habitat

Bushfire Assessment Report

Four (4) Lot Subdivision

Marina Drive, Moama

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Submitted to Murray River Council
On behalf of Ovens + Murray Land Survey

Document Control

Contact

David Hunter, Director
Chris Joynes, Consultant

Habitat Planning
409 Kiewa Street
Albury NSW 2640
02 6021 0662
habitat@habitatplanning.com.au
habitatplanning.com.au

Habitat Planning Pty Ltd
ABN 29 451 913 703
ACN 606 650 837

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Contents

1. Introduction

1.1. Overview

This Bushfire Assessment Report (BAR) accompanies a Development Application for a four (4) lot Community Title subdivision of Lot 2 in DP286894 and Pt. Lot 10 in DP270580 addressed as Marina Drive and Perricoota Road, Moama.

The south and south-western boundary of the subject land has been identified as being within a Vegetation Buffer Zone according to NSW Planning Portal and is zoned SP3: Tourist as per the Murray River LEP 2011.

In certain circumstances, Council must consult the RFS on measures to be taken to protect life, property and the environment from dangers that may arise from a bushfire. Development applications that are subject to *Section 100B* consultations under the Rural Fires Act 1997 are to be referred to the RFS in relation to residential or rural residential subdivisions or development for a 'special fire protection purposes'.

This is a Bushfire Assessment Report (BAR) prepared in accordance with the submission requirements for Development Applications on bush fire prone land at Section A2.1 of Appendix 2 of the NSW Rural Fire Service's (RFS) document titled Planning for Bush Fire Protection Guidelines 2019 ("the Guidelines"). The purpose of this BAR is to demonstrate the level of compliance of the proposed development with the Guidelines.

In this instance, the development seeks approval for a residential subdivision and the provisions of the Section 100B of the *Rural Fires Act 1997* apply.

2. Site Location and Context

2.1. Site Context

The subject site comprises two (2) existing lots described as Lot 2 in DP286894 and Part Lot 10 in DP270580 and are addressed as 71-77 Marina Drive and Perricoota Road Moama, respectively. The land is located within the Waterfront Marina approximately 17kilometres northwest of Moama. The land has frontage to the Deep Creek Lagoon, which is a tributary to the Murray River, and is shown in a local context map and aerial imagery at **Figures 1** and **2** below.

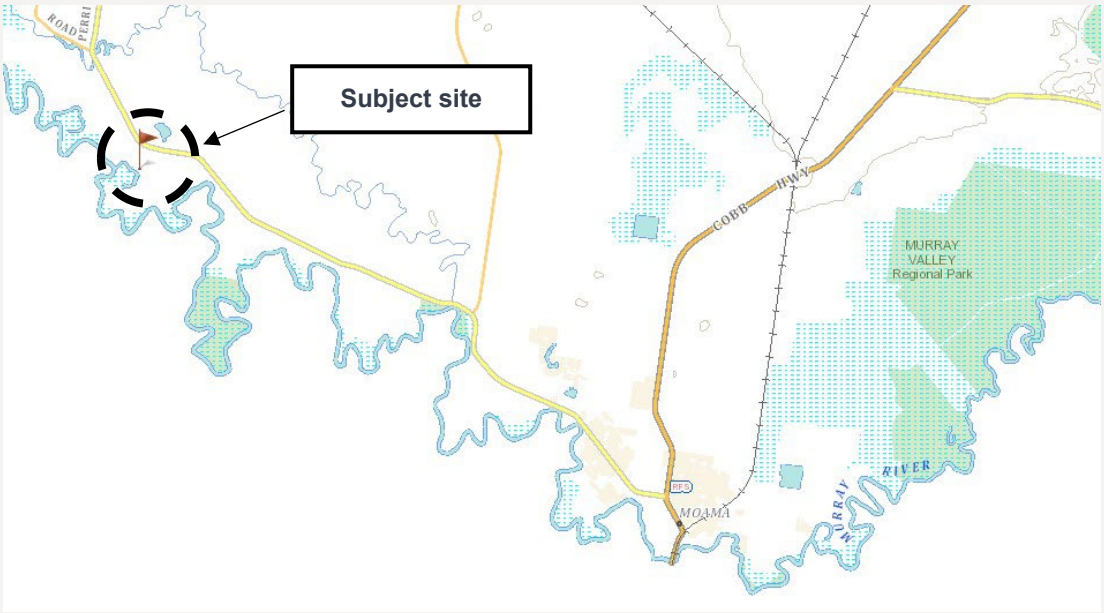

Figure 1 – Context Map

Figure 2 **– Site Aerial**

2.2. Site Description and Existing Conditions

Lot 2 is a vacant development Lot on the northern boundary of the Waterfront Marina. It abuts the Deep Creek Marina common boundary and has an area of approximately 3,388m^2. It forms the northern and lager section of the development Lot.

Lot 10 forms the residual Marina land and balance Lot. It is the southern part of the development Lot and contains two (2) established trees and has frontage and access to the lagoon's marina waters. The part of the lot equating to approximately 977m^2 is proposed to be excised and consolidated into the proposed subdivision.

