CR Bushfire.

BUSHFIRE PLANNING AUSTRALIA

STRATEGIC BUSHFIRE STUDY HALLIDAYS POINT

Prepared for MidCoast Council



Bushfire Planning Australia

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Disclaimer and Limitation

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This report is based on the site conditions surveyed at the time the document was prepared. The assessment of the bushfire threat made in this report is made in good faith based on the information available to Bushfire Planning Australia at the time.

The recommendations contained in this report are considered to be minimum standards and they do not guarantee that a building or assets will not be damaged in a bushfire. In the making of these comments and recommendations it should be understood that the focus of this document is to minimise the threat and impact of a bushfire.

Finally, the implementation of the adopted measures and recommendations within this report will contribute to the amelioration of the potential impact of any bushfire upon the development, but they do not and cannot guarantee that the area will not be affected by bushfire at some time.

Document Status

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Certification

As authors of this Strategic Bushfire Study (SBS), we certify this SBS provides the detailed information required by the NSW Rural Fire Service.



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In signing the above, I declare the report is true and accurate to the best of my knowledge at the time of issue.

Please note that the future upgrade of Old Soldiers Road discussed in this report, is not a viable option at the current time based on constraints in relation to ownership, cost and the required revocation of the National Park

(refer to Agenda item 18.7, Council Ordinary Meeting, 10 December 2025)

Executive Summary

This Strategic Bushfire Study (SBS) has been prepared to guide the preparation of future growth in Hallidays Point. The SBS seeks to:

1. both establish risk and recommend potential treatment mechanisms to mitigate the identified risk to current and future development within the study area.
2. establish the appropriateness of new land release within the study area.
3. acknowledge existing re-zonings and development applications as existing residential context but will not re-visit the appropriateness of those existing approvals.

The bushfire threat within the study area lies predominantly to the west, northwest and southwest with vegetation consisting of Dry Sclerophyll Forest transitioning to Wet Sclerophyll Forest, Rainforest, Forested Wetlands and Heathlands. The minimum level of risk assigned by the MidCoast Bushfire Risk Management Plan is 'High' and the area has a recent wildfire history having been subject to various fire events during the 2019/2020 Black Summer fire season.

A consideration of the climate change impact recommends adopting a higher Forest Fire Danger Index (FFDI) of 100 (rather than 80) to calculate the required setbacks or Asset Protection Zones (APZ) for the Growth Areas. This study shows that even where larger APZs are adopted to account for potential impacts of climate change, there is an insignificant impact on future residential yield. If this approach is adopted by Council, it will need to be secured within future re-zoning and subdivision. A further study may be required to identify appropriate mechanisms to achieve this.

From a landscape perspective, the main fire risk in the area is identified as being isolation of communities in the east of the study area as a result of fire being generated in the west and travelling under predominant north-westerly/westerly wind influences. However, during the Black Summer fires in 2019/2020, Mid-Coast Council reports that whilst North Diamond Beach was threatened by fires driven by northerly to north-westerly winds, Black Head Village was threatened by fires driven by southerly to south-westerly winds. There is clearly significant fire threat within the study area from both the north/north-westerly and southerly directions. Evacuation is a significant potential problem due to the risk of roads being impacted by fire or smoke, the provision of additional evacuation routes is therefore an important measure for consideration.

A Traffic Study, which includes a Bushfire Traffic Study (BTS), prepared by arc traffic + transport identifies capacity issues in a bushfire emergency event on several key routes including Blackhead Road in relation to both the existing approvals and potential land release. Council has explored the opportunity to provide an upgraded and re-aligned Old Soldiers Road to service predominantly Diamond Beach Growth Areas 1, 2 and 3 and provide a secondary access/egress. It is recommended that over and above the existing development application approvals within the study area, no new residential development occurs until at least one additional access route can be provided or additional emergency egress routes are provided and existing routes upgraded within Council owned land and existing fire trails within Khappinghat Nature Reserve is upgraded by NSW National Parks and Wildlife Service (NPWS). This has the potential of alleviating some the peak evacuation capacity issues and providing additional firefighting access and egress.

To augment the movement of residents and visitors, assembly areas may be provided at various locations to function as staging points to dissipate and alleviate the traffic movements on the evacuation routes. Additional relocation facilities may also be required for residents to take refuge, particularly in light of the capacity issues with the current road network and potential for roads within the study area to be impacted within a bushfire event. The provision of these facilities, particularly within Diamond Beach, Red Head and/or Black Head should be considered as a bare minimum, even to take account of existing development application approvals within the study area. 'Safe assembly areas or local refuge areas should be identified for existing and future residents and funding mechanisms investigated for enabling infrastructure.

Discussions with NSW RFS Mid-Coast District office highlighted the need for the existing and new residents to be informed of their bushfire risk, and the need to be able to make informed decisions regarding evacuation. Due to the small number of emergency responders in the area, experiences within the 2019/2020 fire season showed that having an informed community makes a significant difference in aiding emergency resourcing. It is recommended that either a new community bushfire role or community education opportunities be considered to support any new development within the area and included in the future revisions of the Bush Fire Risk Management Plan.

The study area is serviced by the Manning Water Supply Scheme. Any increase in demand resulting from future development of the Urban Growth Areas should not impact water pressure and flow to the study area. Additional static water supplies are recommended within Diamond Beach Growth Area 3 to account for the higher bushfire landscape risk within this area and the potential for active firefighting within this area to provide mitigation. This additional static water provision is an extension of the requirement of *Planning for Bush Fire Protection 2019* to have a water supply which is accessible, reliable and available. It can be included within a site-specific DCP for the growth area or, at the very least, future re-zoning and subdivision of the land should refer back to this report to take a lead on additional provisions required for bushfire protection.

Recommendations of this SBS include the following:

1. The identified URAs could be considered for rezoning based on their ability to provide the appropriate bushfire protection measures, including APZs commensurate with the bushfire risk associated with the required FFDI 80. APZs can be provided for and managed in accordance with Section 5.3a of PBP 2019.
2. APZ setbacks for a climate change scenario can be achieved using an FFDI of 100.
3. Mechanisms such as mechanical fuel reduction, alternative landscaping initiatives, less dependence on reticulated water supplies and improved emergency management planning/procedures may be required to account for climate change.
4. The capacity for the existing road network to deal with future increased densities of evacuating residents and responding emergency services based on the proposed community profiles would need to be improved for any new growth to occur. The preferred option is an upgrade/re-alignment of Old Soldiers Road, along with an additional carriageway in the west bound direction on Blackhead Road. As the primary access to Halliday's Point, road users travelling along Blackhead Road will unavoidably be exposed to a bushfire hazard. Vegetation within the road corridor shall be suitably managed to reduce the fuel load and bushfire hazard.
5. Audit all existing registered and sign posted fire trails within the study area up until the fire trail connects with a sealed public road (eg. The Pines Road up to The Lakes Way). Where required, upgrade to ensure all registered and sign posted fire trails are constructed in accordance with the NSW RFS Fire Trail Standards and NSW RFS Fire Trail Design, Construction and Maintenance Manual.
6. Engage with NSW National Parks & Wildlife Service to extend the audit of fire trails to within land managed by NPWS to assess if a safe continuous path of travel can be provided from the study area (eg. northern section of Tallwood Drive shall continue onto Tallwood Fire Trail C9 through Khappinghat National Park and connect with Old Soldiers Road).
7. Upgrade and extend Eastern Valley Way through to Diamond Beach Road. The unformed section of Eastern Valley Way shall be constructed in accordance with the requirements for a Category 1 Fire Trail outlined in the NSW RFS Fire Trail Standards. This will require a trafficable surface of a minimum 4m wide.
8. The extent of existing water and electricity services within and/or adjacent to the study area is such that an increase in demand should not influence life safety issues associated with fire and proximity to high voltage power lines or detrimentally impact water pressure and flow rates.

9. Additional static water supplies are recommended at Diamond Beach Growth Area 3 to take account of the increased bushfire risk in this location and the likely increase in demand on the reticulated water system based on existing proposals and future urban land release.
10. Consideration should be given to the provision of a bushfire management and community advisory role and/or community engagment/education sessions to provide the community with additional awareness of bushfire risk and evacuation scenarios.
11. Review, in liaison with NSW RFS Mid-Coast District the current adequacy of Fire Brigade stations within and adjacent to the area with emphasis put on firefighter recruits, equipment and increased training opportunities (ie Breathing Apparatus and village training) to cater for future development and capacity particularly in those areas adjacent to substantial areas of bushland.
12. An investigation should be carried out into the need for planning contributions, Voluntary Planning Agreements, Local Environmental Plan controls, Development Control Plan clauses or State led funding mechanisms that could be utilised to ensure implementation of the above recommendations.

The SBS found that the feasibility of development within identified Urban Growth Areas, contingent upon the successful integration of specific recommendations into the planning phases. We emphasise the importance of assessing the impact of additional traffic volumes on the existing road network when proposing new rezonings. Providing the recommendations above can be incorporated into future planning stages, there is no impediment to development occurring within the identified Urban Growth Areas. Any future re-zonings in these areas must consider the impact of the additional traffic volumes and demands on the road network at the time a planning proposal is submitted prior to demonstrating compliance with Ministerial Direction 4.3.

Table of Contents

Terms and Abbreviations **9**

1. Introduction **10**

1.1 Background 10
1.2 The Study Area 13
1.3 Establishing Risk and Applying Treatment 15
1.4 Ministerial Directions 16
1.5 Aim of the Strategic Bushfire Study 17

2 Bushfire Landscape Assessment **18**

2.1 Vegetation 18
2.2 Topography 22
2.3 Weather and Climate 25
2.4 Bushfire Behaviour and Fire History 27
2.5 Fire Intensity Analysis 32

3 Land Use Assessment **36**

4 Access and Egress **39**

4.1 Fire Access and Fire Trails 46
4.2 Temporary Refuge Areas 48

5 Emergency Services **49**

6 Infrastructure **51**

7 Adjoining Land **52**

8 Conclusion and Recommendations **53**

9 References **55**

Figures

Figure 1: Extract from the *MidCoast Housing Strategy* for Hallidays Point 11
Figure 2: The Study Area 14
Figure 3: NERAG Risk Assessment Methodology 15
Figure 4: Vegetation Types Across the Study Area 19
Figure 5: Location of the Study Area within Bush Fire Prone Land 21
Figure 6: Digital Elevation Model (DEM) 23
Figure 7: Slope Analysis LIDAR 24
Figure 8: NSW State Fire History 28
Figure 9: Human Settlement Assets Within Hallidays Point 31
Figure 10: Fire Intensity Analysis of the Study Area 35
Figure 11: Fire Trail Network and Potential Refuge Areas 47

Tables

Table 1: Vegetation Communities and Corresponding Structural Formations and Fuel Loads 20
Table 2: Climate Statistics Recorded at Forster-Tuncurry Marine Rescue Weather Station (BOM Climate Statistics for Australian Locations, March 2020) 25
Table 3: Major Bushfires Within the Study Area (Australian Government, 2022) 29
Table 4: Risk Rating of Assets within Hallidays Point, *MidCoast Bush Fire Management Committee Bush Fire Risk Management Plan (2019)* 30
Table 5: Classification of Bushfire Protection Requirements for Proposed Land Uses Within the MidCoast URAs 36
Table 6: Access/Egress Routes and Density from URAs to Major Road Linkages 40
Table 7: Fire Brigades within 15km of the Study Area 49

Appendices

Appendix A: Fire Intensity Mapping
Appendix B: Photographs
Appendix C: Darawank Nature Reserve Fire Management Strategy 2005 (NPWS)
Appendix D: Khappinghat Nature Reserve & Talawahl Nature Reserve Fire Management Strategy 2005 (NPWS)

Terms and Abbreviations

Abbreviation	Meaning
APZ	Asset Protection Zone
AS2419-2021	Australian Standard – Fire Hydrant Installations
AS3959-2018	Australian Standard – Construction of Buildings in Bush Fire Prone Areas
BAR	Bushfire Assessment Report
BCA	Building Code of Australia
BC Act	NSW Biodiversity Act 2016
BFRMP	Bush Fire Risk Management Plan
BMP	Bush Fire Management Plan
BPA	Bush Fire Prone Area (Also known as Bushfire Prone Land)
BPL	Bush Fire Prone Land
BPLM	Bush Fire Prone Land Map
BPM	Bush Fire Protection Measures
DCP	Development Control Plan
DoE	Commonwealth Department of the Environment
DPI Water	NSW Department of Primary Industries – Water
EPA Act	NSW Environmental Planning and Assessment Act 1979
EPBC Act	Commonwealth Environment Protection and Biodiversity Conservation Act 1999
FDI	Fire Danger Index
FMP	Fuel Management Plan
ha	hectare
HRP	Hunter Regional Plan 2041
IPA	Inner Protection Area
LEP	Local Environmental Plan
LGA	Local Government Area
OPA	Outer Protection Area
OEH	NSW Office of Environment and Heritage
MCC	MidCoast Council
PBP 2019	Planning for Bush Fire Protection 2019
RF Act	Rural Fires Act 1997
RF Regulation	Rural Fires Regulation 2022
RFS	NSW Rural Fire Service
SBS	Strategic Bushfire Study
TSC Act	NSW Threatened Species Conservation Act 1995 (as repealed)
ULM	Urban Land Monitor
URAR	MidCoast Urban Release Areas Report

1. Introduction

1.1 Background

The MidCoast is a large and diverse region of 195 towns, villages and localities stretching from Tea Gardens-Hawks Nest in the south to Crowdy Bay in the North and Barrington Tops in the west. It covers an area of 10,000 square kilometres and ranges from beaches to mountain ranges with the two main population centres being Taree and Forster-Tuncurry. The area has always been seen as a highly desirable place to live and a significant domestic tourism destination.

In May 2016 the MidCoast Council was formed following the amalgamation of Gloucester, Great Lakes and Greater Taree City Councils.

Upon acknowledgement of growing metropolitan areas and greater economic diversification within the Hunter[1], in December 2022 the State government released the *Hunter Regional Plan 2041* (HRP). The Plan was developed to further cement economic growth by guiding NSW government land use planning priorities and defining population growth aspirations and delivery of associated dwellings over a 20 year period. The plan established a target for housing delivery of 5,000 dwellings in the MidCoast by 2036, an approximate 10% increase (note this figure also includes Dungog LGA).

In order to examine residential settlements identified within the HRP, MidCoast Council in October 2019, developed the *Urban Land Monitor Report 2016-2036* (ULM*)*. The report looked at future demand and key considerations to be addressed in order to guide future residential growth in a sustainable way. With regard to Hallidays Point, the report identified the demand for dwellings by 2036 as being 1,837 at the current population projection (of 3.74% per year) and 2,205 under a high growth scenario. Currently, land which is currently being developed or already approved for future development can provide an additional 1,780 additional dwellings, including aged care and tourist facilities.

The 2020/2021 Covid-19 boom saw the expansion of population into regional areas in an effort to seek a quieter lifestyle, and this was facilitated by enhanced capabilities associated with being able to work from home. The boom resulted in land being taken up as soon as it became available to the market in the coastal settlements of Forster, Hallidays Point (particularly Diamond Beach) and Tea Gardens. The ULM projections together with the Covid-19 boom have resulted in the area now being identified as a hotspot to concentrate efforts on for rezoning Urban Release Areas in the short term following the preparation of the proposed future growth study of Hallidays Point.

The *MidCoast Urban Release Areas Report (URAR)* developed in July 2021 identified land that could be rezoned for residential and employment land uses in order to meet the demand of housing, business and industrial growth. The development of urban release areas is subject to a rezoning process where detailed investigations are undertaken to determine the appropriate site use, constraints, capability and future yield.

The *MidCoast Housing Strategy (MHS)* was publicly exhibited in January 2020 and finalised in October 2021 following the release of the URAR. This strategy was prepared to guide residential zoning and controls within the future consolidated MidCoast LEP. The strategy identified the opportunities and constraints within the current housing market and housing needs of the future. Specifically, in relation to Hallidays Point, the strategy recommends:

- reinforcing the definition and character of each of the villages, maintaining separation through vegetation or open space.
- facilitating connection between the villages to encourage pedestrian and cycle movements.
- facilitating redevelopment and growth in existing areas through a mix of flexible and more traditional zoning approaches.
- ensuring consistency in built form through the retention of existing height controls.
- encouraging future urban infill development in appropriate urban residential areas.

- encouraging medium density residential in the tourist precinct at North Diamond Beach subject to master planning of the area.

