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Bushfire Resilience Plan

Central Tilba Heritage Village

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Template 2.1.1

Contents

1. Executive Summary	1
2. Introduction.....	2
2.1 Project Background.....	2
2.2 Project Objectives.....	2
2.3 Scope of Report	2
3. Central Tilba Heritage Village.....	5
3.1 Locality.....	5
3.2 Demographics.....	5
3.3 Heritage values	7
3.4 Climate.....	8
3.5 Fire History	8
3.6 Existing bushfire operational provisions	12
3.6.1 Eurobodalla Local Emergency Management Plan 2019 (ELEMP)	12
3.6.2 Eurobodalla Bush Fire Risk Management Plan 2019 (BFRMP)	12
4. Village Infrastructure	13
4.1 Access	13
4.2 Utilities.....	13
4.2.1 Telecommunications.....	13
4.2.2 Water Supply	14
4.2.3 Gas Supplies.....	14
4.2.4 Electricity	15
4.3 Evacuation provisions	15
5. Bushfire Risk Assessment	17
5.1 Bush Fire Prone Land Status	17
5.2 Climatic Bushfire Predictions	17
5.3 Bushfire Hazard Assessment.....	17
5.3.1 Vegetation assessment	17
5.3.2 Effective slope assessment	18
5.3.3 Landscape risk summary.....	18
5.4 Community Protection Plan Assessment.....	19
6. Building Fire Risk Assessments	22
6.1 Bushfire Risk	22
6.2 Structural Risk.....	23
6.3 Risk summary.....	24
6.4 Property Bushfire Resilience Plans	25

7. Bushfire Resilience Recommendations26

7.1 Mitigation 26

7.1.1 Asset Protection Zones (APZs) 26

7.1.2 Building upgrades 29

7.1.3 Infrastructure upgrades 32

7.2 Preparation 32

7.2.1 Tilba District Community Bush Fire Management Committee 32

7.2.2 Bushfire Resilience Rating Home Assessment App 33

7.2.3 Emergency Planning Recommendations 33

7.2.4 Evacuation Planning 34

7.3 Summary of Recommendations 36

8. Conclusion39

9. References.....40

Appendix A – RFS Community Protection Plan Maps42

Appendix B – Tilba District Strategic Plan45

Appendix C - Asset Protection Zone and Landscaping Standards46

Appendix D – Building treatment recommendations47

Appendix E – Community Fire Unit Information50

List of Figures

Figure 1: Location of subject land	4
Figure 2: ESC LEP zonings across the study area (ESC 2012a).....	6
Figure 3: Major fires in southern Eurobodalla from 1950-2009 (Source: RFS, Batemans Bay)	10
Figure 4: Badja Forest Road, Countegany Fire extent in southern Eurobodalla 2019/20 (Source: RFS, Batemans Bay).....	11
Figure 5: Reticulated water supply and hydrant network (Source: Eurobodalla Shire Council).....	16
Figure 6: Excerpt of Bushfire Prone Land layer from NSW ePlanning Spatial Viewer (Source: DPE).....	20
Figure 7: Bushfire hazard assessment showing minimum residential APZs required by PBP	21
Figure 8: Bushfire risk ratings.....	24
Figure 9: Structure fire risk ratings.....	24
Figure 10: Proposed APZs surrounding CTHV	27
Figure 11: Central Tilba Community Protection Plan – Bush Fire Preparation Plan (RFS 2022).....	43
Figure 12: Central Tilba Community Protection Plan – Bush Fire Survival Map (RFS 2022)	44
Figure 13: Central Tilba Community Protection Plan – Bush Fire Preparation Plan (Tilba CoC 2022).....	45

List of Tables

Table 1: CTHV BRP scope	3
Table 2: Tilba assets recognised in Eurobodalla BFRMP 2019	12
Table 3: Bushfire risk ranking assessment summary	22
Table 4: Structural fire risk ranking assessment summary	23
Table 5: Risk scoring system and associated categories	24
Table 6: Guiding principles for bushfire sprinkler/drenching systems	31
Table 7: Bushfire Resilience Plan recommendations for CTHV	36
Table 8: APZ management specifications	46
Table 9: Building treatment recommendations from individual Bushfire Resilience Plans.....	47

Abbreviations

Abbreviation	Description
ABS	Australian Bureau of Statistics
APZ	Asset Protection Zone
AS 3959	Australian Standard AS 3959:2018 'Construction of buildings in bushfire-prone areas'
BAL	Bushfire Attack Level
BRP	Bushfire Resilience Plan
BFDP	Bush Fire Danger Period
BFPL	Bush fire prone land
BoM	Australian Bureau of Meteorology
CoC	Chamber of Commerce
DPE	NSW Department of Planning and Environment
ELEMC	Eurobodalla Local Emergency Management Committee
ELEMP	Eurobodalla Local Emergency Management Plan
EBFMC	Eurobodalla Bush Fire Management Committee
EBFRMP	Eurobodalla Bush Fire Risk Management Plan
ESC	Eurobodalla Shire Council
FDR	Fire Danger Rating
LEP	Local Environment Plan
PBP	Planning for Bush Fire Protection 2019
RBC	Resilient Building Council
RF Act	<i>Rural Fires Act 1997</i>
RFS	NSW Rural Fire Service
SFPP	Special fire protection purpose
TDCBFMC	Tilba District Community Bush Fire Management Committee
UoW	University of Wollongong

1. Executive Summary

In response to community concerns following the 2019/20 bushfires, funding was secured to prepare a Bushfire Resilience Plan (BRP) for the Central Tilba Heritage Village (CTHV).

The objectives of the project included engaging directly with home/business owners/operators within CTHV and the preparation of the following:

- Individual BRPs for each participating property;
- A Village-wide BRP; and
- A project evaluation report.

CTHV is a National Trust listed rural village with high heritage, tourism and economic values. It is comprised primarily of timber buildings constructed in the mid-1890s to no specific bushfire construction standard, leaving them particularly vulnerable to both bushfire attack and to building-to-building fire spread.

A number of recommendations have been made within the BRP that primarily sit within the mitigation and preparation phases of disaster management. The bushfire resilience recommendations are summarised below:

- More extensive/appropriately managed Asset Protection Zones that more accurately reflect the construction and vulnerability of the heritage buildings within CTHV;
- Building upgrades – including ember protection upgrades and a Village-wide bushfire sprinkler/drenching system;
- Upgrades to infrastructure (telecommunications, water, electricity and gas supplies); and
- Improved emergency planning at a strategic and local level.

Given the climate change projections for more frequent, severe and longer fire seasons, and the particular vulnerabilities and values of the built assets within CTHV, implementation of the recommendations outlined within this Plan are critical to improving the bushfire resilience of the Village and its occupants.

With financial constraints likely to present the greatest impediment to implementing the BRP recommendations outlined herein, it is recommended that the Tilba District Bush Fire Management Committee (TDCBFMC) is re-established either as a stand-alone Committee or as a sub-Committee of the Tilba District Chamber of Commerce (ToC). It is recommended that the TDCBFMC works closely with Council, the NSW Rural Fire Service (RFS), the Minderoo Foundation and the Resilient Building Council (RBC) to support CTHV with funding and assistance to ensure that these bushfire resilience recommendations are implemented.

2. Introduction

2.1 Project Background

In response to the Black Summer bushfires of 2019/2020 and interest from Tilba Village residents during post-fire community consultation (Tilba District Community Planning Forum on 15 August 2020), Eurobodalla Shire Council (ESC) has partnered with the Minderoo Foundation, NSW Rural Fire Service (RFS), NSW National Parks and Wildlife Service (NPWS) and the Central Tilba Chamber of Commerce (CoC) to develop individual property Bushfire Resilience Plans (BRPs) and a Village BRP for Central Tilba Heritage Village (CTHV).

The aim of the project is to improve the resilience of the National Trust listed CTHV in recognition of its high heritage, tourism and economic values along with its significant potential for building-to-building fire spread due to its primarily 1890s timber weatherboard construction.

In the context of this project, CIFAL Newcastle (2022) defines a bushfire resilient community as one that:

- a. Conducts regular assessments and anticipates the likelihood/consequence of bushfire;
- b. Responds to and recovers from bushfires; and
- c. Allocates resources to reduce risk in bushfire prone areas and improvises/innovates in response to disasters.

The project has been run concurrently with NSW Rural Fire Service (RFS) Community Protection Planning for CTHV (RFS 2022) with the Central Tilba Bush Fire Preparation and Survival Maps prepared by RFS in consultation with the Central Tilba community contained in Appendix A.

This project is also a key strategy under the 'Prepare, Protect and Preserve' section of the 'Tilba District Strategic Plan' (Tilba CoC 2022) a summary of which is contained in Appendix B.

2.2 Project Objectives

The specific objects for the project are summarised as follows:

Engage directly with property owners/operators within CTHV;

Develop and document individual property bushfire resilience plans within the CTHV area identified by ESC (see Figure 1);

Prepare an overall resilience plan and report for the Village; and

Prepare a report of processes used, successes, challenges and lessons learnt from the BRP project (separate report to BRP).

2.3 Scope of Report

As per the agreed project methodology, the CTHV BRP has been developed to summarise identified opportunities for improvement in resilience, arising from field assessment, data analysis and preparation of individual property BRPs. Table 1 outlines the scope of the CTHV BRP along with an indication of where these items have been addressed within the BRP.

Table 1: CTHV BRP scope

Element	Relevant Report Section(s)	Comments
Infrastructure including access and utilities	4 and 7.1.3	
Firefighting capacity (both public and private)	4.2.2, 7.1.2 and 7.1.3.2	
Identification of landscape wide bushfire protection measures including any treatments identified in the Eurobodalla Bush Fire Risk Management Plan	3.6.2, 5.3.3, 5.4 and 7.1.1	
Any Village wide implications of the proposed fire protection upgrades for heritage management	6 and 7.1.2	
Evaluate the likelihood of rapid onset bushfire attack i.e. when early evacuation is not feasible		Limited due to optional bushfire intensity
Identify constraints and opportunities for evacuation (both shelter-in-place and offsite evacuation routes/locations) under different bushfire attack scenarios	4.3 5.4 7.2.4	modelling/risk analysis tasks not adopted by ESC
Review the building loss potential under different evacuation scenarios		
Examine impacts from surrounding land including fuel hazard assessments and review of management practices (NP and surrounding agricultural land)	5.3, 5.4, 7.1.1 and 7.2.3	



Figure 1: Location of subject land

3. Central Tilba Heritage Village

3.1 Locality

CTHV is located at the southern end of the Eurobodalla Shire in the foothills of the eastern side of Gulaga National Park. The Village is primarily surrounded by grazed pasture, rainforest and prominent igneous rock outcrops. The study area for this project is shown in Figure 1.

The study area is zoned as follows under the Eurobodalla Local Environment Plan (ESC 2012a) as shown in Figure 2:

- RU5 – Village: Most of Bate Street;
- R5 – Large Lot Residential: Either side of Whiffens Lane and south of Corkhill Drive;
- SP2 – Car Park: Public car park north of Corkhill Drive;
- RE1 – Public Recreation: The ESC public toilets in Bate Street; and
- RU1 – Primary Production: All surrounding areas to the north, east and south of the study area along with the access to the water storage tanks on Bellbrook Farm to the west of the Village.

3.2 Demographics

Central Tilba (including surrounding rural areas) had a population at the 2021 Australian census of 342 people across 100 families with a median age of 57 years. The data identified a total of 189 private dwellings within the Central Tilba area with an occupation rate of just over 85% and an average of 2 vehicles per household (ABS 2021).

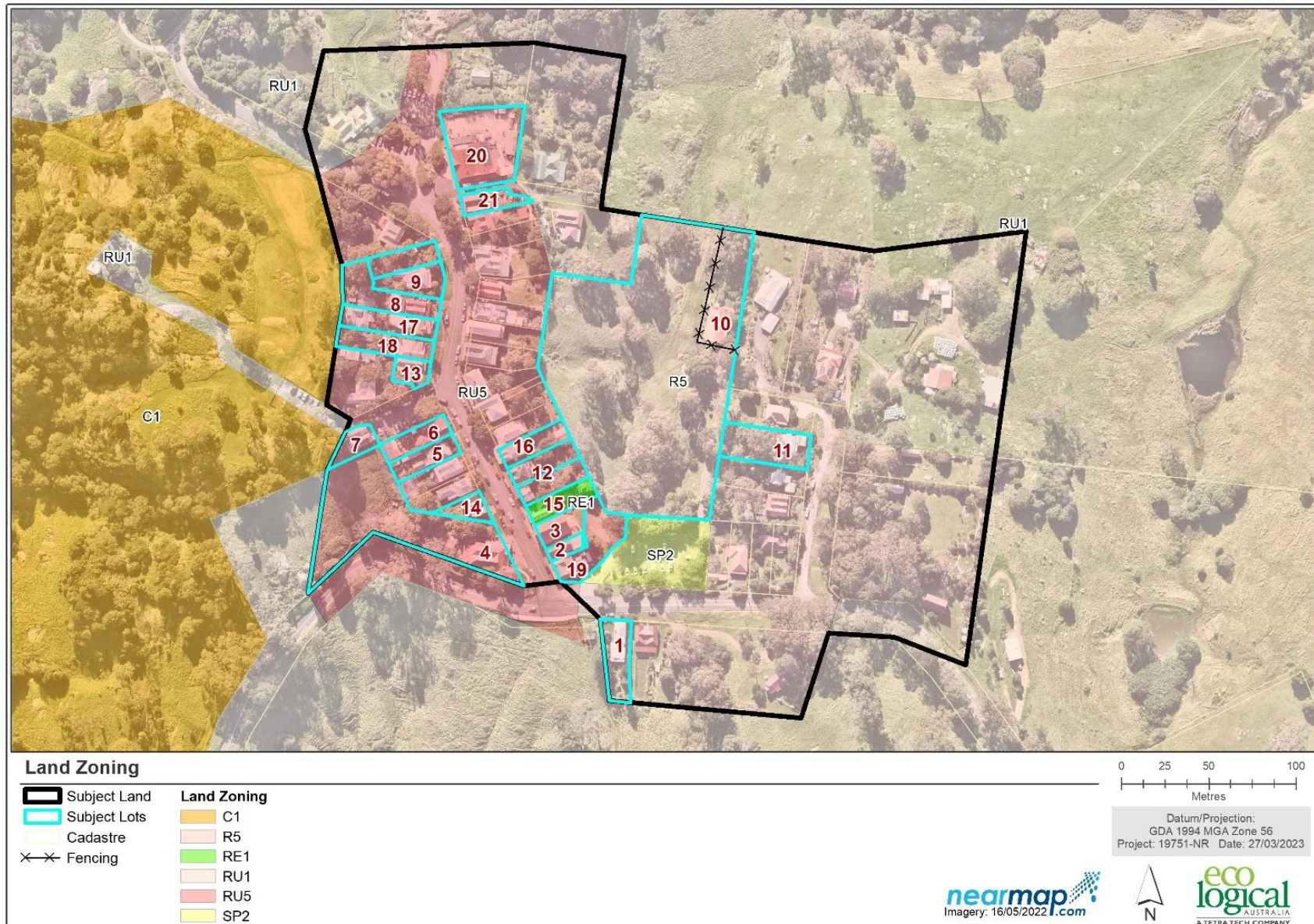


Figure 2: ESC LEP zonings across the study area (ESC 2012a)

3.3 Heritage values

The area has a rich history of continuous habitation by the local Yuin people and Gulaga Mountain is a site of great significance to First Nations people. In particular, the mountain and its surrounds were a traditional birthing place for Yuin women. Gulaga National Park is located to the west of CTHV and was handed back to traditional owners in 2006 (South Coast Beagle 2023).

