

## **Bushfire Risk Assessment**

### **294 McLennan Street, Mooroopna**



**June 2023**

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**April 2022**

Report by Julian Drummond

**Cover image:** Channel and managed reserve areas onsite viewed from the south-western boundary

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# 1. INTRODUCTION

Practical Ecology have been commissioned by Greater Shepparton City Council to provide a bushfire risk assessment for 294 McLennan Street, Mooroopna which forms part of the Mooroopna West Growth Corridor in order to guide future development in a bushfire responsible manner.

## 1.1 Background

The Mooroopna West Growth Corridor comprises 260 hectares of developable land and is bound by the established urban area of Mooroopna to the east, Cornish Road to the north, the proposed Goulburn Valley Highway (Shepparton Bypass) reservation to the west along Excelsior Avenue and the Midland Highway to the south. The Growth Corridor is expected to take 30 years to fully develop and is expected to support a population of approximately 4,000 people based on a total lot yield of 1,600 lots (see Figure 1 for the proposed layout).

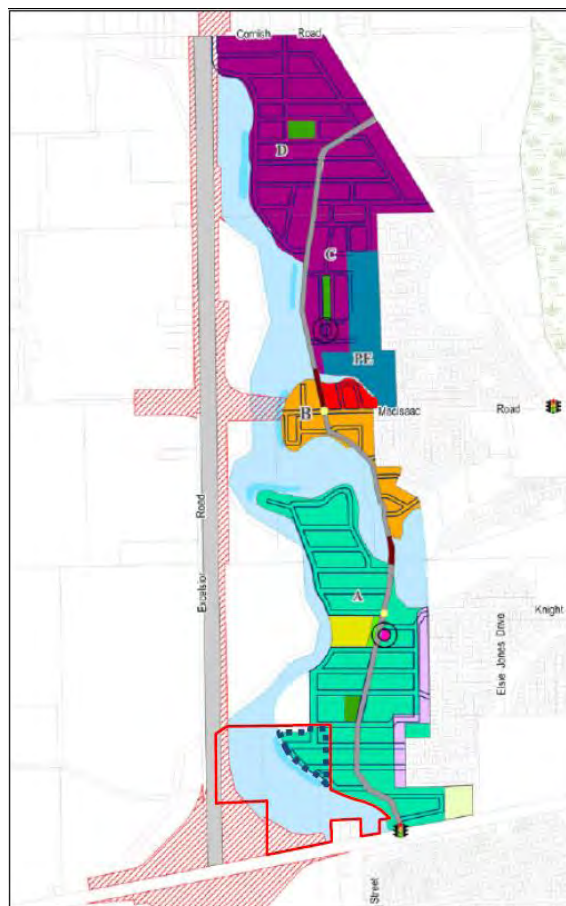


Figure 1. Mooroopna West Growth Corridor Concept Plan

Council acquired all of 294 McLennan Street, Mooroopna to facilitate the construction of the ultimate stormwater drainage solution envisaged for the Growth Corridor. Since then, the existing floodway traversing through the land has been formalised and a retardation basin constructed on the land to serve the residential development to the east. The north-eastern section of 294 McLennan Street is identified for residential development but is currently zoned Farming Zone.

As the site is located within the Bushfire Prone Area (BPA), it is subject to the planning implications enforced under Clause 13.02–1S. The Bushfire Management Overlay (BMO) is not present within the site although the objectives and strategies of Clause 44.06 BMO have still been taken into consideration as a benchmark for bushfire safety. We have addressed these requirements in the following report which include sections detailing the Bushfire Hazard Site Assessment, Bushfire Hazard Landscape Assessment and Bushfire Risk Assessment.

Clause 13.02–1S’s objective is to strengthen the resilience of settlements and communities to bushfire through risk-based planning that prioritises the protection of human life. While it does not list strict requirements and decision guidelines, it contains multiple strategies which need to be considered when determining bushfire risk in planning. One of these strategies, ‘Use and development control in a Bushfire Prone Area’, dictates which developments within Bushfire Prone Areas need to consider bushfire risk as part of their planning permission:

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

Since the expected development can be considered under one or more the above categories, this assessment seeks to determine the bushfire risk to the site and evaluate it against the requirements of Clause 13.02–1S to ensure it can proceed safely.

## 1.2 Scope

In order to provide a detailed assessment of the bushfire risk and provide the best possible solutions and options for any future development, this project encompassed the following:

- An assessment of the site and the area within 150m of the boundary to determine the vegetation classifications and slopes as per Australian Standards 3959–2018: Construction of Buildings in Bushfire Prone Areas (AS3959–2018).
- A review of the access and egress conditions around and within the site and of the vegetation and other infrastructure within the assessment and any hazard that may be present.
- A review of the wider landscape including bushfire history, potential bushfire conditions under prevailing conditions and potential refuges

- An assessment of the determined bushfire risk against Clause 44.06 Bushfire Management Overlay and Clause 53.02 Bushfire Planning (while the BMO does not apply within site, these measures form an excellent benchmark for bushfire safety).
- An assessment of the determined bushfire risk against the individual strategies of Clause 13.02–1S how well they are met across various areas of the site and surrounding areas.
- A list of recommendations for the subject site based on the determined bushfire risk and the strategies of Clause 13.02–1S.

### 1.3 Executive Summary

The subject site includes several parcels covering an irregular area at the southern end of the Mooroopna West Growth Corridor with McLennan Street along the southern boundary and Excelsior Avenue along the western boundary (see Figure 1 for the location). There are partially constructed residential areas to the east which are considered Low Threat along with surrounding road reserves and residential areas to the south.

The majority of the Classified Vegetation as per AS3959–2018 within the assessment area is Grassland on tilled paddocks, open, unmanaged paddocks and on a drainage/floodplain reserve established in the centre of the site. Grassland is also present on paddocks to the north–east, south of McLennan Street and west of Excelsior Avenue. There is also Woodland as per AS3959–2018 on an adjacent property to the north of the site.

The wider landscape is low risk with managed farmland being the only vegetation present to the north, south and west of the site. The landscape to the east contains the Township of Mooroopna, forested areas along the Goulburn River and the City of Greater Shepparton. The greatest bushfire hazard in this landscape is the vegetated areas around the Goulburn River which are separated from the site and in a position where bushfires are moved away from the site by prevailing conditions.

Bushfire can only approach the site from the north–west or south–west as a grassfire which is highly likely to be contained before it reaches the site due to the managed farmland present. Grassfires are also less likely to produce embers so the chances of the site being threatened are very low. Based on this and the site conditions present, the assessment area has been divided into thirteen areas based on the features present and the conditions they are likely to be subject to or create.

The risk of them being threatened by bushfire and the hazard they posed once ignited was rated as Low, Moderate or High. The majority of these areas had Low ratings except for the following (see Map 5 for the locations):

- **Area 5** is the Woodland vegetation on the property north of the site. This vegetation had a Low risk of igniting due to the reduced landscape risk but, if it were to ignite, it would pose a Moderate threat to adjacent areas.
- **Area 6** is the unmanaged paddocks on the south–western side of the site which also contains clay refuse piles from recent construction which create a large hillock. It is at a Moderate risk due to the Grassland and difficult terrain making it difficult to contain a fire here. It is well separated from residential areas though so the hazard is Low.



- **Area 8** is the existing drainage/floodplain reserve in the centre of the site. It is currently slashed, has high moisture levels and has open access so a fire can easily be contained so the risk is Low. **Area 9** is recently tilled farmland to the north-east which also has managed terrain and open access and it is considered Low risk. If a fire were to start and spread within these areas though, it would pose a Moderate hazard to the adjacent residential areas.
- **Area 10** and **Area 11** are the partially constructed residential areas to the east and some commercial/industrial lots along McLennan Street respectively. Both are adjacent to open Grassland areas to the south-east of the site so they are at Moderate risk. There would be hazard from the people attempting to leave these areas during a bushfire but not much ignition risk from the areas themselves so the hazard is Low.

The proposed layout of the site under the Mooroopna West Growth Corridor is for **Area 6** and **Area 7** to be developed into road reserve as part of the expansion of Excelsior Avenue, **Area 8** to be retained in its current form with the reserve to later extend over **Area 5**, and for the section of **Area 9** within the site to be developed into residential areas similar to **Area 10**. This proposal was assessed against Clause 13.02-1S and also against relevant sections of Clause 53.02 to provide additional security.

The reduced landscape risk along with the development of Excelsior Avenue which will increase the fuel break present means the landscape risk is considered addressed and there is not much point in assessing alternative locations. The protection of human life can be considered addressed if the onsite hazards are managed correctly which is being done by considering the requirements of the BMO as a benchmark for bushfire safety.

Proper management in this regard is ensuring the risk from the reserve in **Area 8** is managed and that the separation required to attain BAL-12.5 as per AS3959-2018 is present for future and existing residential areas. The following recommendations are being made to ensure this can occur:

- Ensure a boundary road is present between all residential areas and the reserve.
- Acquire and incorporate **Area 5** into the reserve so it can be managed and no setback are required within residential areas in **Area 9**.
- If setbacks within **Area 9** cannot be avoided (33m is required from the Woodland present) then they can be created through a combination of the road reserve, a manage park along the northern boundary and/or lots large enough to provide the required setback.
- Management within the reserve will need to be carefully managed to ensure the setbacks from residential areas remain appropriate. A fuel break can be established in addition to the boundary road reserve but this will need to reflect the vegetation within the reserve or it can be set at 50m (fuel break and road reserve combined) which is sufficient for Forest vegetation (the highest rated vegetation under AS3959-2018 which could occur). Exceptions under AS3959-2018 can be employed to allow some vegetation patches to be placed and the remainder managed to Low Threat conditions. A combination of these management options would need to be carefully planned but could be applied to ensure the reserve is safe.

These recommendations will need to be discussed by council and the CFA before any rezoning or development takes place but a combination of these elements should be sufficient to reduce the bushfire risk to any onsite development.

## 2. BUSHFIRE HAZARD SITE ASSESSMENT

This section seeks to review the bushfire risk present onsite and within 150m of the site boundary. Map 1 provides an overview of the subject site and Map 2 provides the details of the Bushfire Hazard Site Assessment area.

### 2.1 Subject site

An overview of the subject site is presented on Map 1.

The subject site consists of several parcels on the western side of Mooroopna north of McLennan Street and east of Excelsior Avenue. The site consists of an open floodplain which has been recently established as a reserve/parkland with managed lawn areas and recently planted trees and shrubs in garden beds. There is also a path running along the north-eastern side of the reserve along with an open dam/wetland area. This reserve occupies the majority of the site and the remaining areas are open grassland/paddocks.

The north-eastern corner of the site is a tilled paddock while there does not appear to be any management on the south-western side of the site although there are some elevated areas which are believed to be clay refuse from the recent construction of the reserve and the adjacent residential areas. The south-western paddocks and the reserve are separated by an open irrigation channel which also extends across the northern boundary.