1 The Hunter includes the MidCoast, Port Stephens, Newcastle, Lake Macquarie, Maitland, Cessnock, Singleton, Muswellbrook, Upper Hunter, Dungog LGAs

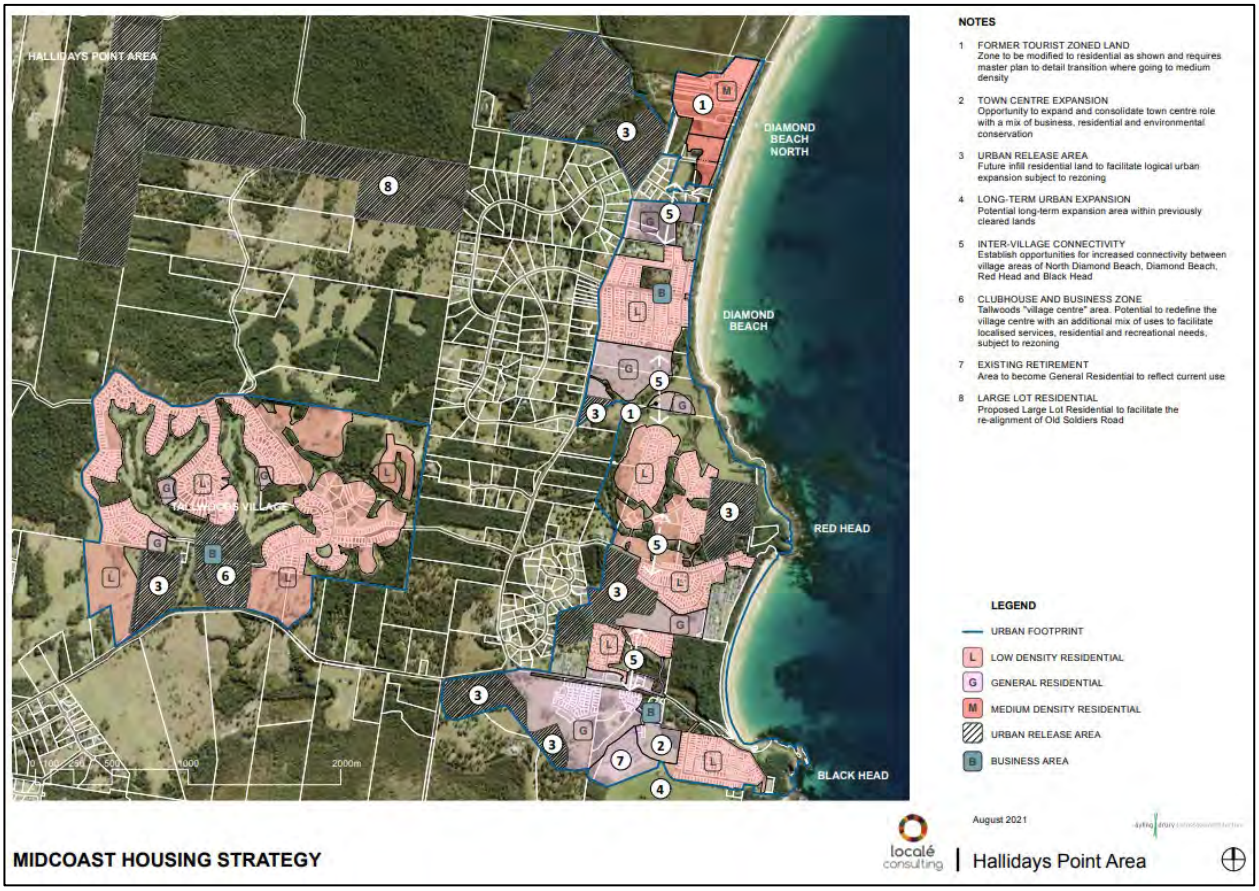


Figure 1: Extract from the *MidCoast Housing Strategy* for Hallidays Point

As part of MidCoast Council's investigations into site constraints and capabilities of future urban release areas, Bushfire Planning Australia (BPA) in collaboration with CR Bushfire (CRB), have been engaged to undertake a Strategic Bushfire Study (SBS) that addresses the specifications and requirements within Chapter 4 of *Planning for Bush Fire Protection 2019* (PBP 2019). In a bushfire context, strategic planning must ensure future land uses are sited in appropriate locations to minimise the risk to human life and property from the threat of bushfire attack.

There are a number of existing areas of land zoned for residential development and development application approvals within the study area which allow for an increase in population. These existing approvals allow for an increase in the number of dwellings within the study area of 1,652, 95 aged care beds and 284 tourist accommodation rooms / sites). This SBS does not consider the strategic appropriateness of any existing zoning for residential development or development applications approved. The existing approvals and potential population expansion under the existing approvals does, however, provide context for the Strategic Bushfire Study in terms of evacuation potential and additional pressure on emergency management resources. It will therefore be considered as context within each section of the study, where relevant.

The SBS aims to assess the appropriateness of increasing population densities on properties identified as being located on or adjacent to bushfire prone land, as identified on the MidCoast Council Bush Fire Prone Land Map (BFPLM). The SBS adopts a broad landscape scale approach to assess the bushfire risk, likely fire runs, appropriateness of land use, adequacy of broadscale

access/egress and services infrastructure and the proposals impact on existing emergency service response and adjoining land owners.

Conclusions derived from this report will determine the appropriateness of the URAs in their bushfire risk context and compliance with the aim and objectives of PBP 2019, particularly in light of existing residential, aged care and tourism approvals within the study area.

1.2 The Study Area

Hallidays Point, located in the MidCoast region of NSW, is made up of the villages of Tallwoods, Diamond Beach, Red Head, Black Head and the southern part of Rainbow Flat. It is located on the east coast of NSW and the forested Darawank National Park, Khappinghat National Park, Talawahl Nature Reserve, Talawahl State Conservation Area and Kiwarrak State Forest. Besides National Parks and State Forests, there are also large parcels of forested private property and Council owned and managed land interspersed amongst the cleared rural and urban landscape just west of the eastern coast line.

Historically the area has been dominated by agriculture, tourism and retirement living. It has significant biodiversity values in its Koala and Squirrel Glider populations that council is looking to conserve by paralleling future growth with environmental protection to avoid increasing the already present stresses to their abundance.

Hallidays Point is accessed off the A1 Pacific Highway from The Lakes Way or Failford Road, with the northern section running in a northerly direction from Tuncurry to Rainbow Flat. Access/egress routes to the locality from The Lakes Way are via Blackhead Road, Tallwood Drive and Old Soldiers Road (indirectly). A roundabout was recently completed at the intersection of The Lakes Way and Blackhead Road.

The structure of Hallidays Point exhibits a range of older style coastal villages (such as Black Head, Diamond Beach and Red Head) combined with more recent subdivisions and master planned communities such as Tallwoods and Seascape at Red Head.

With regards to future growth, Hallidays Point currently consists of land that is:

- already developed or developing;
- vacant or contains a house;
- land that is either zoned for future development or has an existing development approval; or
- earmarked for urban release as per the Midcoast Urban Release Areas Report (URAR).

The basis for this study is to assess the likely bushfire risk and suitability of increased densities within the areas earmarked for urban release whilst also taking into account the exisiting and potential population increases already proposed and/or projected for the area.

There are currently ten urban release areas identified for Hallidays Point (**Figure 2**). Note that Red Head Growth Area 3 (16 Meers Drive and Lot 3 Hope Street) splits into two URAs at the end of the Urban Release Area Report. All ten either contain or are adjacent to bushfire prone vegetation (as mapped in accordance with the requirements of the *Rural Fires Act 1997)* and/or are located in areas accessed by road networks, that could be impacted by fire. To this effect it is imperative that future planning and development consider community risk and operational response to the area.

Project: Hallidays Point URA
Job No: 2223

Figure 2

Study Area

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Study Area

Hallidays Urban Release Area

Suburb Boundaries

SOURCE:

Aerial photo: Nearmap 24/01/2021

N
W E
S

0 500 1,000 1,500
Meters

A3 Scale: 1:35,000

File:2223-HallidaysPoint-Fig1-Site-Location-241021

Date: 21/10/2024

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1.3 Establishing Risk and Applying Treatment

The Strategic Bushfire Strategy (SBS) process was introduced in NSW by Planning for Bush Fire Protection 2019 (PBP 2019). The SBS follows the principles of strategic planning generally in taking a long-term approach to land use planning and development expectations. The SBS aims to minimise or avoid the impact of natural hazards by taking a risk-based approach to the assessment of strategic planning policies and proposals. The SBS uses a macro-scale assessment, creates a risk profile and seeks treatment strategies to respond to the risk.

There are a number of national level guidance documents which provide helpful guidance in preparing strategic studies for natural hazard resilience. At a high level, the stage is set for consideration for natural hazards in strategic planning by the *Sendai Framework for Disaster Risk Reduction 2015 - 2030* (UNDRR, 2015), *The National Disaster Risk Reduction Framework* (Australian Government Department of Home Affairs, 2018), *Profiling Australia's Vulnerability: The interconnected causes and cascading effects of systemic disaster risk* (Australian Government Department of Home Affairs, 2018) and the *National Strategy for Disaster Resilience* (COAG 2011).

The *Land Use Planning for Disaster Resilient Communities* (the Handbook) published in 2020 by the Australian Institute for Disaster Resilience (AIDR) focuses on reducing disaster risk by improving strategic planning processes. The handbook aims to reduce both vulnerability and exposure of communities to natural hazard scenarios.

By considering natural hazards early and through its processes, land use planning can evaluate and select land use mechanisms to treat disaster risk.

The actions proposed by the Handbook are to understand disaster risk, make accountable decisions, establish governance, ownership and responsibility and ultimately, attract enhanced investment to reduce the risk. Ultimately, the goal is to make decisions which avoid risk. However, accepting that some level of risk is inevitable, the concept of risk tolerance and acceptable risk is highlighted. The Handbook uses a key principle introduced by the Planning Institute of Australia *National Land Use Planning Guidelines for Disaster Resilient Communities* (2015) which is the ALARP principle (As Low As Reasonably Practicable). This revolves around identifying risks that are broadly acceptable, tolerable, or generally intolerable and requires the identification of risk treatment options to move more towards the tolerable or broadly acceptable categories.

The Handbook also highlights the role that land use planning can play in climate change mitigation and adaptation. Future climate change models should be identified and utilised in the process of data gathering and analysis, whilst also acknowledging the uncertainties associated with those models.

The relationship with emergency management principles is highlighted by the Handbook. The integration of risk management and land use planning is recommended. The National Emergency Risk Assessment Guidelines produced by AIDR sets out the following structure for evaluating risk and applying risk treatment (taken from NERAG):

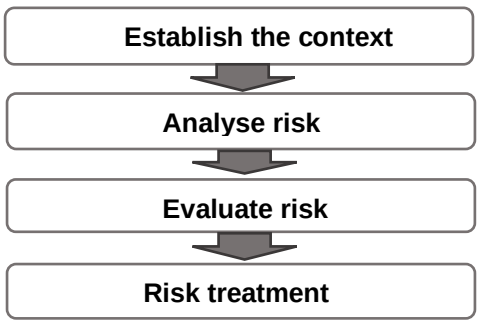


Figure 3: NERAG Risk Assessment Methodology

This process is appropriate for the SBS and will be followed to establish the risk and determine recommended risk treatments.

1.4 Ministerial Directions

Legislatively, planning proposals must follow the Ministerial Directions under Section 9.1(2) of the *Environmental Planning and Assessment Act 1979 (*EP&A Act*)*. Direction 4.3 requires a planning proposal, that will affect or is in proximity to land mapped as bushfire prone land, to have regard to PBP 2019, introduce controls that avoid placing inappropriate developments in hazardous areas and ensure that bushfire hazard reduction is not prohibited within the APZ.

A planning proposal must, where development is proposed, comply with the following provisions, as appropriate:

(1) In the preparation of a planning proposal the relevant planning authority must consult with the Commissioner of the NSW Rural Fire Service following receipt of a gateway determination under section 3.34 of the Act, and prior to undertaking community consultation in satisfaction of clause 4, Schedule 1 to the EP&A Act, and take into account any comments so made.

(2) A planning proposal must:

(a) have regard to Planning for Bushfire Protection 2019,

(b) introduce controls that avoid placing inappropriate developments in hazardous areas, and

(c) ensure that bushfire hazard reduction is not prohibited within the Asset Protection Zone (APZ).

(3) A planning proposal must, where development is proposed, comply with the following provisions, as appropriate:

(a) provide an Asset Protection Zone (APZ) incorporating at a minimum:

i. an Inner Protection Area bounded by a perimeter road or reserve which circumscribes the hazard side of the land intended for development and has a building line consistent with the incorporation of an APZ, within the property, and

ii. an Outer Protection Area managed for hazard reduction and located on the bushland side of the perimeter road,

(b) for infill development (that is development within an already subdivided area), where an appropriate APZ cannot be achieved, provide for an appropriate performance standard, in consultation with the NSW Rural Fire Service. If the provisions of the planning proposal permit Special Fire Protection Purposes (as defined under section 100B of the Rural Fires Act 1997), the APZ provisions must be complied with,

(c) contain provisions for two-way access roads which link to perimeter roads and/or to fire trail networks,

(d) contain provisions for adequate water supply for firefighting purposes,

(e) minimise the perimeter of the area of land interfacing the hazard which may be developed,

(f) introduce controls on the placement of combustible materials in the Inner Protection Area.

The SBS comprehensively addresses Ministerial Direction 4.3. The Study effectively integrates the requirements of PBP 2019, introduces substantial protection measures against inappropriate developments in hazardous locations, and ensures the provision and maintenance of APZs are clearly supported.

Overall, the SBS provides robust strategies that align well with the legislative and policy intent of Ministerial Direction 4.3. It appropriately considers strategic, tactical, and operational bushfire protection measures necessary for the proposed land uses, providing a solid basis for Council and NSW RFS endorsement.

1.5 Aim of the Strategic Bushfire Study

In accordance with Planning for Bushfire Protection (PBP 2019), the Stategic Bushfire Study (SBS) is a high level assessment that identifies land affected by natural hazards and directs development away from inappropriate and constrained lands. In a bush fire context, strategic planning must ensure that future land uses are in appropriate locations to minimise the risk to life and property from bush fire attack. Services and infrastructure that facilitate effective suppression of bush fires also needs to be provided for at the earliest stages of planning.

The bushfire risk is considered at the macro-scale, looking at fire runs, steep slopes and any areas of isolation. The amount of proposed development interfacing vegetation is also considered. Firefighting access and evacuation potential must be considered and an assessment of traffic volumes and evacuation routes will be required. The potential for these evacuation routes to be non-trafficable during a bush fire event will be factored into the assessment.

This SBS follows the considerations outlined within Table 4.2.1 of PBP 2019 to identify and analyse the risk profile and apply risk treatment measures.

The aim of the SBS is to meet the following principles:

- ensure land is suitable for development in the context of bush fire risk;
- ensure new development on bush fire prone land will comply with PBP 2019;
- minimise the reliance on performance-based solutions;
- provide adequate infrastructure associated with emergency evacuation and firefighting operations; and
- facilitate appropriate ongoing land management practices.

2 Bushfire Landscape Assessment

A bushfire landscape assessment considers the likelihood of a bushfire approaching an area, its potential severity and intensity, and the resultant impact on life and property in the context of the broader surrounding landscape.

With regard to the Hallidays Point study area, the bushfire hazard, potential fire behaviour, history of bushfires and fire runs, and operational response was assessed with the outcomes addressed in the following sections.

2.1 Vegetation

An assessment of vegetation is important in determining risk as different types of vegetation burn differently across the landscape. This is largely due to location and topography, structure and arrangement and available surface, elevated and canopy fuel loads.

Grasses and heath burn more quickly and erratically with fire consuming a large proportion of the plant matter, as they are influenced by finer fuels, open air, exposed drying conditions and variations in wind speed and direction, whilst forests burn with greater intensity due to substantial amounts of taller, dense and woodier fuels. The amount of plant matter consumed by forest fires also varies due to the availability of fine fuel loads, fuel moisture and localised wind conditions.

It is these traits in vegetation that determine potential radiant heat and flame characteristics which in turn define building setback requirements in accordance with PBP 2019.

Vegetation within the study area has been mapped by Cumberland Ecology, with this work supported by onsite field investigations in accordance with the site assessment methodologies within Appendix 1 of PBP 2019 (carried out by Bushfire Planning Australia and CR Bushfire between the 9th and 11th May 2022).

The landform progresses from the ridgelines and upper slopes of Kiwarrak State Forest and Talawahl National Park just west of the Pacific Highway (A1), to the foot hills and low lying flats of the coastal fringe there is a change in vegetation structure. Dry Sclerophyll Forest communities transgress to Wet Sclerophyll Forest, Rainforest, Forested Wetlands and Heathlands as the landscape becomes dominated by protected gullies, deeper alluvial soils, riparian corridors, lagoons and coastal plain influences.

The vegetation communities within the study area have been characterised into structural formations according to David Keith (2004) *Ocean Shores to Desert Dunes* and PBP 2019 to determine likely maximum fuel loads in accordance with the NSW RFS fact sheet *Comprehensive Vegetation Fuel Loads (2019)* (Table 1). Mapping of the vegetation within the entire study area is provided in **Figure 4**.