European settlers discovered the area in the early 1820s and gold was discovered in the area including on Gulaga. The Dromedary Gold Mining Company continued mining Gulaga Mountain until the early 1900s. The actual township of Central Tilba was established in 1873 when Richard Bate established a post office and a few houses were erected. A church was built in 1881, by 1890 the town had two stores and a hotel and during the 1890s, most of the other buildings in the main street of CTHV within the study area had been constructed (South Coast Beagle 2023).

The villages of Central Tilba and Tilba Tilba were listed by the National Trust in 1974 within the 'Tilba Conservation Area' and are also covered by the ESC Tilba Villages and Conservation Area Development Control Plan (DCP) (ESC 2012b). Central Tilba is of exceptional European heritage significance, partly due to its very high integrity and its remarkable setting.

Many buildings in Central Tilba and Tilba Tilba predate the existence of formal building regulations in Australia and therefore do not meet the requirements of current building regulations, including contemporary structural fire safety practices and bushfire protection measures (BPM).

The Tilba Villages and Conservation Area DCP states:

The streetscape presentation of existing historic buildings will generally be preserved, so that there will be very little change to their historic form over time. Alterations and additions to historic buildings shall be confined to the rear of the place and shall be done in a manner that is historically authentic in form material and detail. Changes to the interior of buildings will be considered on their merits. The aim is to ensure that new work is only evident as such on close inspection.

The DCP does not address structural fire safety or bushfire construction issues directly, however additions required for fire safety should:

- be installed sympathetically with regard to the building's heritage significance; and
- be installed in a manner that is not obvious and does not obscure or remove significant fabric.

If any changes are proposed to incorporate current day fire safety / bushfire protection measures that require substantial changes to heritage listed buildings (likely if original fabric, structural elements, historical details or building form are removed or obscured), ESC will require a heritage management document (Statement of Heritage Impact) to be prepared that assesses the extent to which the proposed work would affect the heritage significance of the heritage item or heritage conservation area concerned.

The Heritage Office of NSW has prepared an information sheet that provides advice on the means of achieving an adequate level of structural fire safety without making substantial changes to the building (<https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Heritage/heritage-maintenance-fire-and-heritage-buildings-2021>) (Heritage Council of NSW 2021).

Additional information on fire safety in heritage homes can be found on the HRS Aust Group website at <https://hsrsa.com/fire-safety-in-heritage-homes/> (HSR Aust Group 2021).

3.4 Climate

According to the Eurobodalla Bush Fire Risk Management Plan (EBFMC 2019), the climate in the Eurobodalla region is temperate and rainfall is generally not seasonal. Dry winters/springs are not infrequent and these often bring an early start to the fire season. The Bush Fire Danger Period (BFDP) runs from 1 September to 31 March annually (unless otherwise gazetted) and rapid drying is often experienced during the summer months.

The region experiences hot, dry winds from the west and north-west and dry lightning storms often occur with minimal rainfall. Southerly changes frequently follow these hot, dry conditions and have also created hazardous bushfire conditions.

The Eurobodalla is periodically affected by prolonged drought conditions, with the northern/central areas of the Shire often experiencing drier conditions than the southern portion where CTHV is located. These drought conditions are often accompanied by strong, hot, westerly winds blowing from central Australia and the associated high temperatures/low humidities create extreme fire conditions.

The mountainous terrain combined with coastal weather influences make weather forecasting challenging across the Shire. The extensive areas of high fuel load forests combined with variable/extreme fire weather conditions create extreme intensity bushfires across the Shire as was evident during the 2019/20 fire season (EBFMC 2019).

3.5 Fire History

Fire history and associated data to 1976 presented in this section was primarily sourced from a CSIRO study of fires of the South Coast area (Duggin 1976) while the spatial data of all recorded fires was obtained from the NSW Rural Fire Service - South Eastern Area Command, Batemans Bay (Ross, M. personal communication, 12 September 2022).

Fire history records within the Eurobodalla Shire date back at least 110 years and major fires have impacted the South Coast area during this period including 1913, 1924, 1938/39, 1941/42, 1948/49, 1951/52, 1953/54, 1957/58, 1964/65 and 1968/69 and most recently during the Badja Forest Road, Countegany Fire of 2019/2020. Records of significant fires in 1883, 1903, 1905 and 1929 within the Eurobodalla Shire have been passed down verbally and by local historians.

While there is an absence of reliable fire mapping up until the middle of last century, data provided by the RFS was collated into Figure 3 showing the larger fires in the southern Eurobodalla from 1950-2009 and Figure 4 shows the extent of the 2019/20 Badja Forest Road, Countegany Fire.

While these fires burnt extensive areas surrounding the Village and the Badja Forest Road, Countegany Fire required multiple evacuations of the Village and surrounds over a protracted period, none of these fires has directly attacked the CTHV town centre. During the 1941/42 fires, conditions were so dry that many rainforest gullies on Gulaga Mountain were destroyed by the fires and the fires were finally stopped along the Princes Highway near Central Tilba.

Similarly, the 1951/52 fires began near Reedy Creek to the west as a result of graziers burning off and moved across the northern side of Gulaga Mountain threatening both Tilba Tilba and CTHV, but was brought under control along the Princes Highway.

During the 1968/69 fires, the extreme conditions following a prolonged drought (3 years) resulted in early fire activity (September) with 9 fires reported between CTHV and Ulladulla (in the southern

Shoalhaven). Fire suppression was extremely difficult with reports that even overnight conditions were unfavourable for backburning operations.

Similar conditions were experienced in the 2019/20 fires albeit later in the fire season (December/January). Extreme weather conditions followed a period of extended drought (2-3 years) with similar results including pyrocumulonimbus fire activity and unfavourable overnight conditions limiting fire suppression strategies.

According to the Eurobodalla Bush Fire Risk Management Plan 2019 (EBFRMP), the major ignition sources within the Eurobodalla LGA are negligence/accidental, legal burns (typically in late winter/spring), arson, lightning and fallen powerlines (EBFMC 2019).

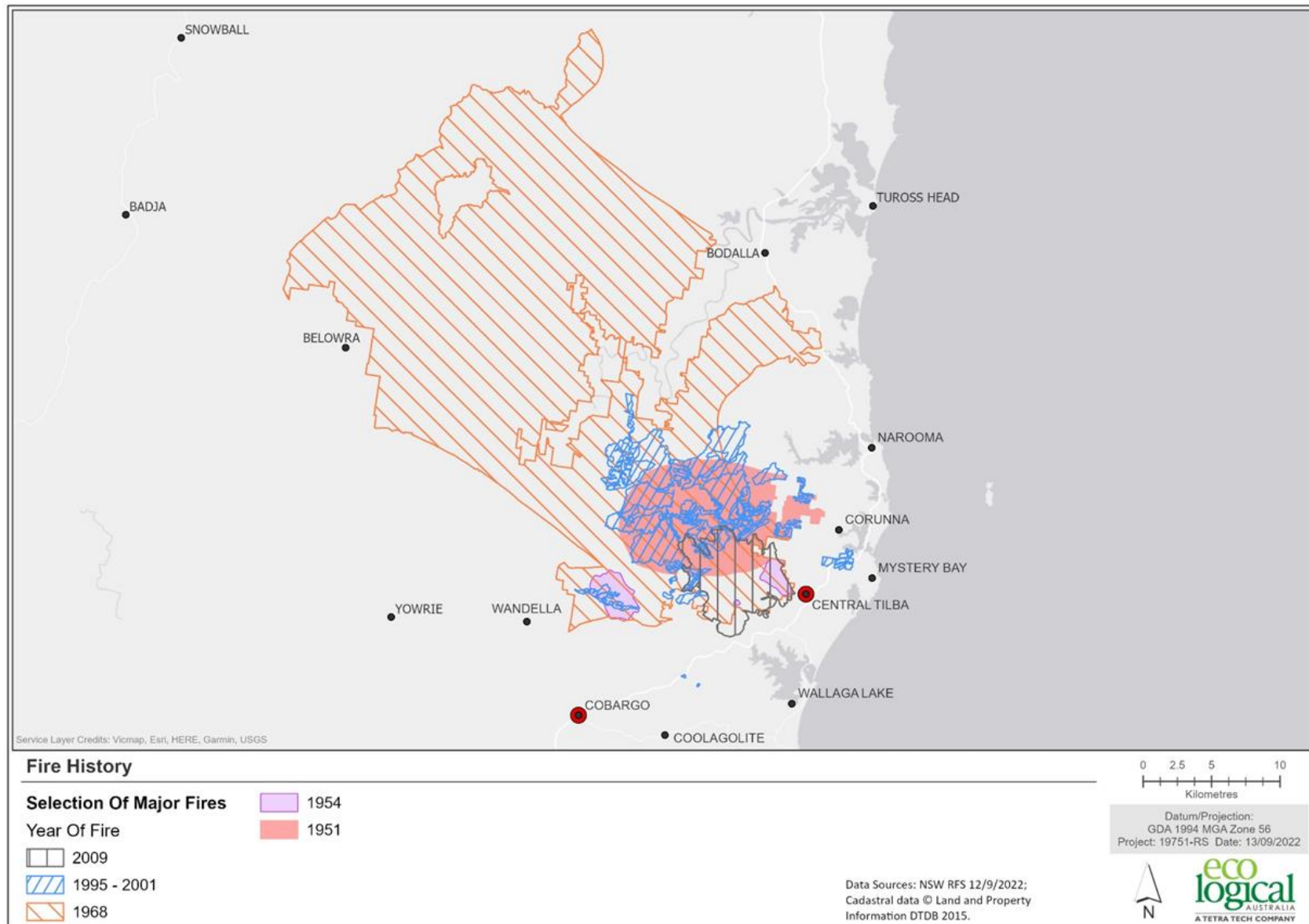


Figure 3: Major fires in southern Eurobodalla from 1950-2009 (Source: RFS, Batemans Bay)

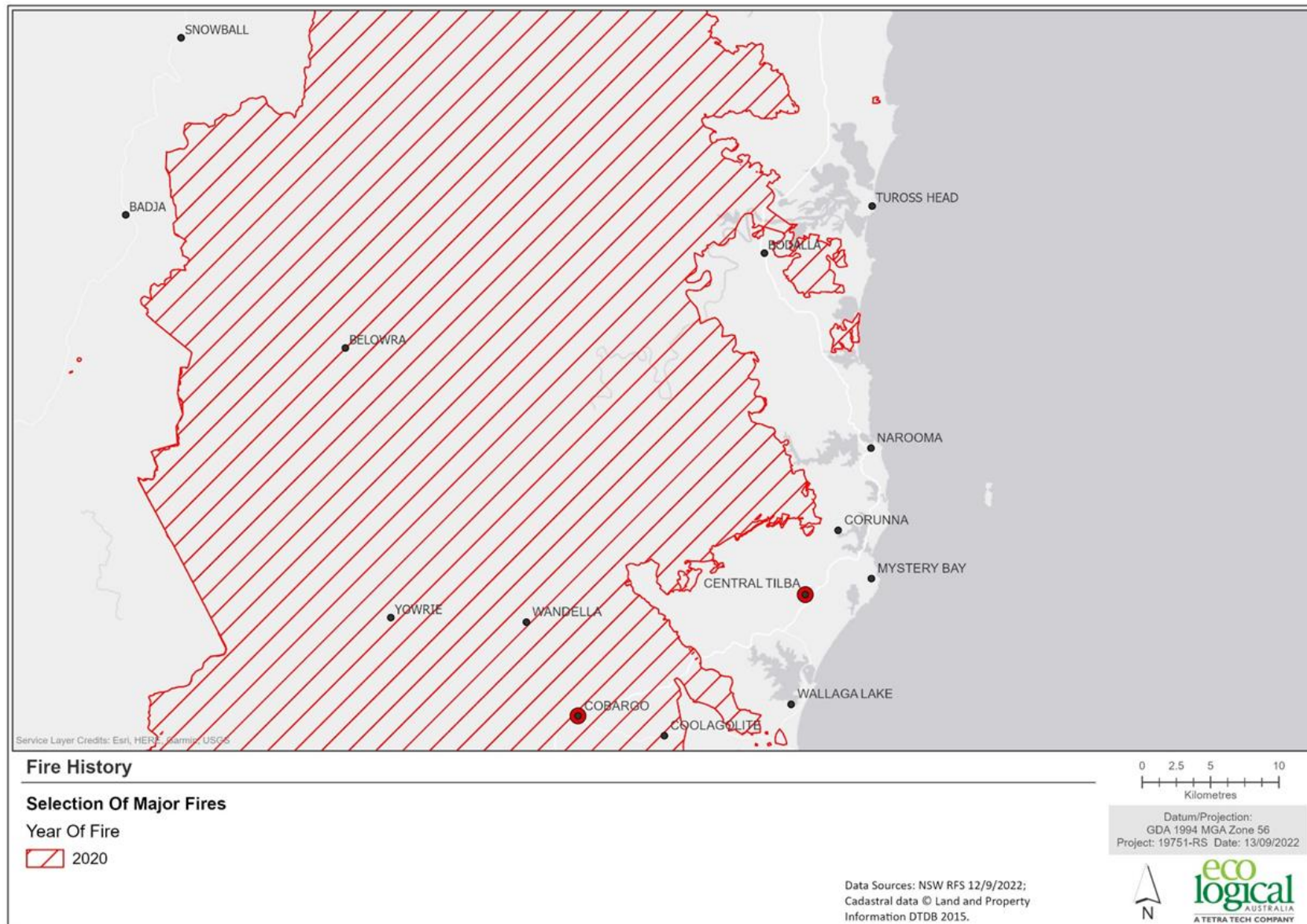


Figure 4: Badja Forest Road, Countegany Fire extent in southern Eurobodalla 2019/20 (Source: RFS, Batemans Bay)

3.6 Existing bushfire operational provisions

3.6.1 Eurobodalla Local Emergency Management Plan 2019 (ELEMP)

The Eurobodalla LEMP was prepared by the Eurobodalla Local Emergency Management Committee (ELEMC) in 2016 and updated in 2019 (ELEMC 2019). The Eurobodalla LEMP includes both RFS and Fire and Rescue NSW (FRNSW) representatives and outlines arrangements for control /coordination/liason during emergencies at a local level.