The site is zoned as Urban Floodway Zone (UFZ) along the channel, Commercial Zone 2 (C2Z) in a small section along the southern boundary and Farming Zone (FZ) across the remainder. The following overlays apply to the site:

- Development Contributions Plan Overlay – Schedule 3 (DCPO3) across the entire site
- Development Plan Overlay – Schedule 14 (DPO14) across the entire site
- Land Subject to Inundation Overlay (LSIO) across the majority of the site except for the areas within the UFZ and in the south-western corner
- Public Acquisition Overlay – Schedule 7 (PAO7) extending along Excelsior Avenue and part of McLennan Street and Schedule 10 (PAO1) along the northern boundary and on the eastern side of the site
- Specific Controls Overlay – Schedule 3 (SCO3) across the entire site

### 2.2 Existing infrastructure connections

Power	The site is connected to mains power
Water	The site is connected to mains water
Nearest fire hydrant	There are hydrants present along McClennan Street, Elizabeth Street and Baydene Terrace along all of the site boundaries where they meet the road.

## 2.3 Vegetation and topography

Refer to Map 2 and Table 1 for the results of the vegetation and slope assessment as per Australian Standards 3959–2018: Construction of Buildings in Bushfire Prone Areas (AS3959–2018) (Standards Australia 2018).

The entire assessment area was on level terrain with some minor slopes leading into waterways. The majority of the assessment area can be considered Grassland under AS3959–2018 and consists of the majority of the site and the paddocks to the north–east, south and west. There is Woodland vegetation as per AS3959–2018 on the adjacent property to the north and Low Threat areas to the east, south and west within residential areas and along road reserves respectively.

Table 1. Bushfire hazard site assessment

Location	North	West	East
Vegetation type	Woodland	Grassland	Low Threat
Effective slope (up/down)	Level	Level	Level
Effective slope (degrees)	0°	0°	0°

### 2.3.1 Woodland

Woodland vegetation as per AS3959–2018 also consists of a canopy layer of between 10–30m tall (can be less than 10m) with foliage cover of between 10–30%. Elevated fuel layers are often also present but at significantly lower density than observed in Forest vegetation. The key difference between Forest and Woodland vegetation is Forest support fires in the canopy. This requires a dense canopy layer and elevated fuel layer so vegetation can be considered Woodland if the canopy density is greater than 30% but there is very little to no elevated fuels.

This vegetation was present on an adjacent property to the north of the site and consists of large trees with a grassy understory (see Figure 2). The canopy density does not exceed 30% and there were minimal connecting fuels between the tree canopy and the understory dominated by grasses so we can consider this Woodland over Forest which has a higher understory and/or canopy trees in greater density so the fire can be carried into the canopy.

### 2.3.2 Grassland

Grassland vegetation as per AS3959–2018 is dominated by grass and herb species and can contain canopy and elevated fuel layers of varying heights as long as the foliage cover is less than 10%. This vegetation covers the entire site and the majority of the surrounding properties (see Figure 3, Figure 4 and Figure 5). Some of this vegetation is on tilled or managed paddocks but the fact that this vegetation will be cultivated means we can consider this as Grassland and not Low Threat.

### 2.3.3 Low Threat

Low Threat vegetation as per AS3959–2018 consists of vegetation managed to minimal fuel conditions including maintained lawns, golf courses, maintained public reserves and parklands, vineyards, orchards, cultivated gardens, commercial nurseries, nature strips and wind breaks. Management on this level was observed on the adjacent residential areas to the east and along the adjacent road reserves to the south and west (see Figure 6 and Figure 7).

## 2.4 Photographs of the site and assessment area



Figure 2. Woodland north of the site



Figure 3. Grassland within the onsite reserve



Figure 4. Grassland on paddocks on the south-western side of the site



Figure 5. Grassland on horse paddocks to the south-west of the site



Figure 6. Low Threat areas within residential areas to the east of the site



Figure 7. Low Threat areas along McLennan Street to the south of the site

### 3. BUSHFIRE HAZARD LANDSCAPE ASSESSMENT

The bushfire risk to the site was considered at the landscape scale to develop an understanding of the likely conditions which threaten the site and then the local and site scales to determine the impact these conditions would have. The results of this assessment are presented below.

#### 3.1 Landscape overview

The bushfire hazard landscape assessment provides information on the bushfire hazard more than 150 m away from the site. The results of this assessment are presented on Map 3 and Map 4 and further details are provided below.

##### 3.1.1 Local landscape

The adjacent landscape is presented on Map 3 and Figure 8.

The Township of Mooroopna is to the east of the site with large vegetation patches to the east of this along the Goulburn River. The adjacent landscape to the south, west and north is open farmland. The majority of the zoning is Farming Zone over the paddocks to the south, west and north while the zoning over the township are various residential and township zones. The vegetated areas further to the east are primarily Urban Floodway Zone. The amount of Farming Zone to the west indicates that the risk from this aspect is unlikely to increase in the near future.

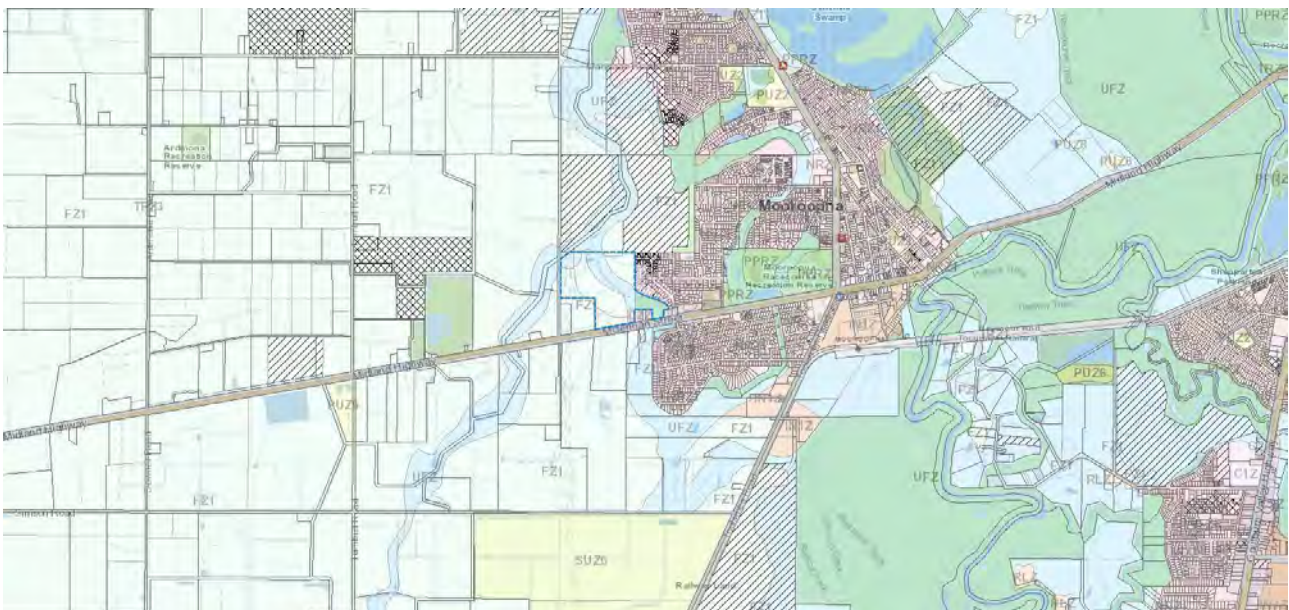


Figure 8. Zoning of adjacent land

### 3.1.2 Wider landscape

The wider surrounding landscape is presented on Map 4 and Figure 9.

The wider surrounding landscape is predominantly the same as the adjacent landscape with managed farmland extending to the north, south and west of the site. There are large vegetated areas along the Goulburn River, to the east of Mooroopna, which runs north to south with offshoots to the east through the City of Shepparton which is on the eastern side of the river. McLennan Street becomes the Midland Highway to the east through the vegetated areas but there are several other main roads extending to the north, south and west of the site and the Tocumwal Rail Line runs through the vegetated eastern areas and extends to the south-west.



Figure 9. Wider surrounding landscape

## 3.2 Bushfire history

The vegetation around the Goulburn River to the east of the site was impacted by small scattered bushfires in 2010, 2013, 2014, 2015, 2016 and 2019. There has also been planned burning within the vegetated areas in 2009, 2010, 2012 and 2017. All of these fires have been smaller scale with nothing larger recorded in the surrounding landscape or outside of the river reserve area.

## 3.3 Landscape bushfire scenarios

During bushfire season, fires are propelled by powerful north-westerly winds before a south-westerly change occurs. This change brings cooler, more humid winds from the Southern Ocean but since the site is more than 200km from the ocean, these winds can be expected to propel similar bushfires and/or turn existing bushfires to the north-east which can be result in larger fires forming as the terrain behind the existing front is reignited.

The site is separated from the vegetation around the Goulburn River so it won't be affected by a fire within this vegetation outside of embers (which prevailing winds will propel away from the site). There is a chance of grassfire from the north-west or south-west which could impact the site directly but considering the fact that this terrain is managed paddock and not natural grassland, the chances of it reaching the site before being contained are very low.

### 3.4 Shelter and refuge options

There are no Neighbourhood Safer Places within Mooroopna or Shepparton and, considering the amount of development present in both towns, there is no point leaving these areas in search of refuge. We do recommend residents seeking refuge do so in Mooroopna and avoid traveling to Shepparton since the vegetation along the Goulburn River separating these towns is the most likely locations for the bushfire to be/move through.

## 2.4 Landscape typology

Planning Practice Note 65 provides a typology of bushfire landscapes (see Table 2).

This site has several characteristics of a Type 1 Landscape since the surrounding vegetation which could impact the site is predominantly grassland, the chances of neighbourhood level destruction are reduced by the presence of managed paddocks and access is readily available along McLennan Street. Bushfire can approach from more than one aspect however which is a characteristic of a Type 3 Landscape. Considering this feature and the amount of fuel present, a Type 2 Landscape is considered the most appropriate option.

Table 2. Landscape typology as presented in Planning Practice Note 65 (DTPLI 2014)

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

## 4. BUSHFIRE RISK ASSESSMENT

In order to provide a detailed analysis of the bushfire conditions and the appropriate responses for future developments, we need to examine the site, the current risk and hazard from each part of the assessment area's (parts are divided based on current usages, management and the developments present. These sections then need to be considered against the current bushfire policy, specifically Clause 13.02-1S Bushfire Planning and Clause 53.02 Bushfire Planning which address general bushfire concerns and provides a viable benchmark for bushfire safety.

Based on this, we can identify any likely hurdles which may be encountered by future planning applications in regards to Bushfire Prone Areas and provide recommendations accordingly. Since the site is outside of the BMO, an application can follow the recommendations of this assessment and potentially address all of the bushfire concerns but an individual assessment is still recommended to account for any unique features proposed by future developments.

