCS Conservation Area

Conservation Areas are proposed along Kororoit Creek and extending over a wetland area in the south of the precinct. The future state of vegetation along Kororoit Creek and within the wider BCS Conservation Area will be managed to various EVC benchmarks listed in Section 3.1.1. The hazard posed by them is not likely to exceed that of a Woodland or Grassland classification under AS 3959-2018. Some areas of Shrubland may occur in wetland areas, however, it is acknowledged that the BAL-12.5 setbacks required from Shrubland are the same as for Grassland.

The Creekline Grassy Woodland (EVC 68), that currently extends along some parts of Kororoit Creek (see Figure 8) and/or will be revegetated/managed within the BCS Conservation Area (Melbourne Water, 2023), is anticipated to be an ongoing Woodland hazard. To represent the likely future state of the treed riparian corridor, a 30m buffer of the entire Kororoit Creek watercourse has been applied within the precinct. For the purposes of hazard assessment and subsequent development setback requirements, a Woodland classification applies to this 30m riparian corridor buffer.

Figure 8 – Grassland and Woodland along the Kororoit Creek riparian corridor within the proposed BCS Conservation Area (see Map 2 and Figure 1).

A Seasonal Herbaceous Wetland is proposed as part of the BCS Conservation Area in the centre of the precinct and connected to the Kororoit Creek by conservation reserve (see Map 2). This is

anticipated to comprise hazardous Grassland, which aligns with the description of vegetation in wetland areas as 'unmanaged grassland', as shown in Appendix B.

The Design Brief (VPA, 2023a) also identifies the provision of Growling Grass Frog habitat is a key objective, which applies to parts of the BCS Conservation Area and other areas of wetland within the precinct. It is considered reasonable to assume that all Growling Grass Frog habitat where tree canopy cover is less than 10%, will comprise no more of a hazard than classified Grassland. This is consistent with guidelines for the management and enhancement of areas to create or improve Growling Grass Frog habitat, as stipulated in the *Growling Grass Frog Habitat Design Standards* (DELWP, 2017b).

These standards stipulate that 50% of terrestrial habitat within 10m of a wetland should be maintained as low, grassy vegetation no higher than 100mm. From 10m and up to 100m where possible, it should comprise short, mown grass. Tree and shrub cover within 100m of a wetland should not exceed 10% (DELWP, 2017b). On this basis, many areas of Growling Grass Frog habitat may in fact comprise low threat vegetation.

The abovementioned Grassland vegetation type also apply to other areas of wetland outside the BCS Conservation Area, such as in drainage reserves.

Drainage Reserves

The future vegetated state of the proposed Drainage Reserves and Easements and/or wetlands associated with the Conservation Areas (see Figure 1 and Map 7), will comprise hazardous Grassland (Melbourne Water, 2023) unless they are managed (mown) in a minimal fuel condition. These areas will need to be sufficiently setback from development such that RHF on buildings will not exceed 12.5kW/m^2. For this safety threshold, in response to flat or upslope Grassland, a 19m setback is required. The land within the setback must be low threat vegetation or a non-vegetated area.

If natural recruitment over time, and/or active revegetation, occurs within reserves, they may comprise higher hazard Woodland vegetation for which a greater setback of development would be required (e.g. 33m for BAL-12.5 in response to flat or upslope Woodland).

Water Sensitive Urban Design (WSUD) features in the MEPSP, that comprise reliably open water or wet areas and little or no vegetation, may be deemed non-vegetated or low threat. However, large, seasonally inundated wetlands or WSUD features that may be dry and vegetated during the fire danger period could comprise classifiable Grassland (or Woodland or Shrubland). Note that the applicable BAL-12.5 setbacks for Shrubland are the same as for Grassland. Based on the Melbourne Water letter in Appendix B, all WSUD features such as drainage reserves have been classified as Grassland and appropriate setbacks applied.

Other Open Space

Other areas designated as Open Space on the PBP may comprise hazardous vegetation if the vegetation is not managed as low threat. This includes the proposed 'Regional Open Space' area, which, as it has been classified as Grassland as a precaution, would necessitate 19m development setbacks.

However, most, if not all of the vegetation in the other Open Space reserves and local parks within the precinct, will likely be managed in a parkland state as low threat vegetation that can be excluded from classification under Section 2.2.3.2 (*f*) of AS 3959-2018 (see Section 4). In which case no setbacks for adjacent development will apply.

Roadside Vegetation

Linear vegetation along roadsides within the proposed PBP is able to be deemed 'low threat' if it meets one of the criteria for excluded vegetation in Section 2.2.3.2 (d) of AS 3959-2018, which allows narrow strips of vegetation along waterways or drainage lines (or roadsides) to be excluded from classification as low threat, non-hazardous vegetation, if they are no more than 20m wide and are separated by at least 20m from future buildings and any other narrow strips or other areas of classified vegetation. The applicable exclusion is:

'Strips of vegetation less than 20m in width (measured perpendicular to the elevation exposed to the strip of vegetation) regardless of length and not within 20m of the site or each other, or other areas of vegetation being classified vegetation' (Standards Australia, 2020).

This exclusion will apply to vegetation along roadsides within and around the precinct. However, as Grassland on urban road reserves, it is more than likely to be mown, and therefore, be deemed low threat via exclusion 2.2.3.2 (f) (see Figure 9).

Figure 9 – Example of a managed low threat road reserve within the precinct.

3.2 Excluded vegetation and non-vegetated areas

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

(a) 'Vegetation of any type that is more than 100m from the site.

(b) Single areas of vegetation less than 1 ha in area and not within 100m of other areas of vegetation being classified vegetation.

(c) Multiple areas of vegetation less than 0.25ha in area and not within 20m of the site, or each other, or of other areas of vegetation being classified vegetation.

(d) Strips of vegetation less than 20m in width (measured perpendicular to the elevation exposed to the strip of vegetation) regardless of length and not within 20m of the site or each other, or other areas of vegetation being classified vegetation.

(e) Non-vegetated areas, that is, areas permanently cleared of vegetation, including waterways, exposed beaches, roads, footpaths, buildings and rocky outcrops.

(f) Vegetation regarded as low threat due to factors such as flammability, moisture content or fuel load. This includes grassland managed in a minimal fuel condition, mangroves and other saline wetlands, maintained lawns, golf courses (such as playing areas and fairways), maintained public reserves and parklands, sporting fields, vineyards, orchards, banana

plantations, market gardens (and other non-curing crops), cultivated gardens, commercial nurseries, nature strips and windbreaks' (Standards Australia, 2020).

Residential and other developed areas in the precinct (see Figure 1 and Map 7) will comprise low threat vegetation as maintained lawns and cultivated gardens. Non-vegetated areas will include the roads, driveways and structures.

Areas where vegetation may be retained that could be a potential bushfire hazard (i.e. that will not meet one or more of the exclusion criteria above) should be identified in the PBP and appropriate development setbacks adopted.