The Eurobodalla LEMP acknowledges increasing fire weather conditions including an increase in extreme fire weather and longer fire seasons. The LEMP also describes the fire-bombing aviation command unit located at Moruya airport and recognises the high risk of major bush or grass fires in the Shire. The LEMP endorses the EBFMP as a compliant/complimentary plan.

3.6.2 Eurobodalla Bush Fire Risk Management Plan 2019 (BFRMP)

The Eurobodalla BFRMP was prepared in 2019 by the Eurobodalla Bush Fire Management Committee (EBFMC) and endorsed in December 2020 by the NSW Bush Fire Coordinating Committee (EBFMC 2019).

The Eurobodalla BFRMP identifies human settlement and economic assets in and around CTHV ranging in priority from 3D down to N/A as outlined in Table 2.

There is no recognition in the Eurobodalla BFRMP of the heritage or economic (tourism) value of CTHV. The Far South Coast BFMC is currently in the process of updating the current 2019 BFRMP which includes opportunities for the community to provide input into the next gen Plan.

Table 2: Tilba assets recognised in Eurobodalla BFRMP 2019

Asset Number	Asset Type	Name	Likelihood	Consequence	Risk	Priority	Treatment Number	Treatment Description
186	Economic	Filtration plant	Almost certain	Minor	High	3D	49	Monitor/ maintain LGA APZs in High risk areas
187	Human settlement	Residential	Unlikely	Major	Medium	4	74, 75, 76	Monitor/ maintain private, LGA, TI CL APZs in Low Risk areas
191	Human settlement	Tilba Public School	Unlikely	Moderate	Low	N/A	N/A	N/A
201	Economic	Pumping Station	Possible	Minor	Low	N/A	N/A	N/A
213	Human settlement	Tilba Tilba Sports Ground	Unlikely	Moderate	Low	N/A	82	Maintain fuels in accordance with Guidelines

4. Village Infrastructure

4.1 Access

The Village is serviced by two main roads as shown in the RFS 'Bush Fire Survival Map' (Figure 12 in Appendix A). Corkhill Drive runs roughly west to east along the southern side of the CTHV connecting the Village to the Princes Highway approximately 1 km to the east and to Tilba Tilba and back to the Princes Highway approximately 3 km to the south-west.

Bate Street runs approximately north to south and forms the main street of the Village. It changes name north of the Village to Punkalla-Tilba Road and extends north into the hills to the west of Narooma and joins back onto the Princes Highway approximately 8 km north of Narooma near Lake Mummaga.

As shown in Figure 12, there are two 'Leave Early' options identified for Central Tilba during a bushfire to safer places of larger urban expanse being Narooma, located 14 km to the north and Bega, located 62 km to the south.

4.2 Utilities

4.2.1 Telecommunications

According to the Australian Communications and Media Authority (ACMA), telecommunications were a challenge across the entire fireground throughout the 2019/20 fires and the Eurobodalla was no exception (ACMA 2020). The combination of large numbers of people being online particularly on apps like the Bureau of Meteorology (BoM) and the former 'Fires Near Me' (now 'Hazards Near Me') along with communications within and to the fire-affected areas, placed huge stress on the existing telecommunication network.

Despite often being located at the top of steeply forested hills to optimise functionality, a study by ACMA on the impacts of the 2019/20 bushfires on the telecommunications network revealed that:

- Most of the outages during the 2019/20 fires were caused by power outages rather than direct fire damage;
- Direct fire damage only accounted for 1% of outage incidents; and
- Reliance on mains power affects network resilience (ACMA 2020).

Eurobodalla Shire Council (ESC) provided the following advice via email on 9 December 2022 regarding the current status of the telecommunications network across the Shire:

- The back-up power at telecommunications towers and exchanges has been upgraded from 4 hours capacity to 12 hours and more in the case of Mt Wandera which is the key telecommunications site for Eurobodalla;
- Telstra and NSW Telco Authority continue to work with ESC on the overall resilience of Mt Wandera and see this as an example that can potentially be applied elsewhere. This is because the focus extends well beyond hardening of the infrastructure and back-up power systems to the overall site protections and resilience of power supply to the site; and
- Similar reviews are now underway for the telecommunications (Telstra and Optus) facilities across Eurobodalla. The resilience of power supply and APZs is being considered as part of that review as well as advocating for the providers to continue to harden their infrastructure.

4.2.2 Water Supply

As shown in Figure 5, CTHV is serviced by a reticulated water supply with an extensive hydrant network within the study area. There are also some private Static Water Supplies (SWS) within the Village in the form of swimming pools, poly tanks, metal tanks and underground tanks of 5,000 -20,000 L capacity.

ESC advised via email on 27 March 2023 that water is pumped to the 340 KL Engine Road Reservoir which gravity feeds to the 220 KL Tilba Reservoir. The total reservoir storage downstream of the Engine Road pump station is therefore 560 KL.

ESC has a bulk water filling station at Mystery Bay which should be used by the fire brigade for carting water for firefighting in rural areas (where accessible). In addition to provision for domestic supply, the Mystery Bay supply allows for 772 KL for water carting on a peak day (about 80 x 10 KL tankers).

Based on anecdotal evidence acquired during project fieldwork and issues raised in community meetings (as per the minutes of the TDCBFMC meeting with EBFMC 26 August 2020), loss of water supply in the Village on at least one of the Catastrophic Fire Danger Rating (FDR) days during the 2019/20 fires led to concerns regarding the capacity/reliability of the reticulated water supply within CTHV.

ESC advised that when the power supply was lost on 31 December 2019 (36 hours and more in isolated areas across the Shire) the ability to refill reservoirs was challenged. The reservoir filling control valve (electrically operated) which controls the refilling of the Tilba Reservoir from the Engine Road Reservoir ceased to operate when power was lost and therefore the Tilba Reservoir started to drain below the normal refill level. The valve was later re-opened manually by Council staff to restore the feed from Engine Road Reservoir. To ESC's knowledge, only properties higher in the system fed by the Tilba Reservoir started to run out of water and there was still sufficient water within the 2 reservoirs, it just required opening flow from Engine to Tilba Reservoir to allow access to the stored water in the system. Generators were then installed at the pumping station feeding Engine Road to replenish water in the system. For note, Council has 30 reservoirs shire wide to manage and operate.

Planned improvements to the system including installation of backup power at key sites e.g., Deep Creek Dam, Northern Water Treatment Plant and Eurobodalla Water Treatment Plant and the once constructed the new Southern Water Storage (Eurobodalla Dam) will provide greater resilience in the network and allow staff to focus on other sites in the system including water pump stations and reservoirs during times of power loss. The new Eurobodalla Dam also provides greater supply security rather than relying almost exclusively on Deep Creek Dam. Council will still rely on portable generators and manual operation during times of power outage to maintain the system due to the prohibitive costs of installing and operating backup generators at each water pump station, reservoir filling control valves and other sites.

ESC is confident that these improvements and gained experience will ensure the current capacities are sufficient for meeting firefighting needs into the future.

4.2.3 Gas Supplies

There is no reticulated natural gas supply to CTHV and many buildings utilise bottled LPG supplies. These supplies varied in terms of their location/capacity with many being located between buildings, some located under windows and the safety vents of a substantial portion of cylinders facing either the subject or neighbouring buildings. In one instance, the bottled LPG cylinders were enclosed with a timber paling box.

This does present a potential threat to life and the built assets within the Village during a bushfire or structure fire.

4.2.4 Electricity

Electricity supply to CTHV is via overhead supply lines. During the 2019/20 fires, extensive portions of the above ground power supply network in the Eurobodalla were fire impacted and many areas were without power for varying periods. The power outage in turn impacted other infrastructure including telecommunications (discussed in Section 4.2.1) and water supply (as outlined in Section 4.2.2).

As mentioned above, permanent standby generators are being investigated by ESC for all critical water supply infrastructure and telecommunications infrastructure power back up has been increased three-fold from 4 to 12 hours.

4.3 Evacuation provisions

The leave early options for Central Tilba as outlined in the RFS BFSM are Narooma to the north (14 km away) or Bega to the south (62 km away). Bushfires coming from the south-west through to the south of CTHV have the potential to cut off access to both of these larger towns.

The nearest Neighbourhood Safer Place (NSP) is the Tilba Tilba Oval on the eastern side of town, some 2.5 km to the south-west of Central Tilba. Strong southerly changes like the one seen on the South Coast during the Badja Forest Road, Countegany Fire on 4 January 2020 produce erratic fire behaviour, turn flank fires into large fire fronts and rapidly increase the rate of spread of fires so could easily impact the NSP or the access road to it rendering the NSP unsafe for use for residents fleeing last minute.

Despite evacuation recommendations, there will always be a small group of residents in an area who will stay and defend their property and their neighbours' properties during a bushfire despite advice to leave early on days of higher FDR (Parliament of Victoria 2010). During project fieldwork, discussions were held with a number of local residents who stayed throughout the multiple evacuations of CTHV associated with the 2019/20 Badja Forest Road, Countegany Fire.

Staying and defending property during bushfires despite warnings to 'Leave Early' relates to the fact that the risk of building loss is several times higher if buildings are vacant than if occupied (Leonard et al 2009).

It is important to recognise this fact, particularly in a Village where most buildings are not constructed to withstand bushfire impact in order to identify and fortify a potential 'place of last resort' within the Village to enhance protection for those who stay to defend during bushfires.



Figure 5: Reticulated water supply and hydrant network (Source: Eurobodalla Shire Council)

5. Bushfire Risk Assessment

5.1 Bush Fire Prone Land Status

The entire study area is identified as bush fire prone land (BFPL) on the Bushfire Prone Land layer within the ePlanning Spatial Viewer¹ (see Figure 6) due to surrounding grassland and rainforest vegetation. Note that the Village itself has been mapped as ‘Vegetation Category 2’ rather than primarily ‘Vegetation Buffer’ which appears to be in error and it is recommended that when the BFPL mapping is next reviewed (due 2026), that this it revised.

5.2 Climatic Bushfire Predictions

Climate change projections by CSIRO and the Bureau of Meteorology (BoM) for the Murray-Darling Basin up to 2090, predict increased temperatures based on all emissions scenarios especially in southern Australia (CSIRO 2015).

In its ‘State of the Climate 2022’ report, BoM reported that 2019 experienced 41 extremely warm days which is approximately triple the highest number in any year prior to 2000 (BoM 2022). Also in 2019, there were 33 days when national daily average maximum temperatures exceeded 39°C which is a larger number than the previous 59 years (1960-2018) combined.

The effects of these increased average temperatures and increased frequency of extreme heat days, include less rainfall in winter, increased length of fire season and reduced opportunities for both hazard reduction burning (fire mitigation) and backburning (fire suppression).

5.3 Bushfire Hazard Assessment

In accord with the risk assessment methodology in ‘Planning for Bush Fire Protection 2019’ (RFS 2019a), herein referred to as ‘PBP’, the landscape parameters most affecting fire behaviour and impact on buildings are vegetation type and effective slope. These factors, in combination with fire weather parameters (including drought factor (time since rain), temperature, humidity and wind speed/direction), largely determine bushfire intensity/direction of spread.

5.3.1 Vegetation assessment

As shown in Figure 7, the primary vegetation type within and surrounding the village in all directions is ‘grassland’. Most of this grassland is actively grazed by a combination of sheep, cattle and alpacas. The grassland to the west within the former ‘Bellbrook Farm’ property is in the process of being transferred to the NPWS estate, so grazing is no longer undertaken within this property.

The NSW Department of Planning and Environment (DPE) State Vegetation Type Map (SVTM) shows a variety of vegetation types within and surrounding the Village (DPE 2022), however, site inspection revealed that the Shoalhaven Biometric mapping of the study area and surrounds provides more accurate vegetation mapping as shown in Figure 7 (OEH 2013). There are small remnants of ‘Warm Temperate Rainforest’ to the north and more extensive remnants to the west of the study area. These areas of vegetation are classified as ‘rainforest’ by PBP.

¹ <https://www.planningportal.nsw.gov.au/spatialviewer/#/find-a-property/address>

5.3.2 Effective slope assessment

CTHV's location in the eastern foothills of Gulaga Mountain mean that it is influenced by quite steep terrain. The effective slope is the slope under vegetation most affecting fire behaviour and these fall into numerous PBP slope categories in and around CTHV as shown by the slope interfaces in Figure 7.

The internal grassy gully between Bate Street and Whiffens Lane and grassland surrounding the Village to the north, east and south falls into PBP slope categories from 'All upslopes and flat land' to the south-east all the way through to '>15-20 degrees downslope' to the east and south-west.

The grassland and rainforest vegetation to the west and north of CTHV primarily falls into the PBP slope category 'All upslopes and flat land'.

5.3.3 Landscape risk summary

The combination of topography (primarily upslopes to the west and north), vegetation type (predominantly grassland with remnant stands of rainforest), significant igneous rock outcrops and the large amount of rainforest on the eastern side of Gulaga Mountain to the west of CTHV are likely to have influenced bushfire behaviour favourably in the past. Furthermore, the grazing of Bellbrook Farm to the west meant that fuel loads were kept low but this may no longer be the case now that the property is transferring to NPWS estate.

However, the climate predictions that are already coming to fruition as seen during the 2019/20 (BoM 2022) mean that these natural features are less likely to provide protection to CTHV in the future.

Furthermore, a recently published study (Cruz et al 2022) that undertook a review/analysis of relevant scientific literature that 'suggest that fuel characteristics have a gradual diminishing effect on the rate of fire spread in forest and shrubland fuel types with increasing fire danger, with the effect not being observable under extreme fire danger conditions'. This means that during the predicted more frequent extreme fire conditions, fire rate-of-spread and direction are primarily weather driven, particularly by wind speed/direction.

As seen during the 2019/20 fires in the Eurobodalla, the fire took 'runs' towards the coast in different locations on numerous days based on the fire weather conditions including the Dignams Creek run to the south of CTHV. These fires resulted in multiple evacuations of different towns/localities with some residents being evacuated up to four (4) times in the local area.

