



# Albury Regional Job Precinct

## Bushfire Assessment Report

20 September 2023

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## Signature Page

20 September 2023

# Albury Regional Job Precinct

## Bushfire Assessment Report



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## Acronyms and Abbreviations

Name	Description
Albury LEP	Albury Local Environment Plan 2010
APZ	Asset Protection Zones
Asset	anything valued by the community which includes houses, crops, heritage buildings and places, infrastructure, the environment, businesses, and national parks, that may be at risk from bushfire.
AS 3959-2018	<i>Australian Standard 3959 - 2018 Construction of Buildings in Bushfire-prone Areas</i>
BAL	Bushfire Attack Level
BC Act	<i>Biodiversity Conservation Act 2016 (NSW)</i>
BFMC	Bushfire Management Committee
BFRMP	Bush Fire Risk Management Plan
Bushfire Hazard	the potential severity of a bushfire, which is determined by fuel load and topography under a given climatic condition
BOM	Bureau of Meteorology
Bushfire Hazard	the potential severity of a bushfire, which is determined by fuel load and topography under a given climatic condition
Bushfire Risk	the chance of a bushfire igniting, spreading and causing damage to the community or the assets they value
EP&A Act	<i>Environmental Planning and Assessment Act 1979 (NSW)</i>
EPBC Act	<i>Environmental Protection and Biodiversity Conservation Act (Commonwealth)</i>
ERM	Environmental Resources Management Australia Pty Ltd
GIS	Geographic Information System
Ha	Hectare

Name	Description
IFEG	International Fire Engineering Guidelines
IPA	inner protection area
km/h	Kilometres per hour
kW/m <sup>2</sup>	Kilowatts per metre squared
LGA	Local Government Area
Major Bushfire	A bushfire which requires the attendance of multiple brigades, or causes damage to property or injury to one or more persons
MNES	Matter of National Environmental Significance
NSW	New South Wales
NPWS	National Parks and Wildlife Service
NSW RFS	NSW Rural Fire Service
RF Act	<i>Rural Fires Act 1997 (NSW)</i>
RFS	Rural Fire Service
RJP	Regional Job Precinct
RJP Investigation Area	This is the focus of investigation for the Albury RJP and is approximately 1,199 hectares in size.
SFAZ	Strategic Fire Advantage Zone
SFP	Special Fire Protection
SFPP	"special fire protection purpose" means the purpose of the following: (a) a school, (b) a child care centre, (c) a hospital (including a hospital for the mentally ill or mentally disordered), (d) a hotel, motel or other tourist accommodation, (e) a building wholly or principally used as a home or other establishment for mentally incapacitated persons, (f) seniors housing within the meaning of State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 , (g) a group home within the meaning of State Environmental Planning Policy No 9-- Group Homes , (h) a retirement village, (i) any other purpose prescribed by the regulations.
TOBAN	Total Fire Ban
VM	Verification Method

**Note:**

*Despite the mitigation measures and treatments that are put in place, it is noted that some bushfire risk will always remain and that some of the infrastructure may be subject to direct flame contact. The absence of any identified hazard or asset within the RJP Investigation Area should not be interpreted as a guarantee that such hazards or impacts do not exist. It will be important that a Bushfire Emergency Management Plan is prepared as part of the future Master Plan in conjunction with relevant stakeholders, including local fire services, NSW RFS, NSW Fire and Rescue, and adjoining property owners and employees.*

**Disclaimer:**

*Any representation, statement of opinion, or advice expressed or implied in the bushfire assessment will be made in good faith on the basis that ERM employees and / or agents are not liable (whether by reason of negligence, lack of care or any other reason ) to any person, company or their agents for any damage or loss whatsoever which has occurred or may occur in relation to that person taking (or not taking) action in respect of any representation, statement or advice provided within the bushfire assessment.*

## EXECUTIVE SUMMARY

Environmental Resources Management Australia Pty Ltd (ERM) has been engaged by the New South Wales (NSW) Government to prepare a Bushfire Assessment Report to support the development of the Master Plan for the Albury Regional Job Precinct (RJP). The report aims to establish the relevant specifications and requirements to assist in the development of the Master Plan.

This assessment considers the bushfire landscape, land use, access and egress and emergency services capacity. Based on these factors it is anticipated that new development within the precinct can be designed to meet the requirements of Planning for Bush Fire Protection 2019. Of particular note is the importance of future development to consider existing access and egress routes across the locality with key consideration of the NEXUS Industrial Precinct, Ettamogah Rail Hub, Overall Forge site and Visy site, as well as the existing Special Fire Protection assets (retirement villages, schools, hospitals and tourist attractions) within Albury.

Complying development will not be applicable to all land use types or where a referral to the NSW RFS is required. The remaining commercial and industrial type development can be addressed within the Master Plan through the aims and objectives of Planning for Bush Fire Protection 2019. Specifically:

- Complying development is only permitted on lower risk bushfire prone land (BAL-29 or lower);
- Where potentially hazardous industries are proposed, consultation with the NSW RFS and preparation of a performance based solution will be required. These development types will not be considered for complying development;
- Developments classified as special fire protection purpose (SFPP) would trigger referral to the NSW Rural Fire Service under s100b RF Act 1997 and will not be considered complying development; and
- Other land uses such as places of public worship and other public assembly buildings (i.e., function centres) also require referral to the NSW RFS under s.4.14 of the EP&A Act. Any buildings used for public assembly with a floor space area of greater than 500m<sup>2</sup> will be treated as SFPP.

At a strategic level, the Master Plan has taken into consideration the bushfire prone land mapping and new development within the precinct can be designed to meet the requirements of Planning for Bush Fire Protection 2019. This includes the creation of defined conservation areas which correspond with the areas' high bushfire hazard, and the provision of defensible space within the boundary of the RJP. These areas of defensible space may include the perimeter road network, drainage channels and maintained public open space. All recreational space and landscaped areas should be designed and managed to meet the requirements of an APZ, and must be maintained in perpetuity to ensure ongoing protection from the impact of bushfires, particularly in advance of the bushfire season.

The development of the Master Plan has also considered the application of suitable Asset Protection Zones across the precinct to result in a Bushfire Attack Level of:

- BAL 29 or lower to all the future building envelopes;
- BAL 12.5 or lower to all SFPP; and
- BAL 12.5 or lower to all potentially hazardous industry.

The RJP may also require the creation of APZs that need to be maintained sequentially until the final phase of development is completed to afford each stage of the development the appropriate level of bushfire protection.

Key specifications and requirements to assist in the development of the Master Plan are provided in Table E.1.

**Table E.1 Proposed Performance Criteria – Bushfire**

Performance Criteria No.	Performance Criteria Description
1	Asset Protection Zones are managed and maintained to prevent the spread of a fire within the precinct in accordance with the requirements of Appendix 4 of Planning for Bushfire Protection 2019 to result in a Bushfire Attack Level of BAL 29 or lower (not BAL 40 or BAL FZ) to all future building envelopes that are being assessed as complying development. This includes part of a staged or partial development of the Precinct.
2	Where referral to NSW RFS is required (SFPP, potentially hazardous development and/or places of public worship), Asset Protection Zones should be managed and maintained to result in a Bushfire Attack Level of BAL 12.5 or lower (not BAL 29, BAL 40 or BAL FZ). These developments will not be assessed as complying development.
3	All landscaping is to comply with Appendix 4 of Planning for Bushfire Protection 2019 and relevant environmental approvals required under the NSW <i>Biodiversity Conservation Act 2016</i> and/or Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i> . Where environmentally sensitive vegetation such as endangered ecological communities or threatened species habitat are to be cleared, the proposals will need to be carefully considered and may no longer be consistent with complying development.
4	Access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating as well as providing a safe operational environment for emergency service personnel during firefighting and emergency management on the interface. The requirements for access identified in Planning for Bushfire Protection 2019 must be met for all stages of development within the Regional Job Precinct.
5	Adequate water supplies are provided for firefighting purposes. Hydrants are to be installed to achieve compliance with AS 2419.1 – 2005 Fire Hydrant Installations - System Design, Installation and Commissioning (AS 2419) and must be located less than 70m from each building envelope.
6	The location and design of gas services will not lead to ignition of surrounding bushland or the fabric of buildings. Reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 and the requirements of relevant authorities, and metal piping is used.
7	The location of electricity services limits the possibility of ignition of surrounding bushland or the fabric of buildings and must comply with requirements of Planning for Bushfire Protection 2019.



## 1. INTRODUCTION

Environmental Resources Management Australia Pty Ltd (ERM) has been engaged by the New South Wales (NSW) Government to prepare a Bushfire Assessment Report to support the development of the Master Plan for the Albury Regional Job Precinct. The report aims to establish the relevant specifications and requirements to assist in the development of the Master Plan.

### 1.1 Project Description

The NSW Government's Regional Job Precincts (RJP) will provide planning support to drive growth, investment and development opportunities within regional NSW. Four locations have been chosen for the first round of this initiative: Albury, Richmond Valley, South Jerrabomberra and Namoi.

The Albury Regional Job Precinct will leverage the opportunities associated with an expanded NEXUS Industrial Precinct to create a hub of advanced manufacturing, circular economy and recycling, agribusiness, freight and logistics services, and create more jobs for the region.

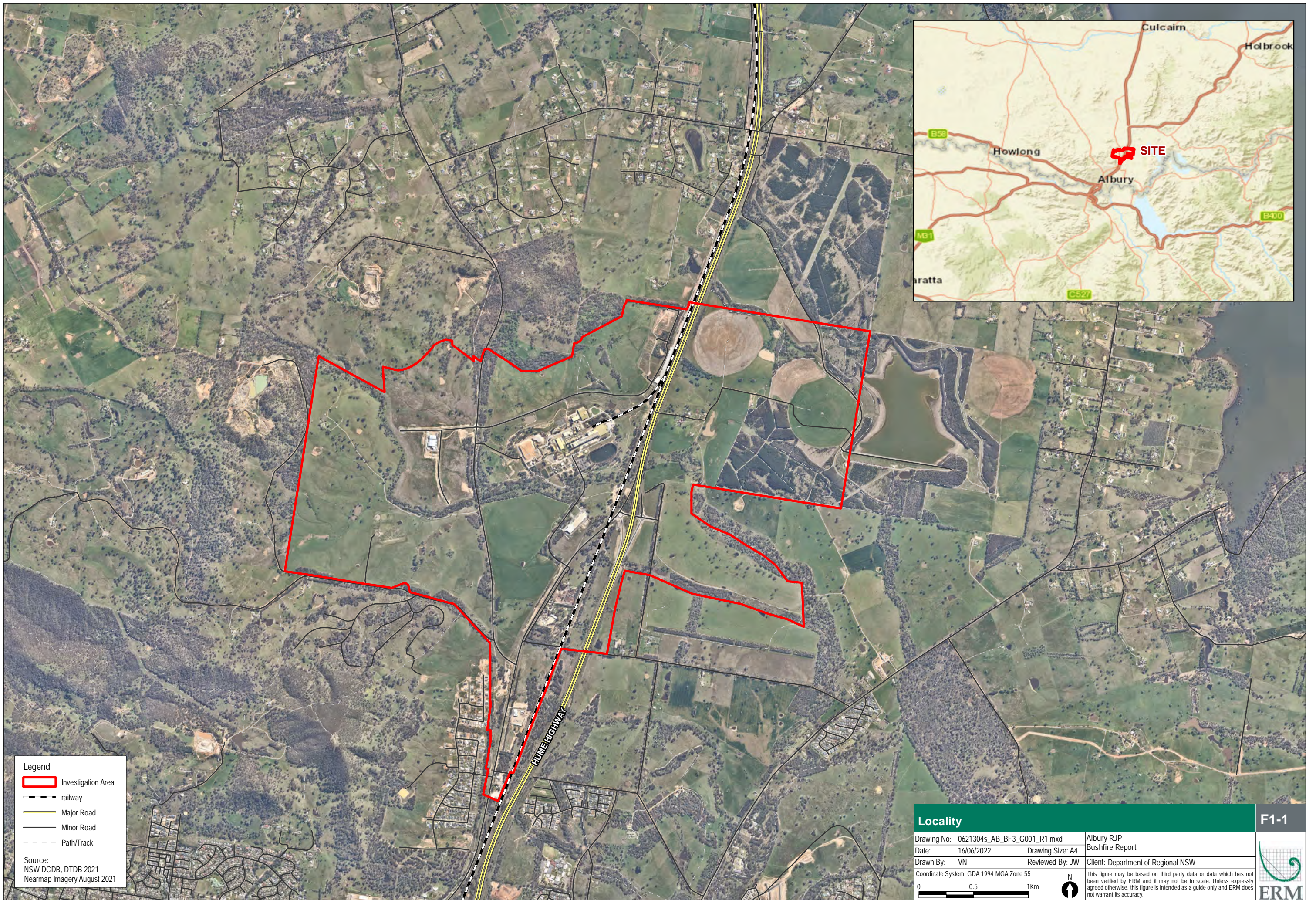
By reducing delays and simplifying planning processes, the precinct will attract investment and diversify business opportunities, creating jobs for the young and a skilled and growing local workforce in Albury.

### 1.2 Albury Investigation Area

The Albury RJP investigation area is approximately 1,199 hectares in size and is located north-east of the Albury Town Centre within the suburb of Ettamogah. It is located 12km from Albury Airport, with an intermodal hub, and direct road and rail access between Sydney and Melbourne. The investigation area includes the current NEXUS site as well as an area to the east of the Hume Highway identified as a potential area for NEXUS to expand. It is well placed to become a major distribution centre for the manufacturing, agribusiness and circular economy industries and also includes:

- Former Norske Skog paper mill (now owned by Visy);
- Hume Highway;
- Twin City Model Aero Club;
- Ettamogah Rail Hub;
- Overall Forge;
- Circular Plastics Australia PET recycling plant;
- Rural and agricultural land;
- Commercial and light industrial clusters; and
- Seven and Eight Mile Creeks and associated tributaries.

It is important to note that despite the mitigation measures and treatments that are put in place, some bushfire risk will always remain and that some of the infrastructure may be subject to direct flame contact. It will be important that a Bushfire Emergency Management Plan is prepared as part of the future Master Plan in conjunction with relevant stakeholders, including local fire services, NSW RFS, NSW Fire and Rescue, and adjoining property owners and employees.

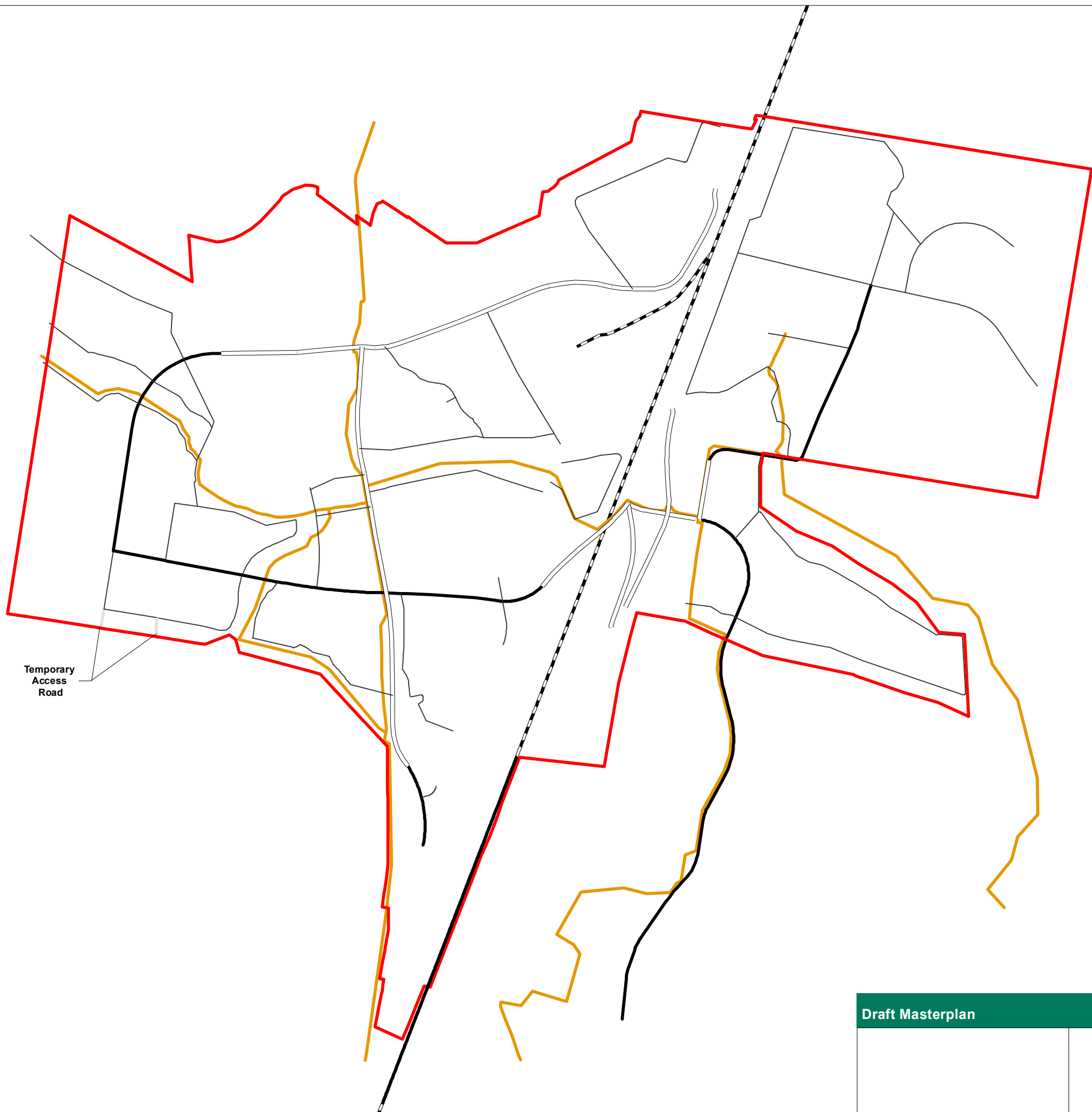


**Legend**

- Investigation Area
- railway
- Major Road
- Minor Road
- Path/Track

Source:  
NSW DCDB, DTDB 2021  
Nearmap Imagery August 2021

Locality		F1-1
Drawing No: 0621304s_AB_BF3_G001_R1.mxd	Drawing Size: A4	Albury RJP Bushfire Report
Date: 16/06/2022	Reviewed By: JW	Client: Department of Regional NSW
Coordinate System: GDA 1994 MGA Zone 55		<p>This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.</p>



**Legend**

- Investigation Area
- Land Use Direction**
- Conservation
- Low and General Impact Industries
- High Impact Industries
- Rail Intermodal
- Productivity Support
- Service Station
- Roads**
- Major Road
- Minor Road
- Temporary Access Road
- Upgraded Road
- railway
- Proposed Cycle Paths

**Source:**  
NSW DCDB, DTDB 2021  
Nearmap Imagery August 2021

### 1.3 Strategic Bushfire Planning

Bushfire presents a threat to human life and assets and can adversely impact ecological values. In planning for the use of land in the rural or urban context, it is important to consider the potential threat from bushfire. Bushfire risk is a major constraint to future development, and with the impacts of climate change already being observed, the need to address these issues as early as possible within the planning process is critical.