The subject land is currently vacant development land. It has access to common urban services including water and electricity; however, the site remains unimproved in the context of the existing and establishing marina. The land has a gentle slope to the mooring docks and water frontage and contains two existing remnant trees with manicured lawns.

The site is accessed from Perricoota Road via an internal private road network under the Neighbourhood Association property within the Marina.

There is a gently fall from the north frontage of the land to the berthing docks at the water's edge. Existing drainage infrastructure provides stormwater management across the site.

Figure 3 below, illustrates the bushfire hazard as it pertains to the subject site.

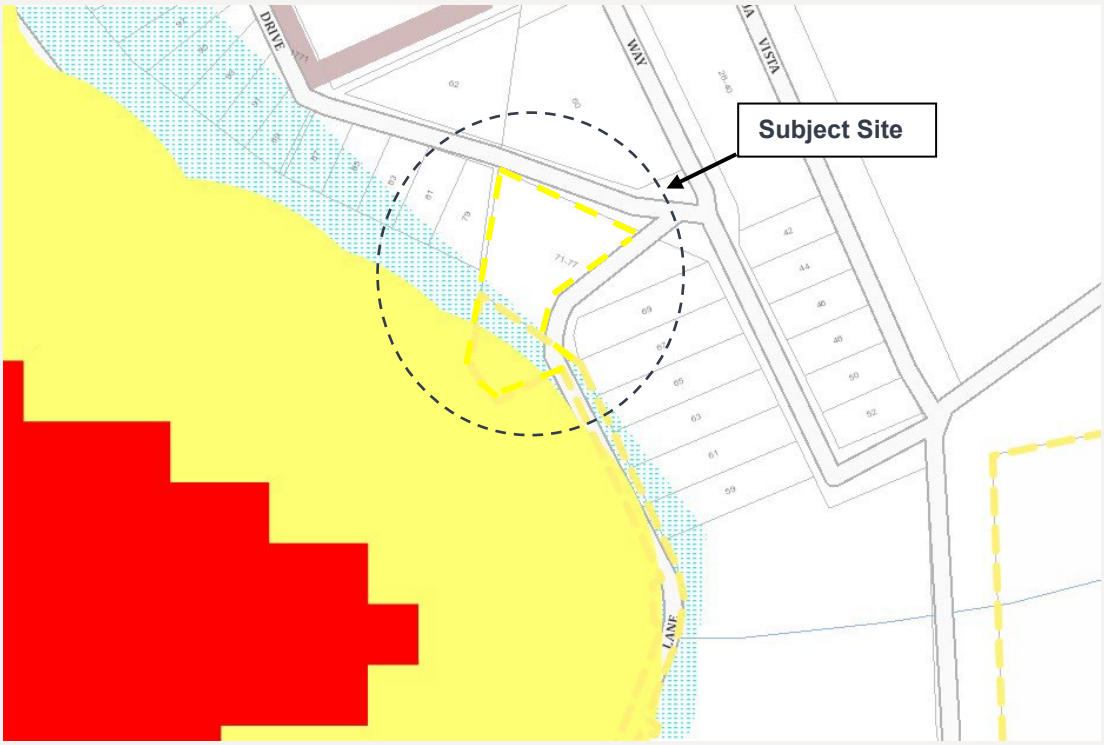

Figure 3 – Extract of Bushfire prone land map (NSW Planning Portal)

3. Description of Proposal

3.1. Overview

This application seeks approval for a four (4) Lot subdivision of land contained in Lot 2 in DP 286894 and Lot 10 in DP 270580 pursuant to the *Community Land Development Act 2021*.