Project: Hallidays Point URA
Job No: 2223

Figure 4

NSW State Vegetation Type - Class

BUSHFIRE PLANNING AUSTRALIA

- Study
- Hallidays Urban Release Area

Vegetation Class

- Coastal Dune Dry Sclerophyll Forests
- Coastal Floodplain Wetlands
- Coastal Freshwater Lagoons
- Coastal Headland Heaths
- Coastal Heath Swamps
- Coastal Swamp Forests
- Dry Rainforests
- Hunter - Macleay Dry Sclerophyll Forests
- Littoral Rainforests
- Mangrove Swamps
- Maritime Grasslands
- North Coast Wet Sclerophyll Forests
- Northern Hinterland Wet Sclerophyll Forests
- Northern Warm Temperate Rainforests
- Not native vegetation
- Saltmarshes
- Subtropical Rainforests
- Wallum Sand Heaths

SOURCE:
Vegetation: Pre-Release v1.1.0 Eastern NSW
Vegetation Type: NSW Department of Planning, Industry and Environment 2021
Aerial photo: Nearmap 24/01/2021

N W E S

0 500 1,000 1,500
Meters

A3 Scale: 1:35,000

File:2223-HallidaysPoint-Fig3b-SVT-Class-241021

Date: 21/10/2024

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Table 1: Vegetation Communities and Corresponding Structural Formations and Fuel Loads

Vegetation Community	Structural formation (Keith 2004)	Structural formation (PBP 2019)	Overall fuel load (including surface, elevated, bark and canopy) tonnes/ha
North Coast Wet Sclerophyll Forest	Wet Sclerophyll Forest (Shrubby)	Forest	35.98
Northern Hinterland Wet Sclerophyll Forest	Wet Sclerophyll Forest (Grassy)	Forest	33.1
Hunter Macleay Dry Sclerophyll Forest	Dry Sclerophyll Forest (Shrub/Grass)	Forest	24.6
Wallum Sand Heath	Tall Heath	Tall Heath	36.9
Coastal Swamp Forest	Forested Wetland	Forest	34.1
Coastal Floodplain Wetland	Forested Wetland	Forested Wetland	15.1
Littoral Rainforest/Dry Rainforest	Rainforest	Rainforest	13.2
Maritime Grassland	Grassland	Grassland	6.0
Coastal Freshwater Lagoons	Freshwater Wetland	Freshwater Wetland	4.4
Saltmarsh	Saline Wetland	Excluded	-

Although development and farming on the coastal fringe east of the Pacific Highway (A1) and The Lakes Way has to some extent reduced the amount and continuity of vegetation that influences fire behaviour, there are still significant forested corridors and rural lands to allow fire transfer to the residential areas. This is illustrated within the Bush Fire Prone Land Map for the study area (**Figure 5**). The extension and enhancement of vegetative corridors within the study area and adjacent to the URAs will lead to a greater bushfire risk infliltrating the study area.

Preservation of these nodes of habitat and corridors of vegetation for the purpose of maintaining biodiversity and conservation values local to the area (specifically with regard to Koala and Squirrel Glider populations) has historically seen fire paths leading into Hallidays Point, with the most recent being the 2019/2020 fire season, and will continue to see fire influences into the future. With this in mind, it is imperative that provisions be made in any future planning proposals for adequate setbacks commensurate with vegetation type and structure. Any enhancement or reintroduction of unmanaged bushfire fuels will influence the depth of required setbacks. The potential benefits of embellishing vegetation corridors shall be balanced with providing appropriate setbacks that are required to be managed as an Inner Protection Area (IPA).

Section 3 of this report addresses Asset Protection Zones and building setbacks within the study area to achieve radiant heat levels of ≤29kW/m^2.

Project: Hallidays Point URA
Job No: 2223

Figure 5

NSW Bush Fire Prone Land

BUSHFIRE PLANNING AUSTRALIA

Study Area
Hallidays Urban Release Area

Bushfire Prone Land

Vegetation Category 1
Vegetation Category 2
Vegetation Category 3
Buffer

SOURCE:

Aerial photo: Nearmap 24/01/2021
NSW Bush Fire Prone Land: NSW Rural Fire Service 2021

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Meters

A3 Scale: 1:35,000

File:2223-HallidaysPoint-Fig2a-BFPL-Overview-241021

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2.2 Topography

Topography and slope play a significant role in influencing the rate of fire spread and fire behaviour in relation to the potential for canopy involvement.

Research shows that the speed of an advancing bushfire front will double with every 10 degree increase in slope, so that on a 20 degree slope, its speed of advancement is four times greater than on flat ground. This is because the radiation and convection a fire creates preheats the unburned fuel ahead of the fire front causing it to combust at a quicker rate. This is done more effectively upslope than down. Fuel distributed across every layer of the vegetation community, in effect creating a ladder, also contributes to the likelihood of fire transfer to the canopy. This transfer is also more effective on steeper slopes.

Digital Elevation Modelling (DEM) shows us the topography within the locality of Hallidays Point ranges from peaks at 260 metres above sea level to the west of the Pacific Highway (A1) in the Talawahl National Park to the foothills of Tallwoods Village 104 metres above sea level to the floodplain troughs of 0 metres above sea level along the eastern coastline (**Figure 6**).

An assessment of the effective slope (that which sits underneath the bushfire hazardous vegetation) impacting the study area was undertaken using LIDAR point cloud data, DEM (NSW LPI) and results from field investigations carried out in May 2022.

An assessment of the slope over a distance of 100m in the hazard direction, as is required within Appendix 1 of PBP 2019, was undertaken. Results revealed slopes within the study area varied across the landscape from greater then 20 degrees in bushland immediately north/north-west of Tallwoods Village in Rainbow Flat, to between 10 and 20 degrees in the valleys between Rainbow Flat, Tallwoods Village and Red Head and 0 to 10 degrees as the landscape progresses to the coastal villages of Diamond Beach and Black Head (**Figure 7**).

Planning for Bush Fire Protection 2019 generally assigns larger setbacks to development on steeper slopes, where the bushfire threat is downhill and has the potential to increase the rate of spread and intensity of bushfire.

Section 3 of this report addresses Asset Protection Zones and building setbacks commensurate with slope surveyed within the study area to achieve radiant heat levels ≤29kW/m^2.

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Job No: 2223

Figure 6

Digital Elevation Model

BUSHFIRE PLANNING AUSTRALIA

Study Area

Hallidays Urban Release Area

Contour (20m)

Contour (10m)

Elevation (AHD)

High : 112m

Low : 0m

SOURCE:
Surface analysis: Derived from LiDAR - BULAHDELAH & FORSTER 1 metre Resolution Digital Elevation Model © Department Finance, Services and Innovation 2012

N W E S

0 500 1,000 1,500
Meters

A3 Scale: 1:35,000

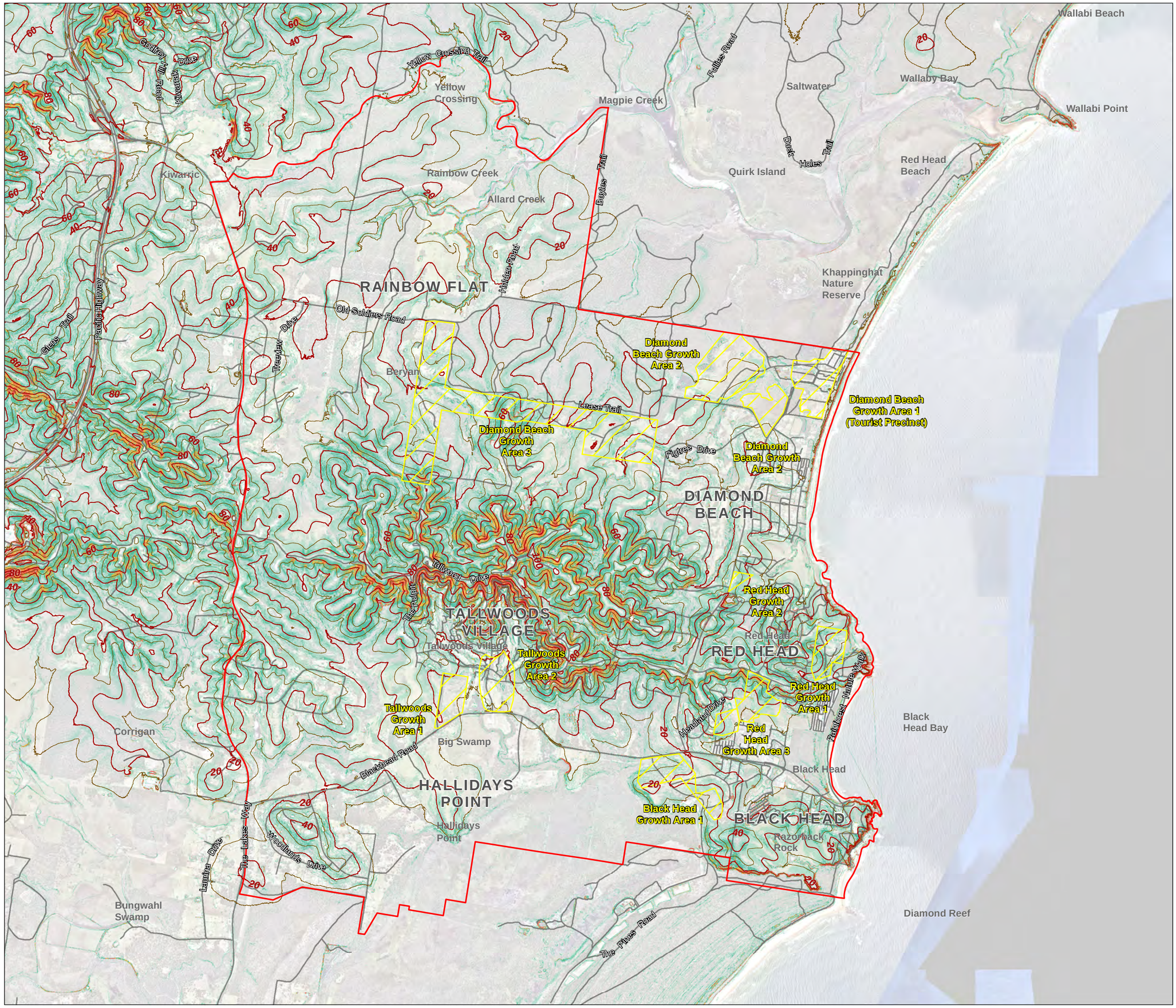
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Job No: 2223

Figure 7

Slope Analysis: LiDAR

BUSHFIRE PLANNING AUSTRALIA

- Study
- Hallidays Urban Release Area
- Contour (20m)
- Contour (10m)

Slope

- 0° - 5°
- 5° - 10°
- 10° - 15°
- 15° - 20°
- >20°

SOURCE:
Surface analysis: Derived from LiDAR - BULAHDELAH & FORSTER 1 metre Resolution Digital Elevation Model © Department Finance, Services and Innovation 2012

N W E S

0 500 1,000 1,500
Meters

A3 Scale: 1:35,000

File:2223-HallidaysPoint-Fig5-SlopeLiDAR-241021

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2.3 Weather and Climate

The typical/average climate varies across the MidCoast LGA from warm temperate, with a summer rainfall pattern, to a humid subtropical climate characterised by warm humid summers and mild winters along the coastal area. The climate of the western section of the LGA is tempered by elevation. In these higher altitudes, areas experience lower temperatures, higher rainfall and slower drying conditions than on the coast.

The official bushfire danger period in the North Coast Fire Weather Area (which includes the MidCoast LGA as designated by the NSW RFS and the Bureau of Meteorology - BOM) ordinarily begins on 1 September and ends on 31 March. According to the *Mid Coast Bush Fire Management Committee Bush Fire Risk Management Plan (2019)* (BFRMP) however the bush fire season for the MidCoast LGA generally starts earlier and runs from July to November extending into December or January during periods of low rainfall.

Strong north-west to south-west winds often prevail within this time of year, particularly the month of August. Longer bush fire seasons occur when summer rainfall is lower than normal, with the bush fire season extending through Summer to early Autumn. Serious fires have occurred late in the season under dry summer conditions.

Prevailing weather conditions are dominated by dry north-westerly winds, usually associated with high pressure systems and the passage of cold fronts. Extended periods of low rainfall and the resultant fuel moisture deficiencies, combined with high temperatures and hot dry westerly winds form the circumstances for high intensity fires to develop.

Although Summer rains generally bring an end to the fire season, short dry spells can create extensive wildfires in the region as late as April. Generally, these fires have proved to be less damaging than those occurring in Spring and early Summer.

The Forest Fire Danger Index (FFDI) given to the North Coast region is 80. The index is calculated from weather station data and is based on representative values of wind speed, temperature, humidity and fuel conditions.

The index represents a 1:50 year fire weather scenario and is applied to methodologies in calculating anticipated bushfire attack levels. It is possible that due to local variations in elevation, slope, and aspect, FFDI values at any point location may reflect values which are higher or lower then 80 resulting in different rates of fire spread across a landscape. **Table 2** provides a brief overview of point location weather data recorded at Forster-Tuncurry Marine Rescue (closest weather station with climate statistics to Hallidays Point).

Table 2: Climate Statistics Recorded at Forster-Tuncurry Marine Rescue Weather Station (BOM Climate Statistics for Australian Locations, March 2020)

Weather Station	Forster-Tuncurry Marine Rescue
Mean maximum temp (degrees)	Highest 26.6 (January), Lowest 18.4 (July)
Highest temp (degrees)	43 (1 Dec 2004)
Mean number of days ≥ 30 degrees	1.9 (January)
Mean rainfall (mm)	Highest 151.6 (March), Lowest 66.4 (September)
Mean 3pm relative humidity (%)	Highest 74 (February), Lowest 59 (August)
Mean 3pm windspeed (km/h)	Highest 21.7 (November), Lowest 14.9 (June)
Lowest temp (degrees)	1 (29 May 2019)
Mean minimum temp (degrees)	Highest 19.7 (January), Lowest 8.7 (July)

Climate change is influencing the frequency and severity of dangerous bushfire conditions in Australia. Fire risk is affected by four main factors, fuel load, fuel dryness, weather and ignition. Understanding the impacts of climate change on bushfires in NSW, relies on how climate change might affect these factors.

- vegetation (i.e. fuel) growth will be affected by global increases in greenhouse gas emissions such as carbon dioxide as well as changes to rainfall patterns.
- climate models have predicted that NSW will experience warmer drier periods of weather, drying vegetation and increasing bushfire risk. The 2019/2020 Black Summer bushfire season was predeeded by three years of increasing drought conditions.
- the risk of fire is increased by low rainfall and humidity and high temperature and wind speeds. There have been significant changes observed in recent decades towards more dangerous bushfire weather conditions for various regions of Australia. Observed changes in southern and eastern Australia include an earlier start to the bushfire season with dangerous weather conditions occurring significantly earlier in spring than they ever used to.
- in relation to fire ignition, there is some indication that climate change could influence the risk of ignitions from dry-lightning storms. Additionally, there has recently been a number of devastating fire events in Australia associated with extreme pyroconvection (including thunderstorm development in a fire plume), with recent research indicating a long-term trend towards increased risk factors associated with pyroconvection in southeast Australia.

According to the BFRMP, based on long-term (1910–2011) observations, temperatures have been increasing in the North Coast Region since about 1970, with higher temperatures experienced in recent decades. This warming trend is expected to continue, with anticipated considerable rainfall variability across seasons and from year to year. These projected changes include increasing maximum and minimum temperatures, increasing number of hot days, decreasing number of cold nights together with winter rainfall and increasing Autumn and Spring rainfall. Average fire weather and severe fire weather days are projected to increase in Summer and Spring.

In addition to the changing weather conditions, it is anticipated that the potential for wildfire ignition will increase and fuels may also change. There is increased capacity for lightning strikes within the landscape due to potentially more volatile weather conditions, increased ignition potential could lead to more challenging firefighting conditions. Over the longer term, fuels can become drier, areas of forested wetland or rainforest could become drier with a higher propensity to burn. The increased risk of hotter fires occurring on a more regular basis can also increase the risk of vegetation communities such as rainforest being impacted more frequently by fire and taking hundreds of years to recover (NSW Department of Planning and Environment, 2021).

In planning for the future it is therefore imperative that development takes into consideration projected climate and associated fire behaviour to limit the impacts on lives, homes, economy and the environment. In order to do this, Asset Protection Zone (APZ) distances should be based on an FFDI of 100, rather than the FFDI of 80 currently required for the North Coast Fire Weather District.

In planning for a climate change future, the following mechanisms are recommended:

- increased setbacks from bushfire hazardous vegetation (ie using building setbacks commensurate with an FFDI 100),
- mechanical fuel reduction, where achievable, as opposed to controlled burning,
- improved emergency management planning and procedures.

2.4 Bushfire Behaviour and Fire History

Information on fire history is a useful factor in understanding fire frequency and bushfire risk. Review of available fire history data within and surrounding the MidCoast LGA indicates a number of fires both large and small that have occurred over the last 60 years, as far back as publicly available mapping records show. These fires have historically followed the larger tracts of vegetation that surround the rural and urban interface impacting from the west, north-west and south-west (**Figure 8**).

According to the Bush Fire Risk Management Plan (BFRMP) the MidCoast LGA has on average 730 bush and grass fires per year, of which 82 on average can be considered to be major fires. The main sources of ignition include:

- escapes into forested areas from legal burning off;
- incendiarism / arson in both grassland and forested areas of which increased visitation is thought to be a contributing factor;
- re-ignition of previous wildfire or hazard reduction;
- illegal burning off; and
- lightning associated with late spring and summer thunderstorm activity.

