

City of Greater Bendigo

**Bushfire Assessment of Potential Growth
Areas**

Vr 4.0

May 2024



The City of Greater Bendigo is on Dja Dja Wurrung and Taungurung Country. We acknowledge and extend our appreciation to the Dja Dja Wurrung and Taungurung People, the Traditional Owners of the land.

We pay our respects to leaders and Elders past, present and emerging for they hold the memories, the traditions, the culture and the hopes of all Dja Dja Wurrung and Taungurung Peoples.

We express our gratitude in the sharing of this land, our sorrow for the personal, spiritual and cultural costs of that sharing and our hope that we may walk forward together in harmony and in the spirit of healing.



(Source: <https://www.bendigoadvertiser.com.au/story/4663156/rekindling-tradition-photos-video/#slide=0>)

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Abbreviations

BAL	Bushfire Attack Level	GBPS	Greater Bendigo Planning Scheme
BMO	Bushfire Management Overlay	MGS	Managed Growth Strategy
BPA	Bushfire Prone Area	PPF	Planning Policy Framework
CFA	Country Fire Authority	RHF	Radiant Heat Flux
CoGB	City of Greater Bendigo	VBRC	Victorian Bushfire Royal Commission
DTP	Department of Transport and Planning		

Executive Summary

Following the 2009 Bushfire Royal Commission, the State Government has progressively made sweeping changes to the planning policy and statutory controls related to managing bushfire risk. This is built around the principle that the prioritisation the protection of human life from bushfire takes precedence over all other policy considerations. Other important policy considerations flowing from this are:

- Directing population growth and development to low risk locations.
- The availability of safe access to areas assessed as being low fuel or having a BAL-LOW rating.
- The assessment and availability of alternative low risk locations.
- The need to ensure future land use and development will not increase bushfire risk.
- That where there are areas that population growth and development might be appropriate considering the risk from bushfire, measures need to be put in place to mitigate that risk.
- That areas of future growth need to be able to achieve a radiant heat flux of less than 12.5 kilowatts per square metre (BAL 12.5).
- The City must engage relevant fire authority and other emergency management agencies in strategic planning projects.
- That bushfire protection measures cannot result in unacceptable biodiversity impacts.

The City of Greater Bendigo (the City) identified 12 Potential Growth Areas (PGAs) for investigation in this report. The PGAs are within or adjoining the Bendigo Urban Area, or townships proximate to Bendigo. These areas were identified on the basis that:

- They have been previously identified for future growth (in the Greater Bendigo Residential Strategy, amended 2016, and in the Urban Strategic Framework Plan at clause 02.04 of the Greater Bendigo Planning Scheme),
- They adjoin the Urban Growth Boundary (UGB) and could be considered as a logical inclusion,
- There is known developer or landowner interest in the area.

Areas that are isolated from existing settlements or are constrained for other reasons for example being highly flood prone have not been considered as they are not areas which the City considers from a strategic planning perspective are suitable for development.

These PGAs have been assessed against the State policy for Bushfire at Clause 13.02 of the Greater Bendigo Planning Scheme. The report also considers whether development in a growth area may lower the bushfire risk for adjoining development and non-bushfire constraints to development.

The overall objective of the project is to understand the varying levels of bushfire risk at a landscape and neighbourhood scale across these PGAs and identify where future growth and development should be directed the City's Managed Growth Strategy, to meet the State planning policy for bushfire planning, including giving priority to protection of human life.

The report assessed 12 PGAs and the following were generally considered to be low risk:

- Marong
- Huntly (North and East)

A further two PGAs have some areas of low risk and areas of more elevated risk. Detailed planning for growth in these locations will require careful design with the Country Fire Authority (CFA) to ensure

that neighbourhood and landscape scale bushfire risks are understood and able to be managed to an acceptable level, and any important biodiversity values are protected. The two PGAs are:

- Parts of Strathfieldsaye (south and east)
- Parts of the Maiden Gully Precinct Structure Plan area

The City's Managed Growth Strategy establishes a policy position of directing 70 per cent of residential growth to urban infill areas, and 30 per cent of residential growth to greenfield areas. Currently there is 47 per cent of residential growth in urban infill areas and 53 per cent of residential growth in greenfield areas. This greater shift towards urban infill development assists in creating a more compact and sustainable Greater Bendigo, while minimising the need to expand the Urban Growth Boundary into highly vegetated and bushfire prone areas.

The four PGAs can provide sufficient supply of greenfield land to provide for future housing growth and development for the planning horizon of the Managed Growth Strategy (refer Section 1.2).

Junortoun was also identified as having growth potential, but its relatively small size, existing pattern of development and other constraints make it less viable as a location to direct significant future growth and development.

The remaining PGAs do not require further assessment as the level of bushfire risk is too high and managing that risk would likely result in unacceptable biodiversity outcomes.

In support of the four recommended PGAs, there are several mechanisms that will be implemented to ensure that they are developed appropriately. These include:

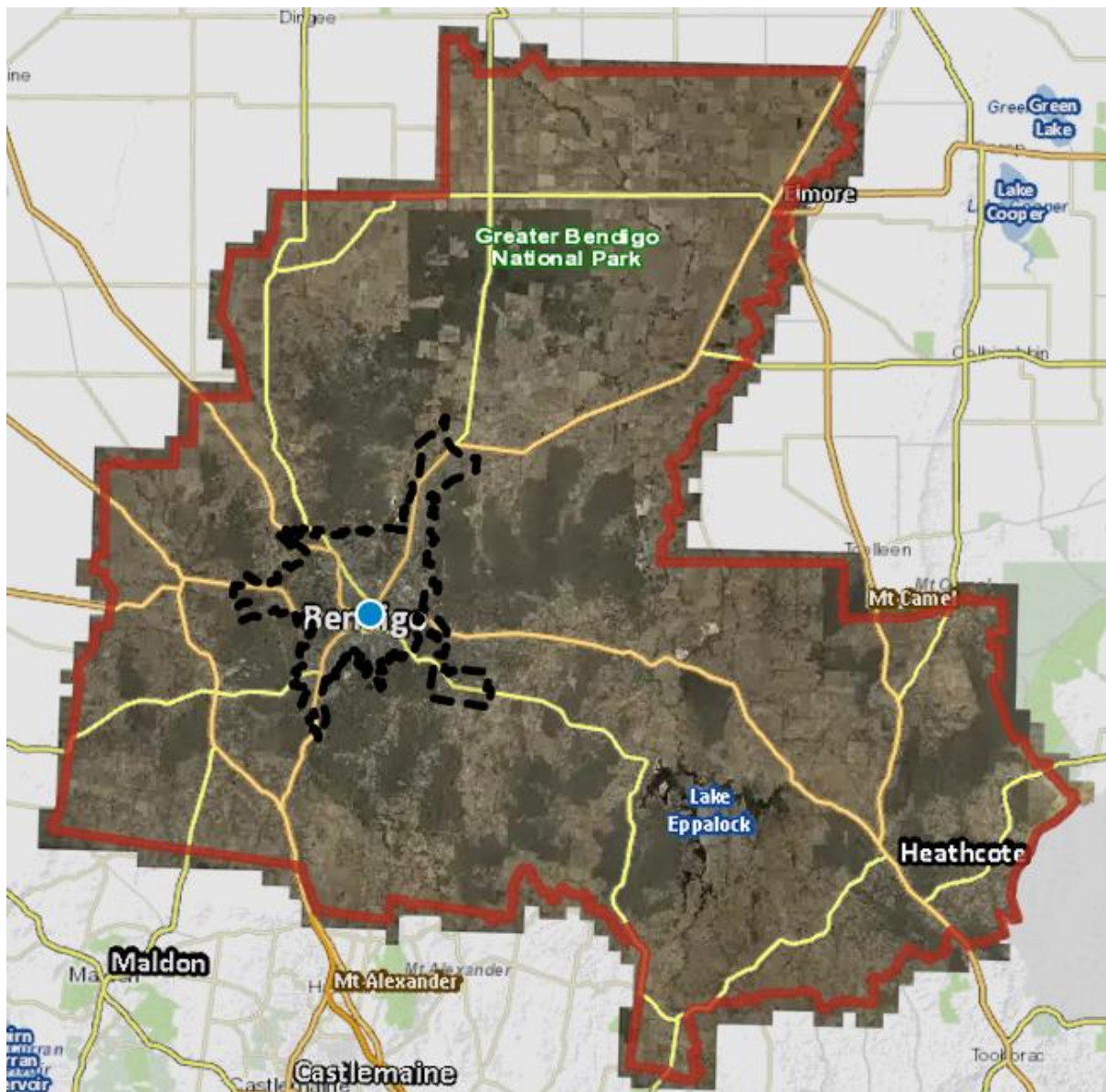
- Introducing a local planning policy at clause 13.02-1L of the Greater Bendigo Planning Scheme.
- Introducing Design and Development Overlays to better guide growth area bushfire management.
- Introducing Development Plan Overlays to ensure that the design, layout, access, land uses and staging of each of the PGAs can be considered and approved in a coordinated manner.

The above mechanisms will be prepared in collaboration with the CFA.

The City will continue to work with all emergency services, not only on the planning and design of the four recommended PGAs, but also on the future services in urban Bendigo where the City is aiming to direct most of its residential growth.

1 Introduction

The Greater Bendigo municipality covers 3,000 square kilometres in central Victoria.



Map 1: Aerial view of the City of Greater Bendigo

Bendigo is a city within a forest. A number of small towns in Greater Bendigo also sit within vegetated settings. Vegetation and the environment are defining characteristics in Greater Bendigo and are highly valued by the community. Vegetation plays an important role in cooling the urban environment, is important to the streetscapes and backdrops of Bendigo, supports rich biodiversity, and is significant to the First Nations peoples of the area. It also represents a bushfire risk to the community, particularly on the western edge of the UGB, which is the prevailing direction a bushfire is likely to attack from during bushfire season.

The municipality has and will continue to experience strong population growth. The Estimated Residential Population of Greater Bendigo as at 30 June 2024 of 124,174¹ this is forecast to grow by an estimated 85,000² residents by 2056.

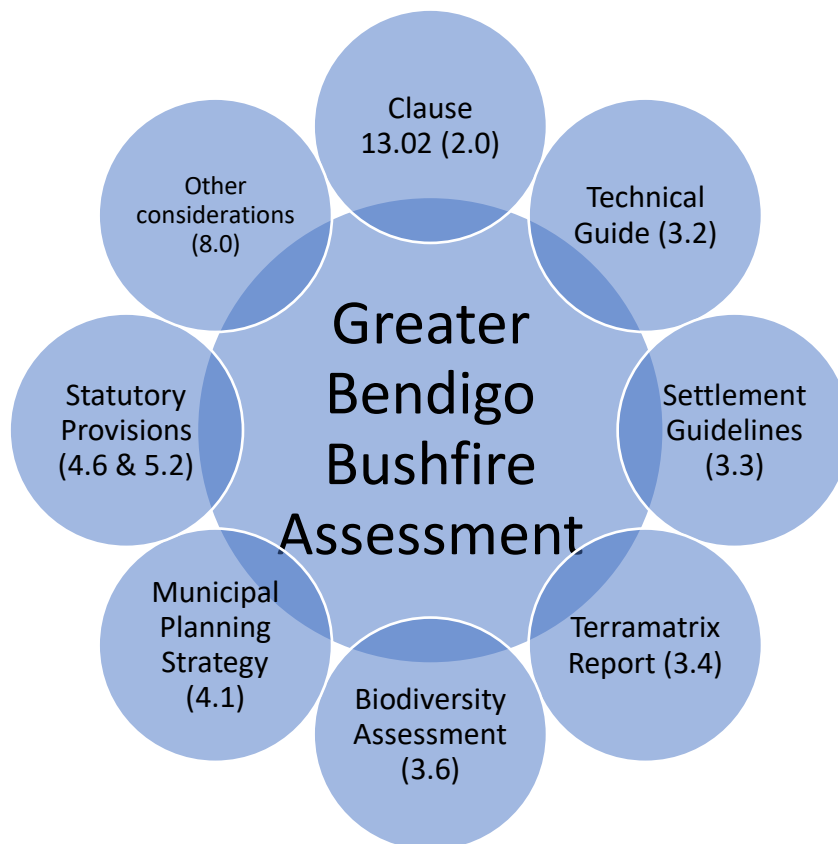
The City has been planning how to accommodate this growth over many years. However, changes to State policy in 2017 in relation to bushfire planning, including prioritising human life and native vegetation management now need to be addressed when planning for growth in Greater Bendigo.

This report has been prepared to respond to Clause 13.02 of the Greater Bendigo Planning Scheme that relates to bushfire. It addresses the provisions that relate to settlement planning including the need to prioritise the protection of human life by directing population growth and development to low bushfire risk locations. The State policy is discussed in more detail in Section 2.

The report focuses on growth opportunities within and adjacent to the Bendigo Urban Area as this is in accordance with Clause 2.03-1 (Settlement) and Clause 11.01-1L-01 (Settlement – Greater Bendigo) of the Greater Bendigo Planning Scheme. The growth being envisaged is conventional residential development and not low density/rural living development.

This report has been informed by a technical bushfire assessment and desktop ecological assessment, but it goes beyond this to consider bushfire risk in a holistic strategic planning context. This includes considering proximity to services and activity centres, access, and other non-bushfire constraints to development such as the likelihood of land being developed and infrastructure constraints.

The following graphic indicates the various inputs into this report:



¹ <https://profile.id.com.au/bendigo/population-estimate>.

² Draft Managed Growth Strategy

1.1 Managed Growth Strategy

The City is currently preparing a Managed Growth Strategy (MGS) to provide a direction for long-term residential growth in and around the Bendigo Urban Area, with a growth horizon of 2056. The MGS builds upon past strategic documents related to housing, commercial and industrial development, open space and transport. It considers constraints and hazards such as vegetation protection, climate change, flooding and managing bushfire risk.

The MGS seeks to encourage more housing within existing urban areas and decrease reliance on greenfield locations. The policy position in the MGS is for infill locations to eventually accommodate 70 per cent of new housing in urban areas. This will be achieved through development in existing residential areas and at key development sites.

This report, together with the technical bushfire risk assessment, are key inputs into the MGS to help respond to this challenge, to respond to clause 13.02 of the planning scheme and to prioritise the protection of human life.

More details on the MGS can be found on the City's website:

<https://letstalkgreaterbendigo.com.au/managed-growth-strategy>

1.2 Future Land Requirements

According to the 2021 Census there were 49,484 privately occupied dwellings in Greater Bendigo. It is expected to 2056 that the municipality will need to accommodate an additional 38,000 new dwellings.

Currently greenfield development accounts for approximately 50 per cent of all new housing in urban Bendigo, with an average density of 11 dwellings per hectare. An emerging policy direction from the MGS is that growth should be directed where possible to well serviced infill locations. With the policy direction of 30 per cent of residential growth in greenfield areas in the MGS, and with a density of 15 lots per hectare, an additional 400 hectares of land is required to meet long term supply needs over what is identified in the Urban Development Program prepared by the Department of Transport and Planning³.

The City has considered the need to prioritise bushfire risk and balanced with other growth planning objectives including access to existing water, transport and facilities, as well as not enabling development in areas which may be subject to high risk of flooding or contamination. The City has made a balanced decision and prioritised areas for development which are of a comparative low bushfire risk compared with other PGAs and that with the appropriate treatments in place the bushfire risk which exists can be managed. This will include planning tools to ensure adequate setbacks for new development and requirements around the design or uses within new development. These extra design measures will then address the objective of clause 13.02 in the planning scheme *'To strengthen the resilience of settlements and communities to bushfire through risk-based planning that prioritises the protection of human life.'*

³ <https://www.planning.vic.gov.au/guides-and-resources/data-and-insights/urban-development-program/greenfield-land-supply-in-regional-victoria-2022/bendigo>

The City regularly reviews its growth projections, and will continue to do so, to account for changes to population projections throughout the life of the MGS.

2 State Policy

Amendment VC148 was introduced in 2018 and implemented a new State policy in relation to bushfire planning. This policy came about as a recommendation of the Victorian Bushfire Royal Commission (VBRC).

The introduction of this policy was a significant moment and change in relation to bushfire and settlement planning and one that has necessitated a review of the City's long term growth planning framework.

Clause 13.02-1S of the Planning Policy Framework (PPF) sets out the *Bushfire planning* policy. The objective of the policy is:

"To strengthen the resilience of settlements and communities to bushfire through risk-based planning that prioritises the protection of human life." (with emphasis)

The key strategies from the policy that are of most direct relevance to this project:

Give priority 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 the consideration of bushfire risk in decision making at all stages of the planning process.*

Identify bushfire hazard and undertake appropriate risk assessment by:

- *Considering and assessing the bushfire hazard on the basis of:*
 - *Landscape conditions - meaning conditions in the landscape within 20 kilometres (and potentially up to 75 kilometres) of a site;*
 - *Local conditions - meaning conditions in the area within approximately 1 kilometre of a site;*
 - *Neighbourhood conditions - meaning conditions in the area within 400 metres of a site; and*
 - *The site for the development.*
- *Consulting with emergency management agencies and the relevant fire authority early in the process to receive their recommendations and implement appropriate bushfire protection measures.*
- *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.*

Plan to strengthen the resilience of settlements and communities and prioritise protection of human life 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 under AS 3959-2009 Construction of Buildings in Bushfire-prone Areas (Standards Australia, 2009).*

- *Ensuring the availability of, and safe access to, areas assessed as a BAL-LOW rating under AS 3959-2009 Construction of Buildings in Bushfire-prone Areas (Standards Australia, 2009) where human life can be better protected from the effects of bushfire.*
- *Ensuring the bushfire risk to existing and future residents, property and community infrastructure will not increase as a result of future land use and development.*
- *Achieving no net increase in risk to existing and future residents, property and community infrastructure, through the implementation of bushfire protection measures and where possible reducing bushfire risk overall.*
- *Assessing and addressing the bushfire hazard posed to the settlement and the likely bushfire behaviour it will produce at a landscape, settlement, local, neighbourhood and site scale, including the potential for neighbourhood-scale destruction.*
- *Assessing alternative low risk locations for settlement growth on a regional, municipal, settlement, local and neighbourhood basis.*
- *Not approving any strategic planning document, local planning policy, or planning scheme amendment that will result in the introduction or intensification of development in an area that has, or will on completion have, more than a BAL-12.5 rating under AS 3959-2009 Construction of Buildings in Bushfire-prone Areas (Standards Australia, 2009).*

An important aspect of the policy is that any bushfire protection measures should not result in *unacceptable biodiversity impacts*.

A copy of Clause 13.02-1S can be found here:

https://planning-schemes.api.delwp.vic.gov.au/schemes/vpp/13_02-1S.pdf?_ga=2.43455397.1498571822.1636926501-509083867.1629083899

It is also important to note that Clause 71.02-3 (Integrated decision making) re-enforces the need to prioritise the protection of human life over other policy considerations.

Another important policy direction from the State can be found at Cl. 11.01-1R: “*Support Bendigo as the regional city and the major population and economic growth hub, offering a range of employment and services*”. While Clause 13.02-1S clearly gives priority to the consideration of protection of human life over all other policy considerations, the State Government has also identified that Bendigo is a growth hub and does need to accommodate population growth.

The challenge is ensuring that the protection of life is the primary policy consideration and that other policy directions are factored into decision making.

3 Relevant documents

3.1 Loddon Mallee Regional Bushfire Assessment (April 2012)

The *Loddon Mallee Regional Bushfire Planning Assessment* (RBPA) was prepared in response to recommendations from the VBRC that “*emphasised the importance of considering bushfire matters at all stages of the planning process.*”

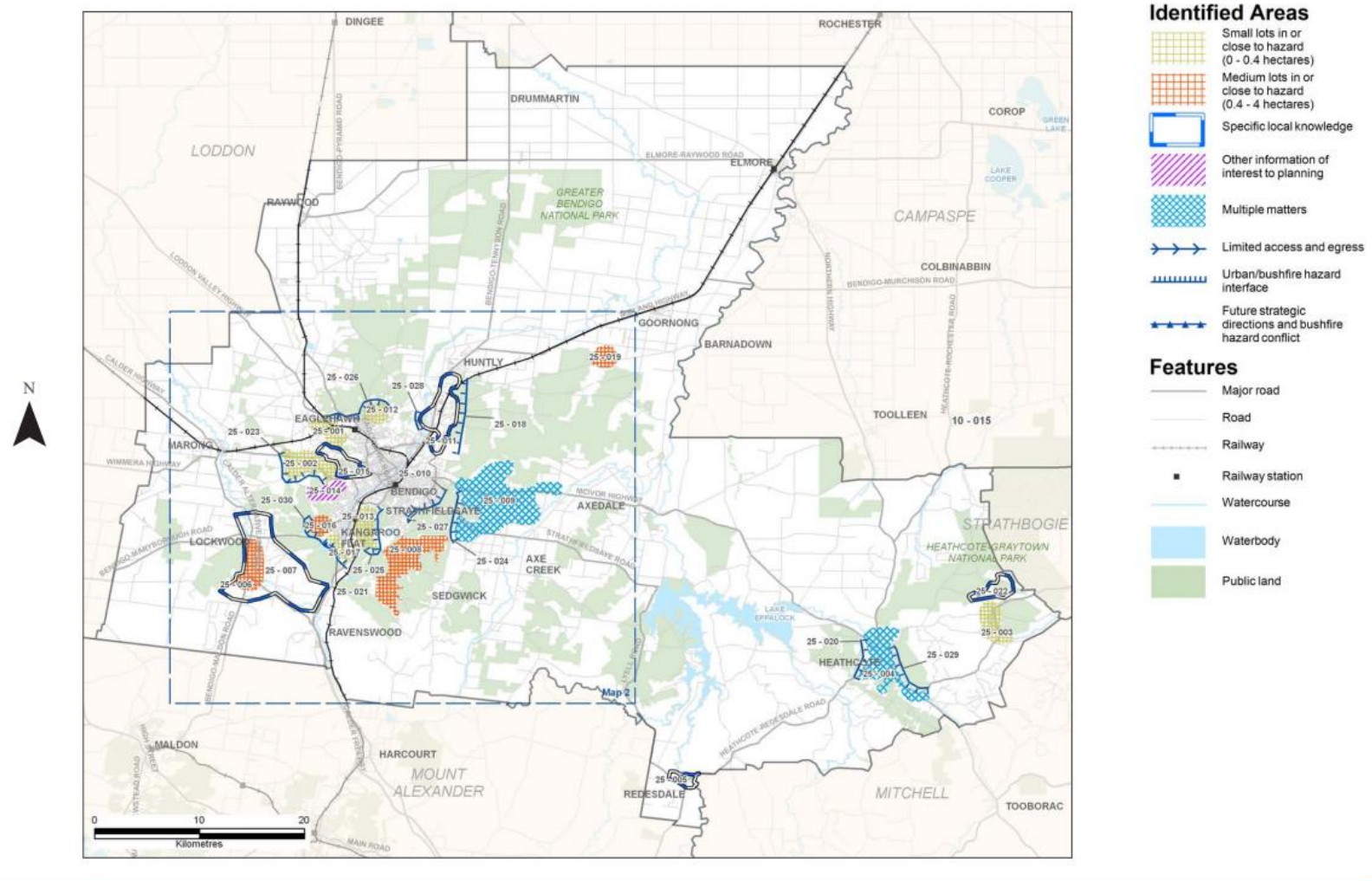
The Loddon Mallee RBPA seeks to provide additional guidance to the City’s’ strategic planning processes on locations where growth and bushfire hazard intersect and cause potential risks to life and property. It is not a statutory control.

The RBPA outlines 30 “identified areas” of potential hazard and described the nature of the hazard. For example, in Redesdale it notes that “*Local vegetation conditions at Redesdale are a known bushfire hazard. Grasslands interface with cluster of lots with a riparian vegetation corridor*”. The hazard is spatially identified and described but not how the hazard should be managed in planning sense. That would be the role on any future strategic planning process that affects the area.

Copies of the two maps from the RBPA can be found on the following pages and a copy of the document can be found here:

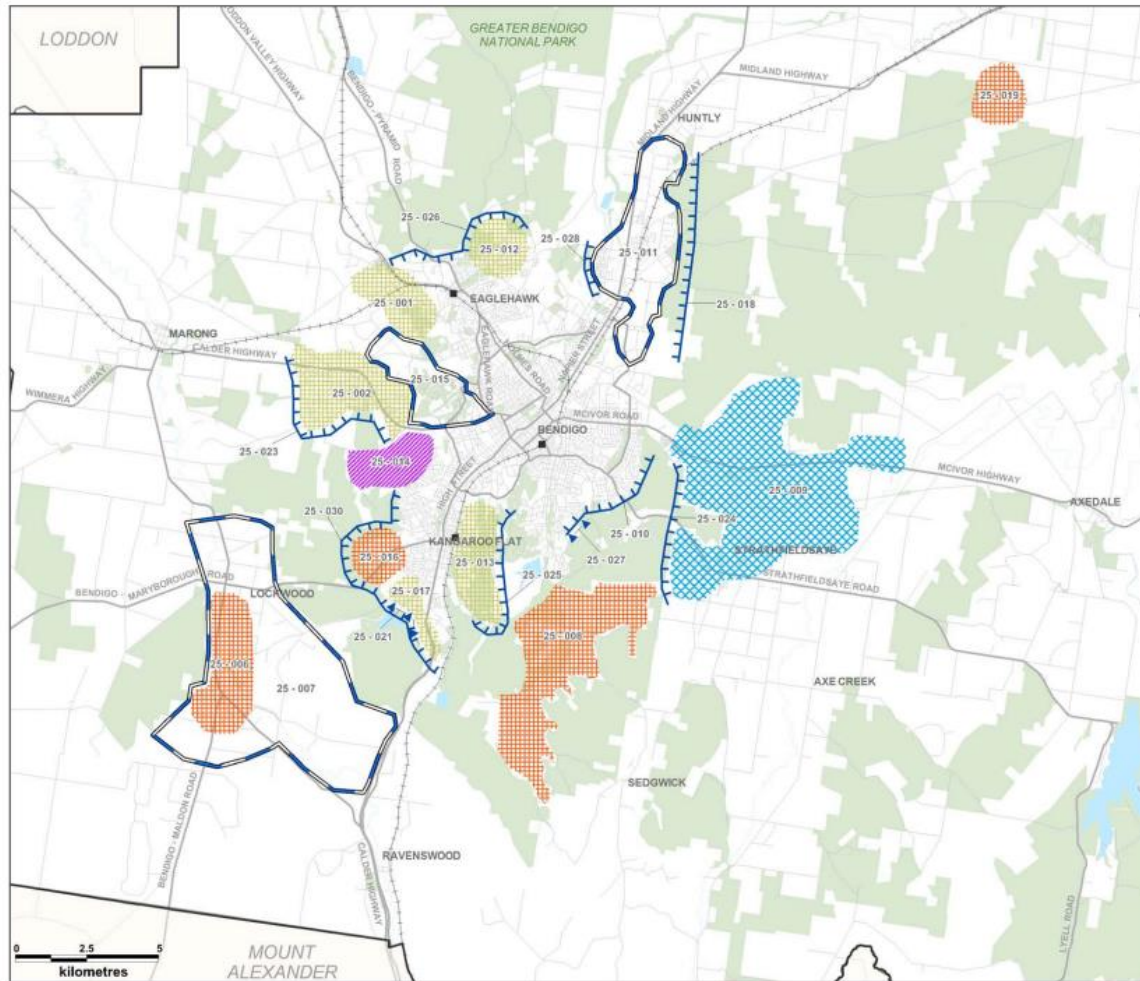
https://www.planning.vic.gov.au/_data/assets/pdf_file/0013/102307/Loddon-Mallee-Region-Part-1.pdf

GREATER BENDIGO MUNICIPAL MAP - MAP 1



Map 2: Loddon Mallee Regional Bushfire Assessment

GREATER BENDIGO MUNICIPAL MAP – MAP 2



Identified Areas

- Small lots in or close to hazard (0 - 0.4 hectares)
- Medium lots in or close to hazard (0.4 - 4 hectares)
- Specific local knowledge
- Other information of interest to planning
- Multiple matters
- Limited access and egress
- Urban/bushfire hazard interface
- Future strategic directions and bushfire hazard conflict

Features

- Major road
- Road
- Railway
- Railway station
- Watercourse
- Waterbody
- Public land

Map 3: Loddon Mallee Regional Bushfire Assessment

3.2 Planning Permit Applications Bushfire Management Overlay Technical Guide (2017)

While this document relates to planning permit applications rather than settlement planning and identifying the relative levels of risk across a municipality, it does contain information and guidance to inform settlement planning decisions.

The section on Bushfire Hazard Landscape Assessment is particularly relevant. It notes that *“Considering bushfire from the broader landscape perspective is important as it affects the level of bushfire risk to a development...”*

The guide sets out four distinct Landscape Types to be used when considering bushfire risk from a landscape perspective. They are used to help inform the decisions about comparative risk levels when it comes to deciding if an area is “low risk” when it comes to directing population growth and development in accordance with Clause 13.02.

The Landscape Types are described as:

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




It is important to recognise that a particular area might not fit neatly within one landscape type but exhibit elements of two landscape types, especially noting that the first bullet point for Landscape Types 2 and 3 are identical. For example, an area might have a bushfire approach from more than one direction (Type 3) but has ready access to a place that provides shelter from bushfire (Type 2). It is also important to note that an area’s Landscape Type may change over time. For example, if an area develops fuel loads become managed and safe access can improve.

These different landscape types are intended to inform strategic planning decision making and recognise that *“the scale of a bushfire and its potential destructive power is driven by the characteristics of broader landscape, rather than those characteristics within 150 metres of the site⁴.”*

The technical guide also identifies the factors that influence bushfire behaviour at this landscape scale are:

- Vegetation
- Topography
- Potential for fire runs
- Exposure of a settlement to bushfire
- Potential extent of damage a bushfire may produce.

The *Technical Guide* also provides some aerial images to act as an example of what each Landscape Type looks like:

Landscape Type 1	Landscape Type 2
	
Landscape Type 3	Landscape Type 4
	

A copy of the Technical Guide can be found here:

https://www.planning.vic.gov.au/_data/assets/pdf_file/0029/107669/Technical-Guide-Planning-Permit-Applications-Bushfire-Management-Overlay.pdf

⁴ Technical Guide Planning Permit Applications Bushfire Management Overlay (2017)

3.3 Design Guidelines for Settlement Planning at the Bushfire Interface (July 2020)

There are also a variety of mitigation measures that can be implemented through appropriate planning and design measures to reduce the risk of a fire to people and property.

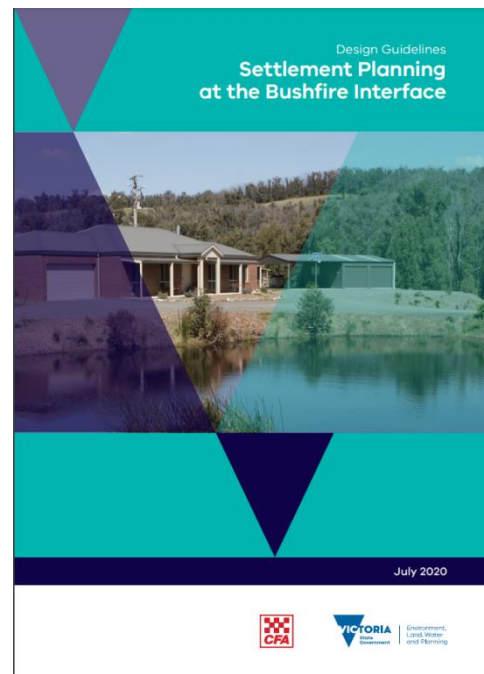
There is useful direction in *Design Guidelines - Settlement Planning at the Bushfire Interface* that was released by the State Government and the CFA in July 2020.

The Guidelines make a number of suggestions in relation to directing settlement growth:

- To direct growth to the east of existing settlements and away from the prevailing wind direction that is likely to carry a bushfire. In the context of the Bendigo Urban Area this is not possible as the land to the east of settled areas is the forest edge.
- To avoid areas with hazardous vegetation and direct growth into low risk locations. It is noted that there are no agreed metrics on how to quantify what is low risk.

It includes numerous planning and design suggestions that can help mitigate bushfire risk that could be applied within the Bendigo context. These include:

- Locate open space at the interface with the hazard (open space areas are generally well managed in terms of vegetation and fuel loads).
- Avoid vulnerable uses at the interface, such as aged care, childcare and the like.
- Locate perimeter roads at the bushfire interface to effectively create a strategic fuel break. Roads leading away from the perimeter road to be no more than 120 metres apart and to ensure there is sufficient road space for emergency services vehicles.
- Apply a development setback and potentially include the use of building envelopes to achieve defensible space setbacks. Using Clause 53.02-5 this setback would generally be 33 metres and may increase to 41 metres depending on the slope of the land. Using the perimeter road referred to above should be within that setback.
- Suggested lot sizes of 800m²-1,200m² at the interface.
- Avoiding highly combustible fencing types.



The image on the following page is taken from the Design Guidelines and illustrates in plan form how the planning and design suggestions can be implemented.

A copy of the design guidelines can be found here:

https://www.planning.vic.gov.au/_data/assets/pdf_file/0041/447998/Design-guidelines-for-settlement-planning-at-the-bushfire-interface.pdf

Settlement planning for bushfire



Figure 1: Settlement planning for bushfire

3.4 Potential Growth Areas Bushfire Assessment (June 2023 Terramatrix)

Terramatrix were engaged to assist the City in understanding the bushfire risk associated with the PGAs (Section 6 provides more detail on how the PGAs were identified). Specifically, Terramatrix were engaged to:

- Identify the bushfire landscape types across the municipality.
- Identify where there are likely to be significant and potentially destructive bushfires.
- Identify the relative level of risk among the PGAs, where population growth and development should be directed, and what bushfire protection measures might be appropriate.

Terramatrix were not engaged to determine the biodiversity values of the PGAs and whether bushfire protection measures would result in unacceptable biodiversity outcomes.

In undertaking this assessment Terramatrix had regard to the broader landscape scale around the PGAs, likely fire behaviour, topography, weather conditions, bushfire history and climate change.

Using the best available science, the matters considered in the Terramatrix report are based on the research of Associate Professor Kevin Tolhurst from Melbourne University who is a highly regarded expert in relation to bushfire behaviour. Associate Professor Tolhurst described four landscape metrics that influences fire behaviour that are considered to represent the best available science. These metrics include:

- Terrain ruggedness – how slope and terrain impact on fire behaviour.
- Convective Strength – how convective wind patterns and wind strength can affect a fire.
- Modelled House Loss Probability – combines convective strength, flame area and ember density in a computer model to calculate the likelihood of houses being destroyed.
- Ember-storm potential – potential for downwind spotting of a fire.