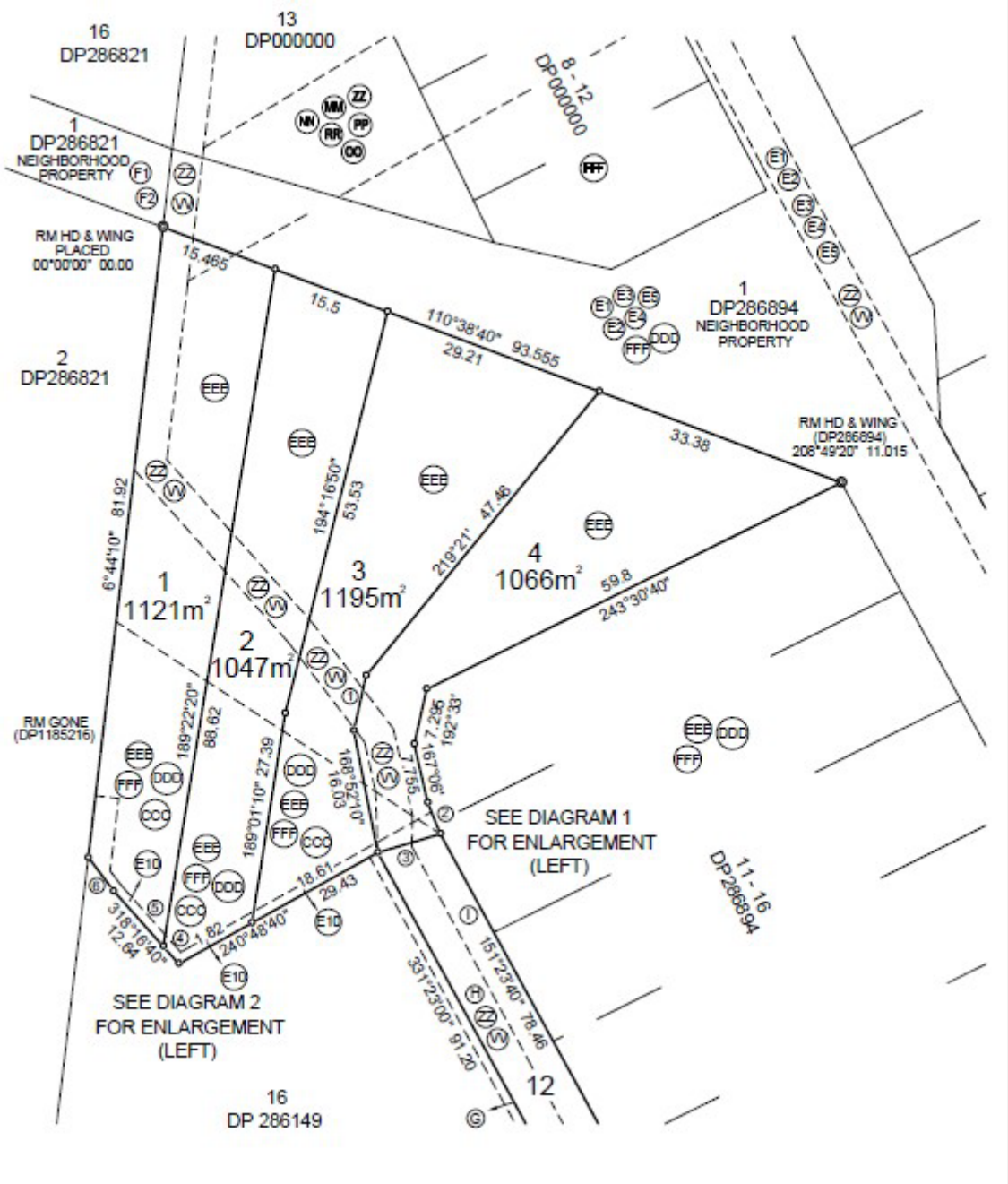

Figure 4 – Proposed subdivision plan Lots 1 – 4

The subdivision will establish vacant serviced development lots with a Neighbourhood Association to enable future tourist and visitor accommodation.

The proposed Lots range in size from 1047m^2 up to 1195m^2 and will have irregular rectangular forms. The lots will gain access to established road reserves contained within the neighbourhood property (DP286894) and have access to all applicable utilities and services.