Project: Hallidays Point URA
Job No: 2223

Figure 8

NSW State Fire History

BUSHFIRE PLANNING AUSTRALIA

Study Area
Hallidays Urban Release Area
Suburb Boundaries

Wild Fire Id

0
658
661
4243
4780
5622
10217
12628
13513
17788
19861
21326
22113
22263
23616
24391
26603
27267
29667
30244
7101621872
9120929236
14110376969
16100538525
19012325377
19102652906
19112860641

SOURCE:

Aerial photo: Nearmap 24/01/2021
NSW State Fire History: NSW Rural Fire Service 2022

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Meters

A3 Scale: 1:35,000

File:2223-HallidaysPoint-Fig2b-FireHistory-241021

Date: 21/10/2024

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Wildfires recorded within the Hallidays Point area since 1957 have been listed in **Table 3**. The most recent of which occurred during the 2019/2020 fire season, which saw a fire burn from Hillville 20kms west of Diamond Beach through to the coast over the course of 28 days. The Hillville Road and Failford Road fires combined burnt through 34,240 hectares of vegetation and impacted 239 homes. The pattern of fire scar that progressed into Hallidays Point at the time was driven by prevailing winds, pushing fires through nodes and corridors of vegetation with further extension into grassed areas on rural blocks. The 2019/2020 fire season benchmarked never before seen fire weather scenarios across NSW as it was preceeded by decadal rainfall deficiency and decadal maximum temperature exceedance. The fire scar from the 2019/2020 fire season provides the local precedence and predictor of future fire conditions/behaviour.

Table 3: Major Bushfires Within the Study Area (Australian Government, 2022)

Fire Name	Suburb	Year of Fire	Cause
Failford Road, Darawank	Black Head, Hallidays Point	2019	Power Line
Hillville Road, Hillville	Diamond Beach, Black Head, Hallidays Point, Rainbow Flat, Kiwarrak, Koorainghat, Saltwater, Failford, Darawank	2019	Debris burning
Coastal View Drive, Tallwoods Village	Tallwoods Village	2019	Electrical
Old Soldiers Road, Diamond Beach	Diamond Beach	2016	Escaped Pile Burn
Darawank	Darawank	2000	Not recorded
	Diamond Beach	1980	Not recorded
	Diamond Beach	1980	Not recorded
	Rainbow Flat	1980	Not recorded
	Rainbow Flat	1973	Not recorded
	Diamond Beach	1968	Not recorded
	Rainbow Flat	1968	Not recorded
	Rainbow Flat	1968	Not recorded
	Rainbow Flat	1968	Not recorded
	Rainbow Flat	1968	Not recorded
	Rainbow Flat	1964	Not recorded
	Rainbow Flat	1964	Not recorded
	Rainbow Flat	1964	Not recorded
	Rainbow Flat	1957	Not recorded
	Rainbow Flat	1957	Not recorded

The BFRMP has identified assets at risk of bushfire impact within the Hallidays Point area and have assigned a risk rating that determines treatment (**Table 4**). An increase in risk corresponds with proximity to consistent tracts of forest vegetation, steeper slopes, likelihood of fire, vulnerability of assets and occupants and consequence of destruction.

Treatment strategies to minimise risk involve a combination of hazard reduction via mechanical and controlled burning, maintaining fire trails identified within the *Mid Coast Bush Fire Management Committee Fire Access and Fire Trail Plan (2019)* (FAFT), enhancement of community engagement programs that educate the public on bushfire impact and the importance of bushfire survival plans and, ignition management to maintain vegetation underneath powerlines, restrict access where necessary and undertake broad area surveillance.

Table 4: Risk Rating of Assets within Hallidays Point, *MidCoast Bush Fire Management Committee Bush Fire Risk Management Plan (2019)*

Asset ID	Asset Name	Risk Rating
27	Hallidays Point Public School	Extreme
181	Red Head / Black Head Villages	Very High
144	Tallwoods Golf Club House and Course Neighbourhood Safer Place	Very High
375	Tallwoods Village	High

Currently within the Mid Coast Bush Fire Management Committee area, the minimum level of risk acceptability identified within the plan was determined as “High”. Areas of medium or low risk are likely to be managed by routine procedures and Bush Fire Management Committee wide treatments, and so do not require specific application of resources. **Figure 9** provides a snapshot of the study areas assets at risk (indicated as red and orange hatching and icons) as identified within the BFRMP.

It should be noted that given the BFRMP was produced just prior to the 2019/2020 Black Summer bushfires, which burnt through a large proportion of vegetation within the Hallidays Point area, a revised plan will need to be prepared that will incorporate new fire behaviour modelling, new human settlement areas as development occurs and new treatment strategies in line with fire regimes. The revised plan may see higher risk ratings given to areas that experienced extreme fire impact during the 2019/2020 fire season.

As well as updates to the BFRMP,regular updates are also required for National Parks and Wildlife Service Fire Management Strategies including: Khappinghat National Park, Talawahl National Park and Darawank National Park, which were produced in 2005.

Like the BFRMP, these strategies identify risk, fire frequency and treatment options, specifically burning regimes over a five-year period.

Considering the available fire history information above, the Urban Release Areas with the highest bushfire risk profile would be those located in Diamond Beach, followed by Black Head/Red Head and Tallwoods Village.

The main risk to these areas is isolation as a result of a fire being generated in the west and travelling to the coast under north-westerly/westerly wind influences. In this scenario, late evacuation out of Hallidays Point is likely to suffer the effects of congestion as the population currently exits via one road, Blackhead Road, and the risk of roads being cut off by fire and suffering the effects of smoke and minimal visibility.

Accordingly, any proposals that investigate opportunities for development and increased population densities need to take into account appropriate additional access/egress infrastructure and/or nomination of additional safe assembly or refuge areas, provision of asset protection zones within lot boundaries as well as along roadside verges, and enhancement of emergency management procedures. Specific requirements are discussed later within this report.

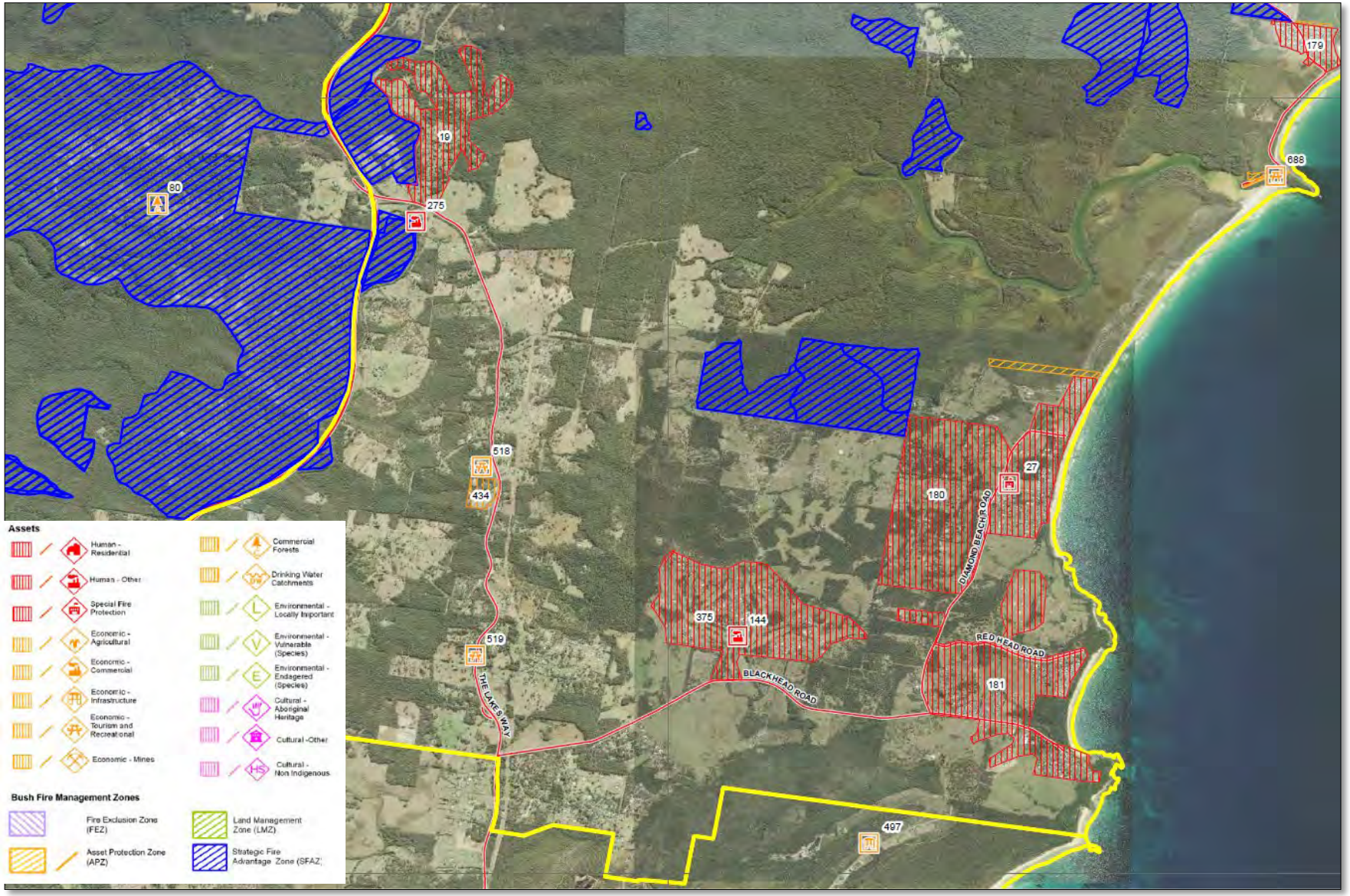


Figure 9: Human Settlement Assets Within Hallidays Point

2.5 Fire Intensity Analysis

A GIS analysis has been employed to model the anticipated Fire Intensity (FI) for the study area. This mapping of FI serves various purposes, including the spatial ranking of bushfire risk based on FI. Furthermore, the FI model, in conjunction with other risk assessment tools like proximity to refuges, fire catchments, bushfire frequency/likelihood, ignition potential, suppression capacity, and impact/damage potential, aids in comprehending the bushfire risk profile of the various locations throughout the study area. By utilising the FI map, firefighters and bushfire planners can extract information regarding FI, which affects the rate of spread, risk to personnel or visitors, feasibility of fire control lines, and the relative bushfire risk across the landscape. It is important to mention that the mapping of areas into different intensity levels does not indicate the frequency of potentially damaging fires in a particular area. However, it does offer a valuable means of comparing and ranking the intensity levels across the landscape.

The analysis of the predicted FI for the study area has been modelled using the fire behaviour formula of MacArthur Mark 5 (1962). It is a fire behaviour model that estimates the rate of spread and intensity of a fire based on various factors such as fuel load, weather conditions, and topography. The methodology used in the McArthur Mark 5 model is detailed below:

1. Vegetation Assessment: The first step is to assess the fuel characteristics of the area where the fire is burning. This includes factors such as fuel type, fuel moisture content, fuel load, and arrangement. Fuel models are assigned to represent different fuel types and their characteristics and measured in tonnes per hectare (t/ha).
2. Weather Conditions: The model takes into account weather conditions, including temperature, humidity, wind speed, and wind direction. These variables play a crucial role in determining fire behaviour and are represented as a Forest Fire Danger Index (FFDI). The FFDI for the Mid Coast Council area is 80.
3. Topography: The influence of topography on fire behaviour is considered in the model. Factors such as slope steepness and aspect are taken into account to estimate fire spread and intensity.
4. Rate of Spread: The McArthur Mk 5 model uses empirical relationships to estimate the rate of spread of the fire front. This is typically based on observations from past fires and field experiments. The rate of spread is influenced by the fuel characteristics, weather conditions, and topography, and
5. Fire Intensity: Fire intensity is determined based on the rate of spread and the heat released by the fire. The model estimates the amount of energy released per unit area per unit time, typically measured in kilowatts per meter (kW/m).

The fire intensity analysis for the Hallidays Point study area classifies potential fire behaviour into distinct intensity bands to assess the scale and severity of likely bushfire impacts across the landscape. Fire intensities are typically expressed in kilowatts per metre (kW/m), and grouped as follows:

- **Low (0 - 10,000 kW/m):** Fires within this band are generally manageable under standard suppression conditions and typically do not result in significant flame contact or structural loss.
- **Moderate (10,000 - 30,000 kW/m):** Represents intense bushfire activity with substantial flame lengths, spot fire generation, and increased suppression difficulty.
- **High (30,000 - 60,000 kW/m):** Severe bushfire behaviour is likely, including high rates of spread, ember attack, and potential for crown fires.
- **Very High (60,000 - 100,000 kW/m):** Extreme fire behaviour, with significant threat to life and property, making suppression efforts largely ineffective.

- **Catastrophic (>100,000 kW/m):** Fires of this magnitude exceed the thresholds for safe human survival and are associated with near-total loss of unprotected assets and untenable conditions for evacuation or firefighting.

These intensity thresholds assist in identifying areas within the study area that may not support safe evacuation or reliable emergency access during a bushfire event. The classification provides essential input for determining Asset Protection Zone widths, refuge area locations, and infrastructure upgrade priorities.

The FI mapping can be used to better understand the risk profile and can serve as a substitute for assessing bushfire risk, where regions with higher fire intensity indicate areas and where fire control efforts may be more challenging or hazardous. However, it is important to note that many areas in the northwest of the study area have the capability to sustain fires at intensities that surpass the controllability of firefighters.

The FI mapping (**Figure 10** and **Appendix A**) provides a spatial analysis of potential fire behaviour across the study area under severe conditions. The results highlight the significant influence of vegetation and steep topography, particularly to the west and northwest, in generating potentially extreme fire intensities (>100,000 kW/m) that exceed suppression capabilities. The predominant threat path involves uncontrolled fires spreading from these western/northwestern areas towards the coastal settlements

The results of the FI analysis confirm the greatest threat to the study area is from an uncontrolled bushfire spreading from the west/ northwest towards the Tallwoods Village (**Plate 1**). The pattern indicates the steep and heavily vegetated landscape immediately north of Tallwoods Village would be able to sustain a bushfire that may spread eastwards towards Diamond Beach and Red Head.

Under the influence of north-westerly winds, the fire could advance along the steep slopes, gradually ascending towards the ridgeline as it progresses east. This pattern continues as it reaches the northern areas of the Tallwoods Village, including affecting the hill where the water reservoir is situated.

South east of the Tallwoods Village, heading towards the southern end of the study area also shows higher intensity, but their significance is relatively minor. These areas with a higher FI are less influential and appear sporadically, indicating that if a fire starts further south, it could potentially spread uphill when influenced by a southerly wind.

Critically, this analysis indicates that key access and egress routes, namely Blackhead Road and Diamond Beach Road, interface with vegetated areas capable of producing moderate to high fire intensity (10,000 kW/m to 60,000 kW/m). As the primary route, Blackhead Road users will unavoidably be exposed to bushfire hazards during significant events. This potential exposure to elevated radiant heat levels poses a significant risk during emergencies, potentially rendering these routes unsafe or impassable for both evacuating residents and responding emergency services.

The suitability of Blackhead Road and Diamond Beach Road for emergency service use during intense bushfire events is therefore questionable without significant mitigation. While these roads are essential for access, their proximity to hazardous vegetation capable of generating high radiant heat levels means their availability cannot be guaranteed. Management of roadside vegetation to reduce fuel loads is recommended, however, the inherent risk associated with potential fire intensity necessitates the consideration of alternative access/egress solutions and robust emergency management planning, as discussed further in Chapter 4. The potential for these critical routes to be compromised by fire and smoke, limiting safe passage for emergency vehicles, underscores the vulnerability of the Hallidays Point community, particularly considering projected population growth.

The FI maps are contained in **Appendix A**, and an overall FI map of the study area is shown in **Figure 10**.



Plate 1: Looking northwest over Tallwoods Village (The Pulpit) to heavily vegetated landscape on steep slopes

Project: Hallidays Point URA
Job No: 2223

Figure 10

Fire Intensity

BUSHFIRE PLANNING AUSTRALIA

- Study Area
- Hallidays Urban Release Area
- Contour (20m)
- Contour (10m)

Intensity (kWm)

- 0 - 1,000
- 1,000 - 15,000
- 15,000 - 30,000
- 30,000 - 60,000
- 60,000 - 90,000
- 90,000- 120,000
- 120,000 - 150,000
- 150,000 - 180,000
- 180,000 - 250,000
- >250,000

SOURCE:
Fire Intensity analysis based on NSW Vegetation Type: NSW Department of Planning, Industry and Environment 2022 and LiDAR -slope (BULAHDELAH & FORSTER 1 metre Resolution Digital Elevation Model) © Department Finance, Services and Innovation 2012
AerialPhoto: NearMap 24/01/2022

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A3 Scale: 1:35,000

File:2223-HallidaysPoint-Fig16-FireIntensityStudyArea-241021
Date: 21/10/2024

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3 Land Use Assessment

A land use assessment identifies the appropriateness of siting different land uses in particular locations based on risk profiles.