The 2019/20 fires also penetrated considerable distances into rainforest vegetation types along the Great Dividing Range through to the coast from Queensland down to Victoria with 12% of the rainforest estate (29,031 ha) burnt in south-east Queensland alone (Thorley et al 2023).

All of this points to CTHV being at increased risk from bushfire into the future and at some point, the Village is likely to be directly impacted by bushfire potentially under extreme fire weather conditions.

5.4 Community Protection Plan Assessment

The RFS undertook community consultation with CTHV in April 2022 as part of its Community Protection Plan preparation for the Village and produced both a Bush Fire Preparation Map (BFPM) and a Bush Fire Survival Map (BFSM) as shown in Appendix A.

In accord with the RFS 'Community Protection Planning Guideline' (RFS 2019b), the BFSM modelled bushfire behaviour based on an Extreme Fire Danger Rating (FDR) to determine the following 'Bush Fire Threat' zones across CTHV:

- Flame Impact: areas of direct flame contact and $>29 \text{ kW/m}^2$ Radiant Heat Flux (RHF);
- Radiant Heat Impact: zone impacted by RHF of $10 - <29 \text{ kW/m}^2$ and significant ember attack;
- Ember Impact: up to 350 m from the bushfire hazard interface ($<10 \text{ kW/m}^2$ RHF); and
- Be Aware: remaining area of the community that may be impacted by ember attack.

As shown in the BFSM for Central Tilba, significant portions of the Village are within the Flame Impact zone and the entire study area is expected to be impacted by significant ember attack. This is based on only Extreme FDR so on Catastrophic FDR days, the Flame Impact and Radiant Heat Impact zones will cover an even greater portion of the Village.

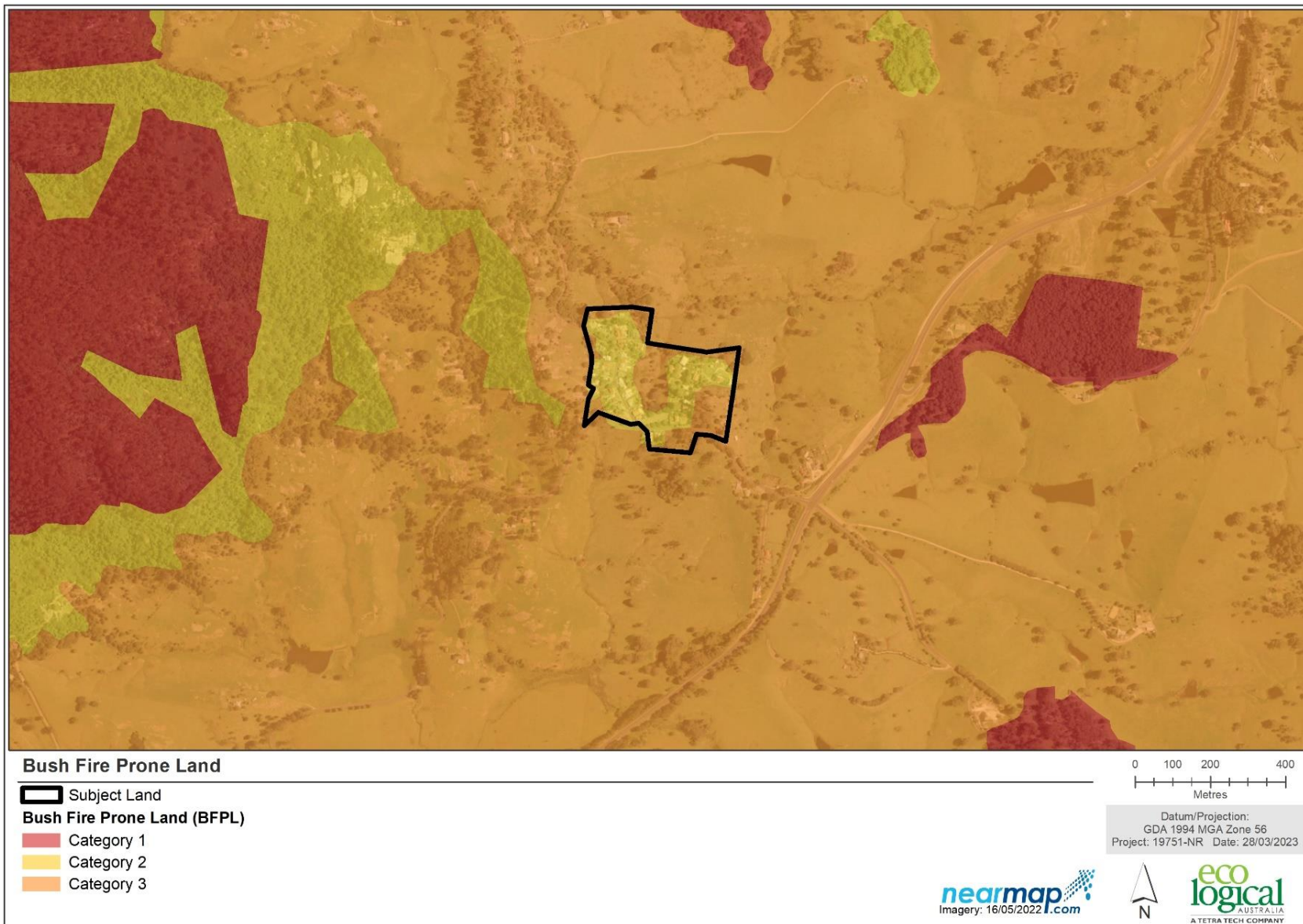


Figure 6: Excerpt of Bushfire Prone Land layer from NSW ePlanning Spatial Viewer (Source: DPE)

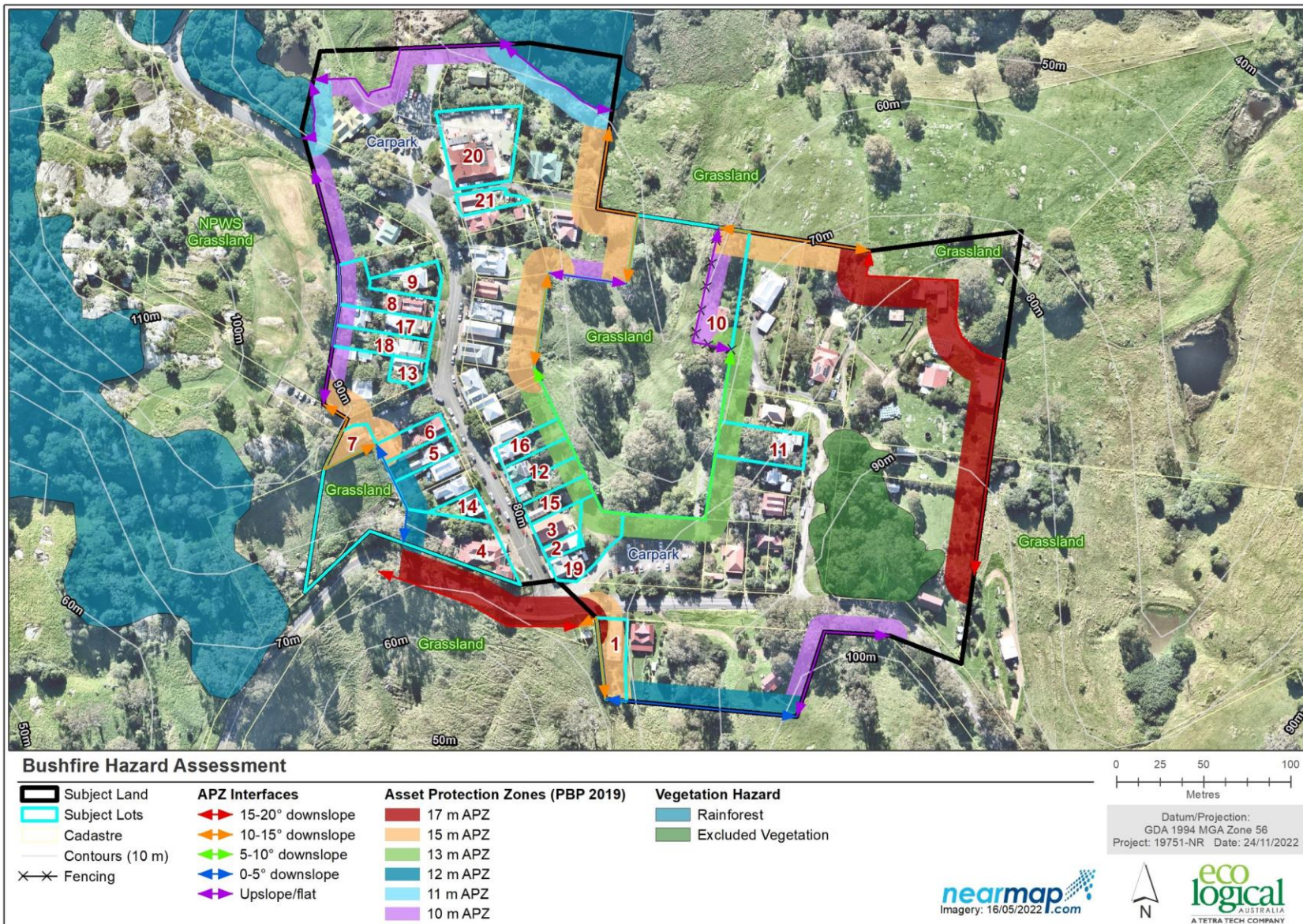


Figure 7: Bushfire hazard assessment showing minimum residential APZs required by PBP

6. Building Fire Risk Assessments

In March 2022, residents and business owners within the study area were sent written invitations to participate in the CTHV Bushfire Resilience Plan project. Despite promotion by the Tilba CoC, initial uptake was limited and when the concept was presented in tandem with the RFS CPP project community consultation in April 2022, a few additional residents/business owners came on board.

Initial fieldwork completed in April 2022 saw a total of 11 properties inspected and rapidly assessed for both bushfire and structure fire risk. In October, a further round of fieldwork was undertaken with an eventual total of 21 participants across 23 properties which represents 46% of the total number of properties within the CTHV study area.

Risk ratings were determined through the analysis of both the bushfire risk and structural fire risk. The analysis is relevant to the point in time at which the data was collected (April and October 2022) and the agreed project assessment methodology that was developed by ELA in consultation with the CTHV BRP Steering Committee.

6.1 Bushfire Risk

Bushfire risk is defined as the likelihood and consequence of a bushfire starting, spreading and impacting on people, property and the environment. In this case, the bushfire risk for the assessed buildings was calculated by attributing scores on a scale of 1-5 (based on increasing risk) to the parameters outlined in the bushfire risk ranking framework in Table 3 and determining a score out of a possible 35 for each building. As part of assessing the bushfire risk to each property, a Bushfire Attack Level (BAL) assessment was undertaken in accord with the methodology outlined in PBP.

Table 3: Bushfire risk ranking assessment summary

Bushfire Risk Ranking Framework						Max. Building Score
Element	1	2	3	4	5	
Hazard direction (worst case)	N/A	East	South	North	West	5
Assessed BAL	BAL-12.5	BAL-19	BAL-29	BAL-40	BAL-FZ	5
BAL difference*	1 level	2 levels	3 levels	4 levels	5 levels	5
Exposed sub-floor	Compliant supports/floors	-	Partial	-	Non-compliant supports/floors	5
Ember protection measures	Complete	-	Partial	-	None	5
Landscape APZ compliance	Compliant	-	Partial	-	Non-compliant	5
Combustible material storage	None	-	Within APZ	-	Under building	5
Bushfire risk score:						35 / 35

* BAL difference = assessed BAL (in accord with PBP) – actual BAL (that building has been constructed to).

6.2 Structural Risk

Structural fire risk relates to the likelihood and consequence of a structure fire starting, spreading and impacting structural components of buildings. In the context of this project, structural fire risk was primarily being examined in the context of a bushfire impacting CTHV causing a building to ignite then spreading from one building to the next (building-to-building ignition).

The structural fire risk analysis for subject buildings within CTHV was determined in consultation with fire engineers from Norman Disney and Young (NDY) who provided professional advice and feedback on the parameters considered and the relevant measurements for each of these parameters.

The selected parameters were divided into two categories – structure fire ignition risk and risk of building-to-building fire spread and assigned a score between 1 and 5 (in increasing order of risk) as outlined in Table 4 to determine an overall score out of 40 for each building.

Table 4: Structural fire risk ranking assessment summary

Structural Fire Risk Ranking Framework						Max. Building Ranking
Element	Score					
	Structure Fire Ignition Risk					
	1	2	3	4	5	
Bushfire risk	Low		Medium		High	5
Meter board type	Safety switches				Ceramic fuses	5
Overloaded power outlets	No		1-2		Yes	5
Subtotal						15
Building-to-Building Fire Spread Risk						
Distance from surrounding buildings	>6 m		1.8 - 6 m		≤1.8 m	5
Wall material on opposing walls (from bushfire assessment)	Masonry	FCS			Timber	5
Internal fuel load	Low		Medium		High	5
Opposing windows	No				Yes	5
Internal sprinkler system	Yes				No	5
Subtotal						25
Structural fire risk rating:						40/40

6.3 Risk summary

The bushfire and structural fire risk scores and associated rankings assigned to each assessed building within the Village were then assigned a Low, Medium or High risk category as outlined in Table 5 below.

Table 5: Risk scoring system and associated categories

Risk Element	Score Range	Category
Bushfire risk	1-11	Low
	12-23	Medium
	24-35	High
Structural risk	1-12	Low
	13-25	Medium
	26-40	High

As shown in Figure 8, there were no buildings in the Low bushfire risk category, nine (9) in the Medium bushfire risk category and twelve (12) in the High bushfire risk category.

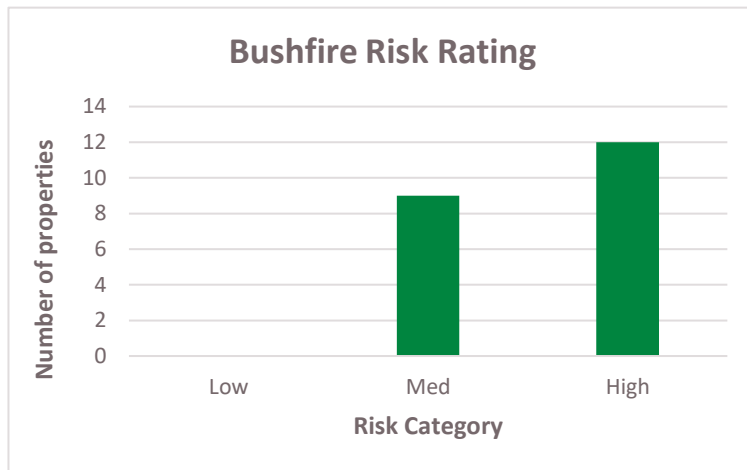


Figure 8: Bushfire risk ratings

As shown in Figure 9, there were no buildings in the Low structure fire risk category, six (6) in the Medium structure fire risk category and fifteen (15) in the High structure fire risk category.