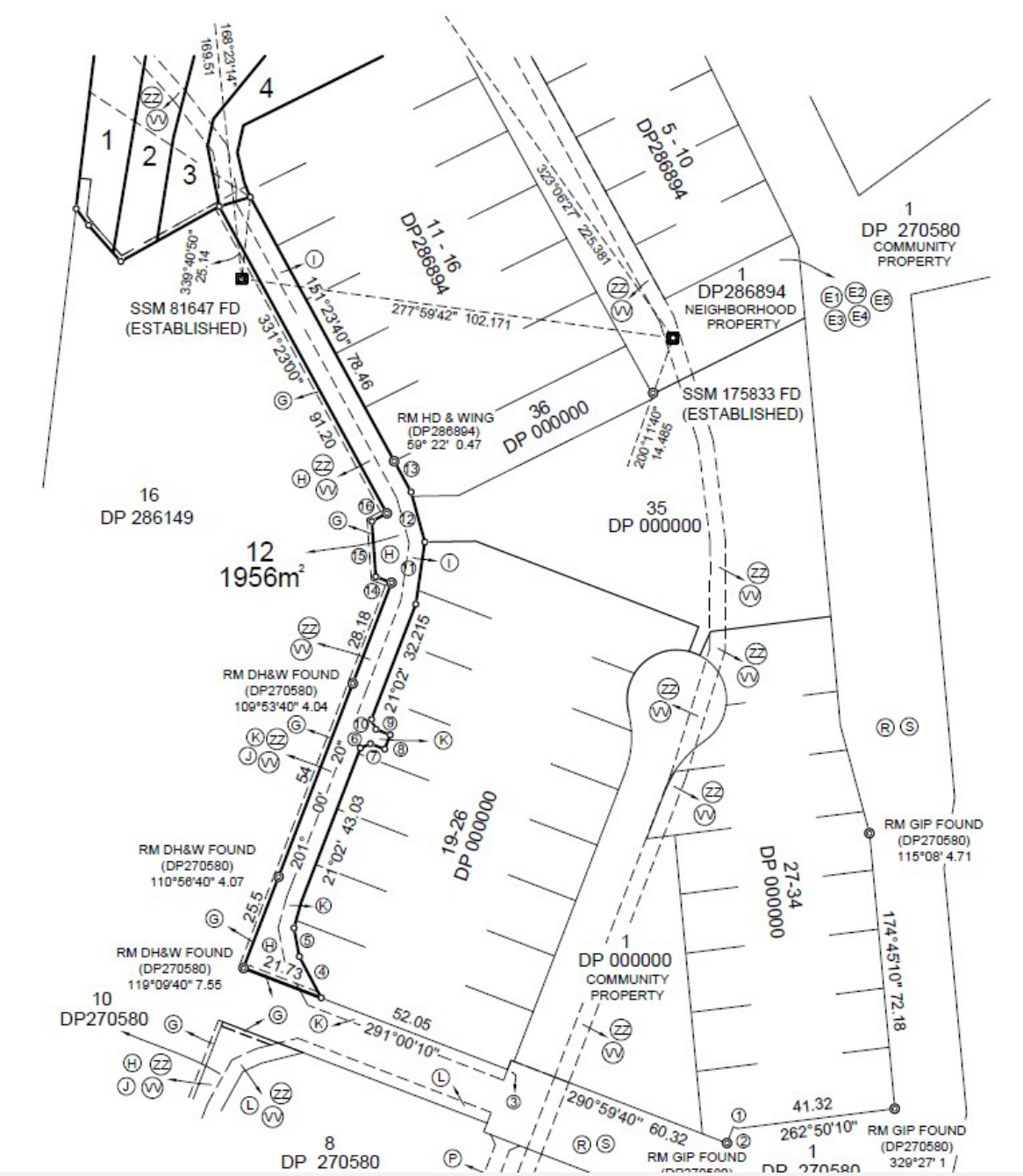

Figure 5 – Proposed subdivision plan Lot 12 (common association lot)

All Lots are encumbered with a 4meter wide and variable services and underground electricity easement. The easement is necessary and does not preclude the ability of development in the site. A variable width water supply easement also extends around the southern boundary of the site along the water's edge.

4. Site Assessment

4.1. Vegetation

Consistent with the identification key in Keith (2004) and the Guidelines, vegetation within 140 metres from the subject land consists of 'woodland', 'managed land', and 'grassland'.

The subject land itself has been heavily modified as rural land, with only scattered native trees remaining and disturbed groundcovers. The subject land is most appropriately defined as 'managed land/grassland' vegetation.

The assessment has determined the following vegetation classifications:

Table 1 - Vegetation Assessment

Interface	Description
North	Managed Land/Grassland The northern portion of the subject land is former rural land and cleared grassland. The land to the north, comprises managed land and grassland, and is undergoing significant transformation from grassland to managed land.
East	Managed Land/Grassland The land to the east is similar to the northern interface. It is undergoing development from grassland to managed land.
South	Woodland 140m south across the waters of Deep Lagoon is land classified as woodlands vegetation.
West	Managed Land The land adjoining the western boundary of the subject land is best classed managed land. It comprises of houseboats and associated tourist infrastructure, with a scattering of native vegetation.

A map showing the surrounding vegetation classifications is provided in **Figure 6** below.