In accordance with the Section 4 of NSW RFS Planning for Bushfire Protection 2019, in bushfire prone areas strategic planning should provide for the exclusion of inappropriate development. Development should be avoided as follows:

- Where a development area is exposed to a high bushfire risk;
- Where a development is likely to be difficult to evacuate during a bushfire due to its siting in the landscape, access limitations, fire history and/or size and scale;
- Where the development will adversely affect other bushfire protection strategies or place existing development at increased risk;
- Where density of existing development may cause evacuation issues for both existing and new occupants; and
- Where the development has environmental constraints to the area which cannot be overcome.

This report provides an overview of the bushfire landscape, and also broadly identifies how the preferred scenario for the proposed Master Plan can be designed to satisfy the aims and objectives of Planning for Bush Fire Protection 2019. It does not provide any advice or recommendations for alternative solutions and does not provide any site or industry specific advice in terms of bushfire hazard or risk mitigation. This will need to be addressed separately as part of any future development applications.

## 2. LEGISLATIVE AND POLICY CONTEXT

Table 2.1 summarises the relevant legislation and policies applicable to this assessment. In summary, the NSW land use planning framework provides two main phases: strategic planning (the development of the Master Plan) and development assessment (future development within the precinct). Planning for Bushfire Protection 2019 provides the foundation for bushfire protection during both of these phases of development.

**Table 2.1 Key Legislation and Policies**

Key Legislation/Guideline	Description
<i>NSW Rural Fires Act 1997</i>	<p>The main objectives of the <i>NSW Rural Fires Act 1997</i> (RF Act) are to:</p> <ul style="list-style-type: none"> <li>■ prevent, mitigate and suppress bush and other fires in NSW;</li> <li>■ co-ordinate bushfire fighting and bushfire prevention throughout the State;</li> <li>■ protect people from injury or death and property from damage as a result of bushfires;</li> <li>■ protect infrastructure and assets from damage as a result of bushfires; and</li> <li>■ protect the environment.</li> </ul> <p>With specific reference to the Albury RJP, the subdivision of bushfire prone land that could lawfully be used for residential or rural residential purposes (unlikely within the precinct), or development of bushfire prone land for a Special Fire Protection Purpose (SFPP) would trigger referral to the NSW Rural Fire Service under s100b RF Act. <u>These developments would not be considered under complying development.</u></p> <p>It is also noted that under Section 63 of the RF Act, owners and occupiers of land have a duty to take practicable steps to prevent the occurrence of bushfires on, and to minimise the danger of the spread of bushfires on, or from, that land.</p>
<i>Planning for Bushfire Protection 2019</i>	<p><i>Planning for Bushfire Protection 2019</i> (NSW Rural Fire Service, 2019) is a planning document to link responsible planning and development control with the protection of life, property and the environment. It is the culmination of significant investment in scientific research and policy development to provide appropriate bushfire protection whilst still having due consideration for development potential and economic sustainability.</p> <p>During development of the Master Plan, consideration is given to the overall aims and objectives of <i>Planning for Bushfire Protection 2019</i> and there is an expectation that the future development will be able to comply with <i>Planning for Bushfire Protection 2019</i> at the DA stage.</p>
<i>Australian Standard 3959 - 2018 Construction of Buildings in Bushfire-prone Areas (AS 3959-2018)</i>	<p>For the purposes of this assessment, the Albury RJP is considered 'other development' under <i>AS 3959-2018</i>, as it is unlikely to include residential subdivision, residential infill, or SFPP and the National Construction Code 2019 does not provide for any bushfire specific performance requirements. This may vary as the planning and detailed design process progresses.</p> <p>In a designated bushfire prone area, a Class 2 building, a Class 3 building, a Class 4 part of a building or a Class 9 building that is a special fire protection purpose or a Class 10a building or deck associated with such a building or part, must comply with <i>AS 3959-2018</i> as a set of 'deemed to satisfy' provisions. These deemed-to-satisfy provisions have not been considered as part of this assessment.</p> <p>General fire safety provisions and the methodology for determining the bushfire attack level (refer to Section 2 of the <i>AS 3959-2018</i>) are taken as acceptable solutions. The aims and objectives of <i>Planning for Bushfire Protection 2019</i> apply in relation to other matters such as access, water and services,</p>

Key Legislation/Guideline	Description
	<p>emergency planning and landscaping/vegetation management. The assessment considers the aims and objectives of Planning for Bushfire Protection 2019.</p> <p>Future development may also need to consider application of the <i>Environmental Planning and Assessment (Development Certification and Fire Safety) Regulation 2021</i>.</p>
<p><i>Biodiversity Conservation Act 2016</i></p>	<p>Projects determined by a statutory authority of the NSW State Government are required to be assessed in accordance with the <i>NSW Environmental Planning and Assessment Act 1979</i> (EP&amp;A Act) and the <i>NSW Biodiversity Conservation Act 2016</i> (BC Act).</p> <p>The BC Act requires the consideration of threatened species and their habitats in the developmental planning process and a responsibility of the proponent to determine potential impacts on listed species and Endangered Ecological Communities. Schedule 3 of the BC Act lists Key Threatening Processes for species, populations and ecological communities within NSW. 'Clearing of native vegetation', 'high frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition', and 'removal of dead wood and dead trees', are listed by the BC Act as Key Threatening Processes and need to be carefully considered and managed when implementing fire management activities.</p>
<p><i>Albury LEP 2010</i></p>	<p>The Albury Local Environmental Plan (LEP) 2010 outlines the rules and guidelines for the control of development in the city through land zoning. It sets out what development types are permissible in each zone, including their legal definitions. It also contains key development standards and provisions to address local land constraints including bushfire hazard reduction and reference to the bushfire prone land mapping.</p>
<p><i>Commonwealth Environment Protection and Biodiversity Act 1999</i></p>	<p>The <i>Commonwealth Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act) is the primary piece of Federal legislation relating to the environment.</p> <p>Under the EPBC Act any action that has, or is likely to have, a significant impact on a Matter of National Environmental Significance (MNES) requires approval from the Commonwealth Minister for the Environment. An action is defined as a project, development, undertaking, activity (or series of activities), or alteration to any of these.</p>

### 3. THE BUSHFIRE ENVIRONMENT (LANDSCAPE ASSESSMENT)

In accordance with Planning for Bush Fire Protection 2019, this landscape assessment considers the likelihood of a bushfire, its potential severity and intensity, the potential impact on life and property in the context of the broader surrounding landscape and includes consideration of vegetation, topography, weather, history of bushfire in the area, and the difficulty in accessing and suppressing a fire.

#### 3.1 Bushfire Prone Land Mapping

Bushfire prone land is land that has been identified by local council which can support a bushfire or is subject to bushfire attack. Bushfire prone land maps are prepared by local council and certified by the Commissioner of the NSW RFS. A review of the Albury Bushfire Prone Land mapping as shown in Figure 3-1 identifies areas of category 1 vegetation within the north eastern corner, along the Eight Mile Creek riparian corridor and along Gerogery Road. Category 1 vegetation is considered to be the highest risk for bushfire and includes woodlands and timber plantations. It has the highest combustibility and likelihood of forming fully developed fires including heavy ember production

This map is the trigger for the consideration of bushfire protection measures for all development, including the Albury RJP.

#### 3.2 Vegetation Hazard

Vegetation growth can be encouraged by periods of wet weather, increasing the amount of fuel available (grass, leaf litter, twigs, bark). When the weather is hot, the humidity is low, and there has been little recent rain, this vegetation dries out and becomes more flammable. A fire is more likely to start, and continue to burn, in hot, dry and windy weather.

For the purposes of this assessment and as identified in Table 3.1, the vegetation mapping as reported in the biodiversity assessment report (ERM 2022) has been simplified in line with the vegetation formations as per Keith (2004). The vegetation types have been classified into fuel groups using the following parameters:

- frequency that the vegetation provides 'available fire fuel';
- structure of the vegetation and the ability of ground level fuels to carry fire into higher vegetation levels e.g., from understorey into crown fire;
- arrangement of the fuel within the vegetation type, e.g., fine fuels that are elevated, such as in heath, contribute more to fire intensity than a similar quantity of leaf litter fuel; and
- amount of fuel that accumulates after a long period without fire.

**Table 3.1 Broad Vegetation Groups**

Vegetation Community (Biodiversity Assessment ERM 2022)	Vegetation Formation (Keith 2004)
White Box – Blakely’s Red Gum – Red Box – Red Stringybark shrubby woodland on shallow soils on metamorphic hills	Dry Sclerophyll Forest (shrub formation)
River Red Gum herbaceous-grassy very tall open forest wetland on inner floodplains in the lower slopes sub-region of the NSW South Western Slopes Bioregion and the eastern Riverina Bioregion.	Forested Wetland
Common Reed - Bushy Groundsel aquatic tall reedland grassland wetland of inland river systems	Freshwater Wetland
Yellow Box - River Red Gum tall grassy riverine woodland of NSW South Western Slopes Bioregion and Riverina Bioregion	Grassy Woodland
White Box grassy woodland	Grassy Woodland

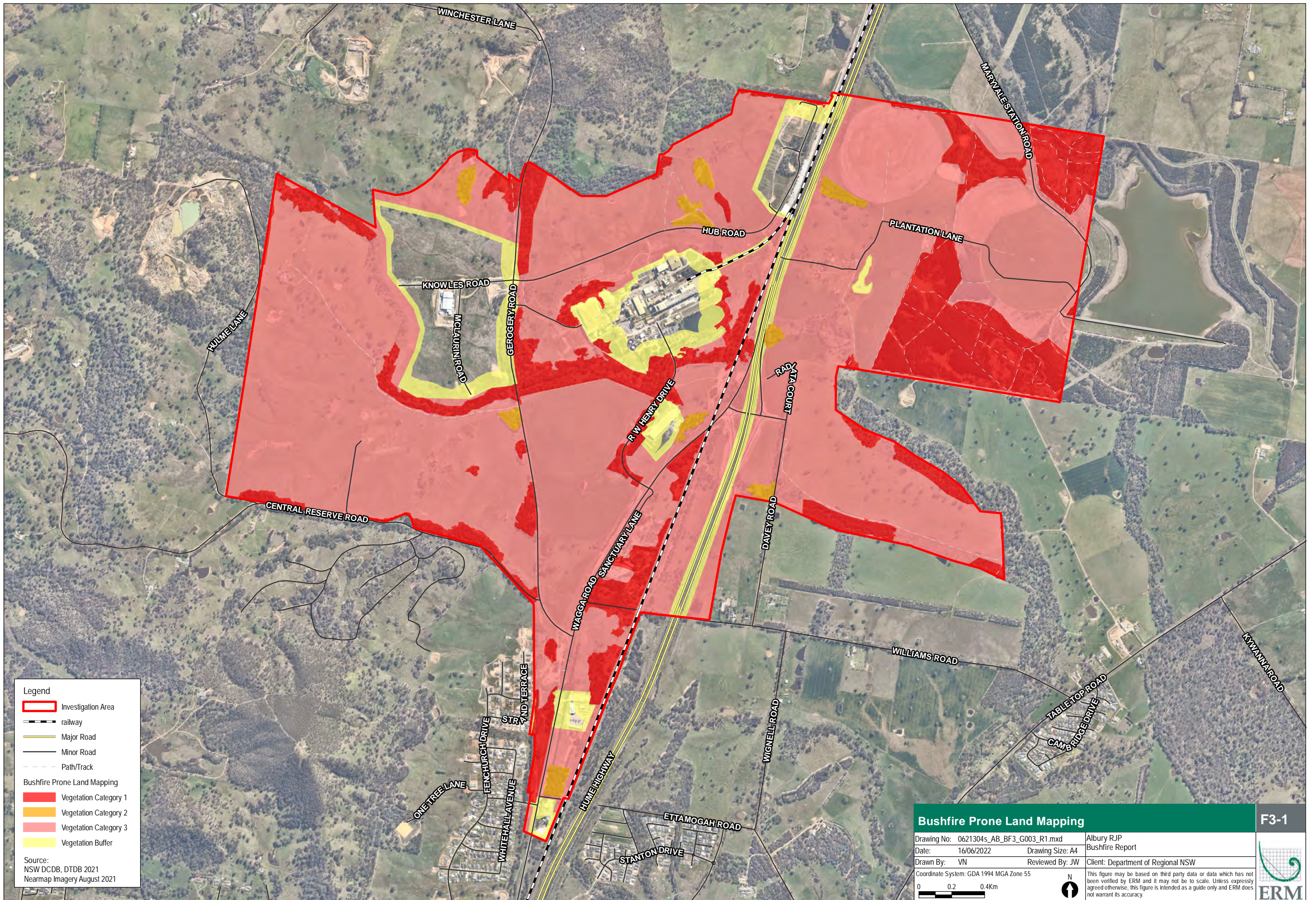
<b>Vegetation Community (Biodiversity Assessment ERM 2022)</b>	<b>Vegetation Formation (Keith 2004)</b>
White Box – Blakely's Red Gum – Long-leaved Box – Nortons Box – Red Stringybark grass-shrub woodland on shallow soils on hills	Grassy Woodland
Blakely's Red Gum – Yellow Box grassy tall woodland	Grassy Woodland
Non-native Overstorey / Plantings	Grassy Woodland
Speargrass – Redleg Grass derived grassland on hills	Grassland
Improved Pasture	Grassland
Non-native Grassland	Grassland
Cropping	Grassland
Plantation	Plantation
Dam	NA

The vegetation classifications are shown in Figure 3-2.

Based on the layout of the Master Plan plan as depicted in Figure 1-2, the vegetation that will have the greatest influence on bushfire behaviour within the precinct is the areas of Dry Sclerophyll Forest and Grassy Woodland within the retained conservation areas as well as within the C3 zoned lands to the west of the precinct. These areas tend to have continuous fuels that are available to burn during average seasons. They are highly combustible and the regional climatic conditions (see Section 3.5 - low rainfall, low humidity, high temperatures and high winds) may support crown fires.

While not identified as a native vegetation community, the areas of non-native and pasture grassland should not be underestimated and grassfires can start and spread quickly. They can travel up to 25 km per hour and pulse even faster over short distances. Grassfires tend to be less intense and produce fewer embers than bushfires, but still generate enormous amounts of radiant heat. Grassfires can also start earlier in the day than bushfires, because grass dries out more quickly when temperatures are high and humidity is low. It should be assumed that, under the most extreme weather, a fire would spread even in heavily grazed paddocks and embers may breach any asset protection zone.





**Legend**

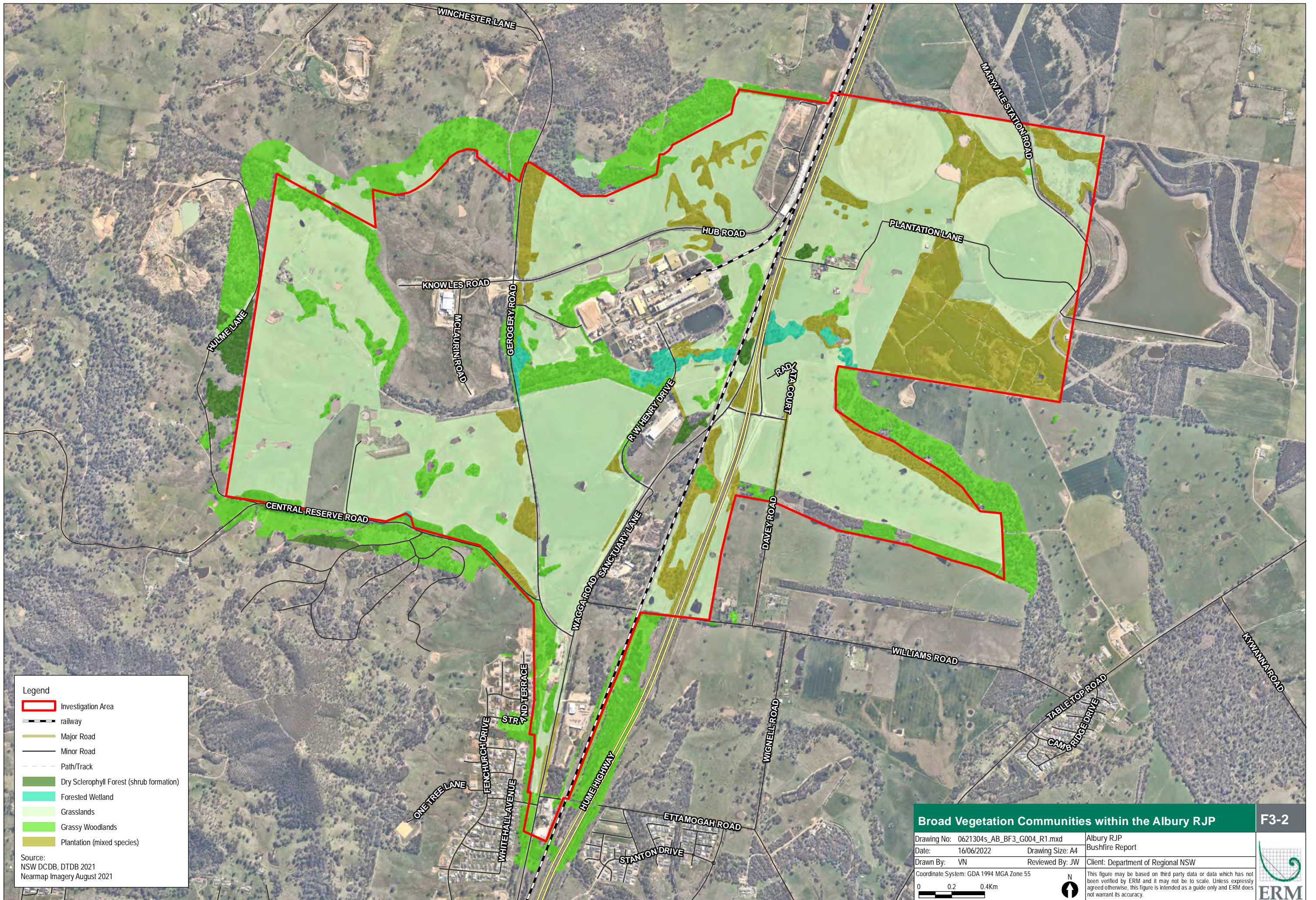
- Investigation Area
- railway
- Major Road
- Minor Road
- Path/Track

**Bushfire Prone Land Mapping**

- Vegetation Category 1
- Vegetation Category 2
- Vegetation Category 3
- Vegetation Buffer

Source:  
NSW DCDB, DTDB 2021  
Nearmap Imagery August 2021

Bushfire Prone Land Mapping		F3-1
Drawing No: 0621304s_AB_BF3_G003_R1.mxd	Albury RJP	
Date: 16/06/2022	Drawing Size: A4	
Drawn By: VN	Reviewed By: JW	Client: Department of Regional NSW
Coordinate System: GDA 1994 MGA Zone 55		This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.