3.3 Topography

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

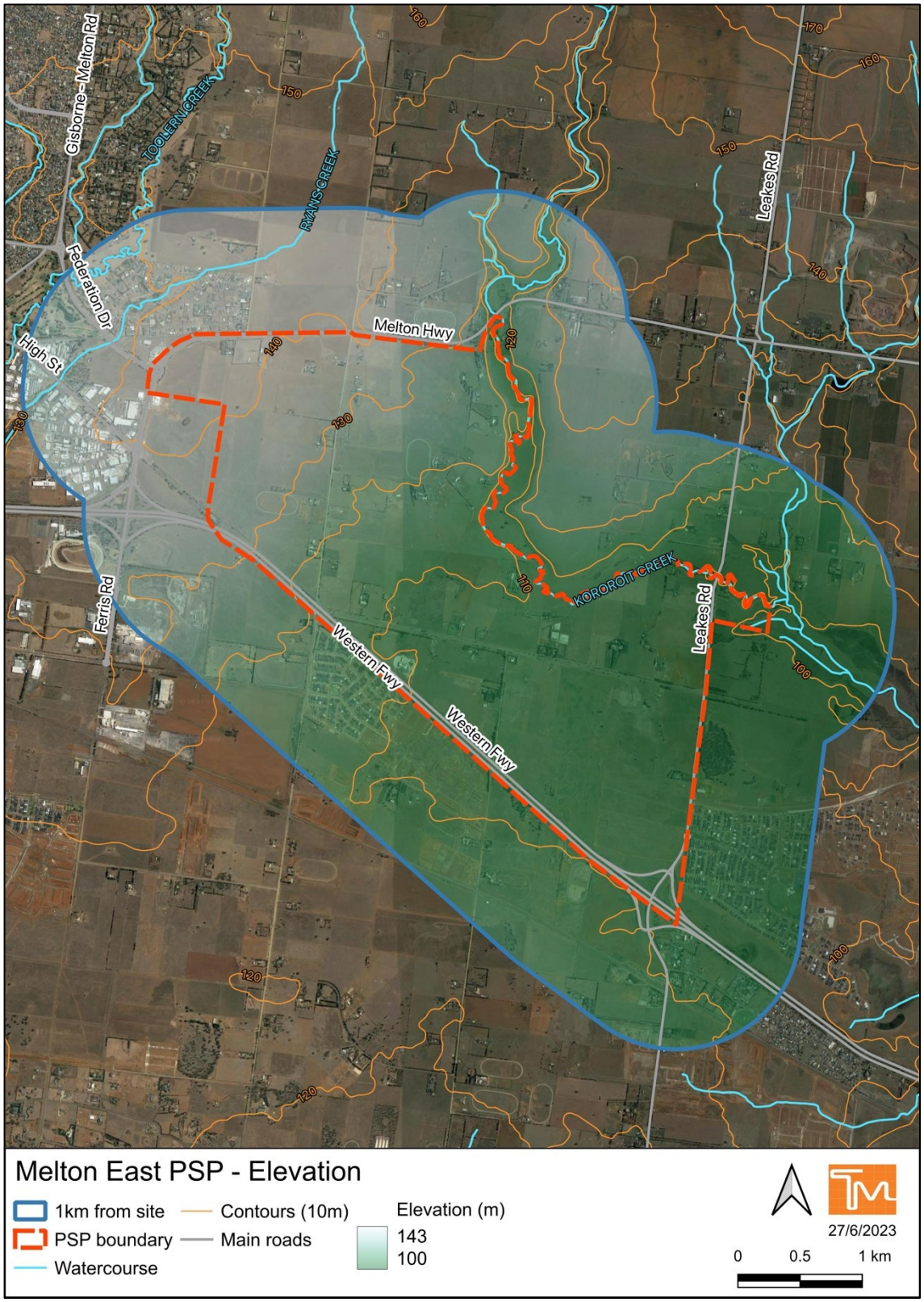
- Flat and/or Upslope - land that is flat or on which a bushfire will be burning downhill in relation to the development. Fires burning downhill (i.e. on an upslope) will generally be moving more slowly with a reduced intensity.
- Downslope - land under the classified vegetation on which a bushfire will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

The topography was analysed by site assessment, publicly available 10m and 1m contour data, and by creating a digital elevation model (DEM) for the site and surrounding land using generated from interpolating 1m contours (see Map 3).

The terrain is relatively benign from a bushfire perspective, being predominantly flat, very gently sloping, or upslope in relation to the precinct. Some downslopes occur along Kororoit Creek, however, they are short and limited to the creek banks and therefore, not considered to appreciably impact fire behaviour.

Overall, the land generally rises gently from the south-east to the north-west of the precinct. For the purposes of determining future BALs and vegetation setback distances for buildings, the applicable slope class is 'All upslopes and flat land'.

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



Map 3 - Elevation map of the precinct and surrounding land.

3.4 Fire weather

The Victorian planning and building systems uses the Forest Fire Danger Index (FFDI) and the Grassland Fire Danger Index (GFDI) as an input to RHF setbacks. An FFDI 100/GFDI 130 (equivalent to a Catastrophic fire danger rating under the recently introduced Australian Fire Danger Rating System (AFDRS) is applied in non-alpine areas of Victoria by the building system, to establish building setback distances from classified vegetation in accordance with AS 3959-2018. The potential fire behaviour and recommended actions under the AFDRS is summarised in Table 1.

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

In southern Australia, since the 1950s there has been an increase in the length of the fire weather season and an increase in extreme fire weather. It is projected that there will be further increase in the number of dangerous fire weather days and a longer fire season for southern and eastern Australia (CSIRO/BOM, 2022). There is a 'high confidence' that climate change will result in a harsher fire weather climate for the Southern Slopes (Victoria West) sub-cluster that the MEPSP is in, with 'low' confidence in the magnitude of change to fire weather (CSIRO/BMO, 2023).

Currently the CFA and the Department of Transport and Planning (DTP) have no published policy on FFDI/GFDI recurrence intervals. There is, therefore, no compelling rationale for applying a different FFDI/GFDI from the 'default' FFDI 100/GFDI 130 threshold currently used throughout non-Alpine areas of Victoria in the planning and building system.

Table 1 - Fire Danger Ratings (Source: BOM 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.

3.5 Landscape risk

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*. These are intended to streamline decision-making and support more consistent decisions based on the landscape risk (DELWP, 2017a).

The MEPSP area is not affected by the BMO, with the nearest areas of BMO coverage being 7 km to the north and west. However, the BMO landscape typologies are useful descriptors of bushfire risk at the neighbourhood, local and broader landscape scales.

The four types range from low risk landscapes where there is little hazardous vegetation beyond 150m of a site and extreme bushfire behaviour is not credible, to extreme risk landscapes with limited or no evacuation options and where fire behaviour could exceed BMO/AS 3959 assumptions (see Table 2).

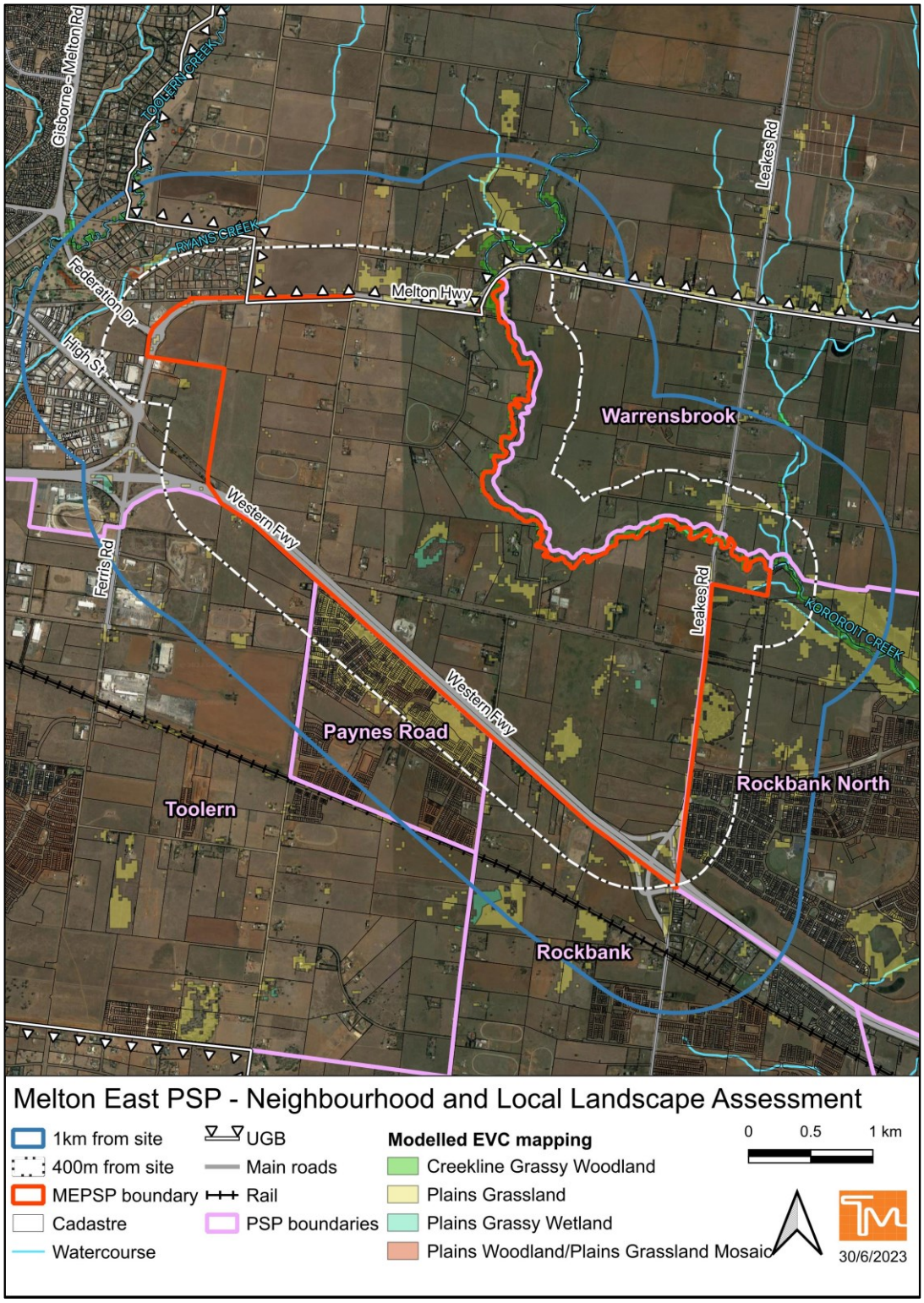
Table 2 - Landscape risk typologies (from DELWP, 2017a).