Terramatrix concluded that based on these metrics the PGAs were unlikely to be subjected to extreme bushfire conditions. It was also noted that the western edge of the PGAs is more susceptible to bushfire due to the prevailing wind direction.

It is understood that Associate Professor Tolhurst's research in relation to bushfire behaviour was not finalised. Terramatrix has still utilised his research as it assists with evidence in their report, but was not the basis for the recommendations.

A detailed description of each metric, together with associated mapping can be found in Section 7.2 of the Terramatrix report. The assessment determined that the areas being assessed were not high-risk locations for extreme fire behaviour and therefore did not fall into the Landscape Type 4 as detailed in the Technical Guide.

The Terramatrix report concluded that the potential growth areas in and around Bendigo fell within the Broad Landscape Type 2 or Type 3, with the potential to become Type 1 (as land develops, access improves, fuels loads are removed/manage and the level of risk decreases).

Importantly the Terramatrix report noted that for the preferred growth areas, a setback of 33 metres from woodland and 19 metres from grassland would potentially meet the BAL-12.5 threshold in Clause 13.02.

Terramatrix ranked the PGAs based on the following attributes:

- Percentage of potential BAL-LOW within the PGA, this was done by applying the mapping criteria used for the Bushfire Prone Areas (see Section 5.3).
- Percentage of area covered by treed vegetation within and up to 150 metres around the PGA.
- Percentage of BMO coverage within the PGA.
- Draft risk assessment from Forest Fire Management Victoria.
- Percentage of the PGA exposed to neighbourhood hazard.
- Egress to a place of relative safety.

Based on these attributes. Terramatrix ranked the suitability of the PGAs for development from more suitable to less suitable. The rankings in order are:

- Huntly
- Marong
- Strathfieldsaye
- Junortoun
- Maiden Gully (noting that Terramatrix aggregated all the Maiden Gully PGAs into one PGA, other than Olympic Parade)
- Big Hill
- Watson Street
- Simpsons Road
- Lockwood Road
- Olympic Parade

The Terramatrix report also identifies a range of bushfire protection measures that could be implemented that are set out in Section 6.4.

3.5 Relationship between the Terramatrix Report and this Report

As indicated above there are a variety of inputs into this report and the Terramatrix Report is especially important. It provides the best available scientific data and technical advice that helps inform the directions for future growth.

This report draws together information from the Terramatrix Report and other documents and places a “planning lens” over these various sources of information and data in order to fully respond to the requirements of Clause 13.02.

The findings and recommendations of the Terramatrix Report will be drawn upon throughout this report.

3.6 Preliminary Ecological Assessment (Practical Ecology)

Practical Ecology were engaged to undertake a desktop review of the growth areas which included reviewing GIS mapping, identifying the extent of native vegetation, mapping Ecological Vegetation Classes (EVCs), threatened flora and fauna, and any other relevant information.

This information has helped inform whether any bushfire protection measures that might be considered for the PGAs would result in unacceptable biodiversity outcomes in accordance with Clause 13.02 (refer Section 2).

3.7 Planning Practice Note 64: Local planning for bushfire protection

This Practice Note dates back to 2015 and is currently being reviewed. The Department of Transport and Planning (DTP website notes that its contents don't reflect the various planning system changes that have occurred since this time, for example Clause 13.02 or the Technical Guide, refer Section 3.2).

4. Municipal Planning Context

4.1 Municipal Planning Strategy

Clause 02.01 describes the context of City of Greater Bendigo:

The City of Greater Bendigo is located in north central Victoria, 150 kilometres north west of Melbourne, and covers an area of approximately 2,995 square kilometres. Greater Bendigo adjoins the municipalities of Campaspe, Strathbogie, Mitchell, Mount Alexander, and Loddon.

Bendigo is Victoria's third largest urban centre outside metropolitan Melbourne and is the major centre for north central Victoria.

Greater Bendigo is growing rapidly with a projected population of over 150,000 people by 2036 (Victoria in Future, 2019) and a population target of 200,000 by 2041 (Loddon Mallee South Regional Growth Plan, 2014).

This growth is creating an increasingly culturally, religiously and ethnically diverse community. Most people live within the urban area of Bendigo. About one in seven people live in townships and rural areas outside the Bendigo Urban Growth Boundary.

The Dja Dja Wurrung and Taungurung people are the traditional inhabitants of the Greater Bendigo region and were present for at least 30,000 years prior to the arrival of European settlers.

Gold was discovered in the early 1850s and Bendigo became the second biggest goldfield in Australia and contributed significantly to the development of Melbourne. The gold rush left a legacy of fine Victorian buildings, and Bendigo has one of the highest concentrations of properties registered on the Victorian Heritage Register in the State.

The gold rush brought a diversity of traditions and cultural practice including large numbers of Chinese, Cornish, and German miners.

Greater Bendigo is strategically positioned with a well-connected network of highways and railways that provide important social and economic links. It is located within the Murray-Darling Basin, the North Central Catchment region and the catchments of the Loddon and Campaspe Rivers.

Greater Bendigo has a large range of natural features that contribute significantly to the municipality's character and appeal, including an extensive network of state, regional and national parks and Big Hill and the Loddon and Campaspe Rivers. Bendigo is in a unique situation of being a regional city surrounded by forest. This requires particular management along the interface to protect environmental values and provide a safe place to live and work.

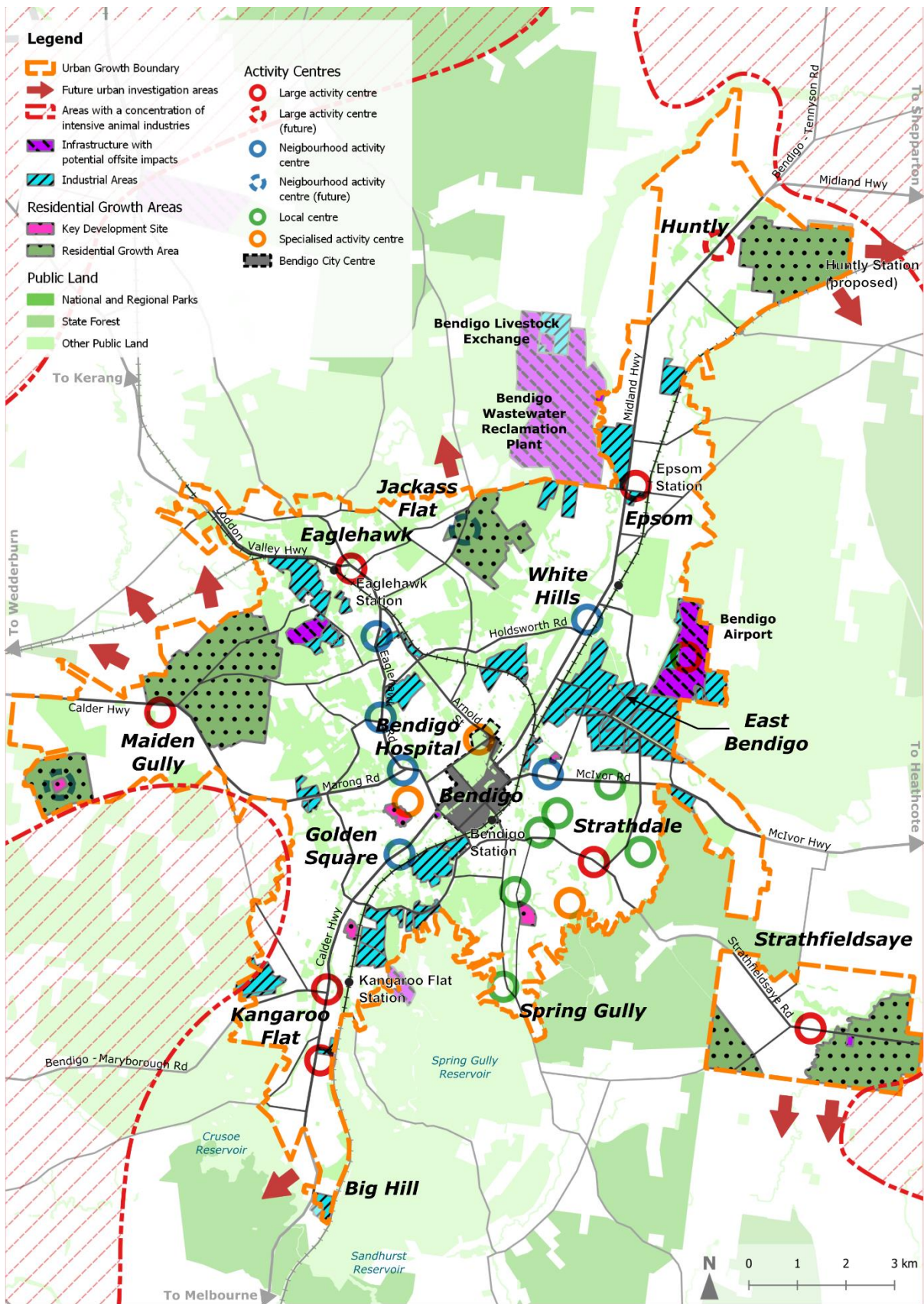
Greater Bendigo performs a regional service role with construction, manufacturing, health care, education and financial services being the major contributors to economic output, along with mining, retail and tourism.

4.2 Strategic Settlement Directions

Clause 02.03-1 of the Greater Bendigo Planning Scheme sets out the strategic directions for urban growth. Relevant directions include:

- *Avoid development in bushfire and flood prone areas, unless risk can be managed.*
- *Protect agricultural land and high value environmental areas from development.*
- *Contain most of Greater Bendigo's growth within the Bendigo Urban Growth Boundary.*
- *Facilitate 10 minute neighbourhoods that:*
 - *Enable people to spend less income on the combined cost of housing and transport.*
 - *Minimise environmental impacts associated with transport.*
 - *Promote a healthy lifestyle through active transport choices.*
 - *Increase neighbourhood safety through activation of the public realm.*
 - *Increase community interaction.*
 - *Support the local economy.*
- *Focus residential and commercial development outside the Bendigo Urban Growth Boundary in rural townships that are well serviced by infrastructure as shown on Rural strategic framework plan in Clause 02.04.*
- *Protect forest values by providing a buffer between urban development and the public and private forests.*
- *Support development of the identified hierarchy of activity centres within the Bendigo Urban Growth Boundary shown on the Urban area activity centre hierarchy framework plan in Clause 02.04.*
- *Discourage rezoning proposals of land for urban purposes outside the urban growth boundary unless in an area marked future urban investigation area on the Urban strategic framework plan in Clause 02.04.*
- *Support rehabilitation of former mining land for development, including residential development.*

The plan on the following page is the current Urban Strategic Framework Plan for the Bendigo Urban Area. It outlines the extent of the Urban Growth Boundary, identifies growth areas, key development sites, activity centres and important land uses.



Map 4: Urban strategic framework plan taken from Clause 02.04 of the GBPS

4.3 Greater Bendigo Planning Policy Framework

Amendment C256 to the Greater Bendigo Planning Scheme came into effect on 11 March 2022, and implemented the Greater Bendigo Planning Scheme Review 2019 by translating the existing Municipal Strategic Statement and Local planning policies into the new Planning Policy Framework format.

This amendment did not make any changes to Clause 13.02-1; however, it does make a number of important policy statements in relation to bushfire including:

- Clause 02.03-1 – *Avoid development in bushfire and flood prone areas, unless risk can be managed.*
- Clause 02.03-3 – *Strengthen the resilience of settlements and communities to bushfire through risk-based planning that priorities the protection of human life.*
- Clause 12.1-1L – *Support biodiversity values through the retention of remnant vegetation in current and future built up areas, where it can be demonstrated that the vegetation can be managed in a way that bushfire risk to human life will not be increased.*
- Clause 12.05-2L – *Avoid increasing risks associated with bushfire through a combination of best practice urban design or land management or both.*

4.4 Potential Future Growth Locations

Approximately 85 per cent of new housing is being built in and around the Bendigo Urban Area (in greenfield and infill locations) with the remaining 15 per cent in small towns and rural areas.

The Managed Growth Strategy is seeking to increase the contribution that infill development makes to total housing supply, however this is likely to take time to achieve so this split is expected to continue in the short to medium term with new residents attracted to the urban area of Bendigo, being a service centre for the region.

While the small towns in the municipality play an important role in the settlement hierarchy, their capacity to grow is limited for a variety of reasons including environmental constraints and a lack of infrastructure.

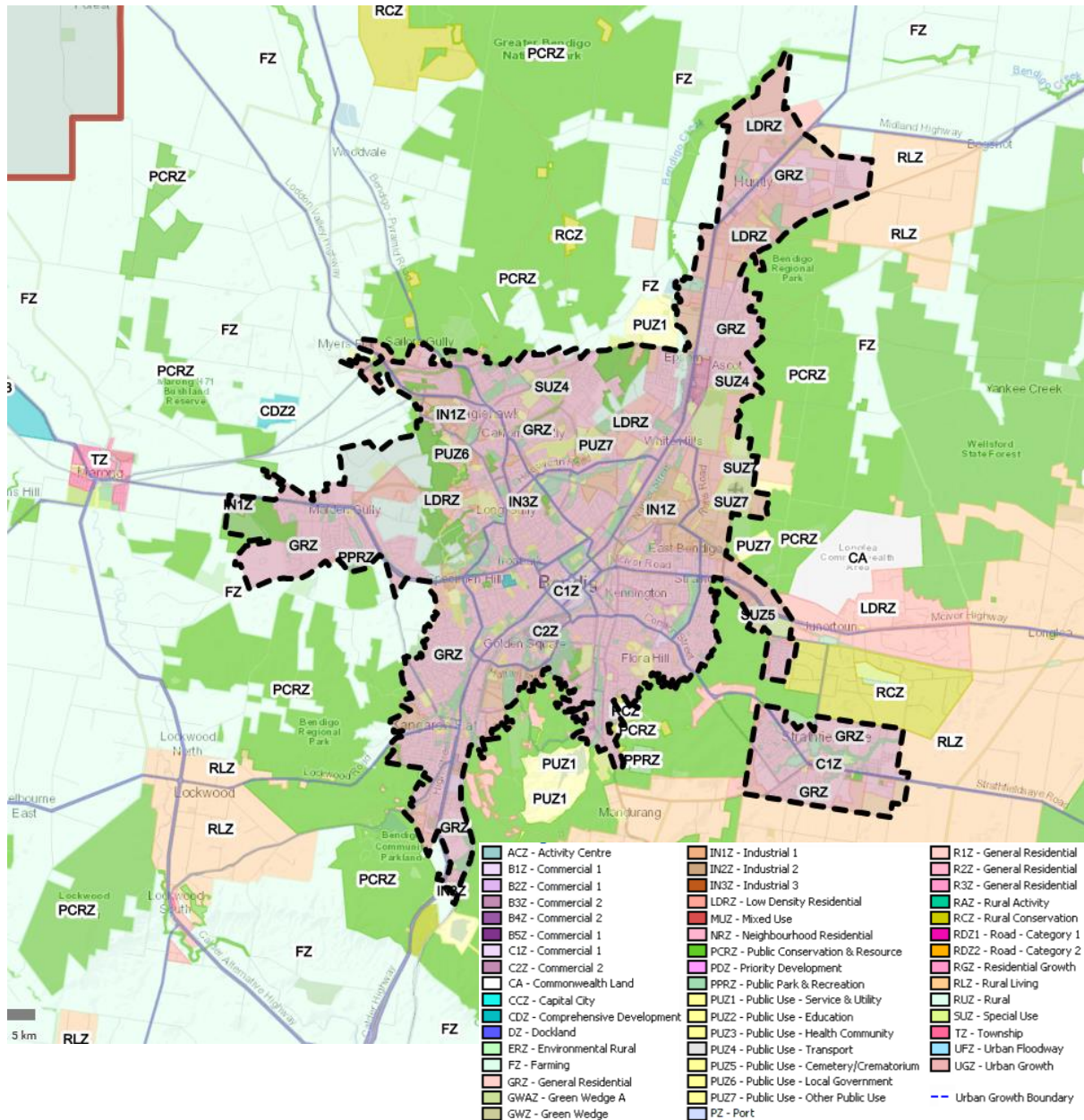
The challenge for the City as a Planning Authority, is to have regard to the need to prioritise the protection of human life (as the primary policy consideration) while also considering how growth can occur having regard to some of the challenges around vegetation, flooding, infrastructure provision and other constraints to development. “Jumping” the forest and establishing entirely new communities that are isolated from services and infrastructure is not considered to be orderly planning practice, particularly when there could be other viable alternatives to growth proximate to the Bendigo Urban Area.

4.5 Zoning

The focus of future growth opportunities for the municipality is for areas in and around the Bendigo Urban Area. Section 6 provides a rationale for this.

Map 3 on the following page indicates the zoning pattern for the Bendigo Urban Area as well as the Urban Growth Boundary (UGB) that has been part of the Greater Bendigo Planning Scheme since 2006.

Setting aside crown land and small towns, the land to the north and west of the Bendigo Urban Area is generally in a Farming Zone and to the east and south is part Farming, part Rural Conservation and part Rural Living.



Map 5: Zoning plan of the Bendigo Urban Area with the Urban Growth Boundary

4.6 Clause 53.02 (Bushfire Planning)

This clause provides direction when considering a planning application for building, works and subdivision when approval is required under the BMO. The purpose of this clause is:

- *To ensure that the development of land prioritises the protection of human life and strengthens community resilience to bushfire.*
- *To ensure that the location, design and construction of development appropriately responds to the bushfire hazard.*
- *To ensure development is only permitted where the risk to life, property and community infrastructure from bushfire can be reduced to an acceptable level.*
- *To specify location, design and construction measures for a single dwelling that reduces the bushfire risk to life and property to an acceptable level.*

The clause then goes on to set out objectives to be achieved for a particular application (such as a subdivision), approved measures to achieve the objective, alternative measures than may be considered and decision guidelines.

Examples of approved measures include the provision of defensible space, setback requirements, static water supply, construction standards, roads and access and landscaping.

4.7 Other Relevant Strategies

- Climate Change and Environment Strategy (2021-2026)
- Greater Bendigo Biodiversity Strategy and Action Plan (2023-2033)
- Greening Greater Bendigo
- VFRR
- Municipal Fire Management Plan

5 Strategic Bushfire Planning Context

This section discusses the strategic planning considerations in relation to bushfire (drawn largely from Clause 13.02) as well as some background information and statutory planning tools.

5.1 Bushfire Attack Levels

Bushfire Attack Level (BAL) is a measure of a building's potential exposure during a bushfire either from ember attack, radiant heat or direct flame contact. It is measure of "radiant heat flux" and is expressed in terms of kilowatts per m². BAL ratings are based on *AS 3959-2009 Construction of Buildings in Bushfire-prone Areas*.

The higher the BAL rating, the greater the sites vulnerability to fire. In terms of construction the higher BAL ratings require more bushfire protection measures be included in the construction and therefore add to costs. In terms of the planning scheme, the higher the BAL rating, the greater the setback distances required.



(source: <https://www.evolutionbuildinggroup.com.au/bushfire-attack-level/>)

5.2 Bushfire Management Overlay

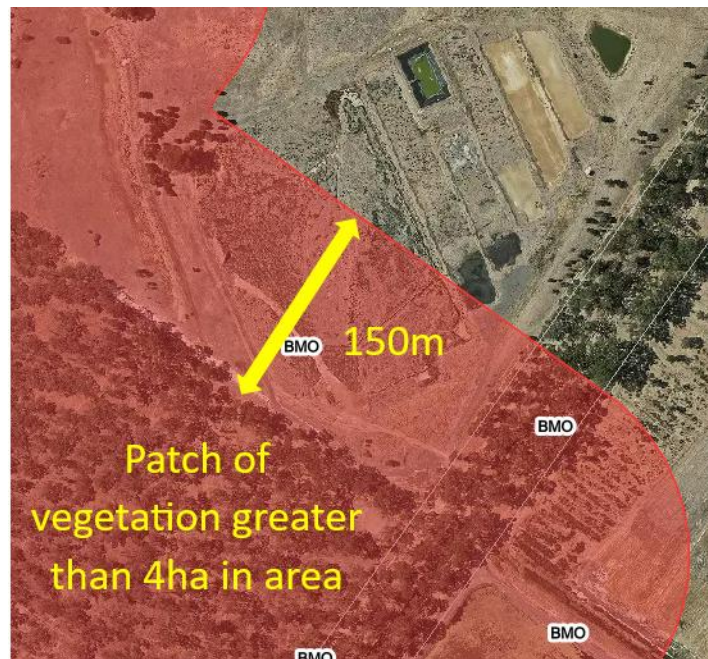
The Bushfire Management Overlay (BMO) is the statutory planning tool that manages bushfire hazard (not risk). The purpose of the BMO is:

- *To ensure that the development of land prioritises the protection of human life and strengthens community resilience to bushfire.*
- *To identify areas where the bushfire hazard warrants bushfire protection measures to be implemented.*

- *To ensure development is only permitted where the risk to life and property from bushfire can be reduced to an acceptable level.*

The BMO ensures that bushfire issues are considered when a planning permit application is assessed in an area subject to bushfire hazard.

The BMO is applied to locations which surround vegetation that is four hectares or more in area. From the edge of the patch of vegetation, the BMO is applied within a 150 metre buffer. The BMO mapping is regularly reviewed by the State Government who consult with the relevant council. The image below shows how this criteria is applied in practice.



In Greater Bendigo there are two schedules to the BMO:

- BMO1 relates to the BAL-12.5 areas.
- BMO2 relates to the BAL-29 areas.

The schedules seek to streamline the planning approval process for new development in those areas.

The maps on the following pages indicate the extent of the BMO within municipality.

It is important to note that the BMO mapping is based on the “hazard” (the vegetation) and does not map the “risk”.

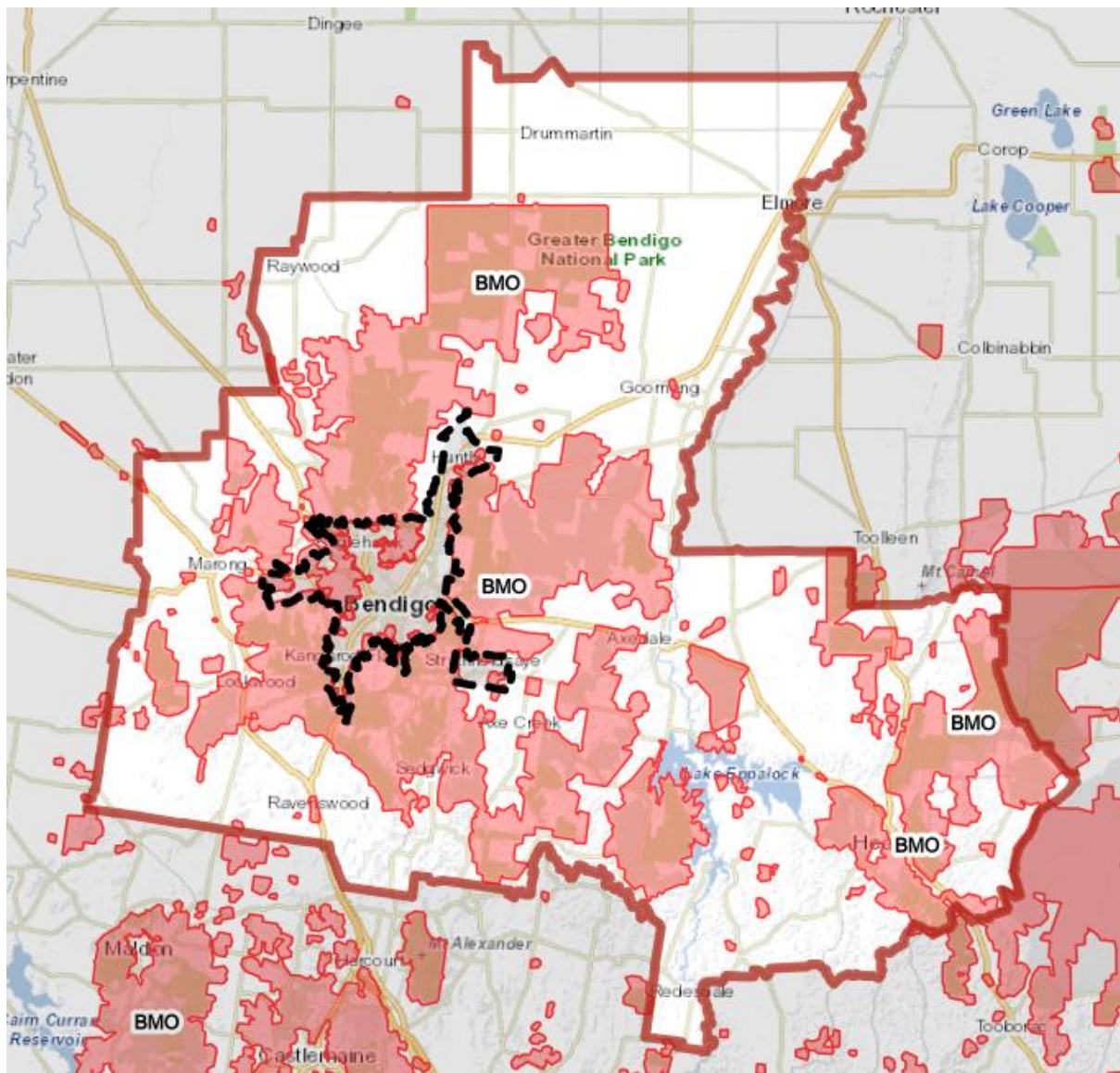
The hazard can influence what a fire will do and how it will behave in the landscape. It is a source of potential harm or a situation with a potential to cause loss.

Bushfire risk is the likelihood and consequence of a fire starting, spreading and impacting on people, property and the environment.⁵

The map on the following page indicates the extent of the BMO as it applies across the municipality.

⁵ <https://www.planning.vic.gov.au/policy-and-strategy/bushfire/bushfire-hazard>

The absence of a BMO does not mean the absence of bushfire risk.



Map 6: Extent of the BMO

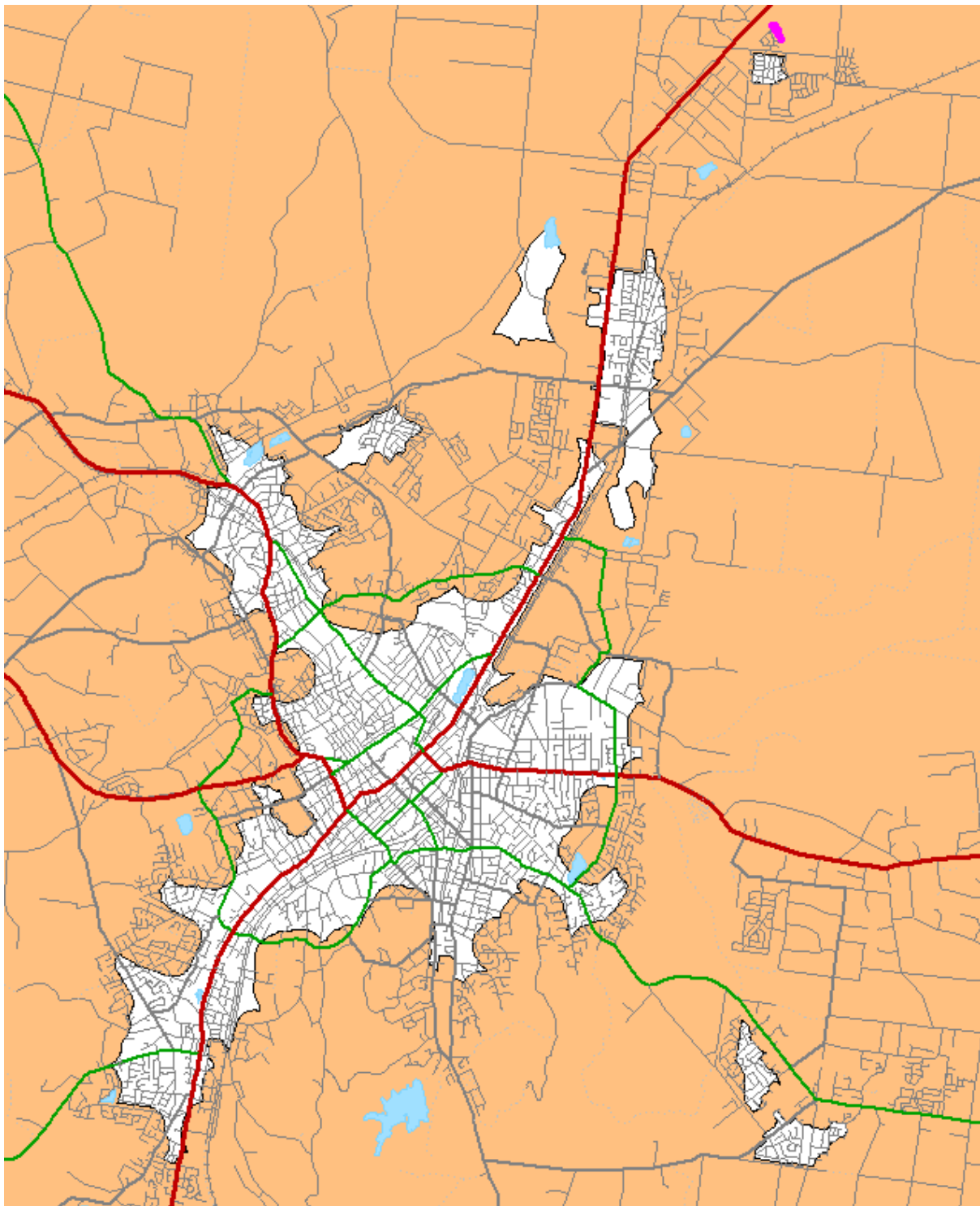
5.3 Bushfire Prone Areas

Bushfire Prone Areas (BPA) are designated under the Building Act (1993) and “are areas subject to or likely to subject to bushfires.” Any new dwelling in a BPA must be built to a minimum BAL-12.5, but the Building Surveyor may require higher construction standards.

The BPA includes grasslands (generally not covered by the BMO) so the geographic extent of the BPA is significantly greater than the BMO. The entire Municipality is largely affected by the BPA (including the PGAs) other than the areas indicated below.

The criteria for mapping the BPA is to map the hazard (vegetation and grassland) - that is two hectares or greater in area, and to apply a 60 metre buffer from the edge of the hazard. The BPA mapping is regularly reviewed by the State Government.

The BPA is referenced in Clause 13.02-1S in relation to planning applications for several sensitive uses that are in an area affected by the BPA.



Map 7: Extent of the BPA

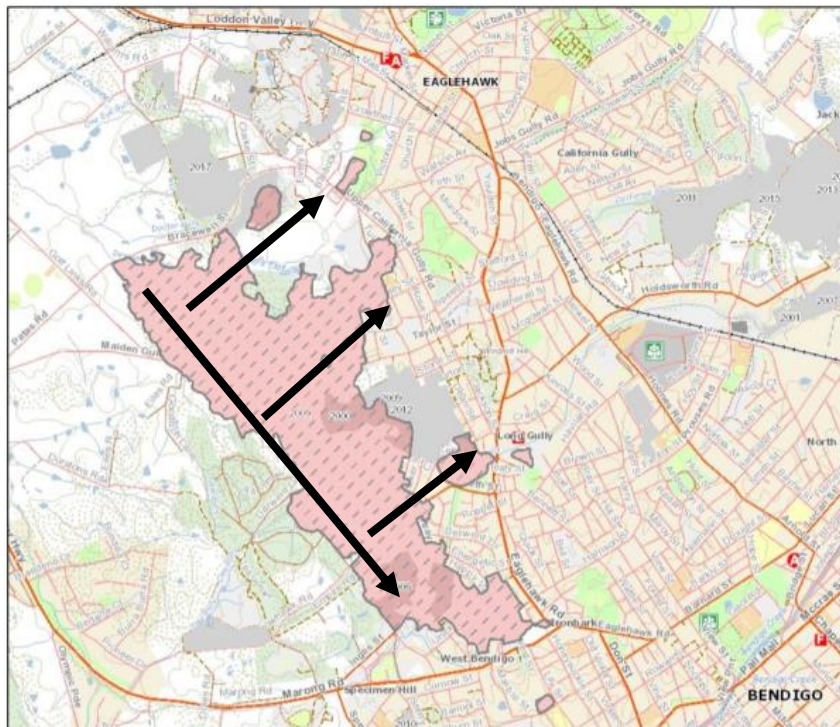
5.4 Greater Bendigo's Landscape Risk Level

In terms of the planning scheme response to assessing risk, Clause 13.02 of the Planning Policy Framework requires that bushfire hazards be identified, and an appropriate risk assessment be

undertaken at a variety of scales ranging from a neighbourhood scale (400m), local (1km) to a landscape scale (20km). Such an assessment should be made using “the best available science” and applying “the best available information.” Section 3.4 summarised the approach taken by Terramatrix in determining Greater Bendigo’s level of risk based on research undertaken by Associate Professor Kevin Tolhurst. As noted above, it’s understood that Associate Professor Kevin Tolhurst’s research wasn’t finalised. For the purposes of Terramatrix’s assessment, it was, however, still considered to be the best available science and the best available information was applied. The landscape risk level of bushfire in Greater Bendigo is influenced by three factors – weather, topography and fuel loads. Of these the only one that can be managed or influenced to a degree is fuel loads.

In terms of weather Greater Bendigo’s vulnerability to bushfire, the Terramatrix Report identifies that the risk comes from the north-west, which is the prevailing wind direction during fire season which could be accompanied by a south westerly wind change. Bendigo is also susceptible to ember spotting, where burning twigs and the like are carried by the wind to start smaller spot fires ahead of the main fire.

The extent of the Bracewell Street fire in 2009 illustrates this weather scenario:



Map 8: Extent of the Bracewell Street Fire

(Source: https://s3.ap-southeast-2.amazonaws.com/hdp.au.prod.app.vic-engage.files/1316/1941/0994/Bendigo_BMP_-_V4.0_Draft_2021_1.pdf)

Catastrophic fire days are typified by strong winds that affect large areas of the State and are not just limited to Greater Bendigo.