The current land use and zoning of Hallidays Point regulates lower densities of people per hectare. The Urban Release Areas Report identifies areas where a rezoning could occur. Based on this it can be estimated that there will be significant increases in occupancy and human traffic during times of potentially high fire danger, all of which are permissible within the proposed setting, provided they meet the performance criteria of PBP 2019.

Under the *Rural Fires Act 1997* and PBP 2019 the proposed land uses fall mostly into the category of residential infill and other development. PBP provides performance criteria for the proposed uses (**Table 5**).

Table 5: Classification of Bushfire Protection Requirements for Proposed Land Uses Within the MidCoast URAs

URA	Title	Location	URA Recommendation	Estimated Dwellings (for modelling purposes only)	Requirements of PBP
Diamond Beach	Diamond Beach Growth Area 1	Tourist Precinct	Removal of SP3 Tourist and rezoned to R3 Medium Density residential.	203	APZ requirements relating to residential development rather than tourist accommodation. Performance Criteria and Acceptable Solutions provided in Table 5.3 a, b, c, d. Additional considerations as per Table 8.2.2 of PBP for Multi-storey residential development.
	Diamond Beach Growth Area 2	Diamond Beach Road/Old Soldiers Road	Rezoned from RU1 Primary Production to R2 Low Density Residential and environmental opportunities.	432	Performance Criteria and Acceptable Solutions provided in Table 5.3 a, b, c, d. With regards to environment, development to incorporate minimum setbacks to ensure compliance with Table A1.12.2 of PBP 2019.
	Diamond Beach Growth Area 3	Old Soldiers Road Realignment	Rezoned from RU1 Primary Production to secure the realignment of Old Soldiers Road and provide R5 Large Lot Residential and environmental.	62	Performance Criteria and Acceptable Solutions provided in Table 5.3 a, b, c, d.
Red Head	Red Head Growth Area 1	14 Red Head Road	Rezoned from R1 General Residential to R2 Low Density Residential, environmental and recreation.	68	Performance Criteria and Acceptable Solutions provided in Table 5.3 a, b, c, d. With regards to environment, development to incorporate minimum setbacks to ensure compliance with Table A1.12.3 of PBP 2019.

	Red Head Growth Area 2	180 Diamond Beach Road	Rezoned from RU1 Primary Production to R2 Low Density Residential and environmental.	19	Performance Criteria and Acceptable Solutions provided in Table 5.3 a, b, c, d. With regards to environment, development to incorporate minimum setbacks to ensure compliance with Table A1.12.3 of PBP 2019.
	Red Head Growth Area 3	Lot 3 Hope Street	Rezoned from RU1 Primary Production to R2 Low Density Residential, environmental.	87	Performance Criteria and Acceptable Solutions provided in Table 5.3 a, b, c, d. With regards to environment, development to incorporate minimum setbacks to ensure compliance with Table A1.12.3 of PBP 2019.
	Red Head Growth Area 4	16 Meers Drive	Rezoned from RU1 Primary Production to R2 Low Density Residential and environmental.	36	Performance Criteria and Acceptable Solutions provided in Table 5.3 a, b, c, d. With regards to environment, development to incorporate minimum setbacks to ensure compliance with Table A1.12.3 of PBP 2019.
Black Head	Black Head Growth Area 1	438 Blackhead Road and 21 Greenview Drive	Rezoned from RU1 Primary Production to R2 Low Density Residential, industrial and environmental.	122	Performance Criteria and Acceptable Solutions provided in Table 5.3 a, b, c, d. With regards to environment, development to incorporate minimum setbacks to ensure compliance with Table A1.12.3 of PBP. Industrial facilities are considered as Class 5 to Class 8 buildings within the NCC. AS3959 and the NASH Standard are not considered as a set of deemed to satisfy provisions. Bushfire protection measures required in relation to access, water supply and services and emergency and evacuation planning.
Tallwoods	Tallwoods Growth Area 1	The Boulevard	Rezoning to redefine the village centre with supporting adjacent zones including public open space.	39	Offices, shops, factories, warehouses, public carparks and commercial and industrial facilities are considered as Class 5 to 8 buildings within the NCC. AS3959 and the NASH Standard are not considered as a set of deemed to satisfy provisions. Bushfire protection measures required in relation to

					access, water supply and services and emergency and evacuation planning. Performance Criteria and Acceptable Solutions provided in Table 5.3 a, b, c, d. Additional considerations as per Table 8.2.2 of PBP for Multi-storey residential development. Meet the requirements of Appendix 4 PBP 2019.
	Tallwoods Growth Area 2	205 Blackhead Road	Rezoned from RU1 Primary Production to R2 Low Density Residential and environmental.	75	Performance Criteria and Acceptable Solutions provided in Table 5.3 a, b, c, d.

4 Access and Egress

PBP requires sufficient access with design objectives that enable safe evacuation away from an area whilst facilitating adequate emergency and operational response. All areas affected by bushfire prone land should ideally have an alternate access or egress option dependant on bushfire risk, density of development, population and the chances of roads being cut-off by fire, smoke and accidents for prolonged periods of time. A combination of identified safe assembly and refuge areas and access/egress options may be acceptable to alleviate traffic volumes under evacuation scenarios.

Current access/egress within the study area allows distribution of local traffic in and around the coastal township with major linkages not only between its suburbs, but also to Forster-Tuncurry in the south and Taree in the north. Access routes in and out of Hallidays Point include:

- A1 Pacific Highway
- The Lakes Way
- Blackhead Road
- Diamond Beach Road
- Tallwoods Drive (currently unsealed)
- Old Soldiers Road (currently unsealed).

In order to improve traffic flow, a new roundabout has recently been completed at the intersection of The Lakes Way and Blackhead Road.

Minor access roads between the major transport routes allows for emergency response and traffic flow of the current population in and out of the area. An increase in density, however, as is experienced during the seasonal summer periods and with potential additional development, may see congestion of roads at any one period of time. The likely access/egress route from the proposed URAs to The Lakes Way are identified in **Table 6**.

Table 6: Access/Egress Routes and Density from URAs to Major Road Linkages

URA	Title	Road Access Location	Land Use	Estimated Additional Dwellings (for modelling purposes only)
Diamond Beach	Diamond Beach Growth Area 2A	Old Soldiers Road	Low Density	246
	Diamond Beach Growth Area 2B	Diamond Beach Road north of Old Soldiers Road	Low Density	100
	Diamond Beach Growth Area 3	Realigned Old Soldiers Road	Large Lot	62
	Total			**408**
Red Head	Red Head Growth Area 1	Red Head Road	Low Density	68
	Red Head Growth Area 2	Diamond Beach Road south of Golden Drive	Low Density	19
	Red Head Growth Area 3	Red Head Road and James Forster Road	Low Density	87
	Red Head Growth Area 4	Red Head Road and James Forster Road	Low Density	36
	Total			**210**
Black Head	Black Head Growth Area 1	The Pines Road	Low Density	**122**
Tallwoods	Tallwoods Growth Area 1	The Boulevard	Medium Density	39
	Tallwoods Growth Area 2	Blackhead Road	Low Density	75
	Total			**114**
COMBINED TOTAL				**854**

A Traffic Study has been prepared by arc traffic + transport consultants, which incorporates a Bushfire Traffic Study (BTS) as an appendix to this document. The BTS anticipates a 3,401 vehicle evacuation traffic demand within the existing study area, based on an additional 792 dwellings as summarised in Table 6. It is assumed within the BTS that approximately 33% of the traffic movements will occur within 60 minutes of evacuation commencement.

Due to the location of the main access/egress routes currently dissecting vegetated corridors into Hallidays Point there is a high probability that impedance by smoke and fire could occur which may also hinder evacuation timeframes and impose implications from a safety perspective with roads being cut off.

The Lakes Way is designated by the BTS as the 'safe zone' for the purposes of evacuation of the study area. Analysis of the capacity of The Lakes Way to support evacuating traffic demand is outside the scope of the BTS and also does not form part of this SBS. Nevertheless, it should be highlighted that there are concerns regarding the evacuation capacity of The Lakes Way and this will be taken into consideration when assessing the strategic merit of land release in the Hallidays Point study area. Furthermore, The Lakes Way itself is exposed to a considerable bushfire hazard along the evacuation routes to the north (Pacific Highway/M1) and south (Tuncurry) and cannot be assumed to be a safe environment. Relying on evacuation by road, considering likely fire direction, is not itself a likely solution for this community.

Currently, the main access/egress route for emergency services and evacuating residents is Blackhead Road and to a lesser extent, confirmed at the time of field investigations, Old Soldiers Road onto the Lakes Way. Chelmsbrook Drive and Tallwoods Drive also connect to the Lakes Way, although Chelmsbrook Drive can only accommodate a small number of residents, albeit this would be local traffic only. Tallwoods Drive is not considered a viable egress route for the numbers anticipated from increased development due to bushfire exposure risk and currently does not comply with the RFS PBP 2019 requirements for access roads. Based on 550 peak hour traffic movements and 1,700 total trip generation anticipated, the BTS confirms that Blackhead Road and other key routes within the study area would provide appropriate capacity for residents and visitors during an evacuation under the existing 2022 population.

The second evacuation scenario considered by the BTS includes both the existing population and the existing development approvals within the study area. Under this scenario, Blackhead Road would be operating at capacity under the estimated peak hour load of 952 vehicle trips.

Looking at the projected population within the study area under a URA development scenario, the BTS anticipates a 1,1223 peak hour trip generation, i.e., within the first hour of evacuation, it is anticipated that 33% of the total estimated 3,3012 vehicles will evacuate the study area. This increase in vehicle trips significantly reduces the potential evacuation capacity on Blackhead Road and other key routes. Capacity on Blackhead Road is likely to be exceeded between Diamond Beach Road and The Lakes Way. Traffic volumes are also anticipated to approach capacity at Diamond Beach Road north of Blackhead Road, but it is anticipated that this intersection would be under the control of emergency services and therefore this issue is considered to be less significant.

The BTS finding that Blackhead Road would potentially exceed capacity in an emergency situation requires a detailed analysis of any options available to relieve the transport network. One option already identified is to upgrade and re-align Old Soldiers Road to provide a secondary traffic route.

Previous studies undertaken by MidCoast Council in 2013 resulted in an Options Analysis Report for Old Soldiers Road being prepared that looked at six options, with the most favourable being a realignment of the current road that dissects Khappinghat National Park. The realignment would follow the southern and eastern boundary of the national park. The road would be a sealed two-lane road with an 60kph speed limit to account for tight radius corners. The realigned section of the road is approximately 3.2km long and would connect the Lakes Way to Diamond Beach Road.

The potential upgrade and re-alignment of Old Soldiers Road provides a secondary access point for the Diamond Beach Growth Areas 1, 2 and 3. This would be a significant advantage given that the BTS suggests that Diamond Beach Road will approach capacity during an emergency evacuation. The provision of a secondary access would normally be required for future compliance with PBP 2019. However, the upgraded road would traverse through significant areas of bushland and would therefore be exposed to bushfire threat. The forested areas to the north and west of Diamond Beach Growth Area 3 result in significant likelihood of the re-aligned Old Soldiers Road being closed at some point during a bushfire event. It is assumed that emergency services would operate within the area to re-open the road as soon as fire conditions ease. Nevertheless, under a scenario where bushfire can approach the study area from a southerly direction, as occurred during the Black Summer bushfires, a secondary evacuation route within the north of the study area is imperative. The closure of Blackhead Road due to bushfire smoke or flame impingement would have a major impact on the controlled evacuation of the study area and the option of using an upgraded Old Soldiers Road would help to relieve this issue.

A discussion was held with NSW RFS Mid-Coast District office whereby the idea of a secondary access route being provided along a re-aligned upgraded Old Soldiers Road was supported. It was agreed that the threat of any such re-aligned road being closed was significant, but nevertheless an additional access route was considered to be beneficial from an operational perspective. The access route could potentially be utilised for active firefighting in addition to occupant evacuation.

Another option for the provision of additional road capacity is the upgrade of Blackhead Road to provide a dual carriageway in the west-bound direction. This would allow more traffic to flow away from the Black Head and Red Head areas towards The Lakes Way. This would be a useful capacity upgrade for the Red Head, Black Head and Tallwoods Urban Release Areas and also the Diamond Beach Urban Growth Areas but also does not remove the need for the Old Soldiers Road realignment and upgrade.

Traffic Options Analysis

Given the identified traffic constraints in the area in relation to a potential increase in the number of residential dwellings in the area, an analysis of the various traffic options is provided below.

Road Upgrade Options	Discussion
Option 1: Do nothing	It has been identified that Blackhead Road would exceed capacity in an emergency situation even under existing dwelling and existing approvals scenario. No further urban land release should occur under a 'do nothing' scenario.
Option 2: Old Soldiers Road Upgrade and re-alignment only	An upgrade and re-alignment of Old Soldiers Road will provide a secondary access option for all existing and proposed communities, particularly those around Diamond Beach who currently need to head south to Blackhead Road to evacuate. The secondary access will help to alleviate the capacity exceedance issues along Blackhead Road. Should a fire approach from the north or north-west, there is a high likelihood that the upgraded and re-aligned Old Soldiers Road would become untenable due to smoke and/or flame and would need to be closed. Should a fire approach from the south, this upgrade would provide an option for residents in existing communities and the proposed Tallwoods, Black Head and Red Head Urban Growth Areas to move in a northward direction and out to The Lakes Way for a period of time. The potential for spot fires and fire activity in the vegetation around Old Soldiers Road and other access routes joining Old Soldiers Road would need to be monitored as there is potential for roads to become untenable should fire occur in the vegetation around the road.
Option 3: Duplicate west bound lane of Blackhead Road only	Duplication of the west bound lane of Blackhead Road would potentially relieve the existing capacity exceedance problems and provide additional capacity for traffic evacuating towards The Lakes Way. The Diamond Beach Urban Growth Areas would be able to use Blackhead Road by travelling south along Diamond Beach Road. Should a bushfire impact from a southerly direction, Blackhead Road may be compromised, potentially needing to close due to smoke and/or flame impingement. Should this occur, there would be no secondary egress option for any of the existing or proposed communities. Environmental impacts of land clearing under this option should be carefully considered.

Option 4: Old Soldiers Road upgrade and re-alignment and duplicate west bound lane of Blackhead Road	This would be a preferred option as it provides two access/egress options towards The Lakes Way, enabling residents to travel away from a bushfire in either a northerly or southerly direction depending on the direction of travel of any impacting bushfire. The upgrade and re-alignment of Old Soldiers Road is imperative to provide the secondary access to enable travel away from the area should a bushfire impact Blackhead Road. Whilst this is the case, there is potential for Old Soldiers Road to be impacted from the north/northwest and the capacity of Blackhead Road therefore needs to be improved should that become the primary evacuation route in a bushfire event. There is also a chance that both of these routes could simultaneously be impacted, although a higher likelihood that emergency services will aim to keep one of these major routes operating at all times.
Option 5: Upgrade Old Soldiers Road to a better fire trail standard and duplicate west bound lane of Blackhead Road	Whilst upgrading Old Soldiers Road to a better fire trail standard may be an option, it does not provide the necessary secondary access away from the area. A fire trail needs to be regularly maintained and there is a high likelihood that during any bushfire event it would not be safe to traverse due to the proximity of vegetation alongside the fire trail. The fire trail shall be identified on a Fire Access and Fire Trail plan (FAFT) prepared for the LGA and assigned a classification to assigned a category for its intended use eg: strategic or tactical.
Option 6: Upgrade existing fire trails and provide additional fire trails along existing road alignments.	- Upgrade Tallwood Drive westbound to The Lakes Way and northbound to the Tallwood Fire Trail (within NPWS land) - Upgrade and connect the Eastern Valley Way between Diamond Beach Road and Coastal View Drive. - Investigate access to the Pines Road for fighting and maintenance activities. Due to several of the fire trails traversing through high bushfire hazards, Option 6 will not offer alternate evacuation routes, rather the use of these tracks and trails during emergencies would be controlled under the direction of emergency services. Liaison with NPWS is required to ensure the condition of the existing Tallwood Fire Trail is in accordance with the NPWS Bushfire Management Plan and NSW Fire Trail Standards. Ensuring the trails are regularly maintained and kept clear of obstructions is critical.

Should the upgrade and re-alignment of Old Soldiers Road be accepted as a viable option for provision of secondary access, further mitigation of the fire threat along this access route will be needed by way of maintaining the vegetation along the sides of the road. The environmental impact of removal of vegetation should be considered to determine whether this is an ecologically sound option.

Given there is currently no direct evacuation route for residents living in Diamond Beach apart from utilising Diamond Beach Road/Blackhead Road, which will reach capacity once existing development approvals are realised or utilising the existing Old Soldiers Road which dissects Khappinghat National Park, it is recommended that any of the options for realignment and upgrade of the road be supported. Realignment and upgrade of this road however would need to include increased road verges to allow for emergency service vehicles to operate and to allow for lower radiant heat levels

experienced by passing vehicles. These measures may reduce the likelihood of the road being closed and allow for evacuation to commence, until such time as the road is deemed impassable due to smoke or flame impingement.