### 4.1 Site analysis

Considering all of the results above, we can divide the site and the surrounding assessment area based on the recorded conditions and current usage to determine the risk posed to each zone and the hazard it poses to adjacent zones. The ratings for the risk and the hazard are detailed below:

- **Low Risk/Hazard** Both the risk to this area from adjacent or external hazards and the hazard generated if this area were ignited are considered to be negligible. Little to no action should be required to manage the risk or the hazard outside of meeting the strategies of Clause 13.02-1S which can be easily accommodated.
- **Moderate Risk/Hazard** The risk and hazard are still considered to be manageable but there is the potential of a bushfire event threatening this area and the potential for this area to threaten adjacent areas when ignited. Any issues here can be addressed through the strategies of Clause 13.02-1S but additional caution is advised when considering applications within or adjacent to these areas.
- **High Risk/Hazard** The determined risk to an area is considered to be above the manageable threshold and/or the hazard being generated is considered to be too high for the adjacent areas to be expected to accommodate. Unlike Moderate where the risk and hazard can be addressed through Clause 13.02-1S, High risks and hazards will require additional specialised actions to reduce the rating to Moderate and should be considered more under the requirements of the BMO. These additional actions will be detailed in the recommendations if or when they're required.


There are some limitations to this method which are discussed in Section 4.3.



## 4.2 Results

The defined areas are displayed on Map 5 and a discussion of these areas is presented below.

### 4.2.1 Area 1


Location	Recently tilled paddocks on the western side of Excelsior Avenue
Risk category	Low
Hazard category	Low
Details	These paddocks could potentially support a grassfire when crops/pasture are present but the open landscape and usage as farmland indicate that a fire would be quickly contained and the presence of Excelsior Avenue means there is an existing firebreak for any development within <b>Area 6</b> .
Photos	 <p>Figure 10. Managed paddocks west of Excelsior Avenue</p>

### 4.2.2 Area 2


Location	Drainage lines and irrigation channels west and north-west of the site
Risk category	Low
Hazard category	Low
Details	These open irrigation channels can be considered Grassland vegetation as per AS3959-2018 but are almost guaranteed to always have water in them so the risk of them igniting and spreading fire elsewhere is greatly reduced. They can also act as firebreak but they do create a barrier which cannot be crossed with a vehicle so some caution is advised.

<p>Photos</p>	 <p>Figure 11. Irrigation channels to the north-west of the site</p>
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### 4.2.3 Area 3

<p>Location</p>	<p>Rural residential property west of Excelsior Avenue</p>
<p>Risk category</p>	<p>Low</p>
<p>Hazard category</p>	<p>Low</p>
<p>Details</p>	<p>This property does contain more vegetation than the surrounding paddocks but is also flanked by irrigation channels on the western side and is separated from the site by Excelsior Avenue so any hazard present is considered to be contained.</p>
<p>Photos</p>	 <p>Figure 12. Rural residential property west of Excelsior Avenue</p>

#### 4.2.4 Area 4


Location	Road reserves along Excelsior Avenue to the west of the site and McLennan Street to the south of the site
Risk category	Low
Hazard category	Low
Details	Managed road reserves which serve as a fuel break and access and pose no risk or hazard outside of higher traffic due to the emergency situation.
Photos	 <p>Figure 13. Rural residential property west of Excelsior Avenue</p>

#### 4.2.5 Area 5


Location	Woodland within paddocks north of the site
Risk category	Low
Hazard category	Moderate
Details	This woodland patch poses a moderate hazard due to the amount of fuel present relative to the rest of the site which is Low Threat or Grassland. It's position to the north of the site means prevailing conditions will also carry a bushfire within this patch directly towards residential areas to the south-east. There are no vegetation patches like this in the adjacent landscape which reduces the risk of ignition and the size of the patch means a full bushfire front is less likely to occur but attention will need to be paid and the proper separation maintained from future residential areas.

<p>Photos</p>	 <p>Figure 14. Woodland vegetation north of the site</p>
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#### 4.2.6 Area 6


<p>Location</p>	<p>Grassland on paddock and refuse clay piles on the south-western side of the site</p>
<p>Risk category</p>	<p>Moderate</p>
<p>Hazard category</p>	<p>Low</p>
<p>Details</p>	<p>This portion of the site contains open Grassland on unmanaged paddocks as opposed to the recently tilled and grazed paddocks observed across the rest of the assessment area. There is a moderate risk of this vegetation being ignited from embers or a fire approaching from the north-west and the ability to contain a fire within this terrain is limited by the clay refuse piles creating steep slopes and the drainage line separating this Grassland from the reserve within Area 8 creating a physical barrier. Despite the moderate risk of this patch igniting, the hazard generated from this patch is reduced due to the separation from surrounding developments. The reserve within <b>Area 8</b> is managed and separates it from the residential areas further east and McLennan Street separates this patch of residential areas to the south.</p>
<p>Photos</p>	 <p>Figure 15. Grassland vegetation on the south-western side of the site</p>

#### 4.2.7 Area 7


Location	Grazed horse paddocks to the south-west of the site
Risk category	Low
Hazard category	Low
Details	While this vegetation can be considered Grassland as per AS3959–2018, it is regularly grazed by horses, is fully developed with access tracks and agriculture infrastructure along with a dwelling so it will be well defended, and is flanked by McLennan Street to the south and Excelsior Avenue to the west.
Photos	 <p>Figure 16. Grazed horse paddocks to the south-west of the site</p>

#### 4.2.8 Area 8


Location	Managed grassland with planted trees and shrubs on the floodplain through the centre of the site
Risk category	Low
Hazard category	Moderate
Details	This reserve is currently considered Grassland as per AS3959–2018 despite signs of slashing being present but there are planted shrubs and trees scattered throughout so it could be considered another vegetation classification in the future. The risk of ignition is reduced due to the irrigation channels along the western and northern sides, the amount of water present within it and the open access which allows encroaching bushfires to be contained. The hazard from it is considered to be Moderate however since, if it does ignite, it could create a fast-moving fire directly adjacent to high-density residential areas.

<p>Photos</p>	 <p>Figure 17. Managed reserve through the centre of the site</p>
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#### 4.2.9 Area 9

<p>Location</p>	<p>Recently tilled paddocks in the north-eastern corner of the site and extending into more paddocks to the north-east</p>
<p>Risk category</p>	<p>Low</p>
<p>Hazard category</p>	<p>Moderate</p>
<p>Details</p>	<p>Similar to Area 8, the risk of these area igniting is low due to the open access to defend against a fire within the Woodland areas of <b>Area 5</b> and the management present within this area which keeps the fuel levels to Grassland or below. The hazard from this patch is still considered to be Moderate though since, if a fire does spread to this area, it will be directly adjacent to a high-density residential area.</p>
<p>Photos</p>	 <p>Figure 18. Managed paddock in the north-eastern corner of the site</p>

#### 4.2.10 Area 10


Location	Unoccupied lots and recently built dwellings in high-density residential area to the east of the site.
Risk category	Moderate
Hazard category	Low
Details	<p>It should be noted that the photos we have of this area are older and/or do not capture the current status of the residential area (our focus was on the classified vegetation). During the site assessment, it was noted that this residential area was at least two thirds occupied and developed.</p> <p>The risk to this area is moderate because of the number of dwellings and people in permanent residence directly adjacent to open Grassland and Woodland. While the chances of a grassfire reaching this area is low, the impact a fire would have has to be accounted for in the risk assessment and the increased risk of burning buildings and/or residences evacuating during an emergency increases the risk to Moderate. The hazard generated from this area is considered Low however as fire will not spread through this terrain and the risk is reduced significantly after moving just over 100m from the hazardous areas to the west.</p>
Photos	 <p>Figure 19. Unbuilt lots within the residential areas east of the site</p>

#### 4.2.11 Area 11

Location	Industrial and commercial lots on the southern side of the site.
Risk category	Moderate
Hazard category	Low
Details	<p>The risk to this area can be considered Moderate as these lots are directly adjacent to the Grassland within <b>Area 6</b> and <b>Area 8</b> with no real fuel break observed. The risk is reduced by the position on the southern end so a grassfire is more likely to be contained before it reaches this area. The patch itself poses minimal threat to the surrounding areas.</p>


<p>Photos</p>	 <p>Figure 20. Industrial/commercial lots to the south of the site</p>
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#### 4.2.12 Area 12

<p>Location</p>	<p>Drainage reserve south of McLennan Street and north of a higher density residential area to the south.</p>
<p>Risk category</p>	<p>Low</p>
<p>Hazard category</p>	<p>Low</p>
<p>Details</p>	<p>This open drainage reserve is well separated from the hazards within the site and from hazards to the south so it has a low chance of igniting and a fire within this area has very little chance of threatening the areas within the site or further to the south before being contained.</p>
<p>Photos</p>	 <p>Figure 21. Drainage reserve south of McLennan Street</p>



### 4.2.13 Area 13

Location	Managed paddocks and agricultural areas to the south of McLennan Street
Risk category	Low
Hazard category	Low
Details	These paddocks could potentially support a grassfire when crops/pasture are present but the open landscape and usage as farmland indicate that a fire would be quickly contained and the presence of McLennan Street means there is an existing firebreak for any development within <b>Area 6</b> .
Photos	 <p>Figure 22. Grassland on paddocks south of McLennan Street</p>

## 4.3 Limitations

It has been indicated that this breakdown of risk and hazards over such a small area is not strictly necessary and a more basic assessment under AS3959–2018 and Clause 53.02 is sufficient. While we agree that this method was developed for assessing risk on a larger scale (where assessing to the level of detail required under Clause 53.02 is not feasible), it does have some application here when considering the scope of the assessment and the assessment under Clause 13.01–1S.

Assessments under Clause 53.02 consider the area within 150m of the site with the focus on what can be done within the site to account for the risk within the site (while also considering the hazards from the landscape assessment). Since there are several areas within 150m managed by council, whether external areas can be managed to lower the risk within the site should be considered. These are recommendations at this stage but should be considered if council are considering expanding the population in this area.

## 5. LEGISLATION AND POLICY

In order to provide an assessment of the bushfire risk, which can be utilised by Council or by future developers seeking planning applications, the assessment of the bushfire risk needs to be considered against the current bushfire legislation. Under the BMO, applications need to be considered against Clause 53.02 while some applications within Bushfire Prone Areas need to be considered against Clause 13.02–1S (see Section 1.1 for the details).

There are no areas within this site within the BMO so we only really need to consider the Bushfire Prone Areas. Properties within Bushfire Prone Areas normally don't require a planning response but if one is required under Clause 13.02–1S, Clause 53.02 can be used as a benchmark for bushfire safety so we will consider the entire site under both clauses. The logic regarding the sections of these clauses being applied and if/how the site meets these requirements is detailed below.