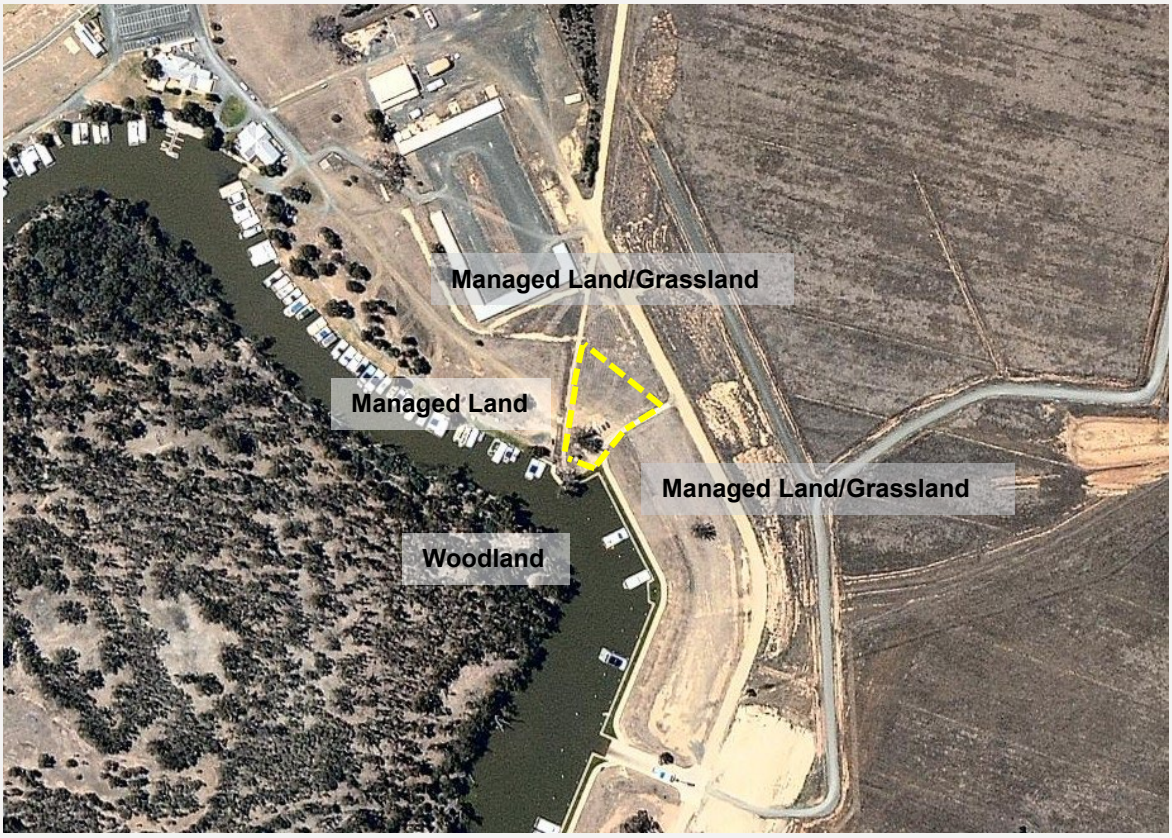

Figure 6 – Vegetation classification for the subject land and surrounds

4.2. Slope

The slope of the land beneath the hazard that is most likely to influence bushfire behaviour has been calculated by topographical map analysis to a distance of 140 metres from the subject land.

It should be noted that the identified slope is described in relation to the surface of the adjacent land, in context to the subject land, as per the directions of AS3959 and the Planning for Bushfire Protection.

The assessment has determined the slope calculations summarised in Table 2 below.

Table 2 - Slope Assessment

Interface	Description
North	External – Downslope 0-5 degrees The slope of land to the north is assessed as having a downslope in context to the development site. It is assessed that this slope is varied, but on average is less than 5 degrees.
East	External – Upslope/Flat The slope of land to the east is assessed as being flat.

South	External – Upslope 0-5 degrees The slope of land to the south is assessed as having an upslope in context to the development site. It is assessed that this slope is varied, but on average is less than 5 degrees.
West	External – Downslope 0-5 degrees The slope of land to the west is assessed as having a downslope in context to the development site. It is assessed that this slope is varied, but on average is less than 5 degrees.

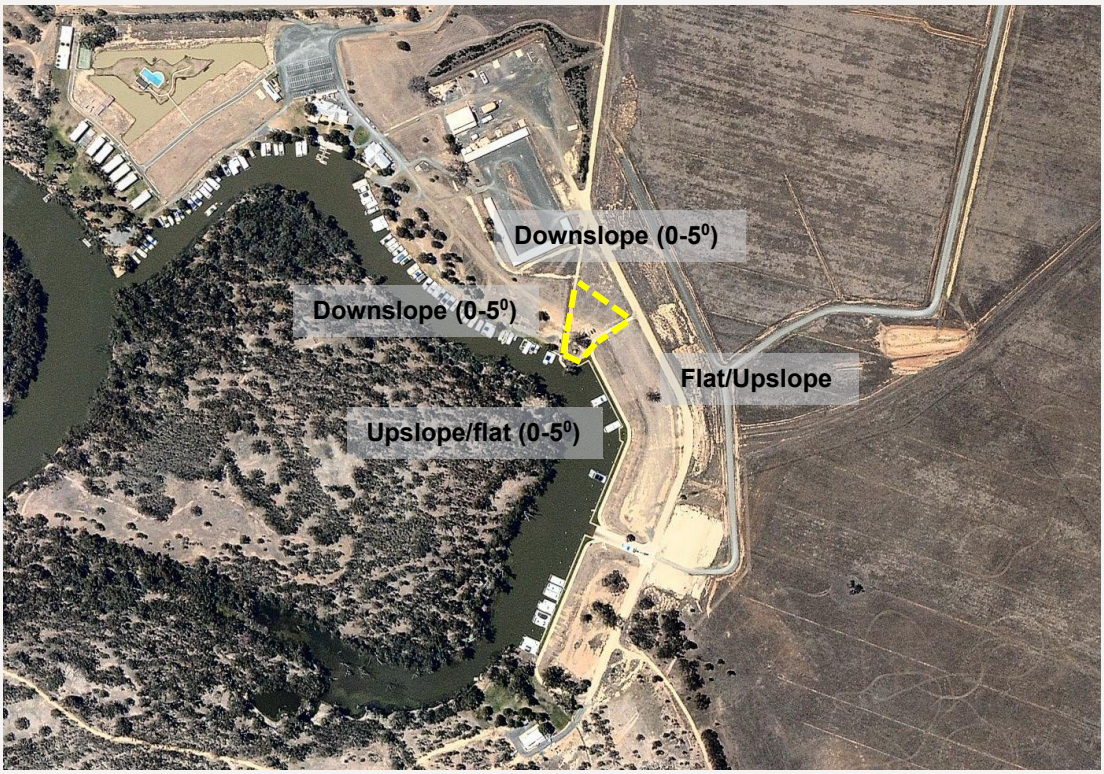

Figure 7 – Topography classification for the subject land and surrounds

4.3. Significant Environmental Features

The conditions of the site are described as modified, with the land being mostly cleared of woody vegetation, with some scattered remnant native vegetation.