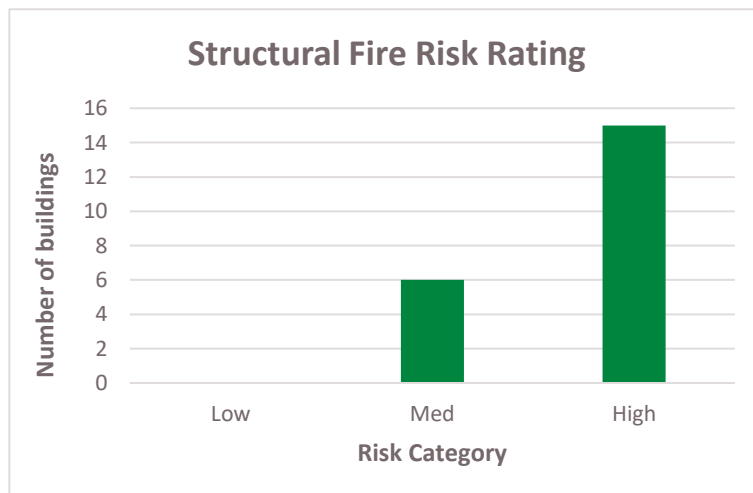


Figure 9: Structure fire risk ratings

Given the primarily timber, 1890s, suspended floor construction of most of the heritage listed/style buildings in Central Tilba, the results of the building risk assessments were unsurprising. The proximity of these buildings to one another (often < 1.8 m and the majority <6 m) means that should a fire ignite one building, particularly in the main street (Bate Street), building-to-building ignition is highly likely and the resulting loss could be catastrophic. The heritage and economic losses to the community and to the ESC area as a result would be significant.

6.4 Property Bushfire Resilience Plans

Following on from the building risk assessments above, 21 property Bushfire Resilience Plans (BRPs) were developed within the study area. These Plans included the following key sections:

- i Risk rating (as outlined above and including additional risk/mitigating factors observed);
- ii Bushfire resilience recommendations (building retrofits, heritage considerations, building approvals and property/occupant recommendations);
- iii Additional resources (agencies/organisations and materials/suppliers); and
- iv Asset Protection Zones/landscaping standards.

These property BRPs were issued to property owners/tenants between 24 January and 1 March 2023.

It is anticipated that the greatest impediments to implementing the bushfire recommendations in these individual BRPs will be funding, not compromising heritage values of the buildings and maintaining focus on bushfire preparedness during seasons of much lower bushfire danger.

7. Bushfire Resilience Recommendations

Community based bushfire resilience is the ability of a community exposed to bushfires to resist, adapt and recover from the effects of bushfires in a timely and efficient manner. Bushfire resilience is enhanced when all elements of disaster response are effectively implemented – mitigation, preparation, response and recovery. Bushfire resilience requires shared responsibility and active engagement between government agencies, emergency services and community members (McLennan et al 2019).

The focus of the recommendations within this report are to enhance community bushfire resilience with a primarily focus on the mitigation and preparation phases, as these phases of disaster response are where owners/occupiers, agencies and emergency services can have the greatest impact on improving their bushfire resilience. The bushfire resilience recommendations within this Plan have been arranged into the two key areas of 'Mitigation' and 'Preparation' as outlined in subsequent sections.

7.1 Mitigation

7.1.1 Asset Protection Zones (APZs)

The bushfire hazard assessment shown in Figure 7 shows the minimum residential APZs required by PBP under current legislation. These are the minimum APZs that would apply to new construction within the study area based on a new building also achieving the corresponding level of bushfire construction standards (i.e. BAL-29).

Given none of the buildings assessed throughout the project or observed within the study area appeared to have been constructed in accord with any bushfire construction level under the current (or any previous) version of AS 3959:2018 'Construction of buildings in bushfire-prone areas' (SA 2018), the identified minimum residential APZs required by PBP are not considered appropriate.

Many of the buildings are currently exposed to a Bushfire Attack Level (BAL) of BAL-FZ (Flame Zone) or BAL-40 so will potentially experience flame contact and extremely high levels of radiant heat flux (RHF) during a bushfire.

Consequently, many of the existing APZs are considered inadequate and need to be extended/better maintained to reduce the risk of bushfire impacting CTHV.



Figure 10: Proposed APZs surrounding CTHV

7.1.1.1 Identification of Asset Protection Zones (APZs)

This section is focussed on establishing/maintaining Asset Protection Zones (APZs) commensurate with the vulnerable heritage attributes of the majority of the buildings within CHTV (irrespective of tenure) in order to improve the bushfire resilience of these assets and enhance the safety of occupants.

In most cases surrounding CTHV, the predominant vegetation is grassland with some areas to the south-west and north also being impacted by remnant rainforest.

Initially a 50 m APZ surrounding all buildings was considered as a minimum as shown in Figure 10 in order to provide protection from flame contact and radiant heat commensurate with buildings that have been constructed to no specific bushfire construction standard adjoining grassland vegetation.

However, to ensure that rainforest/forest regeneration does not occur in areas that are currently grassland, particularly in the former Bellbrook Farm property to the west (that is transitioning to NPWS estate) and private properties to the north where remnant rainforest vegetation is located, an APZ >50 m - 100 m APZ is recommended where all existing managed/grassland areas continue to be managed to APZ standards as shown in Figure 10.

7.1.1.2 APZ Maintenance

APZs may be managed by a number of different methods including:

- Hand tool methods – pruning, raking, weeding;
- Mechanical – Brush-cutting, mowing, slashing;
- Chemical – through the application of herbicide;
- Grazing – using domestic livestock. The RFS Mitigation section has been trialling the use of goats to graze APZs and this has been beneficial particularly in areas like CTHV where exposed rock limits the use of slashing machinery/mowers; and
- Burning – may also be applicable to the western ‘Bellbrook Farm’ APZ and/or sections of pasture surrounding the Village.

If APZ areas are not regularly managed throughout the BFDP (at a minimum), negotiation with neighbours may be required to ensure the management of offsite portions of the 100 m APZ. Should this not achieve the necessary fuel management outcome, the RFS may be contacted to follow up on the APZ management via the Division 2A ‘Bush fire hazard complaints’ process under the *Rural Fires Act 1997*. Through this process, private landholders or public authorities can be directed to undertake the requisite APZ management works, and if they do not undertake those works within the specified timeframe, the RFS will arrange for a contractor +6.

3to complete the APZ works and bill the owner/manager for the cost of those hazard reduction works.

7.1.1.2.1 Village APZ - Internal

The APZs within the village centre should be managed in accord with Table 9 (Appendix C). These areas are largely ‘cottage garden’ in style and form part of the heritage attributes of the Village centre. The APZ management recommendations within this APZ zone have been selected to both achieve the fuel reduction objectives within APZs but also maintain the integrity of the Village’s National Trust listing.

7.1.1.2.2 Village APZ - External

As shown in Figure 10, the majority of the 50 m wide Village APZ is located within private land (predominantly grazed pasture), the western 'Bellbrook Farm' APZ within land transitioning to NPWS estate and a small amount of ESC managed land (car parks, road reserves, public toilets and the halls).

At a minimum, this APZ should be managed to the APZ standards outlined in Table 9 (Appendix C) throughout the (BFDP) which runs annually from 1 September to 31 March in the Eurobodalla Shire. This APZ is critical to ensuring that there is no direct flame contact on any of the buildings within the CTHV study area and the 50 m APZ will significantly reduce radiant heat impact on these buildings during a bushfire. It is envisaged that for the most part this APZ will be managed via grazing by cattle, sheep and alpacas in line with current surrounding agricultural practices.

It is recommended that the Village APZ is inspected a minimum of 3 times per year in August (prior to the BFDP), November and January and management enacted as required.

7.1.1.2.3 Landscape APZ

The broader landscape APZ from >50 - 100 m from the Village interface covers land under multiple tenure as outlined in Figure 10 with the majority being located within private land (predominantly grazed pasture), the western 'Bellbrook Farm' APZ within land transitioning to NPWS estate and a small amount of ESC managed land (car parks, road reserves, public toilets and the halls).

This APZ is to be managed as outlined in Table 9 (Appendix C) where all existing grassland areas are to be maintained and any rainforest/forest regeneration is to be actively suppressed.

It is recommended that the Landscape APZ is inspected annually in August and management of any regrowth is activated as required.

7.1.2 Building upgrades

APZs cannot be solely relied upon to eliminate the risk of bushfire within CTHV. Even if flame contact and radiant heat are removed as mechanisms of bushfire attack by large APZs, ember attack from a surrounding bushfire will still impact the buildings within the Village and APZs do not remove the risk of structure fires. Should a fire ignite within the Village, either bushfire or structure fire, recommendations within this section of the report seek to minimise the damage/destruction that will occur by improving building protection from ember attack and reducing the potential for building-to-building fire spread.

The local Central Tilba Rural Fire Brigade has a Category 1 and a Category 7 fire tanker and is a volunteer brigade with members located over a wide geographic area, meaning that response times will vary and may not be favourable for structure fire suppression. In a large bushfire with multiple concurrent points of impact on the urban interface, RFS resources cannot be guaranteed to be present in the Village.

The measures outlined in Sections 7.1.2.1 - 7.1.2.3 are recommended to minimise the risk of a fire that starts from bushfire and/or within a building from spreading to other buildings in the Village.

7.1.2.1 Ember protection upgrades

Appendix D contains the full suite of building treatment recommendations that were applied as relevant to each of the individual properties assessed during the project. While the higher cost items will provide a higher level of protection, it is recognised that many of these will be beyond the financial capability of many residents/business owners.

Consequently, and in light of the large APZ proposed for CTHV, it was recommended that property owners focus on implementing the primarily lower cost ember protection options highlighted in yellow within the list. Materials may be cheaper if purchased in bulk if residents/business can coordinate these purchases.

In the longer term, when construction upgrades are considered and heritage requirements permit, the following upgrades should be prioritised/considered:

- a. Replacing weatherboard cladding and other external timber with either non-combustible material powder-coated to look like traditional cladding (particularly in areas of BAL-FZ/40 where flame contact is possible) or with specific hardwoods outlined in Appendix F of AS 3959:2018; and
- b. Replacing external walls with fire rated walls. Highest priority should be for buildings <1.8 m apart followed by those up to ≥ 1.8 m but <6 m apart.

7.1.2.2 Thermal gels

One of the measures outlined in the individual BRPs is the use of a thermal gel product for the purpose of additional bushfire protection, when applied immediately prior to the onset of bushfire attack. These products can reduce the transfer of radiant heat to vulnerable building elements and mitigate ignitions from ember attack.

Thermal gel products such as 'Barricade' and 'Thermo-gel' can be stored in drums until required. They are applied to the outside of a building using a garden hose attachment and can provide protection from radiant heat for 7- 24 hours. Misting the coating with additional water spray can extend the protection times. Kits for a standard residential dwelling range from \$600 - \$700 at the time of this report.

The only two downsides of these products are that they are an active fire protection system that needs to be applied or potentially refreshed close to the expected time of bushfire impact and clean up can be a messy task. Provided that buildings are well maintained, thermal gels should not impact the painted surface.

These products could be considered as a lower cost interim measure to provide protection to heritage buildings within CTHV particularly the commercial centre in Bate Street until such time as other longer term options can be implemented such as sprinkler/drenching systems.

7.1.2.3 Sprinkler/drenching systems

Sprinkler or drenching systems are active fire protection systems that rely upon them being switched on and running for the duration of fire impact to wet down rooves, walls and/or eaves. These systems are useful for heritage buildings such as those in CTHV where construction is primarily >100 year old timber and where passive construction measures are expensive/difficult to implement and may be inconsistent with heritage requirements.

Sprinkler/drenching systems have the potential to limit fire spread during bushfires and to avoid catastrophic widespread building-to-building fire spread/loss. Given the estimated cost of \$30,000 for a modest domestic dwelling system (Sinclair Fire 2023), sprinkler systems are likely to be beyond the financial capability of many/most property owners in CTHV. Sprinkler systems that are activated automatically/remotely will be even more expensive.

Given the potential heritage and economic losses to the region that would result from catastrophic loss of buildings in CTHV from future bushfires, it is recommended that sprinkler/drenching systems be retrofitted to existing buildings particularly those in Bate Street and the immediate surrounds. The cost associated with these systems means that grant funding is likely needed to facilitate wholesale implementation of this measure.

Table 6 summarises the guiding principles from the CSIRO ‘Bushfire best practice guide – Sprinklers and shutters’ that should be considered when designing a bushfire sprinkler/drenching system for the buildings within CTHV (CSIRO 2023).

Table 6: Guiding principles for bushfire sprinkler/drenching systems

Positive attributes	Things to avoid
Use non-combustible materials including metal pipework/sprinkler heads	Pumps and generators should not be exposed – they should be shielded or installed within the building’s envelope
Complement the external bushfire system with internal sprinklers (ideally separate systems)	Do not rely on mains electricity and system must be able to operate for a minimum of 4 hours without refuelling
Consider additional sprinkler/drenching heads in the roof cavity and subfloor spaces	System does not replace ember protection upgrades
Ensure sprinkler system is fed by a reliable water source	Do not rely on mains water – system should be fed by its own Static Water Supply (SWS)
Consider use of automatically activated system or one that can be operated remotely	Avoid manual start-up system that has to be switched in on an exposed location
Additional information may be found in Australian Standard (AS) 5414:2012 ‘Bushfire water spray systems’ (Standards Australia 2012)	Do not rely on the system as primary means of protection

Based on the principles above, the design and implementation of a Village wide sprinkler system should consider the following:

- Identify and submit for funding opportunities for the system;
- Engage with key stakeholders (residents/business owners, ESC, RFS);
- Identify buildings to be included in the system – suggested priority order as follows:
 - Heritage/commercial/residential buildings at northern end of Bate Street (high risk of bushfire impact and buildings, particularly the ABC Cheese Factory/retail outlet, provide significant tourism/local employment);
 - Western side of Bate Street (highest risk of bushfire impact and significant heritage/commercial value including General Store and Dromedary Hotel);
 - Corkhill Drive heritage buildings (significant heritage value and at risk from erratic southerly wind driven bushfire behaviour);
 - Eastern side of Bate Street (at risk due to grassland in gully to the east);
 - Remaining heritage buildings within CTHV study area; and
 - Other commercial and residential buildings within CTHV study area;
- Engage services of a suitably qualified professional i.e. hydraulic engineer and/or bushfire sprinkler design specialist to design the system and associated infrastructure (power supply and SWS);
- Consider inclusion of internal sprinkler systems (independent of external bushfire system) to reduce the risk of building-to-building fire spread following a structure fire particularly for buildings <6m apart; and
- Obtain heritage advice either from ESC or a suitably qualified professional i.e. heritage consultant to ensure system design is consistent with heritage requirements (e.g. drenching systems may be more favourable with pipework to be hidden behind fascia and/or ground-based systems).