### 5.1 Clause 13.02–1S Bushfire Planning

As mentioned previously, Clause 13.02–1S's objective is to strengthen the resilience of settlements and communities to bushfire through risk-based planning that prioritises the protection of human life. It contains multiple strategies which need to be considered as part of any bushfire planning application either through the BMO or through separate assessment. These strategies include:

- Protection of human life,
- Bushfire hazard identification and assessment,
- Settlement Planning,
- Areas of biodiversity conservation value,
- Use and development control within a Bushfire Prone Area, and
- Policy guidelines and documents

The use and development control within a Bushfire Prone Area is detailed in Section 1.1 and states the types of development which need to be considered at the planning level within a Bushfire Prone Area so this has already been addressed. Additionally, this document will seek to inform the current municipal management plans and utilises AS3959–2018 among other bushfire policy documents so this strategy can also be considered addressed. The remaining strategies are discussed below.

#### 5.1.1 Protection of human life

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##### Protection of Human Life

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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.
-

This strategy is very broad, but focuses on ensuring that this ideal is at the forefront of any development when considering bushfire safety. This strategy, along with Settlement Planning, are also utilised to ensure higher risk areas are not developed over lower risk ones. Considering the size of this area and the proximity to other developments, we feel reviewing alternative locations is secondary here to ensuring the safety of areas immediately adjacent.

As shown on Figure 23, the current plan for the site under the Mooroopna West Growth Corridor Concept Plan is to develop the north-eastern corner (**Area 9**) into more residential areas while **Area 8** will be retained as a reserve within the floodplain and **Area 6** and **Area 7** will be developed into an expanded intersection for developments along Excelsior Avenue. The expanded access will remove the hazards on **Area 6** and **Area 7** so the big question is does the placement of this residential areas within Area 9 adjacent to the drainage reserve within **Area 5** and **Area 8** prioritise the protection of human life and direct populations away from hazards.



Figure 23. The current intentions for the site under the Mooroopna West Growth Corridor Concept Plan

This can be addressed with how the drainage reserve is managed and whether proper separation and access is provided within the proposed residential areas. The wider surrounding landscape is primarily farmland and the site is well separated from the Goulburn River which is considered the largest bushfire risk threat in this landscape. The only fires which can approach the site are grassfires through farmland which will generate less embers and will likely be contained before they reach the site so the landscape can be considered low risk enough to accommodate an increased population.

Despite the fact that development within the Mooroopna West Growth Corridor Concept Plan has already started to the east, this assessment is considering the higher risk areas early within the planning process. The risk from the landscape is low enough that we can consider the drainage reserve adjacent to the site as acceptable with accommodations made for bushfire risk rather than considering an alternative location away from this reserve. Assurances will be required regarding the management of this reserve and through the design of the residential areas but, overall, confidence has been provided that human life has been prioritised and can account for the risk present.

## 5.1.2 Bushfire hazard identification and assessment

### Bushfire hazard identification and assessment

Identify bushfire hazard and undertake appropriate risk assessment by:

- Applying the best available science to identify vegetation, topographic and climatic conditions that create a bushfire hazard.
- Considering the best available information about bushfire hazard including the map of designated bushfire prone areas prepared under the Building Act 1993 or regulations made under that Act.
- Applying the Bushfire Management Overlay in planning schemes to areas where the extent of vegetation can create an extreme bushfire hazard.
- Considering and assessing the bushfire hazard on the basis of:
  - Landscape conditions – meaning the conditions in the landscape within 20 kilometres and potentially up to 75 kilometres from a site;
  - Local conditions – meaning conditions in the area within approximately 1 kilometre from a site;
  - Neighbourhood conditions – meaning conditions in the area within 400 metres of a site; and,
  - The site for the development.
- 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.
- Not approving development where a landowner or proponent has not satisfactorily demonstrated that the relevant policies have been addressed, performance measures satisfied or bushfire protection measures can be adequately implemented.

Sections 2 and 3 use the best available science and data to determine the bushfire risk at the scales detailed above and the requirements of the BMO have been applied here in detail (despite not being required here) so overall, this assessment addresses this strategy. The CFA will need to be consulted on this development plan and the recommendations being made but, as long as the recommendations are approved and are followed by future applications, this strategy can be easily addressed.

## 5.1.3 Settlement planning

### Settlement Planning

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 3959–2018 Construction of Buildings in Bushfire-prone Areas (Standards Australia, 2018).
- Ensuring the availability of, and safe access to, areas assessed as a BAL-LOW rating under AS 3959–2018 Construction of Buildings in Bushfire-prone Areas (Standards Australia, 2018) where human life can be better protected from the effects of bushfire.
- Ensuring the bushfire risk to existing and future residents, property and community infrastructure will not increase as a result of future land use and development.
- Achieving no net increase in risk to existing and future residents, property and community infrastructure, through the implementation of bushfire protection measures and where possible reduce bushfire risk overall.
- 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.

### Settlement Planning

- 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 3959-2018.

This strategy is the most important one which needs to be addressed by this assessment and by this development plan. This strategy is designed to prevent subdivisions and other developments which result in people congregating in large numbers from being constructed in dangerous locations. The primary means of achieving this is a blanket ban on developments, where BAL-12.5 as per AS3959-2018 cannot be attained by every development within an area.

As detailed above, the proposed development within the site will focus residential areas into the north-eastern corner while the majority of the site will contain a drainage/floodplain reserve. This reserve is already present and is slashed but is being considered Grassland at present. There is also Woodland which will form part of the extended drainage reserve to the north. Proper separation will need to be provided from this vegetation and management plans for the reserve will need to provide assurance that the vegetation classification will not be changed so the separation remains accurate.

A BAL assessment for the relevant vegetation patches is provided in Section 5.2.2 below. Assuming that the vegetation within this reserve is maintained in its current condition, the distances required for BAL-12.5 under AS3959-2018 should not change. This separation can be factored in through larger residential lots and boundary roads which are recommended along the length of the drainage reserve and any other retained vegetation adjacent to residential areas.

The fact that this is a new subdivision and residential area means the appropriate bushfire protection measures can be installed into every aspect. In addition to the separation required from the drainage reserve, the access can be designed to ensure boundary roads are present and there are immediate and multiple access options to safer areas within Mooroopna if needed. As stated previously, the landscape risk means we do not need to consider other locations as the risk is low enough if any hazard from the drainage reserve is addressed. This application can therefore be considered acceptable under this strategy as long as the proper precautions are taken.

#### 5.1.4 Areas of high biodiversity conservation value

##### Areas of high biodiversity conservation value

Ensure settlement growth and development approvals can implement bushfire protection measures without unacceptable biodiversity impacts by discouraging settlement growth and development in bushfire affected areas that are of high biodiversity conservation value.

The only areas likely to contain indigenous habitat are the areas within the proposed/existing drainage reserve which are being retained and managed. These areas will be managed to provide proper floodway mitigation and for conservation but must also contain some vegetation management for bushfire risk. Setbacks and other measures will also be undertaken within the residential areas so the proper balance of management between conservation and bushfire protection will allow this proposal to meet this strategy.

## 5.2 Clause 53.02 Planning for Bushfire

As stated previously, this property is not within the BMO and does not need to comply with Clause 44.06 BMO or Clause 53.02 Planning for Bushfire. The proposed rezoning does need to comply with Clause 13.02-1S and the 'Bushfire hazard identification and assessment' strategies of this Clause lay out several points which are covered within Clause 53.02's criteria. This Clause also contains the measures required to achieve BAL-12.5 for all proposed developments which is vital for the 'Settlement Planning' strategies of Clause 13.02-1S so reviewing the potential rezoning against this Clause can assist in determining if and how this application should proceed.

The required responses under this Clause are based on the application types and include:

- **Clause 53.02-3 Dwellings in existing settlements** applies to single dwellings on properties within residential zonings (Neighbourhood Residential Zone, General Residential Zone, Residential Growth Zone, Urban Growth Zone, Low Density Residential Zone, Township Zone or Rural Living Zone). These applications can make certain assumptions regarding the landscape risk and available services so they do not require a landscape scale assessment and have much simpler application requirements.
- **Clause 53.02-4 Bushfire Protection Objectives** applies to all other developments except subdivisions. These measures are designed to review the landscape and local conditions with greater scrutiny since, unlike existing settlements, whether or not the landscape risk is acceptable or if particular amenities such as suitable access are available is not known.
- **Clause 53.02-4.4 Subdivision Objectives** refers to subdivisions and employs aspects of 4.1 – 4.4 even if the application is within an existing settlement since the application needs to consider whether the proposed change in usage and/or population density can be accommodated by existing systems.

The residential areas to the east of the site are General Residential Zone – Schedule 1 (GRZ1) and it is expected that the desired residential area within Area 9 under the Mooroopna West Growth Corridor Concept Plan will want to adopt the same or similar zoning in this area onsite. In order to allow this rezoning, we need to consider the change in usage in regards to the bushfire safety. The majority of this is discussed under Clause 13.02-1S but, in order to provide additional assurance, the Approved Measures of Clause 53.02 can be employed to demonstrate how this rezoning can be applied even if the site was within the BMO.

Since the rezoned area will need to be subdivided into residential lots, the requirements of Clause 53.02-4.4 will be considered here. These requirements are summarised in Table 3 below.

Table 3. Approved measures to meet Clause 53.02–4.4 Subdivision Objectives

Clause 53.02–4.4 Subdivision objectives		
Measure	Requirement	Applicable
	<p>To provide lots that are capable of being developed in accordance with the objectives of Clause 53.02.</p> <p>To specify at the subdivision stage bushfire protection measures to develop a lot with a single dwelling on land zoned for residential or rural residential purposes.</p>	
<b>AM5.1</b>	<p>An application to subdivide land, other than where AM 5.2 applies, demonstrates that each proposed lot is capable of meeting:</p> <ul style="list-style-type: none"> <li>The defensible space in accordance with Table 2 Columns A, B or C and Table 6 Clause 53.02–5.</li> <li>The approved measures in Clause 53.02–4.1 and Clause 53.02–4.3.</li> </ul>	No – 5.2 applies
<b>AM5.2</b>	<p>An application to subdivide land zoned for residential or rural residential purposes must be accompanied by a plan that shows:</p> <ul style="list-style-type: none"> <li>Each lot satisfies the approved measure in <b>AM 2.1</b>.</li> <li>A building envelope for a single dwelling on each lot that complies with <b>AM 2.2</b> and provides defensible space in accordance with:                             <ul style="list-style-type: none"> <li>Columns A or B of Table 2 to Clause 53.02–3 for a subdivision that creates 10 or more lots; or</li> <li>Columns A, B or C of Table 2 to Clause 53.02–3 for a subdivision that creates less than 10 lots.</li> </ul> </li> </ul> <p>The bushfire attack level that corresponds to the defensible space provided in accordance with Table 2 to Clause 53.02–3 must be noted on the building envelope</p> <ul style="list-style-type: none"> <li>Defensible space wholly contained within the boundaries of the proposed subdivision.</li> <li>Defensible Space may be shared between lots within the subdivision. Defensible space for a lot may utilize communal areas, such as roads, where that land can meet the requirements for defensible space.</li> <li>Vegetation management requirements in accordance with Table 6 to implement and maintain the defensible space required under this approved measure.</li> <li>Water supply and access that complies with AM 4.1</li> </ul>	Yes – requires consideration
<b>AM 5.3</b>	An application to subdivide land to create 10 or more lots provides a perimeter road adjoining the hazardous vegetation to support firefighting.	Yes – requires consideration
<b>AM 5.4</b>	A subdivision manages the bushfire risk to future development from existing or proposed landscaping, public open space and communal areas.	Yes – requires consideration

## 5.2.1 Landscape assessment

Subdivision applications utilise Approved Measure 2.1 and 2.2 from Clause 53.02–4.1 to determine if the risk from the surrounding landscape can be mitigated to an acceptable level. These measures are provided in detail below.