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.* • *Fires have hours or days to grow and develop before impacting.* • *Evacuation options are limited or not available.*
I N C R E A S I N G R I S K →			

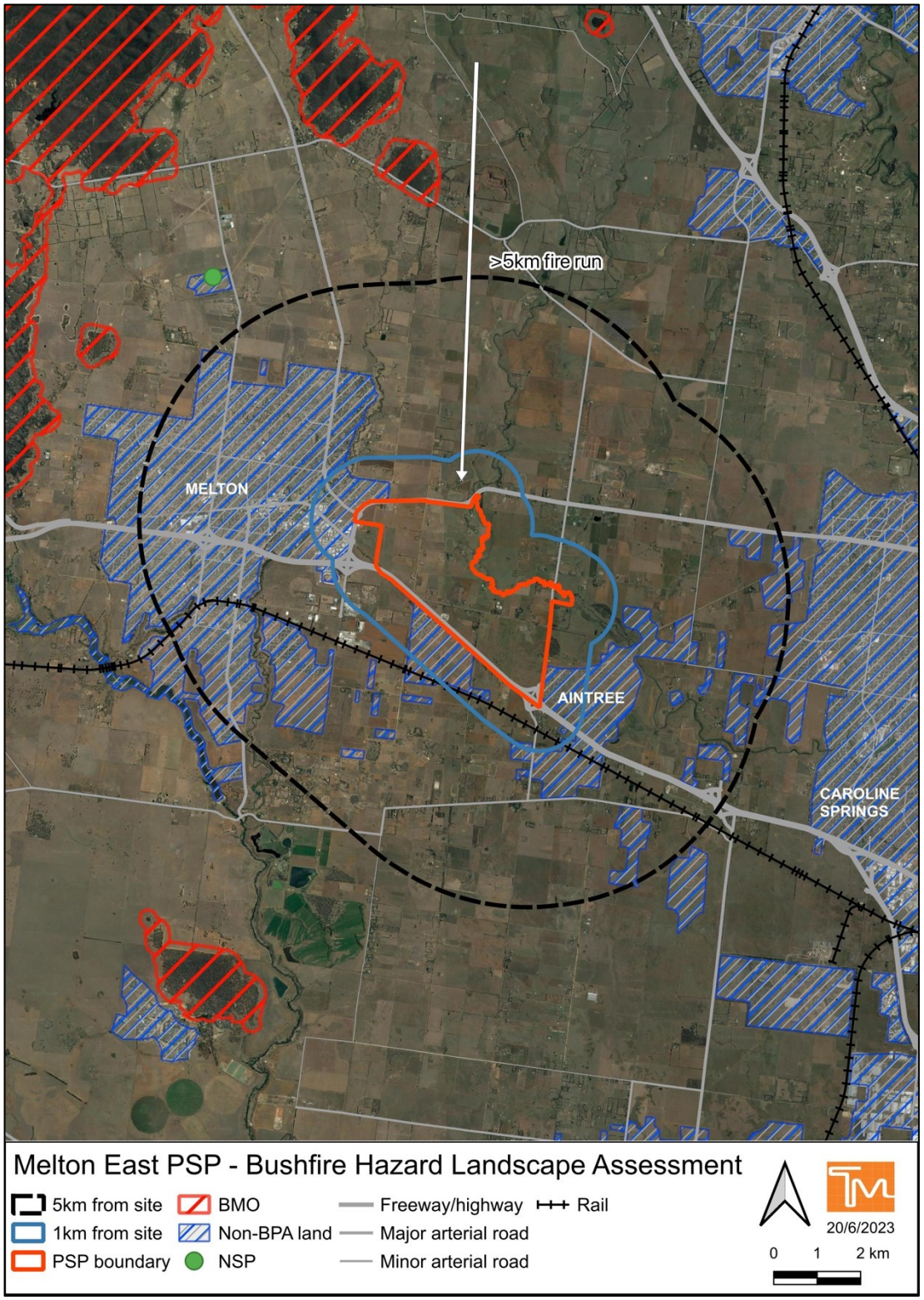
It is considered that the landscape around the precinct best matches the attributes of Landscape Type 1. The topography is relatively benign and the predominant hazard is Grassland. To the west and north-west the precinct is largely protected from grassfire by the Melton township area and associated non-BPA land. Similarly, to the south, south-west and south-east, establishing residential areas in adjacent precincts are creating low threat and non-BPA landscapes (see Map 4 and Map 5).

The longest grassfire run that can approach the site is from the north, through agricultural land, as occurred in the 1965 fire that impacted the site (see Map 6). It is noted that the northern interface is somewhat buffered by the Melton Highway, which will provide the commensurate provide radiant heat setbacks needed for development if greater than 19m in width.

Good precinct design that responds to the bushfire risk, including the provision of BAL-12.5 setbacks, the application of the building controls for development in a BPA, an urban residential road network and reticulated water supply, can appropriately mitigate the risk. Setbacks with perimeter roads are recommended along the north-east interface with the Kororoit Creek and the BCS area (see further discussion in Sections 4 and 4.1.1).



Map 4 – Neighbourhood and Local Assessment areas showing EVC modelling. N.B. As all surrounding land other than beyond the UGB is within a neighbouring PSP, the EVCs do not indicate the presence of native or hazardous vegetation.



Map 5 - Bushfire Hazard Landscape Assessment.

Map 6 - Broad Landscape and showing the bushfire history and MEPSP's position relative to the wider urban Melbourne metropolitan area.

4 Planning and design response

This section identifies how the PBP and PSP responds appropriately to the bushfire risk, including the requirements of Clause 13.02-1S, published guidance and the building regulations applicable to construction in a BPA.

4.1 Settlement form and structure

4.1.1 Considering the bushfire hazard in directing growth

Situated as it is within the Melton local government are (LGA), the MEPSP area is identified in the Melton MSS as an area *'subject to ongoing development pressures'* and a primary location for urban growth and consolidation. Melton is also identified as one of the fastest growing areas of Victoria (Melton Planning Scheme).

Due to the precinct's position as an infill PSP, it is exposed to less of a hazard than more isolated precincts. Only part of one boundary is exposed to an ongoing grassfire hazard beyond the UGB to the north of the MEPSP). Existing or proposed development covers a significant portion of the land within 5km to the east, west and south (see Map 4).

Whilst forested areas occur in the wider landscape to the north and north-west, including the Lerderderg State Park, these are over 7km away and sufficiently distant not to present a significant risk (see Map 5). The Melton township also lies between these hazards and the precinct.

As identified in Section 3.5 the landscape is relatively low risk. The precinct is protected or 'buffered' from a bushfire approach from the north-west, east, west and south by the Aintree and Melton township areas and other establishing residential areas where the bushfire hazard has been or is being removed by settlement. The reduced risk is reflected by the removal of significant areas of land in these directions from the BPA (see Map 4).

The higher risk parts of the precinct are those abutting the northern precinct boundary and to a lesser extent, the Kororoit Creek and BCS area.

The main form of bushfire attack on future development is potentially low levels of ember attack from a large, 'landscape scale' grassfire approaching from the north. However, the bushfire risk is low and not significant enough to prevent development of the precinct. The existing planning and building controls are appropriate to mitigate the risk. If the development layout responds to the bushfire risk and development is setback sufficiently from hazardous vegetation such that RHF will not exceed 12.5kW/m^2 (equivalent to BAL-12.5).

The precinct is located to the east of an established settlement, which accords with DTP guidance about lower risk locations. Furthermore, as land is developed in and around the precinct it will result in areas of the precinct becoming eligible for exclusion from the BPA if they are sufficiently distant from hazardous vegetation around it (see the criteria for excision in Section 2.3).

4.1.2 The distribution of land uses in the settlement

The VPA has considered the location of hazards in relation to proposed vulnerable uses in PSP planning and their locations (including schools and community facilities), nominated on the draft PBP, have been assessed and are shown in Map 7. A vulnerable use is typically a residential aged care facility, residential building, retirement village, child care centre, education centre, hospital, leisure and recreation facility or a place of assembly. The draft PBP identifies potential locations for schools and town centres, which are generally located in lower risk parts of the precinct, well away from the higher risk northern, boundary of the precinct, which abuts the UGB.

Providing access for emergency vehicles and a protective 'buffer' for vulnerable use buildings and residential development from a potential fire within conservation areas and reserves within the precinct by incorporating perimeter roads is recommended. This can achieve RHF setbacks of 12.5kW/m^2 from potential future hazardous vegetation in the reserves. Locating roads at the edge of conservation, drainage and other reserves that may contain hazardous vegetation, also facilitates fire fighting if required to protect residential areas located near the reserves. Similarly, Terramatrix understands that perimeter roads will be provided along other areas of hazard, such as the BCS Conservation Area interface.

4.1.3 Lot sizes in settlement layout

It is estimated that there will be 11,000 new residential lots in the MEPSP. Most of the precinct is proposed to have standard, medium or high density housing, with an average density of 20 lots per hectare respectively (VPA 2023a, VPA 2022b). Along with creating large non-vegetated areas of land, these residential densities with smaller lot sizes will result in low threat cultivated gardens and streetscapes that will prevent the establishment of hazardous vegetation within the residential area.