**Legend**

- Investigation Area
- railway
- Major Road
- Minor Road
- Path/Track
- Dry Sclerophyll Forest (shrub formation)
- Forested Wetland
- Grasslands
- Grassy Woodlands
- Plantation (mixed species)

Source:  
NSW DCDB, DTDB 2021  
Nearmap Imagery August 2021

Broad Vegetation Communities within the Albury RJP		F3-2
Drawing No: 0621304s_AB_BF3_G004_R1.mxd	Albury RJP	
Date: 16/06/2022	Drawing Size: A4	Bushfire Report
Drawn By: VN	Reviewed By: JW	Client: Department of Regional NSW
Coordinate System: GDA 1994 MGA Zone 55		
0 0.2 0.4Km	N 	This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.

### 3.3 Topography

Steeper slopes significantly increase the rate of spread of fires, and the relationship of the steepness of slope, and whether a fire moves upslope or downslope, is vital to understanding bushfire behaviour potential. For every 10 degree slope, the fire will double its speed. Slope and wind are often the major factors determining the direction of fire spread.

As identified within Figure 3-3 the topography within the RJP investigation area is generally flat to undulating, with localised steeper slopes along the banks of the creeklines.

Recent research by Sharples (2011) has shown that dynamic fire behaviour can occur on steep slopes of over 24-26 degrees. Areas downwind of these slopes can be exposed to a much greater risk of damage than normal, due to the occurrence of dynamic fire propagation and the development of catastrophic 'firestorms'. In the case of eruptive fire behaviour, the spread will be dominated by convective heat transfer (by strong air movement) rather than radiant heat transfer alone. In addition, eruptive fires may produce a larger area of active flame than the standard fire front, which makes containment of a bushfire more difficult. This is not a key risk within Albury RJP with only small localised steep slopes.

### 3.4 Fire History

As reported in the Hume Zone Bush Fire Risk Management Plan (2017), the region has on average 50 bushfires per year, of which very few can be considered to be major fires.

Based on a review of the publicly available information, no fires have been reported within the RJP investigation area although bushfires occur in most years in this broader district, and escapes from legal burning off, lightning and equipment use remain the top three causes of bushfire in the zone. These are mainly confined to rural areas.

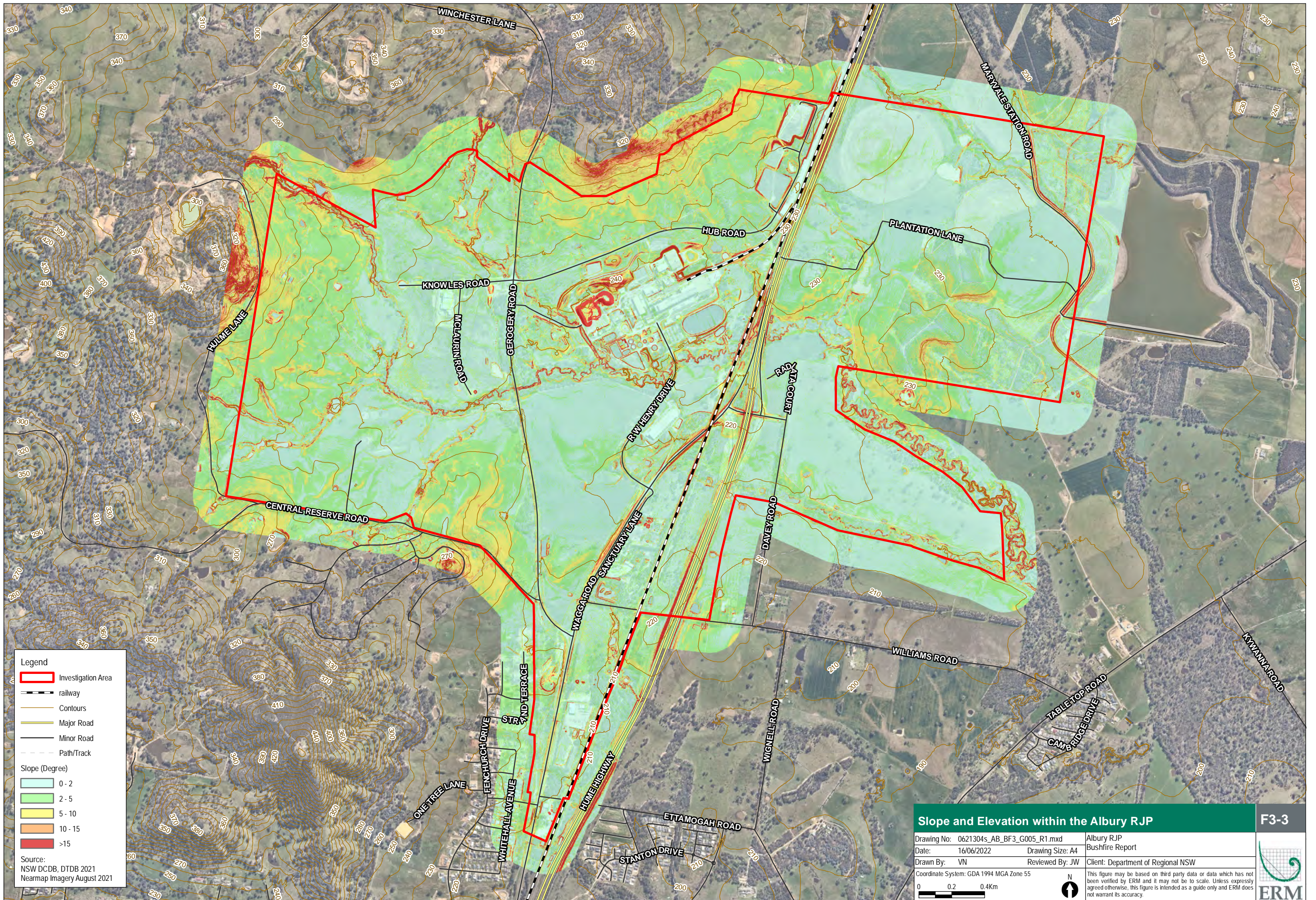
As reported by Hume Zone BFMC (2017), the main sources of ignition in the Hume Zone BFMC area are:

- escapes from legal burning off;
- lightning;
- farm machinery;
- travelling public;
- trains; and
- incendiarism.

Lightning activity in the Zone is mainly associated with late spring and summer thunderstorm activity, which is normally (but not always) accompanied by rainfall. Farm machinery activity early in the summer when cereal crops are being harvested often produce outbreaks of fire across the Zone. Many haystack fires have also been experienced in recent years that appear associated with the unusual rainfall pattern.

Incendiarism continues as a trend and is most common in the grassland and forested areas adjacent to townships, particularly the suburbs of Albury. Areas of high incidence have been identified by the BFMC.

The main Melbourne to Sydney railway line passes through the Zone and has been a known ignition source in the past decade. The Hume, Riverina and Olympic Highways pass through the Zone with a number of recorded ignitions occurring each year.



**Legend**

- Investigation Area
- railway
- Contours
- Major Road
- Minor Road
- Path/Track

**Slope (Degree)**

- 0 - 2
- 2 - 5
- 5 - 10
- 10 - 15
- >15

Source:  
NSW DCDB, DTDB 2021  
Nearmap Imagery August 2021

Slope and Elevation within the Albury RJP		F3-3
Drawing No: 0621304s_AB_BF3_G005_R1.mxd	Albury RJP	
Date: 16/06/2022	Drawing Size: A4	Bushfire Report
Drawn By: VN	Reviewed By: JW	Client: Department of Regional NSW
Coordinate System: GDA 1994 MGA Zone 55		This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.
0    0.2    0.4Km <div style="display: flex; align-items: center; margin-top: 5px;"> <div style="width: 40px; border-bottom: 1px solid black; margin-right: 5px;"></div> <div style="width: 20px; border-bottom: 1px solid black; margin-right: 5px;"></div> <div style="width: 20px; border-bottom: 1px solid black;"></div> </div>		
<div style="display: flex; align-items: center; justify-content: center;"> <span style="font-size: 10px; margin-right: 5px;">N</span> <div style="width: 15px; height: 15px; border: 1px solid black; border-radius: 50%; display: flex; align-items: center; justify-content: center;"> <span style="font-size: 8px;">↑</span> </div> </div>		



### 3.5 Climate and Fire Weather

Weather conditions influence the size, intensity, speed, and predictability of bushfires and how dangerous they can be to the community. While bushfires can happen at any time of the year in Australia, the time of peak bushfire activity varies across the country with the changes in the seasonal weather patterns. In NSW and southern Queensland this generally occurs in spring to mid-summer.



Source: Bureau of Meteorology – *Bushfire Weather* (2021)

<http://www.bom.gov.au/weather-services/fire-weather-centre/bushfire-weather/index.shtml>

#### Figure 3-5 Fire Danger Seasons

As described by the Bureau of Meteorology (BOM) (2021), the greatest danger occurs following a dry winter and spring (as seen during the bushfires in 2019). The worst conditions occur when deep low-pressure systems near Tasmania bring strong, hot and dry, westerly winds to the coastal districts. The end of the fire season is determined by the onset of moister conditions, sometimes the result of a tropical cyclone developing near the Queensland coast.

As reported by the Hume Zone Bushfire Management Committee (BFMC) (BFMC, 2017), the typical / average climate in the Hume Zone BFMC is warm to hot during the summer period of November to March. During the summer, dry storms producing lightning frequently occur. Winters tend to experience higher rainfall and lower temperatures.

Prevailing weather conditions associated with the bushfire season in the Hume Zone BFMC area are north-westerly winds accompanied by high daytime temperatures and low relative humidity. There are also dry lightning storms occurring during the bushfire season in areas across the district, many being recorded around the softwood plantations and National Park in the east of the zone.

Strong gusty winds help fan the flames and cause a fire to spread faster across the landscape. Strong winds can carry hot embers long distances - these can start spot fires many kilometres ahead of the main fire front. Smoke attributed to bushfire can also have a major impact on various assets and the environment. Wind direction, fuel moisture content, and ignition source should be considered and managed to reduce the likelihood of smoke issues.

### 3.6 Climate Change and Bushfires

Eastern Australia is documented to be one of the most bushfire-prone areas in the world. As reported by the Bureau of Meteorology (BOM 2020), human induced climate change is influencing the frequency and severity of dangerous bushfire conditions in Australia and other regions of the world, effecting temperature, environmental moisture, weather patterns, and fuel conditions. Observed changes in southern and eastern Australia include more extreme conditions during summer, as well as an earlier start to the bushfire season with dangerous weather conditions occurring significantly earlier in spring than they used to.

While climate change might not ignite the fire, it is giving fires the chance to turn into catastrophic fires by creating warmer temperatures, increasing the amount of fuel (dried vegetation) available, and reducing water availability due to higher evaporation. In relation to fire ignition, there is some indication that human induced climate change could also influence the risk of ignitions from dry-lightning (i.e., lightning that occurs without significant rainfall).


Bushfire weather conditions in future years are projected to increase in severity for many regions including Albury. This will result in:

- an earlier start to the bushfire season;
- reduced opportunities for fuel reduction burning;
- management of fire risk to property, people and biodiversity will become increasingly challenging; and
- an increase in the number of extreme fire danger days.



### 3.7 Key Assets and Land Use within and Surrounding the Investigation Area



Key assets and land use within and surrounding the RJP have been very broadly classified in Table 3.2. A separate asset register has also been included in Appendix C, based on the Hume Zone Bush Fire Management Committee Bush Fire Risk Management Plan (2017).

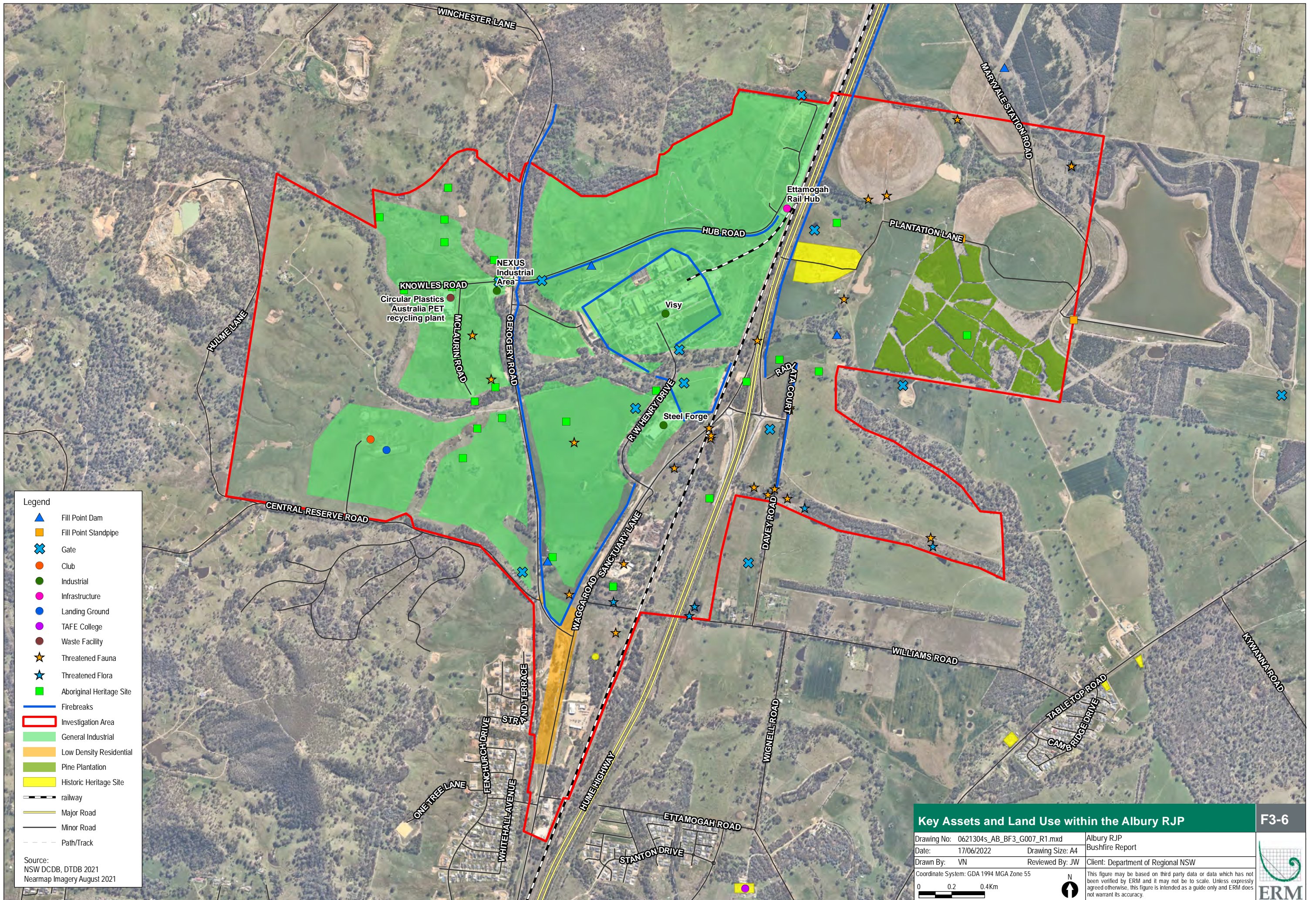
**Table 3.2 Identification of Assets within the Albury RJP**

Asset		Description of asset	Vulnerable to bushfire impacts?
Residential areas and Special Fire Protection (SFP) assets.		<p>The precinct is located to the north of Albury and associated infrastructure including shopping centres, tourist accommodation, children’s playgrounds, sporting grounds, schools, hospitals.</p> <p>Key sites include:</p> <ul style="list-style-type: none"> <li>■ areas zoned residential bordering the south of the RJP;</li> <li>■ areas identified for future residential in the Thurgoona-Wirlinga Precinct Structure Plan on the eastern side of the Hume Highway;</li> <li>■ the nearest schools are Trinity Anglican College (850m south of the RJP boundary) and Table Top Public School (2km to the north of the RJP boundary);</li> <li>■ the nearest aged care facility is Estia Health (2km to from the south of the RJP); and</li> <li>■ rural residential areas are also scattered within the surrounding landscape.</li> </ul>	✓
Rail		<p>The Main Southern Railway is a major railway in New South Wales, Australia. It runs from Sydney to Albury, near the Victorian border. The line passes through the Southern Highlands, Southern Tablelands, South West Slopes and Riverina regions.</p> <p>The Ettamogah Rail Hub is a container handling, intermodal transport facility providing a rail-transport option for national and international freight to and from the Albury-Wodonga region. It has its own rail sidings with direct access to the rail line as well as the Hume Freeway.</p> <p>The proposed Albury to Illabo (A2I) Inland Rail project would provide further enhancement of this existing 'Main South' corridor to operate double stack trains up to 1,800 metres long and 6.5 metres high. With reference to the Albury RJP, the Inland Rail project includes track lowering under the highway.</p>	✓



Asset		Description of asset	Vulnerable to bushfire impacts?
Commercial and Industrial Infrastructure		<p>A wide variety of commercial and industrial development have been identified within the precinct. This includes a number of assets that are vulnerable to bushfire, including (but not limited to):</p> <ul style="list-style-type: none"> <li>■ former Norske Skog paper mill;</li> <li>■ overall Forge;</li> <li>■ circular Plastics Australia PET recycling plant; and</li> <li>■ commercial and light industrial clusters.</li> </ul>	<p>✓</p>
Threatened ecological communities		<p>Field surveys undertaken as part of the biodiversity investigations have confirmed that presence of one BC Act and EPBC Act listed Critically Endangered Ecological Community:</p> <ul style="list-style-type: none"> <li>■ White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland</li> </ul>	<p>✓</p>

Asset		Description of asset	Vulnerable to bushfire impacts?
Threatened species		<p>One threatened flora species has been recorded in the Investigation Area:</p> <ul style="list-style-type: none"> <li>■ <i>Amphibromus fluitans</i> River Swamp Wallaby Grass</li> </ul> <p>A total of 12 threatened fauna species have been recorded within the Investigation Area, including:</p> <ul style="list-style-type: none"> <li>■ <i>Melithreptus gularis</i> Black-chinned Honeyeater</li> <li>■ <i>Stagonopleura guttata</i> Diamond Firetail</li> <li>■ <i>Petroica phoenicea</i> Flame Robin</li> <li>■ <i>Pteropus poliocephalus</i> Grey-headed Flying-fox</li> <li>■ <i>Petaurus norfolcensis</i> Squirrel Glider</li> <li>■ <i>Artamus cyanopterus</i> Dusky Woodswallow</li> <li>■ <i>Falco hypoleucos</i> Grey Falcon</li> <li>■ <i>Glossopsitta pusilla</i> Little Lorikeet</li> <li>■ <i>Petroica boodang</i> Scarlet Robin</li> <li>■ <i>Crinia sloanei</i> Sloane's Froglet</li> <li>■ <i>Lathamus discolor</i> Swift Parrot</li> <li>■ <i>Neophema pulchella</i> Turquoise Parrot</li> </ul> <p>Threatened fauna species records are generally found in the areas featuring denser vegetation, such as Bell's Reserve, Eight Mile Creek and vegetation to the north and south of the Investigation Area.</p>	<p style="text-align: center;">✓</p>
Cultural heritage		<p>The RJP investigation area and the local Albury and Ettamogah region contains a number of Aboriginal and historic heritage sites that will need to be considered during the Master Plan process.</p> <p>Indigenous land use and burning practices were recognised in the recent 2020 National Bushfire and Climate Summit and are being addressed within the Royal Commission into National Natural Disaster Arrangements. The Master Plan may also present an opportunity to explore additional options and integrate Indigenous land use and fire management practices.</p>	<p style="text-align: center;">✓</p>



**Legend**

- ▲ Fill Point Dam
- Fill Point Standpipe
- ✕ Gate
- Club
- Industrial
- Infrastructure
- Landing Ground
- TAFE College
- Waste Facility
- ★ Threatened Fauna
- ★ Threatened Flora
- Aboriginal Heritage Site
- Firebreaks
- Investigation Area
- General Industrial
- Low Density Residential
- Pine Plantation
- Historic Heritage Site
- railway
- Major Road
- Minor Road
- Path/Track

Source:  
NSW DCDB, DTDB 2021  
Nearmap Imagery August 2021

Key Assets and Land Use within the Albury RJP		F3-6
Drawing No: 0621304s_AB_BF3_G007_R1.mxd	Albury RJP	
Date: 17/06/2022	Drawing Size: A4	
Drawn By: VN	Reviewed By: JW	Client: Department of Regional NSW
Coordinate System: GDA 1994 MGA Zone 55		<small>This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.</small>
<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;"> <span style="font-size: 10px;">0</span> <span style="font-size: 10px;">0.2</span> <span style="font-size: 10px;">0.4Km</span> </div> <div style="text-align: center;"> <span style="font-size: 10px;">N</span>  <span style="font-size: 10px;">↑</span> </div> </div>		

### 3.8 Suppression and fire response difficulties

Fragmentation of the landscape due to existing disturbance and infrastructure provide fire suppression control options within the RJP. While not mapped at this scale, asset protection zones have been established around existing individual assets within the precinct. They are also a requirement for all residential, special fire protection development and most other assets that require protection from bushfires. The landscape also includes the following major public roads that would be used in the event of an emergency evacuation (noting that other minor roads would also be used as required):

- Hume Highway, Gerogery Road, Wagga Road and Central Reserve Road.