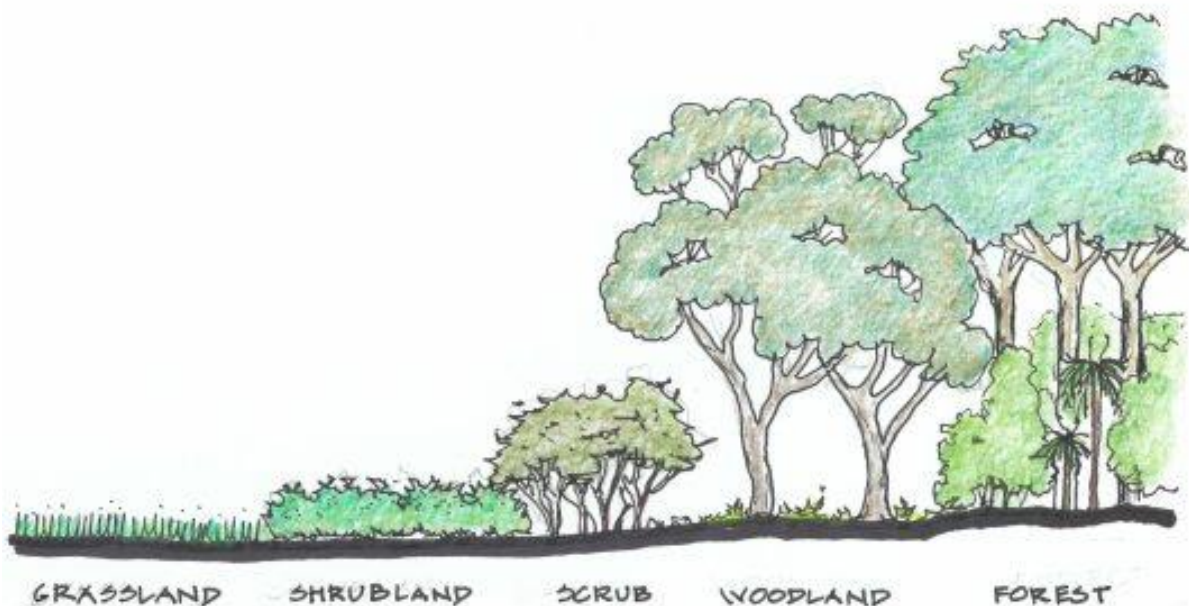
Topography comes into play as fire travels faster up a slope than it does on flat ground or going down slope. The topography of much of the municipality is best described as flat to undulating, although there are exceptions to this such as the Big Hill Escarpment, One Tree Hill and the McIvor Ranges near Heathcote. In relation to the PGAs (with the exception of Olympic Parade and parts of

Strathfieldsaye), the topography is largely 0-5 degrees, although there are isolated areas of 10+ degrees that are also generally well vegetated.

In other areas of the State, notably the north east the topography plays a far more significant role in bushfire risk due to steep terrain, so relative to other parts of Victoria the topography in Greater Bendigo is not as high a risk.

In terms of fuel loads there are significant areas of hazard (vegetation) in and around Greater Bendigo. This vegetation (which includes trees, shrubs and understorey) is on public and private land. It is possible to manage fuel loads and decrease the severity of a bushfire, however the assumption in this report is that the fuel loads generated by this vegetation (regardless of land tenure) are not managed in a low fuel state, and a “worst case scenario” has been assumed in terms of fuel loads. Another assumption in this report is that given the right atmospheric conditions the entire Bendigo Urban Area could be subject to ember attack. Both these assumptions are supported by the CFA (refer to Section 7).

The image below is taken from the CSIRO illustrates the 5 vegetation classifications relate back to Clause 53.02. Most of the vegetation in Greater Bendigo falls within the “Woodland” classification, however the canopy cover in Greater Bendigo is typically at 30% which is the benchmark between Woodland and Forest. The approach taken is to use the more conservative Forest vegetation classification, which would result in larger setbacks being required to meet a BAL-12.5 rating.



Source: <https://research.csiro.au/bushfire/bushfire-basics/how-bushfires-behave/vegetation/>

Relative to other parts of the State, the bushfire risk associated with vegetation in Greater Bendigo is of a lower bushfire risk.

That said there are options to manage fuel loads through controlled burning, mechanical mulching and the like that could be implemented within a growth area (i.e., not reliant on the adjacent land). Appendix 1 provides some examples of fuel management practices that could be implemented to help reduce the risk from fire.

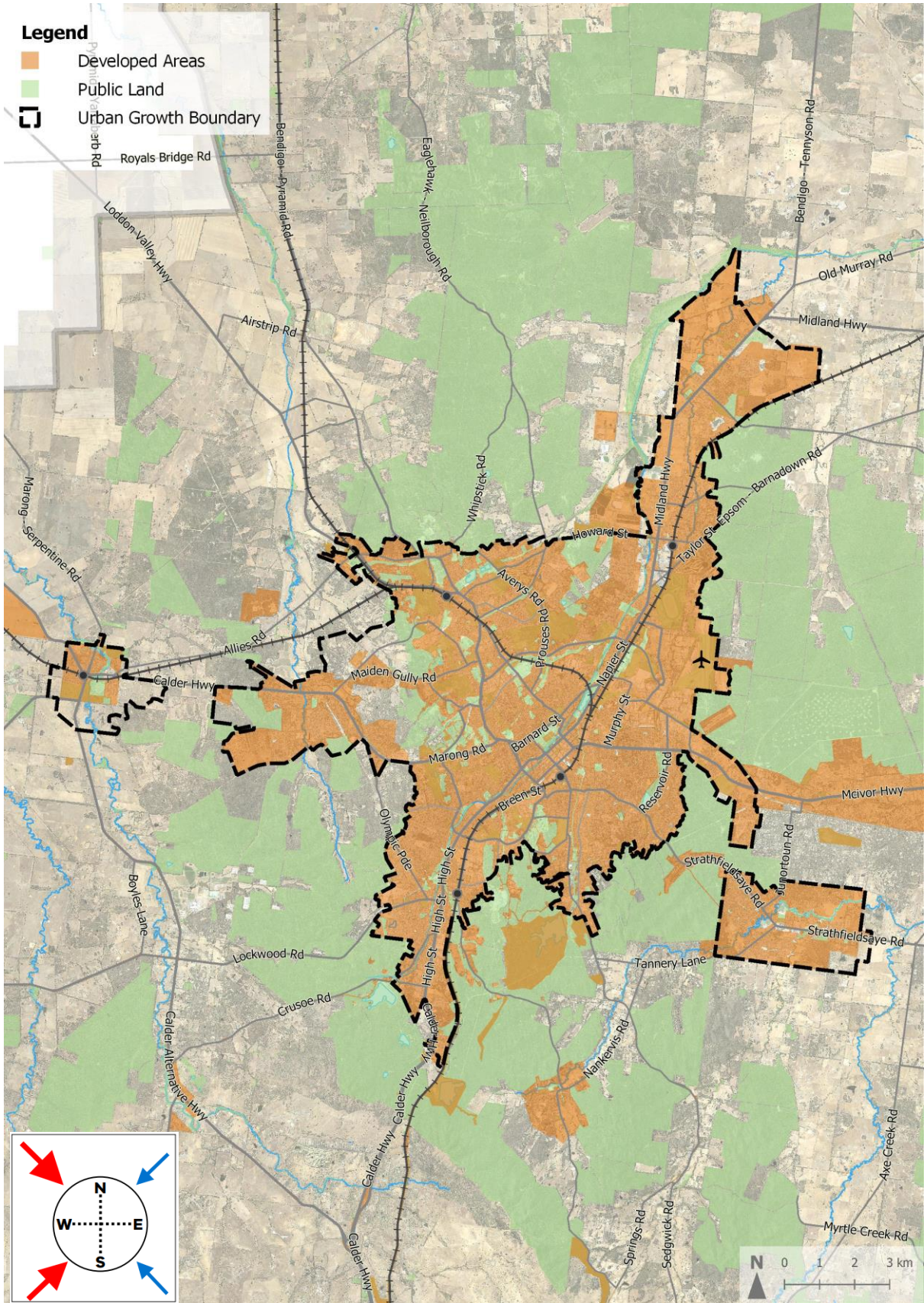
Much of the land on the eastern edge of the urban area is built up to the public land boundary, so there are limited opportunities for growth in these areas. It is also a relatively lower risk area as it is protected from a large bushfire run from the north-west and south-west by existing residential development, although there are risks from ember attack depending on conditions.

The western edge of the urban area is more challenging as this is where a number of growth opportunities exist, but it is also more vulnerable to bushfire approaching from the north-west and with a south-west wind change and there is diversity in the classifiable vegetation (refer to Section 6.2).

There is also potential for some long bushfire runs to establish and impact certain areas. While recognising the primacy of the State bushfire policy and the protection of human life, there are also areas along this western edge that are affected by flood controls and other non-bushfire constraints to development which adds a further layer of complexity.

Having regard to the above it is considered that on a State wide comparative level, the potential for extreme bushfire behaviour in Greater Bendigo is unlikely.

The Technical Guide (Section 3.2) provides direction on mapping landscape scale bushfire risk and this information has been used to summarise Greater Bendigo's landscape risk:



Map 9: Landscape Hazard

5.5 Climate change and impacts on bushfire

In 2017 the Climate Council released an updated report titled *Climate Change and the Victoria Bushfire Threat*. Included among the key findings are:

- Climate change is increasing the risk of bushfires in Victoria and lengthening fire seasons.
- Victoria is likely to experience increasing bushfire risk.
- The economic cost of bushfires will double by 2050.
- Bushfires will continue to adversely affect human and environmental health.
- Victoria is very likely to experience an increase in the number of days of extreme fire danger.



A copy of the report can be found here:

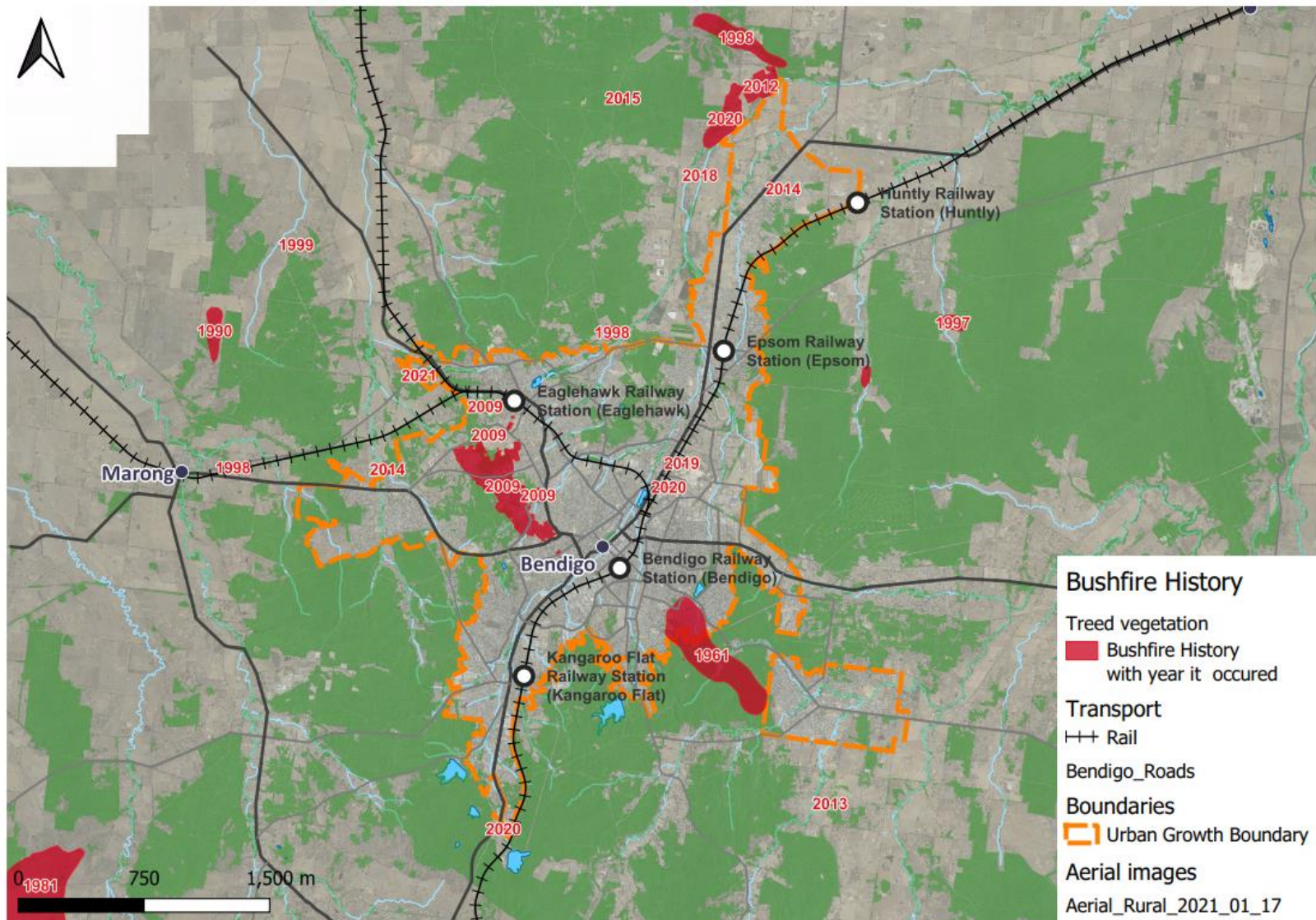
<https://www.climatecouncil.org.au/resources/vicbushfires/>

The draft *Bendigo Bushfire Mitigation Plan* (2021)⁶ also notes that with reduced rainfall the fuel loads in and around Bendigo will also change.

5.6 Greater Bendigo's bushfire history

Compared to other parts of Victoria, Greater Bendigo's bushfire history is limited. The following map indicates the bushfire history for the area in and around the Bendigo Urban Area:

⁶ <https://engage.vic.gov.au/bendigos-bushfire-mitigation-plan>



Map 10: Bushfire History

6. Potential Growth Areas (PGAs)

6.1 Location identification

Currently in urban Greater Bendigo approximately 50 per cent of new housing is in greenfield locations and 50 per cent is in infill locations. The MGS sets an aspirational target of changing this to 30 per cent greenfield and 70 per cent infill. This is a major change to the pattern of development and will take time to achieve but is an important aspirational goal not only from a bushfire perspective but from a more general strategic planning viewpoint as well.

Before discussing the PGAs and how areas were assessed it is important to again note that in planning for future growth and development, the primary policy driver is the protection of human life from bushfire. It is also important to recognise that there are a range of secondary (non-bushfire) issues that need to be considered in identifying and planning for future growth areas.

For example, while an area might be low risk from a bushfire perspective, if it cannot be serviced with infrastructure or is significantly constrained by non-bushfire issues then its suitability as a location to direct population growth and development would be challenging.

While the Greater Bendigo's small towns can accommodate some population growth these areas are also constrained by infrastructure capacity, in some towns there is no reticulated sewerage and provision of the infrastructure would require significant government investment, which is highly unlikely to occur. Other small towns, notably Heathcote has existing bushfire risks that would preclude it as a location to direct population growth. While not a relevant bushfire planning consideration it is noted that there is limited demand for new housing in small towns on a Municipal scale.

While these rural areas and small towns are not proposed to be considered as an area to actively assess against clause 13.02, they have been allocated a Landscape Type taken from the Technical Guide (refer section 6.3).

Having regard to sound and orderly planning, environmental features and constraints, and an efficient infrastructure delivery perspective, it is logical that any PGA to be investigated be within or proximate to the Urban Growth Boundary (UGB), or other settled areas such as Marong that have ready access to services and infrastructure. Given the ring of forest that surrounds the City this limits potential locations for growth without major infrastructure investment.

"Jumping" the forest or establishing an entirely new community that is isolated from services, infrastructure and other facilities necessary to support growth is not supported while there are other viable lower bushfire risk alternatives to growth proximate to the Bendigo Urban Area for the reasons identified.

This report has identified 12 PGAs to be assessed against the requirements of Clause 13.02. As will be set out below, the suitability of these areas to accommodate growth from a bushfire perspective varies considerably. A number of the PGAs are lower bushfire risk and others have obvious risks that could not be overcome without resulting in unacceptable biodiversity outcomes.

The MGS has identified a number of “Key Development Sites” that are suitable for more intensive residential development. This report does not consider the bushfire risk associated with key development sites within the existing urban area of Bendigo as these locations are generally isolated from any hazard (vegetation), and are currently zoned for residential development.

It is acknowledged there is landowner interest in establishing new residential areas that are currently isolated from other urban development, most notably the proposed Ravenswood Run. As part of the Expression of Interest process for the Managed Growth Strategy (refer Section 1.1), a bushfire report was submitted by the proponents for Ravenswood Run which has been reviewed by City officers.

This Growth Areas Bushfire Assessment has focused on locations either within or near the Urban Growth Boundary for the reasons outlined above. The proposed Ravenswood Run, and other areas that were not close to the edge of the existing Urban Growth Boundary or not identified as a ‘Future urban investigation area’ in clause 2.04 of the Greater Bendigo Planning Scheme, have not been investigated further as part of this assessment. The merits of the proposed Ravenswood Run and other areas not close to the edge of the existing Urban Growth Boundary will still be considered during the development of the Managed Growth Strategy.

The investigated PGAs are located in areas identified for future growth in the planning scheme or another Council adopted strategy, or are within the Urban Growth Boundary. Some PGAs have obvious bushfire constraints but are being assessed to understand the relative municipal risk is. This will be explored in more detail below.

It is noted that these areas are only being assessed against clause 13.02 and that there may be other non-bushfire constraints to development that need to be considered. These include biodiversity and flooding constraints, buffers to offensive uses etc. These will be discussed below in Section 8.

It is also important to note that the extent of the areas identified is “potential” it should not be interpreted as the entire extent of the area being available for development, as parts of the area may be unavailable due to bushfire issues particular to that location, or other constraints that limit development opportunities.

The PGAs include:

Marong:

Marong has long been identified as a future growth satellite township area. The Marong Township Structure Plan has been prepared, and the planning scheme amendment to implement the Structure Plan is nearing completion.

Huntly (North and East):

An area that has been identified as a future growth area. In recent years the State Government has also built a new train station to service the growth area. Structure planning for the growth of Huntly is underway.

Strathfieldsaye (South and East):

The area to the south of Strathfieldsaye is identified a future urban investigation area in the Urban Strategic Framework Plan in clause 02.04. The land to the east was included as it is a logical expansion and is capable of being serviced with the necessary infrastructure.

Maiden Gully (North West)

This area (to the north west of the PSP area) is identified a future urban investigation area in the Urban Strategic Framework Plan in clause 02.04. There is known developer interest in this area, most notably the former Eaglehawk Golf Course site.

Maiden Gully Precinct Structure Plan

The identification of this growth area dates back to the Bendigo Residential Development Strategy (2004). The PSP went through an exhaustive development phase and has broad community support. A secondary school has established in area based on the PSP and infrastructure agencies have planned upgrades to service the area. This area is within the UGB.

Junortoun

This area is within the UGB and is currently zoned Low Density Residential. The area has access to necessary infrastructure to support residential development, although some of the area is affected by planning controls related to the Bendigo Airport.

Maiden Gully (South East)/Olympic Parade

This area largely sits outside of the UGB (other than land to the north of Marong Road) and has landowner interests. The area is significantly constrained by vegetation and has obvious bushfire risks associated with it.

Simpsons Road

This area sits outside of the UGB but is identified a future urban investigation area in the Urban Strategic Framework Plan in clause 02.04. There is landowner interest in developing the area.

Watson Street

The Watson Street area is within the UGB and is currently zoned Low Density Residential. There has in the past been landowner interest in developing the area.

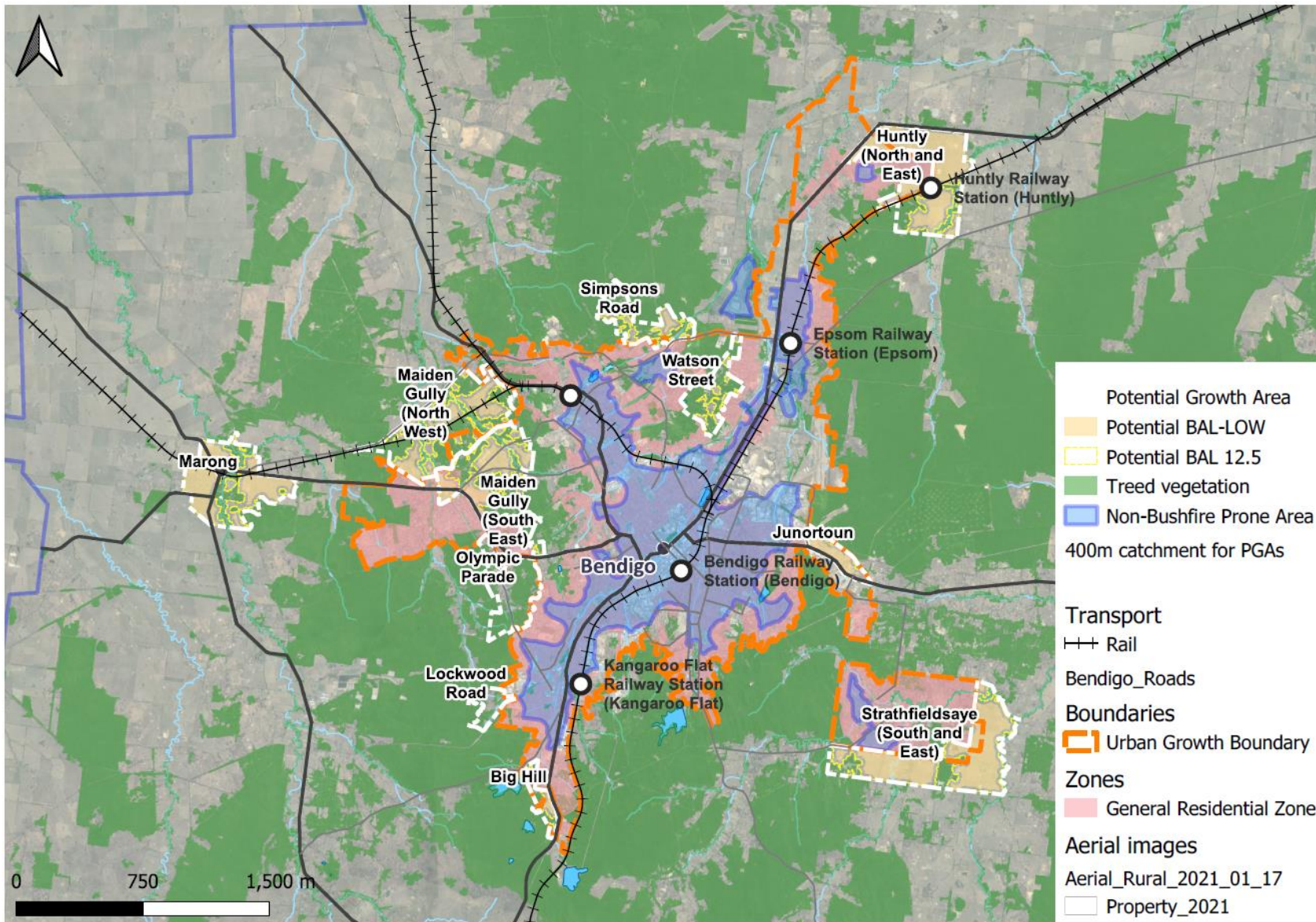
Big Hill

This area adjoins the UGB and is identified a future urban investigation area in the Urban Strategic Framework Plan in clause 02.04. There is landowner interest in developing the area.

Lockwood Road

This area adjoins the UGB and has landowner interest in development. It does adjoin an industrial area and was subject to a previous planning scheme amendment request that did not proceed to Panel.

The map on the following page indicates the location of the PGAs.



Map 11: Potential Growth Areas

6.2 Matters being considered

Each of the PGAs needs to be considered against the relevant criteria in Clause 13.02 and have regard to the Landscape Types discussed in Section 3.2. This will help inform a comparative assessment of the bushfire risk and in turn identify low risk locations to direct population growth and development.

The following issues will be considered in determining the locations risk profile from a strategic planning perspective. These issues all closely align to Clause 13.02.

- Landscape scale hazard assessment.
- Vegetation and topography within 400 metres of the PGA (the topography uses the slope gradients in Cl. 53.02-5, i.e., >0 to 5 degrees, >5 to 10 degrees, etc. and contours uses to determine if it is upslope or downslope in the direction of fire).
- Potential for a neighbourhood scale fire to develop (within 400m) based on the possible extent of a fire run leading into the PGA and potential for ember attack. It is noted that during fire season, fires generally come from the north-west and can be affected by a south-west wind change. It is therefore vegetation in these directions that provides the greater hazard.
- Access and availability to potential BAL-Low areas as determined in the Terramatrix report (i.e., land at least 50m from grassland and 100m from woodland patches)
- The locations of potential BAL 12.5 areas as determined in the Terramatrix report (i.e., land at least 33m from woodland and 19m from grassland in within 150m of the PGA boundary).
- Extent of BMO mapping.
- Whether development would reduce the risk to adjoining areas.
- Whether a radiant heat flux of 12.5kilowatts/per square metre can be achieved.
- Classification of the Vegetation Type.
- Overall risk level – low, medium or high, but noting that some PGAs do not have uniform risk levels across the entire area.
- The biodiversity values of the PGAs which is taken from a desktop assessment prepared by Practical Ecology.

For those PGAs where growth is recommended there is also an indication of what planning and design responses might be suitable to minimise and mitigate any bushfire risk.


The PGAs were also inspected jointly by the CoGB and the CFA to discuss the relative level of risk of each area.

As noted previously, there are non-bushfire constraints to development that will be detailed below that will also be factored into the final recommendations on where to direct population growth and development.

6.3 Allocating a Landscape Type

A critical part of this project is to be able to allocate a Landscape Type as set out in *Planning Permit Applications Bushfire Management Overlay Technical Guide (2017)* (refer Section 3.2). These Landscape Types are as follows:

Landscape Type 1	Landscape Type 2	Landscape Type 3	Landscape Type 4
------------------	------------------	------------------	------------------

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

Type 1 are relatively lower risk areas and this graduates to a Type 4 Landscape that applies to areas of extreme risk. It is noted that Terramatrix concluded that extreme bushfire behaviour is unlikely in Greater Bendigo based on their assessment of the “best available science” using the methodology developed by Associate Professor Kevin Tolhurst.

In the absence of guidance for applying the Landscape Types, CoGB, through this report, will ensure a clear, consistent, and justifiable approach.

In this instance a staged approach was taken to mapping the Landscape Types. The first stage was to map the City of Greater Bendigo using the following criteria:

- Vegetation patches over two hectares in area were mapped and allocated a Landscape Type 3. The two hectare figure was taken from *Bushfire Mapping Methodology and Criteria Fact Sheet* (DELWP, 2019) as this is the figure generally used for mapping vegetation used in the BPA (Refer to Section 5.3).
- A 150 metre buffer was then identified from these vegetation patches in accordance with the *Planning Permit Applications Bushfire Management Overlay Technical Guide* (2017) and were allocated a Landscape Type 2.
- The remaining areas were in a Landscape Type 1 and these areas are generally cleared of vegetation.

This is a more conservative approach than using the vegetation mapped for the BMO that uses four hectares as its minimum patch size.

This mapping was then reviewed having regard to whether bushfire could approach from more than one aspect and whether there is ready access to a place that provides shelter from bushfire.

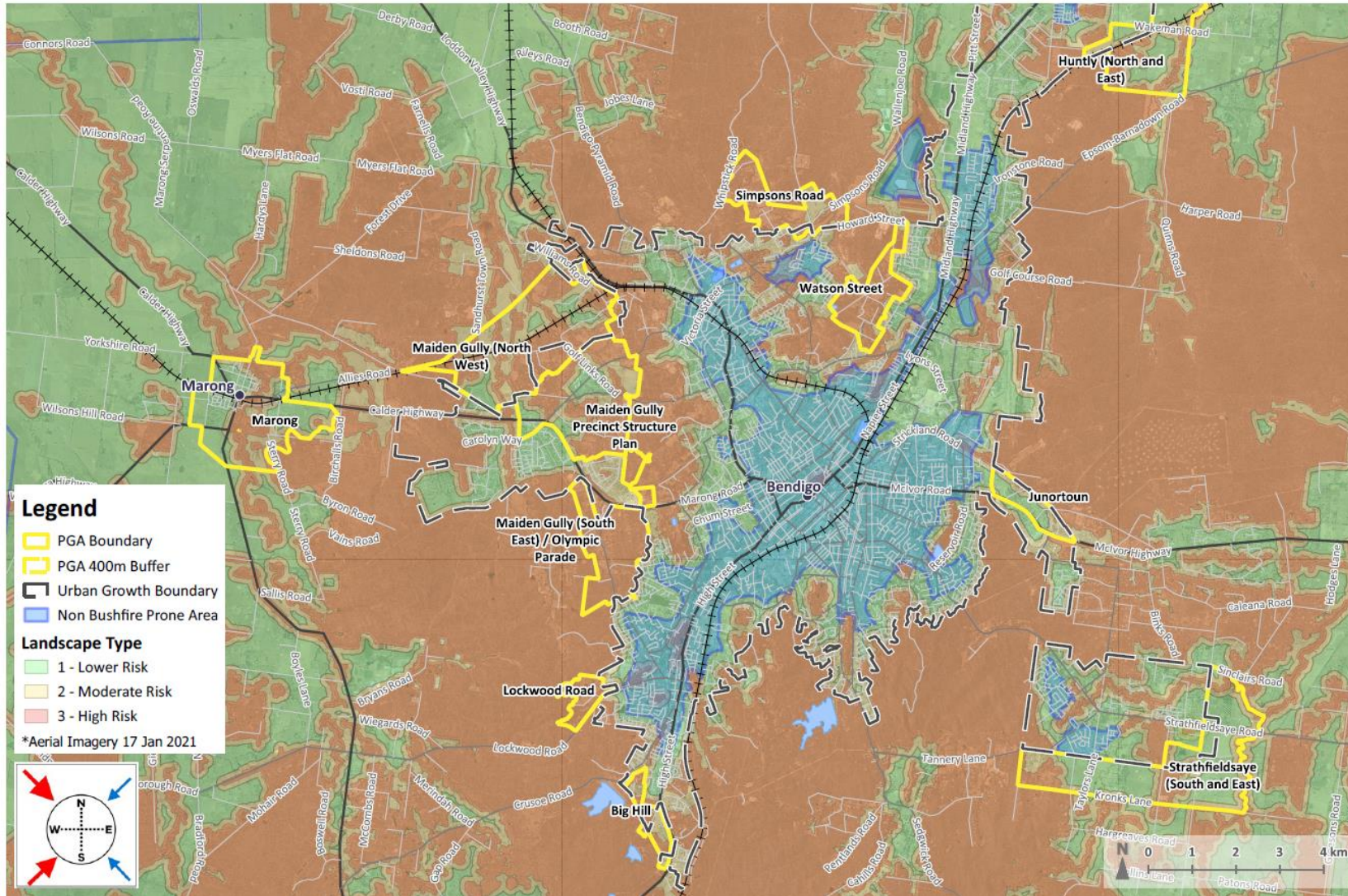
For example, in the south-west corner of the Strathfieldsaye PGA (see opposite), there is a small pocket of land identified as a Type 1 Landscape using this methodology. However, given the surrounding vegetation, the uncertain nature of access to a safer area and that fire could approach from two aspects, this area is more appropriately considered as a Type 3 Landscape.



The results of this mapping for across each of the PGAs is indicated on the following map and for each individual PGA refer to Section 7 (below).

This map is based solely on the vegetation and does not factor in whether a fire can impact a PGA from one or multiple directions and whether there is access to a place that provides shelter from bushfire which is also an important consideration in allocating a Landscape Type. Issues around access are discussed in the written description to each PGA.

Landscape Types - Potential Growth Areas (PGAs)



Map 12: Landscape Types

6.4 Policy, Planning and Design Response

The key planning response to bushfire is to direct growth into low risk locations in accordance with State policy. The Terramatrix Report⁷ draws on research that shows the relationship between building loss and proximity to bushland which found that:

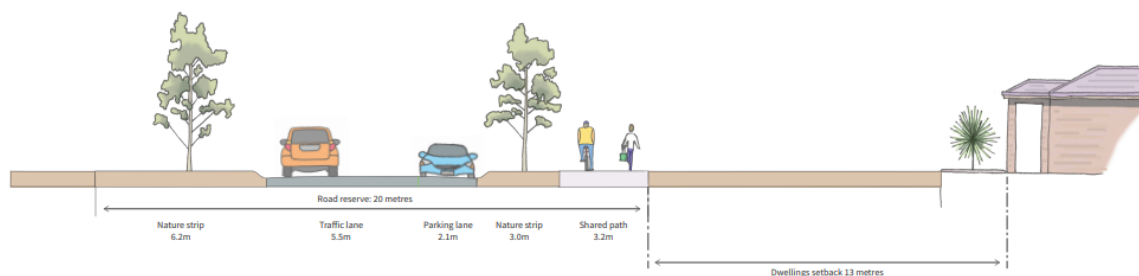
- Approximately 50% of buildings were lost within 20 metres of bushland.
- Approximately 35% of buildings were lost between >20 metres to 100 metres of bushland.
- Approximately 10% of buildings were lost between >100 metres to 200 metres of bushland.
- Approximately 5% of buildings were lost between >200 metres to 700 metres of bushland.
- No buildings were lost beyond 700 metres from the bushland.

The Design Guidelines for Settlement Planning at the Bushfire Interface (2020) – refer to Section 3.3 – provides good guidance when considering appropriate “planning and design” responses to the interface between PGAs and bushfire hazard. The planning and design response is in areas that are a lower risk (and where population growth and development can be directed) but there is a need to implement measures to minimise the bushfire or grassfire risk.

The following are some examples of what the planning and design response might be.

One of the key responses is to have a perimeter road between the hazard (vegetation) and the development. This hard edge serves as defensible space and goes some of the way to providing the setbacks required by Clause 53.02-5 (Refer to Section 4.6). Any vegetation in the road reserve would need to be managed and the CFA provides guidance “Landscaping for Bushfire” (<https://www.cfa.vic.gov.au/plan-prepare/how-to-prepare-your-property/landscaping>) which could be used in planning the tree planting in the road reserve. Terramatrix also noted that future road layouts should provide at least two access/egress routes to BAL-LOW areas.

Other potential considerations for the perimeter road are the width of carriageway to allow for emergency vehicle access and having enough roads leading away from the perimeter road every 120 metres leading to low fuel areas.



Other potential planning and design responses include:

- Specify lot sizes between 800 and 1,200m² at the interface as these lots generally have low fuel levels and can act as a barrier to fire penetration. Larger lots are less favourable at the interface.