7.1.3 Infrastructure upgrades

7.1.3.1 Telecommunications

Power supply outages were identified as having the greatest impact on telecommunication facilities and causing associated outages during the 2019/20 bushfires in the Eurobodalla (see Section 4.2.1). Where feasible, the following back-up power supply upgrades are recommended to the existing network servicing CTHV:

- 24 hour supply for primary telecommunication tower and associated infrastructure (Mt Wandera); and
- Provide 12 hour supplies for secondary telecommunication tower(s) and associated infrastructure towers.

7.1.3.2 Water supply

Similar to the telco network, water supply was significantly impacted by power outages during the 2019/20 fires (see Section 4.2.2) and the following upgrades are recommended where feasible:

- Continue to progress the Southern Water Storage (Eurobodalla Dam) and ensure key sites such as water treatment plants and dams have minimum 48 hours backup power supplies; and
- Review of operations to ensure a sufficient and reliable water supply is available during major fires (ensuring reservoir refill capacity in response to multiple potential fire impact days).

7.1.3.3 Gas supply

A number of issues (Section 4.2.3) were identified in relation to bottled LPG supplies within the Village and the following actions are recommended to mitigate the risk to/from these gas supplies:

- LPG cylinders to be turned so safety valves are facing outwards from buildings or at least parallel to buildings (where buildings are close together); and
- All cylinders are to be cleared of surrounding fencing/vegetation to a distance of at least 1 m from the top of the cylinders.

7.1.3.4 Electricity supply

Above ground electricity supply infrastructure across Australia is at ongoing risk from bushfire and significant investment would be required to mitigate the bushfire risk to this infrastructure. However, the following recommendations would improve the resilience of electricity supply infrastructure:

- Relocate infrastructure underground (where feasible);
- Harden infrastructure (e.g. metal poles instead of timber); and
- Ensure vegetation clearance under powerlines is maintained to the appropriate standard (ISSC3 2016).

7.2 Preparation

This section seeks to provide localised planning within overarching Plans such as the Eurobodalla LEMP and BFRMP to reinforce links/information sharing between residents, the local RFS Brigade volunteers and RFS staff. The most critical part of this section is to identify timing/responsibilities for bushfire preparation, response and evacuation within CTHV.

7.2.1 Tilba District Community Bush Fire Management Committee

The Tilba District Community Bush Fire Management Committee (TDCBFMC) was convened following the 2019-20 Badja Forest Road, Countegany Fire and met with representatives from the Eurobodalla BFMC in August 2020 to discuss a range of bushfire protection related issues and primarily to seek:

- a. Community input/ownership in preparation for and response to future fire events; and
- b. Information on improvements to water supply/infrastructure and fuel loads/hazard reduction.

The RFS Community Protection Plans for Central Tilba and Mystery Bay and the CTHV Bushfire Resilience Project were identified within the Tilba District Strategic Plan under the ‘Prepare, Protection and Preserve’ key driver.

The TDCBFMC does not appear to be currently operating and consideration should be given to either reconvening such a Committee or perhaps having it function as a sub-committee of the Chamber of Commerce.

A recent case study of Kangaroo Valley following the Badja Forest Road, Countegany Fire 2019/20 supported by the University of Wollongong (UoW) focussed on community-led initiatives that contributed to preparation, response and recovery to bushfire in Kangaroo Valley (McKinnon et al 2022).

The report provides an outline of the structure/role of the Kangaroo Valley Community Bushfire Committee, the Bushfire Ready Neighbourhood Groups (groups of 8-15 households who fostered development of individual household Bushfire Survival Plans), and the Kangaroo Valley Bushfire Recovery Drop In Centre and how they operated before, during and following the 2019/20 fires.

Given the parallels between Kangaroo Valley (tourist village/agricultural district) and the broader Tilba District within which CTHV is located, the information in this case study may provide a useful model/guide for establishment and enhancement of similar community networks for the CTHV study area and the wider Tilba District.

7.2.2 Bushfire Resilience Rating Home Assessment App

The Resilient Building Council (RBC) is currently running a trial project in the Shoalhaven and is scheduled to launch the Bushfire Resilience Rating Home Assessment App in April 2023. The system works by assessing site-specific risk and measuring a building’s vulnerability to provide owners with a list of evidence-based, tailored actions to adapt their building, improve their resilience rating and enable financial incentives. It is hoped that in time, insurers will provide financial incentives in the form of reduced premiums to those who retrofit their buildings for bushfire and other natural disasters. It is recommended that the reconvened TCDBFMC establishes contact with the RBC to explore opportunities for funding and other financial incentives for undertaking individual property and Village wide bushfire resilience upgrades.

7.2.3 Emergency Planning Recommendations

Emergency planning recommendations are outlined below for the CTHV study area.

1. BFRMP amendments:

- Placing a higher priority on CTHV due to its heritage and economic value within the local Eurobodalla BFRMP including for APZ management and increasing community engagement;
- Identify more extensive APZs as recommended herein irrespective of tenure; and
- These recommendations can be raised with the EBFMC by the CoC/CTHV community as part of the update to the EBFMP which is currently underway via <https://www.rfs.nsw.gov.au/plan-and-prepare/managing-bush-fire-risk/bush-fire-management-committees/far-south-coast>.

2. Preparation of a CTHV Bushfire Management Plan that includes the following:

- Community engagement:
 - at a minimum annually prior to BFDP;

- encourage residential APZ management;
 - identify residents who could benefit from the AIDER program (Assist Infirm, Disabled and Elderly Residents) which provides one-off assistance with domestic bushfire preparation (gutter cleaning, thinning vegetation, removing overhanging branches, removing leaf litter/debris and mowing/slashing long grass);
 - development of/updates to Bushfire Survival Plans (BSPs) as very few residents were found to have BSPs in place during the BRP fieldwork; and
 - encourage residents/business owners without smoke alarms (almost half of individual BRP properties) or upgraded electricity meter boards (2 of individual BRP properties) to install/upgrade these as a matter of urgency;
 - APZ management schedule including:
 - Annual inspections – including who is responsible/due dates;
 - Outlining process where works are required e.g. negotiation with private landholders, contacting public authorities; and
 - Outlining hazard complaint process where non-compliances unable to be resolved;
 - SFAZ burning (if applicable);
 - Fire trail maintenance (if applicable – perhaps trails within ‘Bellbrook Farm’);
 - Outlining responsibilities/activities for a Village Fire Unit trailer/program (see further detail below and in Appendix E); and
 - Village wide sprinkler system testing/maintenance regime.
3. Preparation of a CTHV Bushfire Emergency Management and Evacuation Plan (BEMEP) including:
- Identification of triggers for leaving early/sheltering in place evacuation options;
 - Outline of procedures for leaving early/sheltering in place evacuation options;
 - Description of where use of the NSP may be appropriate;
 - Consideration of an appropriate Village refuge or development of a purpose-built structure (although this may be less of a concern once the Village-wide sprinkler system is commissioned);
 - Outline of preparation and triggers/procedures for use of ‘place of last resort’ Village refuge; and
 - A communication plan.
4. Establishment of a Village Fire Unit trailer/program within CTHV:
- Based on the Community Fire Unit (CFU) program provided on urban/bushland interfaces within FRNSW jurisdiction (additional information is included in Appendix E); and
 - This project could potentially be funded by community grants and managed by Tilba District Community BFMC.

7.2.4 Evacuation Planning

Anecdotal evidence gathered during fieldwork for this project determined that despite the Extreme or Catastrophic fire weather conditions predicted on various days during the 2019/20 Badja Forest Road, Countegany Fire, a core group of residents/business owners stayed to defend their properties and neighbouring properties.

This is a consistent observation of community response during bushfires to other locations, because many people understand that their homes/businesses have a better chance of withstanding a bushfire when someone is present (Parliament of Victoria 2010).

The identified Neighbourhood Safer Place (NSP) for Central Tilba is located almost 2.5 km away to the south-west in Tilba Tilba (an open space NSP) and is not protected within an extensive urban area. The NSP location combined with the risk of westerly or southerly fire progression surrounding CTHV, means that under Extreme or Catastrophic fire weather conditions, it is unlikely to be safe for residents/business owners who have stayed to defend within CTHV to travel to or take safe shelter out in the open within the Tilba Tilba NSP.

The buildings being defended within CTHV are at significant risk from bushfire and consideration may need to be given to identifying/constructing an appropriate Community Bushfire Refuge within CTHV in accord with the 'Design and Construction of Community Bushfire Refuges Handbook' (Australian Building Codes Board (ABCB) 2014).

It is important to communicate to residents who decide to stay and defend that a Community Bushfire Refuge does not provide any guarantee of protection, but it should provide a higher level of survivability than other buildings within the Village.

7.3 Summary of Recommendations

Table 7 summarises the bushfire resilience recommendations identified within this Plan along with an indication of who is likely to be responsible for each recommendation and a suggested timeframe.

Table 7: Bushfire Resilience Plan recommendations for CTHV

Item	Recommendations	Report Section(s)	Responsibility	Timing
1. Asset Protection Zones	1.1 Ensure Village APZ (Internal) are managed in accord with Table 8 in Appendix C.	7.1.1.2.1	Residents/business owners	Throughout BFDP
	1.2 Ensure Village APZ (External) of up to 50 m (see Figure 10) managed to IPA standards as per Table 8 in Appendix C.	7.1.1.2.2	Private landholders, NPWS, ESC	August, November and January
	1.3 Landscape APZ of 50-100 m (see Figure 10) managed to ensure existing grassland areas are maintained and no rainforest/forest regeneration occurs as per Table 8 in Appendix C.	7.1.1.2.3	Private landholders, NPWS	Annually in August
2. Ember protection upgrades to buildings	2.1 Implement ember protection upgrades for all buildings within CTHV as outlined in Appendix D.	7.1.2.1	Private landholders	ASAP
	2.2 Seek advice from a qualified heritage advisor (ESC) or consultant to ensure construction upgrades are sympathetic to heritage requirements.		Private landholders, Tilba CoC	TBC
	2.3 Seek funding sources to assist with implementation of ember protection upgrades (including engagement with Resilient Building Council).		Tilba CoC	TBC
3. Provision of thermal gels	3.1 Provision of thermal gels (such as ‘Barricade’ or ‘Thermo-gel’) to provide additional protection for buildings during bushfires until Village-wide sprinkler system can be installed.	7.1.2.2	Private landholders	TBC
	3.2 Seek funding sources to assist with purchase of thermal gels (including engagement with Resilient Building Council).		Tilba CoC	TBC
4. Implement a Village-wide sprinkler/drenching system	4.1 Implement a sprinkler/drenching system that covers at a minimum the commercial precinct (Bate Street and western end of Corkhill Avenue) and if feasible, Village-wide.	7.1.2.3	Residents/business owners, Tilba CoC, ESC	TBC
	4.2 Seek advice from a suitably qualified professional i.e. heritage advisor (ESC) or consultant to ensure sprinkler/drenching system installation is sympathetic to heritage requirements.			TBC
5. Telecommunications infrastructure	5.1 Upgrades to back-up power systems to ensure: <ul style="list-style-type: none"> 24 hour supply for primary telco tower (Mt Wandera); and 12 hour supply for secondary telco towers. 	4.2.1	NSW Telco Authority, Telstra, Optus	Ongoing
		7.1.3.1		

Item	Recommendations	Report Section(s)	Responsibility	Timing
6. Water supply infrastructure	6.1 Continue to progress the Southern Water Storage (Eurobodalla Dam) and ensure key sites such as water treatment plans and dams have minimum 48 hours backup power supplies.	4.2.2	ESC	Ongoing
	6.2 Review of operations to ensure a sufficient and reliable water supply is available during major fires (ensuring reservoir refill capacity in response to multiple potential fire impact days).	7.1.3.2		
7. Gas supplies	7.1 LPG cylinders to be turned so safety valves are facing outwards from buildings or at least parallel to buildings where two buildings are located close together.	4.2.3	Residents/business owners	By 1 September 2023 (BFDP)
	7.2 All cylinders are to be cleared of surrounding fencing/vegetation to a distance of at least 1 m from the top of the cylinders.	7.1.3.3		
8. Electricity supply	8.1 Relocate infrastructure underground (where feasible).	4.2.4	Essential Energy	TBC
	8.2 Harden infrastructure (e.g. metal poles instead of timber).	7.1.3.4		
	8.3 Ensure vegetation clearance under powerlines is maintained to the appropriate standard.			
9. Reactivate the Tilba District Community Bush Fire Management Committee (BFMC)	9.1 Reactivate the Tilba District Community BFMC to lead the implementation of the BRP recommendations and source funding.	7.2.1	Residents/business owners, Tilba Chamber of Commerce	2024
	9.2 Establish Bushfire Ready Neighbourhood Groups.			
10. BFRMP amendments	10.1 Review risk assessment due to high heritage/economic value of CTHV and increase priority for APZ management and community engagement during the current next gen BFRMP process.	7.2.3	Far South Coast BFMC, RFS	2024
	10.2 Incorporate the recommend APZ into the next document revision, in a tenure blind approach.			
11. Prepare a CTHV Village-wide Bushfire Management Plan	11.1 Prepare a CTHV Bushfire Management Plan as outlined in Section 7.2 of this report.	7.2.3	Private landholders, Tilba Chamber of Commerce, with input from NPWS, RFS, ESC	2025
12. Establish Village Fire Unit trailer/program within CTHV	12.1 Establish a Village Fire Unit trailer/program within CTHV based on the FRNSW Community Fire Unit program.	7.2.3	Private landholders, Tilba Chamber of Commerce with input from RFS and FRNSW.	2024

Item	Recommendations	Report Section(s)	Responsibility	Timing
13. Prepare a CTHV Village-wide Bushfire Emergency Management and Evacuation Plan	13.1 Prepare a CTHV BEMEP. 13.2 Consider identification/construction of a Community Bushfire Refuge (may not be considered necessary/feasible particularly once the Village-wide sprinkler system is commissioned).	7.2.4	Private landholders, Tilba Chamber of Commerce with input from NPWS, RFS and ESC	2025

8. Conclusion

It is important to appreciate that no amount of mitigation works (relating to either bushfire or structure fire) will completely remove the risk to Central Tilba Heritage Village and a level of residual fire risk will always remain.