New fire ignitions are likely to be detected relatively quickly due to the generally flat topography of the project area reducing visual barriers to observers and the presence of a major roads.

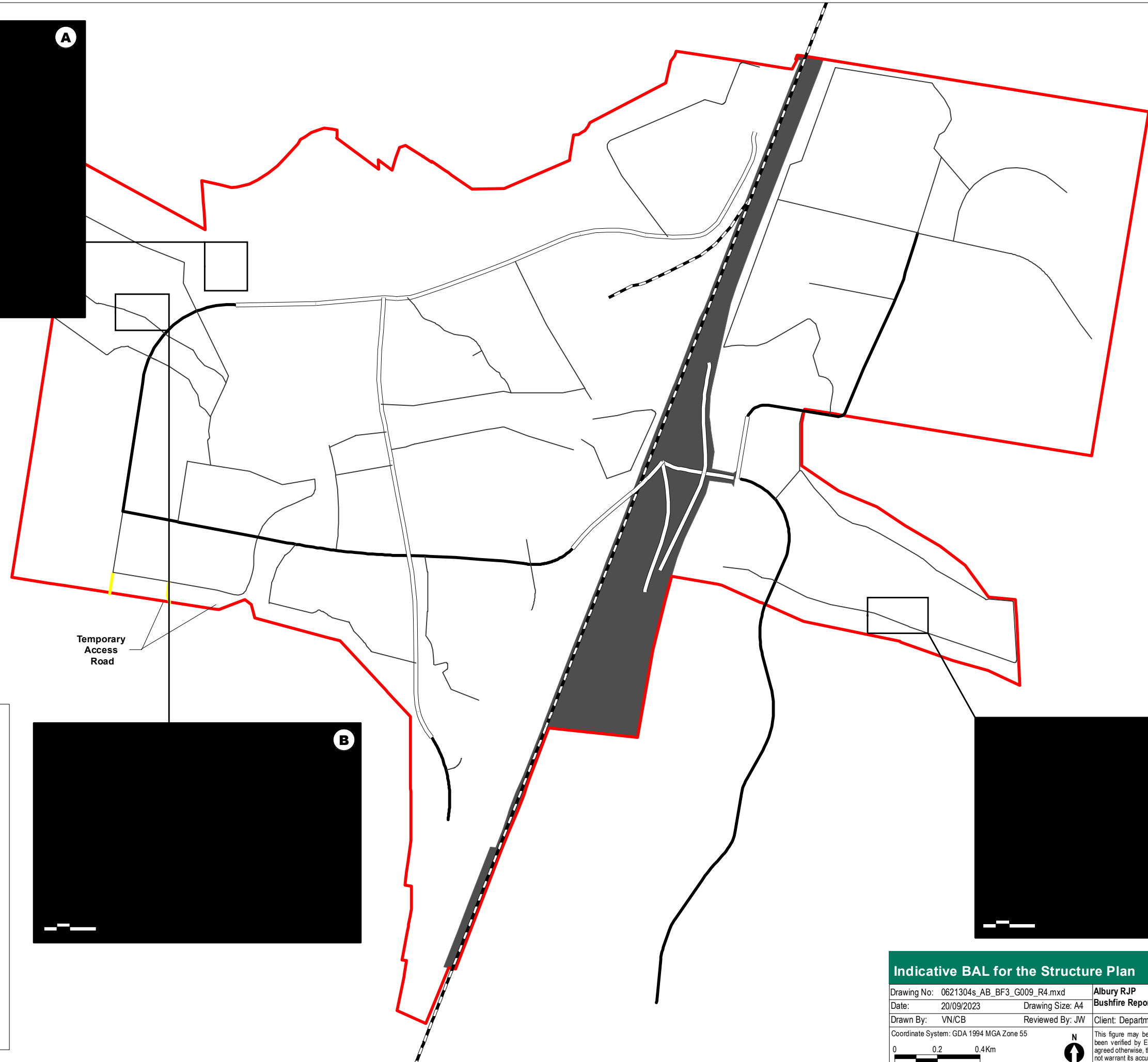
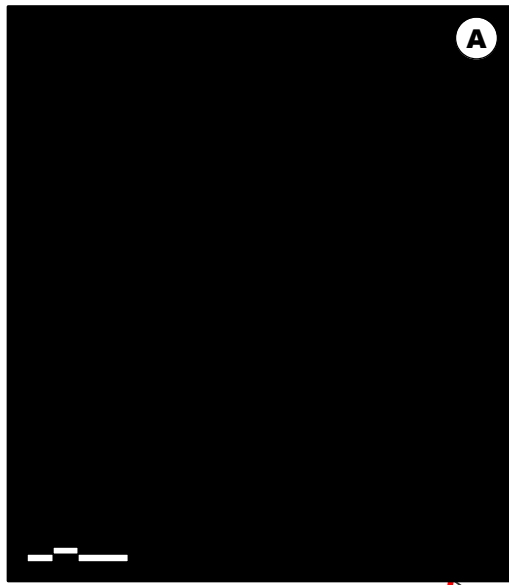
The capacity of the current road network to deal with increased traffic volumes associated with the development of the RJP, including evacuating residents and workers, is being addressed separately and is further discussed within Section 5.7.

### 3.9 Summary

The Albury RJP is located within a bushfire prone landscape with no history of major fire events. As identified in Figure 3-7, the vegetation that will have the greatest influence on bushfire behaviour within the precinct is the areas of Dry Sclerophyll Forest and Grassy Woodland within the retained conservation areas as well as within the C3 zoned lands to the west of the precinct. These areas tend to have continuous fuels that are available to burn during average seasons. They are highly combustible, and the regional climatic conditions may support crown fires. To mitigate this identified bushfire risk and support other environmental objectives, the majority of this high bushfire risk area within the Albury RJP has been allocated for environmental protection with limited to no development occurring in these areas.

Bushfire hazard classes were identified across the landscape by applying relative weightings to the varying fuel groups and combining them with available slope classes (i.e., <2°, 2-5°, 5-10°, >10°) within a Geographic Information System (GIS) model. The vegetation fuel load and slope data sets were loaded into a Weighted Overlay Model, to combine the data and highlight areas of overall higher hazard considering both fuel load and slope. Slope was calculated in degrees and bushfire hazard rating based on steepness and movement speeds of potential bushfire up or down these slopes. The model assumed in this case that both slope and fuel load were equally important or weighted the same in the analysis process.

This analysis does not indicate how often an area will receive potentially damaging fires or the actual intensity of a fire, it does however, provide a useful comparative ranking, identifying sites of higher and lower potential fire behaviour compared to others in an area.



**Legend**

- Investigation Area
- Existing Highway
- BAL**
- Flame Zone
- BAL 40
- BAL 29
- BAL 19
- BAL 12.5
- railway
- Land Use Direction**
- Conservation
- Existing Conservation
- Major Road
- Minor Road
- Temporary Access Road
- Upgraded Road

**Source:**  
NSW DCDB, DTDB 2021  
Nearmap Imagery August 2021

Indicative BAL for the Structure Plan		F5-1	
Drawing No: 0621304s_AB_BF3_G009_R4.mxd	Albury RJP	<div style="font-size: 2em; margin-bottom: 5px;">N</div> <div style="font-size: 1.2em;">↑</div>	
Date: 20/09/2023	Drawing Size: A4		<b>Bushfire Report</b>
Drawn By: VN/CB	Reviewed By: JW		Client: Department of Regional NSW
Coordinate System: GDA 1994 MGA Zone 55			This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.
<div style="display: flex; align-items: center; justify-content: center;"> <span style="margin-right: 5px;">0</span> <span style="margin-right: 10px;">0.2</span> <span>0.4Km</span> </div>			

## 4. LAND USE ANALYSIS

As outlined within Planning for Bushfire Protection 2019, land use planning can be an effective tool in minimising or avoiding the impact of natural hazards such as bushfire. From a risk management perspective, the safest approach is always to avoid high risk areas. In a bushfire context, strategic planning must ensure that future land uses are in appropriate locations to minimise the risk to life and property from bushfire attack. Services and infrastructure that facilitate effective suppression of bushfires also need to be provided for at the earliest stages of planning.

The design of precinct and the retention of the riparian corridors presents a clear, well defined interface between the hazard and potential development within the RJP. This interface will be the focus of the bushfire mitigation measures and required setbacks (asset protection zones) although it is noted that some bushfire risk will always remain, and it will be important that a Bushfire Emergency Management Plan is prepared in conjunction with relevant stakeholders.

It is also noted that at the strategic land use planning stage the range of possible tenants, activities and associated hazards are unknown. Hence, it is not possible to undertake a detailed land use assessment and the following information provided is general in nature.

### 4.1 Complying Development

It is understood that to streamline future building construction works it is intended to maximise the type and number of developments which can occur through complying development pathways. Considerations for assessing applications located on bushfire prone land are outlined in Part 5A, Division 4, Clause 5A.29 of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008, as follows:

#### *5A.29 Development standards for bushfire prone land*

*(1) This clause applies—*

- (a) to all development specified in clause 5A.2(1) for this code that is to be carried out on a lot that is wholly or partly bushfire prone land, and*
- (b) in addition to all other development standards specified for this code.*

*Note - See clause 1.19A for additional provisions relating to bushfire prone land.*

*(2) The development may be carried out on the lot only if—*

- (a) the development conforms to the specifications and requirements of Planning for Bush Fire Protection that are relevant to the development, and*
- (b) (Repealed)*
- (c) the lot has direct access to a public road or a road vested in or maintained by the council, and*
- (d) a reticulated water supply is connected to the lot, and*
- (e) a fire hydrant is located less than 70m from the location on the lot of the proposed development, and*
- (f) mains electricity is connected to the lot, and*
- (g) reticulated or bottled gas on the lot is installed and maintained in accordance with AS/NZS 1596:2014, The storage and handling of LP Gas and the requirements of relevant authorities (such as the requirement that metal piping be used), and*
- (h) any gas cylinders on the lot that are within 10m of a dwelling—*
  - (i) have their release valves directed away from the dwelling, and*
  - (ii) are enclosed on the hazard side of the installation, and*
  - (iii) have metal connections to and from the cylinders, and*
- (i) there are no polymer sheathed flexible gas supply lines to gas meters adjacent to any dwelling on the lot or an adjoining lot.*

*Note - The requirements relating to the construction of buildings in bushfire prone areas set out in the Building Code of Australia also apply.*

At this Master Plan phase, one of the important items is the ability for future complying development to provide suitable Asset Protection Zones to result in a Bushfire Attack Level of BAL 29 or lower (not BAL 40 or BAL FZ) to the future building envelopes in accordance with the requirements of Planning for Bush Fire Protection 2019. The identification, application and management of asset protection zones is further considered in Section 5.2.

In addition to these requirements, the proposed development MUST comply with all relevant provisions of:

- Planning for Bush Fire Protection 2019;
- Australian Standard AS 3959-2018: Construction of Buildings in Bushfire-Prone Areas; and
- Any other documents prescribed by the Environmental Planning and Assessment (Development Certification and Fire Safety) Regulation 2021.

These requirements are in addition to any other standards prescribed by the relevant code and applying to a particular development type (e.g., setbacks, landscaped area, building height, etc).

## 4.2 Special Fire Protection Purpose Development

Special Fire Protection Purpose (SFPP) uses would attract larger minimum required Asset Protection Zones and more onerous Bushfire Protection Measures. **Examples of SFPP developments relevant to the RJP and the potential land uses are child care facilities and education facilities.**

Information and education facilities are defined in the Standard Instrument - Principal Local Environmental Plan as a building or place used for providing information or education to visitors, and the exhibition or display of items, and includes an art gallery, museum, library, visitor information centre and the like. For the purposes of this assessment and in accordance with Section 8.3.11 of Planning for Bush Fire Protection 2019, any buildings used for public assembly with a floor space area of greater than 500m<sup>2</sup> will be treated as SFPP.

Other land uses such as places of public worship and other public assembly buildings (i.e., function centres) are not defined as SFPP under section 100B of the RF Act but do require referral to the NSW RFS under s.4.14 of the EP&A Act. For the purposes of this assessment and as outlined above, any buildings used for public assembly with a floor space area of greater than 500m<sup>2</sup> will also be treated as SFPP.

**Commercial and industrial development is also captured by EP&A Act s.4.14 only where a manager's residence is included. Where no residential component is included, commercial and industrial development would be addressed through the aims and objectives of Planning for Bush Fire Protection 2019.**

A SFPP development is one which is occupied by people who are considered to be at-risk members of the community. In a bushfire event, these occupants may be more susceptible to the impacts of bushfire. Evacuating at-risk members of the community is more challenging because they may be physically or psychologically less able to relocate themselves or are unfamiliar with their surroundings.

Due to the potential vulnerable nature of the occupants, there is more reliance on the provision of a wider APZ and emergency management. The specific objectives for SFPP developments are to:

- minimise levels of radiant heat, localised smoke and ember attack through increased APZ, building design and siting;
- provide an appropriate operational environment for emergency service personnel during firefighting and emergency management; ensure the capacity of existing infrastructure (such as roads and utilities) can accommodate the increase in demand during emergencies as a result of the development; and
- ensure emergency evacuation procedures and management which provides for the special characteristics and needs of occupants.

The identification, application and management of increased asset protection zones is further considered in Section 5.2. It is also noted that the location of sensitive land uses will be defined by a number of additional restrictions such as location of the natural gas pipeline, access capabilities, air quality, noise impacts and consideration of other planned facilities (co-location).

**It is also important to note that development of bushfire prone land for a Special Fire Protection Purpose (SFPP) triggers referral to the NSW Rural Fire Service under s100b RF Act 1997 and cannot be considered 'complying development' under any environmental planning instrument.**

### 4.3 Hazardous Industry

Some developments are considered by their very nature to be hazardous, as much for their ability to start bushfires as their susceptibility to bushfire impacts. Where hazardous industries are proposed, consultation with the NSW RFS and preparation of a performance-based solution will be required. These development types will also not be considered for complying development. Hazardous industries include but are not limited to:

- power generating works;
- sawmills;
- junk yards;
- liquid fuel depots;
- hazardous industries/storage;
- chemical industries/storage;
- service stations;
- ammunition storage/manufacture; and
- fireworks manufacture/storage.

**Hazardous and offensive industries** are types of industries and storage establishments that cannot comply with the conditions of their EPA licence, and present a risk to life, property and the environment. Hazardous developments are not suitable within the Albury RJP.

**Potentially hazardous development** such as service stations that can comply with their license and conditions of consent may be permitted at the identified location, although they will require consultation with the NSW RFS and preparation of a performance-based solution. As the service station is currently proposed within Stage 1 of the Master Plan, increased asset protection zones may also be required until the Stage 2 development has been completed. State Environmental Planning Policy (Resilience and Hazards) 2021 will also continue to apply. In preparation of a performance-based solution, the Fire Safety Study prepared under the DPIE Hazardous Industry Planning and Assessment Papers (HIPAPs) should be considered. As described by Planning for Bush Fire Protection 2019, this study provides details of all credible fire hazards and the associated fire prevention and mitigation measures for the development. Care should also be taken to ensure that such facilities do not impact on existing developments.

Other potentially hazardous developments also requiring consultation with the NSW RFS and preparation of a performance-based solution may include:

- rail hub expansion;
- warehouse and storing facilities;
- advanced manufacturing;
- renewable energy; and
- recycling facilities and stockpiles.

Separation distances to existing potentially hazardous developments such as the paper mill must also be considered to limit the potential for land use safety conflicts.

These development types will not be considered for complying **development within the Albury RJP.**



## 4.4 Commercial / Industrial Development

Under the building classification system within the National Construction Code (NCC), Class 5 to 8 buildings include offices, shops, factories, warehouses, public car parks and other commercial and industrial facilities. The NCC does not provide for any bushfire specific performance requirements for these particular classes of buildings and as such Australian Standard 3959 'Construction of buildings in bushfire-prone areas' does not apply as a set of 'deemed to satisfy' provisions.

In this case (and as outlined within Section 8.3.1 of Planning for Bushfire Protection 2019), the following objectives will be applied in relation to access, water and services, and emergency and evacuation planning to:

- provide safe access to/from the public road system for firefighters providing property protection during a bushfire and for occupant egress for evacuation;
- provide suitable emergency and evacuation (and relocation) arrangements for occupants of the development;
- provide adequate services of water for the protection of buildings during and after the passage of bushfire, and to locate gas and electricity so as not to contribute to the risk of fire to a building; and
- provide for the storage of hazardous materials away from the hazard wherever possible.

Construction requirements for bushfire protection will need to be considered on a case-by-case basis. Where a manager's residence is included in the proposal for a commercial and industrial development it is captured by s4.14 of the EP&A Act (refer to Section 4.2).