Land south and southwest from the subject site consists of undisturbed woodland vegetation, with the lagoon which abuts representing a wetlands area. It is this direction which poses the most risk to the subject site.

Land to the north and east is cleared ex-rural land, which is currently being developed for tourist purposes. Grasslands give way to cleared subdivisions, newly constructed roads, a scattering of structures, and tourist houseboats moored on the lagoon.

4.4. Aboriginal Heritage

A search completed on the NSW AHIMS database on 30/08/23 confirmed that there are no recorded cultural sites/places within a 50m radius of the subject site.

5. Bushfire Protection Measures

Having regard to the assessment and site conditions above, an Asset Protection Zone (APZ) has been calculated in accordance with the recommendations of Table A1.12.4 of the Guideline as reproduced below:

Table 3 – Minimum distance for APZs – residential development, FFDI 80 areas

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 (Shrubby and Grassy) including Coastal Swamp Forest, Pine Plantations and Sub-Alpine Woodland	20	25	31	39	48
Woodland (grassy and woody)	11	13	17	21	27
Forested Wetland	8	10	13	17	22
Tall Heath	15	16	18	21	23
Short Heath	10	11	13	14	16
Arid-Shrublands (acacia and chenopod)	7	8	9	10	11
Freshwater Wetlands	6	7	8	9	10
Alpine Complex	7	8	8	10	11
Grassland	10	11	12	14	16

The subject land is located within a FFDI of 80, the adjoining vegetation is classified primarily as grassland/managed land hazards, with the southern interface representing woodland vegetation.

APZ's will be applied to the boundaries of the subdivision, which will provide a managed space between the hazard and the proposed residential lots to be created as part of the development. The proposed APZ's and distances are provided in the **table** below.

Based on the site assessment above and Table A1.12.3, the following sets out the required APZ distances along with the proposed locations.

Table 4 – Asset Protection Zone Summary

Interface	APZ Distance	Location
North	11 metres	The APZ will be accommodated by the internal road network.
East	10 metres	An APZ can be accommodated within the internal road reserves.
South	11 metres	Proposed APZ can defer to the waters of Deep Lagoon which has a width of approximately 40m from the southern tip of the subject site to the beginning of the woodland vegetation area. This is external to the proposed site of subdivision's boundaries.
West	10 metres	An APZ can be accommodated within the proposed Lot 1 – as an update to the plans and conditioned as part of the determination of subdivision.

5.1. Bushfire Protection Measures for Residential and Rural Residential Subdivisions

Table 3 provides an assessment of the proposed subdivision against the performance criteria and acceptable solutions as specified in Section 5 of the Guidelines.

The specific objectives for residential and rural residential subdivisions with a dwelling entitlement as outlined within the Guidelines are provided as follows:

- *minimise perimeters of the subdivision exposed to the bush fire hazard (hourglass shapes, which maximise perimeters and create bottlenecks should be avoided);*
- *minimise vegetated corridors that permit the passage of bush fire towards buildings;*
- *provide for the siting of future dwellings away from ridge-tops and steep slopes, within saddles and narrow ridge crests;*
- *ensure that APZs between a bush fire hazard and future dwellings are effectively designed to address the relevant bush fire attack mechanisms;*
- *ensure the ongoing maintenance of APZs;*
- *provide adequate access from all properties to the wider road network for residents and emergency services;*
- *provide access to hazard vegetation to facilitate*
- *bush fire mitigation works and fire suppression; and*
- *ensure the provision of an adequate supply of water and other services to facilitate effective firefighting.*

The proposed subdivision is generally consistent with these specific objectives as follows:

- the subdivision provides an appropriate interface to the adjoining bushfire hazard that will be managed ongoing.
- the subdivision does not contain any vegetated corridors that will permit the passage of bush fire towards dwellings;
- the land does not contain any ridgetops or steep land.
- the APZ has been designed to achieve the relevant requirements of the Guidelines (see **Table 3** for further details).
- the APZs will be managed ongoing by the operators of Waterfront Marina.
- the subdivision will be serviced via a connected road network, which leads away from the hazard.
- the subdivision will be connected to all reticulated services and infrastructure including water.