### AM 2.1

The bushfire risk to the development from the landscape beyond the site can be mitigated to an acceptable level.

This measure focuses on the factors outside of the site which cannot be changed and links back to the considerations under Clause 13.02–1S as to whether the development of the site is appropriate. As stated previously, the site is on the western side of Mooroopna with open farmland in all directions except to the east which contains Mooroopna, the vegetation surrounding the Goulburn River and the City of Greater Shepparton further east.

The largest bushfire hazard in the landscape is the forested areas around the Goulburn River which the site is well separated from and out of the path of a bushfire within this area which will push bushfires to the north or south–west. The only hazard to the site will come from grassfires through farmland which are highly likely to be contained before they reach the site and will be a reduced hazard regardless so management within the site should allow the rezoning to meet this measure.

### AM 2.2

A building is sited to ensure the site best achieves the following:

- The maximum separation distance between the building and the bushfire hazard.
- The building is in close proximity to a public road.
- Access can be provided to the building for emergency service vehicles

This approved measure has less of an application at this stage since there are no plans for the subdivision but it should be considered to ensure the BAL–12.5 separation is present. As stated previously, the adjacent drainage reserve is Grassland within **Area 8** and Woodland within **Area 5**. Management plan for the drainage reserve will need to be designed to maintain this vegetation classification or determine which vegetation classification should be aimed for (if any). Section 5.2.2 below provides the details on the separation required from the vegetation currently present.

Separation can be attained through a managed fuel break within the reserve (a path or a simple slashed buffer), a road reserve, setbacks on proposed lots or a combination of these options. A boundary road between the reserve and the residential lots is recommended as it ensures access as per Approved Measure 2.2 and provides the boundary road required under Approved Measure 5.3. All of these items are only recommendations due to the lack of the BMO but attaining BAL–12.5 is a requirement and ensuring the separation and access are present can assist with this.



## 5.2.2 Site assessment

Approved Measure 5.2 also contains the details for addressing site specific hazards with residential subdivisions which should be considered as part of the potential rezoning. The points relevant to this assessment are highlighted below.

### AM 5.2

An application to subdivide land zoned for residential or rural residential purposes must be accompanied by a plan that shows:

- Each lot satisfies the approved measure in AM 2.1.
- A building envelope for a single dwelling on each lot that complies with AM 2.2 **and provides defensible space in accordance with:**
  - Columns A or B of Table 2 to Clause 53.02–5 for a subdivision that creates 10 or more lots; or
  - Columns A, B or C of Table 2 to Clause 53.02–5 for a subdivision that creates less than 10 lots.

**The bushfire attack level that corresponds to the defensible space provided in accordance with Table 2 to Clause 53.02–5 must be noted on the building envelope**
- Defensible space wholly contained within the boundaries of the proposed subdivision.
- Defensible Space may be shared between lots within the subdivision. Defensible space for a lot may utilize communal areas, such as roads, where that land can meet the requirements for defensible space.
- Vegetation management requirements in accordance with Table 6 to implement and maintain the defensible space required under this approved measure.
- Water supply and access that complies with AM 4.1

Column A of Table 2 to Clause 53.02–5 are the requirements for BAL–12.5 which are expanded on further in the BAL assessment below. Defensible space is not enforceable here as the site is outside the BMO but it can be provided in public land management which may be sufficient to address the risk and will also address Approved Measure 5.4. Details regarding land management are also provided below.

## BAL Assessment

Table 4 details the conditions within the 150m assessment area to detail the required defensible space. The assessment is split into areas based on the varying threat due to the different vegetation and slope and the setback requirements are displayed on Map 6.

Table 4. Defensible space and BAL assessment

Vegetation	Woodland	Grassland	Low Threat
Forest Fire Danger Index	100	100	100
Direction relative to site/dwelling	North	West	East
Slope (up/down)	Level	Level	Level
Slope (degrees)	0°	0°	0°
Defensible space for BAL 12.5 (m)	33	19	N/A
Defensible space for BAL 19 (m)	24	13	N/A
Defensible space for BAL 29 (m)	16	9	N/A

All of **Area 9** has been excluded from this assessment as this is where the proposed residential area will be placed and the paddock to the north-west will also be developed into residential areas as part of the Mooroopna West Growth Corridor Concept Plan (if this rezoning proceeds while this vegetation is still present the 19m will be sufficient to address any risk until this area is developed). A road reserve separating the reserve from the adjacent lots is sufficient for the Grassland vegetation present and will allow residential lots to proceed without setbacks. This will be insufficient from the Woodland however and a fuel break or setbacks within lots will be required.

The Woodland vegetation requires 33m of separation to achieve BAL-12.5 (see Figure 24 for a summary of the BAL ratings). A road reserve is normally 20m wide which means 13m needs to be provided either within proposed lots which will need to be larger along the northern boundary to accommodate this or a fuel break will be required within **Area 5**. Whether a fuel break can be installed will be dependent on who is responsible for managing the drainage reserve and whether this Woodland is a part of it so, unless a 13m within lots is preferable, **Area 5** will need to be acquired and managed before a subdivision application is considered within **Area 9**.

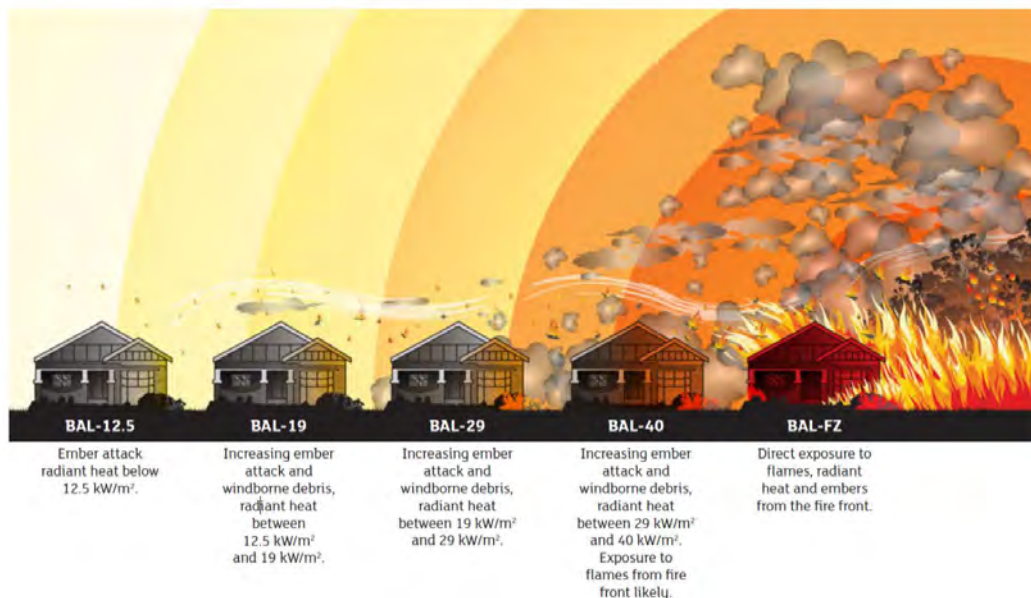


Figure 24. BAL levels (CFA 2012)

## Land Management

Vegetation management within public space is required under Approved Measure 5.4 and is essential in ensuring whether BAL-12.5 can be attained as per Clause 13.02-1S. The BAL assessment above is based on the current vegetation classification but if vegetation is removed within the Woodland to make it more like **Area 8** or the planted shrubs and trees within **Area 8** are allowed to spread then this classification could change which will seriously impair the setbacks established within adjacent residential areas.

As stated previously, the landscape risk is low enough that management onsite will be sufficient to allow residential development which means the land management needs to be established and followed. The lack of the BMO means we cannot enforce management standards on future landowners but smaller lots found in general residential areas will provide assurance that the vegetation present will be managed which is sufficient for an area this low risk. Public land management can also provide assurance as long as the management standards are established.

As stated previously, if **Area 5** is to be included within the reserve, then it needs to be acquired and established before the subdivision can proceed or else large setbacks will be required on lots. Management needs to be mindful of what the overall goals are. Will this be managed parkland or a conservation reserve? What will the established look like in terms of classified vegetation? And will a fuel break be required to separate this reserve from the residential areas and how wide should it be?

Defendable space management standards are recommended for the fuel break and a simple BAL assessment can determine how much separation is required when the reserve is established so the proper fuel break can be installed. These standards could even be applied across the entire reserve to avoid the need for setback altogether. Table 6 to Clause 53.02–5 requires that defendable space is provided and is managed in accordance with the following requirements:

- Grass must be short cropped and maintained during the declared fire danger period.
- All leaves and vegetation debris must be removed at regular intervals during the declared fire danger period.
- Within 10 metres of a building, flammable objects must not be located close to the vulnerable parts of the building.
- Plants greater than 10 centimetres in height must not be placed within 3m of a window or glass feature of the building.
- Shrubs must not be located under the canopy of trees.
- Individual and clumps of shrubs must not exceed 5 sq. metres in area and must be separated by at least 5 metres.
- Trees must not overhang or touch any elements of the building.
- The canopy of trees must be separated by at least 5 metres.
- There must be a clearance of at least 2 metres between the lowest tree branches and ground level.

There are also exemptions under AS3959–2018 which can be utilised by the management plan so that vegetation can be retained within the reserve and not need a setback. These are listed under AS3959–2018 in Section 2.2.3.2.a–f. and expanded on further in Table 5 below.

Table 5. Application of exemptions under AS3959–2018

Section 2.2.3.2	Excluded vegetation	Potential application in Reserve (Area 8)
<b>a</b>	Vegetation of any type that is more than 100m from the site.	This could potentially be applied with a buffer of 100m from the reserve’s eastern boundary and vegetation beyond this buffer not requiring management for fuel levels. Any vegetation patches more than 100m from the residential areas cannot have sections within 100m or the entire patch needs to be considered.
<b>b</b>	Single areas of vegetation less than 1 ha in area and not within 100 m of other areas of vegetation being classified vegetation.	The size of the reserve means this exemption is not really applicable.