Future development of the URAs will also need to ensure there is adequate access/egress within them and to the existing public road system. Section 5.3.2 of PBP requires a development to provide safe operational access to structures and water supply for emergency services while residents are seeking to evacuate. Should the recommended road realignments and upgrades be completed and evacuation route capacity is able to meet the forecasted increase in population, future development of the URA's could be more favourably assessed.

All new roads would need to comply with the following requirements, in accordance with Table 5.3b of PBP:

- all roads are two-wheel drive, sealed, all-weather roads;
- a secondary access is provided to the development;
- traffic management devices do no prohibit access by emergency services vehicles;
- maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees;
- carriageway width kerb to kerb shall be a minimum of 5.5 metres and have a minimum vertical clearance of 4 metres to overhanging obstructions and tree branches;
- all parking shall be provided outside of the carriageway width;
- curves of roads shall have a minimum inner radius of 6 metres and crossfall shall not exceed 3 degrees;
- dead end roads incorporate a minimum 12 metres outer radius turning circle and are clearly sign posted as a dead end;
- one way only public access roads are no less than 3.5 metres wide and have designated parking bays with hydrants located outside of these areas to ensure accessibility to reticulated water;
- the capacity of roads/bridges/causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes) with bridges/causeways clearly indicating load rating;
- perimeter roads are two-way with a minimum carriageway width of 8 metres kerb to kerb;
- where kerb and guttering is provided on perimeter roads, roll top kerbing should be used to the hazard side of the road.

There is no impediment to these standards being achieved for any of the URAs. The provision of secondary access can only be achieved if Old Soldiers Road can be upgraded and re-aligned. No other existing access routes within the study area can provide secondary access/egress. Given the existing evacuation routes are unable to provide sufficient capacity for the existing population and future base conditions (existing approvals), it is unlikely the development and completion of all URA's could be supported.

The assessment of access and egress arrangements is critical for the Hallidays Point study area, given the existing constraints and the potential population increase from the proposed Urban Release Areas (URAs). The primary access route, Blackhead Road, faces significant limitations. As detailed in the BTS, analysis under Scenario 2 (existing population plus existing approvals) indicates Blackhead Road will operate at capacity during peak evacuation periods. Furthermore, under Scenario 3 (incorporating the URAs), peak hour traffic during standard conditions is projected to exceed capacity on Blackhead Road, particularly between The Lakes Way and Diamond Beach Road. Intersections, notably The Lakes Way/Blackhead Road and Blackhead Road/Diamond Beach Road, also show significant capacity constraints under future growth scenarios.

The BTS further highlights these constraints under emergency evacuation conditions. While the existing network can manage current evacuation demands, Scenario 2 requires an additional westbound lane on Blackhead Road (between The Boulevard and The Lakes Way) purely to meet evacuation capacity needs. Scenario 3 necessitates further westbound capacity upgrades on Blackhead Road (between Diamond Beach Road and The Boulevard) for evacuation. Relying solely on Blackhead Road presents considerable risk, as the route could be compromised by fire or smoke, potentially isolating the community.

Therefore, enhancing the road network is imperative to support any future growth. The analysis strongly supports the preferred Option 4 identified in this chapter: the upgrade and realignment of Old Soldiers Road *in conjunction with* the duplication of Blackhead Road (initially westbound, potentially eastbound later). The Old Soldiers Road upgrade is crucial for providing a vital secondary access/egress route, particularly beneficial for the Diamond Beach URAs and offering an alternative should Blackhead Road be impacted, a necessity acknowledged by the NSW RFS. Simultaneously, upgrading Blackhead Road addresses the identified capacity shortfalls under both standard peak and emergency evacuation conditions for the cumulative growth projected across all URAs.

In conclusion, the existing access network is insufficient to safely support the proposed growth in all of the Hallidays Point URAs. The successful implementation of strategic road upgrades, specifically the improvement and realignment of Old Soldiers Road and the duplication of Blackhead Road is essential. These upgrades would significantly improve evacuation capacity and resilience, providing enhanced safety for residents and enabling a greater level of service and operational capability for emergency services responding to incidents within the growing community. Failure to deliver this enhanced network infrastructure presents a significant barrier to the safe and sustainable development of all of land identified in the URAs

4.1 Fire Access and Fire Trails

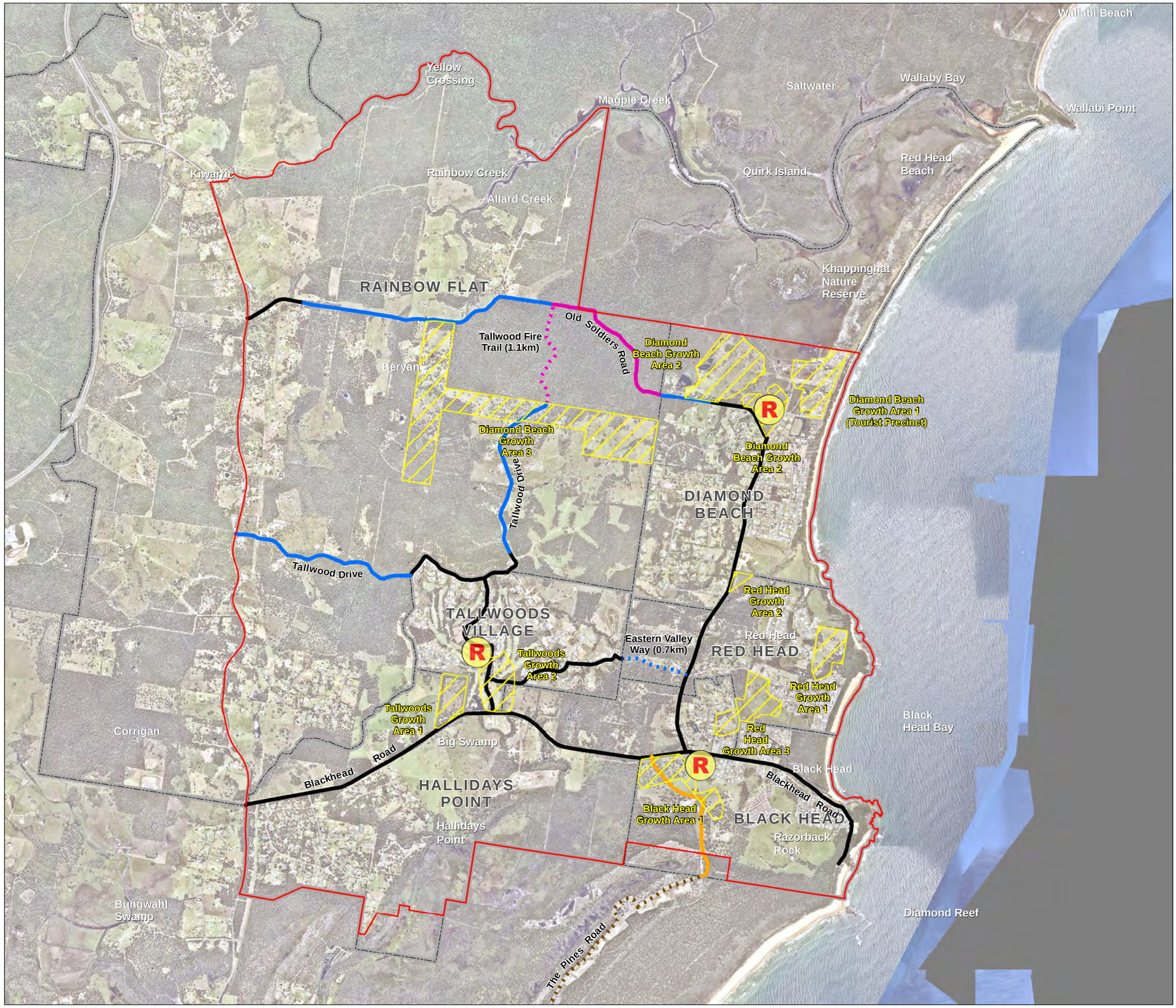
Firefighters rely on public roads to access the landscape to prevent and contain bush fires. Where public roads do not or are unable to provide access to all parts of the landscape, fire trails are able to provide supplementary access to respond to bush fires. It is critical to identify and maintain an effective network of accessible trails.

Throughout the study area there is a network of fire trails and access tracks of varying condition and accessibility. Several of these fire trails are located within land owned or managed by other stakeholders including the NSW National Parks and Wildlife Service (NPWS). The fire trails are indicated on the Darawank Nature Reserve Fire Management Strategy 2005 and the Khappinghat Nature Reserve & Talawahl Nature Reserve Fire Management Strategy 2005 (contained in **Appendix C and D**).

These fire trails need to be maintained to ensure they can be relied upon for use during an emergency. The public is not encouraged to access fire trails, however the registered fire trail networks provide three separate routes from the Study Area as shown in **Figure 11**.

Additional improvements to the existing fire trail network; including upgrading several unformed public roads is recommended to augment the public road network; regardless of any increase in local population. As a minimum the fire trail network will provide access for firefighters to a broader area of the landscape and may function as containment lines in certain circumstances.

For fire trail maintenance and upgrades, the primary responsibility lies with the NSW RFS under the BFRMP and FAFT register. However, where trails intersect the public road network or could be used for private vehicle access during emergencies, Council should liaise with the RFS to confirm suitability, ensure public safety, or clarify if access will be restricted (e.g., gated).



Project: Hallidays Point URA
Job No: 2223

Figure 11

Potential Refuge Locations & Access Routes

BUSHFIRE PLANNING AUSTRALIA

- Study Area
- Hallidays Urban Release Area
- Suburb Boundaries
- R — Potential Refuge Areas

Access Routes

- Sealed Council road
- Unformed Council road to be upgraded to C1 fire trail
- Unsealed Council road
- Unsealed NPWS firetrail to be upgraded from C9 to C1
- Unsealed NPWS road
- Unsealed Road - multiple owners (Council & NPWS)
- Unsealed private road

SOURCE:

Aerial photo: Nearmap 24/01/2021

N W E S

0 500 1,000 1,500
Meters

A3 Scale: 1:35,000

File:2223-HallidaysPoint-Fig11-RefugeAccessRoutes-241021

Date: 21/10/2024

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4.2 Temporary Refuge Areas

As part of a contingency plan, individuals might need to move to a designated refuge area. Refuge areas designated by the RFS are known as Neighbourhood Safer Places (NSPs). NSPs serve as emergency refuges during bushfire threats, specifically when individuals haven't planned ahead or can't follow through with their initial plans (such as leaving the area early or traffic volumes hinder evacuation timing). Essentially, an NSP can be a structure or open area designed to offer enhanced protection to people during bushfire incidents. These places are meant for individuals directly threatened by a bushfire, offering them shelter during the most dangerous phases of the fire. They are meant to be used when primary plans (including evacuation) have been thwarted or have failed. The RFS, in collaboration with potential NSP owners/operators and community stakeholders, designates these NSPs based on specific evaluation procedures detailed in the related document.

NSPs are not to be confused with Fire Refuges, Recovery Centres, Assembly Areas, Evacuation Centres or Informal Places of Shelter. Additionally, it is to be noted that each community faces different risks and has its own local needs. The intended occupation time of an NSP is from a couple of minutes to a couple of hours as the impact of a bushfire subsides. Once safe to exit, it is intended that occupants would return to their homes or move on to more official centres mentioned above.

The importance of designated safer places or refuge areas is part of a holistic approach to bushfire safety and preparedness. It is critical that if safe assembly or refuge areas are provided in Hallidays Point, there must be proper access to and egress from these safer places, with the roads being able to handle the high traffic numbers during emergency evacuations. Any refuge area, be it a NSP or an assembly area have limited capabilities and do not guarantee peoples safety. Any area advertised for refuge will need provision for vehicle parking and safe access.

As part of the recommendations of this SBS, NSPs are offered as supplementary measures to be made available as an interim measure for use by the community while the road and evacuation route improvements are being implemented.

The Tallwoods Golf Club House and Course is already identified on the RFS NSP register. An additional two locations have been identified for consideration as an NSP as shown within **Figure 11**. These locations have been selected for further detailed assessment as they are located in URAs and are able to provide an area suitable for use as NSP as determined by the RFS Assessment Criteria for a NSP; including being strategically located at key intersections along evacuation routes. Before any locations are nominated as a NSP, a full assessment in accordance with the RFS Guidelines for the Identification and Inspection of Neighbourhood Safer Places in NSW must be completed.

It is again reiterated that NSPs are not a replacement measure to avoid augmenting the local road network; rather the NSPs can be implemented as additional interim measures to take some of the pressure of the evacuation routes.

While formal NSPs require NSW RFS endorsement and may not be supported for new development in this location, the SBS acknowledges this and instead recommends the identification of local refuge or safe assembly areas. These are intended to function as staging points and interim safe areas for residents, particularly in Diamond Beach, Red Head, and Black Head, in the event evacuation routes are impacted.

5 Emergency Services

With an increase in population comes a growing demand on emergency services and it is prudent that consideration be given to the future impact on retained and volunteer firefighter numbers, appliances, infrastructure, training and response time. Currently within a 15-kilometre radius of the study area there are five Rural Fire Brigades, one RFS Fire Control Centre/District Office (located at Muldoon Street, Taree) and two Fire and Rescue NSW fire stations (**Table 7**).

Their locations are spaced kilometres apart which may impact quick response to bushfire and building fire emergencies and has in previous times often relied upon attendance from out of area brigades to assist with larger bushfire emergencies. All but one of the local RFS Brigades are outside of the study area and access into the study area may be impacted by fire based on historic fire pathways.

Table 7: Fire Brigades within 15km of the Study Area

Rural Fire Brigades	Address
Rainbow Flat Rural Fire Brigade	Bonvale Close, Rainbow Flat
Diamond Beach Rural Fire Brigade	36 Anniversary Drive, Diamond Beach
Old Bar Rural Fire Brigade	22 Wyden Street, Old Bar
Tuncurry Rural Fire Brigade	Grey Gum Road, Tuncurry
Nabiac Rural Fire Brigade	24/42 Clarkson Street, Nabiac

Fire and Rescue NSW Stations	Address
FRNSW Forster	22 Lake Street, Forster
FRNSW Taree	75 Pulteney Street and corner of Wynter Street, Taree

Due to the small number of Rural Fire Brigades and FRNSW stations there is a significant requirement for the community to understand their risk and ensure they have a bushfire survival plan that outlines their emergency arrangements and course of action, particularly where there is tourist accommodation. Discussions with NSW RFS Mid-Coast District Office confirmed that education of both the existing and proposed community would be a significant benefit in undertaking safe evacuation of the area. It was clear from our discussions that an informed community is easier to evacuate. Providing the community with information regarding potential evacuation routes and timing of evacuation, in line with the BTS, would significantly assist a safe evacuation process.

Potential growth in population should also prompt MidCoast Council and the RFS District Office to assess the implications on resource capabilities and the need for extra bushfire management and community advisory roles, stations, firefighting volunteers, equipment and/or increased training opportunities (i.e. Breathing Apparatus and village training) to cater for future development and capacity, particularly in those areas adjacent to substantial areas of bushland. It is recommended that some of these opportunities be accommodated via subsequent planning stages through, for example, planning contributions, Voluntary Planning Agreements or a State-led planning/funding mechanism.

Other infrastructure that caters for fire emergencies includes RFS endorsed Neighbourhood Safer Places (NSP) that are identified as places of last resort to access when all other options for evacuation have been exhausted. Within Hallidays Point there is one NSP located along the Boulevard at Tallwoods Golf Club House and Course. Its use will be highly dependent on fire activity and direction of fire run. If occupants within the study area are unable to reach the NSP there are a number of other locations nearby, displaying traits consistent with fuel free or fuel reduced areas away from bushfire hazardous vegetation, including the more built up areas of Seascape at Red

Head and the beachfronts which can afford occupants protection away from the direct effects of radiant heat, and embers.These areas could cater for the overspill of residents from NSPs. Further to this however it would be beneficial to locate and formalise an additional one or two building relocation points for residents to take refuge in within the main township of Diamond Beach, Red Head and/or Black Head. It is recommended that an Emergency Management Plan be prepared by Council in relation to the existing community, including existing approvals.

The identification of existing or provision of new buildings that have suitable APZs, construction standards, static water supplys and a Bushfire Survival Plan will also afford residents improved sheltering in place safety against the impacts of bushfire. The need for these buildings to be operated to provide food/water and information is an important consideration. An NSP will not provide any amenity during a fire event. A ‘refuge’ should provide amenity, supplies and information to assist those who choose, or need, to shelter there rather than evacuate.

6 Infrastructure

An assessment of the issues associated with infrastructure and utilities considers the safety issues of fire in proximity to high voltage power lines and the pressures that major bushfire events put on flow rates of reticulated water systems and telecommunications infrastructure.

Aboveground low and high voltage power lines exist in the older suburbs of Diamond Beach and Black Head. Generally, the energy authority's vegetation management policies and procedures assist with managing fire risks associated with existing vegetation within close proximity to powerlines to prevent ignitions.

As is the case within the suburbs of Red Head and Tallwoods any new development as a result of rezoning and urban release can site electricity, and communication cables underground so as to both reduce the bushfire risk from sparking power lines and protect the infrastructure supply in a bushfire event.