Table 5 – Residential subdivision compliance table (adapted from the Guidelines)

Performance Criteria	Acceptable Solutions	Response
Asset Protection Zones		
Potential building footprints must not be exposed to radiant heat levels exceeding 29kW/m² on each proposed lot.	• APZs are provided in accordance with Tables A1.12.2 and A1.12.3 based on the FFDI.	• Classifiable bushfire hazards include managed land/grassland hazard to the north, east, and west. The southern interface is classified as woodland vegetation. • An APZ has been calculated in accordance with Table A1.12.3 of PBP 2019. Refer to **Table 2** • The APZ's for development can be contained entirely within the internal road network, which will comprise managed land, or defer to the natural watercourse of Deep Lagoon for the southern interface. This body of water provides a natural APZ for the site, to the hazard.
APZs are managed and maintained to prevent the spread of a fire towards the building.	• APZs are managed in accordance with the requirements of Appendix 4.	• Ultimately, the APZ's will be accommodated within road reserves, lagoon reserves and some lot areas.
The APZ is provided in perpetuity.	• APZs are wholly within the boundaries of the development site.	• Noted. A request for this control to be conditioned as part of a determined development application.
APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is negated.	• The APZ is located on lands with a slope less than 18 degrees.	• The subject land does not have a slope greater than 18 degrees.

Performance Criteria	Acceptable Solutions	Response
Landscaping		
Landscaping is designed and managed to minimise flame contact and radiant heat to the buildings and the potential for wind-driven embers to cause ignitions.	• Landscaping is in accordance with Appendix 4; and • Fencing is constructed in accordance with Section 7.6.	• No landscaping is proposed as part of the subdivision. • Future landscaping to properties that are impacted by APZ can be conditioned accordingly at DA stage to ensure compliant landscaping provision in accordance with PBP 2019.
Access		
Fire fighting vehicles are provided with safe, all-weather access to structures.	• property access roads are two-wheel drive, all-weather roads; • perimeter roads are provided for residential subdivisions of three or more allotments; • subdivisions of three or more allotments have more than one access in and out of the development; • traffic management devices are constructed to not prohibit access by emergency services vehicles; • 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; • all roads are through roads	• All new internal roads will be constructed in accordance with Murray River Council Engineering Guidelines, which is compliant with this requirement. • The proposed subdivision utilises perimeter roads that can be utilised by fire fighting vehicles during an emergency. • There are no traffic management devices proposed that would prohibit access by emergency services. • All roads within the subdivision will comply with Murray River Council Engineering Guidelines, which is compliant with this requirement. • The proposed road network is a loop.

Performance Criteria	Acceptable Solutions	Response
	• 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; • where kerb and guttering is provided on perimeter roads, roll top kerbing should be used to the hazard side of the road; • 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 • 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.	
The capacity of access roads is adequate for firefighting purposes.	• The capacity of perimeter and non-perimeter road surfaces and any bridges/causeways is sufficient to carry fully loading firefighting vehicles (up to 23 tonnes); bridges/causeways are to clearly indicate load rating.	• The capacity of the road network will be designed to be sufficient to carry fully loaded fire fighting vehicles.
There is appropriate access to water supply.	• Hydrants are located outside of parking reserves and road carriageways to ensure accessibility to reticulated water for fire suppression. • hydrants are provided in accordance with the relevant clauses of AS 2419.1:2005 - Fire hydrant installations System design, installation and commissioning; and	• Internal water supply and hydrants will be provided. • The site is connected to a reticulated water supply.

Performance Criteria	Acceptable Solutions	Response
	• there is suitable access for a Category 1 fire appliance to within 4m of the static water supply where no reticulated supply is available.	
Perimeter Roads		
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.	• are two-way sealed roads; • minimum 8m carriageway width kerb to kerb; • parking is provided outside of the carriageway width; • hydrants are located clear of parking areas; • are through roads, and these are linked to the internal road system at an interval of no greater than 500m; • curves of roads have a minimum inner radius of 6m; • the maximum grade road is 15 degrees and average grade of not more than 10 degrees; • the road crossfall does not exceed 3 degrees; and • a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.	• All new internal roads will be constructed to urban standards, in accordance with Murray River Council Engineering Guidelines, which is compliant with this requirement. • Details regarding perimeter roads have been addressed above and the subdivision will ensure that an appropriate link will be provided from the internal road network to the wider road network. • Minimum 8m carriageways width kerb to kerb will be provided to the access roads

Performance Criteria	Acceptable Solutions	Response
Non-Perimeter Roads		
access roads are designed to allow safe access and egress for firefighting vehicles while residents are evacuating.	• minimum 5.5m carriageway width kerb to kerb; • parking is provided outside of the carriageway width; • hydrants are located clear of parking areas; • roads are through roads, and these are linked to the internal road system at an interval of no greater than 500m; • curves of roads have a minimum inner radius of 6m; • the road crossfall does not exceed 3 degrees; and • a minimum vertical clearance of 4m to any overhanging obstructions, including tree branches, is provided.	• All new internal roads will be constructed to urban standards, in accordance with Murray River Council Engineering Guidelines, which is compliant with this requirement.
Fire fighting vehicles can access the dwelling and exit the property safely.	• There are no specific access requirements in an urban area where an unobstructed path (no greater than 70m) is provided between the most distant external part of the proposed dwelling and the nearest part of the public access road (where the road speed limit is not greater than 70kph) that supports the operational use of emergency firefighting vehicles. In circumstances where this cannot occur, the following requirements apply: • minimum 4m carriageway width;	• The subject land is located within an outlying urban area and all roads will meet minimum standards. • No dwellings are proposed – application is for a subdivision only.