⁷ City of Greater Bendigo Potential Growth Areas Bushfire Assessment, Terramatrix, pg 58

- Stage larger subdivisions and vegetation management to ensure there is ongoing management of the bushfire risk as the subdivision develops.
- Specify setback requirements and/or building envelopes in order to meet defensible space requirements.
- Protect any patches or areas of vegetation within the PGA and carefully plan to ensure and fire risk is appropriately managed.
- Have active open space or drainage infrastructure at the interface with the hazard (vegetation). This is because these areas generally have a higher level of fuel management.
- Avoid vulnerable uses at the interface. For example, schools and aged care facilities.
- Avoid hazardous uses at the interface. For example, petrol stations and the storage of chemicals.
- Have steel, post and wire or other non-combustible fencing rather than timber or brush fencing.
- Require any street planting to be of species that are more resistant to fire.
- Specify a BAL rating of 28, even though the required rating might be 12.5 in accordance with the Australian Standard as this will provide enhanced protection from ember attack.
- Remove any VPOs or have a Native Vegetation Precinct Plan in place to ensure the protection of life and property takes precedence over any environmental imperatives in accordance with State policy.

Removal of vegetation (the hazard) is also a response to the risk, however Clause 13.02 notes that any bushfire protection measures should not result in un-desirable biodiversity impacts.

There are also a range of measures listed in Clause 53.02 that can be implemented. These include to:

- Provide a water supply.
- Ensure adequate defensible space.
- Provide a private bushfire shelter, although any area that requires a private shelter should not be developed.

6.5 CFA Advice

The PGAs were inspected by CoGB and the CFA on July 2023. There were some overarching comments that apply to all of the PGAs:

- Ember attack is possible everywhere in the urban area of Bendigo given the right conditions.
- Any future residential growth should be in line with the Design Guidelines for Settlement Planning at the Bushfire Interface.
- In the first instance, it should be assumed that adjoining land is not managed to a low fuel state. Fuel on the adjoining land should be assumed to be at its maximum levels and that there is no 'reasonable assurance' that fuel management will occur in perpetuity.
- Maintaining a hard edge (perimeter road) is critical for managing fire risk (both grass and bushfire) in accordance with the settlement design guidelines. How this edge is designed, managed, and fire moderated will influence the growth potential and development extent/type.
- Grassfires act differently and are relatively easier to plan for.
- Consideration needs to be given as to whether development would decrease the risk to existing (adjoining) sensitive uses such as residential.

It was generally agreed that Marong and Huntly were lower risk locations in which to direct population growth and development. Whereas for Maiden Gully and Strathfieldsaye there is a need for further investigation to ensure that growth in accordance with the State's bushfire policy can be achieved when other competing objectives such as biodiversity conservation are fully considered. Growth in the remaining PGAs should not be actively considered.

7. Potential Growth Areas Assessment

The following is an assessment of each PGA against the criteria referred to in Section 6.2.

7.1 Marong

The Marong Township Structure Plan (MTSP) was adopted by Council in 2020 and was in development prior to approval of Amendment VC148 that introduced the new requirements in Clause 13.02 (Refer Section 2). A Bushfire Development Report was prepared by Terramatrix which was a key input into the MTSP. It identified future residential growth areas to west, south and east of the existing township as well as a future industrial area to the south of the township, referred to as the Bendigo Regional Employment Precinct (BREP).

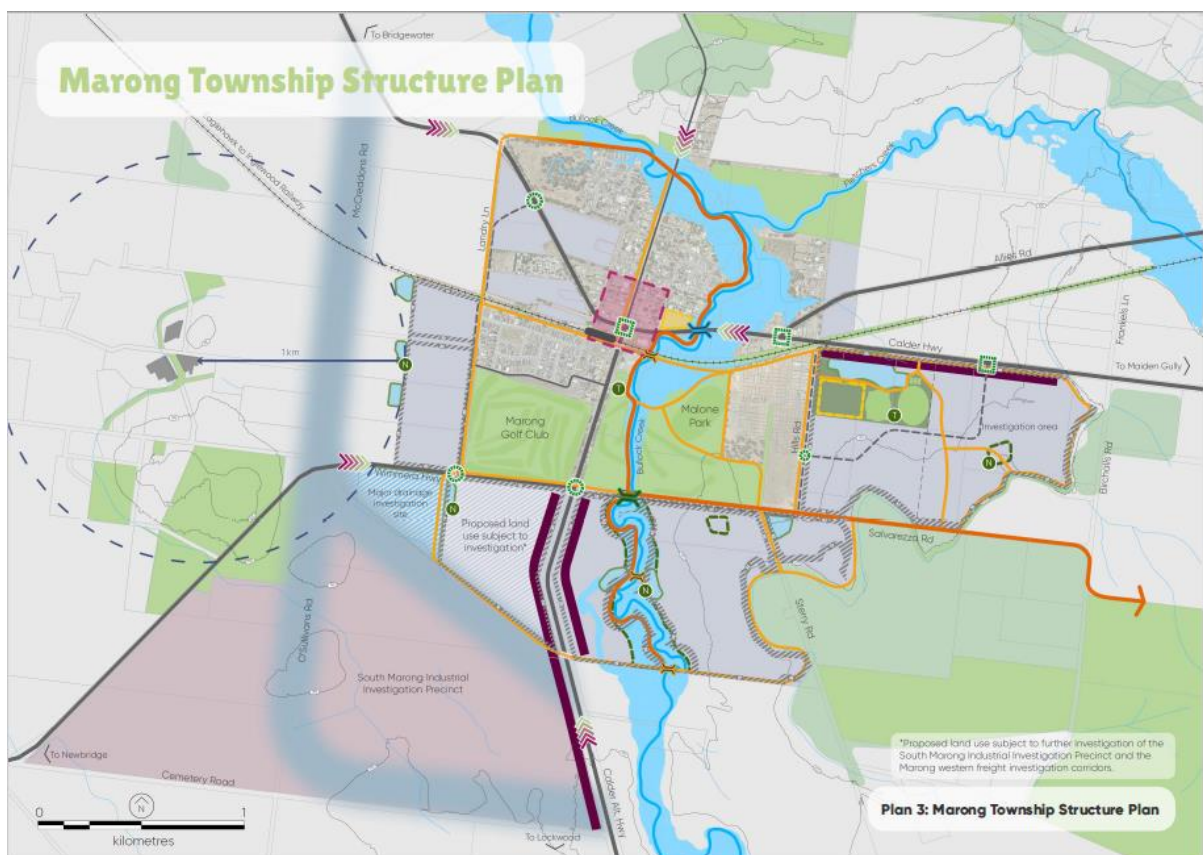
In time it is anticipated that when fully developed Marong will have a population of 8,000.

Amendment C263gben is implementing the MTSP which includes changes to PPF and zoning and overlay changes within the existing township boundary. It is not rezoning the future growth areas as these will be subject to a future planning scheme amendment(s) that will be developer initiated. The CFA supported the amendment subject to the recommendations of the Bushfire Development Report being implemented.

These future growth areas are being assessed as part of this broader growth areas assessment to confirm their suitability for future growth and to ensure that the settlement directions in Clause 13.02 are addressed prior to the developer led planning scheme amendments commence.

A copy of the Marong Township Structure Plan can be found here:

<https://www.bendigo.vic.gov.au/Services/Strategic-Planning-Projects/Marong-Structure-Plan>



Map 13: Marong Township Structure Plan 2020



Vegetation and topography

The future growth areas are currently used as farmland and as such are largely cleared of vegetation. There is some vegetation in road reserves and along the Bullock Creek corridor. There are some isolated stands of vegetation that have been identified as future public open space areas, however they do not form part of a large patch of vegetation so it is unlikely that a neighbourhood scale bushfire could develop.

There is vegetation to the north and south-east of the town, however these areas pose a relatively lower bushfire risk as they are not in the prevailing wind direction that would carry a fire or embers.

The topography of the of area is 0-5 degrees with land generally falling gently towards the Bullock Creek (downslope in the direction of fire to the west, and upslope to the east).

Potential for neighbourhood scale fire

There is limited vegetation to the north-west and south-west of the PGA which limits the ability of a neighbourhood scale bushfire to impact on the PGA, although it would be susceptible to a grassfire. The Terramatrix report noted that the impacts of grassfire would be managed through establishing hard, non-vegetated edges along the western, north western and south western interfaces.

There is a small area in the south-east corner of the PGA that is affected by the BMO due to vegetation outside the growth area. The bushfire risk associated with this vegetation is relatively low as it is not in the prevailing wind direction that would carry a fire into the growth area.

The Wilsons Hill Nature Conservation Reserve is to the west of the Bendigo Regional Employment Precinct. This reserve is approximately 44 hectares in area but is isolated from larger patches of vegetation so the potential for a neighbourhood scale fire is likely to be low but the Reserve could produce embers that may impact the PGA.

There is vegetation within Malone Park that could potentially be impacted by ember spotting, but the area in question is not of sufficient size that a neighbourhood scale fire would be likely to develop. It is noted that parts of the reserve are managed to a low fuel condition. There are also perimeter roads between the reserve and existing residential development.

The Terramatrix report identified that Marong was one of four PGA's that had low exposure to hazardous vegetation.

Access to low fuel areas

There is currently no Neighbourhood Safer Place (Bushfire Place of Last Resort) in the Marong area.

There are currently no BAL-LOW areas within Marong. The Terramatrix report did identify potential BAL-LOW areas by applying the BPA criteria mapping. These locations are indicated on the Bushfire Hazard Assessment map below.

Marong has a number of major roads that would allow for the safe access to low fuel areas in the event of fire.

Risk to adjoining areas

The development of the growth areas may reduce the likelihood of a grassfire affecting the existing township and adjoining farmland.

Achieving a BAL 12.5

Given the surrounding land is best described as "grassland" and the land is generally flat, a BAL 12.5 can be achieved with either a 19 metre or 22 metre setback in accordance with Clause 53.02-5. Land in the south-west corner of the PGA may require a 48 metre setback to achieve a BAL 12.5 due to the adjacent forest/woodland.

This is supported by the Terramatrix work that identifies that the area could potentially achieve a BAL-LOW.

Landscape Type

The Marong PGA is best described as a Landscape Type 1 as there is little vegetation beyond 150 metres of the site that would result in neighbourhood scale destruction and there is access available to low fuel areas. This access would further improve as the area develops.

Biodiversity values

The following environmental planning controls apply in parts of the PGA:

- Environmental Significance Overlay 1 (Watercourse Protection)

The Ecological Vegetation Classes and Bioregional Conservation Status' apply to the Marong PGA:

- 61: Box Ironbark Forest (Depleted)
- 68: Creekline Grassy Woodland (Endangered)
- 175: Grassy Woodland (Vulnerable)

- 803: Plains Woodland (Endangered)

Marong was not considered as part of the Practical Ecology work as a previous assessment was undertaken by Biosis as part of the Marong Township Structure Plan. The report identified several important patches of vegetation and roadside corridors that are identified as being at risk. These areas were factored into the development of the Marong Township Structure Plan. The Bullock Creek corridor is also an area of cultural heritage sensitivity.

Summary

The PGA and surrounding area are generally flat and there is minimal vegetation in the likely direction of a bushfire. There are corridors of vegetation along waterways, some road reserves and in public ownership which would need to be carefully managed through the planning and design process.

There are multiple routes to safe areas in the event of fire. A large neighbourhood scale bushfire is unlikely to impact on the PGA, although it may be susceptible to a fast moving grassfire.

The PGA is considered broadly to be a Landscape Type One in accordance with the *Planning Permit Applications Bushfire Management Overlay Technical Guide (2017)*.

Marong is a low risk location in which direct population growth and development.

Overall risk level

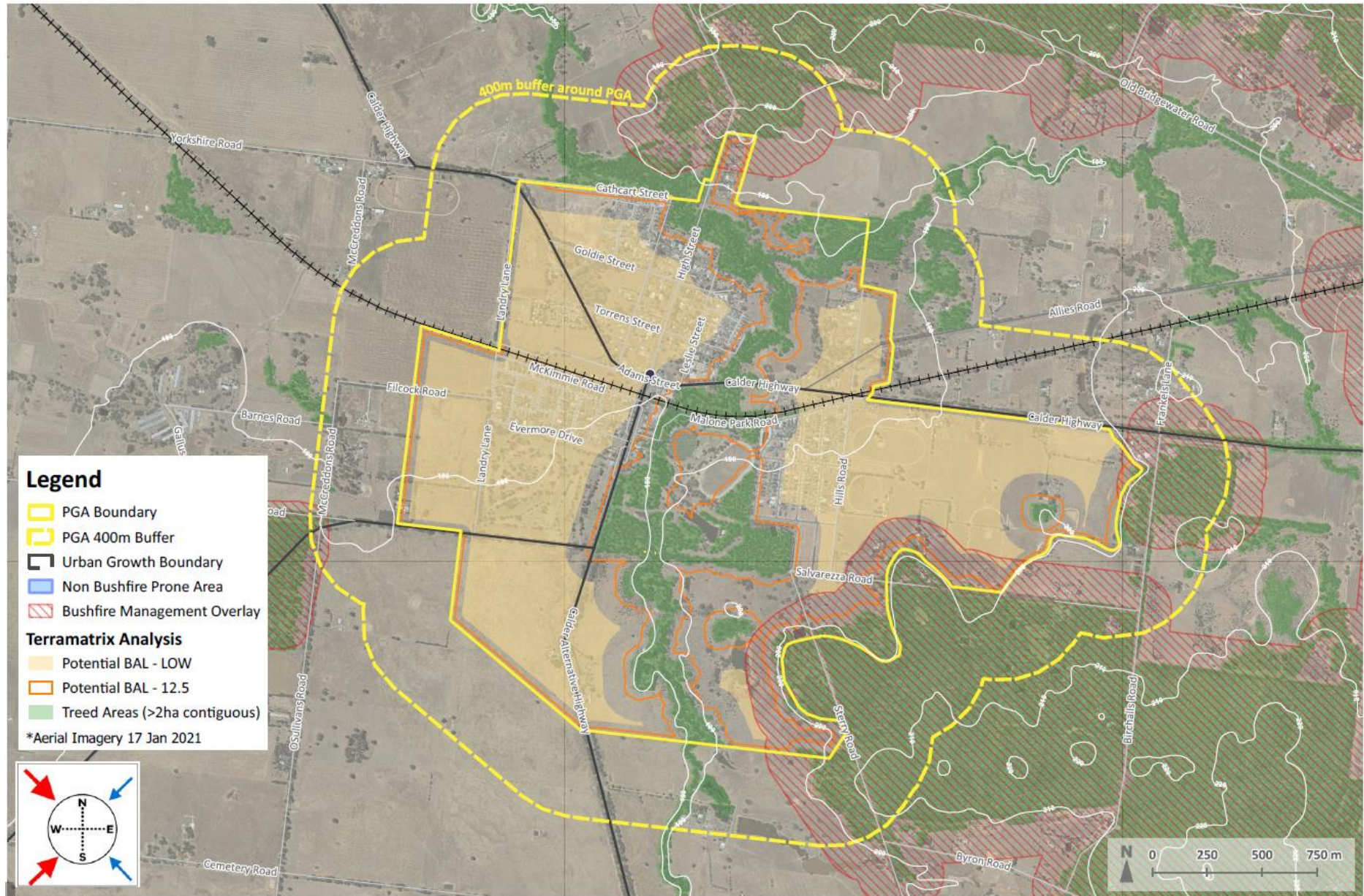
The overall risk level of this PGA is LOW.

Planning and Design Response

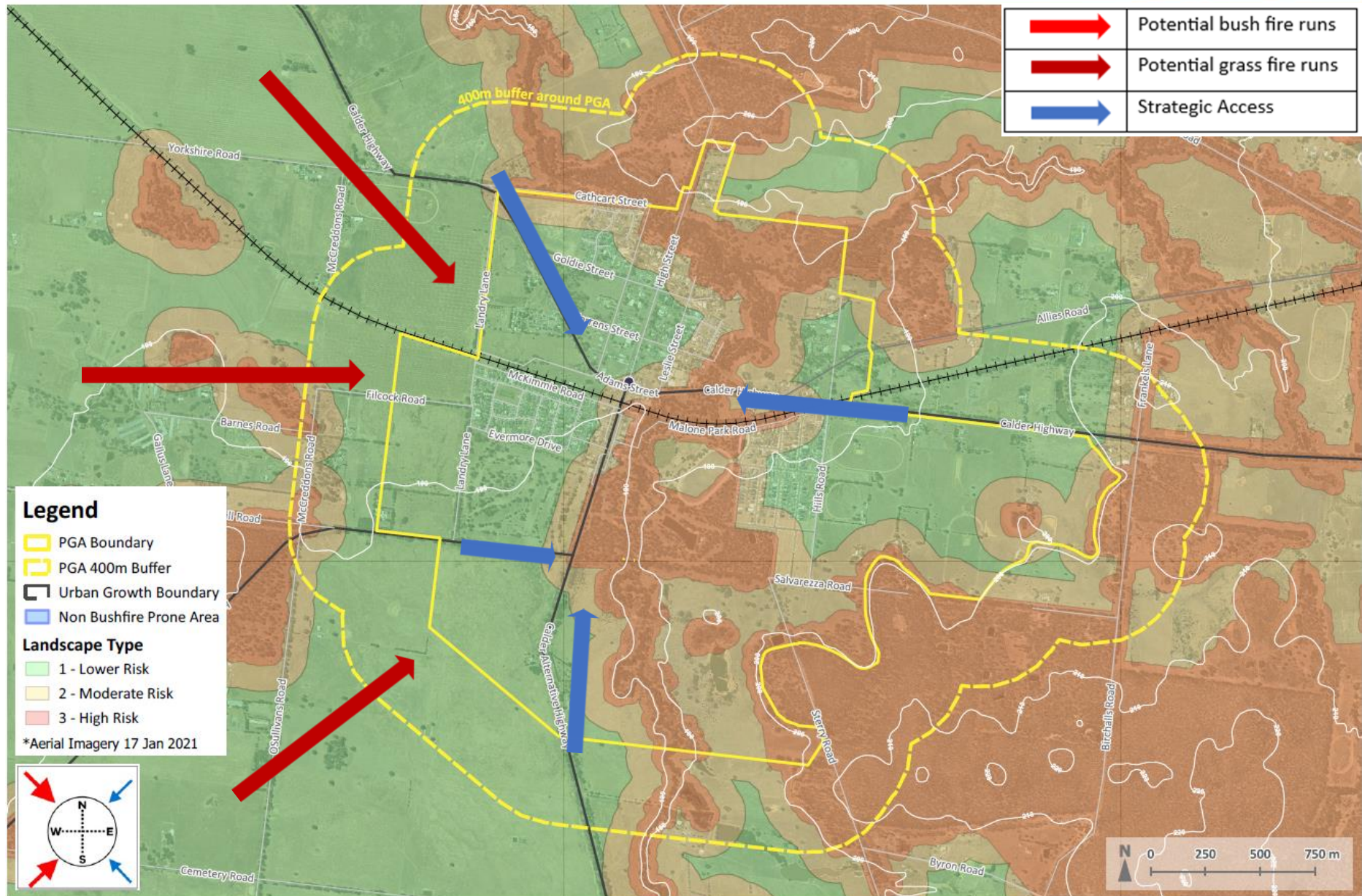
The following are potential planning and design responses that could be implemented to manage and mitigate any bushfire risk:

- Apply a Design and Development Overlay to specify buffer distances
- Apply a Development Plan Overlay that includes requirements for perimeter roads in the likely direction of fire (north west, west and south west), specify lot sizes, avoiding vulnerable uses and the staging of development
- Use the measures in clause 53.02 that relate to water supply and defensible space.

Bushfire Hazard Assessment - Marong Potential Growth Area (PGA)



Landscape Types - Marong Potential Growth Area (PGA)



7.2 Huntly (North and East)

Huntly is an area that has experienced strong and consistent growth over a number of years. A train station has been constructed at the eastern-most point of Huntly and is predominantly surrounded by undeveloped land. The City is currently preparing a structure plan that includes the train station, the adjoining Urban Growth Zone and land adjacent to the existing residentially zoned land. The land to the east and south-east of the train is identified in the Greater Bendigo Residential Strategy (2014) as a potential future growth area.

More details about the Huntly Structure Plan can be found here:

<https://letstalkgreaterbendigo.com.au/huntly-structure-plan>



Vegetation and topography

The majority of the PGA is cleared of vegetation other than the land to the west of Cruikshank Drive and along the Sandy Creek corridor in the southern part of the PGA. There are also a number of roadsides that are vegetated.

The topography of the area is 0-5 degrees downslope in the direction of fire.

Potential for neighbourhood scale fire

There is limited vegetation to the north-west of the PGA which limits the ability of a neighbourhood scale bushfire to impact on the PGA, although the Terramatrix Report recognises that it could be threatened by a fast-moving grassfire.

There is a large area of forest to the south-west of the PGA (also affected by BMO) that has the potential for a neighbourhood scale fire to develop on a south-west wind change with a potential fire run of 2 kilometres. If this area were to develop there would need to be a buffer or interface treatment to manage this risk. A new road reserve could be established at the rear of the properties that front Inglis Road that would create the hard edge to any new development.

There is a small area of BMO to the north of the PGA that is within the 150 metre buffer of a patch of vegetation to the north of the Midland Highway. This patch of vegetation is relatively small and isolated from larger areas of vegetation. It is unlikely that a neighbourhood scale bushfire would develop in this precinct.

The Terramatrix report identified that Huntly was one of four PGA's that had low exposure to hazardous vegetation.

Access to low fuel areas

There is currently no Neighbourhood Safer Place (Bushfire Place of Last Resort) in the Huntly area.

There is currently a small pocket of BAL-LOW to the south-east of the Sawmill and East Road intersection. The City has also recently nominated that further areas in Huntly be removed from the BPA and would therefore be considered BAL-LOW. The Terramatrix report also identified further potential BAL-LOW areas by applying the BPA criteria mapping.

These potential low fuel areas are indicated on the map below.

Road access in and out of the PGA is currently limited as it is a predominately a rural/rural residential area. This would be addressed through the structure planning process.

Risk to adjoining areas

As the area develops it may limit the potential for grassfire to the adjoining land.

Achieving a BAL 12.5

Given the surrounding land is best described as "grassland" and the land is generally flat, a BAL 12.5 can be achieved with either a 19 metre or 22 metre setback in accordance with Clause 53.02-5. Land in the south-west corner in the Cruikshank Drive area of the PGA may require a 48 metre setback to achieve a BAL 12.5 due the adjacent woodland/forest.

Landscape Type

The Huntly PGA (other than the section to the south-west adjoining the bushland) is best described as a Landscape Type 1 as there is little vegetation beyond 150 metres of the site that would result in neighbourhood scale destruction, and there is access available to low fuel areas. This access would further improve as the area develops.

The land in the south-west corner would best be described as Landscape Type 2 or potentially Type 3 as the area may be susceptible to a neighbourhood scale bushfire approaching from the south-west and access is less certain. Any development in this area would require carefully planning and design that is best addressed at the structure planning stage.

Biodiversity values

The following environmental planning controls apply in parts of the PGA:

- Environmental Significance Overlay 1 (Watercourse Protection)
- Vegetation Protection Overlay 3 (Roadside Remnant Vegetation)

The Ecological Vegetation Classes and Bioregional Conservation Status' apply to the Huntly PGA:

- 61: Box Ironbark Forest (Depleted)
- 81: Alluvial Terraces Herb-rich Woodland/Creepline Woodland Mosaic (Vulnerable)
- 175: Grassy Woodland (Vulnerable)
- 803: Plains Woodland (Endangered)

The Preliminary Ecological Assessment prepared by Practical Ecology report (refer Section 3.6.) noted that the area had been significantly disturbed by agricultural activities. It did note that there was remnant vegetation in the south-west corner of the precinct that should be avoided. Overall, the area was considered suitable for development from an ecological perspective, subject to a more detailed assessment being undertaken.

Summary

The PGA and surrounding area are generally flat and there is vegetation in the south-west corner of the PGA that may make a relatively small part of the PGA susceptible to a bushfire in the event of a south-west wind change. There are corridors of vegetation along waterways, some road reserves and in public ownership which would need to be carefully managed through the planning and design process.

Providing routes to safe areas in the event of fire is somewhat limited currently and would need to be addressed as part of any structure planning process. A large neighbourhood scale bushfire may impact the south western portion of the PGA and the broader area may be susceptible to ember attack given the right atmospheric conditions. Other areas may be susceptible to a fast moving grassfire.

The PGA (other than the south-west corner) is considered broadly to be a Landscape Type 1 in accordance with the *Planning Permit Applications Bushfire Management Overlay Technical Guide (2017)*.

Huntly (other than the south-west corner) is a low risk location in which direct population growth and development. The south-west corner should not be developed as any risk mitigation measures would likely result in unacceptable biodiversity impacts.

Overall risk level

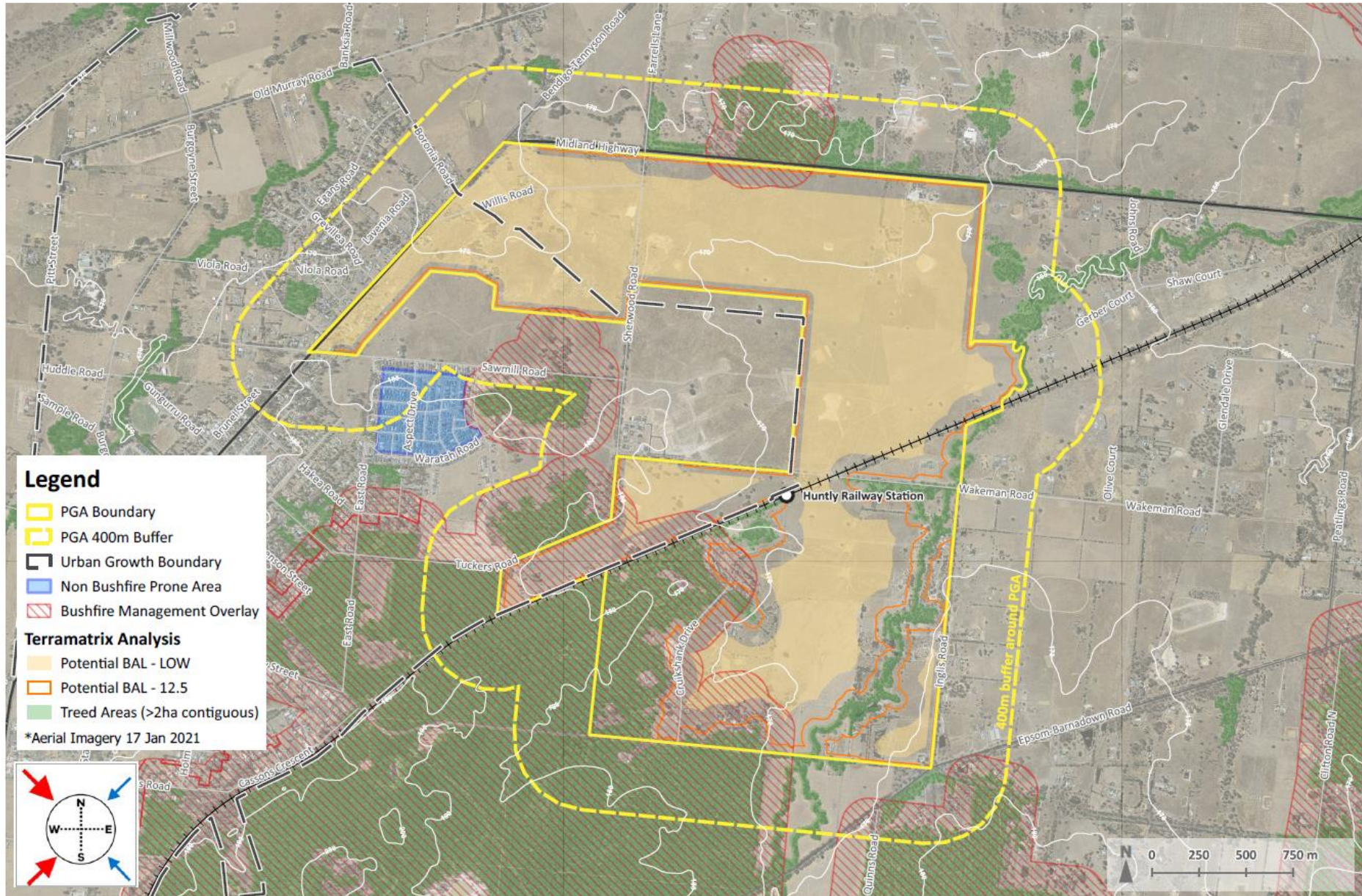
The overall risk level for this PGA is Low, other than the south-west corner that would be medium to high.

Planning and Design Response

The following are potential planning and design responses that could be implemented to manage and mitigate any bushfire risk:

- Introduce a new local planning policy at clause 13.02-1L of the Greater Bendigo Planning Scheme to provide greater guidance on the design and staging of subdivisions in areas with a BMO (Appendix 2 provides draft policy content, as a reference, that will be refined further with input from the CFA).
- Apply a Design and Development Overlay to specify buffer distances (refer to Appendix 3 for draft DDO content).
- Apply a Development Plan Overlay that includes requirements for perimeter roads in the likely direction of fire (north west, west and south west), the general road network and at the interface areas to specify lot sizes, avoiding vulnerable uses and specifying higher construction standards and the staging of development.
- Through the introduction of clause 13.02-1L and the Development Plan Overlay, ensure that subdivisions are staged to ensure that new properties do not abut unmanaged vegetation at completion.
- In collaboration with the CFA, include guidance for the location of any vulnerable land uses such as aged care facilities or child care centres in the Development Plan Overlay.
- Consider utilising a Native Vegetation Precinct Plan to streamline the removal of native vegetation.
- Use the measures in Clause 53.02 that relate to water supply and defensible space.

Bushfire Hazard Assessment - Huntly Potential Growth Area (PGA)



7.3 Strathfieldsaye (South and East)

The Strathfieldsaye PGA is generally to the east and south of the existing township. The land to the south is identified in the Greater Bendigo Residential Strategy (2014) as a potential future growth area. The land to east has not been previously identified for growth, but its proximity to Strathfieldsaye and the availability of services, make it suitable as an expanded growth area over the long term. The area is generally used for agricultural and rural residential use.

No structure planning has been undertaken for the area, although it is noted that the City owns a parcel of land off Mannes Lane that has been earmarked for a future active public open space reserve.

	
<p>Cnr Mannes Lane and Mclvor Hwy looking East</p>	<p>Near cnr of McCleans Road and Bakers Lane</p>
	
<p>Bakers Lane looking south</p>	

Vegetation and topography

There are large areas of vegetation outside of the PGA (some of which comprises the Greater Bendigo National Park) to the east and south-east, which is covered by a VPO. There is also areas of vegetation McCleans Road/Bakers Lane area covered by a VPO.

There are a number of roadsides, as well as the Emu Creek and Axe Creek corridors that are vegetated.

Aside from these areas there are scattered trees and small patches of vegetation throughout the PGA (particularly south of Bakers Lane), which is fairly typical for areas such as this.

There is also a large walnut plantation to the east of Somerset Park Road that is within the PGA.

There are areas within the PGA where the slope is 0-5 degrees generally downslope in the direction of fire and are generally lower risk from a bushfire perspective. The south-west of the PGA is more undulating with a slope in the 5 to 10 degrees range, both upslope and downslope and this poses a greater risk from a bushfire perspective.

Potential for neighbourhood scale fire

The Terramatrix report identified that there is potential for a neighbourhood scale fire to impact on the south-west corner of the PGA given the 4 kilometre length of a possible fire run from the north-west and 6 kilometre fire run with a south-west wind change. Any development in this part of the PGA would require careful consideration and planning.

The existed settled areas of Strathfieldsaye do provide some protection to the PGA, in particular the land east of Mannes Lane/Somerset Park Road and a neighbourhood scale fire is unlikely to develop and impact on the area.

The vegetation in the McCleans Road area has a lower potential for a neighbourhood scale fire to develop as the vegetation in this area is isolated from larger hazard areas but could be impacted by a grassfire. Any interface to this area would need to be planned to manage the bushfire risk.

There is potential for grass fire to impact other areas within the PGA with the possible exception of the walnut plantation that would be managed to a low fuel state.

Both the McCleans Road area and south-west corner of the PGA are affect by the BMO.

The Terramatrix report identified that Strathfieldsaye was one of four PGA's that had low exposure to hazardous vegetation.

Access to low fuel areas

There are areas of BAL-LOW within the existing Strathfieldsaye Township as well as a Neighbourhood Safer Place (Bushfire Place of Last Resort) at the Strathfieldsaye Primary School.

The City has also nominated further areas to be excluded from the BPA and the Terramatrix work has identified further low fuel areas.

Strathfieldsaye has a number of major roads that would allow for the safe access out of town in the event of fire and this would further improve as the area develops.

Risk to adjoining areas

The development of the growth areas would reduce the likelihood of a grassfire affecting the adjacent farming land.

Achieving a BAL 12.5

The land to the east of Mannes Lane/Somerset Park Road is best described as "grassland" and the land is generally flat, a BAL 12.5 can be achieved with a 19 metre setback in accordance with Clause 53.02-5. Land in the south of Bakers Lane may require a setback of 33 metre or 48 metre depending on the location to achieve a BAL 12.5. Land in the south-west corner may require an even higher setback due to the slope of the land.

Landscape Type

The Strathfieldsaye PGA is more complex to describe in terms of Landscape Types. The area to the east of Mannes Lane/Somerset Park Road is best described as a Landscape Type 1 as there is little vegetation beyond 150 metres of the site that would result in neighbourhood scale destruction and there is access available to low fuel areas. This access would further improve as the area develops.

The land south of Bakers Lane, in particular the McCleans Road area and the south-west of the PGA would best be described as Landscape Type 2 or potentially Type 3 as the area may be susceptible to a neighbour scale bushfire approaching from the south-west and access is less certain. Any development in this area would require careful planning and design and an understanding of any biodiversity values.