The study area is serviced by the Manning Water Supply Scheme. Water is supplied by the Manning River, stored at Bootawa Dam and treated at Bootawa Water Treatment Plant. The Nabiac Water Treatment Plant, which extracts from a bore field at Nabiac Inland Dune Aquifer, also supplements the Manning Water Supply Scheme.

The extent of the existing water supply is such that an increase in demand should not detrimentally impact water pressure and flow to the study area. However, increased demand on the reticulated water supply created by the existing approvals together with the proposed URAs over and above existing demand is likely to necessitate a requirement for static water supply systems. Particular attention should be paid to the large residential lots proposed within Diamond Beach Growth Area 3 where static water supplies may also be beneficial to take account of the additional bushfire risk emanating from the west or northwest in this location.

In accordance with Section 5.3.3 of PBP, any new development shall provide adequate services of water for the protection of buildings during and after the passage of a bushfire and will locate electricity so as not to contribute to the risk of fire to any building. Below are the requirements:

- fire hydrant spacing, sizing, flows and pressure will comply with AS 2419.1 – 2005. Hydrants will be located outside of parking reserves and road carriageways.
- all sites within proposed developments will be connected to the internal reticulated water supply.
- all electricity services will be located underground.
- any reticulated or bottled gas should be installed and maintained according to the requirements of the relevant authorities and AS 1596-2014.

7 Adjoining Land

Consideration of the implications of a change in land use on adjoining land, including increased pressure on bushfire protection measures, should also be undertaken.

The anticipated impact on adjoining land would be:

- an increase in traffic to the local area and added dependence on reticulated water supply, both of which have been addressed in the sections above; and
- pressures on landowners and management agencies to more frequently manage bushfire hazardous vegetation on their properties.

With regards to the latter, although Asset Protection Zones are expected to be provided for wholly within the boundary of developable sites, there may be increased pressures for prescribed burning to complement bushfire protection measures, particularly in the larger tracts of vegetation leading into Hallidays Point. Given the biodiversity values of the study area, fire frequencies will need to be directed by already known and established fire regimes and seasonality so as to maintain plant growth cycles, habitat and breeding opportunities of fauna species.

In light of the recent 2019/2020 bushfires hazard reductions within the area are unlikely to be planned and conducted prior to 2026 due to fire intervals required for ecological sustainability. This statement does not apply to grass vegetation, which is likely to grow and cure, requiring management on more of an ongoing basis.

8 Conclusion and Recommendations

The Strategic Bushfire Study (SBS) for Hallidays Point has identified that the feasibility of future development within the identified Urban Release Areas (URAs) hinges significantly upon successful integration and implementation of targeted bushfire mitigation strategies and infrastructure upgrades.

The existing road network, notably Old Soldiers Road and Blackhead Road, has demonstrated critical capacity and safety limitations under extreme bushfire scenarios, as supported by the Hallidays Point Traffic Studies prepared by arc traffic + transport. Without substantial upgrades, these limitations pose significant constraints to effective evacuation and emergency service response. It is therefore crucial that Old Soldiers Road undergoes realignment and significant improvements, and Blackhead Road is widened to incorporate additional lanes in both directions between Diamond Beach Road and The Lakes Way. These enhancements would substantially elevate the operational capacity of emergency services and reduce bushfire risks to the community, directly addressing the concerns raised about road suitability and associated bushfire intensity risks.

The landscape, vegetation and topographic studies within the report show that although there is the potential for fire activity across the study area there is the ability for provisions to be incorporated into future development that adress bushfire risk. The level of risk varies dependent on proximity to more continuous tracts of forest vegetation and steeper slopes. Assessment of previous fire history records also gives weight to the varied threat of fire and vulnerablity of certain localities.

Although separated from the larger tracts of vegetation west of The Lakes Way and A1 Pacific Highway there are still significant pockets of bushland within and adjacent to the study area that can impact assets from a smoke, ember and radiant heat perspective and as such the consideration of the impact of fire at this early stage of the decision making and planning process is imperative to ensuring protection of life, property and the environment.

Legislatively, there is no foresable barrier to any of the Urban Growth Areas achieving compliance with the current Ministerial Direction 4.3; provided that the upgrade and re-alignment of Old Soldiers Road can be achieved, or improved evacuation routes are identified and accepted by the NSW RFS. If the recommended infrastructure upgrades are not implemented, the risk remains and the URAs would be unsuitable for residential development as lack of acceptable evacuation options severely limits community safety.

Recommendations of this SBS include the following:

1. Rezoning of the identified URAs can be considered based on their ability to provide minimum APZ setbacks to bushfire hazardous vegetation consistent with the required FFDI 80. APZs can be provided for and managed in accordance with Section 5.3a of PBP 2019.
2. APZ setbacks for a climate change scenario can be achieved using an FFDI of 100.
3. Mechanisms such as mechanical fuel reduction, alternative landscaping initiatives, less dependence on reticulated water supplies and improved emergency management planning/procedures may be required to account for climate change.
4. The capacity for the existing road network to deal with future increased densities of evacuating residents and responding emergency services based on the proposed community profiles would need to be improved for new growth to occur. The preferred option is an upgrade/re-alignment of Old Soldiers Road, along with an additional carriageway in the west bound direction on Blackhead Road.
5. Audit all existing registered and sign posted fire trails within the study area up until the fire trail connects with a sealed public road (eg. The Pines Road up to The Lakes Way). Where required, upgrade to ensure all registered and sign posted fire trails are constructed in accordance with the NSW RFS Fire Trail Standards and NSW RFS Fire Trail Design, Construction and Maintenance Manual.
6. Engage with NSW National Parks & Wildlife Service to extend the audit of fire trails to within land managed by NPWS to assess if a safe continuous path of travel is provided from the

study area (eg. northern section of Tallwood Drive shall continue onto Tallwood Fire Trail C9 through Khappinghat National Park and connect with Old Soldiers Road).

7. Upgrade and extend Eastern Valley Way through to Diamond Beach Road. The unformed section of Eastern Valley Way shall be constructed in accordance with the requirements for a Category 1 Fire Trail outlined in the NSW RFS Fire Trail Standards. This will require a trafficable surface of a minimum 4m wide.
8. The extent of existing water and electricity services within and/or adjacent to the study area is such that an increase in demand should not influence life safety issues associated with fire and proximity to high voltage power lines or detrimentally impact water pressure and flow rates.
9. Additional static water supplies are recommended at Diamond Beach Growth Area 3 to take account of the increased bushfire risk in this location and the likely increase in demand on the reticulated water system based on existing proposals and future urban land release.
10. Consideration should be given to the provision of a bushfire management and community advisory role and/or community engagment/education sessions to provide the community with additional awareness of bushfire risk and evacuation scenarios.
11. Review, in liaison with NSW RFS Mid-Coast District the current adequacy of Fire Brigade stations within and adjacent to the area with emphasis put on firefighter recruits, equipment and increased training opportunities (ie Breathing Apparatus and village training) to cater for future development and capacity particularly in those areas adjacent to substantial areas of bushland.
12. An investigation should be carried out into the need for planning contributions, Voluntary Planning Agreements, Local Environmental Plan controls, Development Control Plan clauses or State led funding mechanisms that could be utilised to ensure implementation of the above recommendations.

In conclusion, provided the recommendations outlined above are effectively integrated into future planning stages, including essential road infrastructure upgrades, community engagement initiatives, and strategic APZ implementation, the identified Urban Release Areas within Hallidays Point can proceed with significantly enhanced bushfire resilience. This approach will ensure the safety and viability of future growth while addressing Ministerial Direction 4.3 and ensuring alignment with broader bushfire risk management strategies.

9 References

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- MidCoast Council (2018) *Mid Coast Water Services, Drinking Water Quality Management System, revised June 2018*.
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- MidCoast Council (2021) *Urban Release Areas Report July 2021.*
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- Rural Fires and Environmental Assessment Legislation Amendment Act 2002.
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- Australian Government, NPWS Fire History – Wildfires and Prescribed Burns, 2022 (data.gov.au)

Appendix A: Fire Intensity Mapping

Project: Hallidays Point URA
Job No: 2223

Fire Intensity

Diamond Beach Growth Areas 1 & 2

BUSHFIRE PLANNING AUSTRALIA



Sheet 1 of 7

Hallidays Urban Release Area

Intensity (kWm)

- 0 - 1,000
- 1,000 - 15,000
- 15,000 - 30,000
- 30,000 - 60,000
- 60,000 - 90,000
- 90,000- 120,000
- 120,000 - 150,000
- 150,000 - 180,000
- 180,000 - 250,000
- >250,000

SOURCE:
Fire Intensity analysis based on NSW Vegetation Type: NSW Department of Planning, Industry and Environment 2022 and LiDAR -slope (BULAHDELAH & FORSTER 1 metre Resolution Digital Elevation Model) © Department Finance, Services and Innovation 2012
AerialPhoto: NearMap 24/01/2022

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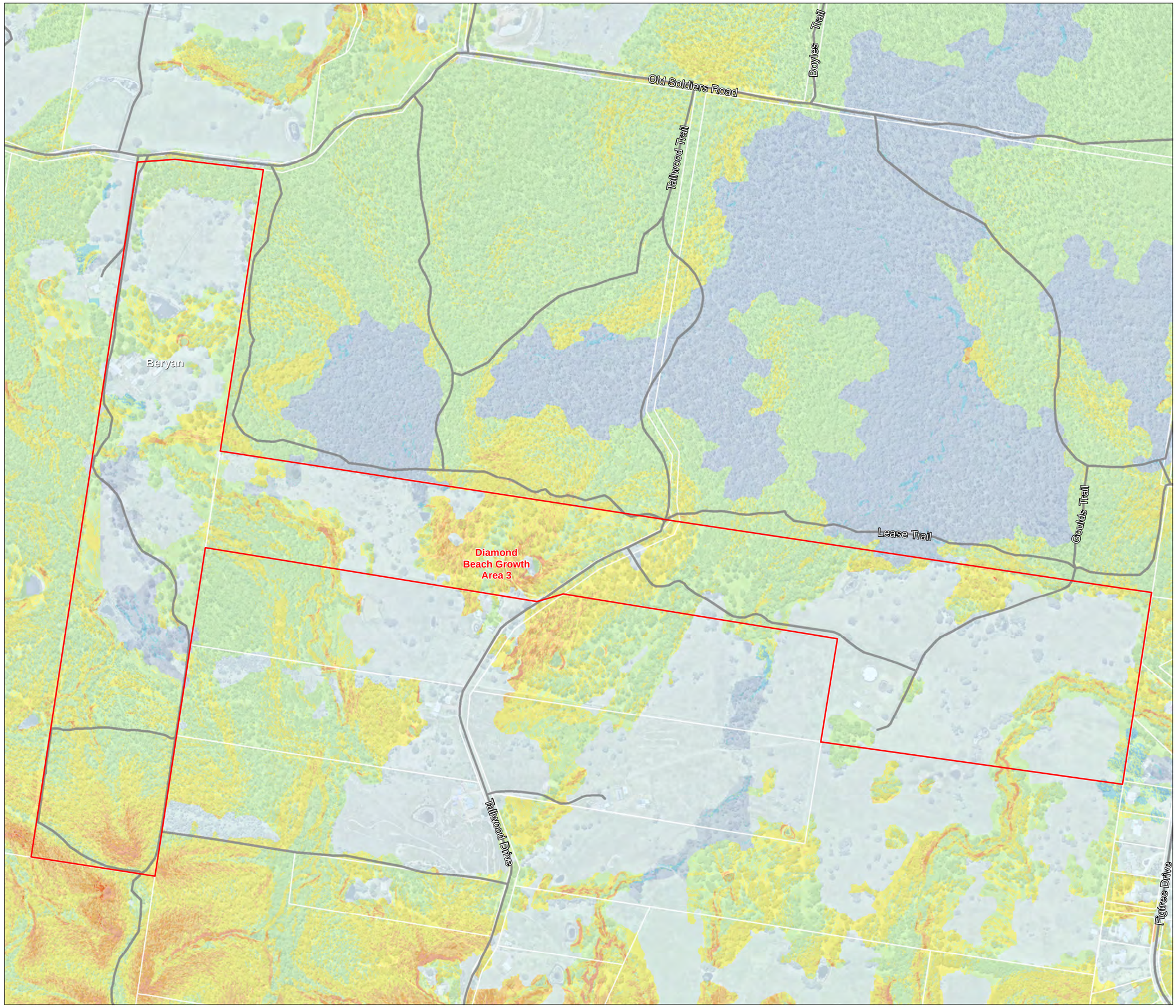
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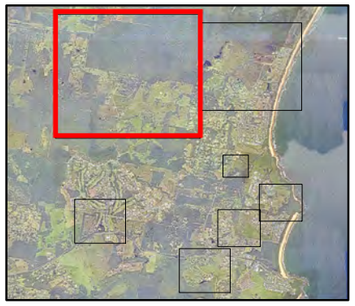


Project: Hallidays Point URA
Job No: 2223

Fire Intensity

Diamond Beach Growth Area 3

BUSHFIRE PLANNING AUSTRALIA



Sheet 2 of 7

- Hallidays Urban Release Area

Intensity (kWm)

- 0 - 1,000
- 1,000 - 15,000
- 15,000 - 30,000
- 30,000 - 60,000
- 60,000 - 90,000
- 90,000- 120,000
- 120,000 - 150,000
- 150,000 - 180,000
- 180,000 - 250,000

SOURCE:
Fire Intensity analysis based on NSW Vegetation Type: NSW Department of Planning, Industry and Environment 2022 and LiDAR -slope (BULAHDELAH & FORSTER 1 metre Resolution Digital Elevation Model) © Department Finance, Services and Innovation 2012
AerialPhoto: NearMap 24/01/2022

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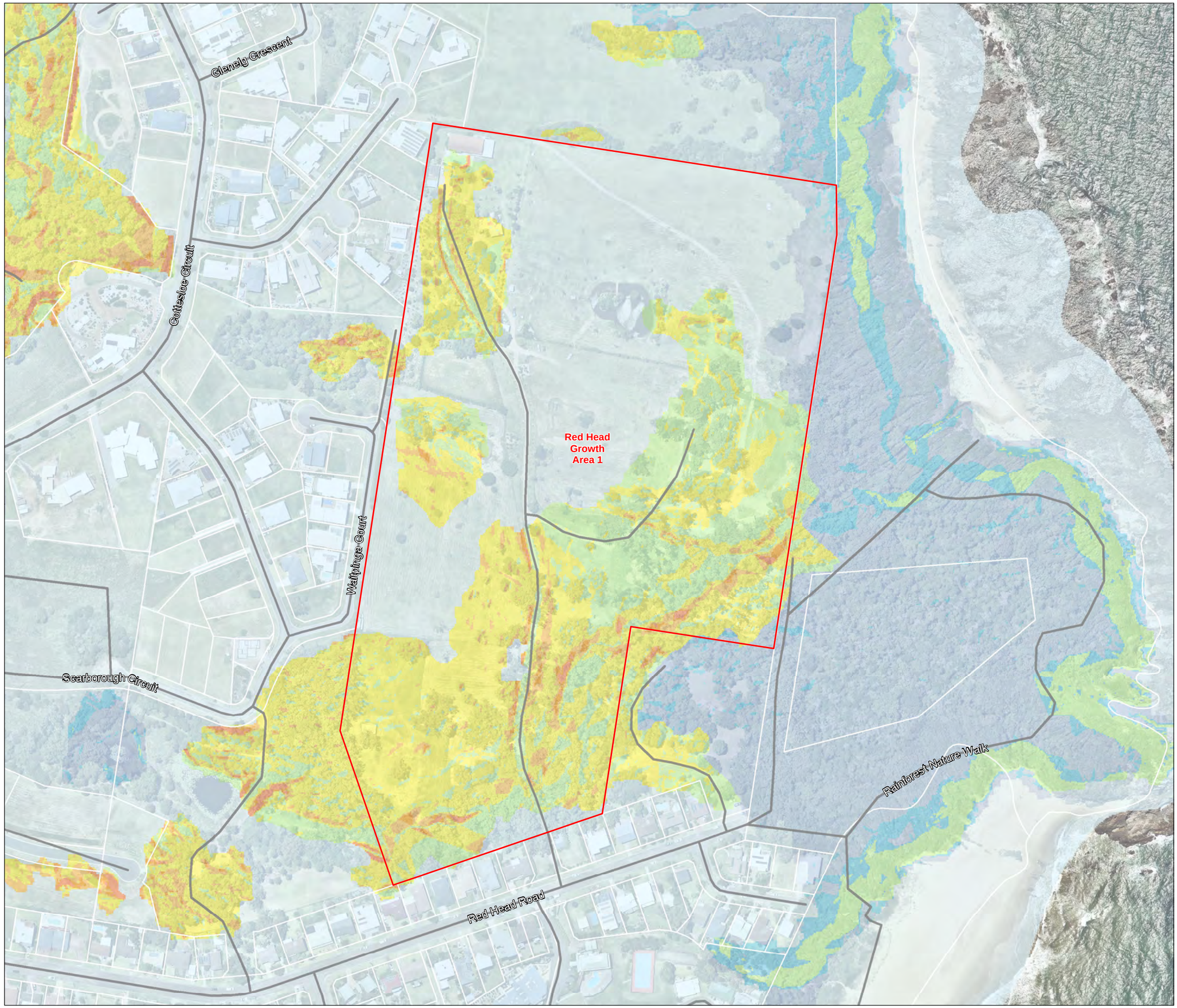
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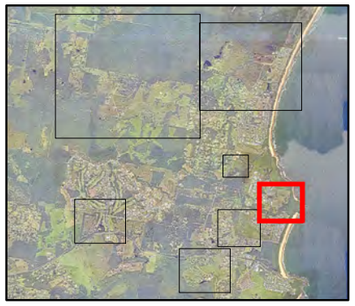