Where no residential component is included, commercial and industrial development is addressed through the objectives of Planning for Bush Fire Protection 2019, being:

- i. afford buildings and their occupants protection from exposure to a bushfire;
- ii. provide for a defensible space to be located around buildings;
- iii. provide appropriate separation between a hazard and buildings which, in combination with other measures, minimises material ignition;
- iv. ensure that appropriate operational access and egress for emergency service personnel and residents is available;
- v. provide for ongoing management and maintenance of BPMs; and
- vi. ensure that utility services are adequate to meet the needs of firefighters.

The scale of the development, types and quantities of material to be stored and numbers of people likely to be occupying the building will directly influence the bushfire protection measures. While there are no minimum required Asset Protection Zones applicable to commercial / industrial development to satisfy the aim and objectives of Planning for Bush Fire Protection 2019, the buildings must be located outside Flame Zone.

**To satisfy the requirements of complying development, commercial and industrial development should have a Bushfire Attack Level of BAL 29 or lower (refer to Section 5.2).**

## 5. OTHER CONSIDERATIONS

It is neither possible nor desirable to eliminate bushfires in NSW – they are inevitable across all fire-prone vegetation types. When high fuel loads, ignition sources and adverse weather inevitably coincide, wildfires will result. Modern fire management requires the assessment, measurement and mitigation of risks – to social, economic and environmental values. As reported by OEH (2012), this creates an imperative to work closely with adjoining land managers, community groups and fire authorities to continually improve our understanding of bushfires, and to work together in managing the risks associated with living in a fire-prone environment.

Development of the RJP must ensure complementary bushfire management and mitigation strategies. Of particular note is the importance to consider existing access and egress routes across the locality and ensure complementary management strategies with key consideration of the NEXUS Industrial Precinct, Ettamogah Rail Hub, Overall Forge site, Visy site as well as the Special Fire Protection assets (retirement villages, schools, hospitals and tourist attractions) within Albury.

The capacity of the current road network to deal with increased traffic volumes associated with the development of the Albury RJP including evacuating residents and workers is being addressed separately.



### 5.1 Firefighter and Public Safety

The firefighters likely to respond to a bushfire in this area would be volunteers from the NSW RFS and/or individual property owners. Based on the locality of the site, NSW RFS may also work closely with the Fire and Rescue NSW in the event of any major fires in this area.

These agencies and groups work together through local bushfire management committees across NSW. Set up under the NSW RF Act, these committees coordinate fire management planning, prevention and suppression in local areas.

NSW Police, NSW Ambulance and the NSW State Emergency Services will also assist in active support roles in bushfire and emergency incidents. Emergency service capacity may need to expand to meet suppression requirements based on the type, nature and size of development within the Albury RJP over the coming years. Once the scale and type of development is known, a decision to scale up emergency resources in the region may be required.

## 5.2 Asset Protection Zones and Defendable Space

An APZ is a buffer zone between a bushfire hazard and buildings, and is managed to minimise fuel loads and reduce potential radiant heat levels, flame, localised smoke and ember attack. The appropriate APZ distance is based on vegetation type, slope and the nature of the development (refer to Appendix A).

The APZ can include roads, fences, boardwalks, signage, seating or other passive recreational activities managed to be consistent with the NSW RFS document Standards for Asset Protection Zones. A fuel-reduced, physical separation between buildings and bushfire hazards is a key element in the suite of bushfire measures and has a major influence on the type of construction necessary to mitigate bushfire attack.

Irrespective of the bushfire prone land mapping, it is important to ensure that a defendable space is provided for the size and scale of the development. Proposed measures must operate in combination to minimise the impact of bushfire and ensure that access and services are adequate. At this stage of the Master Plan process, it is important to highlight the need to provide suitable Asset Protection Zones across the precinct to result in a Bushfire Attack Level of:

- BAL 29 or lower to all the future building envelopes;
- BAL 12.5 or lower to all SFPP; and
- BAL 12.5 or lower to all potentially hazardous industry.

As indicated within Figure 5.1, the width of the APZ will differ based on the location of the hazard (slope and vegetation type) relevant to the development footprint. As an indication, the following separation distances will apply to all areas located 0.5 degrees downslope (the hazard is downslope or lower than the development footprint). Additional information is provided in Appendix A.

**Table 5.1 Indicative separation distances**

KEITH VEGETATION FORMATION		BUSHFIRE ATTACK LEVEL (BAL)*				
		BAL-FZ	BAL-40	BAL-29	BAL-19	BAL-12.5
		Distance (m) from the asset to the predominant vegetation formation				
0 > 5 degrees	Forest (dry sclerophyll and pine plantations)	< 19m	19 -< 25m	25 -< 35m	35 -< 47m	47 -< 100m
	Grassy Woodland	< 10m	10 -< 13m	13 -< 19m	19 -< 28m	28 -< 100m
	Forested Wetland	< 8m	8 -< 10m	10 -< 15m	15 -< 22m	22 -< 100m
	Freshwater Wetlands	< 4m	4 -< 6m	6 -< 8m	8 -< 12m	12 -< 100m
	Grassland	< 8m	8 -< 11m	11 -< 16m	16 -< 23m	23 -< 50m
		Not complying development	Not complying development	BAL 29 or lower to all the future building envelopes		Potentially Hazardous Industry and SFPP

\*Based on 0-5 degrees downslope. Refer to Table A1.12.6 Planning for Bushfire Protection

As much of Precinct is located on the bush-urban interface, consideration should also be given to the DPE Fire Management Manual which highlights the complexities of managing fires along the interface.

### 5.3 APZs on Environmentally Protected Lands

Bushfire protection measures such as asset protection zones may not necessarily be compatible with environmental protection and conservation objectives. It must not be assumed that an asset protection zone can extend into an adjoining vegetated area or riparian corridor.

Where environmentally sensitive vegetation such as endangered ecological communities or threatened species habitat are to be cleared for the purposes of an APZ, the proposals will need to be carefully considered and may no longer be consistent with complying development.

### 5.4 Landscaped Areas and Recreational Spaces

All landscaping is to comply with Appendix 4 of Planning for Bushfire Protection 2019 and relevant environmental approvals required under the NSW BC Act and/or Commonwealth EPBC Act

All landscaped areas should be designed and managed to meet the requirements of an APZ. These areas should be maintained in perpetuity to ensure ongoing protection from the impact of bushfires, particularly in advance of the bushfire season. As a minimum:

#### Trees

- tree canopy cover should be less than 30%; and
- canopies should be separated by 2 to 5m.

#### Shrubs

- shrubs should not form a continuous canopy; and
- shrubs should form no more than 20% of ground cover.

#### Grass

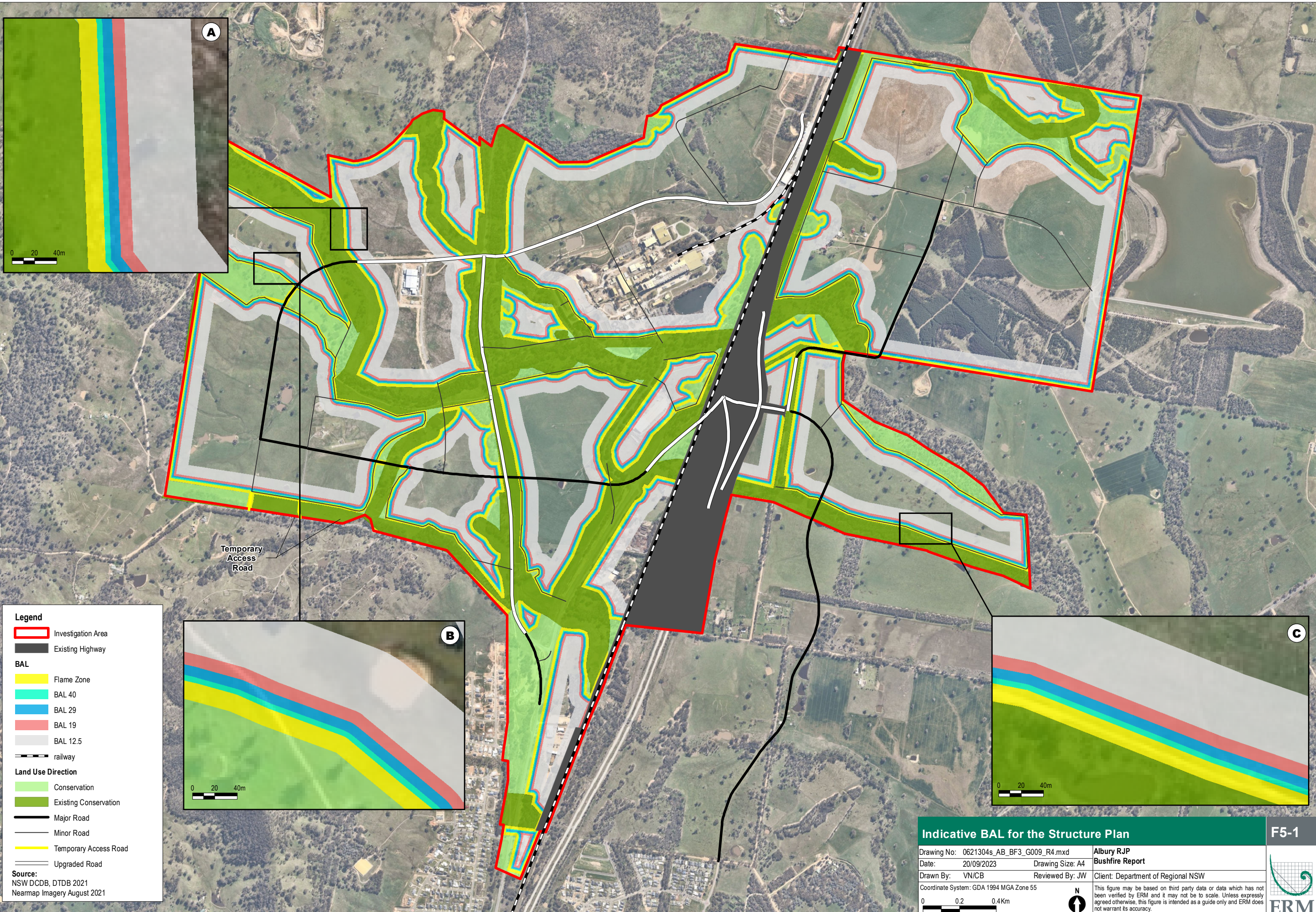
- grass should be kept mown to a height of less than 100mm; and
- leaf and other debris should be removed.

Provided that these areas are designed (and maintained) to comply with Appendix 4 of Planning for Bushfire Protection 2019, no additional asset protection zones need to be applied to these areas.

### 5.5 Staged Development

As outlined within Planning for Bush Fire Protection 2019 and relevant to the Albury RJP, often a time lag can occur between one or more stages of development which can result in persons and property being unprotected in the event of a bushfire. The precinct may require the creation of APZs that need to be maintained sequentially until the final phase of development is completed to afford each stage of the development the appropriate level of bushfire protection.

The preferred/indicative staged development is outlined within the Master Plan and indicative BAL mapping is provided in Figure 5.2. This is also applicable to other development adjacent to the RJP. For example, if a development is constructed on the southern boundary of the RJP (subject to a separate planning approval process) an APZ would no longer be required or would be of reduced width.



**Legend**

- Investigation Area
- Existing Highway

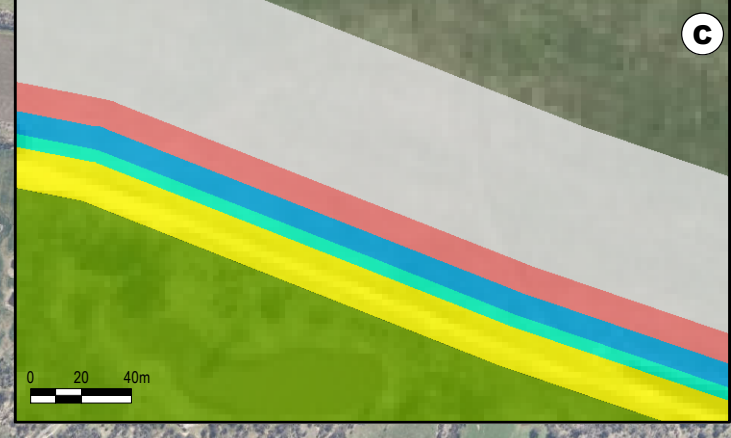
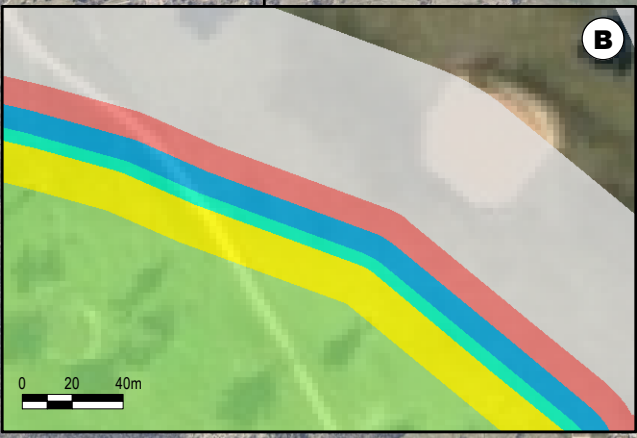
**BAL**

- Flame Zone
- BAL 40
- BAL 29
- BAL 19
- BAL 12.5

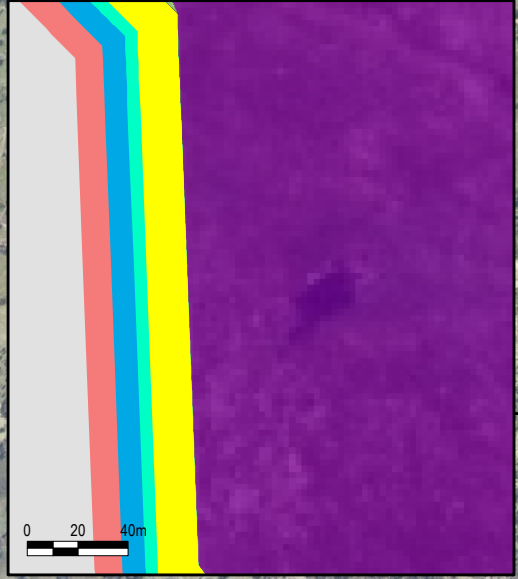
**Land Use Direction**

- Conservation
- Existing Conservation
- Major Road
- Minor Road
- Temporary Access Road
- Upgraded Road

**Source:**  
NSW DCDB, DTDB 2021  
Nearmap Imagery August 2021



Indicative BAL for the Structure Plan		F5-1
Drawing No: 0621304s_AB_BF3_G009_R4.mxd	Date: 20/09/2023	Drawing Size: A4
Drawn By: VN/CB	Reviewed By: JW	Client: Department of Regional NSW
Coordinate System: GDA 1994 MGA Zone 55		This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.



**Legend**

- Investigation Area

**BAL**

- Flame Zone
- BAL 40
- BAL 29
- BAL 19
- BAL 12.5

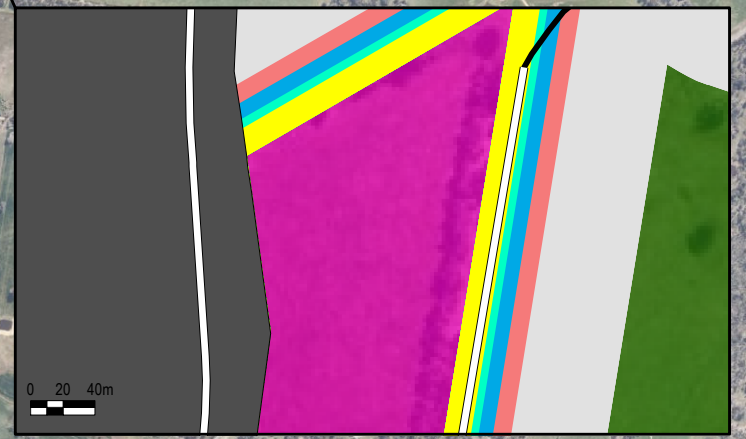
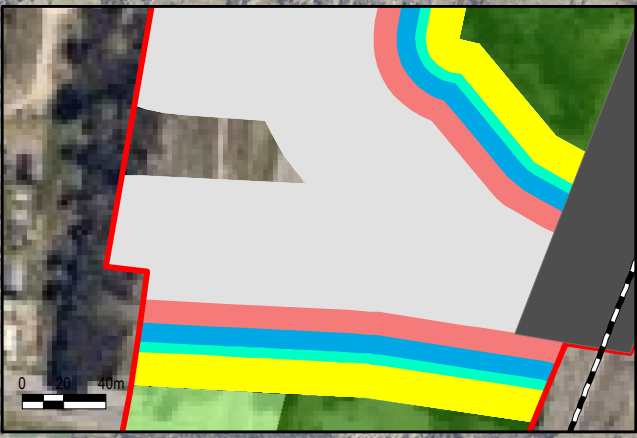
**Land Use Direction**


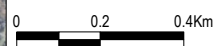
- Conservation
- Low and General Impact Industries
- High Impact Industries
- Rail Intermodal
- Productivity Support
- Service Station

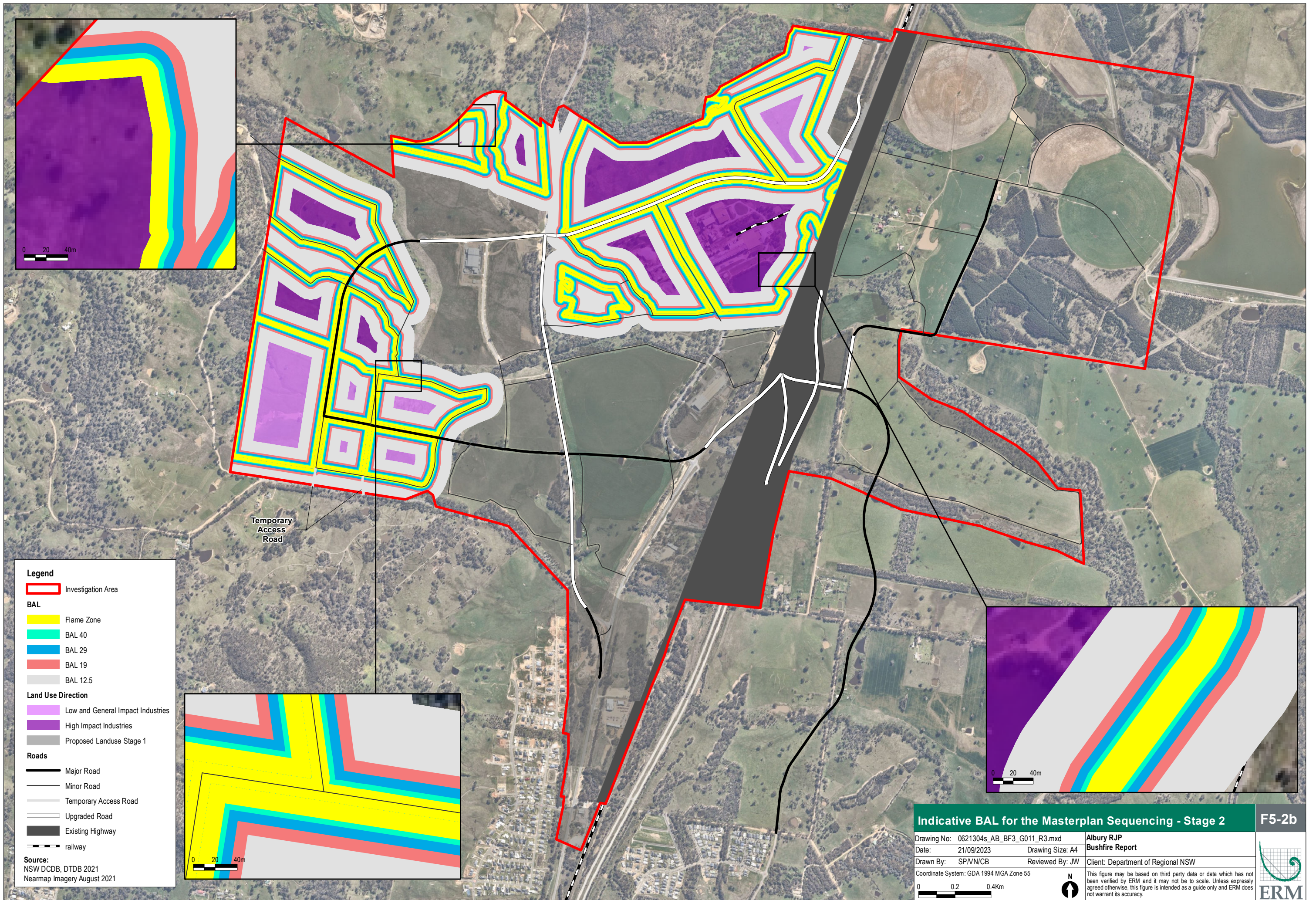
**Roads**

- Major Road
- Minor Road
- Temporary Access Road
- Upgraded Road
- Existing Highway
- railway