4.1.4 Vegetated areas within a settlement

Vegetated areas within the settlement that may pose a hazard are identified in the PBP. This allows setbacks from them to be defined to achieve the RHF 12.5kW/m^2 safety threshold. Note that more heavily vegetated areas may be able to be designed to meet one or more of the small patch or narrow strips criteria for exclusion as non-hazardous vegetation, and therefore be

deemed 'low threat' with no need for a development setback, or where a lesser development setback can apply (see Section 3.2).

Potential exclusion criteria from AS 3959-2018 that could be applied to ensure classified vegetation does not occur in proximity to buildings, are the small patch criteria for:

- Section 2.2.3.2 (b) – *"Single areas of vegetation less than 1 ha in area and not within 100m of other areas of classified vegetation;"*
- Section 2.2.3.2 (c) – "*Multiple areas of vegetation less than 0.25ha in area and not within 20m of the site/building, or each other, or of other areas of classified vegetation;"* and
- Section 2.2.3.2 (d) – "*Strips of vegetation less than 20m in width (measured perpendicular to the elevation exposed to the strip of vegetation) regardless of length and not within 20m of the site/building or each other, or other areas of classified vegetation."* (Standards Australia, 2020).

It is recognised, however, that at the strategic and settlement planning stage it may be difficult to define the future vegetated state. Statutory controls will be put in place to ensure that, at the subdivision design and approval stage, any localised areas of hazardous vegetation are identified and commensurate development setbacks incorporated with appropriate certainty about management of vegetation within a setback area. As identified in Section 3, future vegetation within some of the reserves will be hazardous according to the AS 3959-2018 hazard classification methodology, therefore, development setbacks as identified in this report will apply from them (see Section 4.2.1).

The intent of this Draft Bushfire Development Report is to inform the strategic planning of the MEPSP so that areas of current and future hazardous vegetation are sufficiently setback from development so as to achieve a RHF not exceeeding 12.5kW/m^2. These recommendations will then be incorporated into the PBP.

4.2 The hazard interface

4.2.1 Applying the required development setbacks

To satisfy key settlement planning strategies of Clause 13.02-1S, future development must be sufficiently setback[6] from classified vegetation to ensure RHF does not exceed 12.5kW/m^2. 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[7] under AS 3959-2018 Construction of Buildings in Bushfire-prone Areas (Standards Australia, 2018).*
- *Not approving any strategic planning document, local planning policy, or planning scheme amendment that will result in the introduction or intensification of development in an area that has, or will on completion have, more than a BAL-12.5 rating under AS 3959-2018 Construction of Buildings in Bushfire-prone Areas (Standards Australia, 2018)'* (Melton Planning Scheme).

The RHF setbacks required for development in response to Grassland/Shrubland, Woodland and Forest, based on the hazard assessment in Section 3 and determined using the simple Method 1 procedure of AS 3959-2018, are shown in Table 3 below.

Table 3 – Applicable setbacks from hazardous vegetation within/around the MEPSP.

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

[6] 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).

[7] Note that the first strategy is to ensure RHF is less than 12.5kW/m^2 (author's emphasis). The second strategy stipulates a maximum BAL-12.5 construction standard (which requires that RHF not exceed 12.5kW/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.

Map 7 shows the setbacks that would be required from the edge of classified vegetation within and around the precinct for development (as per the site assessment in Section 3.1). More detailed scale map frames are illustrated in Map 8 and Map 9.

The setbacks in Table 3 are applicable to vegetation beyond the precinct and in the proposed reserves within the precinct if the vegetation does not meet one or more of the exclusion criteria (see Section 3.2 and 4.1.4). Such vegetation is anticipated to occur in the BCS Conservation Area, Regional Open Space reserve and in the Drainage Reserves (see Section 3).

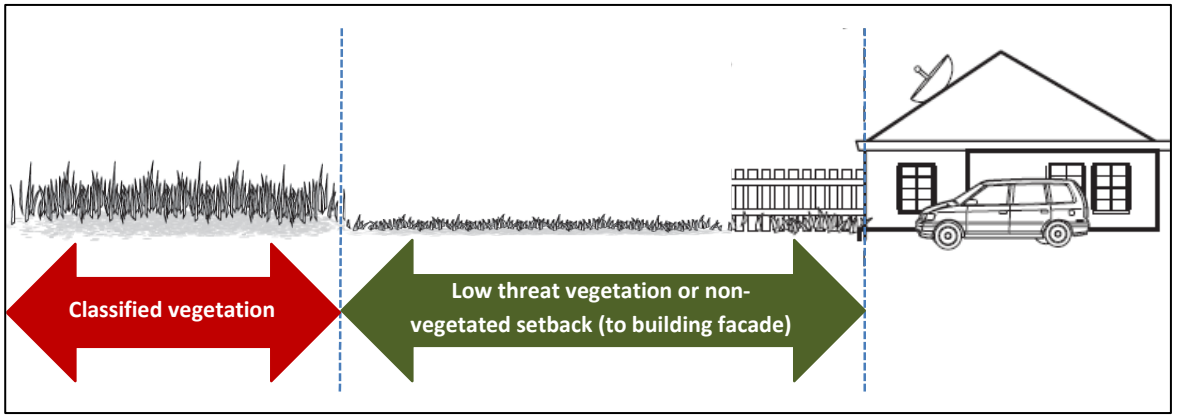


Figure 10 - Example of building-classified vegetation setback (adapted from CFA, 2013).

The setbacks in Map 7 illustrate setback distances that will apply from proposed future vegetation, which may be subject to change in location, size and future state of vegetation within (and to some extent around) the precinct. Regardless of the final form, the same setbacks shown in Table 3 will apply from the applicable vegetation types if vegetation is deemed hazardous.

The interim hazard that arises from the staging of development within the precinct must also be considered and can be managed by maintaining 'rolling buffers' between any stage of development and a temporary hazard within the site (e.g. Grassland). This must be in the form of a Site Management Plan as a permit requirement that identifies the staging of development and associated setbacks from hazardous vegetation during the construction phase (see Section 2.4.1).

4.2.2 Designing the hazard-development interface

Section 3.5 has identified that the landscape risk to the MEPSP is low. However, as identified in Section 4.2.3, perimeter roads should be located on hazard-development interfaces, including along the precinct boundary, to provide setbacks for residential development from areas of hazardous vegetation around the precinct. The designing of perimeter roads along the BCS Conservation Area boundary will provide residential setbacks from this hazard interface, which will be ongoing. Additionally, parts of the conservation and open space reserves may be managed in a

low threat state to provide setbacks for adjacent development within the reserves, as a buffer from hazardous vegetation in them.

Road layouts and design will also provide a similar degree of safety in places, separating development from any future potential bushfire hazard. The eastern, southern interface and western part of the northern interface are lesser risk locations due to the existing or proposed development in those directions, the prevailing winds on days of elevated fire danger, and the presence of the Western Freeway, Melton Highway and Leakes Road, which will each form a useful 'hard edge' and low threat/non-vegetated setback along precinct boundaries (see Section 4.2.3).

The Melton Highway and Leakes Road provide at least 20m low threat and non-vegetated buffers from the hazard interface to adjacent development along the north, north-western and eastern boundaries. Similarly, the separated double-lane section of the Western Freeway along the southern boundary provides a 60m combined major road and service road, which more than achieves the minimum required setbacks for development from the Grassland hazard temporarily posed by the pastures further to the south (19m).

Additional development setbacks are required from the patch of Forest beyond the precinct boundary to the east. Approximately half of the required development setbacks to achieve 12.5kW/m2 are already provided by Leakes Road.

It is noted that the PSP will include requirements and guidelines that also address how road layouts and future development design, construction standards and setbacks respond to classified vegetation and bushfire hazard.

4.2.3 Designing access and egress

Perimeter roads are required as above, to achieve, or contribute to BAL setbacks, separate future development from hazardous vegetation with a 'hard' non-vegetated edge and facilitate property protection and fire fighting (see Figure 11).

Figure 11 below illustrates how perimeter roads will help to provide part or all of the required setbacks required from hazardous vegetation.