Biodiversity values

The following environmental planning controls apply in parts of the PGA:

- Environmental Significance Overlay 1 (Watercourse Protection)
- Vegetation Protection Overlay 1 (Wildlife Corridor Protection)
- Vegetation Protection Overlay 2 (Significant Vegetation)

The Ecological Vegetation Classes and Bioregional Conservation Status' apply to the Strathfieldsaye PGA:

- 61: Box Ironbark Forest (Depleted)
- 68: Creekline Grassy Woodland (Endangered)
- 175: Grassy Woodland (Vulnerable)
- 803: Plains Woodland (Endangered)

The Preliminary Ecological Assessment prepared by Practical Ecology report (refer Section 3.6.) noted that the area was largely cleared and where there were patches of vegetation they were largely disconnected. It did note that there were two patches of larger vegetation, being the south-west corner and the McCleans Road area. A significant number of Large Trees were observed in the area as well as the Flora and Fauna Guarantee Act (FFG) listed Creekline Grassy Woodland Ecological Vegetation Class (EVC).

There would likely be significant offset costs associated with developing these vegetated areas and would likely trigger referrals to the State and/or Commonwealth agencies. It was also noted that the vegetation along the waterways should be retained as they play a connective role across the area.

Summary

In relation to bushfire this PGA is more complex than Marong or Huntly. The land to the east of Mannes Lane/Somerset Park Road is generally flat and there is little vegetation in the likely direction of a bushfire that would impact on this part of the PGA, although it may be impacted by ember attack. Providing routes to safe areas in the event of fire is somewhat limited currently and would need to be addressed as part of any structure planning process. There is the ability to connect into the broader street network, and the provision of a Neighbourhood Safer Place is a positive aspect for this PGS. This area of the PGA is considered to be a Landscape Type One in accordance with the *Planning Permit Applications Bushfire Management Overlay Technical Guide (2017)*.

The area south of Bakers Lane is more challenging. Parts of this area are susceptible to a neighbourhood scale bushfire approaching from more than one direction as well as the potential for

an ember attack. There are some pockets of land in this area that are less susceptible to fire and may be appropriate for growth subject to achieving a good planning and design response.

The south-west corner of the PGA (near James Cook Drive) is higher risk due to its topography and surrounding vegetation. There are corridors of vegetation along waterways, some road reserves and in public ownership which would need to be carefully managed through the planning and design process.

The land to the south of Bakers Lane is considered to be a Landscape Type Two and the south-west corner is a Landscape Type Three in accordance with the *Planning Permit Applications Bushfire Management Overlay Technical Guide (2017)*.

The land to the east of Mannes Lane/Somerset Park Road is a low risk location in which population growth and development can be directed. Some of the land to the south of Bakers Lane will be suitable for development, while other areas are not considered appropriate for development, however this can be determined through the detailed planning process.

Overall risk level

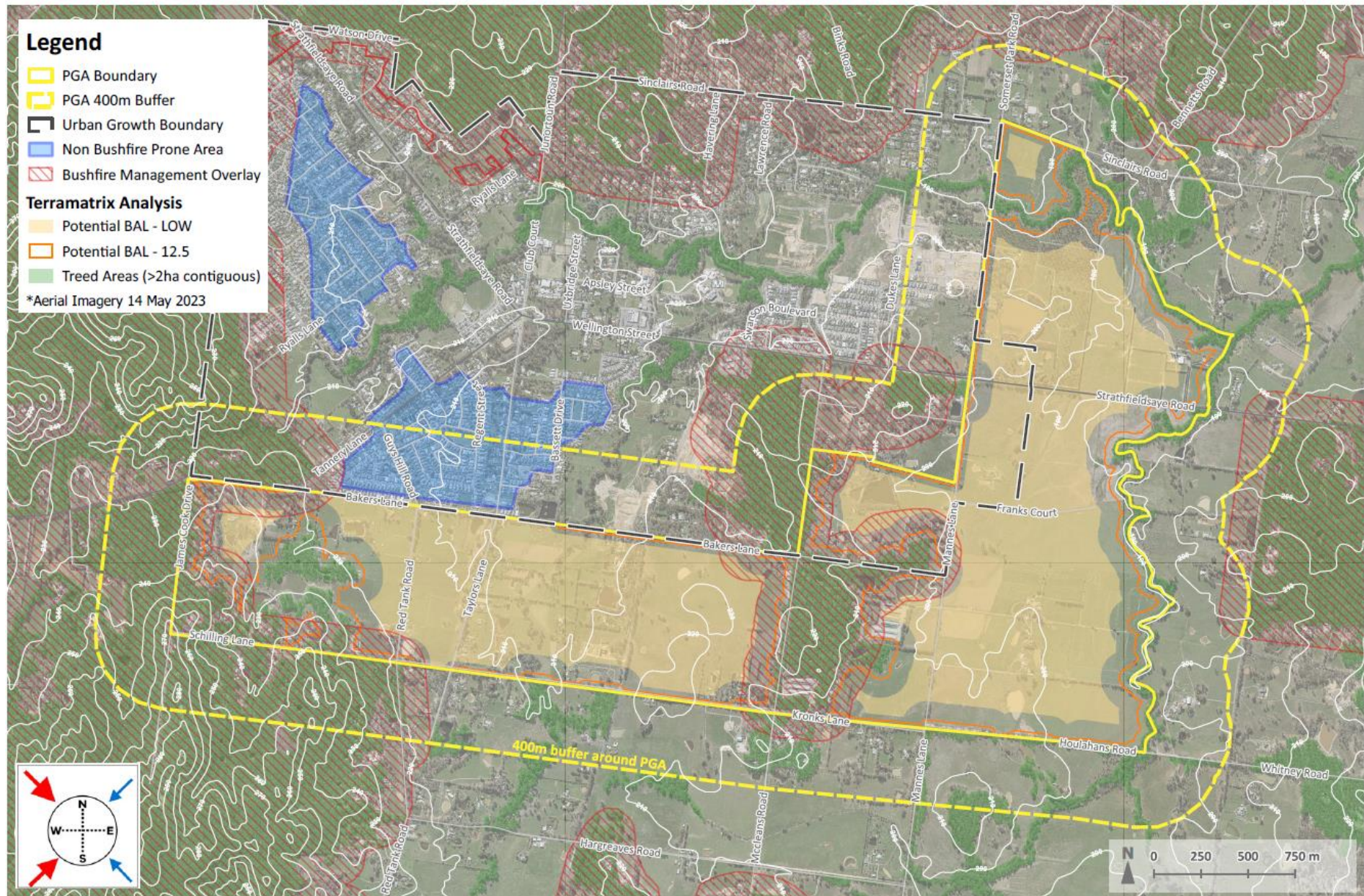
Areas to the east of Mannes Lane/Somerset Park Road are considered low risk. The land to the south of Bakers Lane is less straightforward. The land in the very south west corner is high risk, while other areas are ranked low to medium depending on the presence and scale of hazardous vegetation. Any development in these locations needs to be carefully considered.

Planning and Design Response

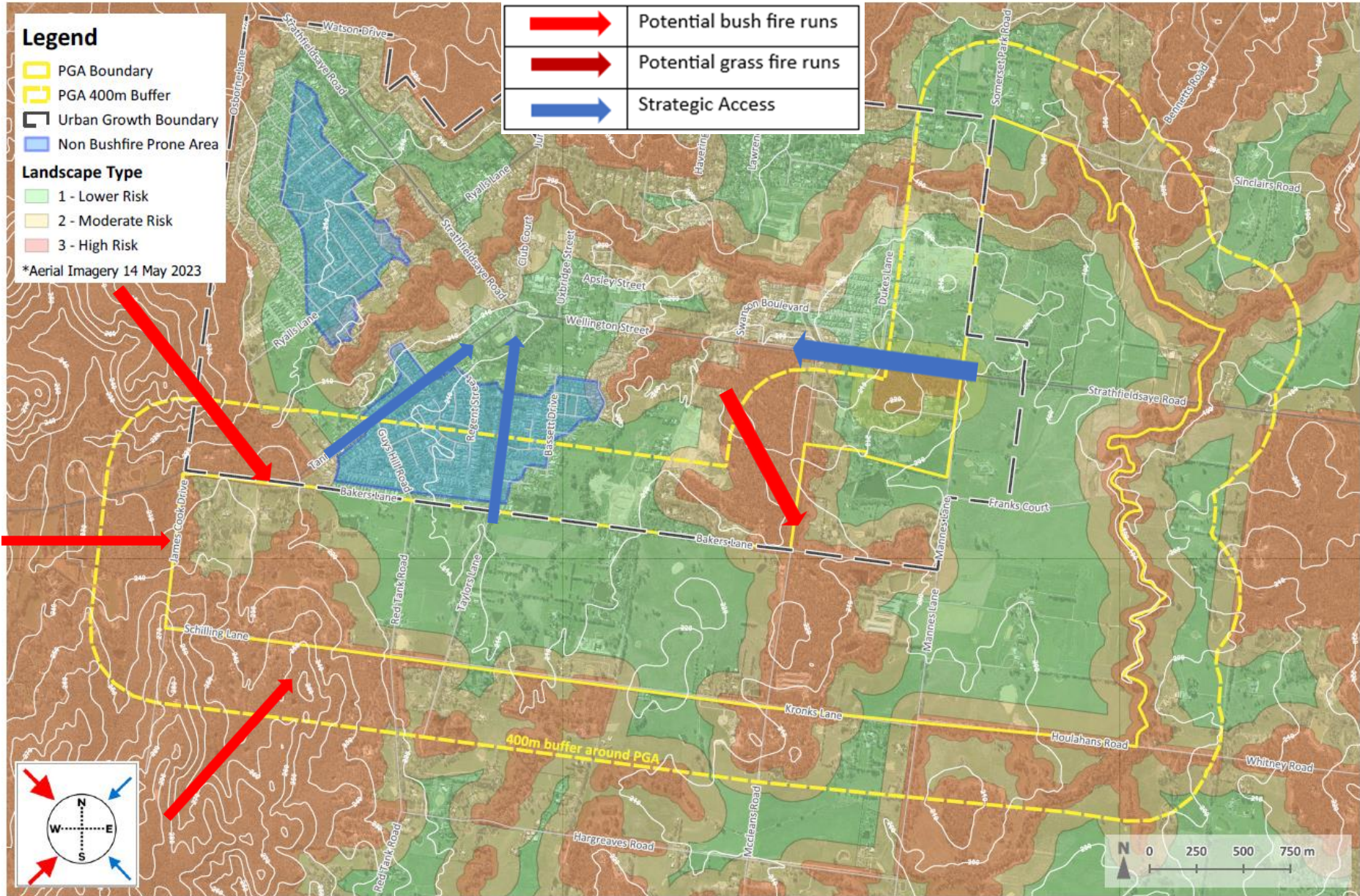
The following are potential planning and design responses that could be implemented to manage and mitigate any bushfire risk:

- Introduce a new local planning policy at clause 13.02-1L of the Greater Bendigo Planning Scheme to provide greater guidance on the design and staging of subdivisions in areas within a BMO (Appendix 2 provides draft policy content, as a reference, that will be refined further with input from the CFA).
- Apply a Design and Development Overlay to specify buffer distances (refer to Appendix 3 for draft DDO content).
- Apply a Development Plan Overlay that includes requirements for perimeter roads in the likely direction of fire (north west, west and south west), the general road network and at the interface areas to specify lot sizes, avoiding vulnerable uses and specifying higher construction standards and the staging of development.
- Through the introduction of clause 13.02-1L and the Development Plan Overlay, ensure that subdivisions are staged to ensure that new properties do not abut unmanaged vegetation at completion.
- In collaboration with the CFA, include guidance for the location of any vulnerable land uses such as aged care facilities or child care centres in the Development Plan Overlay. Vulnerable uses will not be supported in the south-west of the PGA, or more generally, in BMO areas.
- Consider utilising a Native Vegetation Precinct Plan to streamline the removal of native vegetation and the removal of any VPOs.
- Use the measures in Clause 53.02 that relate to water supply and defensible space.

Bushfire Hazard Assessment - Strathfieldsaye (South and East) Potential Growth Area (PGA)

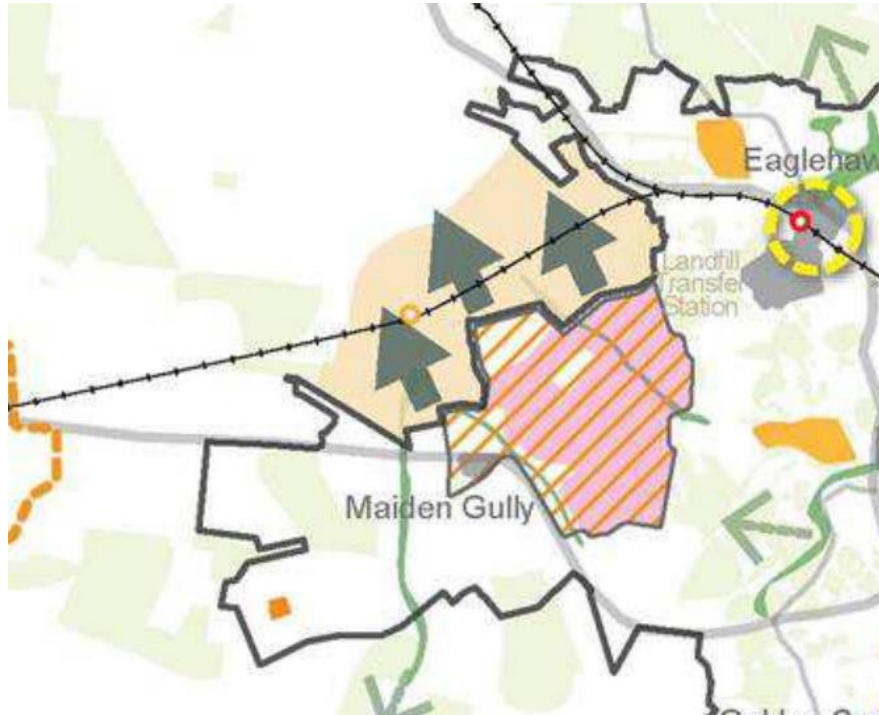


Landscape Types - Strathfieldsaye (South and East) Potential Growth Area (PGA)



7.4 Maiden Gully (North West)

The Maiden Gully North West PGA was identified in the Greater Bendigo Residential Strategy (2014) as being a “Potential Longer Term Growth” area. There is also developer interest in the area, principally with the former Eaglehawk golf course.



Map 14: Maiden Gully North East PGA (taken from Greater Bendigo Residential Strategy 2014)



Allies Road looking east



Schumakers Lane looking east



Vegetation and topography

There are several large patches of vegetation within the PGA, some of which are contiguous with larger tracts of vegetation. There is also open farmland and agricultural uses that are managed to a low fuel state. Together with vegetated roadsides, gullies and drainage lines there is a reasonably complex mosaic of vegetation in the PGA.

The landscape also has an undulating topography. The larger patches of vegetation typically have a slope of 0-5 degrees, generally upslope in the direction of fire.

Potential for neighbourhood scale fire

There are large areas of vegetation to the north-west of the PGA and to a lesser degree to the south-west. The Terramatrix Report identified a potential fire run of 5 kilometres impacting on the area. Much of this vegetated area is in private ownership and it is assumed is not managed in a low fuel state. There is potential for a neighbourhood scale bushfire to develop. The PGA would also be at increased risk of ember attack from these vegetated areas.

Approximately 50 per cent of the PGA is unaffected by the BMO.

Access to low fuel areas

There are potential low fuel areas within the PGA, but safe access to low fuel areas beyond the PGA is challenging due to the limited road access and large patches of vegetation in the adjoining areas. This could potentially be addressed through the planning and design process.

There are no BAL-LOW areas proximate to the PGA. The Terramatrix report identifies that there are pockets of potential BAL-LOW within the PGA, however these are separated by patches of hazardous vegetation that makes access problematic in the event of a fire.

There is a Neighbourhood Safer Place (Bushfire Place of Last Resort) at the Maiden Gully Primary School, however it is not readily accessible from the PGA.

Risk to adjoining areas

Development in this area could help lower the risk to the Maiden Gully PSP area (See Section 7.3) and the Hillcrest Road/Krausgrill Road area which could both be subject to ember attack.

Achieving a BAL 12.5

Given the surrounding land is best described as “grassland” and the land is generally flat, a BAL 12.5 can be achieved with either a 19 metre or 22 metre setback in accordance with Clause 53.02-5. Land adjacent to vegetated areas within the PGA would require a 33 metre setback to achieve a BAL 12.5.

Landscape Type

The Maiden Gully North West PGA is complex when it comes to allocating a Landscape Type. There are areas within the PGA that are best described as a Landscape Type 2 as there is little vegetation beyond 150 metres of the site that would result in neighbourhood scale destruction and there is access available to low fuel areas. This access would further improve as the area develops.

Other areas would be described as a Type 3 as they adjoin larger hazardous areas, could be impacted by fires from two directions and access is less certain.

Any development in this area would require careful planning and design to manage the bushfire risk and a detailed understanding of the biodiversity values.

Biodiversity values

The following environmental planning controls apply in parts of the PGA:

- Environmental Significance Overlay 1 (Watercourse Protection)
- Vegetation Protection Overlay 2 (Significant Vegetation)

The Ecological Vegetation Classes and Bioregional Conservation Status’ apply to the Maiden Gully North West PGA:

- 61: Box Ironbark Forest (Depleted)
- 81: Alluvial Terraces Herb-rich Woodland/Creekline Woodland Mosaic
- 175: Grassy Woodland (Vulnerable)
- 803: Plains Woodland (Endangered)

The Preliminary Ecological Assessment prepared by Practical Ecology report (refer Section 3.6.) referred to this area as Allies Road. The report noted that there were areas disturbed by past agricultural activities as well as areas of dense bushland. Some Large Trees were observed in these areas. Any offsets in these areas are likely to be relatively high and a referral under the Environment Protection and Biodiversity Conservation Act (EPBC Act) may be triggered. If future development were to occur it should be concentrated on the cleared areas and a detailed vegetation assessment would be required.

Summary

The PGA and surrounding area are generally flat and there are pockets of vegetation within the PGA as well as corridors of vegetation along waterways, some road reserves and in public ownership. There is potential for long fire runs to impact on the PGA from multiple directions, so there is potential for a large neighbourhood scale fire to develop as well as ember attack. Safe access in the event of a bushfire is uncertain.

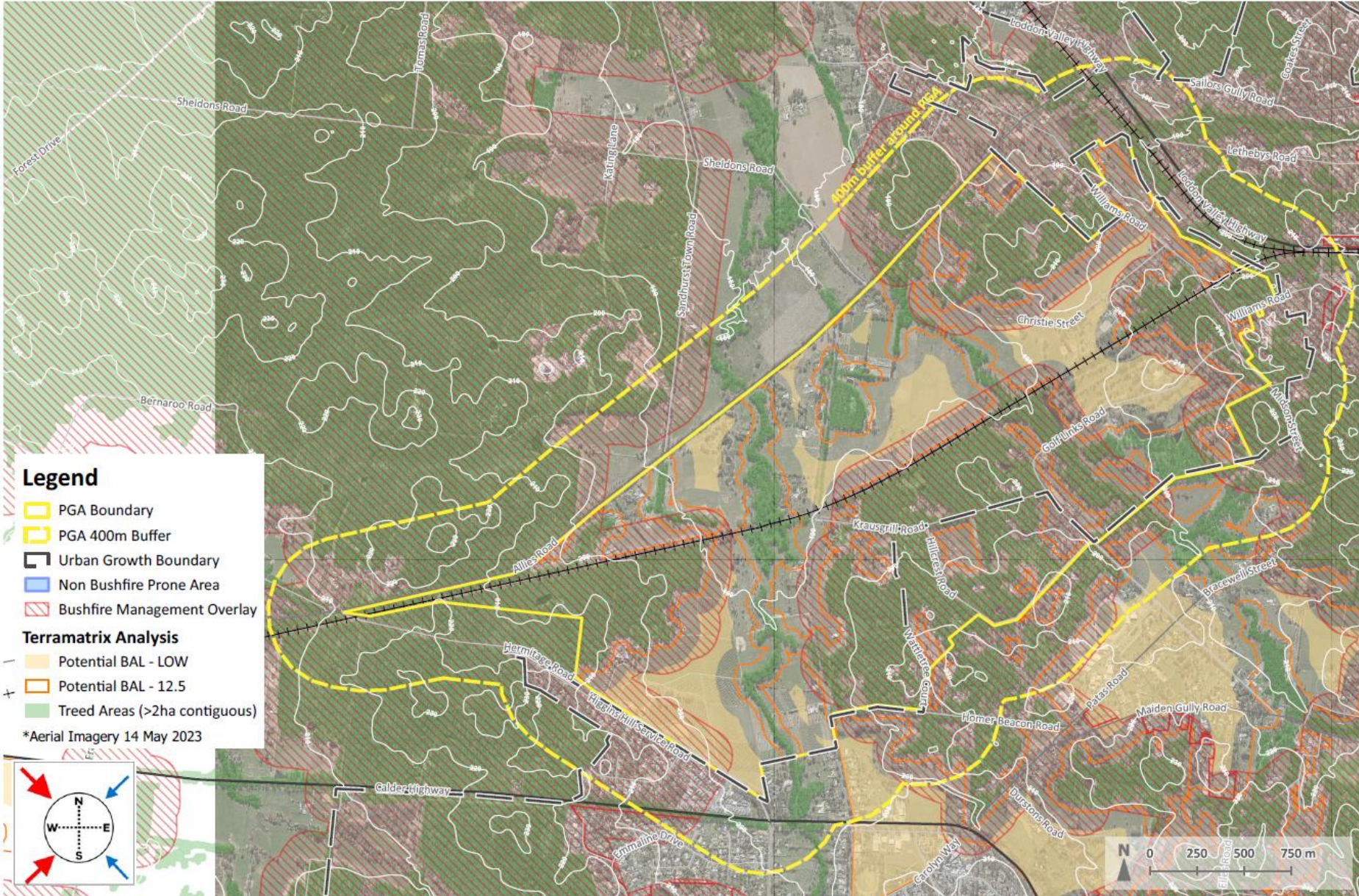
The PGA is considered broadly to be a Landscape Type Two in accordance with the *Planning Permit Applications Bushfire Management Overlay Technical Guide (2017)*.

Maiden Gully North West is a medium risk location in which to direct population growth and development.

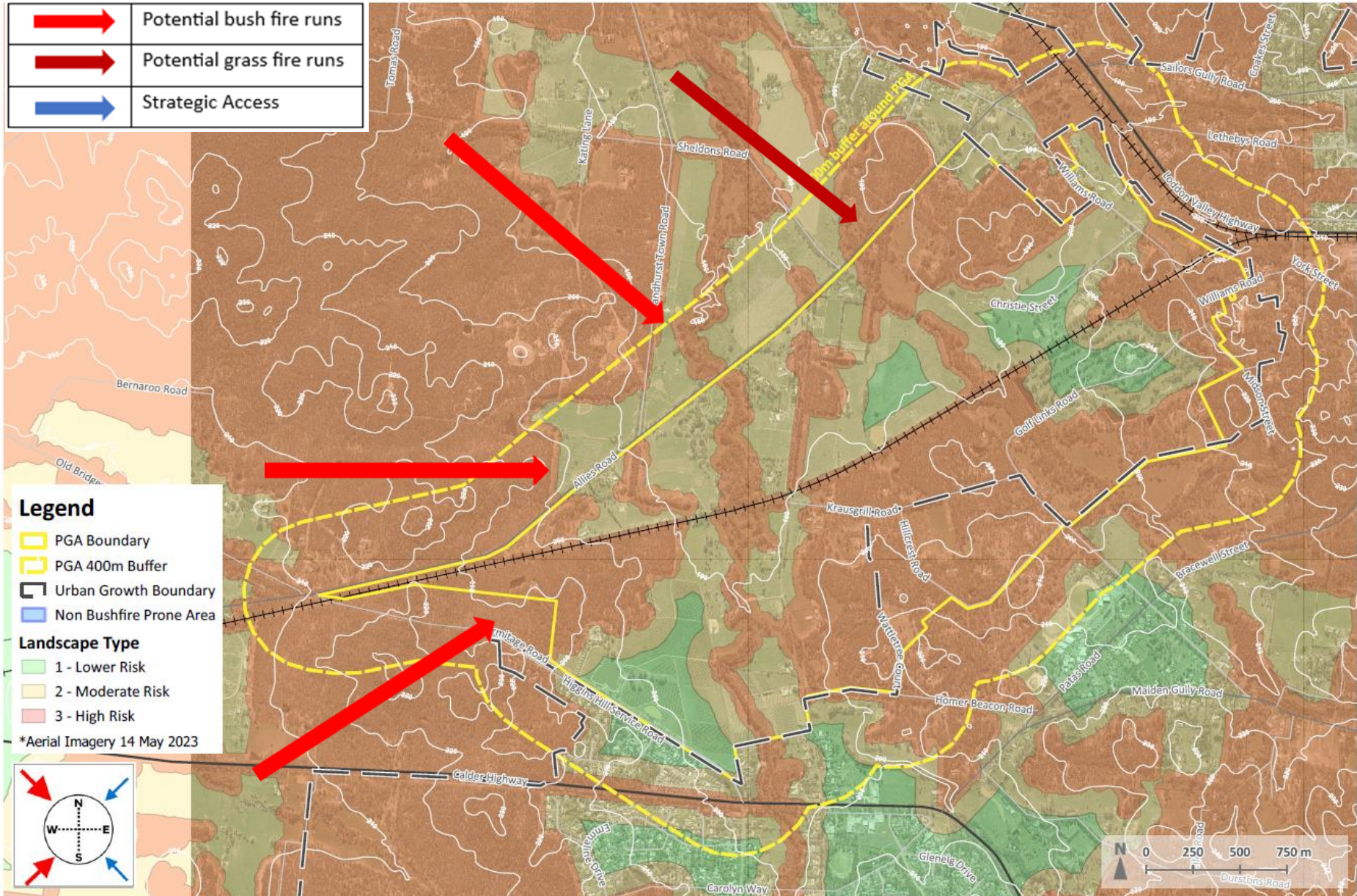
Overall risk level

Overall, the PGA that is considered to be medium risk in which to direct population growth and development.

Bushfire Hazard Assessment - Maiden Gully (North West) Potential Growth Area (PGA)



Landscape Types - Maiden Gully (North West) Potential Growth Area (PGA)



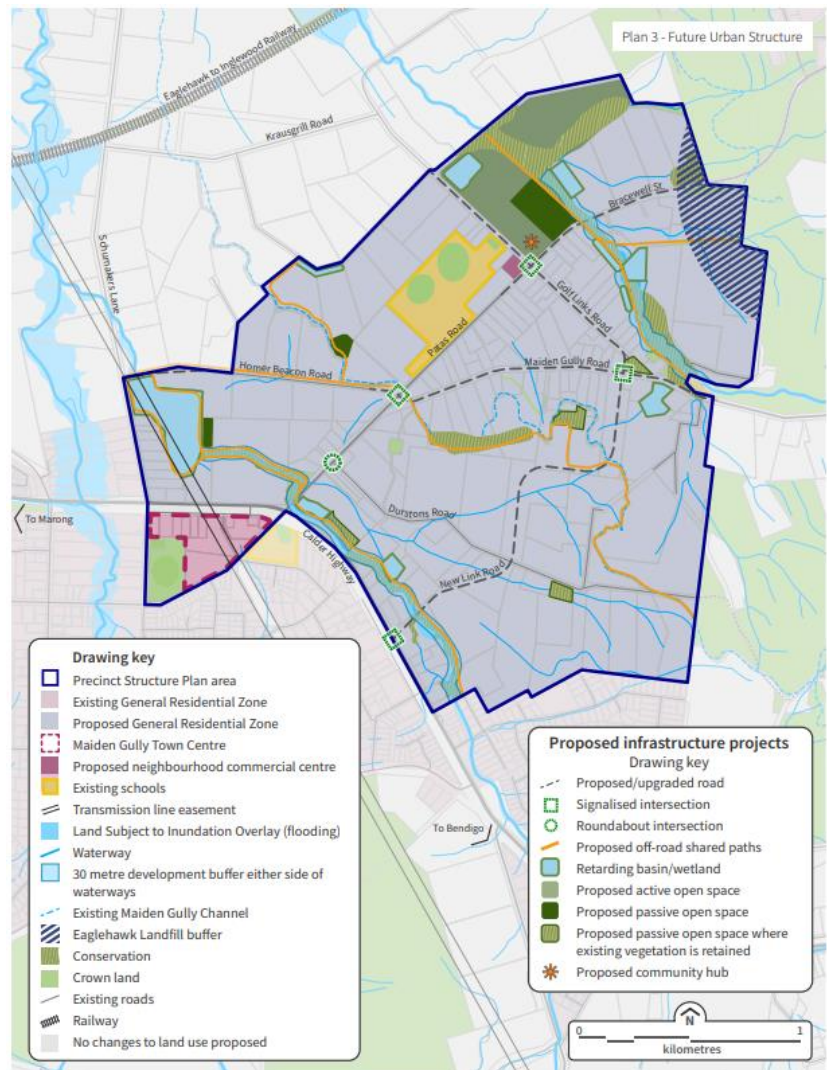
7.5 Maiden Gully Precinct Structure Plan

This PGA was first identified for growth in the Bendigo Residential Development Strategy 2006.

The original Precinct Structure Plan (PSP) was adopted by Council in 2013, and due to a range of factors and further work needing to be completed, it was not immediately implemented into the Planning Scheme. Vegetation and bushfire policy was strengthened as a result of the Bushfire Royal Commission, and bushfire planning provisions were updated and strengthened in 2018.

When Council re-adopted the Maiden Gully Precinct Structure Plan (PSP) in 2020, the outstanding piece of work at the time was the Native Vegetation Precinct Plan.

This couldn't be completed at the time as Melbourne was under Stage 4 COVID restrictions and the consultants couldn't travel to Bendigo to complete the fieldwork.

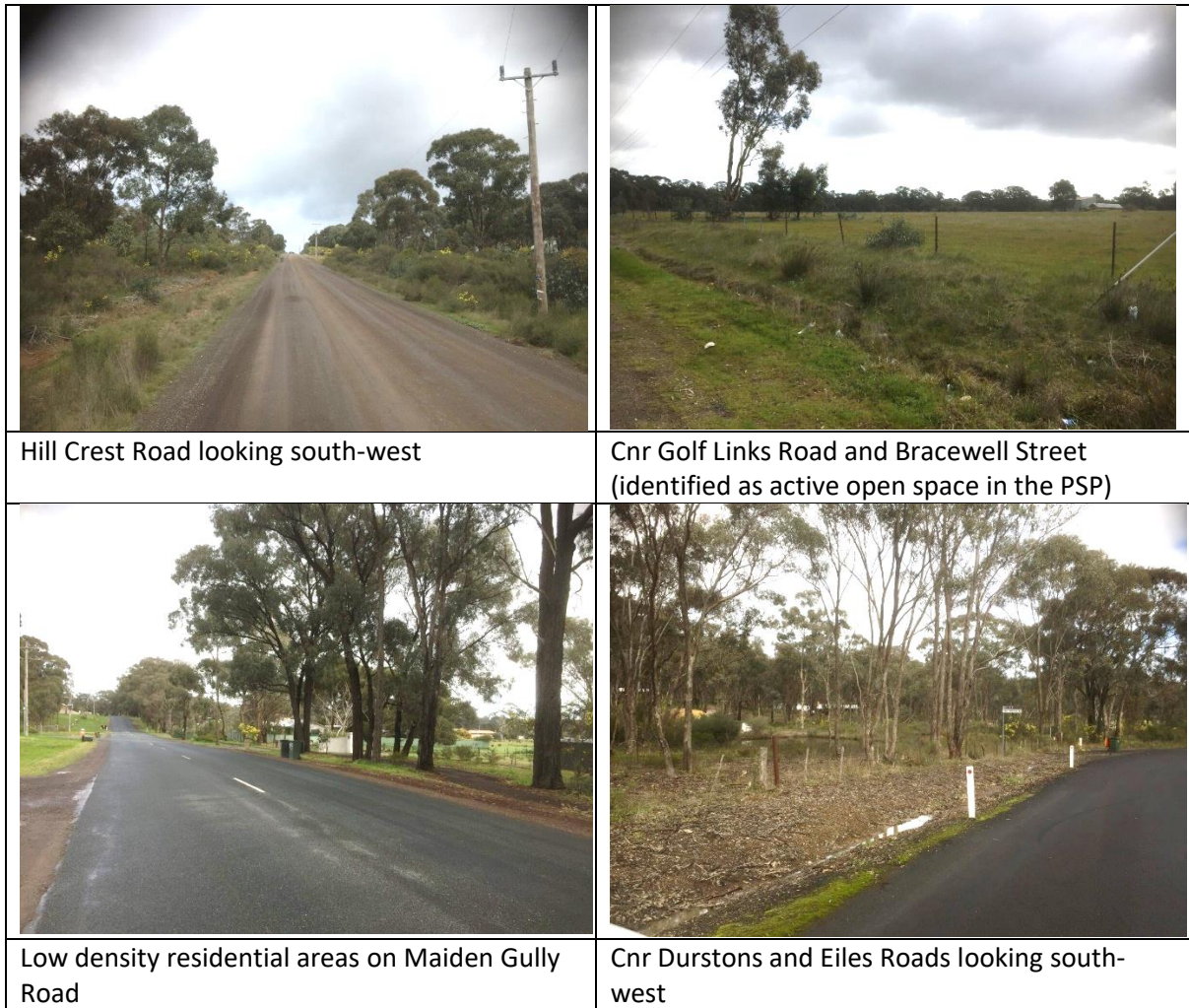


Map 15: Maiden Gully Precinct Structure Plan (PSP)

The agreement at the time was that provided the vegetation assessment only resulted in “minor” changes to the PSP then it would proceed to the planning scheme amendment phase. The fieldwork was subsequently completed, and the vegetation offset requirements were extensive – far more than originally anticipated. The advice at the time was that some vegetation offsets were either unavailable or would be so expensive that it would effectively make subdivision economically unviable.

In order to resolve this more vegetation would need to be protected (in other words the extent of the growth area would need to be reduced). This in turn would increase the bushfire risk to an unacceptable level.

Since this time considerable resources have been allocated to finding a balanced position that meets the requirements of protecting vegetation and managing the bushfire risk.



Vegetation and topography

The planning history of vegetation management and bushfire in the Maiden Gully PSP area is lengthy. As referred to above there have been vegetation assessments carried out in the area – both on-site and desktop.

The distribution of vegetation through the PSP area is complex. There are areas that are heavily vegetated, have important biodiversity values and are not suitable for development. There are areas that have scattered vegetation that might be appropriate for development once there is a clearer understanding of biodiversity values. There are areas that have little vegetation constants and could be suitable for residential development.

The slope in the area is generally in the 0-5 degrees range, but there are areas where this increases to up to 10 degrees (these areas are generally more vegetated). Due to the undulating nature of the general area, it is both upslope and downslope in the direction of fire.