**Source:**  
NSW DCDB, DTDB 2021  
Nearmap Imagery August 2021



Indicative BAL for the Masterplan Sequencing - Stage 1		F5-2a
Drawing No: 0621304s_AB_BF3_G010_R3.mxd	Albury RJP	
Date: 21/09/2023	Drawing Size: A4	
Drawn By: SP/GB	Reviewed By: JW	Client: Department of Regional NSW
Coordinate System: GDA 1994 MGA Zone 55		<small>This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.</small>
		



**Legend**

- Investigation Area

**BAL**

- Flame Zone
- BAL 40
- BAL 29
- BAL 19
- BAL 12.5

**Land Use Direction**

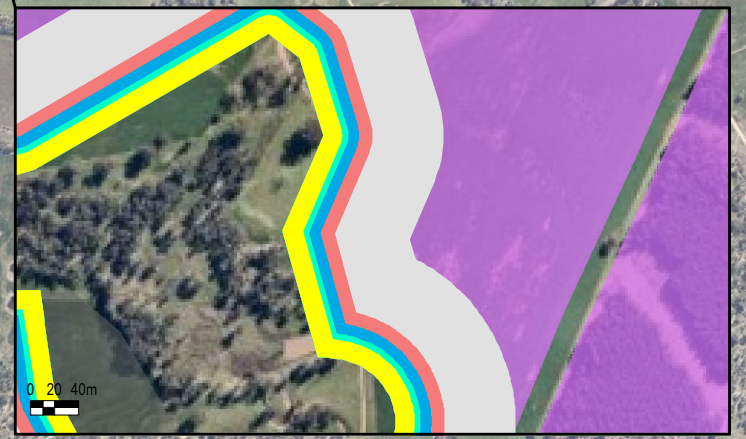
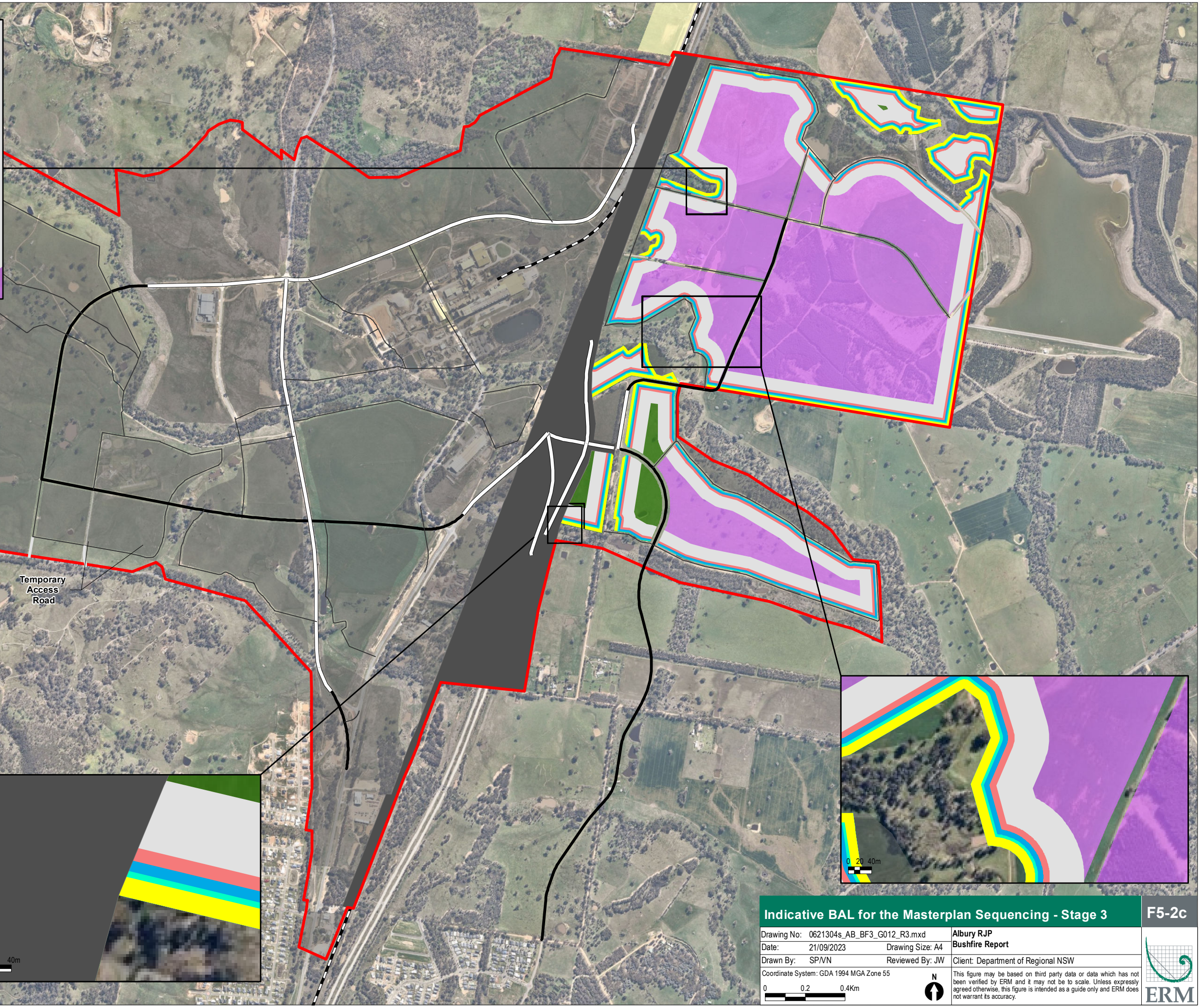
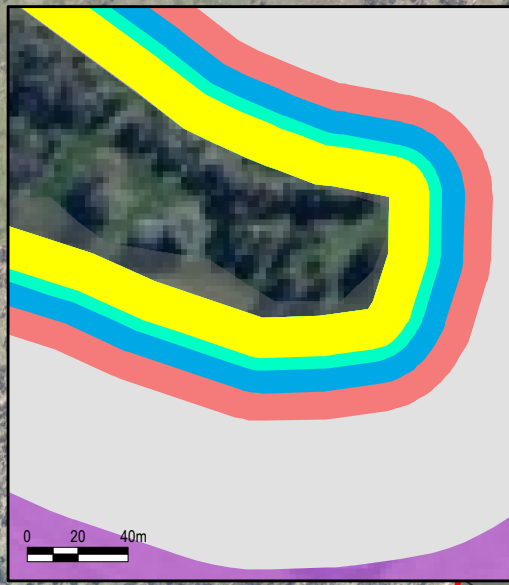
- Low and General Impact Industries
- High Impact Industries
- Proposed Landuse Stage 1

**Roads**

- Major Road
- Minor Road
- Temporary Access Road
- Upgraded Road
- Existing Highway
- railway

**Source:**  
NSW DCDB, DTDB 2021  
Nearmap Imagery August 2021

<b>Indicative BAL for the Masterplan Sequencing - Stage 2</b>		<b>F5-2b</b>
Drawing No: 0621304s_AB_BF3_G011_R3.mxd	Albury RJP	
Date: 21/09/2023	Drawing Size: A4	Bushfire Report
Drawn By: SP/VN/CB	Reviewed By: JW	Client: Department of Regional NSW
Coordinate System: GDA 1994 MGA Zone 55		
 0 0.2 0.4km	 N	This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.



**Legend**

- Investigation Area
- Existing Highway

**BAL**

- Flame Zone
- BAL 40
- BAL 29
- BAL 19
- BAL 12.5

**Land Use Direction**

- Low and General Impact Industries
- Rail Intermodal
- Productivity Support
- Proposed Landuse Stage 1 & 2

**Roads**

- Major Road
- Minor Road
- Temporary Access Road
- Upgraded Road
- railway

**Source:**  
NSW DCDB, DTDB 2021  
Nearmap Imagery August 2021



<b>Indicative BAL for the Masterplan Sequencing - Stage 3</b>		<b>F5-2c</b>
Drawing No: 0621304s_AB_BF3_G012_R3.mxd	Date: 21/09/2023	Drawing Size: A4
Drawn By: SP/VN	Reviewed By: JW	Client: Department of Regional NSW
Coordinate System: GDA 1994 MGA Zone 55		This figure may be based on third party data or data which has not been verified by ERM and it may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and ERM does not warrant its accuracy.
 0 0.2 0.4km		



## 5.6 Building Construction, Siting and Design

Construction measures should not be applied as a stand-alone mitigation solution but will form part of a suite of bushfire management measures. Building design needs to ensure adequate protection of vulnerable building elements. Construction standards are outlined in AS 3959 and the NCC to provide various levels of protection for different building elements.

The NCC does not provide any bushfire specific performance requirements for Class 5 to 8 buildings including offices, shops, factories, warehouses, public car parks and other commercial and industrial facilities.

## 5.7 Access

Design of the internal road network must enable safe access and egress for occupants attempting to leave the area at the same time that emergency service personnel are arriving to undertake firefighting operations. In a bushfire prone area, the purpose of the road system is to:

- provide firefighters with access to structures, allowing more efficient use of firefighting resources;
- provide evacuation routes for firefighters and the public; and
- provide access to areas of bushfire hazard for firefighting and hazard mitigation purposes.

The capacity of the current road network to deal with increased traffic volumes associated with the staged development of the RJP, including evacuating residents and workers, is being addressed separately. Recommendations include (refer to SMEC 2022):

- upgrade of Davey Road interchange ramps and terminals including duplication of bridge;
- intersection upgrades on Wagga Road and possible duplication;
- extension of R W Henry Drive;
- improvements to Gerogery Road cross section, including possible duplication; and
- inclusion of paths and shoulders on internal road network.

A perimeter road should also be provided where possible to separate retained bushland from the development precincts, allowing more efficient use of firefighting resources. A perimeter road usually runs parallel to the bushland interface and provides space to conduct active firefighting operations and hazard reduction activities. Where this is not provided, the application of defensible space within each of the lots should be considered. The precinct should be designed to ensure that no lots directly adjoin the retained environmental protection areas.

Roads must provide sufficient width and other dimensions to ensure safe unobstructed access and allow firefighting crews to operate equipment around the vehicle. Road width is defined as the trafficable width from kerb to kerb or the inside edge of the table drain. As identified within the Master Plan, internal road corridors are all 20m wide which exceeds the requirements of Planning for Bush Fire Protection 2019.

The road network presented in the Master Plan avoids cross-intersections and dead ends to suit freight movement. However, if dead ends are present, they must incorporate a sufficient turn-around area to minimise the need for vehicles to make multipoint turns.

Appendix D provides a summary of the design principles that will need to be considered for the internal road network. Table 5.1 identifies the Acceptable Solutions under the Planning for Bush Fire Protection 2019.

**Table 5.2 Acceptable Solutions for Access Roads (General)**

Performance criteria	Acceptable solutions*
<p>Firefighting vehicles are provided with safe, all-weather access to structures.</p>	<ul style="list-style-type: none"> <li>■ property access roads are two-wheel drive, all-weather roads;</li> <li>■ traffic management devices are constructed to not prohibit access by emergency services vehicles;</li> <li>■ maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees or other gradient specified by road design standards, whichever is the lesser gradient;</li> <li>■ all roads are through roads;</li> <li>■ dead end roads are not recommended, but if unavoidable, are not more than 200 metres in length, incorporate a minimum 12 metres outer radius turning circle, and are clearly sign posted as a dead end;</li> <li>■ where kerb and guttering is provided on perimeter roads, roll top kerbing should be used to the hazard side of the road;</li> <li>■ where access/egress can only be achieved through forest, woodland and heath vegetation, secondary access shall be provided to an alternate point on the existing public road system; and</li> <li>■ one way only public access roads are no less than 3.5 metres wide and have designated parking bays with hydrants located outside of these areas to ensure accessibility to reticulated water for fire suppression.</li> </ul>
<p>The capacity of access roads is adequate for firefighting vehicles.</p>	<ul style="list-style-type: none"> <li>■ the capacity of perimeter and non-perimeter road surfaces and any bridges/causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes); bridges/ causeways are to clearly indicate load rating.</li> </ul>
<p>There is appropriate access to water supply.</p>	<ul style="list-style-type: none"> <li>■ hydrants are located outside of parking reserves and road carriageways to ensure accessibility to reticulated water for fire suppression;</li> <li>■ hydrants are provided in accordance with the relevant clauses of AS 2419.1:2005; and</li> <li>■ there is suitable access for a Category 1 fire appliance to within 4m of the static water supply where no reticulated supply is available.</li> </ul>
<p>Access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating as well as providing a safe operational environment for emergency service personnel during firefighting and emergency management on the interface.</p>	<ul style="list-style-type: none"> <li>■ are two-way sealed roads;</li> <li>■ minimum 8m carriageway width kerb to kerb;</li> <li>■ parking is provided outside of the carriageway width;</li> <li>■ hydrants are located clear of parking areas;</li> <li>■ are through roads, and these are linked to the internal road system at an interval of no greater than 500m;</li> <li>■ curves of roads have a minimum inner radius of 6m;</li> <li>■ the maximum grade road is 15 degrees and average grade of not more than 10 degrees;</li> <li>■ the road crossfall does not exceed 3 degrees; and</li> <li>■ a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.</li> </ul>

\*Planning for Bushfire Protection (NSW Rural Fire Service, 2019)

## 5.8 Water Supply

An adequate supply of water is essential for firefighting purposes and suitable water supply arrangements must be provided for firefighting that meet the NSW RFS requirements. It is essential to ensure that any water sources are maintained at the appropriate capacity.

Where a non-reticulated water supply is provided or the reticulated water supply is deemed inadequate, an additional on-site dedicated supply of water for firefighting will be required.

Any future development must comply with the water supply requirements detailed in Planning for Bush Fire Protection 2019. These requirements can be achieved in two ways, being:

- reticulated water is to be provided to the development, where available; or
- a static water supply is provided where no reticulated water is available.

Given the scale of the proposal it would be considered likely that any future development will be serviced by a hydrant system.

- The fire hydrant spacing, design and sizing must comply with the Australian Standard AS 2419.1:2005;
- Hydrants are not located within any road carriageway;
- Reticulated water supply uses a ring main system for areas with perimeter roads;
- Fire hydrant flows and pressures comply with AS 2419.1:2005; and
- All above-ground water service pipes external to the building are metal, including and up to any taps.

## 5.9 Electricity and Gas

Planning for Bush Fire Protection 2019 also addresses the installation of services (i.e., electricity and gas) within bushfire prone areas. The following are the requirements for the relevant services:

- where practicable, electrical transmission lines are underground;
- where overhead, electrical transmission lines are proposed as follows:
  - lines are installed with short pole spacing (30m), unless crossing gullies, gorges or riparian areas; and
  - no part of a tree is closer to a power line than the distance set out in accordance with the specifications in ISSC3 Guideline for Managing Vegetation Near Power Lines.
- reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 and the requirements of relevant authorities, and metal piping is used;
- all fixed gas cylinders are kept clear of all flammable materials to a distance of 10m and shielded on the hazard side;
- connections to and from gas cylinders are metal;
- polymer-sheathed flexible gas supply lines are not used; and
- above-ground gas service pipes are metal, including and up to any outlets.

## 6. CONCLUSION

This Bushfire Assessment has been prepared for the New South Wales (NSW) Government to support the development of the Master Plan for the Albury Regional Job Precinct. The report aims to establish the relevant specifications and requirements to assist in the development of the Master Plan.

This assessment considers the bushfire landscape, land use, access and egress and emergency services capacity. Based on these factors it is anticipated that new development within the precinct can be designed to meet the requirements of Planning for Bush Fire Protection 2019. Of particular note is the importance of future development to consider existing access and egress routes across the locality with key consideration of the NEXUS Industrial development, Ettamogah Rail Hub, Overall Forge site, Visy site as well as the existing Special Fire Protection assets (retirement villages, schools, hospitals and tourist attractions) within Albury.

Complying development will not be applicable to all land use types or where a referral to the NSW RFS is required. The remaining commercial and industrial type development can be addressed within the Master Plan through the aims and objectives of Planning for Bush Fire Protection 2019.

Specifically:

- Complying development is only permitted on lower risk bushfire prone land (BAL-29 or lower);
- Where potentially hazardous industries are proposed, consultation with the NSW RFS and preparation of a performance-based solution will be required. These development types will not be considered for complying development;
- Developments classified as special fire protection purpose (SFPP) would trigger referral to the NSW Rural Fire Service under s100b RF Act and will not be considered complying development; and
- Other land uses such as places of public worship and other public assembly buildings (i.e., function centres) also require referral to the NSW RFS under s.4.14 of the EP&A Act. Any buildings used for public assembly with a floor space area of greater than 500m<sup>2</sup> will be treated as SFPP.

At a strategic level, the Master Plan has taken into consideration the bushfire prone land mapping and new development within the precinct can be designed to meet the requirements of Planning for Bush Fire Protection 2019. This includes the creation of defined conservation areas which correspond with the areas' high bushfire hazard (and high biodiversity and heritage value), and the provision of defensible space within the boundary of the RJP. These areas of defensible space may include the perimeter road network, drainage channels and maintained public open space. All recreational space and landscaped areas should be designed and managed to meet the requirements of an APZ, and must be maintained in perpetuity to ensure ongoing protection from the impact of bushfires, particularly in advance of the bushfire season.

The development of the Master Plan has also considered the application of suitable Asset Protection Zones across the precinct to result in a Bushfire Attack Level of:

- BAL 29 or lower to all the future building envelopes;
- BAL 12.5 or lower to all SFPP; and
- BAL 12.5 or lower to all potentially hazardous industry.