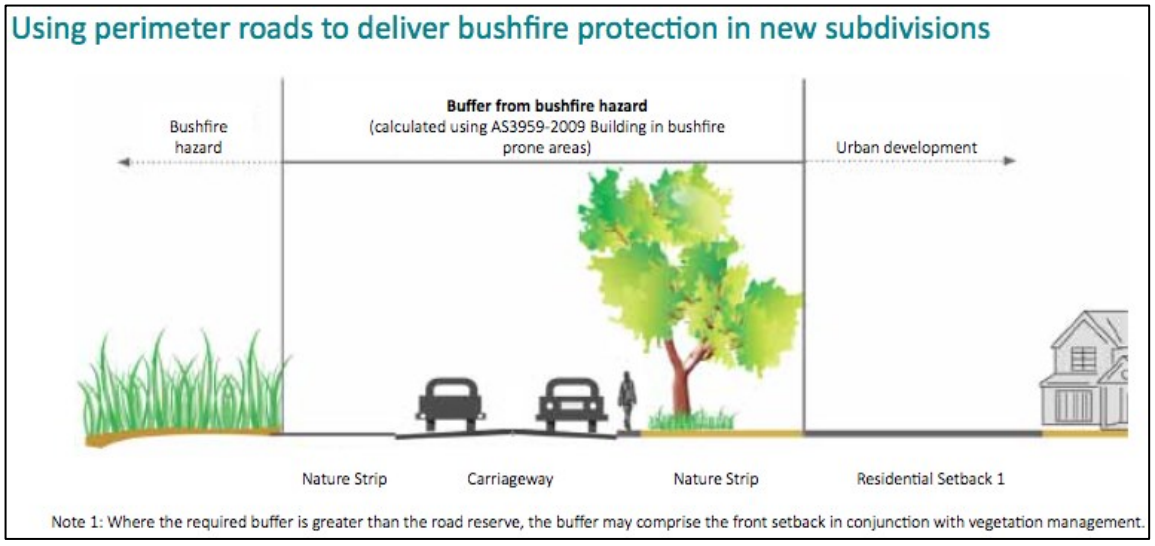


Figure 11 - Illustration of a perimeter road to provide required development setbacks (DELWP, 2015).

To the north-northwest, south and east, the precinct boundaries have the advantage of roads that will provide emergency access around the precinct and a hard edge for development to separate it from hazardous vegetation beyond the precinct.

All of the proposed road widths along the precinct boundary provide a minimum setback reducing RHF to less than 12.5kW/m^2 from Grassland on flat or upslope land, as shown in the draft PBP, which identifies:

- 60m major road for Western Freeway along the southern precinct boundary;
- 20m main road for Leakes Road along the eastern precinct boundary (partial); and
- 20m main road for Melton Highway along the northern precinct boundary (partial).

The Kororoit Creek riparian corridor and BCS Conservation Area within the precinct, which will comprise hazardous vegetation (see Section 3) will also be provided with a perimeter road along the edge of the BCS Conservation Area to provide access and low-threat setbacks between development and areas of potential bushfire hazard within the conservation reserve. An example of this in relation to Growling Grass Frog habitat is provided in Figure 12 below.

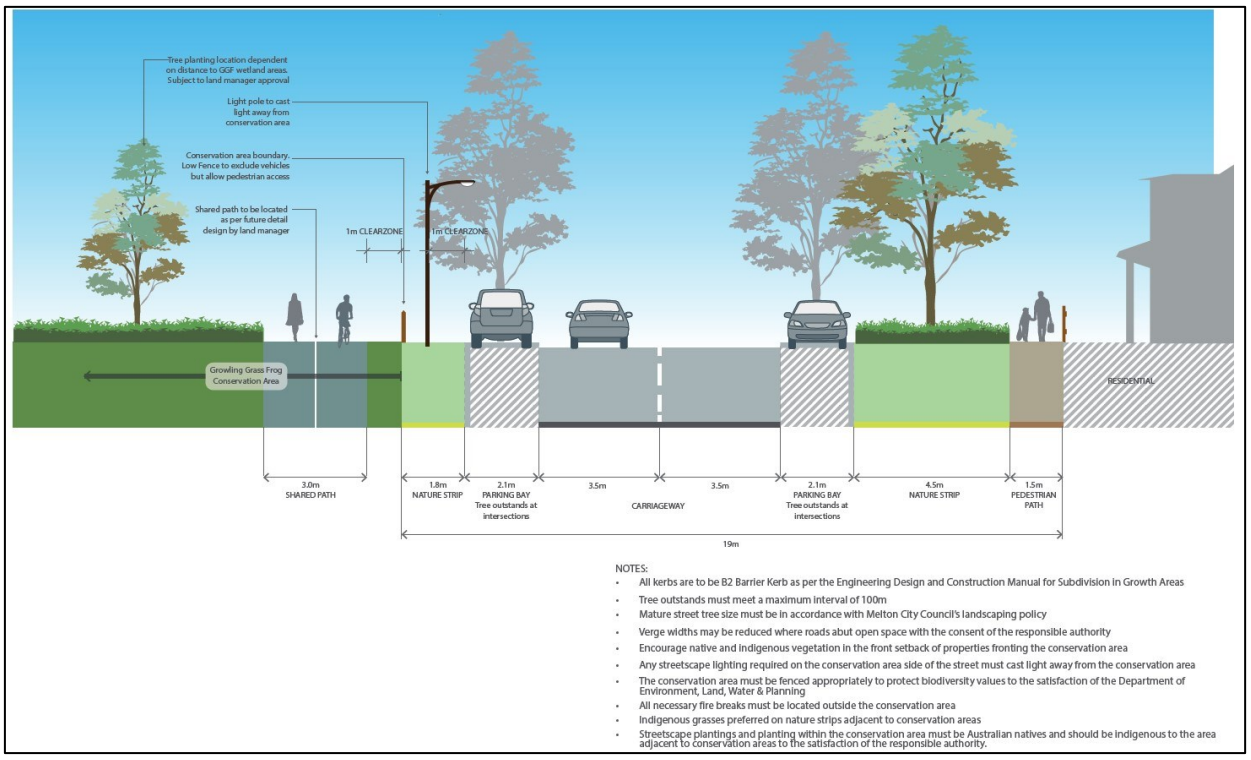


Figure 12 - Illustration of a perimeter road in the context of Growling Grass Frog habitat from the Kororoit PSP (VPA, 2017).

Appropriate access/egress for emergency vehicles and residents will be provided via a conventional residential road network in accordance with the requirements for roads in a residential subdivision at Clause 56.06.

4.3 Bushfire protection measures across a settlement

4.3.1 Vegetation management

Roadsides, narrow waterway and drainage reserves or other parks that could pose a Grassland hazard or contain potentially hazardous patches of remnant vegetation, or revegetation or plantings posing a hazard, could nevertheless be excluded from classification as low threat, non-hazardous vegetation if they meet the AS 3959 exclusion criteria for small patches:

- Single areas of vegetation less than 1ha in area and not within 100m of other areas of classified vegetation;
- Multiple areas of vegetation less than 0.25ha in area and not within 20 m of a site/building, or each other, or of other areas of classified vegetation; and
- Strips of vegetation less than 20m in width (measured perpendicular to the elevation exposed to the strip of vegetation) regardless of length and not within 20m of a

site/building or each other, or other areas of classified vegetation.

For BAL compliance, no further development setbacks are needed from such small or isolated areas of unmanaged vegetation that lack connectivity with larger areas and meet one or more of the AS 3959 exclusion criteria for low threat vegetation (see Section 3.2).

The BCS Conservation Area proposed in the draft PBP will contain areas of hazardous vegetation that require setbacks from the hazard for development. Minimum 19m setbacks from Grassland and 33m setbacks from Woodland are identified for RHF to not exceed 12.5kw/m^2. Landscaping of road reserves and other reserves that do not have a conservation, reserve or drainage function will be low threat and therefore excludable.

While the future form of the Regional Open Space area proposed in the draft PBP is not yet defined, it may comprise areas of hazardous vegetation. This land is subject to inundation from Kororoit Creek (VPA 2023b), which precludes development and increases its proclivity toward being established as a vegetated area and/or seasonal wetland that may comprise areas of Woodland, Grassland and/or Shrubland. It may also comprise managed areas of managed parkland and cultivated garden. The Regional Open Space area has been classified as Grassland (see Section 3), therefore 19m setbacks apply for adjacent development to achieve a RHF of 12.5kW/m^2.

Management plans for any new reserves that will contain low threat vegetation, such as the other Open Space areas, will specify the appropriate vegetation maintenance standards to provide assurance they will be managed in a low threat state in perpetuity. These can be maintained as a permit condition on use of the land as Open Space.

Land within the drainage reserves and other WSUD features that is considered 'unmanaged grassland' (Melbourne Water, 2023) will comprise classifiable Grassland (or possibly higher hazard vegetation if they have shrubs and/or trees) and as such, will be provided with adjacent development setbacks unless otherwise managed as low threat.

Identified areas of wetland within the precinct may also include Growling Grass Frog habitat (DELWP, 2017b) or elements of EVC 125 *Plains Grassy Wetland,* which could comprise hazardous Grassland and/or Shrubland unless it is excludable from classification.