Potential for neighbourhood scale fire

A neighbourhood scale fire can potentially only impact the area from the north-west, as the land to the south-west is residentially developed. The vegetation to the north-west of the PGA is isolated and of a scale where a bushfire would have limited time to develop with a potential fire run of up to

1 kilometre. The Terramatrix report did identify that the central area within the PSP is buffered from a fire from a westerly and south westerly direction and access to this area was considered good.

The PSP proposed an active public open space reserve at the northern end of the PSP. These reserves are typically managed in a low fuel state and would provide some protection to the areas to the south-east. This open space reserve has been planned to cater for the needs of not only the PSP area, but it would perform a broader, sub-regional role as well. A separate piece of work is underway that will assess the future open space needs of across the Bendigo Urban Area. Should this identify that this land is still required, regardless of any growth in the immediate area, that would mean that the land to south-east of this site could become suitable for development.

Similarly, the Marist School would protect the land to the south-east which is in a Low Density Residential Zone and potentially vulnerable to fire. Both these areas are largely clear of the BMO. A broader risk for the school is the land to the north-west which has scattered vegetation as there is no clear development edge (such as a road) along this boundary.

The PGA would be susceptible to ember attack.

There is an area of Low Density Residential Zone in the PGA and the lot sizes within this zone currently a minimum lot size of 0.4 hectares in this area. This would decrease to 0.2 hectares if sewerage becomes available and this may marginally decrease the risk in this area. The Design Guidelines for Settlement Planning at the Bushfire Interface suggests lot sizes within the 800 – 1,200m² range are more appropriate for managing fire risk.

Access to low fuel areas

Maiden Gully has a number of major roads that would allow for the safe access out of the PGA in the event of fire and this would further improve as the area develops.

There are currently no BAL-LOW areas proximate to the PGA, however the Terramatrix report has identified three large pockets of potential BAL-LOW within the PGA. The City has nominated an area within the existing Maiden Gully township for removal from the BPA, however this area is isolated from the PSP area.

There is a Neighbourhood Safer Place (Bushfire Place of Last Resort) at the Maiden Gully Primary School which is immediately accessible to the PGA.

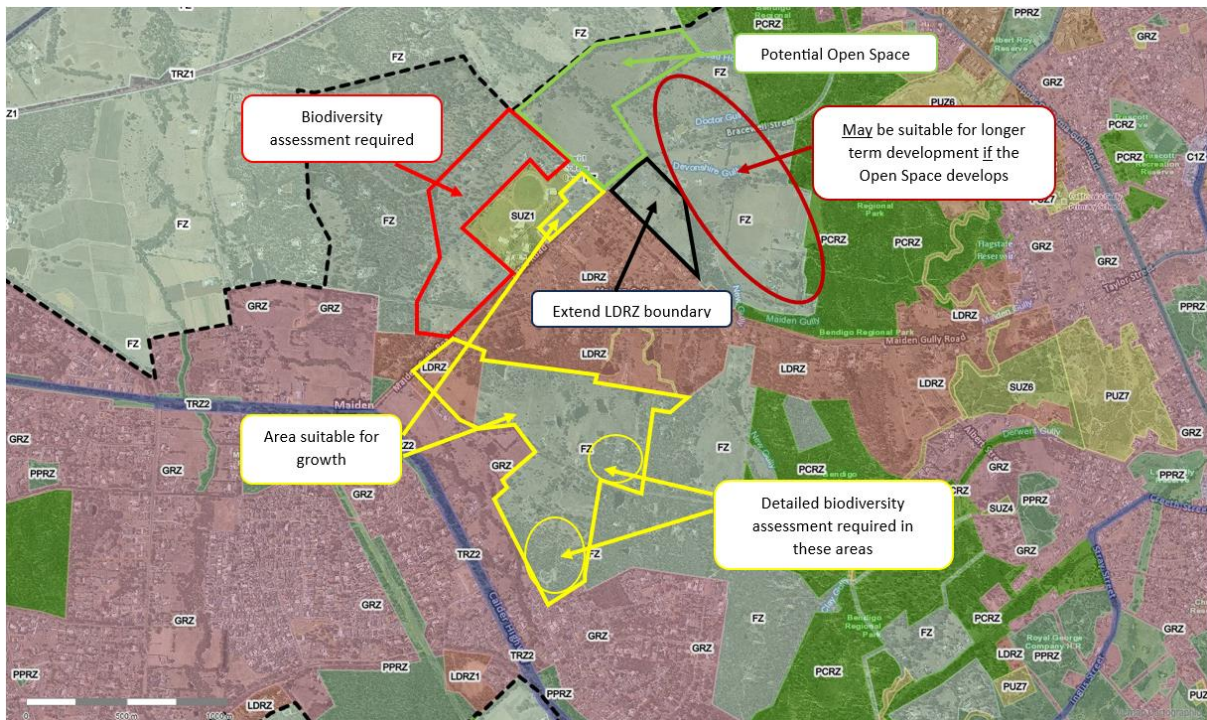
Risk to adjoining areas

Development in this area would have potential benefits in terms of reducing risk to existing uses in the area. This would include the Marist College (within the PGA) and the Pioneer Drive estate immediately to the south-east of the PGA. Development in this area may also help reduce the risk to the Low Density Residential Zone area.

There is currently a significant amount of undeveloped residentially zoned land fronting onto the Calder Highway which will likely progress as standard residential subdivisions in the near future.

The following map indicates where development may take place in Maiden Gully (NB – the CFA has not endorsed this plan, it has been prepared to continue further discussions with the CFA around growth opportunities in Maiden Gully). A precinct wide design response would ensure that access and egress, land uses and staging of development could be coordinated in an integrated manner and to best respond to bushfire risk. This process would also be subject to a more detailed site specific assessment of the vegetation.

The plan has been prepared for Maiden Gully PSP area and not other PGAs in recognition that there is longstanding commitment for growth in the area and there is an adopted PSP in place.



Achieving a BAL 12.5

Where the adjoining land is best described as “grassland” and the land is generally flat, a BAL 12.5 can be achieved with either a 19 metre or 22 metre setback in accordance with Clause 53.02-5. Other areas of the PGA would require a 48 metre setback to achieve a BAL 12.5 due the adjacent woodland/forest.

Landscape Type

The Maiden Gully PSP PGA is the most difficult PGA to allocate a Landscape Type to given the complexity of the landscape and the mosaic of vegetation in the precinct. Given that fire can only approach from one direction this suggests a Type 2, however the vegetation is not managed in a minimal fuel condition, and on balance it is considered that the area is best classified as a Type 2/3, with central area identified above being a Type 2.

If the area were to develop, access becomes more certain and fuel loads are better managed, the area could potentially be a Type 1.

Biodiversity values

The following environmental planning controls apply in parts of the PGA:

- Environmental Significance Overlay 1 (Watercourse Protection)
- Vegetation Protection Overlay 2 (Significant Vegetation)

The Ecological Vegetation Classes and Bioregional Conservation Statuses apply to the Maiden Gully Precinct Structure Plan PGA:

- 61: Box Ironbark Forest (Depleted)
- 81: Alluvial Terraces Herb-rich Woodland/Creepline Woodland Mosaic (Vulnerable)

- 175: Grassy Woodland (Vulnerable)

Practical Ecology considered the development of this area separate to piece of work referred to in Section 6.2 and is discussed above.

Summary

A large neighbourhood scale bushfire can only impact on the PGA from one direction, but there is potential for ember attack across the PGA. There are multiple routes to safe areas in the event of fire.

The PGA and surrounding area are generally flat, but there are areas within the PGA that have significant vegetation as well as on adjoining land in the likely direction of a bushfire. Any bushfire protection measures implemented in these areas would likely result in unacceptable biodiversity impacts.

There are areas that have scattered vegetation that if developed may reduce the risk to adjoining land. For example, if the land to the south-east of Hillcrest Road was developed this would reduce the risk to the adjoining Marist School. When planning for this area, it is important to understand the biodiversity values.

There are areas to the south of the PGA in the Calder Highway/Durstons Road area that may be suitable for development as they are generally cleared, setback from areas of hazard (vegetation) and have access to safe places (there is a Neighbourhood Safer Place directly opposite this area). Any development in this area would need to be carefully managed through the planning and design process. A biodiversity assessment would be required to understand what bushfire protection measures could be implemented.

The areas to the south of the PGA are considered broadly to be a Landscape Type 1/2 in accordance with the *Planning Permit Applications Bushfire Management Overlay Technical Guide (2017)*. The remaining areas are a Type 2 Landscape.

A reduced Maiden Gully PSP growth area is a low-medium risk location in which direct population growth and development will assist in reducing the bushfire risk to adjoining areas.

Overall risk level

There are areas within the PGA that are considered to be low to medium risk and other areas affected by vegetation and slope that are medium to high risk. Any development in these medium risk locations can be entertained, however would need to be carefully considered and planned. The key consideration is whether the biodiversity impacts associated with development in these low to medium risk areas are considered acceptable.

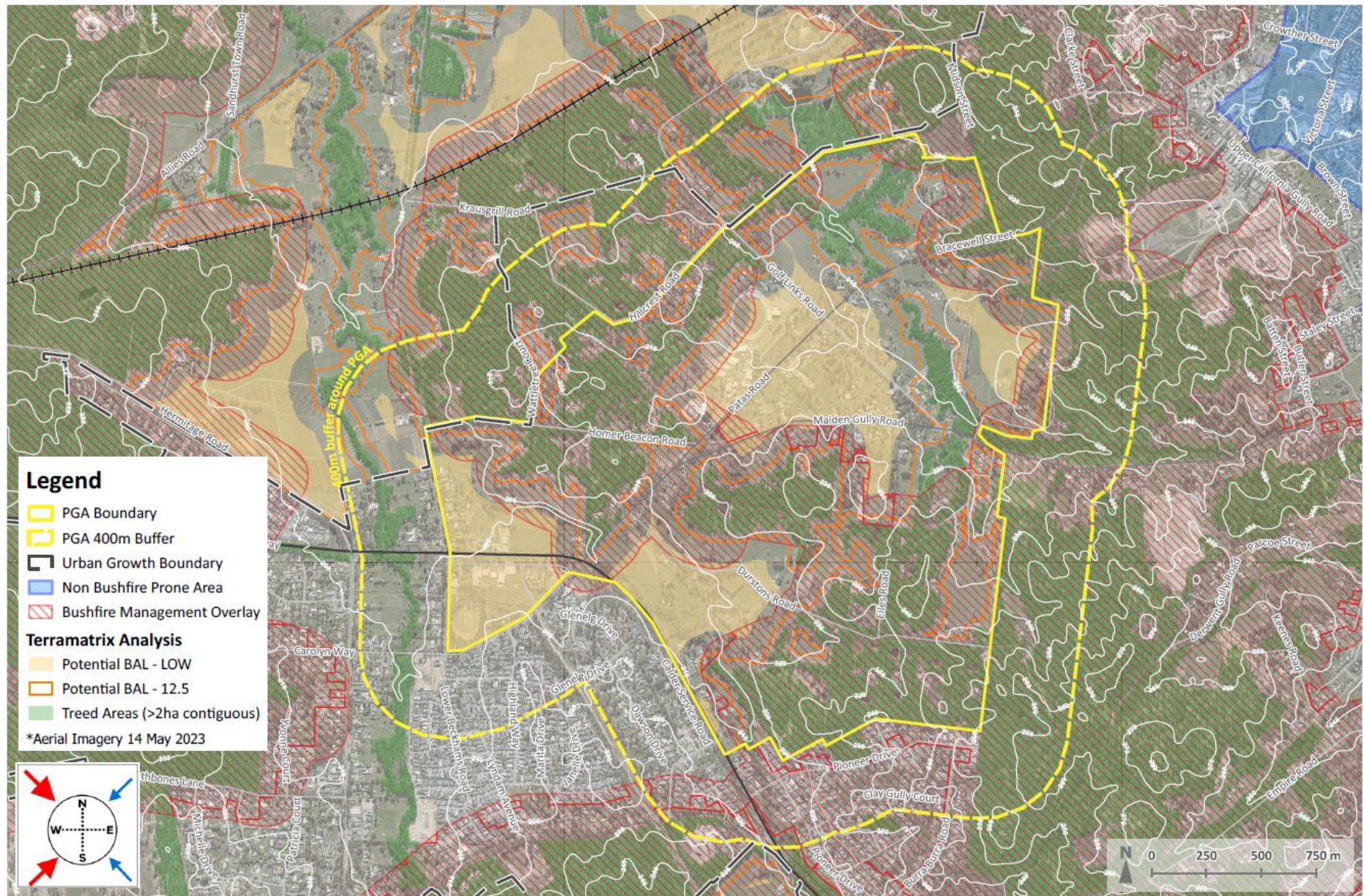
Planning and Design Response

The following are potential planning and design responses that could be implemented to manage and mitigate any bushfire risk:

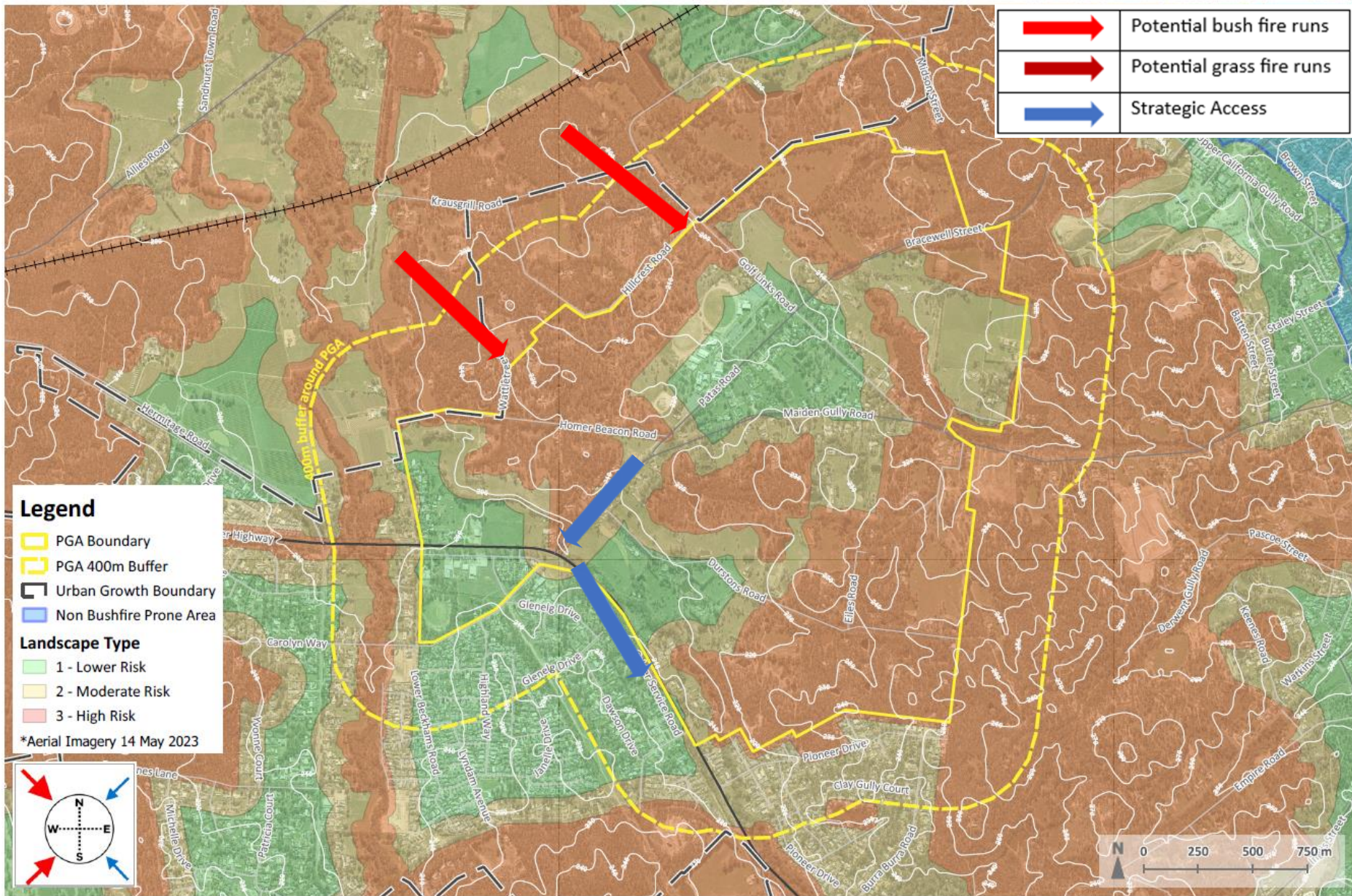
- Introduce a new local planning policy at clause 13.02-1L of the Greater Bendigo Planning Scheme to provide greater guidance on the design and staging of subdivisions in areas within a BMO (Appendix 2 provides draft policy content, as a reference, that will be refined further with input from the CFA).

- Apply a Design and Development Overlay to specify buffer distances (refer to Appendix 3 for draft DDO content).
- Apply a Development Plan Overlay that includes requirements for perimeter roads in the likely direction of fire (north west, west and south west), the general road network (including road widths) and at the interface areas to specify lot sizes, avoiding vulnerable uses and specifying higher construction standards, fencing and the staging of development
- Through the introduction of clause 13.02-1L and the Development Plan Overlay, ensure that subdivisions are staged to ensure that new properties do not abut unmanaged vegetation at completion.
- Through the introduction of the Development Plan Overlay, specify under ‘Requirements for development plan’ that vulnerable land uses such as aged care facilities or child care centres won’t be allowed. The designation of other land uses will be determined in collaboration with the CFA.
- Consider utilising a Native Vegetation Precinct Plan to streamline the removal of native vegetation, the removal of any VPOs and specifying fire resistant tree plantings.
- Use the measures in Clause 53.02 that relate to water supply and defensible space.

Bushfire Hazard Assessment - Maiden Gully Precinct Structure Plan Potential Growth Area (PGA)



Landscape Types - Maiden Gully Precinct Structure Plan Potential Growth Area (PGA)



7.6 Maiden Gully (South East)/Olympic Parade

There has been longstanding interest from landowners within this PGA in developing the area. Some properties within the PGA have been subject to submissions and representations at previous Planning Panel Hearings.

Some of the land sits outside the Urban Growth Boundary and any suggested changes to zoning to intensify development have previously not been supported by the City, principally on the grounds of bushfire risk and biodiversity impacts.

The C215 Panel to implement the Greater Bendigo Residential Strategy 2014 made the following observation in relation to a site known as 7 Wicks Road:

Development of the Wicks Road site would entail significant impact on a large remnant parcel of vegetation outside the UGB and require a highly finessed bushfire response. The Panel is not satisfied that, in a net community benefit sense, realising the development potential of the site outweighs the potential impact on the natural environment."

This PGA is being reviewed as part of this project to better understand how the site compares to other potential growth areas in Greater Bendigo.



Vegetation and topography

There is significant vegetation in the PGA as well as surrounding properties. Some of the vegetation on the nearby land comprises the Bendigo Regional Park with the remainder being on private land.

The topography in the area is undulating with the slope in the area generally being in the 0 to 10+ degree range, thereby further potentially increasing the risk.

Potential for neighbourhood scale fire

The Terramatrix Report identified that the area could be exposed to a large, intense bushfire with high potential for a neighbourhood scale fire to impact on the area given the extent of vegetation to the north-west and south-west of the PGA. There is potential for a fire run of 1.9 - 3.0 kilometres to impact the area from the north-west and 5 kilometres from the south-west. The potential for ember attack is also high given the extent of adjoining vegetation.

The Terramatrix work did not identify any areas of potential BAL-LOW in the PGA.

The PGA is entirely affected by the BMO.

Access to low fuel areas

There is limited access to low fuel areas in the PGA and in the adjoining areas.

There is a Neighbourhood Safer Place (Bushfire Place of Last Resort) at the Maiden Gully Primary School, although this is not within the PGA itself and is located at least 1.4 kilometres away from the closest point of the PGA. Safe access to this site would be uncertain in the event of a bushfire.

Risk to adjoining areas

Development in this area would reduce the risk to the existing residential properties to the south-east of the PGA.

Achieving a BAL 12.5

A BAL 12.5 could potentially be achieved, but it would require a significant setback – potentially up to 60 metres depending on the slope of the land and would require vegetation removal and management.

Landscape Type

The Maiden Gully South East PGA is a Type 3 landscape. There is unmanaged vegetation within 150 metres and has the potential for neighbourhood scale destruction. Fire can approach from both the north-west and south-west and safe access to a low fuel area is uncertain.

Biodiversity values

The following environmental planning controls apply in parts of the PGA:

- Environmental Significance Overlay 1 (Watercourse Protection)
- Environmental Significance Overlay 2 (Groundwater Recharge Protection Area)
- Vegetation Protection Overlay 2 (Significant Vegetation)

The Ecological Vegetation Classes and Bioregional Conservation Statuses apply to the Maiden Gully South East PGA:

- 20: Heathy Dry Forest (Least Concern)
- 61: Box Ironbark Forest (Depleted)

The Preliminary Ecological Assessment prepared by Practical Ecology report (refer Section 3.6.) considered the PGA in two parts. The land north of the Calder Highway was referred to as Sparrowhawk Road and the land to the south was referred to Olympic Parade.

For the Sparrowhawk Road area was approximately 86 per cent vegetated and that there would be significant vegetation offset required in order to develop this area. A number of Large Trees were observed.

The area assessed by Practical Ecology extends beyond the boundaries of the Maiden Gully (South East)/Olympic Parade PGA and includes land along Edwards Road and Andrews Lane, into areas densely vegetated and almost completely encircled by Regional Park. A number of Large Trees were observed in the area. Any development may trigger significant vegetation offset costs and referral under the EPBC Act.

Development in this area would likely result in unacceptable biodiversity loss outcomes.

Summary

The PGA and surrounding area have significant vegetation and a neighbourhood scale fire could impact the PGA from multiple directions as well as the potential for ember attack.

Safe access is uncertain in the event of fire. Any bushfire protection measures would likely result in unacceptable biodiversity impacts.

The PGA is considered to be a Landscape Type 3 in accordance with the *Planning Permit Applications Bushfire Management Overlay Technical Guide (2017)*.

The Terramatrix report noted that Olympic Parade area was one of the “least favourable locations to direct growth from a bushfire perspective”.

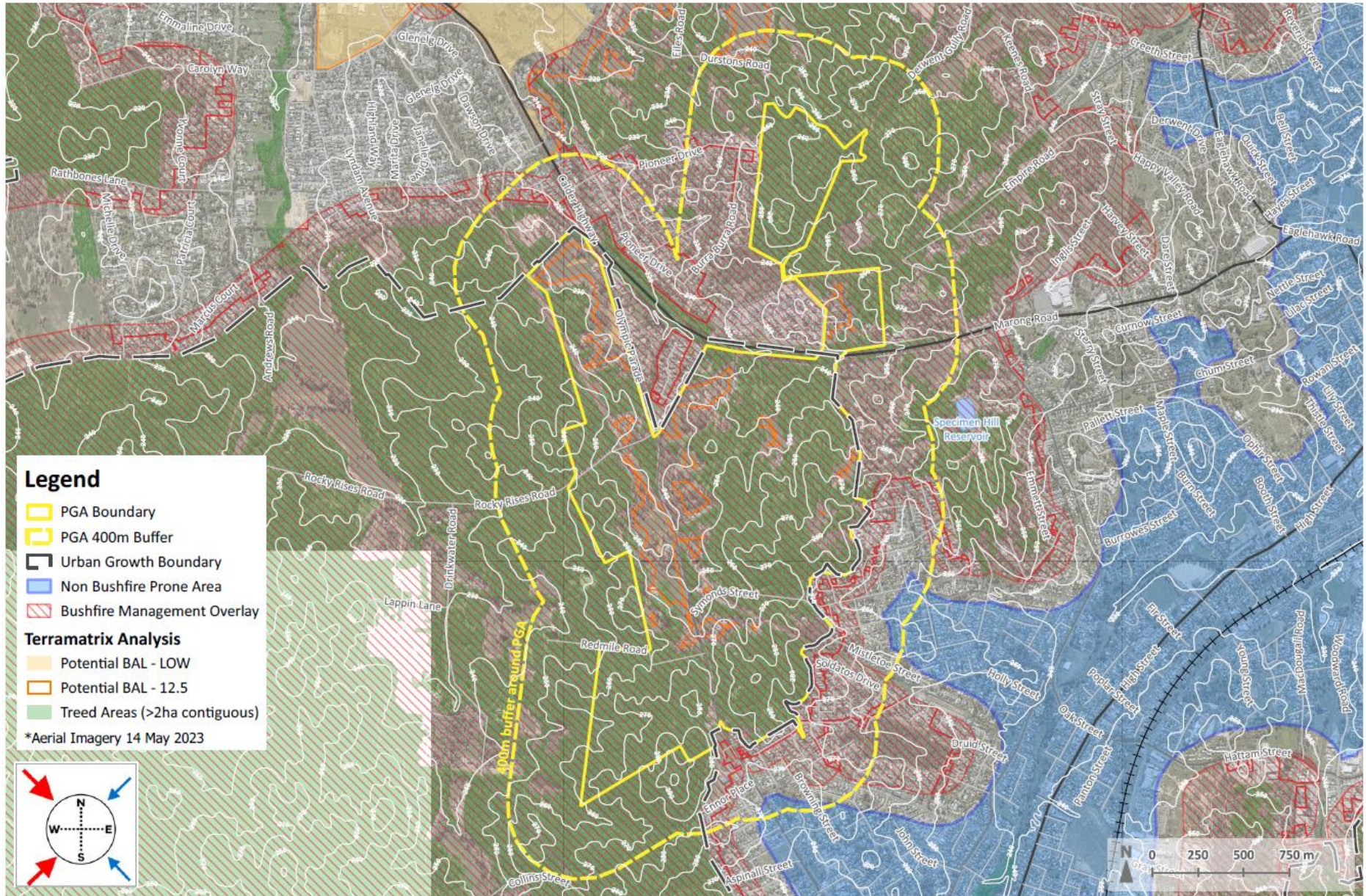
Maiden Gully South East/Olympic Parade is a high risk location to direct population growth and development.

Overall risk level

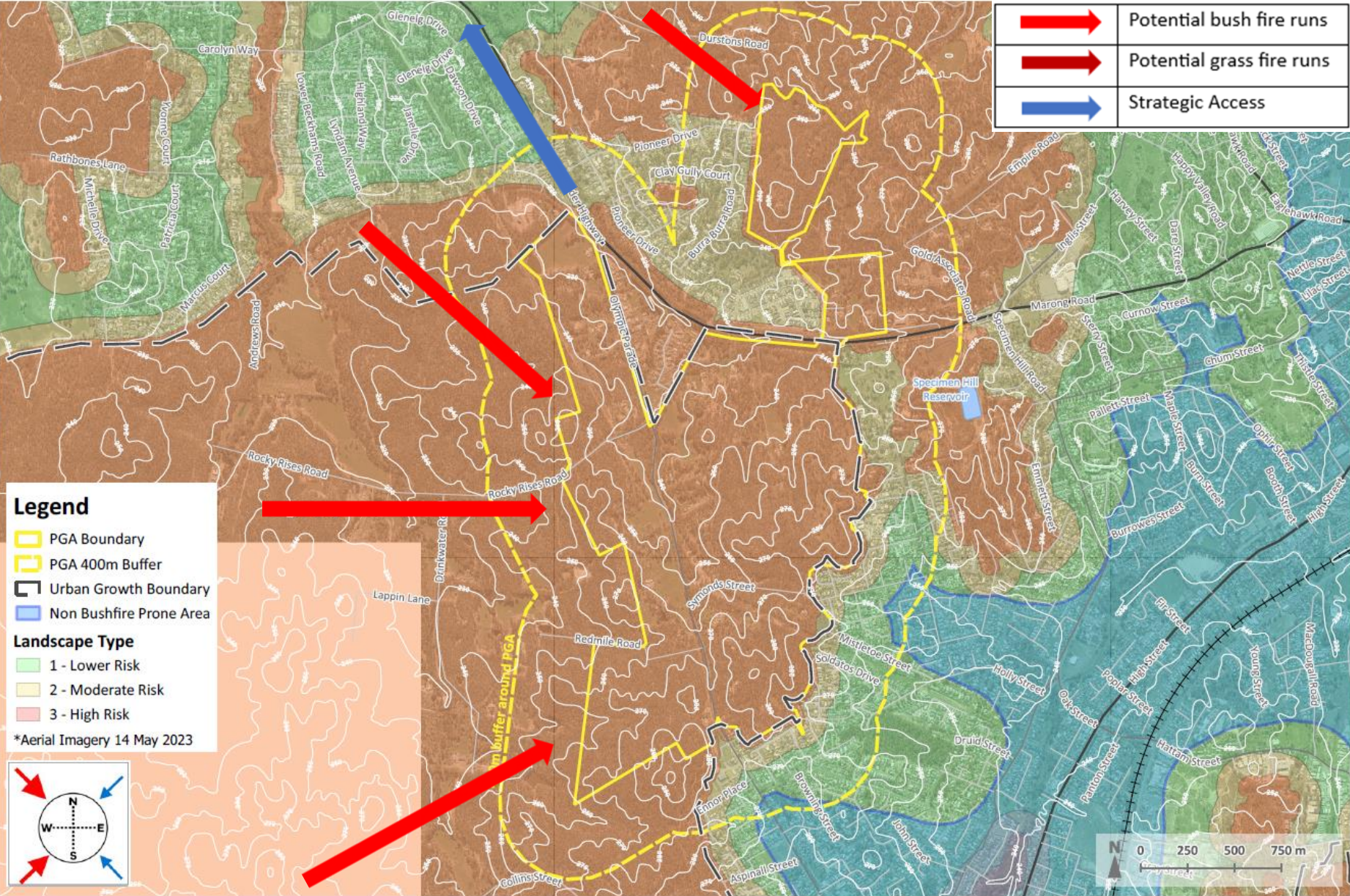
The proponents for the development of the 7 Wicks Road site have submitted a Bushfire Assessment that concluded that the site was of “minimal risk” from any bushfire threat. This conclusion is not consistent with the advice from Terramatrix and the CFA.

The overall level of risk to this PGA is high.

Bushfire Hazard Assessment - Maiden Gully (South East) / Olympic Parade PGA



Landscape Types - Maiden Gully (South East) / Olympic Parade PGA



7.7 Junortoun

The Junortoun corridor is inside the UGB and is currently zoned Low Density Residential. It is one of the smaller PGAs in terms of geographic area.

Changes to the Low Density Residential Zone to reduce the minimum lot size to 0.2 hectare lots where sewerage is available, has resulted in a number of subdivision approvals in the corridor.



Vegetation and topography

There is little in the way of vegetation within the PGA, other than some very small patches and scattered trees.

Land to the north consists of the O’Keefe Rail Trail and the Bendigo Regional Park. The has resulted in the BMO applying to northern area of the PGA. The Greater Bendigo National Park is 330-400 metres to the south-west of the PGA.

The topography of the area is generally in 0-5 degree range, both upslope and downslope in the direction of fire.

Potential for neighbourhood scale fire

Despite the proximity of the PGA to the Greater Bendigo National Park and Bendigo Regional Park the potential for a neighbourhood scale fire to affect the PGA is relatively low. Land to the north-

west (the likely direction a fire would attack) is developed for residential purposes and has minimal hazardous vegetation.

If there was a south-west wind change there is adequate separation between the National Park and the PGA (330-400m) and the land in this area is largely managed in a low fuel state (Secondary School, Lords Raceway and a retirement village).

There is potential for ember spotting depending on weather conditions.

The nearest BAL-LOW area is approximately 650m to the west and the Terramatrix Report identifies that a reasonable proportion of the PGA is potential BAL-LOW.

The Terramatrix report identified that Junortoun was one of four PGA's that had low exposure to hazardous vegetation.

The BMO affects approximately a third of the PGA.

Access to low fuel areas

The Junortoun area is well serviced by the McIvor Highway that provides direct access into the Bendigo Urban Area, however this is the primary access and other access opportunities are limited.

There is a Neighbourhood Safer Place (Bushfire Place of Last Resort) at Lords Raceway.

Risk to adjoining areas

The development of the growth areas would reduce the likelihood of a bushfire and grassfire affecting the adjacent low density residential development.

Achieving a BAL 12.5

Given the surrounding land is best described as "woodland" and the land is generally flat, a BAL 12.5 can be achieved with a 48 metre setback.

The Terramatrix report noted that while Junortoun has good potential to achieve a BAL 12.5 or a BAL-LOW, its narrow shape and location between two large tracts of vegetation means it would require careful consideration for siting and layout of development.

Landscape Type

The Junortoun PGA is best described as a Landscape Type 2 as there is vegetation within 150 metres of the site, although not to the north-west or south-west of the PGA. The PGA does have reasonable access which could be improved with careful planning and design.

Biodiversity values

The following environmental planning controls apply in parts of the PGA:

- Vegetation Protection Overlay 2 (Significant Vegetation)

The Ecological Vegetation Classes and Bioregional Conservation Status' apply to the Junortoun PGA:

- 61: Box Ironbark Forest (Depleted)
- 81: Alluvial Terraces Herb-rich Woodland/Creekline Woodland Mosaic (Vulnerable)
- 175: Grassy Woodland (Vulnerable)

The area considered as part of the Preliminary Ecological Assessment prepared by Practical Ecology report (refer Section 3.6.) extended beyond the boundary of the UGB to include land east of the O’Keefe Rail Trail and south of the Mclvor Highway. Within the PGA boundary the report did note the presence of numerous Large Trees and that the area plays an important role connecting the Greater Bendigo National Park to the south with the Wellsford State Forest to the north.

Summary

The PGA and surrounding area are generally flat and there is minimal vegetation within the PGA. The site does adjoin the Bendigo Regional Park so a neighbourhood scale bushfire may impact on parts of the PGA, although it is generally not in the likely direction of a bushfire. The PGA could be impacted by ember attack.

There is a single safe access route (the Mclvor Highway) in the event of fire.

The PGA is broadly considered to be a Landscape Type 2 in accordance with the *Planning Permit Applications Bushfire Management Overlay Technical Guide (2017)*.

Overall risk level

The overall level of risk to this PGA is low to medium given the lower level of risk from a fire from the north-west impacting the area, however there are risks from a southerly wind change and ember attack.

7.8 Simpsons Road

This PGA is in a potential growth corridor identified in Section 4.2. It sits outside the UGB and has been subject to past submissions to Amendment C215 that implemented the Greater Bendigo Residential Strategy 2014.