The BRP recommendations summarised in Table 7 of Section 7.3 are comprehensive in nature and address mitigation and preparation aspects of bushfire resilience for CTHV.

Implementation of the recommendations outlined within this Plan will equip CTHV with the following attributes of a bushfire resilient community:

- Conducts regular assessments and anticipates the likelihood/consequence of bushfire;
- Responds to and recovers from bushfires; and
- Allocates resources to reduce risk in bushfire prone areas and improvises/innovates in response to disasters.

The BRP recommendations detailed herein will reduce the current fire risk to both the Village and its occupants, providing improved resilience to bushfire events that are expected to become more frequent and severe in the future.

With financial constraints likely to present the greatest impediment to implementing these BRP recommendations, it is recommended that the TDCBFMC is re-established and works closely with Council, RFS, Minderoo and the RBC to support CTHV with funding and assistance to ensure that these bushfire resilience recommendations are implemented.



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Appendix A – RFS Community Protection Plan Maps

Figure 11: Central Tilba Community Protection Plan – Bush Fire Preparation Plan (RFS 2022)

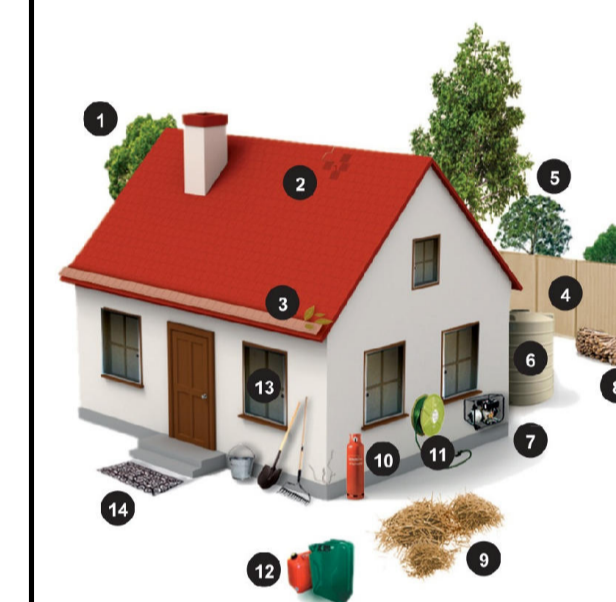


CENTRAL TILBA

WORKS PROGRAM

Map Ref No.	Strategy	Action	Responsible Agency	Target / Action Date (Year)
1	Hazard Reduction	Monitor / Maintain Asset Protection Zones	National Parks & Wildlife Service	Annually & Ongoing
2	Preparedness	Maintain AFZ around dwellings in Resident Preparation Area and develop / maintain personal Bushfire Survival Plan	Private Property Owners	Annually & Ongoing
3	Hazard Reduction	Monitor / Maintain Asset Protection Zones	Private	Annually & Ongoing

Is your property fire-safe?



- Cut back any overhanging trees or shrubs and dispose of cuttings appropriately.
- Check the condition of your roof and replace any damaged or missing tiles.
- Clean leaves from the roof, gutters and downpipes and fit quality metal leaf guards.
- Non-combustible fences are the most effective at withstanding the intense heat generated by bush fire.
- Plant trees and shrubs that are less likely to ignite due to their low oil content.
- If you have a water tank, dam or swimming pool, consider installing a Static Water Supply sign (SWS).
- Enclose sub-floor areas.
- Store wood piles well away from the house and keep covered.
- Keep garden mulch away from the house and keep grass short.
- Make sure the pressure relief valves on LPG cylinders face outwards.
- Ensure you have a hose which is long enough to reach every part of the home.
- Remove and store any flammable items away from the house.
- Install metal fly-wire or solid screens to the outside windows and doors.
- Have a non-combustible doormat.

Zone	Purpose	Suppression Objectives	Zone Characteristics
Asset Protection Zone	To protect human life, property and highly valued public assets and values.	To enable the safe use of Direct Attack suppression strategies within the zone. To minimise bush fire impacts on undefendable assets.	As per RFS document Standards for Asset Protection Zones.
Strategic Fire Advantage Zone	To provide strategic areas of fire protection advantage which will reduce the speed and intensity of bush fires, and reduce the potential for spot fire development. To aid containment of wildfires to existing management boundaries.	To improve the likelihood and safe use of Parallel Attack suppression strategies within the zone. and/or Indirect Attack (back burning) in high to very high fire weather conditions within the zone. To reduce the likelihood of Crown fire development within the zone. and/or Spot fire ignition potential from the zone.	Zone width related to suppression objectives and dependent upon: •Topography •Aspect •Spotting propensity •Location of adjacent firebreaks •Mosaic pattern of treatment Assess Overall Fuel Hazard (OFH) once vegetation communities reach minimum fire thresholds within this plan. Management practices should aim to achieve mosaic fuel reduction patterns so that the majority of the SFAZ has an OFH of less than high.
Resident Preparation Zone	To identify that residents / property owners have a vital role to play in bush fire risk management and that they are responsible for their own property preparedness.	To increase the preparedness of residents for bush fire and ensure that vegetation in close proximity to residential assets are adequately maintained. To provide a defensible space for residents / fire fighters and complement hazard reduction works carried out within Asset Protection Zones / Strategic Fire Advantage Zones.	Residents / property owners should strive to achieve a 'Fire-Safe' property as outlined in the illustration above. Concerns regarding the bush fire safety of neighbouring properties should be raised with the NSW Rural Fire Service.

LEGEND

- Proposed Linear Firebreak
- Proposed Asset Protection Zone
- Proposed Strategic Fire Advantage Zone
- Asset Protection Zone
- Strategic Fire Advantage Zone
- Proposed Hazard Reduction
- Residential Preparation Zone
- Proposed Fire Trail
- Fire Trail

Scale 1:2200

BUSH FIRE INFORMATION LINE
1800 679 737
www.rfs.nsw.gov.au

PRODUCTION INFORMATION

Base Data: LPMA Cadastre and Topo Database
Map Projection: GCS GDA 1994

Print Date: 19/12/2022
Produced by: NSW RFS Community Protection Planning

BFMC Approved: 13/10/2022

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GET READY FOR A BUSH FIRE

There are four simple steps to get ready for a bush



Get prepared for the Bush Fire Season and make your Bush Fire Survival Plan Now.

Go to www.myfireplan.com.au and discuss with your family what to do if a fire starts



Figure 12: Central Tilba Community Protection Plan – Bush Fire Survival Map (RFS 2022)



CENTRAL TILBA

What is Your Bush Fire Threat?

- Flame Impact**
 You and your property are likely to be directly impacted by flame, deadly levels of radiant heat, significant embers and smoke from a bush fire. The risk of death and property destruction from bush fire is greatest in this area. Leaving early is your safest option.
- Radiant Heat Impact**
 You and your property are likely to be impacted by deadly levels of radiant heat, significant embers and smoke from a bush fire. You and your property must be well prepared if you choose to stay and defend.
- Ember Impact**
 You and your property are likely to be impacted by lower levels of radiant heat, significant embers and smoke from a bush fire. You and your property must be well prepared if you choose to stay and defend.
- Be Aware**
 Embers can cause fires kilometres from the main fire and can impact on houses up to one hour before the fire arrives and several hours after the fire has passed. It only takes one ember to ignite your house and property. Ensure that you and your property are well prepared and monitor your property carefully during a bush fire.

NOTE: Impact areas have been prepared at a community level and are based on an Extreme Fire Danger Rating. Information provided on this map is not to be used for building / planning purposes.

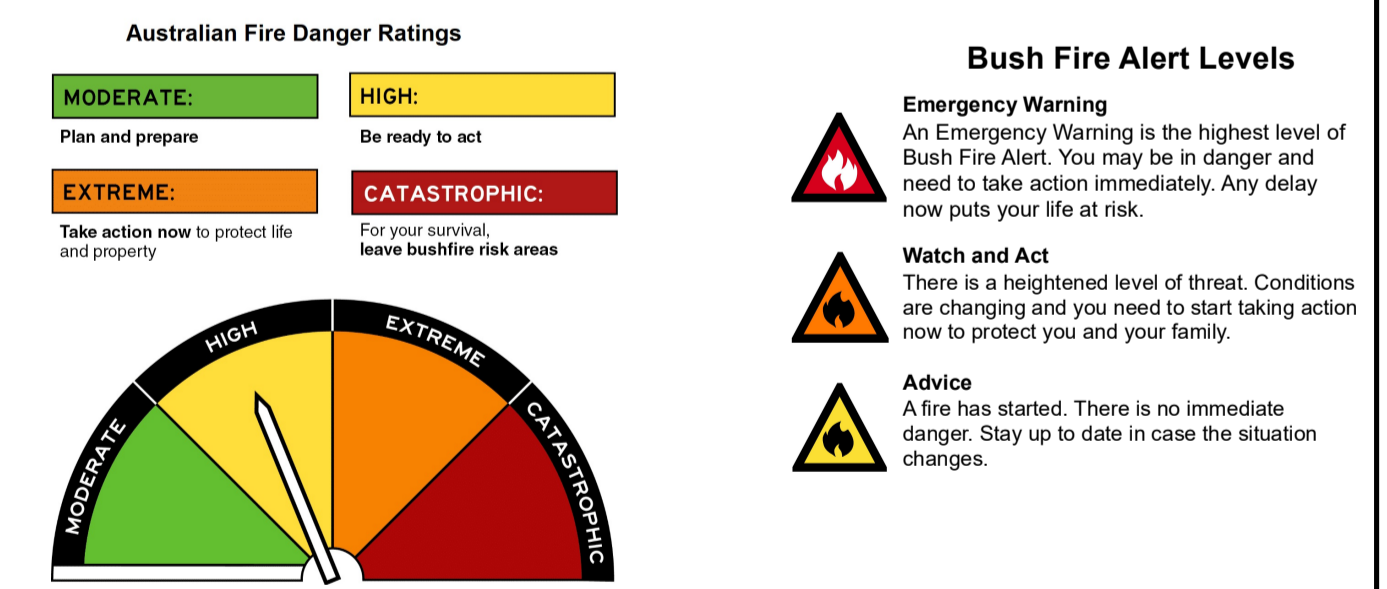
A well designed and prepared building will provide more protection against bush fire. See the accompanying Preparation Map for more information.

- Neighbourhood Safer Place**
 Neighbourhood Safer Places are a Place of Last Resort during a bush fire. Have you identified a Neighbourhood Safer Place and other safer locations in your Bush Fire Survival Plan?
 Your nearest NSP is located at:
 Tilba Tilba Sportsground
 Corkhill Drive, Tilba Tilba
- Main Road**
 Roads may become impassable during a bush fire. Your safest option is to Leave Early.
- Leave Early**
 Leaving Early means leaving long before a bush fire is in your area. On days of Catastrophic Fire Danger you should leave early in the morning or even the night before.

Your Bush Fire Survival Options



Stay informed about local fire conditions. Check the NSW RFS website or listen to the local emergency radio broadcaster for information on the Fire Danger Rating and Bushfire Alert Level.



The needle indicates the Fire Danger Rating.

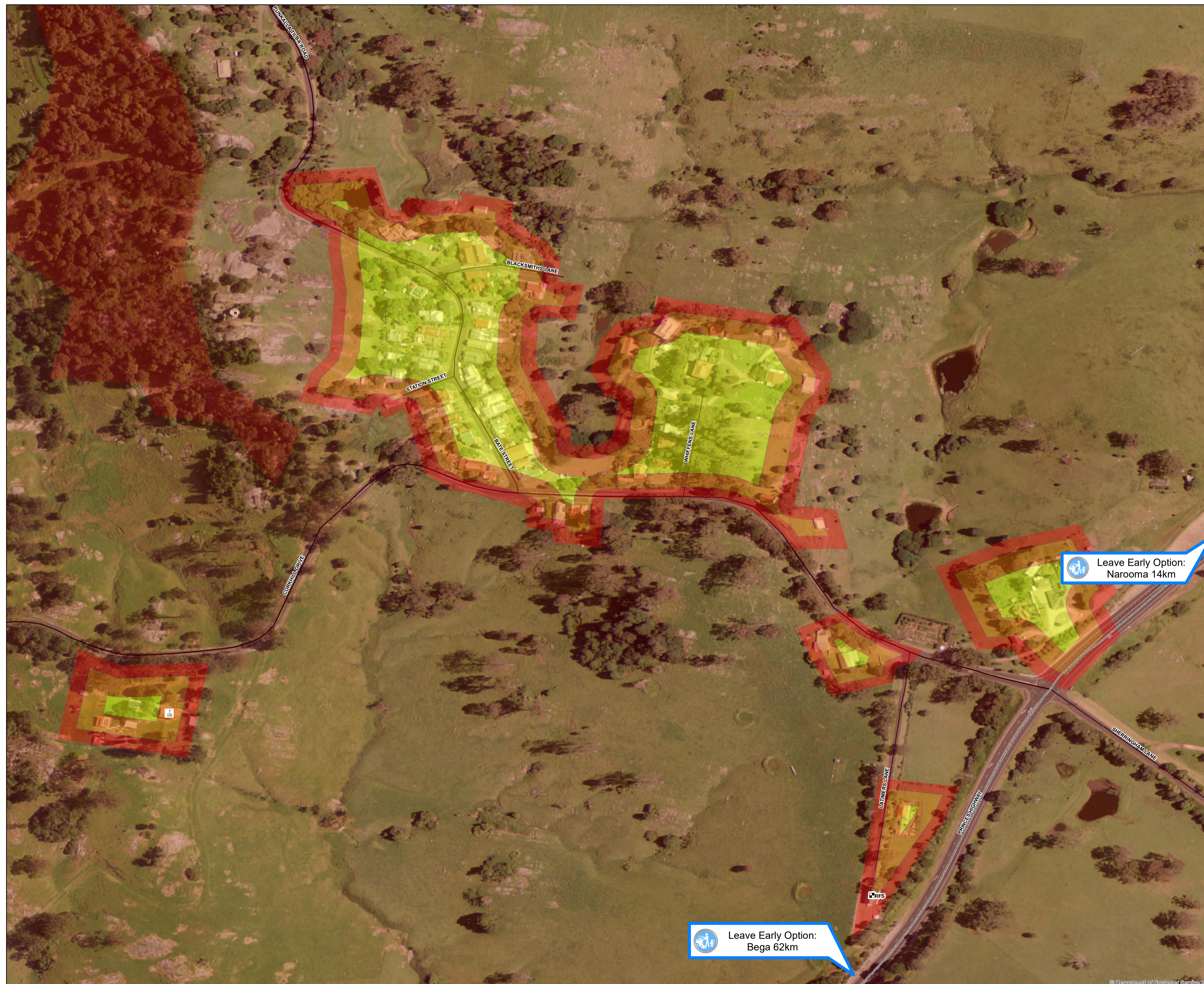
KEEP YOURSELF INFORMED Emergency Local Broadcaster ABC 103.5 FM RTA Traffic Info Line: 132 701 www.facebook.com/nswrfs www.twitter/nswrfs	BUSH FIRE INFORMATION LINE 1800 NSW RFS 1 8 0 0 6 7 9 7 3 7 www.rfs.nsw.gov.au Fires Near Me smart phone application My Road Info smart phone application
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PRODUCTION INFORMATION

Base Data: LPMA Casastre and Topo Database
 Map Projection: GCS GDA 1994
 Print Date: 21 October 2022
 Produced by: NSW RFS Community Protection Planning
 Scale: 1:2200
 BFMC Approval: 13/10/2022

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GET READY FOR A BUSH FIRE

There are four simple steps to get ready for a bush fire:



Get prepared for the Bush Fire Season and make your Bush Fire Survival Plan Now.
 Go to www.myfireplan.com.au and discuss with your family what to do if a fire starts near you.