The RJP may also require the creation of APZs that need to be maintained sequentially until the final phase of development is completed to afford each stage of the development the appropriate level of bushfire protection.

Key specifications and requirements to assist in the development of the Master Plan are provided in Table 6.1.

**Table 6.1 Proposed Performance Criteria – Bushfire**

Performance Criteria No.	Performance Criteria Description
1	Asset Protection Zones are managed and maintained to prevent the spread of a fire within the precinct in accordance with the requirements of Appendix 4 of Planning for Bushfire Protection 2019 to result in a Bushfire Attack Level of BAL 29 or lower (not BAL 40 or BAL FZ) to all future building envelopes that are being assessed as complying development. This includes part of a staged or partial development of the Precinct.
2	Where referral to NSW RFS is required (SFPP, potentially hazardous development and/or places of public worship), Asset Protection Zones should be managed and maintained to result in a Bushfire Attack Level of BAL 12.5 or lower (not BAL 29, BAL 40 or BAL FZ). These developments will not be assessed as complying development.
3	All landscaping is to comply with Appendix 4 of Planning for Bushfire Protection 2019 and relevant environmental approvals required under the NSW <i>Biodiversity Conservation Act 2016</i> and/or Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i> . Where environmentally sensitive vegetation such as endangered ecological communities or threatened species habitat are to be cleared, the proposals will need to be carefully considered and may no longer be consistent with complying development.
4	Access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating as well as providing a safe operational environment for emergency service personnel during firefighting and emergency management on the interface. The requirements for access identified in Planning for Bushfire Protection 2019 must be met for all stages of development within the Regional Job Precinct.
5	Adequate water supplies are provided for firefighting purposes. Hydrants are to be installed to achieve compliance with AS 2419.1 – 2005 Fire Hydrant Installations - System Design, Installation and Commissioning (AS 2419) and must be located less than 70m from each building envelope.
6	The location and design of gas services will not lead to ignition of surrounding bushland or the fabric of buildings. Reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 and the requirements of relevant authorities, and metal piping is used.
7	The location of electricity services limits the possibility of ignition of surrounding bushland or the fabric of buildings and must comply with requirements of Planning for Bushfire Protection 2019.

*Despite the mitigation measures and treatments that are put in place, it is noted that some bushfire risk will always remain and that some of the infrastructure may be subject to direct flame contact. The absence of any identified hazard or asset within the Albury RJP should not be interpreted as a guarantee that such hazards or impacts do not exist. The approval authority may require that a Bushfire and Emergency Management Policy is prepared based on the approved Master Plan design in conjunction with relevant stakeholders, including local fire services, NSW RFS, NSW Fire and Rescue, and adjoining property owners and employees.*

*Any representation, statement of opinion, or advice expressed or implied in the bushfire assessment will be made in good faith on the basis that ERM employees and / or agents are not liable (whether by reason of negligence, lack of care or any other reason ) to any person, company or their agents for any damage or loss whatsoever which has occurred or may occur in relation to that person taking (or not taking) action in respect of any representation, statement or advice provided within the bushfire assessment.*

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**APPENDIX A      TABLES FOR DETERMINING MINIMUM DISTANCES FOR  
APZ, PLANNING FOR BUSHFIRE PROTECTION 2019**

### Minimum distances for APZs – SFPP developments ( $\leq 10\text{kW/m}^2$ , 1200K)

KEITH VEGETATION FORMATION	EFFECTIVE SLOPE				
	Up slopes and flat	>0°-5°	>5°-10°	>10°-15°	>15°-20°
	Distance (m) from the asset to the predominant vegetation formation				
Rainforest	38	47	57	69	81
Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland	67	79	93	100	100
Grassy and Semi-Arid Woodland	42	50	60	72	85
Forested Wetland (excluding Coastal Swamp Forest)	34	42	51	62	73
Tall Heath	50	56	61	67	72
Short Heath	33	37	41	45	49
Arid-Shrublands (acacia and chenopod)	24	27	30	34	37
Freshwater Wetlands	19	22	25	28	30
Grassland	36	40	45	50	55

### Minimum distances for APZs – FFDI 80 areas ( $\leq 29\text{kW/m}^2$ , 1090K)

KEITH VEGETATION FORMATION	EFFECTIVE SLOPE				
	Up slopes and flat	>0°-5°	>5°-10°	>10°-15°	>15°-20°
	Distance (m) from the asset to the predominant vegetation formation				
Rainforest	9	12	15	20	25
Forest (wet and dry sclerophyll) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland	20	25	31	39	48
Grassy and Semi-Arid Woodland	11	13	17	21	27
Forested Wetland (excluding Coastal Swamp Forest)	8	10	13	17	22
Tall Heath	16	18	20	22	25
Short Heath	9	10	12	13	15
Arid-Shrublands (acacia and chenopod)	6	7	8	9	10
Freshwater Wetlands	5	6	6	7	8
Grassland	10	11	12	14	16



## Determination of BAL, FFDI 80

KEITH VEGETATION FORMATION		BUSHFIRE ATTACK LEVEL (BAL)*				
		BAL-FZ	BAL-40	BAL-29	BAL-19	BAL-12.5
		Distance (m) from the asset to the predominant vegetation formation				
ALL UPSLOPE AND FLAT LAND	Rainforest	< 7	7 -< 9	9 -< 14	14 -< 20	20 -< 100
	Forest (wet and dry sclerophyll) including CoastalSwamp Forest, Pine Plantations and Sub-Alpine Woodland	< 15	15 -< 20	20 -< 29	29 -< 40	40 -< 100
	Grassy and Semi-Arid Woodland (including Mallee)	< 8	8 -< 11	11 -< 16	16 -< 22	22 -< 100
	Forested Wetland (excluding Coastal Swamp Forest)	< 6	6 -< 8	8 -< 12	12 -< 18	18 -< 100
	Tall Heath	< 12	12 -< 16	16 -< 23	23 -< 32	32 -< 100
	Short Heath	< 7	7 -< 9	9 -< 14	14 -< 20	20 -< 100
	Arid-Shrublands (acacia and chenopod)	< 5	5 -< 6	6 -< 9	9 -< 14	14 -< 100
	Freshwater Wetlands	< 4	4 -< 5	5 -< 7	7 -< 11	11 -< 100
	Grassland	< 7	7 -< 10	10 -< 14	14 -< 20	20 -< 50
> 0 > 5 DEGREES – DOWNSLOPE	Rainforest	< 9	9 -< 12	12 -< 17	17 -< 25	25 -< 100
	Forest (wet and dry sclerophyll) including CoastalSwamp Forest, Pine Plantations and Sub-Alpine Woodland	< 19	19 -< 25	25 -< 35	35 -< 47	47 -< 100
	Grassy and Semi-Arid Woodland (including Mallee)	< 10	10 -< 13	13 -< 19	19 -< 28	28 -< 100
	Forested Wetland (excluding Coastal Swamp Forest)	< 8	8 -< 10	10 -< 15	15 -< 22	22 -< 100
	Tall Heath	< 13	13 -< 18	18 -< 26	26 -< 36	36 -< 100
	Short Heath	< 8	8 -< 10	10 -< 15	15 -< 22	22 -< 100
	Arid-Shrublands (acacia and chenopod)	< 5	5 -< 7	7 -< 11	11 -< 16	16 -< 100
	Freshwater Wetlands	< 4	4 -< 6	6 -< 8	8 -< 12	12 -< 100
	Grassland	< 8	8 -< 11	11 -< 16	16 -< 23	23 -< 50
> 5 > 10 DEGREES – DOWNSLOPE	Rainforest	< 11	11 -< 15	15 -< 22	22 -< 32	32 -< 100
	Forest (wet and dry sclerophyll) including CoastalSwamp Forest, Pine Plantations and Sub-Alpine Woodland	< 24	24 -< 31	31 -< 43	43 -< 57	57 -< 100
	Grassy and Semi-Arid Woodland (including Mallee)	< 12	12 -< 17	17 -< 24	24 -< 34	34 -< 100
	Forested Wetland (excluding Coastal Swamp Forest)	< 10	10 -< 13	13 -< 20	20 -< 28	28 -< 100
	Tall Heath	< 15	15 -< 20	20 -< 29	29 -< 40	40 -< 100
	Short Heath	< 9	9 -< 12	12 -< 18	18 -< 25	25 -< 100
	Arid-Shrublands (acacia and chenopod)	< 6	6 -< 8	8 -< 12	12 -< 18	18 -< 100
	Freshwater Wetlands	< 5	5 -< 6	6 -< 10	10 -< 14	14 -< 100
	Grassland	< 9	9 -< 12	12 -< 18	18 -< 26	26 -< 50

KEITH VEGETATION FORMATION		BUSHFIRE ATTACK LEVEL (BAL)*				
		BAL-FZ	BAL-40	BAL-29	BAL-19	BAL-12.5
		Distance (m) from the asset to the predominant vegetation formation				
> 10 > 15 DEGREES – DOWNSLOPE	Rainforest	< 14	14 -< 20	20 -< 29	29 -< 40	40 -< 100
	Forest (wet and dry sclerophyll) including CoastalSwamp Forest, Pine Plantations and Sub-Alpine Woodland	< 30	30 -< 39	39 -< 52	52 -< 68	68 -< 100
	Grassy and Semi-Arid Woodland (including Mallee)	< 16	16 -< 21	21 -< 31	31 -< 42	42 -< 100
	Forested Wetland (excluding Coastal Swamp Forest)	< 12	12 -< 17	17 -< 25	25 -< 35	35 -< 100
	Tall Heath	< 17	17 -< 22	22 -< 32	32 -< 44	44 -< 100
	Short Heath	< 10	10 -< 13	13 -< 20	20 -< 29	29 -< 100
	Arid-Shrublands (acacia and chenopod)	< 7	7 -< 9	9 -< 14	14 -< 20	20 -< 100
	Freshwater Wetlands	< 5	5 -< 7	7 -< 11	11 -< 16	16 -< 100
	Grassland	< 10	10 -< 14	14 -< 21	21 -< 30	30 -< 50
> 15 > 20 DEGREES – DOWNSLOPE	Rainforest	< 19	19 -< 25	25 -< 36	36 -< 49	49 -< 100
	Forest (wet and dry sclerophyll) including CoastalSwamp Forest, Pine Plantations and Sub-Alpine Woodland	< 38	38 -< 48	48 -< 63	63 -< 81	81 -< 100
	Grassy and Semi-Arid Woodland (including Mallee)	< 20	20 -< 27	27 -< 38	38 -< 52	52 -< 100
	Forested Wetland (excluding Coastal Swamp Forest)	< 16	16 -< 22	22 -< 32	32 -< 43	43 -< 100
	Tall Heath	< 19	19 -< 25	25 -< 36	36 -< 49	49 -< 100
	Short Heath	< 11	11 -< 15	15 -< 23	23 -< 32	32 -< 100
	Arid-Shrublands (acacia and chenopod)	< 7	7 -< 10	10 -< 16	16 -< 23	23 -< 100
	Freshwater Wetlands	< 6	6 -< 8	8 -< 13	13 -< 18	18 -< 100
	Grassland	< 12	12 -< 16	16 -< 24	24 -< 34	34 -< 50

**APPENDIX B      BUSHFIRE RISK MATRIX (NSW RFS 2008)**

## Bushfire Risk Matrix (NSW RFS 2008)

The following methodology is outlined within the Bush Fire Risk Management Planning Guidelines for Bush Fire Management Committees (NSW Rural Fire Service, 2008) was used in the development of bushfire risk management plans in NSW by the Rural Fire Service, including the Hume Zone BFMC Bush Fire Risk Management Plan (2017). It follows the procedures and considerations of AS/NZS ISO 31000:2009 Risk Management – Principles and Guidelines (Standards Australia, 2009a).

The likelihood of bushfire risk is defined as the chance of a bushfire igniting and spreading. There are four possible likelihood ratings: unlikely, possible, likely and almost certain. It is often challenging to determine the likelihood rating for assets. This is mainly due to a lack of fire history records. Where data is not available, subjective estimates may be used which reflect the likelihood that a bushfire will occur. Likelihood should be considered in the context of long term planning, not just the likelihood of a bushfire occurring in the next few years. Table A.1 outlines the process for determining likelihood.

**Table B.1 Likelihood Ratings for Assessing Bushfire Risk**

	Fires are expected to spread and reach assets	Fires are not expected to spread and reach assets
Fires occur frequently	Almost certain	Possible
Fires occur infrequently	Likely	Unlikely

(NSW Rural Fire Service, 2008)

Consequence is the outcome or impact of a bushfire event. The assessment process for consequence is subjective and includes consideration of threat, vulnerability and other issues such as level of impact and recovery costs. There are four possible consequence ratings: minor, moderate, major and catastrophic. A description of each is provided in Table B.2.

**Table B.2 Consequence Ratings for Assessing Bushfire Risk**

Consequence Rating	Descriptions
<b>Minor</b>	<ul style="list-style-type: none"> <li>■ No fatalities.</li> <li>■ Some minor injuries with first aid treatment possibly required.</li> <li>■ No persons are displaced.</li> <li>■ Little or no personal support (physical, mental, emotional) required.</li> <li>■ Inconsequential or no damage to an asset.</li> <li>■ Little or no disruption to community.</li> <li>■ Little or no financial loss.</li> </ul>
<b>Moderate</b>	<ul style="list-style-type: none"> <li>■ Medical treatment required but no fatalities. Some hospitalisation.</li> <li>■ Localised displacement of persons who return within 24 hours.</li> <li>■ Personal support satisfied through local arrangements.</li> <li>■ Localised damage to assets that is rectified by routine arrangements.</li> <li>■ Community functioning as normal with some inconvenience.</li> <li>■ Local economy impacted with additional financial support required to recover.</li> <li>■ Small impact on environment / cultural asset with no long term effects.</li> </ul>

Consequence Rating	Descriptions
<b>Major</b>	<ul style="list-style-type: none"> <li>■ Possible fatalities.</li> <li>■ Extensive injuries, significant hospitalisation.</li> <li>■ Large number of persons displaced (more than 24 hours duration).</li> <li>■ Significant resources required for personal support.</li> <li>■ Significant damage to assets that requires external resources.</li> <li>■ Community only partially functioning, some services unavailable.</li> <li>■ Local or Regional economy impacted for a significant period of time with significant financial assistance required.</li> <li>■ Significant damage to the environment/cultural asset which requires major rehabilitation or recovery works.</li> <li>■ Localised extinction of native species (this may range from loss of a single population to loss of all of the species within the BFMC area (for a species which occupies a greater range than just the BFMC area).</li> </ul>
<b>Catastrophic</b>	<ul style="list-style-type: none"> <li>■ Significant fatalities.</li> <li>■ Large number of severe injuries.</li> <li>■ Extended and large number requiring hospitalisation.</li> <li>■ General and widespread displacement of persons for extended duration.</li> <li>■ Extensive resources required for personal support.</li> <li>■ Extensive damage to assets.</li> <li>■ Community unable to function without significant support.</li> <li>■ Regional or State economy impacted for an extended period of time and financial assistance required.</li> <li>■ Permanent damage to the environment.</li> <li>■ Extinction of a native species in nature (This category is most relevant to species that are restricted to the BFMC area, or also occur in adjoining BFMC areas and are likely to be impacted upon by the same fire event). In nature means wild specimens and does not include flora or fauna bred or kept in captivity.</li> </ul>

(NSW Rural Fire Service, 2008)

**APPENDIX C    KEY ASSETS WITHIN THE INVESTIGATION AREA (HUME  
ZONE BFMC 2017)**

**Table C.1 Assets within Albury and surrounds**  
**(extract from Hume Zone Bush Fire Risk Management Plan (Hume Zone BFMC 2017))**

Asset Type	Asset Sub Type	Asset Name	Asset Location	LGA	Display area	Likelihood	Consequence	Risk	Treatment Strategy
Economic	Commercial Forest	Norske Skog Pine Plantation	Hume Highway, Table Top	Albury	Hume Zone East	Likely	Major	Very High	
Human Settlement	Special Fire Protection	Table Top Primary School	Burma Rd, Table Top	Albury	Hume Zone East	Likely	Major	Very High	Community Education - Ensure Community Response Plans are current Property Planning - Emergency Fire & Relocation Plans Preparedness - Undertake Duty of Care Inspection Annually
Human Settlement	Residential	Spring Park Estate	Old Table Top Rd, Thurgoona	Albury	Hume Zone East	Likely	Major	Very High	Community Education - Community Fire Unit Hazard Reduction - Spray/Slash, Low Intensity Burn Preparedness - Fire Trail Maintenance
Human Settlement	Special Fire Protection	The Grange Aged Care Facility	Thurgoona Dr, Thurgoona	Albury	Hume Zone East	Likely	Major	Very High	Community Education - Implement Community Engagement Strategy Property Planning - Emergency Fire & Relocation Plans
Human Settlement	Special Fire Protection	Charles Sturt University, Thurgoona Campus	Elizabeth Mitchell Dr, Thurgoona	Albury	Hume Zone East	Likely	Major	Very High	Property Planning - Emergency Fire & Relocation Plans
Human Settlement	Residential	Hume Weir Village	Hume Weir Village, Lake Hume	Albury	Hume Zone East	Likely	Major	Very High	Community Education - Implement Community Engagement Strategy and ensure Community Response Plans are current Hazard Reduction - Spray/Slash/Burn
Human Settlement	Residential	East Albury Interface	East Albury	Albury	Hume Zone East	Likely	Major	Very High	Hazard Reduction - Spray/Slash Preparedness - Fire Trail Maintenance
Cultural	Aboriginal Significance	Tree Modification	Riversdale Rd	Albury	Hume Zone East	Likely	Major	Very High	Preparedness - Undertake awareness training for fire fighters Manual clearing and raking only