Vegetation and topography

The western portion of the PGA has a reasonable amount of vegetation, while the eastern end is less constrained. The PGA has a significant abuttal to the Bendigo Regional Park to the west, north and east.

The topography in the area is also undulating and generally within the 0-10+ degrees range, both upslope and downslope.

Potential for neighbourhood scale fire

The Terramatrix Report identified that the area could be impacted by a large intense bushfire from multiple directions. Given the vegetation to the north-west there is the potential of a 3 – 5 kilometre fire run into the area and a 1 kilometre fire run from the south-west of the PGA. The potential for ember attack is also high given the extent of adjoining vegetation.

There also appears to be limited opportunity to defend a fire that would impact the area.

The PGA is almost entirely affected by the BMO.

Access to low fuel areas

Given the PGA is encircled by the Regional Park on three sides, safe access to and from the site is uncertain and even with careful planning and design and setting aside any biodiversity issues this would likely be a difficult issue to overcome.

There is a Neighbourhood Safer Place (Bushfire Place of Last Resort) at Canterbury Park car park, which is located outside of the PGA.

Risk to adjoining areas

Development in this location could reduce the risk to the adjoining residentially zoned properties from a fire coming from the north-west.

Achieving a BAL 12.5

Achieving a BAL 12.5 could be possible in this area with a setback of 48 or potentially 57 metres, however it would likely necessitate the removal of significant vegetation and the subsequently have biodiversity impacts within the PGA.

Landscape Type

The Simpsons Road East PGA is a Type 3 landscape. There is unmanaged vegetation within 150 metres and has the potential for neighbourhood scale destruction. Fire can approach from both the north-west and south-west and safe access to a low fuel area is uncertain.

Biodiversity values

The following environmental planning controls apply in parts of the PGA:

- Environmental Significance Overlay 1 (Watercourse Protection)

The Ecological Vegetation Classes and Bioregional Conservation Status' apply to the Simpsons Road PGA:

- 61: Box Ironbark Forest (Depleted)

The Preliminary Ecological Assessment prepared by Practical Ecology report (refer Section 3.6.) work noted that the area is 60 per cent covered by vegetation and a number of Large Trees were observed. There would be significant vegetation offset costs associated with any development in the area and that it was likely to trigger referral under the FFG Act or the EPBC Act. The creek in the southern part of the PGA is a FFG listed community – Creepline Grassy Woodland.

Development in this area would likely result in the unacceptable loss of biodiversity outcomes.

Summary

The PGA and surrounding area have significant vegetation and a neighbourhood scale fire could impact the PGA from multiple directions as well as the potential for ember attack.

Safe access is uncertain in the event of fire. Any bushfire protection measures would likely result in unacceptable biodiversity impacts.

The PGA is considered to be a Landscape Type 3 in accordance with the *Planning Permit Applications Bushfire Management Overlay Technical Guide (2017)*.

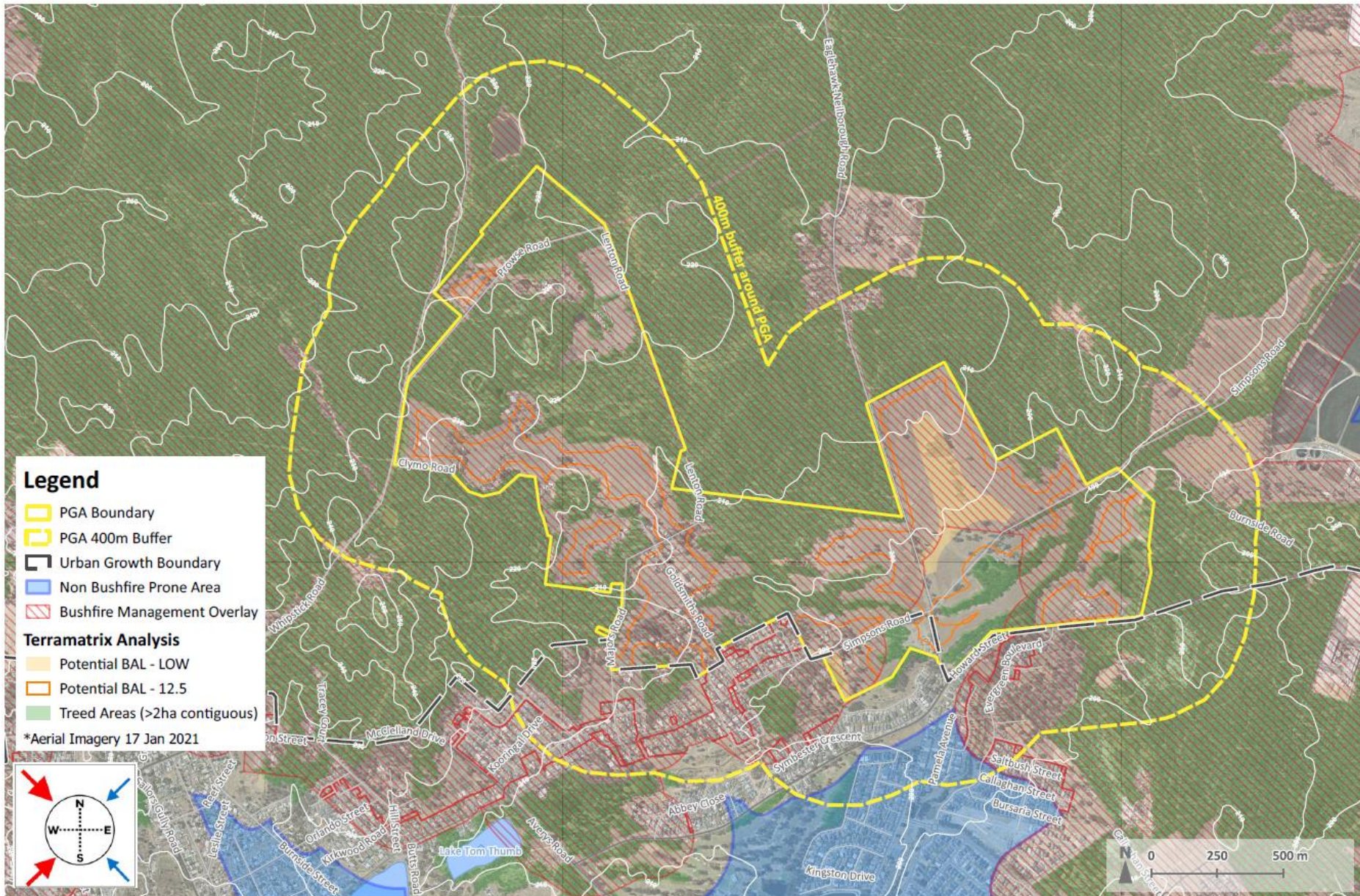
The Terramatrix report noted that Simpsons Road was one of five PGA's that were the "least favourable locations to direct growth from a bushfire perspective".

Simpsons Road is a high risk location to direct population growth and development.

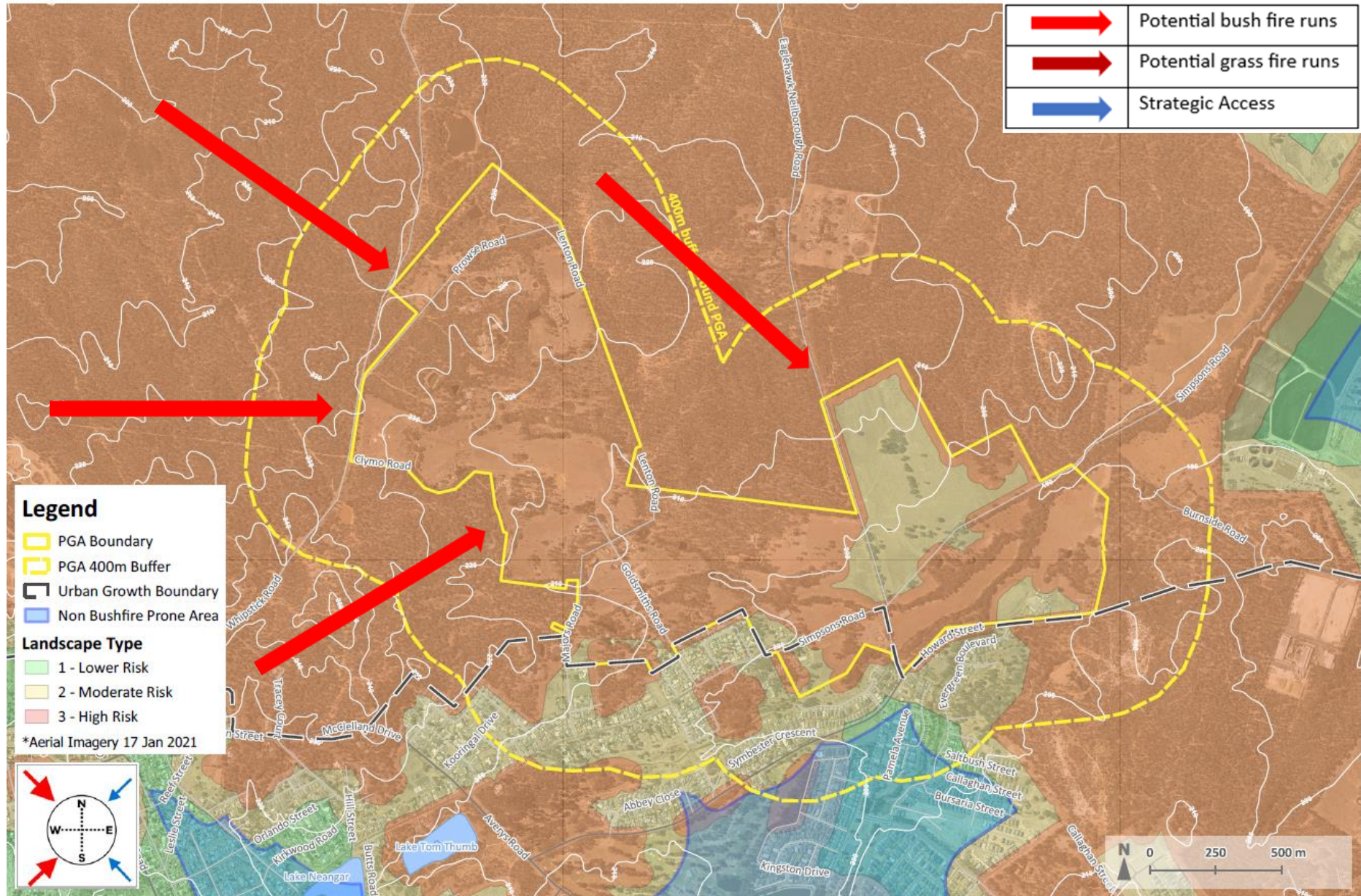
Overall risk level

The overall level of risk to this PGA is high given the extent of vegetation in the immediate area and the lack of access to low fuel areas.

Bushfire Hazard Assessment - Simpsons Road Potential Growth Area (PGA)



Landscape Types - Simpsons Road Potential Growth Area (PGA)



7.9 Watson Street

This PGA is somewhat unique in that it is well within the UGB. The area is a mix of Low Density Residential and Farming Zone and this zoning regime traces back to the pre-amalgamation planning scheme of the mid 1990s.

Development in the area is typified by large lots in a well vegetated setting. There has been some past interest in more intensive development in the area.



Vegetation and topography

There is a significant amount of vegetation within the PGA as well as to the north-west of the precinct comprising the Bendigo Regional Park and the south-west being the Jackass Flat Nature Conservation Reserve.

There are also a number road sides that have large, well-established trees.

The topography in the area is generally 0-5 degrees, although there are a number of steeper ridgelines that run through the area.

Potential for neighbourhood scale fire

The Terramatrix Report identified that the area could be impacted by a large intense bushfire from multiple directions. There is potential for a neighbourhood scale fire to impact the PGA from the Bendigo Regional Park and vegetated private land to the north-west of the site, with a 2 kilometre

fire run. A neighbourhood scale bushfire on a south-west wind change is less likely as the fire runs are shorter.

High risk of ember spotting from a well- developed fire to the north-west.

The PGA is entirely affected by the BMO.

Access to low fuel areas

There are a number of roads in and out of the PGA into low fuel areas. A challenge could be the vegetation in the road reserves making access/egress uncertain.

The Terramatrix report did not identify any potential BAL-LOW areas within the PGA.

Risk to adjoining areas

Development in this area would decrease the risk of bushfire to the adjoining residential areas.

Achieving a BAL 12.5

Given the surrounding land is best described as “woodland” and the topography of the area is undulating, a BAL 12.5 can be achieved with a 48m or 57m setback depending on the location. It may also result in significant biodiversity impacts in some locations.

Landscape Type

The Watson Street PGA is best described as a Landscape Type 3 as bushfire can approach from more than one direction, the area is not managed in a minimal fuel condition and safe access is not certain.

Biodiversity values

The Ecological Vegetation Classes and Bioregional Conservation Status’ apply to the Watson Street PGA:

- 61: Box Ironbark Forest (Depleted)
- 175: Grassy Woodland (Vulnerable)

The following environmental planning controls apply in parts of the PGA:

- Vegetation Protection Overlay 2 (Significant Vegetation)
- Significant Landscape Overlay 1 (Bush Garden and Semi-Bush Residential Areas)

The Preliminary Ecological Assessment prepared by Practical Ecology report (refer Section 3.6.) work noted that the area is heavily constrained by native vegetation that plays an important connective role. Development would trigger significant vegetation offset costs and would trigger a referral under the EPBC Act.

Development in this area would likely result in unacceptable biodiversity loss outcomes.

Summary

The PGA and surrounding area have significant vegetation and a neighbourhood scale fire could impact the PGA from multiple directions as well as the potential for ember attack.

Safe access is uncertain in the event of fire. Any bushfire protection measures would likely result in unacceptable biodiversity impacts.

The PGA is considered to be a Landscape Type 3 in accordance with the *Planning Permit Applications Bushfire Management Overlay Technical Guide (2017)*.

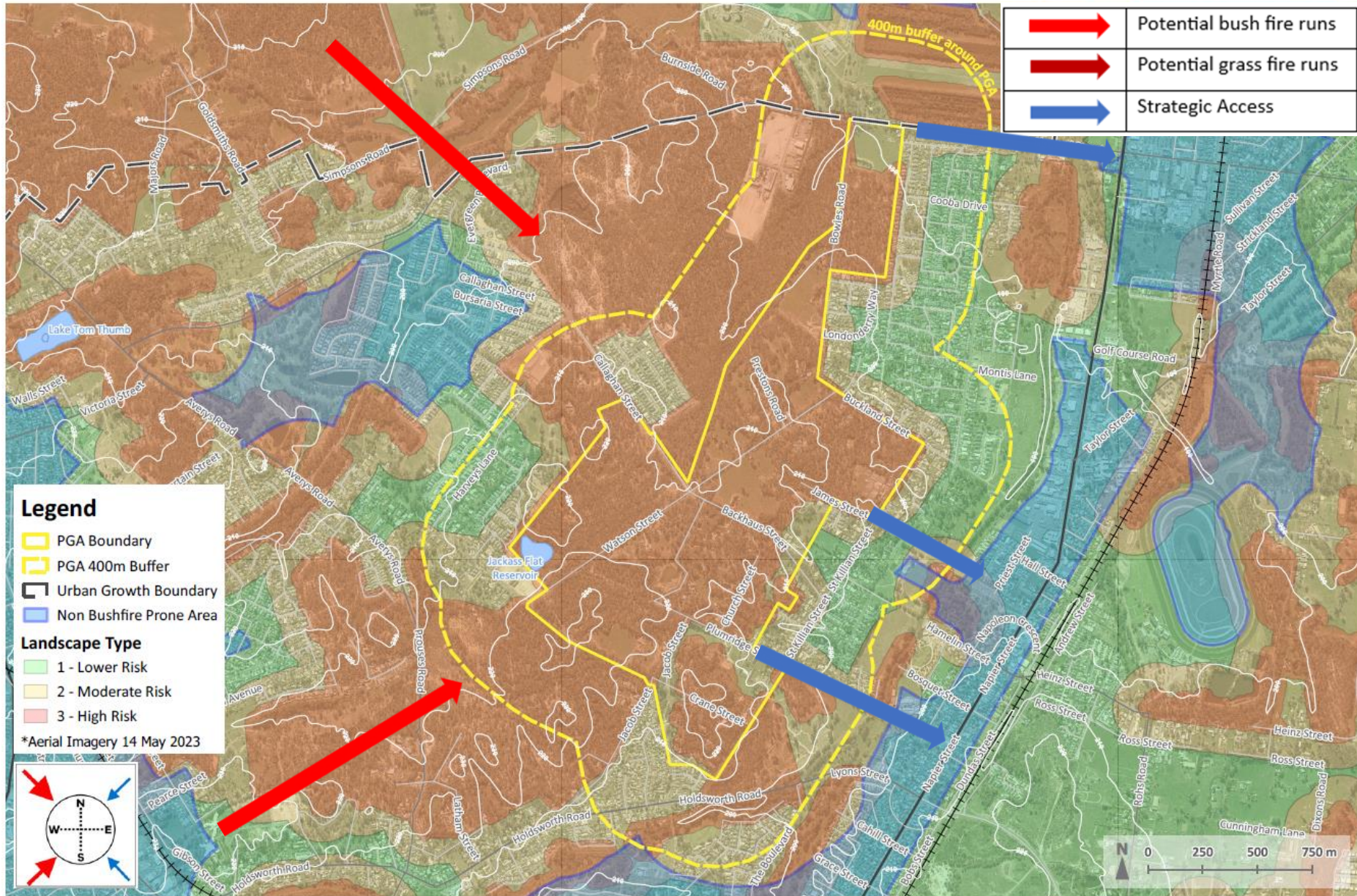
The Terramatrix report noted that Watson Street was one of five PGA's that were the "least favourable locations to direct growth from a bushfire perspective".

Watson Street is a high risk location to direct population growth and development.

Overall risk level

The overall level of risk for this area is considered high given the vegetation that exists and pattern of development. If this vegetation was removed or managed to a low fuel state this would potentially reduce this risk.

Landscape Types - Watson Street Potential Growth Area (PGA)



7.10 Big Hill

The Big Hill PGA is identified as a future urban growth investigation area in the Clause 02.04 of the GBPS (refer Section 4.2). Most of the area (other than Cherry Tree Lane) is outside the UGB.



Vegetation and topography

There are areas in the middle section of the PGA that are reasonably well vegetated and northern sections that are cleared.

The middle and southern sections of the PGA adjoin the Bendigo Regional Park, so there are large areas of forest to the north-west and south-west of this section of the PGA. There is also privately owned land that is well vegetated adjoining other areas of the PGA.

The topography in the area is generally flat in the 0-5 degrees range.

Potential for neighbourhood scale fire

The Terramatrix Report identified that the PGA could be exposed to a large and intense fire from the north and west with the potential of a fire run of more than 5 kilometres. The area could also be impacted by an ember attack.

Almost the entire PGA, other than a small portion of land near the Calder Highway/Granter Street intersection, is affected by the BMO.

Access to low fuel areas

Safe access from the middle and southern sections of the PGA is uncertain. Even if these areas were to develop safe access may remain problematic due to limitations on creating new access points on the Calder Highway. A further challenge would be that the Department of Transport and Planning would likely restrict access onto the Calder Highway, especially given this is in an 80km/h zone.

There is a Neighbourhood Safer Place (Bushfire Place of Last Resort) at Lansell Square Shopping Centre car park, approximately 1.5 kilometres to the north of the PGA.

Risk to adjoining areas

Development in the area may reduce the risk to the land to the south-east, including the Big Hill Primary School, however these areas would remain exposed to potential ember attack.

Achieving a BAL 12.5

Achieving a BAL 12.5 could be possible in this area with a setback of 48 or 57 metres depending on the location within the PGA, however it would likely necessitate the removal of significant vegetation and have subsequent biodiversity impacts within the PGA.

Landscape Type

The Big Hill PGA is a Type 3 landscape. There is unmanaged vegetation within 150 metres and has the potential for neighbourhood scale destruction. Fire can approach from both the north-west and south-west and safe access to a low fuel area is uncertain.

Biodiversity values

The following environmental planning controls apply in parts of the PGA:

- Environmental Significance Overlay 1 (Watercourse Protection)

The Ecological Vegetation Classes and Bioregional Conservation Status' apply to the Big Hill PGA:

- 61: Box Ironbark Forest (Depleted)
- 81: Alluvial Terraces Herb-rich Woodland/Creekline Woodland Mosaic (Vulnerable)

The Preliminary Ecological Assessment prepared by Practical Ecology report (refer Section 3.6.) work referred to this area as the Calder Highway Growth Area. The report noted that this area was well vegetated and that it played an important connective role within the broader landscape. It is also likely to provide quality habitat for local species.

Development in this area, particularly the southern area would likely result in unacceptable biodiversity loss outcomes.

Summary

The PGA and surrounding area are generally flat and but there is vegetation within the PGA and the adjoining land. A neighbourhood scale bushfire could impact the area from multiple directions and there is the potential for ember attack. Access to safe areas is uncertain, particularly for the southern part of the PGA.

The PGA is considered to broadly be a Landscape Type 2/3 in accordance with the *Planning Permit Applications Bushfire Management Overlay Technical Guide (2017)*.

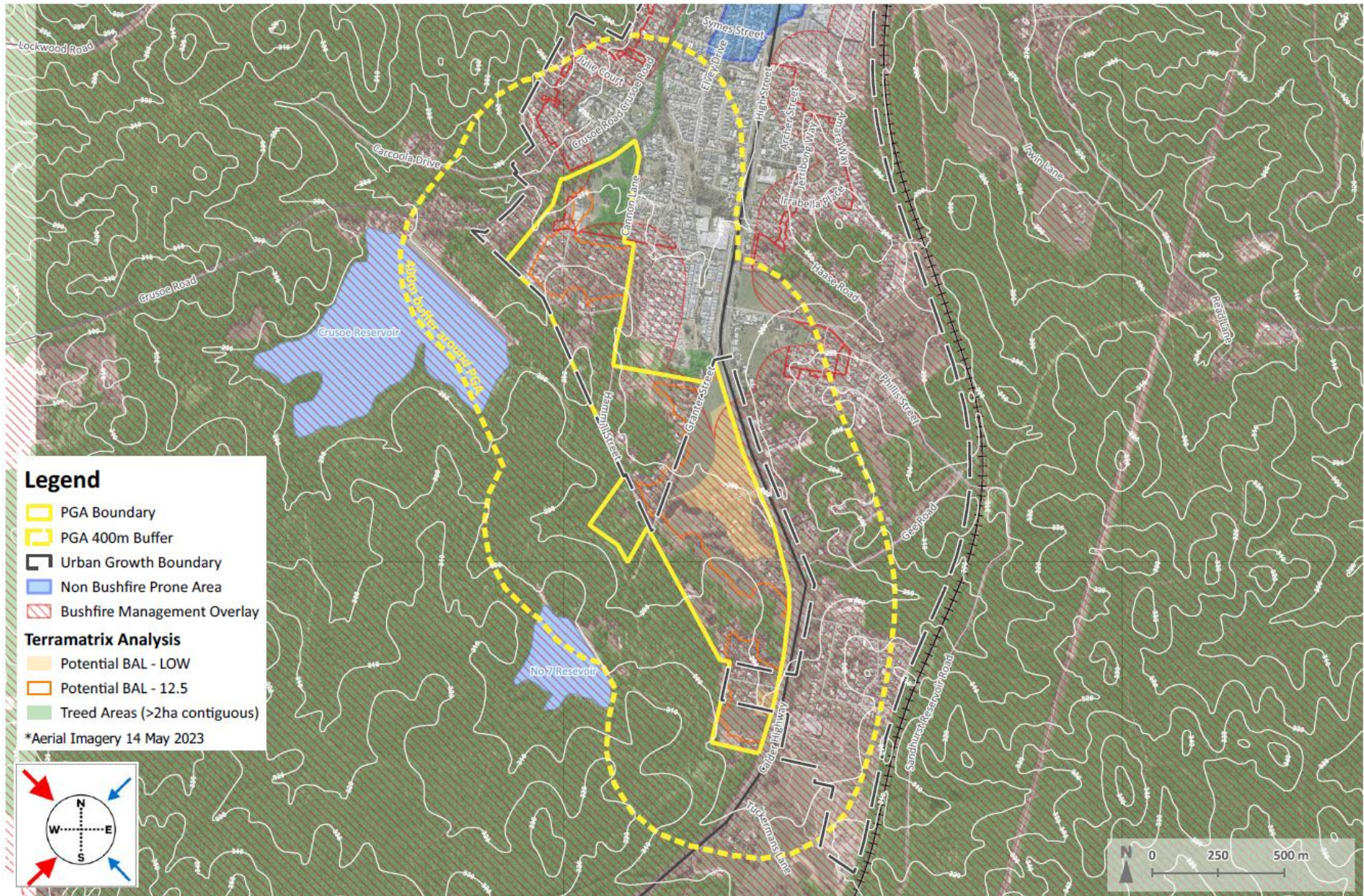
The Terramatrix report noted that Big Hill was one of five PGA's that were the "least favourable locations to direct growth from a bushfire perspective".

Big Hill is a medium to high risk location in which direct population growth and development.

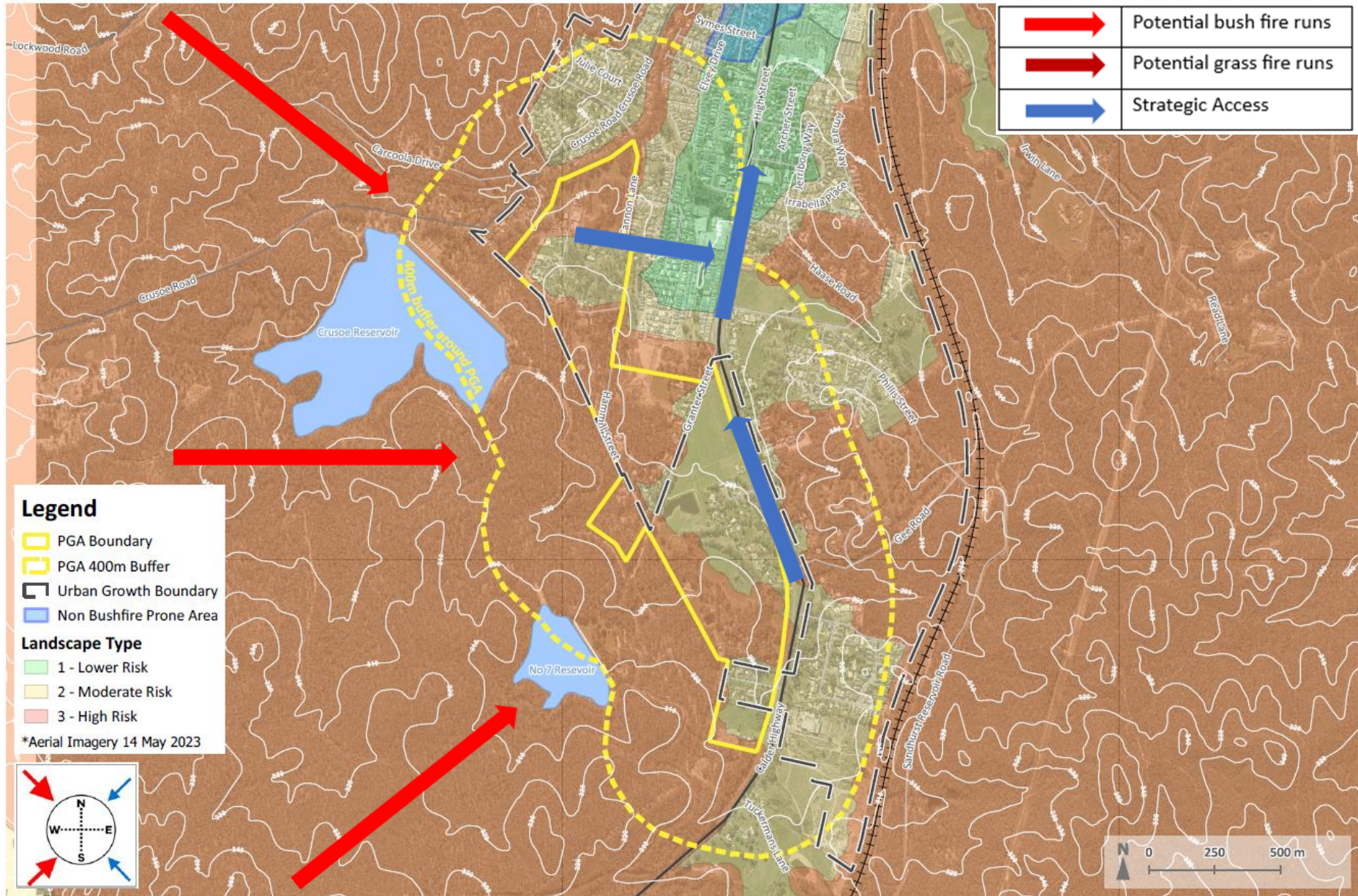
Overall risk level

The overall level of risk to this PGA is medium to high.

Bushfire Hazard Assessment - Big Hill Potential Growth Area (PGA)



Landscape Types - Big Hill Potential Growth Area (PGA)



7.11 Lockwood Road

This PGA sits to the west of Kangaroo Flat and is outside the Urban Growth Boundary. It adjoins Industrial 3 and General Residential zoned land and adjoins the Bendigo Regional Park. It has not been previously identified as a future urban investigation area but there has been landowner interest in developing the area for residential or industrial purposes.

	
<p>Mannallacks Road looking south</p>	<p>Cnr Mannallacks and Lockwood Road looking west</p>
	
<p>Lockwood Road looking north</p>	

Vegetation and topography

The PGA adjoins the Bendigo Regional Park to north, west and south. The western edge of this boundary appears to follow a water race and has an unusual alignment. There is also a reasonable coverage of vegetation within the PGA on private land, in road reserves and along a drainage line that runs parallel to Lockwood Road.

The topography of the area is undulating, with some parts of the PGA having a slope in the 5 to 10 degree range.

Potential for neighbourhood scale fire

The Terramatrix Report identified that there is potential for a neighbourhood scale fire to impact the PGA from the Bendigo Regional Park to the north-west and south-west of the PGA. There is also a high risk of ember spotting from a well developed fire to the north-west and south-west.

Almost the entire PGA, other than a small portion of land near the Lockwood Road/Fairview Road intersection, is affected by the BMO.

Access to low fuel areas

While the site does have access to Lockwood Road, having safe access to a low fuel area in the event of a bushfire could be problematic. This could be improved with careful planning and design should this area develop; however significant vegetation management would be required.

Risk to adjoining areas

Development in this area could reduce the risk to the residential properties to the south-west of the PGA.

Achieving a BAL 12.5

Achieving a BAL 12.5 could be possible in this area with a setback of 48 metre or 57 metres depending on the location, however it would likely necessitate the removal of significant vegetation and have subsequent biodiversity impacts within the PGA.

Landscape Type

The Lockwood Road PGA is a Type 3 landscape. There is unmanaged vegetation within 10 metres and has the potential for neighbourhood scale destruction. Fire can approach from both the north-west and south-west and safe access to a low fuel area is uncertain.

Biodiversity values

The following environmental planning controls apply in parts of the PGA:

- Environmental Significance Overlay 1 (Watercourse Protection)

The Ecological Vegetation Classes and Bioregional Conservation Status' apply to the Lockwood Road PGA:

- 20: Heathy Dry Forest (Least Concern)
- 61: Box Ironbark Forest (Depleted)
- 81: Alluvial Terraces Herb-rich Woodland/Creepline Woodland Mosaic (Vulnerable)

The Preliminary Ecological Assessment prepared by Practical Ecology report (refer Section 3.6.) noted that the area had large patches of vegetation and scattered Large Trees. The area would play an important ecological role in the area. There would be significant offset costs associated with developing the area and a EPBC Act referral would likely be triggered.

Development in this area would likely result in unacceptable biodiversity loss outcomes.

Summary

The PGA and surrounding area have significant vegetation and a neighbourhood scale fire could impact the PGA from multiple directions as well as the potential for ember attack.

Safe access is uncertain in the event of fire. Any bushfire protection measures would likely result in unacceptable biodiversity impacts.

The PGA is considered to be a Landscape Type 3 in accordance with the *Planning Permit Applications Bushfire Management Overlay Technical Guide (2017)*.

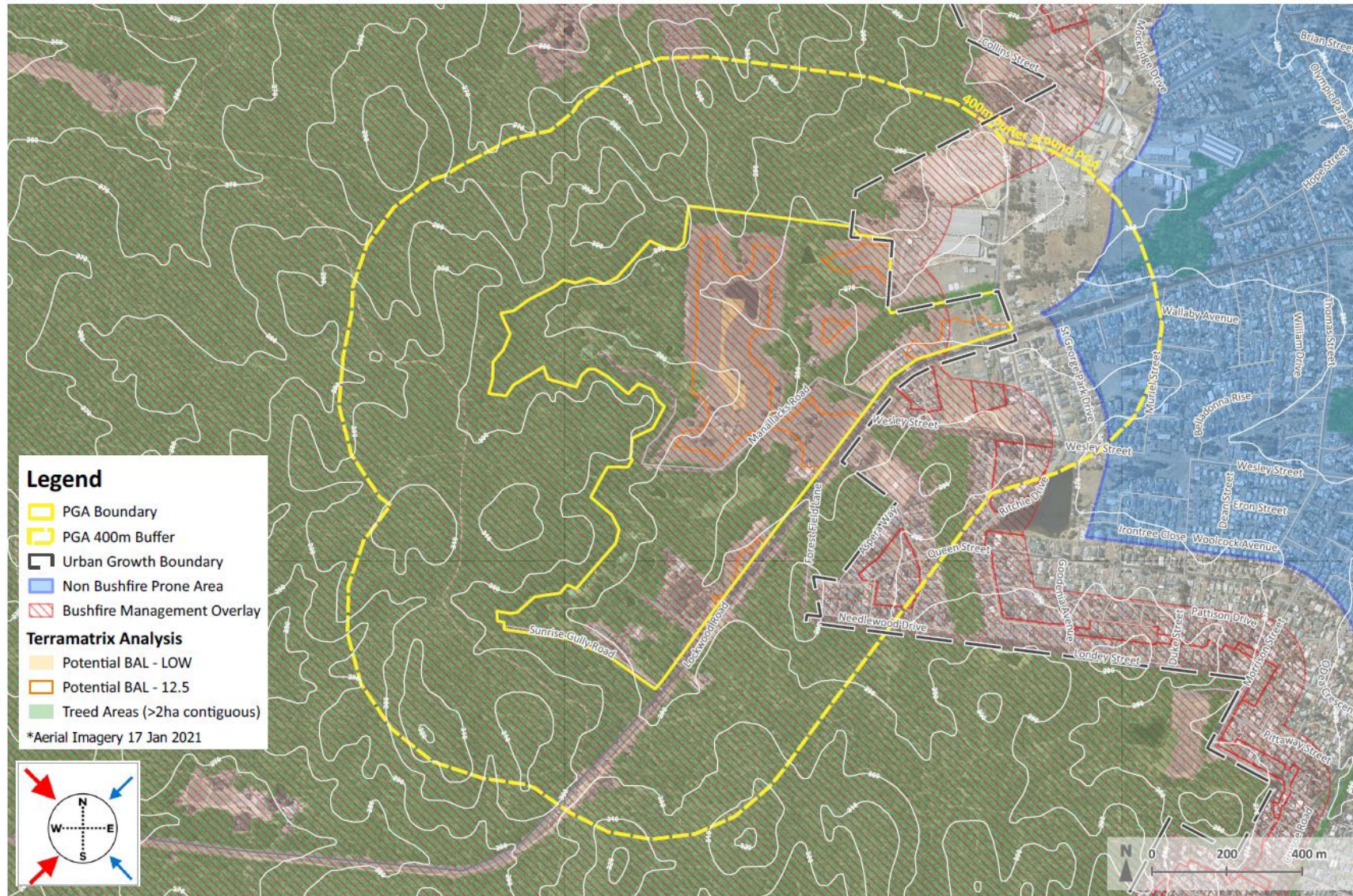
The Terramatrix report noted that Lockwood Road was one of five PGA's that were the "least favourable locations to direct growth from a bushfire perspective".