Section 2.2.3.2	Excluded vegetation	Potential application in Reserve (Area 8)
c	Multiple areas of vegetation less than 0.25 ha in area and not within 20 m of the site, or each other or of other areas of vegetation being classified vegetation.	This could be achieved with several carefully placed individual garden beds.
d	Strips of vegetation less than 20 m in width (measured perpendicular to the elevation exposed to the strip of vegetation) regardless of length and not within 20 m of the site or each other, or other areas of vegetation being classified vegetation.	This could be achieved with several carefully placed individual garden beds or with vegetation along road reserves.
e	Non-vegetated areas, that is, areas permanently cleared of vegetation, including waterways, exposed beaches, roads, footpaths, buildings and rocky outcrops.	This is only really applicable here if large waterbodies are placed in the reserve since the entire area is vegetated.
f	Vegetation regarded as low threat due to factors such as flammability, moisture content or fuel load. This includes grassland managed in a minimal fuel condition, mangroves and other saline wetlands, maintained lawns, golf courses (such as playing areas and fairways), maintained public reserves and parklands, sporting fields, vineyards, orchards, banana plantations, market gardens (and other non-curing crops), cultivated gardens, commercial nurseries, nature strips and windbreaks.	This is where defensible space management standards are employed but can also be applied to wetlands and waterbodies which are listed as low threat since the 2018 update of AS3959.

Alternatively, the highest rated vegetation under AS3959–2018 is Forest which requires 48m of defensible space on level terrain for BAL–12.5. Establishing a large Forest patch immediately adjacent to a residential area is not recommended but if this separation is established as a fuel break and as road reserves then how the reserves are managed becomes a moot point (to an extent, fuel management and emergency services access will always be required in some form).

## 6. RECOMMENDATIONS

After considering the bushfire risks and hazards at the landscape and site scale against the strategies of Clause 13.02-1S and the requirements/decision criteria of Clause 53.02, we can conclude that the proposed layout on the site as per the Mooroopna West Growth Corridor Concept Plan should be able to proceed under the current conditions. We have several recommendations regarding the future management of the subject site which will need to be considered by council and should be reviewed by the CFA despite the BMO not being present.

Since the majority of the site will be council managed under the Mooroopna West Growth Corridor Concept Plan and only a small portion will be rezoned for residential development, protection measures can be placed to make this residential area more feasible. Measures can also be taken within the residential area before the rezoning occurs to account for any items which council cannot address. These recommendations are based on Areas within the site (**Area 6**, **Area 8** and **Area 9**) aside from **Area 5** which needs to be considered before the residential development can proceed. These recommendations are as follows:

- As mentioned previously, the landscape risk is low enough that any remaining bushfire risk can be managed through measures taken onsite and not through updating the layout or considering alternative locations. The proposed expansion of Excelsior Lane into **Area 6** and **Area 7** will increase the size of the fuel break between the site and bushfire hazards to the west which, combined with the existing road reserve along McLennan Street, should remove any doubt that the landscape risk has been adequately addressed.
- The current residential areas within **Area 10** employ a boundary road between lots and **Area 8**, this will need to be continued within **Area 9** to create access and a buffer between future lots and the vegetation within Areas 5 and 8.
- The largest bushfire hazard to the site is from the Woodland within **Area 5** due to that fact that it is the only classified vegetation on the wider landscape which is not Grassland and it is directly adjacent to the proposed residential areas within **Area 9**. Under the Mooroopna West Growth Corridor Concept Plan, **Area 5** will eventually be developed into a drainage/floodplain reserve similar to **Area 8**, This should proceed before the northern half of **Area 9** is subdivided because the 33m setback required from this vegetation will result in setbacks being required within lots.

If council cannot acquire this property or manage this Woodland then the residential area should consider one or more of the following:

- A park or similar managed public space along the northern boundary to gain the additional 13m required (assuming the boundary road reserve is 20m wide).
- Larger lots along the northern boundary which can accommodate the 13m separation required. This can be achieved through a schedule to the zoning, a development overlay schedule, or a different zoning which can enforce a larger minimum lot size.

It should also be noted that developers placing the subdivision application will need to incorporate designs to prove BAL-12.5 is attainable for future lots. Once this is proven however, landowners can reduce the setback with a higher BAL rating since there is no BMO on the site and the subdivision application will provide all of the planning approval required for bushfire.

- If the drainage reserve within **Area 5** can be established before the residential areas are considered within **Area 9** then the required setbacks can be incorporated into the reserve through a managed fuel break within the reserve or management of the reserve to change the vegetation classification and remove/reduce the setback requirements.
- Management within **Area 5** and **Area 8** will have to be carefully managed to not increase the fuels present so the setbacks incorporated into the residential areas remain suitable for BAL-12.5. **Area 8** is currently slashed and was considered to be Grassland based on the vegetation present but there were a lot of planted shrubs and trees throughout this area which means the classification could change in the future. **Area 5** is currently Woodland but could easily become Forest with planted shrub species which would increase the setback requirements from 33m to 48m under AS3959-2018.

In order to ensure the proper setback are present in perpetuity, one or more of the following recommendations should be considered:

- Management will need to follow a set planting and management regime guided by AS3959-2018 to ensure the vegetation classification remains appropriate for the setback present. The boundary road reserves are normally 20m wide so ensuring the reserve remains as Grassland or Shrubland (which has the same setback requirements) will mean no setbacks are required within lots or no fuel break is needed in the reserve. if any other vegetation type is desired then a fuel break along the boundary between the residential areas and the width of this fuel break will need to be monitored to ensure it remains adequate for the vegetation present.
- Managing the entire reserve to minimal fuel conditions or managing to create exemptions under AS3959-2018 will negate the need for a setback. The defensible space management standards are provided in Section 5.2.2 and can be used to ensure minimal fuel conditions are present. There are also exclusions under AS3959-2018 (Section 2.2.3.2.a-f) which can used although this will require careful management.
- While Forest vegetation within the drainage reserve is not recommended since it will place a hazard adjacent to residential areas, if a 48-50m buffer is maintained from the residential areas (either entirely within the reserve or through a combination of road reserve and fuel break), then any management would be acceptable as the defensible space setbacks for the highest rated vegetation have already been provided.

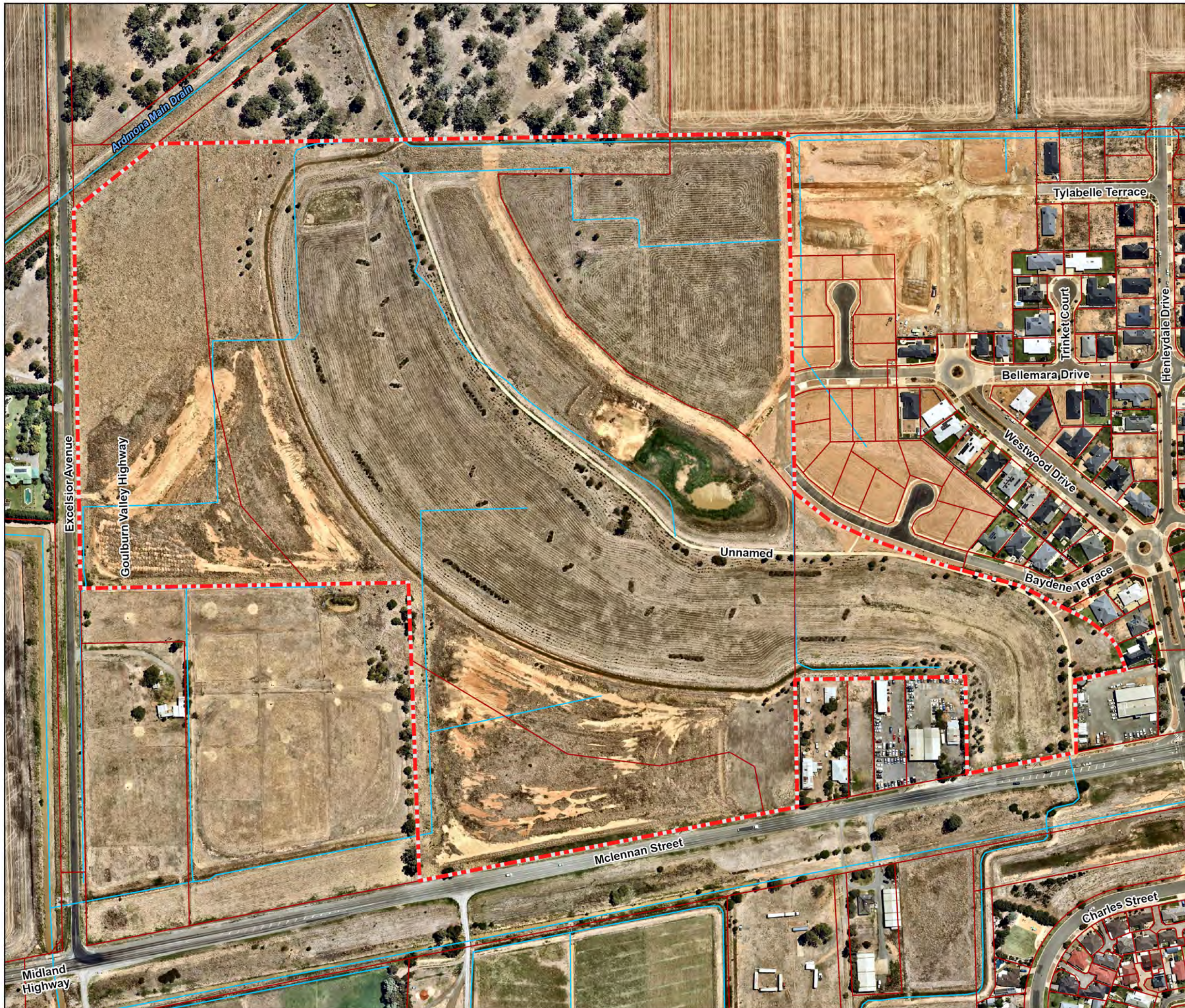
A combination of the above items can potentially be employed but it will need to be properly assessed by a BPAD accredited bushfire consultant and an ecologist to confirm the fuel types which will eventually be present.

## 7. REFERENCES

- CFA (2012) *Planning for Bushfire Victoria – Guidelines for Meeting Victoria's Bushfire Planning Requirements*. Country Fire Authority.
- DTPLI (2014) *Practice Note 65: Preparing and Assessing a Planning Application under the Bushfire Provisions in Planning Schemes, July 2014*. Department of Transport, Planning and Local Infrastructure, Government of Victoria, Melbourne.
- Standards Australia (2018) *Australian Standard 3959–2018 Construction of buildings in bushfire-prone areas (incorporating Amendment No. 1)*. SAI Global, Sydney.