**ALBURY REGIONAL JOB PRECINCT**

## Bushfire Assessment Report

Asset Type	Asset Sub Type	Asset Name	Asset Location	LGA	Display area	Likelihood	Consequence	Risk	Treatment Strategy
Cultural	Aboriginal Significance	Tree modification	Bowna	Albury	Hume Zone East	Likely	Major	Very High	Preparedness - Undertake awareness training for fire fighters Manual clearing and raking only
Economic	Tourist and Recreational	Table Top Homestead Motel	Burma Rd, Table Top	Albury	Hume Zone East	Likely	Moderate	High	
Economic	Tourist and Recreational	Table Top Hall	Burma Rd, Table Top	Albury	Hume Zone East	Likely	Moderate	High	
Economic	Commercial	Table Top Commercial Precinct	Burma Rd, Table Top	Albury	Hume Zone East	Likely	Moderate	High	
Economic	Commercial	Kinross Hotel	Old Table Top Rd, Thurgoona	Albury	Hume Zone East	Likely	Moderate	High	
Human Settlement	Special Fire Protection	National Environmental Centre(Riverina TAFE)	Ettamogah Rd, Thurgoona	Albury	Hume Zone East	Likely	Moderate	High	Hazard Reduction - Spray/Slash Property Planning - Emergency Fire and Relocation Plans
Human Settlement	Special Fire Protection	Trinity College	Elizabeth Mitchell Dr,Thurgoona	Albury	Hume Zone East	Likely	Moderate	High	Hazard Reduction - Spray/Slash Property Planning - Maintain Emergency Fire and Relocation Plans
Human Settlement	Residential	Mitchell Park Estate Interface	Mitchell Park, Thurgoona	Albury	Hume Zone East	Likely	Moderate	High	Hazard Reduction - Spray/Slash/Burn
Economic	Tourist and Recreational	Thurgoona Sports Ground	Table Top Rd, Thurgoona	Albury	Hume Zone East	Likely	Moderate	High	
Economic	Tourist and Recreational	Thurgoona Golf Club	Thurgoona Dr, Thurgoona	Albury	Hume Zone East	Likely	Moderate	High	
Economic	Tourist and Recreational	Thurgoona Tennis Centre	Thurgoona Dr, Thurgoona	Albury	Hume Zone East	Likely	Moderate	High	
Human Settlement	Residential	Thurgoona Park Estate Interface	Thurgoona Park Estate, Thurgoona	Albury	Hume Zone East	Likely	Moderate	High	Hazard Reduction - Spray/Slash/Burn
Human Settlement	Residential	Doctors Point Interface	Eastern Hill, Albury	Albury	Hume Zone East	Likely	Moderate	High	Hazard Reduction - Spray/Slash/Burn Preparedness - Fire Trail Maintenance



**ALBURY REGIONAL JOB PRECINCT**

## Bushfire Assessment Report

Asset Type	Asset Sub Type	Asset Name	Asset Location	LGA	Display area	Likelihood	Consequence	Risk	Treatment Strategy
Human Settlement	Other	Table Top NSP	Burma Rd, Table Top	Albury	Hume Zone East	Likely	Moderate	High	Hazard Reduction - Spray/Slash
Cultural	Aboriginal Significance	Tree Modification	Willamulka	Albury	Hume Zone East	Likely	Moderate	High	
Cultural	Aboriginal Significance	Aboriginal Artefact	Thurgoona	Albury	Hume Zone East	Likely	Moderate	High	
Cultural	Aboriginal Significance	Aboriginal Artefact	Ettamogah	Albury	Hume Zone East	Likely	Moderate	High	
Economic	Commercial	Ettamogah Pub Complex	Burma Rd, Table Top	Albury	Hume Zone East	Likely	Moderate	High	
Cultural	Other	Table Top Rural Fire Brigade Station	Burma Rd, Table Top	Albury	Hume Zone East	Likely	Minor	Medium	
Economic	Commercial	Thurgoona Shopping Centre	Shuter Ave, Thurgoona	Albury	Hume Zone East	Unlikely	Major	Medium	
Economic	Commercial	Albury Airport	Airport Dr, Albury	Albury	Hume Zone East	Unlikely	Major	Medium	
Economic	Infrastructure	Albury Waterworks	Waterworks Rd, Albury	Albury	Hume Zone East	Unlikely	Major	Medium	
Human Settlement	Special Fire Protection	Albury Base Hospital	East St, Albury	Albury	Hume Zone East	Unlikely	Major	Medium	Community Education - Community Awareness
Cultural	Aboriginal Significance	Aboriginal Artefact	Lake Hume	Albury	Hume Zone East	Likely	Minor	Medium	
Cultural	Aboriginal Significance	Aboriginal Artefact	Lake Hume	Albury	Hume Zone East	Likely	Minor	Medium	
Cultural	Aboriginal Significance	Aboriginal Artefact	Lake Hume	Albury	Hume Zone East	Likely	Minor	Medium	
Human Settlement	Special Fire Protection	Border Christian College	Elizabeth Mitchell Dr, Thurgoona	Albury	Hume Zone East	Unlikely	Moderate	Low	
Cultural	Other	Thurgoona Rural Fire Brigade Station	RSD Wells Ave	Albury	Hume Zone East	Unlikely	Minor	Low	
Human Settlement	Other	Alexandra Park NSP	Keene St, Albury	Albury	Hume Zone East	Unlikely	Moderate	Low	Hazard Reduction - Spray/Slash

Asset Type	Asset Sub Type	Asset Name	Asset Location	LGA	Display area	Likelihood	Consequence	Risk	Treatment Strategy
Human Settlement	Other	Ernest Grant Park NSP	Bogong St, Thurgoona	Albury	Hume Zone East	Unlikely	Moderate	Low	Hazard Reduction - Spray/Slash
Cultural	Aboriginal Significance	Aboriginal Artefact	Lake Hume	Albury	Hume Zone East	Unlikely	Minor	Low	
Cultural	Aboriginal Significance	Aboriginal Artefact	Lake Hume	Albury	Hume Zone East	Unlikely	Minor	Low	
Economic	Infrastructure	Wirlinga Ordinance Depot	Riverina Highway, Wirlinga	Albury	Hume Zone East	Likely	Major	Very High	Hazard Reduction - Undertake regular fuel reduction



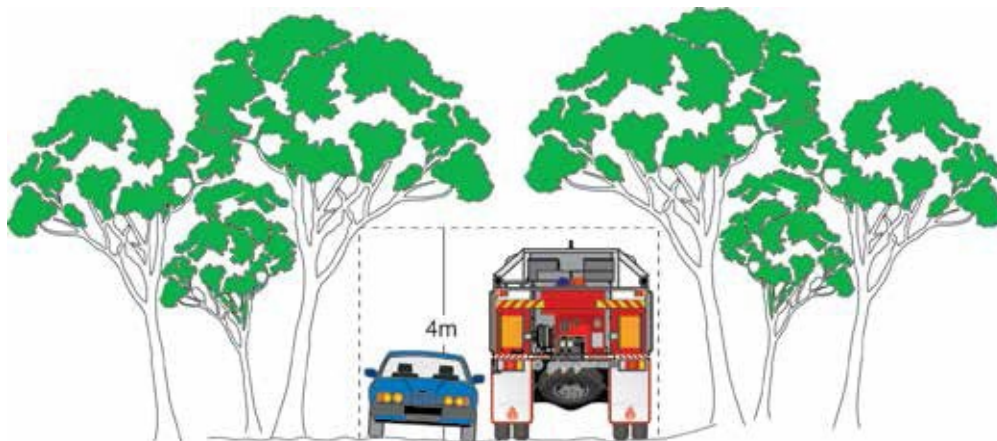
**APPENDIX D      DESIGN PRINCIPLES FOR EMERGENCY SERVICE  
VEHICLE ACCESS, PLANNING FOR BUSHFIRE  
PROTECTION 2019**

## ACCESS

This appendix provides design principles for emergency service vehicle access and is an extract from Appendix 4, Planning for Bushfire Protection 2019

### Vertical clearance

An unobstructed clearance height of 4 metres should be maintained above all access ways including clearance from building construction, archways, gateways and overhanging structures (e.g. ducts, pipes, sprinklers, walkways, signs and beams). This also applies to vegetation overhanging roads.



### Vehicle turning requirements

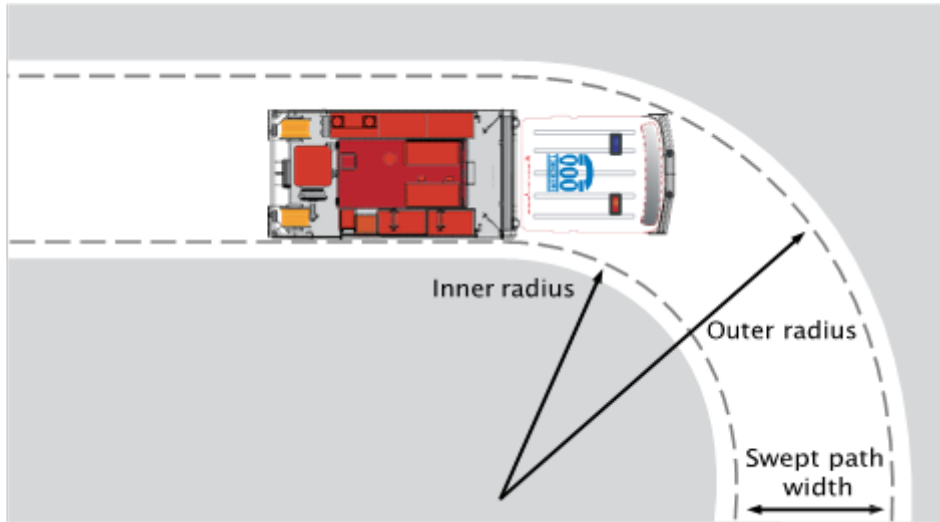
Curved carriageways should be constructed using the minimum swept path as outlined in the Table below:

#### Minimum curve radius for turning vehicles.

Curve radius (inside edge in metres)	Swept path (metres width)
< 40	4.0
40 - 69	3.0
70 - 100	2.7
> 100	2.5

### Swept path width for turning vehicles.

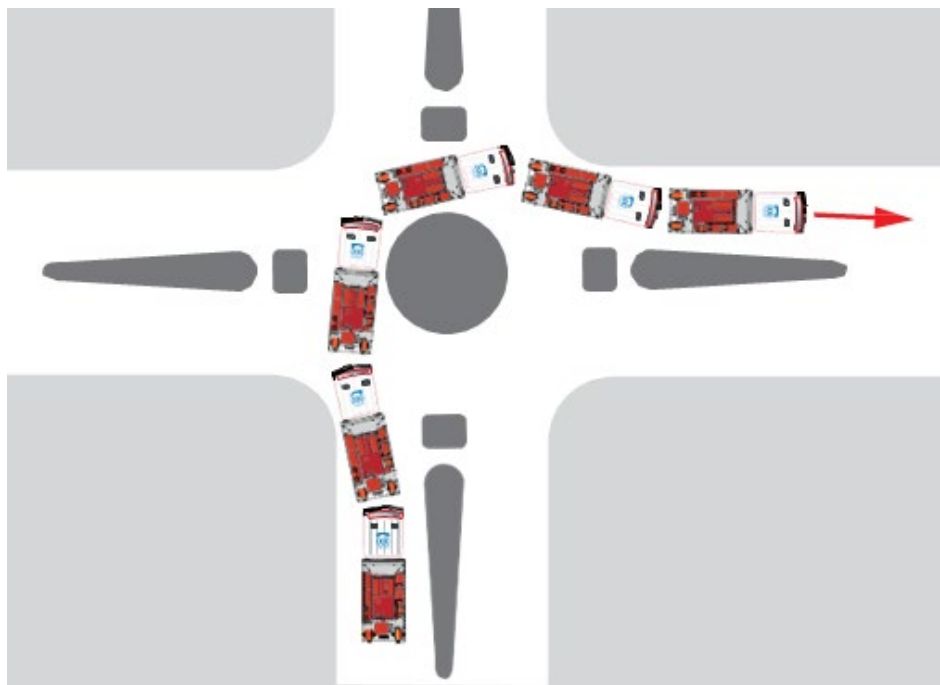
The radius dimensions given are for wall to wall clearance where body overhangs travel a wider arc than the wheel tracks (vehicle swept path). The swept path shall include an additional 500mm clearance either side of the vehicle.



### Roundabout swept path.

Example of a swept path as applied to a roundabout.

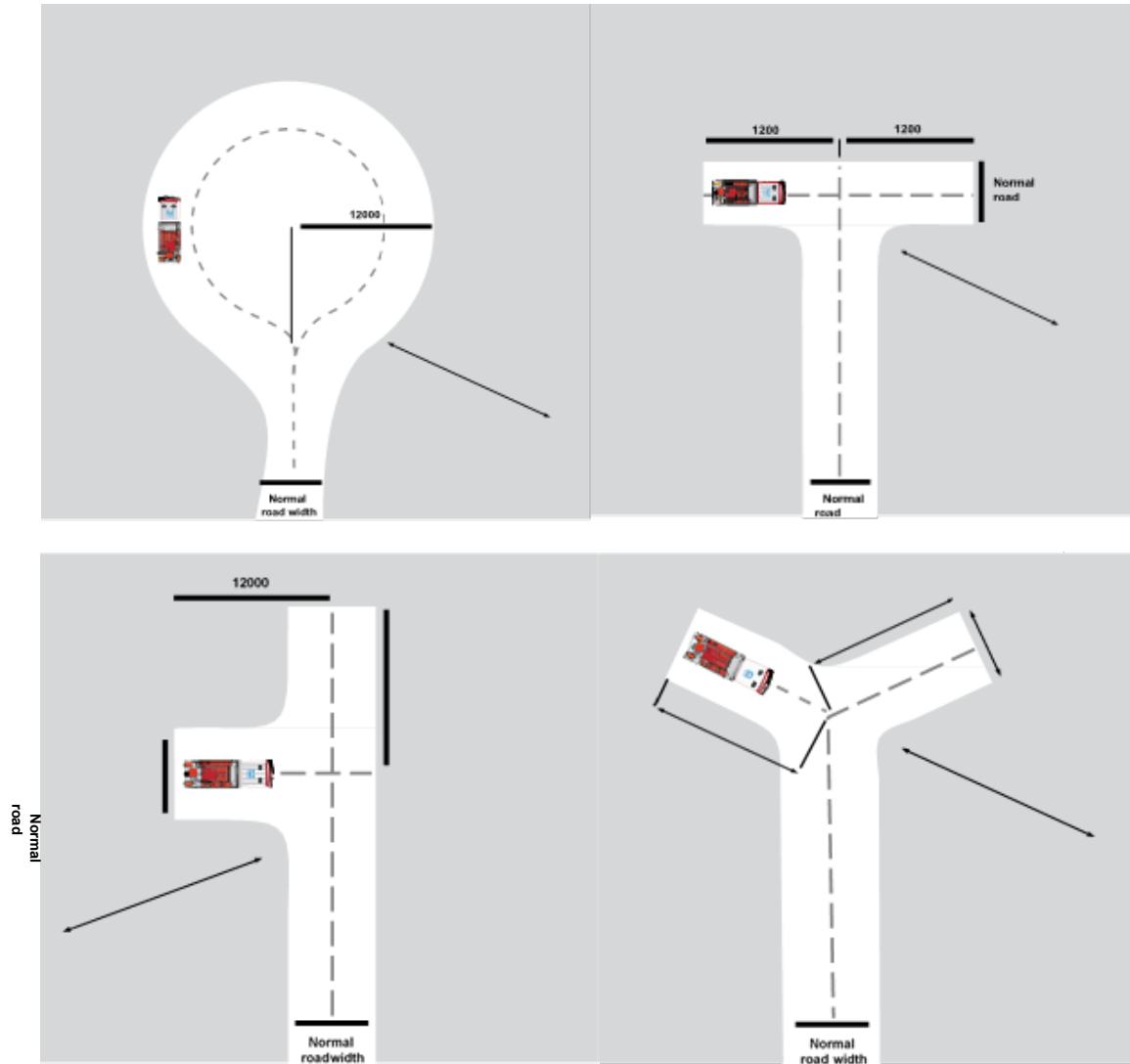
The distance between inner and outer turning arcs allows for expected vehicle body swing of front and rear overhanging sections.



## Vehicle turning head requirements

Dead ends that are longer than 200m must be provided with a turning head area that avoids multipoint turns. “No parking” signs are to be erected within the turning head.

The minimum turning radius shall be in accordance with Table A3.2 of Planning for Bushfire Protection 2019. Where multipoint turning is proposed the NSW RFS will consider the following options:



## Services

Hydrant services should be located outside the carriageway and parking bays to permit traffic flow and access. Setup of standpipes within the carriageway may stop traffic flow. Hydrant services shall be located on the side of the road away from the bushfire threat where possible.

## Passing bays

The construction of passing bays, where required, shall be 20m in length and provide a minimum trafficable width at the passing point of 6m.

*Passing bays can provide advantages when designed correctly. Poor design can and does severely impede access.*



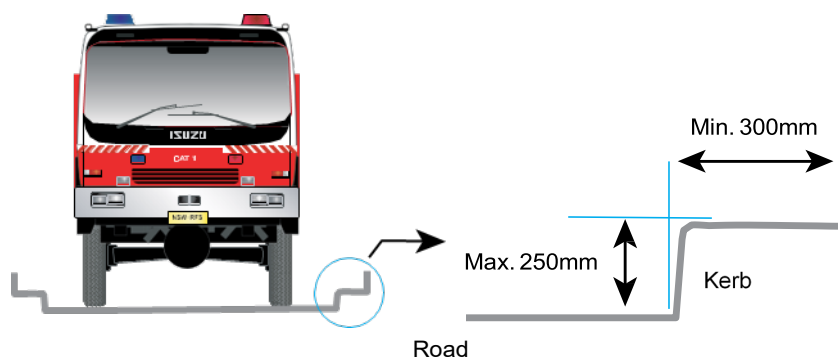
## Parking

Parking can create a pinch point in required access. The location of parking should be carefully considered to ensure fire appliance access is unimpeded. Hydrants shall be located outside of access ways and any parking areas to ensure that access is available at all times.



## Kerb dimensions

All kerbs constructed around access roads should be no higher than 250mm and free of vertical obstructions at least 300mm back from the kerb face to allow clearance for front and rear body overhang.

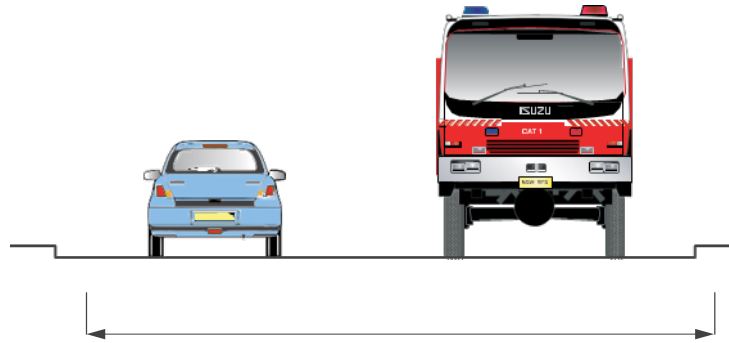




## ROAD TYPES

### Perimeter Roads

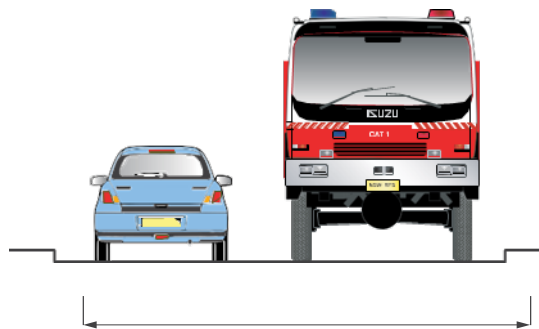
Perimeter roads are to be provided with a minimum clear width of 8m. Parking and hydrants are to be provided outside of carriageways. Hydrants are to be located outside of carriageways and parking areas.



Perimeter roads = 8m to kerb

### Non-perimeter Roads

Non-perimeter roads shall be provided with a minimum clear width of 5.5m. Parking is to be provided outside of the carriageway and hydrants are not to be located in carriageways or parking areas.



Non-perimeter roads = 5.5m to kerb

### Property access

Property access roads are to be a minimum of 4m wide.



Property access road  
4m wide carriage way

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