Lockwood Road is a high risk location to direct population growth and development.

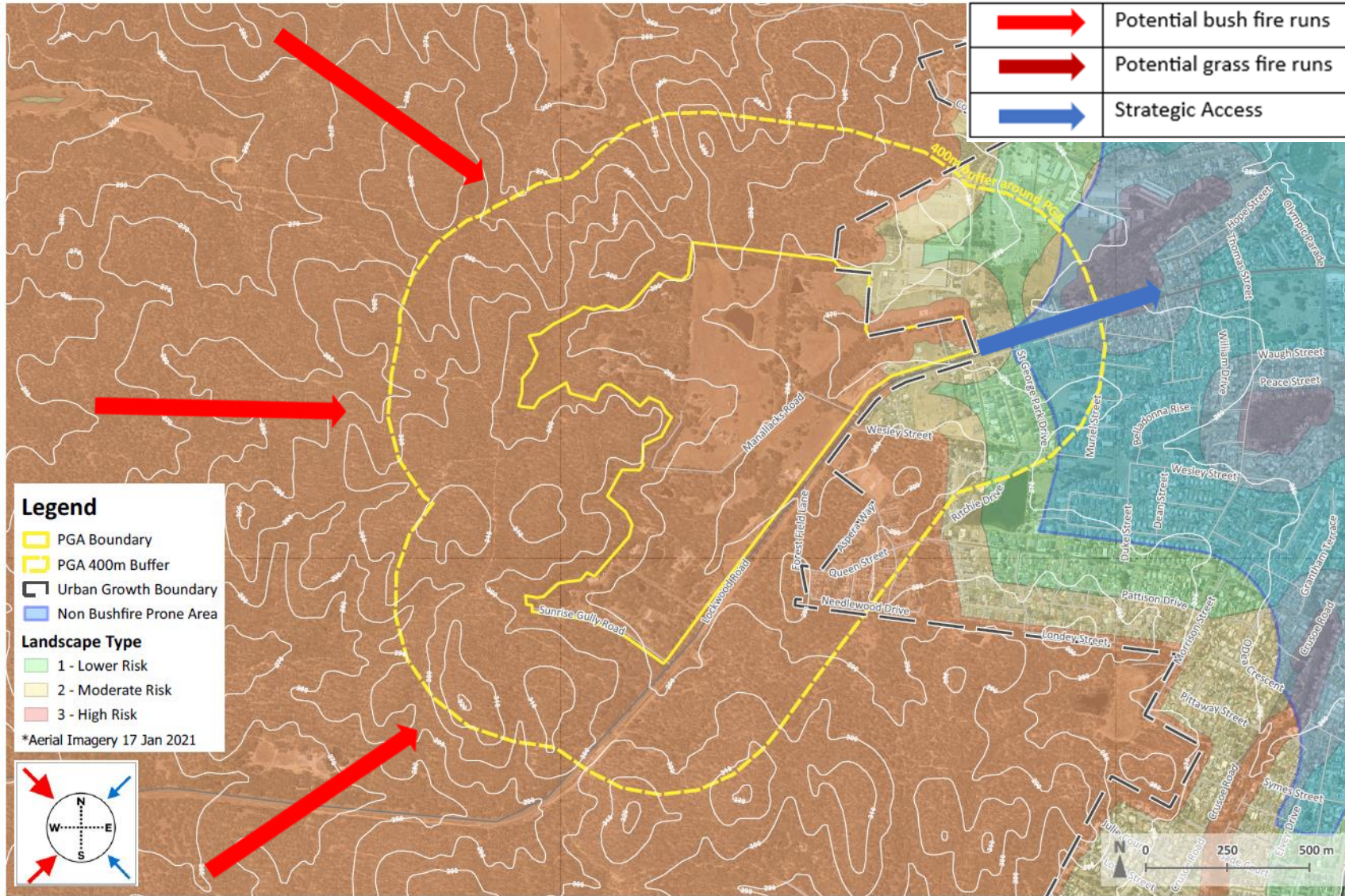
Overall risk level

The overall level of risk to this PGA is high.

Bushfire Hazard Assessment - Lockwood Road Potential Growth Area (PGA)



Landscape Types - Lockwood Road Potential Growth Area (PGA)



7.13 Conclusion

The following table indicates the risk level for each PGA and the Landscape Type. Some PGAs clearly fall within one risk category and Landscape Type, where others are more complex due to the variability in topography, vegetation, adjoining areas and may exhibit characteristics of two or three Landscape Types.

The assessment also recognises that as an area develops the Landscape Type may change as vegetation in the area is removed or managed, once access is improved, or if the potential for a neighbourhood scale destruction decreases.

It is noted that the assessments of these categories have been undertaken at a point in time.

PGA	Risk Level	Landscape Type
Marong Huntly * Strathfieldsaye (part)	Low	1
Maiden Gully PSP (part) Junortoun	Low/Med	1/2
Maiden Gully (north west)	Med	2
Strathfieldsaye (part) Maiden Gully PSP (part) Big Hill	Med/High	2/3
Watson Street Maiden Gully (south east)/Olympic Parade Simpsons Road Lockwood Road	High	3

* Other than the south west corner that is medium to high

Having regard to the above, Marong and Huntly are the two lowest risk locations from a bushfire perspective to direct population growth and development. Land to the east of Mannes Lane/Somerset Park Road in Strathfieldsaye and parts of the Maiden Gully PSP also have some areas that are considered to be low risk or can be designed in such a way to achieve BAL-12.5, whereas other discrete areas within the PGAs are a higher risk (these are indicated in Sections 7.3 and 7.5).

More detailed bushfire assessments will be required when planning and design is undertaken for the chosen growth areas. This will ensure potential biodiversity impacts are considered by CoGB and DEECA, and it will also ensure that CoGB and the CFA can determine the planning and design requirements, including interface treatments.

The remaining areas are not considered to be appropriate for residential or more intensive development at this point as there are lower risk locations in which to direct population growth and development.

These conclusions relate solely to bushfire issues. It is recognised that there are other non-bushfire related constraints to development, and these will be explored below for Marong, Huntly, Strathfieldsaye and parts of the Maiden Gully PSP area.

8. Growth Area considerations and prioritisation

This section discusses the non-bushfire constraints to development. These constraints in addition to the relative level of bushfire risk then inform the prioritisation of the PGAs in terms of locations to direct population growth and development.

8.1 Infrastructure availability/capacity

An important issue when considering a potential future growth area is its ability to be serviced by reticulated infrastructure. Of particular importance is water and sewerage infrastructure, which is the responsibility of Coliban Water.

Coliban Water has long term investment and infrastructure plans, and these will need to align with the PGAs. Electricity, telecommunications and road/transport infrastructure are other considerations.

8.2 Land use and development constraints

While State Planning Policy clearly dictates that the protection of human life is the priority over all other policy considerations it is recognised that there are numerous non-bushfire related opportunities and constraints that may affect an areas ability to accommodate population growth and development.

Within the context of Greater Bendigo:

- Opportunities include:
 - land size/ non-fragmentation
 - alignment to endorsed strategies
 - proximity to transport network
 - proximity to identified activity centres
- Constraints include:
 - flooding
 - potential contamination
 - vegetation
 - buffers to facilities such as Coliban Water's Wastewater Treatment Plan
 - proximity to industrial land
 - Declared Special Water Supply Catchment Areas (under the *Catchment and Land Protection Act, 1994*)
 - proximity to intensive agricultural uses

8.3 Vegetation and Biodiversity Values

Vegetation and biodiversity values are referred to in Section 7 in relation to each PGA. The State Planning Policy does mention that any bushfire protection measures cannot result in "unacceptable biodiversity impacts."

In the event that vegetation loss might be considered acceptable, the offset costs (and in particular the species-specific offset costs) may make development unviable. Although growth areas might be identified, it may be that they do not proceed to planning, design or rezoning if the offset costs make it unviable to develop the land.

8.4 Growth area size and ownership fragmentation

A further challenge for growth in the Greater Bendigo context is the pattern of fragmented land ownership. Multiple landowners on relatively small parcels makes the assembly of land into developable size parcels difficult. It is also challenging to achieve coordinated development when dealing with multiple landowners.

8.5 Strategic planning history

Given the City's long running program of future planning of the municipality, it is also recognised that there are a number of areas that have been identified for growth dating back 20 years.

While the changes associated with bushfire provisions and native vegetation controls increased the complexity of planning growth areas, it is important to recognise that there is a long standing commitment (and community expectation) that these areas will deliver some degree of future growth. This level of growth may not be to the extent that was originally anticipated, but it is important to recognise this past strategic direction.

8.6 Comparative analysis and prioritisation of PGAs

The table on the following page summarises the outcomes of this high level strategic assessment of the bushfire risk and factors in the various other considerations in identifying a future growth area. The table also makes recommendations about the areas in which to direct population growth and development.

Two of the PGAs are split (Strathfieldsaye and the Maiden Gully PSP) in recognition that there are areas within both PGAs that are potentially suitable for development, but there are also some areas that aren't. The potentially suitable areas are indicated with the designation (Part A).

Having regard to the bushfire assessment and the non-bushfire related issues discussed in Section 8 it is considered that Marong and Huntly are the two PGAs that are lower risk locations in which to direct population growth and development in the first instance. The planning scheme amendment to introduce the Marong Township Structure Plan into the Greater Bendigo Planning Scheme (C263gben) is currently underway, and this report reconfirms its designation as a growth area.

There are areas within the Maiden Gully PSP and Strathfieldsaye south and east growth areas that may be suitable for development subject to careful planning and design. These two areas are potentially suitable locations to direct population growth and development but recognising that the relative level of risk is higher than Marong and Huntly.

More detailed precinct assessments will be required for Huntly, Strathfieldsaye and the Maiden Gully PSP to consider bushfire risks and biodiversity values and ensure appropriate mitigation measures. This information would then become an input into the more detailed structure planning process for each growth area.

The remaining areas are not considered to be appropriate locations to accommodate growth, predominantly because the level of bushfire risk and biodiversity impacts are not acceptable.

	Bushfire Risk Level (1)	Risk reduction to adjoining areas (2)	Cost effective provision of infrastructure (3)	Environmental Constraints (% of area) (4)	Incompatible adjoining uses/ Buffers (% of area)	Fragmented ownership	PGA size	Strategic alignment (within UGB or identified as a growth area)	Proximity to transport network (main roads and PT)	Proximity to activity centre	Overall suitability as a growth area
Marong (Refer 7.1)	Low	Development to the west of town would reduce the risk to residents north of the golf course.	All services will be available and have been planned for by agencies. Additional growth over and above what is planned would trigger the need for upgrades.	LSIO along Bullock Creek. Small area of BMO in south east	Broiler farm to the west of town but outside the PGA.	Land assembly largely complete	528.1	MTSP adopted	Good access to the Calder and Calder Alternative Highways. Public transport is currently limited, but will improve as the town develops	Marong activity centre is centrally located and accessible to the growth areas	Highly suited as a growth area
Huntly (N & E) (Refer 7.2)	Low	There is limited development SE and NE of the PGA	All services are available in the area but may require increased capacity.	The BMO applies to land in the south-west corner and there is an ESO1 on Sandy Creek, but other than that the area is unconstrained.	Major poultry farm to the north with buffer impacts on some of the PGA.	Lot sizes in the area are generally larger and some land assembly has occurred.	602.4	Structure plan currently in development for township, and can be expanded to include PGA.	New train station. Has limited bus access currently.	New activity centre being planned proximate to the train station.	Highly suited as a growth area although the south-west corner would require careful consideration.
Strathfieldsaye (S & E) East of Mannes Lane/ Somerset Park Road (Refer 7.3)	Low-Medium	There is limited development SE and NE of the PGA	All services are available in the area but may require increased capacity.	Part LSIO2, Parts ESO1, DPO26, SMO, BMO, VPO2	Potentially affected by buffer to two broiler farms. 39ha of land off Mannes Lane has been purchased by the CoGB for a future public open space reserve.	Lot sizes in the area generally greater than 2ha in area.		Identified as a potential growth area in the PPF. Partially within the UGB.	School bus access only.	Minimum 1.5km from Strathfieldsaye Large Activity Centre	Suited as a growth area, would require detailed consideration of the constraints in the area including bushfire, biodiversity, buffers. There is also a large scale (43 ha) walnut farm that is unlikely to close.
Strathfieldsaye (S & E) South of Bakers Lane (Refer 7.3)	Medium with some areas of high risk	There is limited development SE and NE of the PGA	All services are available in the area but may require increased capacity.	Part LSIO2, Parts ESO1, SMO, BMO, VPO2	Potentially affect by buffer to a broiler farm.	Lot sizes in the area generally greater than 2ha in area. Some land assembly has occurred.		Identified as a potential growth area in the PPF. Partially with the UGB.	School bus access only	Minimum 1.5km from Strathfieldsaye Large Activity Centre	These areas are presently constrained and not suitable for development. If these constraints alter (i.e. a poultry

	Bushfire Risk Level (1)	Risk reduction to adjoining areas (2)	Cost effective provision of infrastructure (3)	Environmental Constraints (% of area) (4)	Incompatible adjoining uses/ Buffers (% of area)	Fragmented ownership	PGA size	Strategic alignment (within UGB or identified as a growth area)	Proximity to transport network (main roads and PT)	Proximity to activity centre	Overall suitability as a growth area
											farm ceases operation) then this could be re-visited)
Maiden Gully (NW) (Refer 7.4)	Medium	Development in this area could help reduce the risk in the Maiden Gully PSP area, should it develop.		There is wide floodplain that impacts on the western part of the PGA and VPO2 (although the area is largely cleared).	N/A	Lot sizes in the area generally greater than 2ha in area.		Identified as a potential growth area in the PPF.	No public transport currently available. Notionally there is a future train station identified in the area.	Minimum 2km from Maiden Gully Large Activity Centre (Future)	These areas are presently constrained and not suitable for development. Should a train station be developed in the future this might present some development opportunities in the area.
Maiden Gully PSP (Part A) (Refer 7.5)	Low-Medium	Development in this area could help reduce the risk to the adjacent residential areas.	The planning for infrastructure in this area is well advanced and includes a school built based on the PSP.	There are pockets of vegetation that would need detailed assessment to understand their biodiversity values.	N/A	Although it appears fragmented, a reasonable amount of land assembly has occurred.		Identified as a potential growth area in the PPF. Within the UGB. Has adopted PSP – therefore community expectation that it will be a residential growth area	Urban and school bus network, but with limited service.	Minimum 400m from Maiden Gully Large Activity Centre (Future)	Suited as a growth area, would require detailed consideration of the constraints in the area including bushfire, biodiversity, buffers.
Maiden Gully PSP (Part B) (Refer 7.5)	Medium	Development in this area could help reduce the risk to the Marist School and the existing Low Density Residential area	The planning for infrastructure in this area is well advanced and includes a school built based on the PSP.		N/A	This area is heavily fragmented and coordinating development would be challenging, although there are a number of lots 2ha+ in area.		Identified as a potential growth area in the PPF. Within the UGB. Has adopted PSP	Urban and school bus network, but with limited service.	Minimum 1.9km from Maiden Gully Large Activity Centre (Future)	These areas are presently constrained and not suitable for development. If these constraints alter (i.e. a public open space reserve is established opp. The Marist School, then this could be re-visited)

	Bushfire Risk Level (1)	Risk reduction to adjoining areas (2)	Cost effective provision of infrastructure (3)	Environmental Constraints (% of area) (4)	Incompatible adjoining uses/ Buffers (% of area)	Fragmented ownership	PGA size	Strategic alignment (within UGB or identified as a growth area)	Proximity to transport network (main roads and PT)	Proximity to activity centre	Overall suitability as a growth area
Junortoun (Refer 7.6)	Medium	Development in this area may help reduce the risk the residential properties to the south-east of the PGA	Can be serviced, but may require water upgrades.	Area significantly affected by airport planning controls, BMO along the boundary of the PGA and VPO2 in the eastern section.	Affected by planning controls that relate to Bendigo Airport flight path.	This area is fragmented with a number of LDRZ subdivisions occurring over recent years	101.8	Within the UGB	Urban and school bus network.	Minimum 2.7km from Strathdale Large Activity Centre	Geographically the PGA is small and ownership is fragmented. The constraint of the airport limits development opportunities.
Maiden Gully (SE)/Olympic Parade (Refer 7.7)	High	May provide some benefit to the land to the south-east.	This area would be challenging to service and would require significant investment	Area entirely affected the BMO and significantly affected by the ESO2 and VPO2	N/A	Lot sizes in the area generally greater than 2ha in area.		Not identified for future growth	Urban and school bus network, but with limited service.	Minimum 1.6km from Large Activity Centre (Future)	Highly constrained, high level of fire risk, unsuitable for development.
Simpsons Road (Refer 7.8)	High	Development in this area may reduce the risk to the residential properties to the south-east.	This area can be serviced but would require upgrades.	Area entirely affected the BMO and partially affected the ESO1 and LSIO1	Part of the PGA potentially affected by buffer to Coliban Water Wastewater Treatment Plant	Lot sizes in the area generally greater than 2ha in area.	237.8ha	Identified as a potential growth area in the PPF.	No public transport currently available.	Minimum 2.6km from Eaglehawk and 3km from Epsom Large Activity Centres	Highly constrained, high level of fire risk, unsuitable for development.
Watson Street (Refer 7.9)	High	Development in this area may reduce the risk to the residential properties to the east.	All services are available in the area but may require increased capacity. Some areas may be more expensive due to topographic constraints.	Area entirely affected the BMO and significantly affected by the SLO1 and VPO2	N/A	This area is fragmented with a number of LDRZ subdivisions that have occurred historically.	206.3ha	Within the UGB but not identified for further growth.	Is accessible to the school bus network.	Minimum 850m from White Hills Neighbourhood Activity Centre	Highly constrained, high level of fire risk, unsuitable for development.
Big Hill (Refer 7.10)	Medium – High	Development in this area may reduce the risk to land to the east, including the Big Hill Primary School.	All services are available in the area but may require increased capacity.	BMO, ESO1, LSIO2	N/A	This area is somewhat fragmented with most lots being under 2ha in area, although there are some 2ha+ lots.	83.2ha	Identified as a potential growth area in the PPF.	Adjoins a main road although creating additional access is not likely to be supported. Is proximate to an urban and rural bus route.	Minimum 1.1km from the Kangaroo Flat South Large Activity Centre	Constrained and not suitable for development. insufficient scale to warrant a Council led rezoning process.

	Bushfire Risk Level (1)	Risk reduction to adjoining areas (2)	Cost effective provision of infrastructure (3)	Environmental Constraints (% of area) (4)	Incompatible adjoining uses/ Buffers (% of area)	Fragmented ownership	PGA size	Strategic alignment (within UGB or identified as a growth area)	Proximity to transport network (main roads and PT)	Proximity to activity centre	Overall suitability as a growth area
Lockwood Road (Refer 7.11)	High	Would potentially reduce some of the risk to land in the south-west	All services are available in the area but may require increased capacity.	Area is 90% constrained by overlays, mainly the BMO but also the ESO1 an LSIO1. It is noted that the undulating topography of the area would likely require significant earthworks if the area were to develop.	Adjoins an Industrial 1 Zone.	Lot sizes in the area generally greater than 2ha in area.	77.5	Not identified for future growth	Adjoins a main road although there are limited points of access currently. Is on a school bus route.	Minimum 1.5km from Kangaroo Flat Large Activity Centre	Highly constrained, high level of fire risk, unsuitable for residential or industrial development.

- (1) This is the overall level of risk as identified in this report, recognising that there are pockets of low risk in a number of the PGAs.
- (2) Does development in the PGA reduce to risk to adjoining area
- (3) This relates to water and sewerage and whether it is (a) planned for by Coliban or (b) distance for a connection.
- (4) Overlays in the Planning Scheme (VPO, ESO, LSIO, FO, etc) – any controls that potentially restrict development.

9 Recommendations

This section draws the bushfire assessments, considers the other constraints to development and then identifies the PGAs where future growth and development should be directed.

9.1 Recommended growth areas

This assessment has reviewed a number of PGAs in relation to bushfire risk and other strategic planning considerations (access, land fragmentation, activity centre proximity etc.), and has concluded that the following areas are suitable for residential growth within the City's Managed Growth Strategy:

- Marong (planning scheme amendment currently underway to implement the Marong Township Structure Plan into the Greater Bendigo Planning Scheme and realise the future residential precincts).
- Huntly – east and south-east of the Huntly Train Station.
- Strathfieldsaye – east of Mannes Lane/Somerset Park Road and areas south of Bakers Lane.
- Maiden Gully PSP – The extent of residential growth previously shown in the Maiden Gully PSP may not be achievable, however a smaller residential growth area can be investigated.

Specific assessments will be required for the Huntly, Maiden Gully and Strathfieldsaye growth areas. These will need to factor in biodiversity considerations as there are areas within each growth area where biodiversity losses could be deemed to be unacceptable. An additional assessment isn't required for Marong township to confirm its growth area designation, as it is currently being implemented into the Greater Bendigo Planning Scheme, however specific assessments will be required for each of the future residential precincts to inform planning and design.

These four growth areas can accommodate sufficient supply to provide for future housing growth and development for the lifespan of the Managed Growth Strategy.

The remaining PGAs are not considered suitable for residential growth as the level of bushfire risk is too high and managing that risk would likely result in unacceptable biodiversity outcomes.

The City will work closely with emergency services, including the CFA, Fire Rescue Victoria, Victoria Police, Ambulance Victoria and State Emergency Services, to ensure that their requirements are also factored into the planning and design of the recommended PGAs.

9.2 Planning and design considerations

One of the key learnings from this project and this was a key direction from the Victorian Bushfire Royal Commission is the need to consider bushfire risks at a strategic level.

In support of the four recommended PGAs, there are several mechanisms that will be used to ensure that they can be developed having regard to bushfire risk. These include:

- Introducing a local planning policy at clause 13.02-1L of the Greater Bendigo Planning Scheme.

- Introducing Design and Development Overlays to provide greater growth area bushfire management.
- Introducing Development Plan Overlays to ensure that the design, layout, access, land uses and staging of each of the PGAs can be considered and approved in a coordinated manner.

These are discussed in more detail below.

While Clause 13.02 provides a strong overarching policy direction there is a need to build on this and provide some more localised policy guidance. A draft local policy for potential inclusion in Clause 13.02 has been prepared and can be found at Appendix 2.

Included within the policy directions are:

- Road layouts
- Lot sizes and staging of subdivisions
- Location of defensible spaces

Similarly, while the BMO provides direction on development at a subdivision and a site scale, it does not really address bushfire risk issues at a precinct scale.

A Design and Development Overlay (DDO) template has been prepared and included in Appendix 3. This is intended to provide a guide that should be adapted for each growth area and respond to any issues that might be particular to the precinct.

It is also important to note that before considering the application of the DDO to manage the bushfire risk, broader consideration needs to be given as to whether an area is low risk, whether the protection of life be prioritised and whether the risk can be managed without resulting in unacceptable biodiversity outcomes.

The DDO provisions build upon the guidance provided in the *Design Guidelines for Settlement Planning at the Bushfire Interface* (Section 3.3). These are in addition to the Approved and Alternative Measures listed in Clause 53.02. Included in the draft DDO are provisions related to:

- Locating open space at the interface with the hazard
- The use of perimeter roads being located at the bushfire interface and roads leading away from the hazard
- Treatments, landscaping, etc. for the defensible space areas
- Lot sizes
- Fencing

Appendix 1 Fuel Management Practices

The following are examples of fuel management practices that are used in Greater Bendigo to manage fuel loads.

Prescribed Burning

A prescribed or controlled burn is probably the most recognisable and well-known form of fuel management where a small fire is deliberately lit under strict supervision and burns any ground fuels and the like. These typically take place on crown land although there is a strong push by fire agencies for “cross tenure” burns that also include privately owned land.

The challenge with prescribed burns is that the time of year, weather and other factors have to be “just right” for the burn to take place and successfully reduce fuel loads. If these conditions aren’t met the burn cannot take place.

There have also been “cultural burns” take place under the auspice and participation of local indigenous people that seek to replicate traditional land management practices.

Mulching

This is where ground fuels and the like are mulched (or “groomed”) rather than be subject to prescribed burning. It is generally regarded as having a lesser environmental impact but is not always possible due to heavy machinery needing to access the area in question. It is also less invasive in terms of impact on nearby residents compared to prescribed burning. Mulching is also less subject to environmental/weather conditions compared to prescribed burning.

The following image is a before and after example of an area that has been mulched.



Strategic Fuel Breaks

A Strategic Fuel Break is where a strip of vegetation (up to 40m wide) has been removed or modified on a permanent basis to reduce the spread and/or intensity of a fire. It can also assist emergency services in accessing a fireground.



Clearing Vegetation

The final way to manage fuel loads is to remove the vegetation. While some vegetation removal may be appropriate to manage risk, State policy requires that bushfire mitigation measures should not result in an “unacceptable biodiversity” impact. What constitutes “unacceptable” needs to be determined on a case by case basis.

Appendix 2 Draft Local Policy to Clause 13.02-1L

Policy application

This policy applies to residential subdivisions of 16 lots or more in greenfield settings that are subject to the Bushfire Management Overlay.

Objectives

To ensure the design and development of land for residential purposes reduces the risk to human life, property and community infrastructure from bushfire to an acceptable level.

Strategies

For subdivision of land into 16 lots or more, to:

- Provide perimeter roads and hard edges at the urban – hazard interface (including grassland).
- Space roads leading away from the hazard no more than 120 metres apart and have a minimum pavement width of 7.3 metres to allow for the passage of emergency service vehicles.
- Discourage cul-de-sacs.
- Locate lot sizes of between 800m² and 1200m² at the interface with the hazard.
- Stage subdivisions to ensure that properties do not abut unmanaged vegetation at completion.
- Ensure that defensible space is to be wholly contained within the subject land.
- Where practical, locate public open space, drainage reserves or other uses that require elevated levels of fuel management (and therefore increased levels of safety) to be located at the interface with the bushfire hazard.
- Ensure that landscaping including vegetation screening, is designed to minimise fire risk.
- Avoid development in areas of biodiversity or landscape significance where bushfire mitigation measures will compromise their biodiversity or landscape values.

Policy Guidelines

Consider as relevant:

The condition, location and route of available vehicle access and its suitability for safe and efficient egress before and during a bushfire.

Policy Documents

Consider as relevant:

- *Greater Bendigo Bushfire Assessment* (CoGB, 2024)
- *Design Guidelines for Settlement Planning at the Bushfire Interface* (CFA and DELWP, July 2020)

GROWTH AREA BUSHFIRE MANAGEMENT

Design objectives:

- To ensure that the construction standards of new development appropriately respond to the localised landscape bushfire risk.
- To ensure that development is sited to appropriately respond to landscape bushfire hazards.
- To ensure that development is provided with adequate defensible space.
- To prevent the bushfire landscape risk from increasing.

Buildings and works

A permit is not required to construct a building or carry out works for the following:

- A dwelling or extension to a dwelling or an outbuildings and non-habitable building on land not subject to the Bushfire Management Overlay.
- A dwelling or extension to a dwelling or an outbuildings and non-habitable building where a radiant heat flux of no more than 12.5 kilowatts/square metre can be achieved under AS 3959-2009 Construction of Buildings in Bushfire-Prone Areas (Standards Australia, 2009).
- An alteration or extension to an existing building used for a dwelling or dependent person's unit that is less than 50 per cent of the gross floor area of the existing building.
- A non-habitable building, or outbuilding, that is sited more than 10 metres away from any building used for accommodation.
- A habitable building within an approved building envelope where the lot was created in accordance with Section 3.0 of this Clause and the requirements listed below have been met

An application to construct a building or construct or carry out works should meet the following requirements:

- Any development must be setback (or separated) from a bushfire hazard at least the minimum distance specified in Table 1 Column A of Clause 53.02 based on a vegetation and slope assessment undertaken against Australian Standard AS3959-2009.
- Canopy trees must be separated by at least 2 metres.
- Ensure buildings achieve a construction standard not less than BAL-19.
- Ensure a minimum of 2,500 litres static water supply for firefighting purposes, with fire authority fittings and access, is provided for developments on lots under 1,000 square metres.
- Ensure a minimum of 5,000 litres static water supply for firefighting purposes, with fire authority fittings and access, is provided for all lots over 1,000 square metres.
- Side and rear fencing is to be of non-combustible construction.

An application for construction of a building or to construct or carry out works is exempt from the notice requirements of section 52(1)(a), (b) and (d), the decision requirements of section 64(1), (2) and (3) and the review rights of section 82(1) of the Act.

Subdivision

A permit to subdivide land must meet the following requirements:

- Each lot must be of a sufficient size to ensure that the future development of the land can achieve a radiant heat flux of no more than 12.5 kilowatts/square metre under AS 3959-2009 Construction of Buildings in Bushfire-Prone Areas (Standards Australia, 2009).
- Each lot must be provided with vehicle access of good condition, in a suitable location that provides a route that is suitable for safe and efficient egress before and during a bushfire. Cul-de-sacs are discouraged.
- Staging of subdivisions is to be planned to ensure that properties do not abut unmanaged vegetation at completion.
- Defendable space is to be wholly contained within the subject land.
- For subdivisions of more than 16 lots a perimeter road is to be located at the interface with the hazard.
- Roads leading away from the hazard (as identified in the Bushfire Hazard Landscape Assessment) should be spaced no more than 120 metres apart and have a minimum pavement width of 7.3 metres to allow for the passage of emergency service vehicles (fire trucks).
- In a staged subdivision:
 - It must be demonstrated how safe access and egress to a BAL-LOW area under AS 3959-2009 Construction of Buildings in Bushfire-Prone Areas (Standards Australia, 2009) or low fuel area is to be maintained for each stage.
 - It must be demonstrated how each stage can achieved a radiant heat flux of no more than 12.5 kilowatts/square metre under AS 3959-2009 Construction of Buildings in Bushfire-Prone Areas (Standards Australia, 2009).
- Require lots sizes between 800m² and 1200m² to be located at the interface with the hazard as identified in the Bushfire Landscape Hazard Assessment. Lots should also indicate building envelopes that meets the relevant setback requirements in Clause 53.02.
- Locate public open space, drainage reserves or other uses that require elevated levels of fuel management (and therefore increased levels of safety) to be located at the interface with the bushfire hazard.

Application requirements

The following application requirements apply to an application for a permit under Clause 43.02, in addition to those specified elsewhere in the scheme and must accompany an application, as appropriate, to the satisfaction of the responsible authority:

- A Bushfire Hazard Site Assessment including a plan that describes the bushfire hazard within 150 metres of the proposed development. The description of the hazard must be prepared in accordance with Sections 2.2.3 to 2.2.5 of AS3959:2009 Construction of buildings in bushfire prone areas (Standards Australia) excluding paragraph (a) of section 2.2.3.2. Photographs or other techniques may be used to assist in describing the bushfire hazard.
- A Bushfire Hazard Landscape Assessment including a plan that describes the bushfire hazard of the general locality more than 150 metres from the site. Photographs or other techniques may be used to assist in describing the bushfire hazard. This requirement does not apply to a dwelling that includes all the approved measures specified in Clause 53.02- 3.
- A Bushfire Management Plan describing how the proposed development responds to the requirements in this clause including siting, defendable space, vegetation management, construction standards and other bushfire protection measures. If the application proposes an alternative measure, a bushfire management statement must explain how the alternative measure meets the objectives of this clause.
- A Vegetation Management Plan prepared to scale and with dimensions to show, to the satisfaction of the responsible authority:

- Landscaping of road reserves to be in accordance with the CFA publication “Landscaping for Bushfire”
- Street trees must not encroach over the trafficable roadway
- The setbacks of the development to all site boundaries.
- The defensible space zone.
- The vegetation management requirements, derived from Table 6 at Clause 53.02.
- How the vegetation management requirements will be practicably implemented.

Decision guidelines

The following decision guidelines apply to an application for a permit under Clause 43.02, in addition to those specified in Clause 43.02 and elsewhere in the scheme which must be considered, as appropriate, by the responsible authority:

- Whether appropriate siting can occur to provide for sufficient defensible space to protect development against bushfire risk.
- Whether the building design is appropriate in the context of any identified bushfire risk.
- Whether appropriate access and egress can be provided to lots in the event of a bushfire.
- Whether lots can be created without abutting unmanaged vegetation.
- Whether adequate water supply for firefighting purposes has been provided.
- Whether appropriate vehicle access design and construction has been provided.
- Whether the relevant application and permit requirements in this schedule have been met.
- Whether a Section 173 Agreement pursuant to the Planning and Environment Act 1987 is required to ensure ongoing maintenance of defensible space and other bushfire protection measures included within the Vegetation Management Plan.
- Any vegetation offsets should not be provided within the development area.
- Whether the proposed development would decrease the bushfire risk on the adjoining land.
- Any recommendations of the Bushfire Hazard Landscape Assessment.