## Appendix 1. Maps







**Map 1. Subject site**  
 294 McLennan Street, Mooroopna

**Legend**

- Subject site
- Parcels
- Constructed watercourse

**Details**

Mapping by: Ali Nia  
 Date: 20/04/2022  
 Version: 1  
 Aerial photography from Nearmap (Feb 2022).  
 Data Source: Base layers courtesy of VicMap,  
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Scale: 1:3,000 (Page size A3)

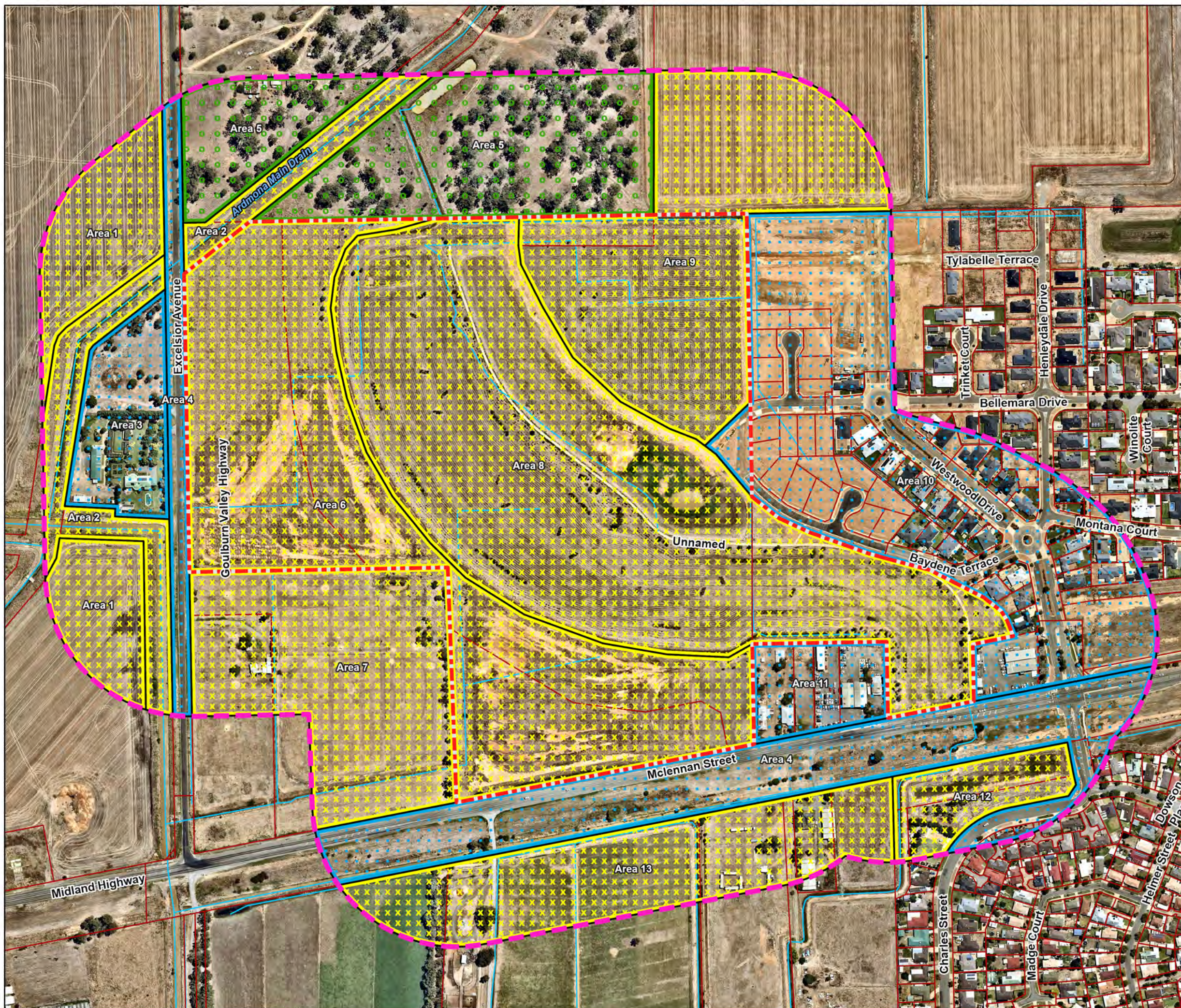
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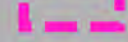
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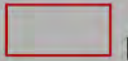
## Map 2. Bushfire Hazard Site Assessment


294 McLennan Street, Mooroopna



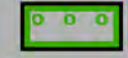
### Legend


-  Subject site
-  Assessment area (150m)


 Parcels

 Constructed watercourse

### Classified vegetation

 Woodland

 Grassland

 Low Threat

### Details

Mapping by: Ali Nia

Date: 20/04/2022

Version: 1

Aerial photography from Nearmap (Feb 2022).

Data Source: Base layers courtesy of VicMap,  
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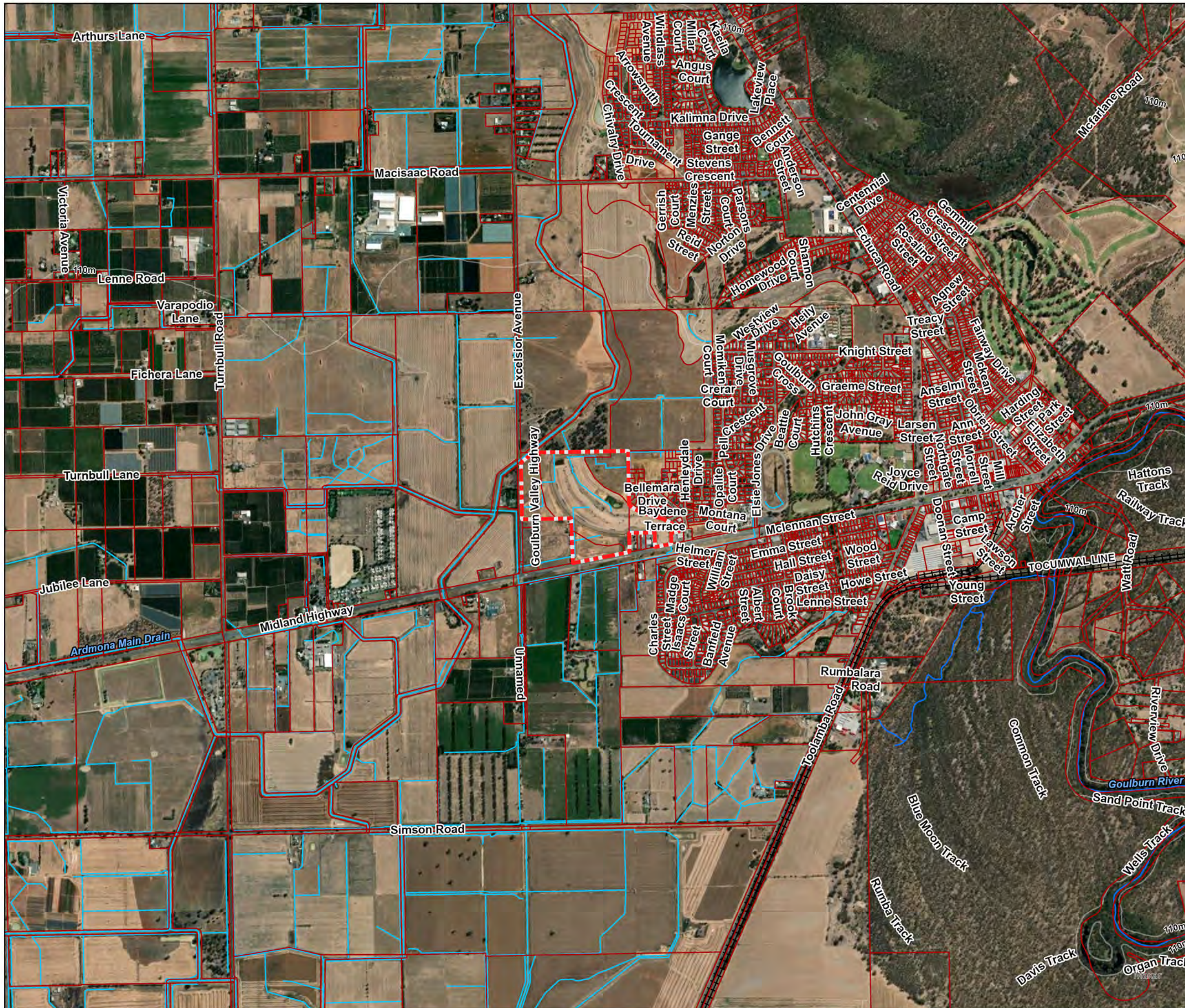


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### Map 3. Local context

294 McLennan Street, Mooroopna



**Legend**

- Subject site
- Parcels
- Contours (10m)
- Constructed watercourse
- Natural watercourse
- Railways

**Details**

Mapping by: Ali Nia  
 Date: 20/04/2022  
 Version: 1  
 Aerial photography from ArcPro World Imagery.  
 Data Source: Base layers courtesy of VicMap,  
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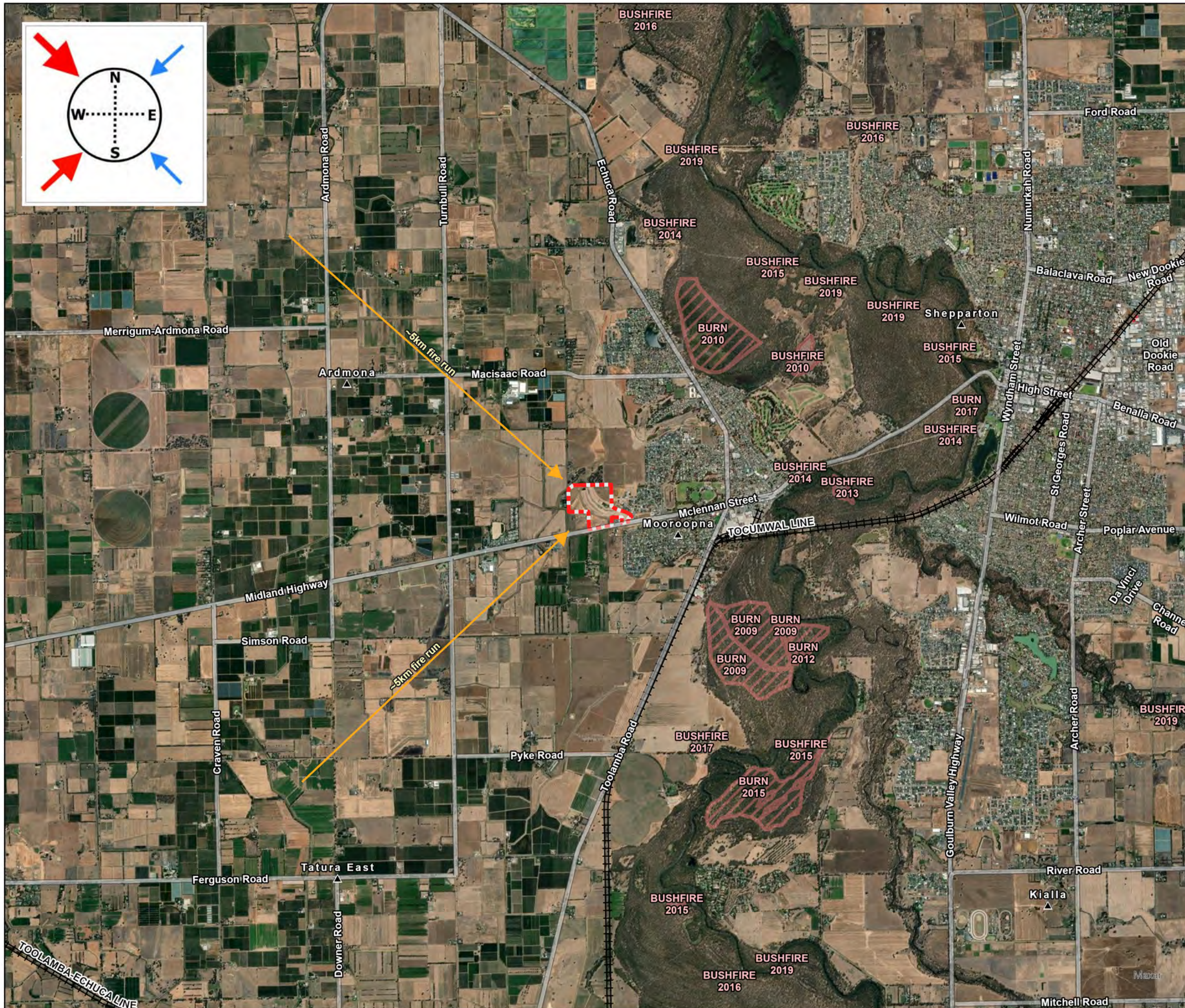
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# Map 4. Bushfire Hazard Landscape Assessment