Appendix B – Tilba District Strategic Plan

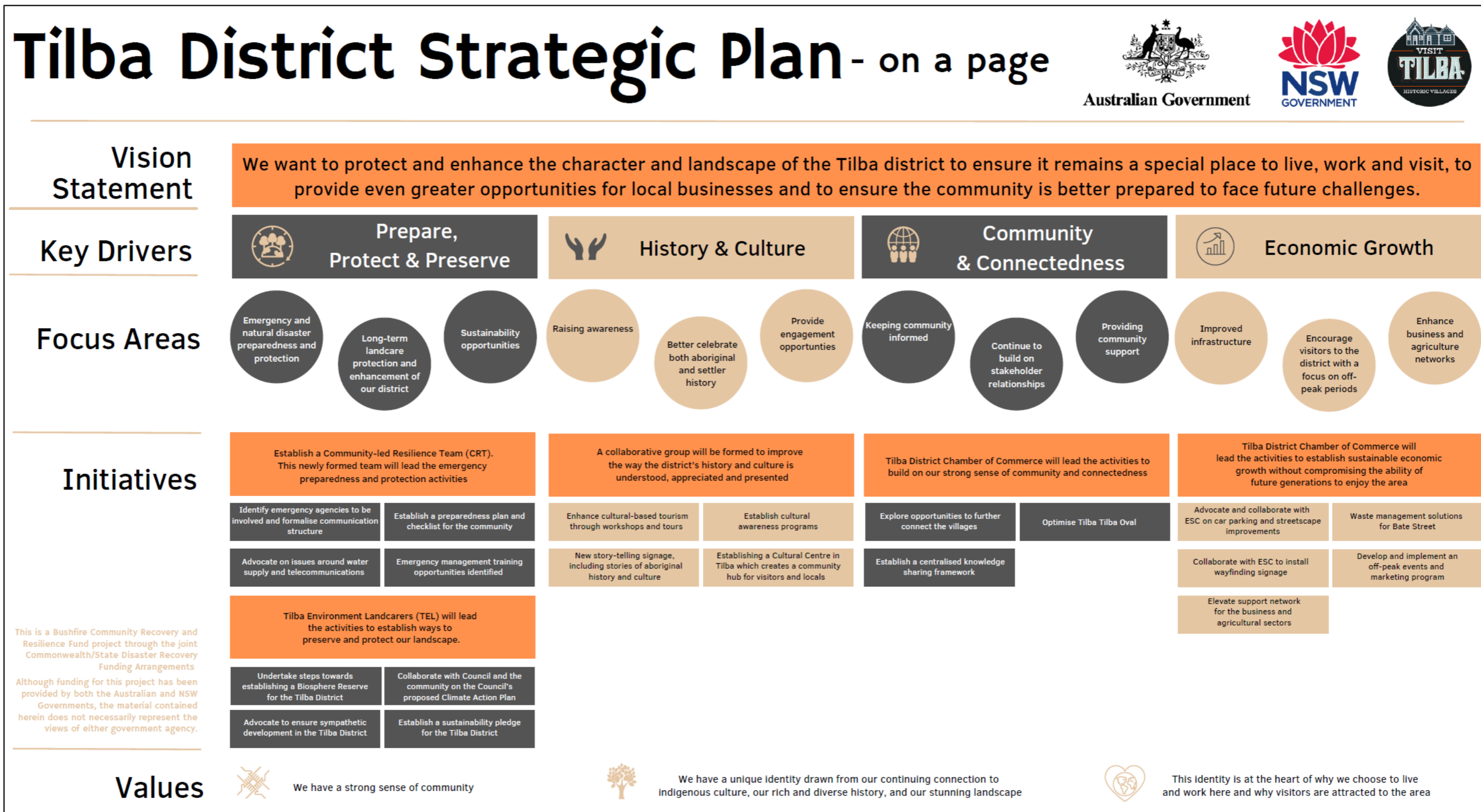


Figure 13: Central Tilba Community Protection Plan – Bush Fire Preparation Plan (Tilba CoC 2022)

Appendix C - Asset Protection Zone and Landscaping Standards

Table 8 contains a list of APZ recommendations to be applied to the proposed APZs within/surrounding Central Tilba Heritage Village as shown in Figure 10. The APZs are to be maintained in perpetuity with management undertaken on an annual basis (as a minimum) and prior to the commencement of the fire season.

These APZ management specifications should be considered for any future landscaping and maintenance within the designated APZ areas (up to 100 m from Village interface). Further details on APZ implementation and management can be found on the NSW RFS website (<https://www.rfs.nsw.gov.au/resources/publications>).

Table 8: APZ management specifications

Vegetation Stratum	APZ Specifications for Village APZ – Internal (Central Tilba Heritage Gardens)	APZ Specifications for 50 m Village APZ - External	APZ Specifications for Landscape APZ (Grassland Areas) from 51-100 m from interface
Trees	<ul style="list-style-type: none"> • Avoid planting large and/or sclerophyllous species (such as eucalypts); • Ensure that if horizontal separation cannot be provided, that overhanging tree canopy is raised to at least 2 m vertical separation from rooflines; and • Preference should also be given to mesic (rainforest or ornamental) species which typically have large glossy green leaves. 	<ul style="list-style-type: none"> • Tree canopy cover should be less than 15% at maturity; • Trees (at maturity) should not touch or overhang the building and lower limbs should be removed up to a height of 2 m above ground; • Canopies should be separated by 2 to 5 m; and • Preference should be given to smooth barked and evergreen trees. 	<ul style="list-style-type: none"> • Remove all tree regeneration from existing grassland areas within 51-100 m of CTHV interface as shown in Figure 10.
Shrubs	<ul style="list-style-type: none"> • Over time, replace organic mulch with inorganic mulch especially within 2 m of the building; • If shrubs are located under trees, preference should be given to mesic or low flammability species over dryer native species with high oil contents; • Avoid shrubby gardens within 2 m of buildings and particularly glazed building elements (windows/doors); and • Climbers should be pruned regularly to prevent them from spreading to rooflines/walls of buildings. 	<ul style="list-style-type: none"> • Create large discontinuities or gaps in the vegetation to slow down or break the progress of fire towards buildings should be provided; • Shrubs should not be located under trees; • Shrubs should not form more than 10% ground cover; and • Clumps of shrubs should be separated from exposed windows and doors by a distance of at least twice the height of the vegetation. 	<ul style="list-style-type: none"> • Remove all shrub regeneration from existing grassland areas within 51-100 m of CTHV interface as shown in Figure 10.
Grass	<ul style="list-style-type: none"> • As per the PBP recommendations listed to the right. 	<ul style="list-style-type: none"> • Should be kept mown (as a guide grass should be kept to no more than 100 mm in height). 	<ul style="list-style-type: none"> • Slash/graze grassland to no more than 100 mm in height.

Appendix D – Building treatment recommendations

Table 9: Building treatment recommendations from individual Bushfire Resilience Plans

Element	Lower cost recommendations	Medium cost recommendations	Higher cost recommendations ¹
Flooring	<ul style="list-style-type: none"> Ensure that any subfloor area remains free of combustible materials. 	<ul style="list-style-type: none"> Cover the underside of any exposed timber flooring with sarking OR Cover underside of any exposed bearers/joists below floors with bushfire compliant mesh² OR Enclose subfloor with non-combustible material or bushfire compliant mesh². 	<ul style="list-style-type: none"> Replace flooring and supports with non-combustible material or bushfire resisting timber (if subfloor not fully enclosed as outlined to the left)³.
Walls/fascia	<ul style="list-style-type: none"> Seal all small gaps around the building with appropriate joining strips or a fire-rated flexible silicon-based sealant or bushfire compliant mesh². 	<ul style="list-style-type: none"> Paint walls/fascia with fire-retardant paint product. Install sarking⁴ behind weatherboards/external cladding when being replaced for maintenance/other reasons. 	<ul style="list-style-type: none"> Install a sprinkler/drenching system (ground based or concealed if heritage is a concern). Install sarking⁴ behind weatherboards/external cladding when they otherwise would not have been replaced. Replace wall cladding/fascia with non-combustible material or bushfire resisting timber³.
Doors/windows	<ul style="list-style-type: none"> Install weather strips, draught excluders or draught seals at the base of all side-hung external doors. Replace or overclad door frames <400 mm above ground or other level surface (e.g. deck/patio) with bushfire resisting timber or metal. 	<ul style="list-style-type: none"> Replace external doors with non-combustible OR solid timber doors with a minimum thickness of 35 mm. Install bushfire compliant mesh screens to all openable windows². Install metal bushfire compliant screens to entire window surface particularly on windows directly exposed to surrounding bushfire hazards. 	<ul style="list-style-type: none"> Replace glass with Grade A safety glass or toughened glass, especially if within 400 mm of ground or other level surface (e.g. a deck/patio). Install fire shutters to all glazed doors/windows.

Element	Lower cost recommendations	Medium cost recommendations	Higher cost recommendations ¹
Vents/eaves/ weepholes	<ul style="list-style-type: none"> • Screen any masonry weepholes with 'Weepa' style product – retrofit product that just pushes into weepholes is available from Bunnings. • Cover wall vents, eave vents and gables with bushfire compliant mesh either externally or internally (especially if heritage is a concern) and seal gaps around the edge of these screens with bushfire rated sealant. 		
Roofs	<ul style="list-style-type: none"> • Seal around roofing and roof penetrations with fire-rated sealant. • Seal ridge capping and roof/wall junction with mineral wool. 	<ul style="list-style-type: none"> • Install sarking⁴ beneath existing roofing when it is being replaced for maintenance or other reasons. 	<ul style="list-style-type: none"> • Install a sprinkler/drenching system (ground based or concealed if heritage is a concern). • Replace any overhead glazing with Grade A safety glass and/or shield with bushfire compliant mesh² or compliant bushfire shutter⁵. • Install sarking beneath existing roofing when it otherwise would not have been replaced.
Gutters and downpipes	<ul style="list-style-type: none"> • Ensure gutters are kept free of debris especially during Bush Fire Danger Period (1 September – 31 March annually unless otherwise gazetted). 	<ul style="list-style-type: none"> • Install non-combustible leaf/gutter guards with suitable gutter flushing system to ensure maintenance. 	
Decking/verandas	<ul style="list-style-type: none"> • Apply fire-retardant paint treatment to existing decks/verandas. 	<ul style="list-style-type: none"> • Replace with bushfire-resisting timber. 	<ul style="list-style-type: none"> • Replace with non-combustible material.

Element	Lower cost recommendations	Medium cost recommendations	Higher cost recommendations ¹
General	<ul style="list-style-type: none"> • If not already in place, install smoke detectors – preferably hard-wired. • Maintain APZ within property to Inner Protection Area (IPA) standards outlined in Appendix C with particular attention to: <ul style="list-style-type: none"> ○ Removing/pruning vegetation close to windows and glass doors; ○ Trimming overhanging branches; and ○ Maintaining lawn/pasture at ≤100 mm. • Ensure LPG cylinder safety valves so they face away from buildings and combustible materials. • Ensure large LPG cylinders are clear of combustible material/vegetation for a minimum of 5 m both vertically and horizontally (including overhanging vegetation from neighbouring property). 		<ul style="list-style-type: none"> • Install a drenching/sprinkler system particularly on walls within 6 m of other buildings (ground based or concealed if heritage is a concern).

¹ All higher cost and some medium cost recommendations will require approval from Council and if uncertain, contact ESC to confirm approval requirements. If original fabric, structural elements, historical details or building form is removed or obscured, a Statement of Heritage Impact and mitigation measures is also likely to be required.

² Corrosion-resistant steel, bronze or aluminium mesh with maximum aperture ≤2 mm.

³ Bushfire resisting timber species: *Eucalyptus sieberi* (Silvertop Ash), *E. pilularis* (Blackbutt), *E. camaldulensis* (River Red Gum), *E. sideroxylon* (Red Ironbark), *Corymbia maculata* (Spotted Gum), *Syncarpia glomulifera* (Turpentine) and *Intsia bijuga* (Merbau).

⁴ Sarking to be non-combustible **OR** meet requirements of AS/NZS 4200.1, installed on outside of frame and have a flammability index ≤5 under AS 1530.2.

⁵ See AS 3959-2018 'Construction of buildings in bushfire-prone areas' for further information on compliant shutters.

* Items highlighted in yellow are higher priority measures primarily relating to ember protection.

Appendix E – Community Fire Unit Information



Source: FRNSW – Community Fire Units, Facebook page.

Overview

The FRNSW Community Fire Unit (CFU) program only operates in FRNSW jurisdiction (urban areas) with significant bushland interface.

Participants must apply to join their local CFU and complete four (4) mandatory CFU eLearning Modules. Upon completion of these modules, they attend a practical equipment session in order to be fully inducted into the CFU Program as an Operational Member.

More information can be found here: <https://www.fire.nsw.gov.au/page.php?id=133>.

CFU Equipment

The CFUs as picture above are generally equipped with the following items:

- Side and rear opening weatherproof box trailer;
- 3 McLeod Tools (rake hoes);
- 2 x 5 HP portable firefighting pumps;
- 2 standpipes (to access hydrants);
- Fuel container(s);
- Hoses/couplings including 38 mm suction hoses, 38 mm percolating (canvas) delivery hoses, various breaches/nozzles;
- Notes whiteboard and community whiteboard.