4.3.2 Building construction standards

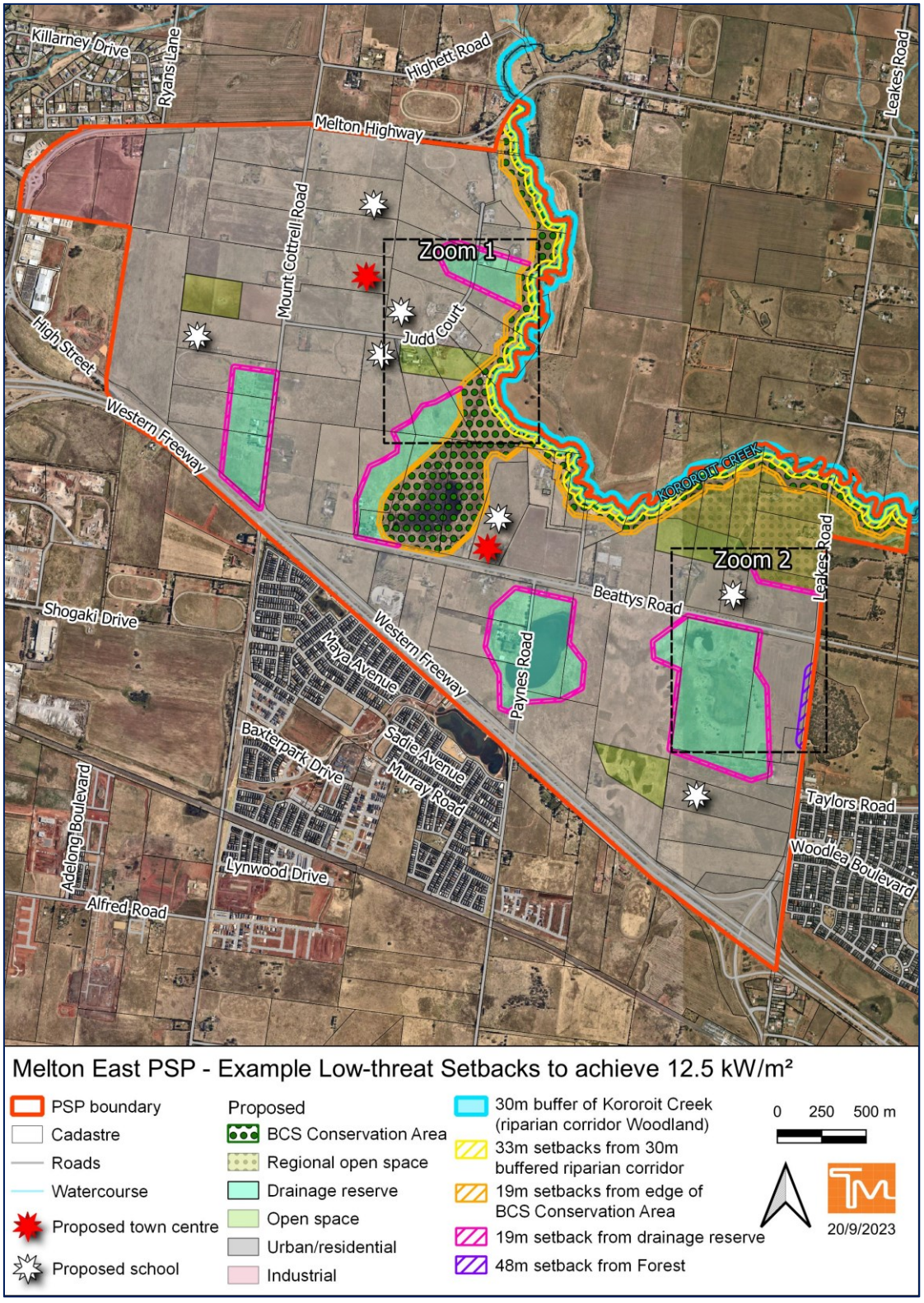
The precinct should be designed to ensure that no BAL construction standard higher than the minimum BAL-12.5 that applies in a BPA, is required for any building. The development setbacks required for BAL-12.5 in response to the Grassland, Shrubland and Woodland identified in the

hazard assessment in Section 3, were determined using the simple Method 1 procedure of AS 3959-2018, and are provided in Table 3 above.

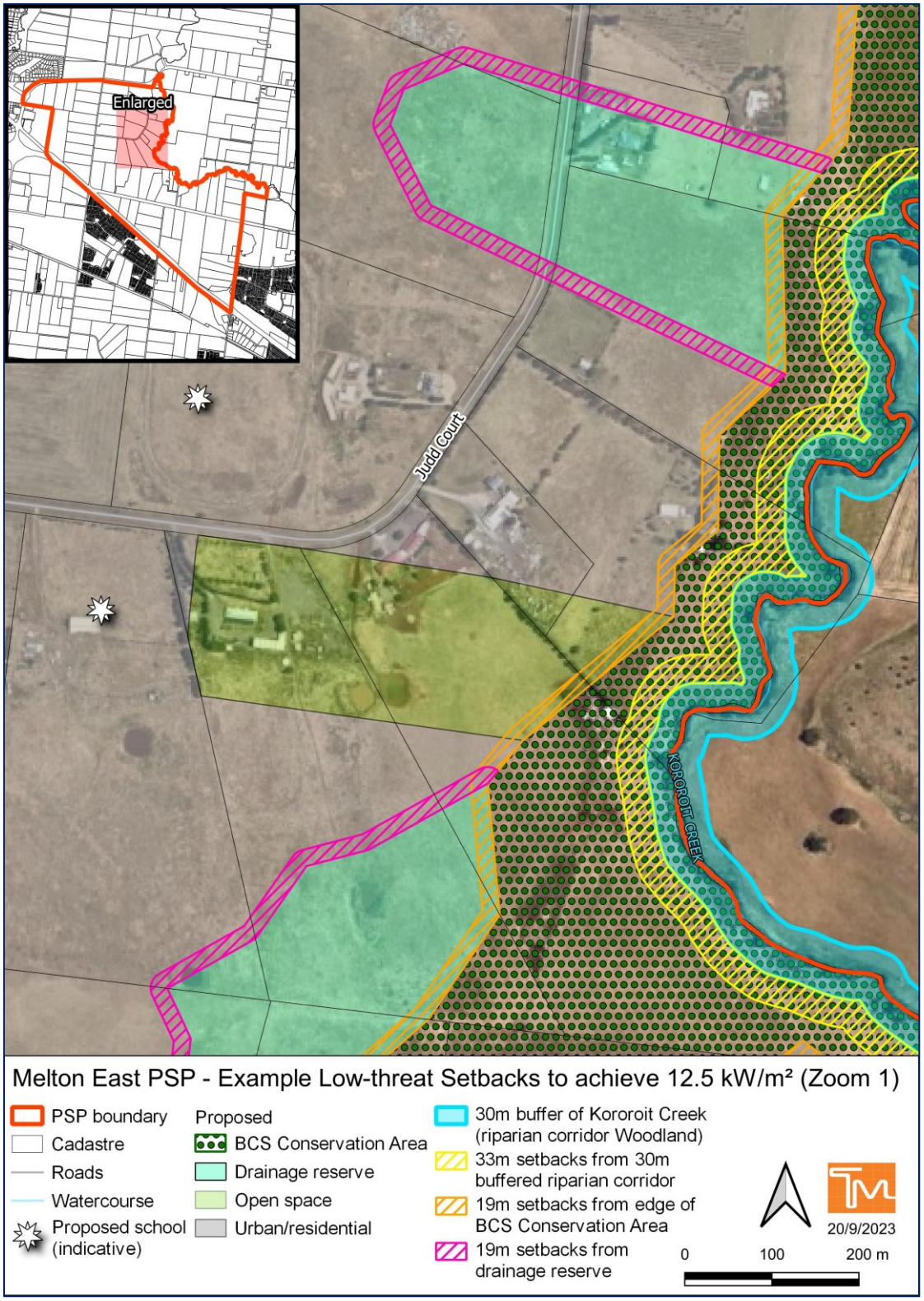
Note that as identified above, one of the key settlement planning strategies of Clause 13.02-1S is that strategic plans and policies, planning scheme amendments and settlement planning must not result in development exceeding a BAL-12.5 standard.