294 McLennan Street, Mooroopna



**Legend**

- Subject site
- Town centre
- Major Roads
- Railways
- Neighbourhood Safer Place
- Potential fire runs

**Fire History**

**Bushfire**

- Bushfire Pre 1950
- Bushfire 1950-1979
- Bushfire 1980 onwards

**Planned Burn**

- Planned Burn Pre 1980
- Planned Burn 1980 onwards

**Details**

Mapping by: Ali Nia  
 Date: 20/04/2022  
 Version: 1  
 Aerial photography from ArcPro World Imagery.  
 Data Source: Base layers courtesy of VicMap,  
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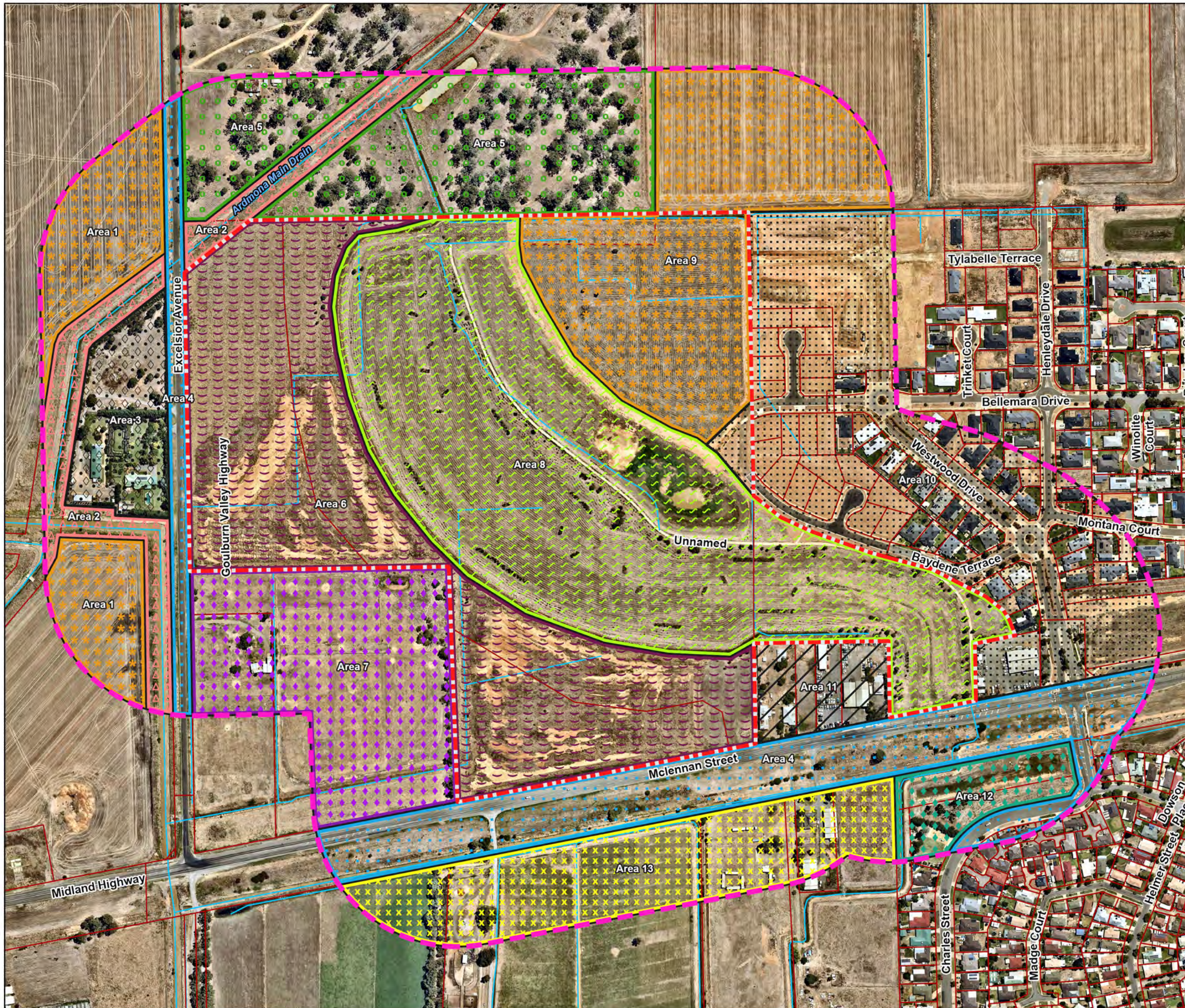
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# Map 5. Bushfire Risk Assessment

294 McLennan Street, Mooroopna



**Legend**

- Subject site
- Assessment area (150m)
- Parcels
- Constructed watercourse

**Bushfire hazards**

- Open grassy woodland
- Open managed reserve area with planted trees/shrubs
- Drainage reserve
- Managed channel
- Managed paddocks and scattered agricultural structures
- Managed/tilled paddock
- Open paddock with raised piles of clay (construction refuse)
- Managed horse paddocks
- Partially constructed high density residential area
- Low-density residential properties
- Industrial structures
- Road reserve

**Details**

Mapping by: Ali Nia  
 Date: 21/04/2022  
 Version: 1

Aerial photography from Nearmap (Feb 2022).  
 Data Source: Base layers courtesy of VicMap,  
 Copyright © State of Victoria.

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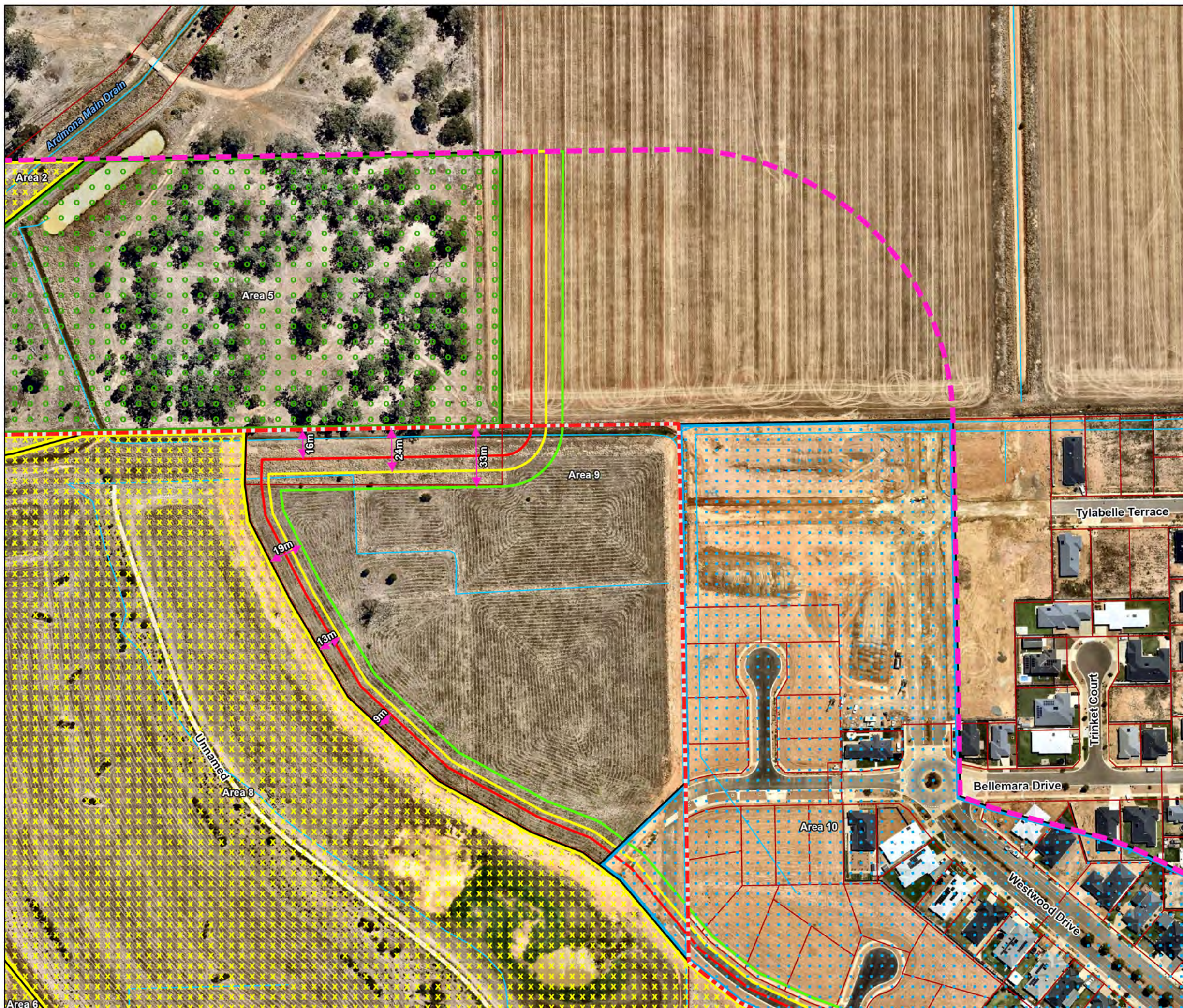
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# Map 6. Defendable Space Setbacks

294 McLennan Street, Mooroopna



**Legend**

- Subject site
- Assessment area (150m)
- Parcels
- Constructed watercourse

**Classified vegetation**

- Woodland
- Grassland
- Low Threat

**Defendable space setbacks**

- BAL-12.5
- BAL-19
- BAL-29

**Details**

Mapping by: Ali Nia  
 Date: 21/04/2022  
 Version: 1

Aerial photography from Nearmap (Feb 2022).  
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