Performance Criteria	Acceptable Solutions	Response
	• in forest, woodland and heath situations, rural property access roads have passing bays every 200m that are 20m long by 2m wide, making a minimum trafficable width of 6m at the passing bay; • Provide a suitable turning area in accordance with Appendix 3; • Curves have a minimum inner radius of 6 metres and are minimal in number to allow for rapid access and egress. • The minimum distance between inner and outer curves is 6 metres. • The crossfall is not more than 10 degrees. • Maximum grades for sealed roads do not exceed 15 degrees and not more than 10 degrees for unsealed roads. • A development comprising more than three dwellings has access by dedication of a road and not by right of way. Note: Some short constrictions in the access may be accepted where they are not less than the minimum (3.5m), extend for no more than 30m and where the obstruction cannot be reasonably avoided or removed. The gradients applicable to public roads also apply to community style development property access roads in addition to the above.	

Performance Criteria	Acceptable Solutions	Response
Water Supplies		
Adequate water supplies is provided for firefighting purposes.	• Reticulated water is to be provided to the development where available. • A static water and hydrant supply is provided for non-reticulated developments or where reticulated water supply cannot be guaranteed; and • Static water supplies shall comply with Table 5.3d.	• The subject land will be connected to the reticulated water network.
water supplies are located at regular intervals; and	• fire hydrant, spacing, design and sizing complies with the relevant clauses of Australian Standard AS 2419.1:2005;	• The subject land will be connected to Council's reticulated water supply and fire hydrants will be included within the road network.
the water supply is accessible and reliable for firefighting operations.	• hydrants are not located within any road carriageway; and • reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads.	• All fire hydrants will be constructed in accordance with the relevant Australian Standard.
the integrity of the water supply is maintained	• all above-ground water service pipes are metal, including and up to any taps; and • above-ground water storage tanks shall be of concrete or metal	• No water supply tanks are proposed as part of the subdivision

Performance Criteria	Acceptable Solutions	Response
Electricity Services		
Location of electricity services limits the possibility of ignition of surrounding bushland or the fabric of buildings	• Where practicable, electrical transmission lines are underground. • Where overhead electrical transmission lines are proposed as follows: o lines are installed with short pole spacing (30 metres), unless crossing gullies, gorges or riparian areas; and o no part of a tree is closer to a power line than the distance set out in accordance with the specifications in 'Vegetation Safety Clearances' issued by Energy Australia (NS179, April 2002).	• Electricity supply to individual allotments will be via underground supply.
Gas Services		
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 1596 and the requirements of relevant authorities. Metal piping is to be used. • All fixed gas cylinders are kept clear of all flammable materials to a distance of 10 metres and shielded on the hazard side of the installation. • connections to and from gas cylinders are metal • Polymer sheathed flexible gas supply lines to gas meters adjacent to buildings are not used.	The subject land will be connected to reticulated gas, which will be provided in accordance with AS 1596.

Performance Criteria	Acceptable Solutions	Response
	• above-ground gas service pipes are metal, including and up to any outlets.	

6. Conclusion & Recommendations

The development application seeks approval for a four (4) lot community title subdivision at Lot 2 in DP286894 and Lot 10 in DP270580, and addressed as Marina Drive and Perricoota Road, Moama.

The subject land and immediate surrounds are identified as being at a moderate risk from bushfire. The subject land and the southern and southwestern interfaces are identified as being within a bushfire Vegetation Category – Buffer.

In accordance with the requirements of the Guidelines, the subdivision is proposing the inclusion of APZ's surrounding future development. This will include placement of APZ's along site boundaries, utilising predominantly road and reserve areas. It is requested that any requirements regarding APZs for the site be conditioned as part of Council's determination.

Accordingly, the proposed development is considered to generally satisfy the relevant objectives, performance measures and decision criteria set out in the Guidelines. The proposal is compliant with the Guidelines because:

- The required APZ is appropriately secured on the land and will ensure suitable protection for future dwellings within the subdivision;
- Future dwellings will be provided on mostly level portions of the land, at a minimum of 40m from the banks of Deep Lagoon, and with minimal site cut and fill required;
- The proposal is accessible to fire fighting vehicles;
- The site is zoned SP3: Tourist. This is significant as the area will host transient tourist accommodation rather than residential dwellings;
- Suitable access arrangements are proposed to allow safe access and egress in bushfire emergency events; and
- The access roads can accommodate heavy vehicles and fire personnel.

Notwithstanding the above, the following recommendations are made for the proposed development to ensure the requirements of the Guidelines are satisfied.

- The APZ should be maintained in accordance with the RFS document Standard for Asset Protection Zones; and
- Any future dwellings on proposed residential lots should comply with the Guidelines.