4.3.3 Fences and other localised fuel sources

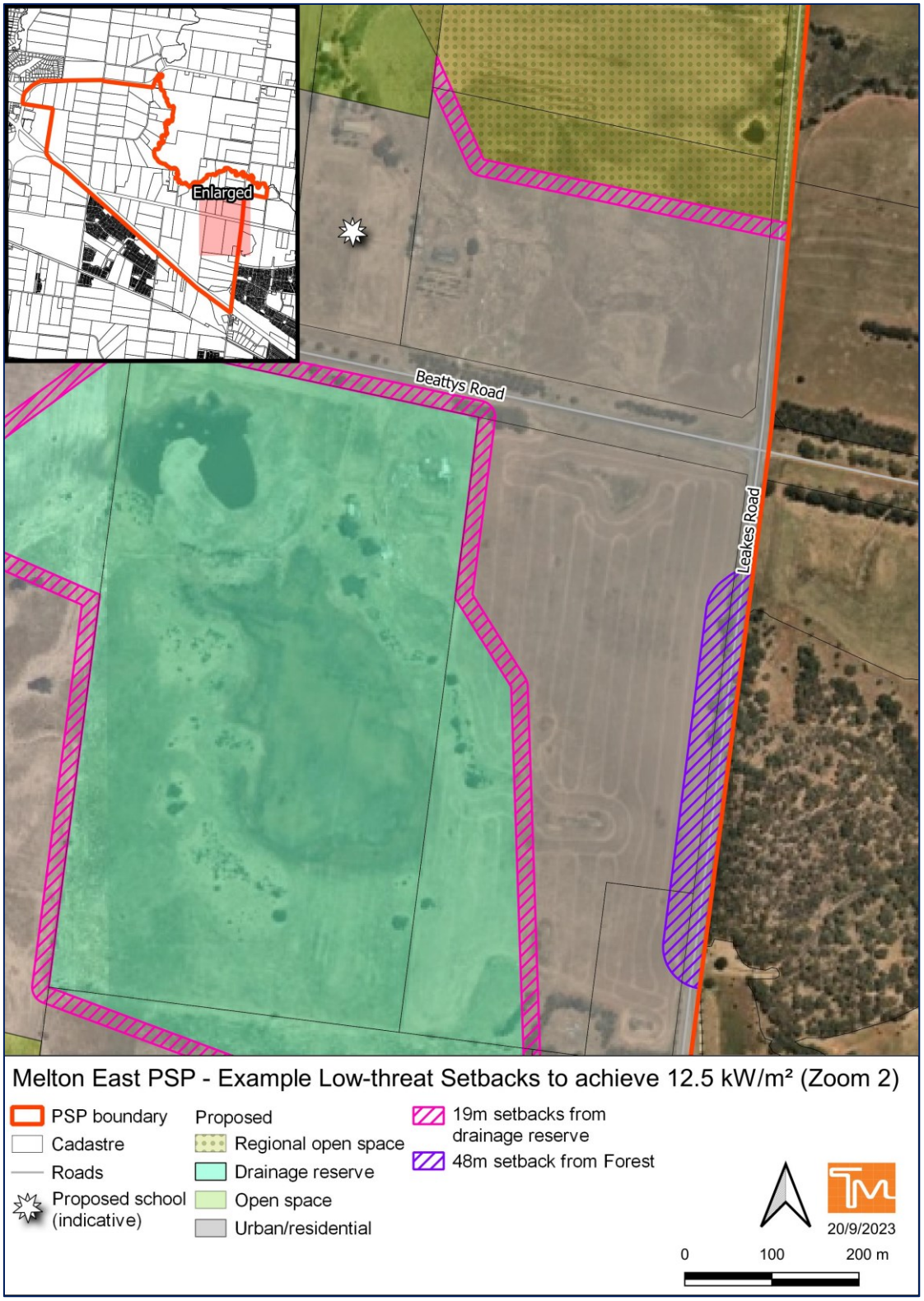
In this low risk, essentially 'infill' development location, restricting or prohibiting the use of combustible fences is not considered necessary.



Map 7 – Proposed PBP and example setbacks from future vegetation for future development to achieve 12.5 kW/m^2. N.B. setbacks will not apply if vegetation is low threat and excludable.



Map 8 – Proposed PBP and example setbacks from future vegetation (zoom 1).



Map 9 – Proposed PBP and example setbacks from potentially hazardous vegetation (zoom 2).

4.4 Clause 13.02-1S Bushfire planning

The applicable strategies stipulated in Clause 13.02-1S are identified below. A response to each of them will be provided in the final report, summarising how the MEPSP implements the strategies.

4.4.1 Protection of human life strategies

Priority must be given to the protection of human life.

Prioritising the protection of human life over all other policy considerations

The site is in a low risk location. The protection of human life can be prioritised by application of the existing building and planning controls. This includes:

- ensuring future buildings are located where a BAL-12.5 construction standard could be achieved (i.e. achieving setbacks for future buildings from unmanaged vegetation, such that radiant heat can be expected to not exceed 12.5kW/m2);
- managing vegetation within the site in a low threat state where appropriate;
- a reticulated hydrant system for fire fighting is maintained; and
- appropriate access and egress via a typical residential road network is provided for site occupants and emergency responders.

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

As identified in Section 4.4, the site is in a low risk landscape.

The nearest lowest risk locations are the urban-residential and township areas of Melton immediately to the west or Aintree to the east, that are not in the BPA and are developed urban neighbourhoods (see Map 5).

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 responding to the bushfire risk at all stages of the planning and building process, whereby the MEPSP will be designed to ensure compliance with a minimum BAL-12.5 standard for all future buildings requiring a BAL.

4.4.2 Bushfire hazard identification and assessment strategies

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

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

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

The type and extent of (hazardous) vegetation within 100m of the precinct has been identified and classified into AS 3959-2018 vegetation groups. The neighbourhood scale hazard is also considered to 400m (see Map 4). Classification was based on the anticipated long-term state of the vegetation, aerial imagery, site assessment and published guidance on vegetation assessment for bushfire purposes.

GIS analysis of publicly available contour data was undertaken, including creating a Digital Elevation Model (DEM) of the topography, and determining slopes, extending to 1km around the precinct (see Section 3.3 and Map 3).

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 3.4.

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 2.3) and is shown in Map 4 (inversely as 'non-BPA land'). This is based on the most recent BPA mapping for the precinct.

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

As identified in Section 3.5, no part of the site or surrounding land within 7km is covered by the BMO.

Considering and assessing the bushfire hazard on the basis of:

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

The hazard has been assessed and described at the landscape, local, neighbourhood and site scales (see Section 3).

At the site scale, the assessment follows the AS 3959-2018 methodology applied in a BPA, of classifying vegetation and topography on the site and within 100m of the site (see Map 2).

At the landscape scale a 5km and 1km radius of the site has been applied (see Map 4 and Map 5) and a 20km radius of the site at the broad landscape scale (see Map 6).

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

A representative of the CFA provided commentary on 6 September 2023 (*CFA ref. 15000-80089-130471*) that broadly agrees with the findings and recommendations of this report. The subsequent considerations from that letter have either been incorporated into subsequent versions of this report (starting v1.1) and/or will be incorporated into the final draft of the PSP.

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 advisory and practice notes, Clause 13.02-1S, and the building regulations invoked by the BPA coverage, including the bushfire hazard landscape assessment, specify the general requirements and standards for assessing the risk. These have been used in this report as appropriate.

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.

There are no identified obstacles to implementing any of the bushfire protection measures in this report.

4.4.3 Settlement planning strategies

Settlement planning must strengthen the resilience of settlements and communities and prioritise protection of human life.

Directing population growth and development to low risk locations, being those locations assessed as having a radiant heat flux of less than 12.5 kilowatts/square metre under AS 3959-2018 Construction of Buildings in Bushfire-prone Areas (Standards Australia, 2018).

The applicable distances for development to be setback from classifiable vegetation, such that RHF is calculated to not exceed 12.5kW/m^2 and BAL 12.5 dwellings could potentially be sited, have been determined (see Section 4.2.1 and Map 7).

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 MEPSP can provide good access via a residential road network to the surrounding developed or developing urban-residential and township areas, including land that is not in the BPA (immediately to the west and east) and are therefore BAL-LOW areas (see Map 5).

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

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

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

- Development achieves vegetation setbacks from hazardous vegetation to enable BAL-12.5 construction, provides an appropriate water supply for fire fighting via a conventional reticulated hydrant system, and appropriate access/egress for emergency vehicles and residents via a conventional residential road network.
- Residential areas within the precinct are designed to provide setbacks between buildings and any potentially hazardous vegetation inside the MEPSP that comprises classified vegetation by the appropriate BAL-12.5 distance (see Section 3.1.2).
- All other vegetation across the site is managed in a low threat state or qualifies for one or

more of the vegetation exclusions (see Section 3.2).

The risk to existing residents in the surrounding suburbs will be reduced by the development of the site as a low threat urban residential area, and associated removal of an existing area of potentially hazardous vegetation.

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 development locations have been assessed as part of this study, however the PSP is in a low threat location within the Western Growth Corridor.

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

All future dwellings and associated buildings in the development that require a BAL, can achieve a BAL-12.5 construction standard.

4.4.4 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.

Terramatrix is aware that the Western Growth Corridor has been assessed in relation to Growling Grass Frog habitat (DEPI, 2013), which includes areas within the precinct. EVC mapping has also been considered (see Map 4) and discussed in the vegetation assessment in Section 3.1.1.

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

4.4.5 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'* (Melton 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'* (Melton Planning Scheme).

Identified bushfire protection measures include:

- ensuring future buildings are located where a BAL-12.5 construction standard could be achieved (i.e. achieving setbacks for future buildings from unmanaged vegetation, such that radiant heat can be expected to be below 12.5kW/m^2)
- managing vegetation within the site in a low threat state where appropriate,
- adequate water for fire fighting is maintained; and
- appropriate access and egress is provided for site occupants and emergency responders;

There are no apparent obstacles to implementing any of the bushfire protection measures identified in this report.

5 Conclusion

This report has assessed the bushfire hazard in and around the Melton East precinct in accordance with the hazard identification strategies of Clause 13.02-1S Bushfire Planning and the BAL assessment methodology of AS 3959-2018 *Construction of buildings in bushfire prone areas*. The report identifies how the design and layout of the precinct and future development that will occur within it, will appropriately mitigate the bushfire risk, including responding to and complying with the applicable bushfire planning and building controls.

It is noted that since the 1950s there has been an increase in the length of the fire weather season and an increase in extreme fire weather, a trend which is projected to continue. 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.

All of the precinct is currently designated as a BPA. However, much of the surrounding land within 5km has been excised from the BPA, which will continue as development occurs. No part of the precinct is affected by the BMO and the nearest areas of BMO coverage is 7 km to the north and west. As development progresses, reliably low threat or non-vegetated areas will be created, which will result in large parts of the precinct being able to be excised from the BPA.

The terrain in the precinct and in the surrounding landscape for at least to the 400m is relatively benign from a bushfire perspective. Overall, the land rises from the south-east to the north-west of the precinct. For the purposes of determining future BALs and vegetation setback distances for buildings, the applicable slope class is 'All upslopes and flat land'.

Vegetation within a 100m assessment zone around the precinct was classified to identify likely BALs and RHF exposure for future buildings in the precinct. The vegetation classification is based on the current and anticipated likely future long-term state of the vegetation, according to the proposed draft PBP. This necessarily involves making assumptions about the future vegetated land within the precinct, in particular the proposed reserves, for which stakeholders in the future management thereof have been consulted.

The dominant hazard outside the precinct, is Grassland. Pastures to the north will remain the dominant hazard to the precinct, as land in these directions is beyond the Urban Growth Boundary. To the south and east, the land comprises a temporary Grassland hazard. Over the long term, when land within and around the MEPSP is developed as part of the Melton UGA, much of the existing Grassland hazard will be removed or at least significantly reduced.

A 30m buffer has been applied within the BCS Conservation Area representing a treed riparian corridor along Kororoit Creek within the precinct, which is likely to be considered Woodland.

Other vegetation within the BCS Conservation Area that will be hazardous Grassland and/or Shrubland, will likely comprise areas designated as Growling Grass Frog habitat and the seasonal herbaceous wetland/s. The future vegetated state of these areas and the Regional Open Space reserve has been determined as classified Grassland, from which development setbacks will apply.

The proposed drainage reserves will comprise a Grassland hazard unless they are managed/partially managed in a minimal fuel condition or excludable from classification. Potential exclusion criteria that could be applied to ensure areas of vegetation within the precinct do not occur in proximity to buildings, are the small patch criteria for:

- Single areas of vegetation less than 1 ha in area and not within 100m of other areas of classified vegetation;
- Multiple areas of vegetation less than 0.25ha in area and not within 20m of the site/building, or each other, or of other areas of classified vegetation; and
- Strips of vegetation less than 20m in width (measured perpendicular to the elevation exposed to the strip of vegetation) regardless of length and not within 20m of the site/building or each other, or other areas of classified vegetation.

Development will need to be separated from any of any areas of classified vegetation by the following low threat setback distances to achieve a RHF on adjacent development of no more 12.5kW/m^2:

- 48m from Forest;
- 33m from Woodland; and
- 19m from Grassland or Shrubland.

Due to the MEPSP location amongst other developed and developing areas, the precinct is a semi-infill development, which has a lower bushfire risk than other PSPs on the edge of the UGA. The Melton UGA comprises land adjacent to the MEPSP to the east and south, which is scheduled for development under other PSPs, removing the temporary hazard from these directions as neighbouring land develops. The precinct is protected from a bushfire approach from the west and north-west by the Melton township area and other residential areas where the bushfire hazard has been removed or substantially modified by settlement. The Western Freeway protects the precinct along its southern boundary.

The main bushfire hazards are potentially ember attack from a large, ‘landscape scale’ grassfires burning near to or into the precinct, and smaller bushfire that may develop in the proposed conservation reserve/s within the precinct. The higher risk parts of the precinct from a landscape fire perspective are those adjacent to the northern boundary and along Kororit Creek.

In consultation with stakeholders, the future vegetated state of the Regional Open Space reserve will be classified Grassland and other Open Space reserves in the precinct will be low threat.

Development setbacks apply from the Regional Open Space reserve. Statutory controls will also be in place to ensure that at the subdivision design and approval stage, any areas of hazardous vegetation are appropriately responded to, especially in the early development phase when temporary grassland may pose a hazard within the precinct.

To the south, north and east, the precinct boundaries have the advantage of the Western Freeway, Melton Highway and Leakes Road that will provide access and a 'hard edge' for residential development and separate it from hazardous vegetation beyond the precinct.

A perimeter road/s will be located along the boundary of the BCS Conservation Area to provide setbacks for adjacent residential areas.

Overall, the hazard and resultant bushfire risk is low and not significant enough to prevent development of the precinct. It is considered that development can appropriately prioritise the protection of human life, and meet the objectives of Clause 13.02-1S, by an appropriate design and layout that, amongst other things, ensures future dwellings will not be exposed to RHF above 12.5kW/m^2, which is commensurate with a Bushfire Attack Level (BAL)-12.5 construction standard. The maximum 12.5kW/m^2 safety threshold is required in settlement planning as the upper limit for acceptable risk.

Appendix A - BALs explained

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

Source: derived from AS 3959-2018 (Standards Australia, 2020).

Appendix B – Melbourne Water letter

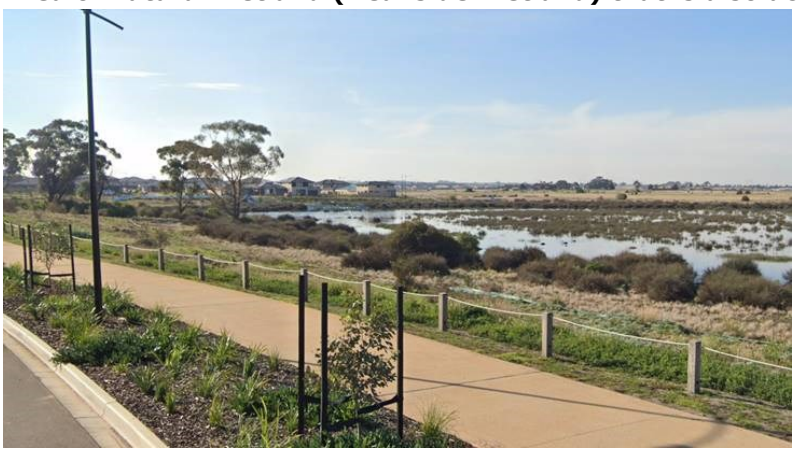
Letter dated 2023-10-26 and provided to Terramatrix on 2023-10-31 (Melbourne Water, 2023).

Wetland/ Retarding Basin Management:
The stormwater treatment wetlands will be mostly wet and filled with aquatic-semi / aquatic species, on the fringes it will be vegetated with native grasses/shrubs and some trees, see images below. All images shown have mown buffers – these are part of the council managed areas of road reserve or edges of shared trails not drainage reserve areas. Melbourne Water does not manage drainage reserves or waterways for bushfire management, including mowing or vegetation selection for new constructed assets.
The retarding basins will have stormwater treatment assets within the bases where feasible so will be similar to the vegetation suite and density in the images below but may have balance as mown public access if required and managed by council or vegetated for habitat with minimal management (stormwater treatment assets have priority and retarding basins are usually maximised with stormwater treatment wetlands in the bases).
Also see Melbourne Water constructed works requirements including vegetation standards for constructed waterways and stormwater assets https://www.melbournewater.com.au/building-and-works/developer-guides-and-resources/guidelines-drawings-and-checklists/guidelines

Area of constructed waterways (canopy trees still growing in both, 1st is approx 70m wide and second is 30m wide):

Stormwater treatment wetlands (mown area is council road reserve):

Area of natural wetland (Deanside Wetland) that is also acting as flood storage:



Area of natural wetland (Point Cook) that is also acting as flood storage RB:

Kororoit Creek

The Kororoit Creek future vegetation objectives is to restore and enhance the Creekline Grassy Woodland EVC. This restoration and enhancement will also need to include GGF BCS requirements along with potential requirement for dense plantings near escarpment areas to keep people away from steep ledges. As high level guidance, this EVC suggests: large tree canopy cover 10-20%, smaller tree and large shrub 25%, remaining unmanaged small shrubs/herbs/grassland.

Regarding the Kororoit Creek floodplain, for the areas not directly interfacing with the waterway, Melbourne Water is not able to provide clear guidance on vegetation state as any certainty will rely on land use decisions yet to be confirmed. At a minimum, unless sporting fields are proposed, we would recommend it be marked as 'unmanaged grassland' and ideally would be closer to the Creekline Grassy Woodland EVC attached but this would depend on land management. See Creekline Grassy Woodland EVC DSE information attached in email or https://www.environment.vic.gov.au/__data/assets/pdf_file/0029/48755/VVP_EVCs_combined.pdf

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