Project: Hallidays Point URA
Job No: 2223

Fire Intensity

Red Head Growth Area 1

BUSHFIRE PLANNING AUSTRALIA



Sheet 3 of 7

- Hallidays Urban Release Area

Intensity (kWm)

- 0 - 1,000
- 1,000 - 15,000
- 15,000 - 30,000
- 30,000 - 60,000
- 60,000 - 90,000
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- 150,000 - 180,000

SOURCE:
Fire Intensity analysis based on NSW Vegetation Type: NSW Department of Planning, Industry and Environment 2022 and LiDAR -slope (BULAHDELAH & FORSTER 1 metre Resolution Digital Elevation Model) © Department Finance, Services and Innovation 2012
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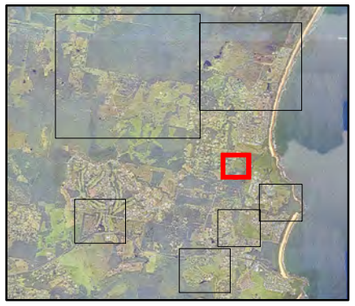
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Project: Hallidays Point URA
Job No: 2223

Fire Intensity

Red Head Growth Area 2

BUSHFIRE PLANNING AUSTRALIA



Sheet 4 of 7

Diamond Beach Road

Golden Drive

Red Head Growth Area 2

Hallidays Urban Release Area

Intensity (kWm)

- 0 - 1,000
- 1,000 - 15,000
- 15,000 - 30,000
- 30,000 - 60,000
- 60,000 - 90,000
- 90,000- 120,000
- 120,000 - 150,000
- 150,000 - 180,000

SOURCE:
Fire Intensity analysis based on NSW Vegetation Type: NSW Department of Planning, Industry and Environment 2022 and LiDAR -slope (BULAHDELAH & FORSTER 1 metre Resolution Digital Elevation Model) © Department Finance, Services and Innovation 2012
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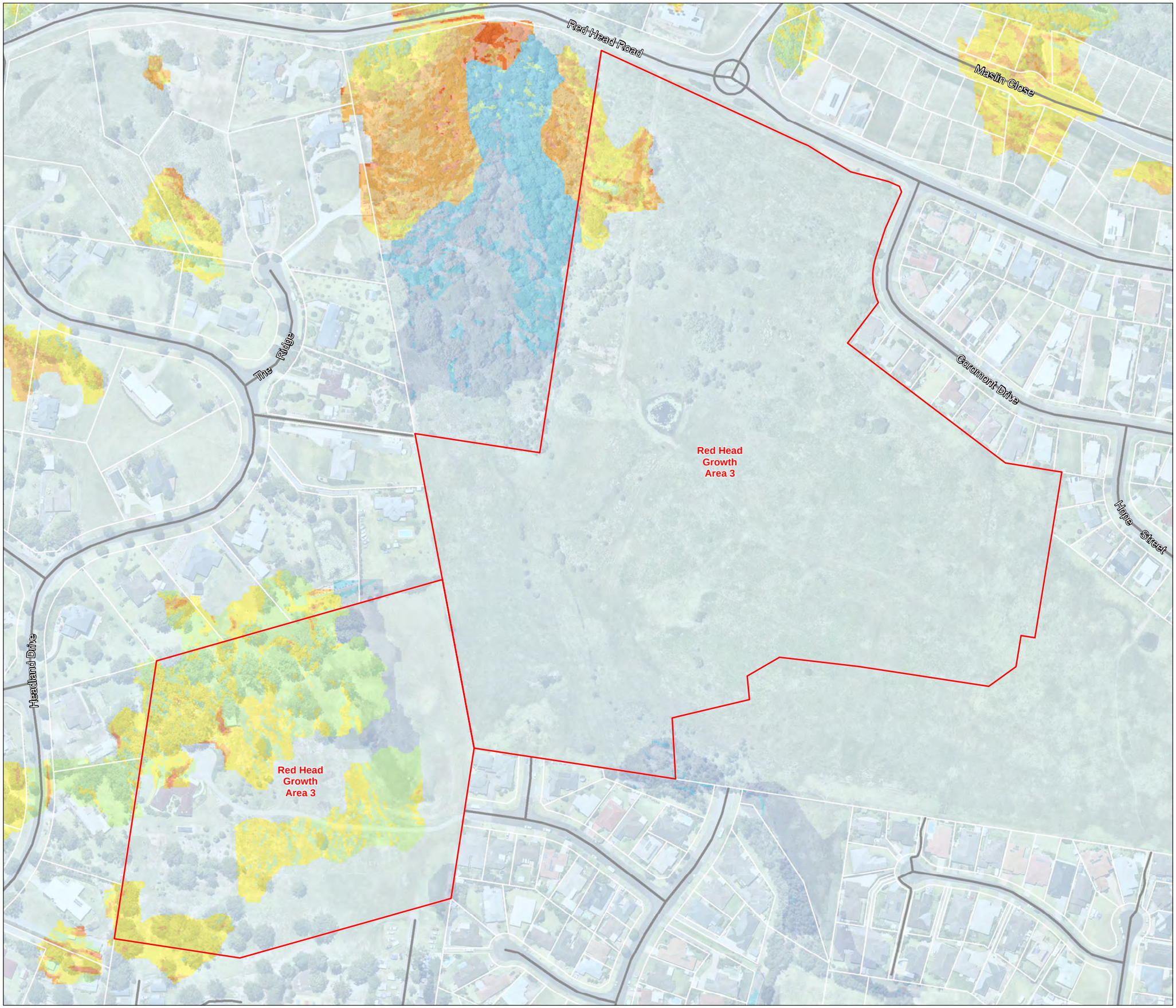
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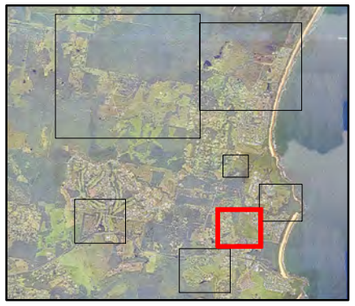


Project: Hallidays Point URA
Job No: 2223

Fire Intensity

Red Head Growth Area 3

BUSHFIRE PLANNING AUSTRALIA



Sheet 5 of 7

- Hallidays Urban Release Area

Intensity (kWm)

- 0 - 1,000
- 1,000 - 15,000
- 15,000 - 30,000
- 30,000 - 60,000
- 60,000 - 90,000
- 90,000- 120,000
- 120,000 - 150,000
- 150,000 - 180,000
- 180,000 - 250,000

SOURCE:
Fire Intensity analysis based on NSW Vegetation Type: NSW Department of Planning, Industry and Environment 2022 and LiDAR -slope (BULAHDELAH & FORSTER 1 metre Resolution Digital Elevation Model) © Department Finance, Services and Innovation 2012
AerialPhoto: NearMap 24/01/2022

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A3 Scale: 1:2,500

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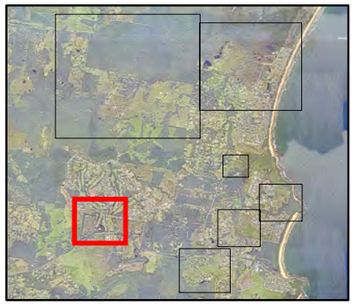
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Job No: 2223

Fire Intensity

Tallwoods Growth Area 1 & 2

BUSHFIRE PLANNING AUSTRALIA



Sheet 6 of 7

Hallidays Urban Release Area

Intensity (kWm)

- 0 - 1,000
- 1,000 - 15,000
- 15,000 - 30,000
- 30,000 - 60,000
- 60,000 - 90,000
- 90,000- 120,000
- 120,000 - 150,000
- 150,000 - 180,000
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SOURCE:
Fire Intensity analysis based on NSW Vegetation Type: NSW Department of Planning, Industry and Environment 2022 and LiDAR -slope (BULAHDELAH & FORSTER 1 metre Resolution Digital Elevation Model) © Department Finance, Services and Innovation 2012
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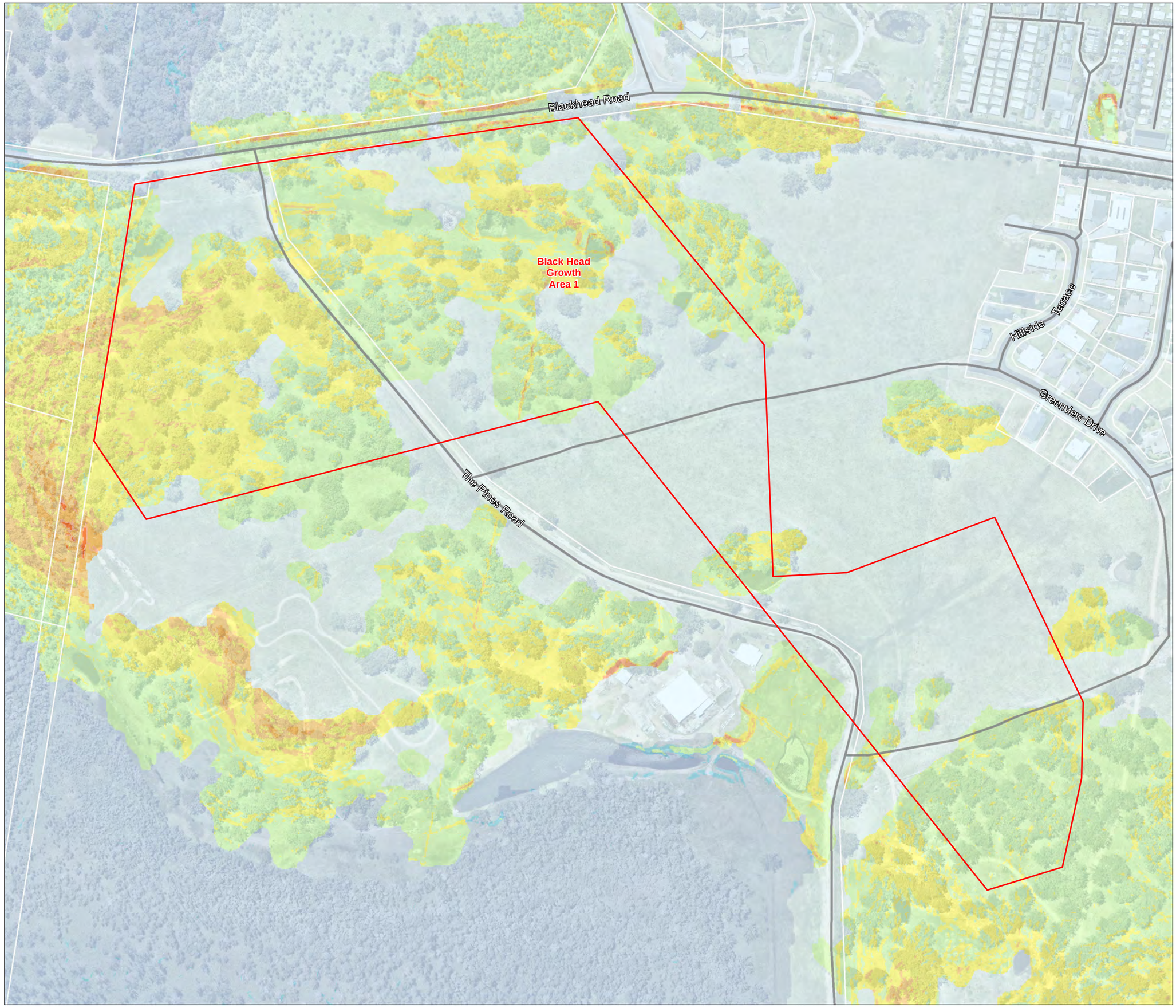
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Barber Close
Grangewood Avenue
The Boulevard
Coastal View Drive
Blackhead Road
Tallwoods Growth Area 1
Tallwoods Growth Area 2

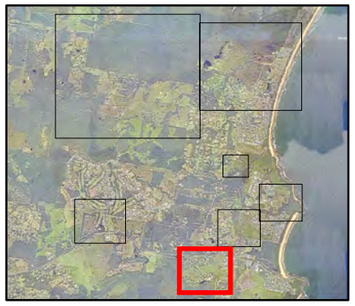


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Fire Intensity

Black Head Growth Area 1

BUSHFIRE PLANNING AUSTRALIA



Sheet 7 of 7

Hallidays Urban Release Area

Intensity (kWm)

- 0 - 1,000
- 1,000 - 15,000
- 15,000 - 30,000
- 30,000 - 60,000
- 60,000 - 90,000
- 90,000- 120,000
- 120,000 - 150,000
- 150,000 - 180,000
- 180,000 - 250,000

SOURCE:
Fire Intensity analysis based on NSW Vegetation Type: NSW Department of Planning, Industry and Environment 2022 and LiDAR -slope (BULAHDELAH & FORSTER 1 metre Resolution Digital Elevation Model) © Department Finance, Services and Innovation 2012
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Appendix B: Photographs



Plate 2: Eastbound along Blackhead Road heading towards Hallidays Point



Plate 3: Blackhead Road has two traffic lanes and a soft shoulder bordered by mature trees

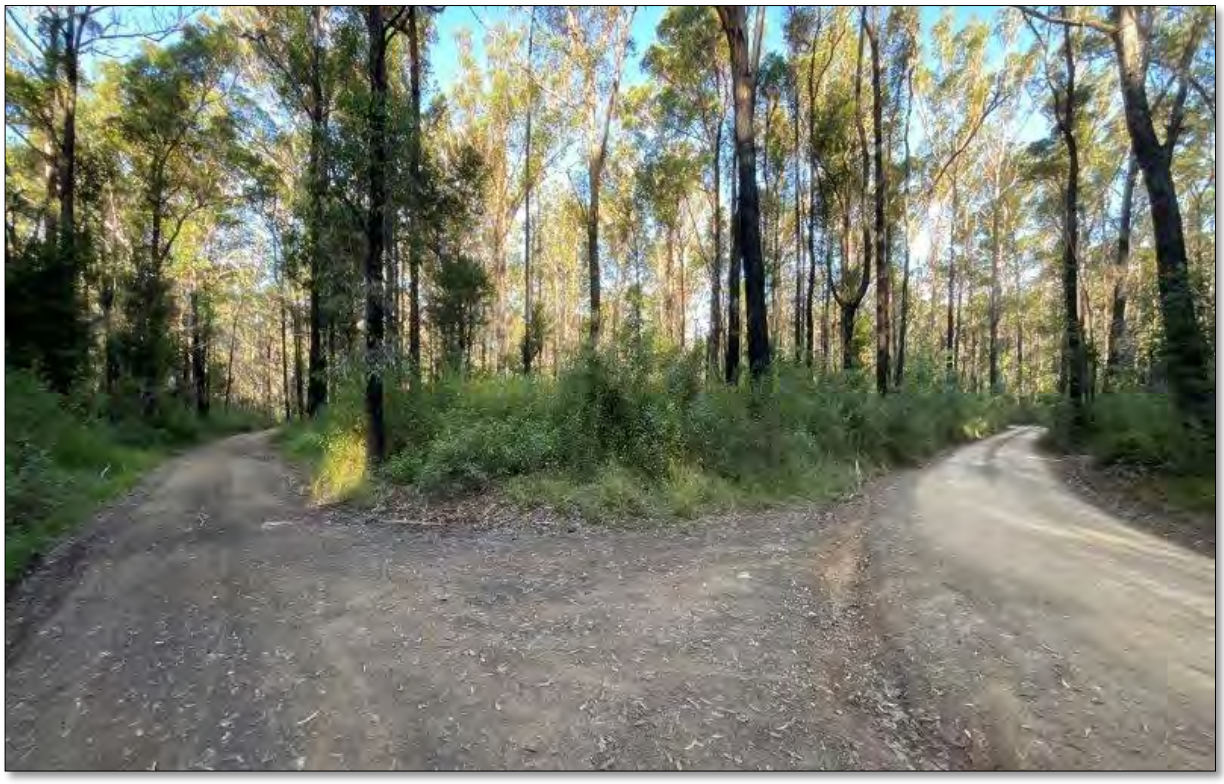


Plate 4: The alignment of Old Soldiers Road within NPWS tenure is not serviceable as a two way public road



Plate 5: The Tallwoods Firetrail connects Old Soldiers Road with Tallwood Drive. The Tallwoods Firetrail is currently not serviceable by 2WD vehicles.



Plate 6: Looking westbound along Old Soldiers Road towards NPWS land



Plate 7: Proposed re-alignment of Old Soldiers Road would traverse an existing paddock

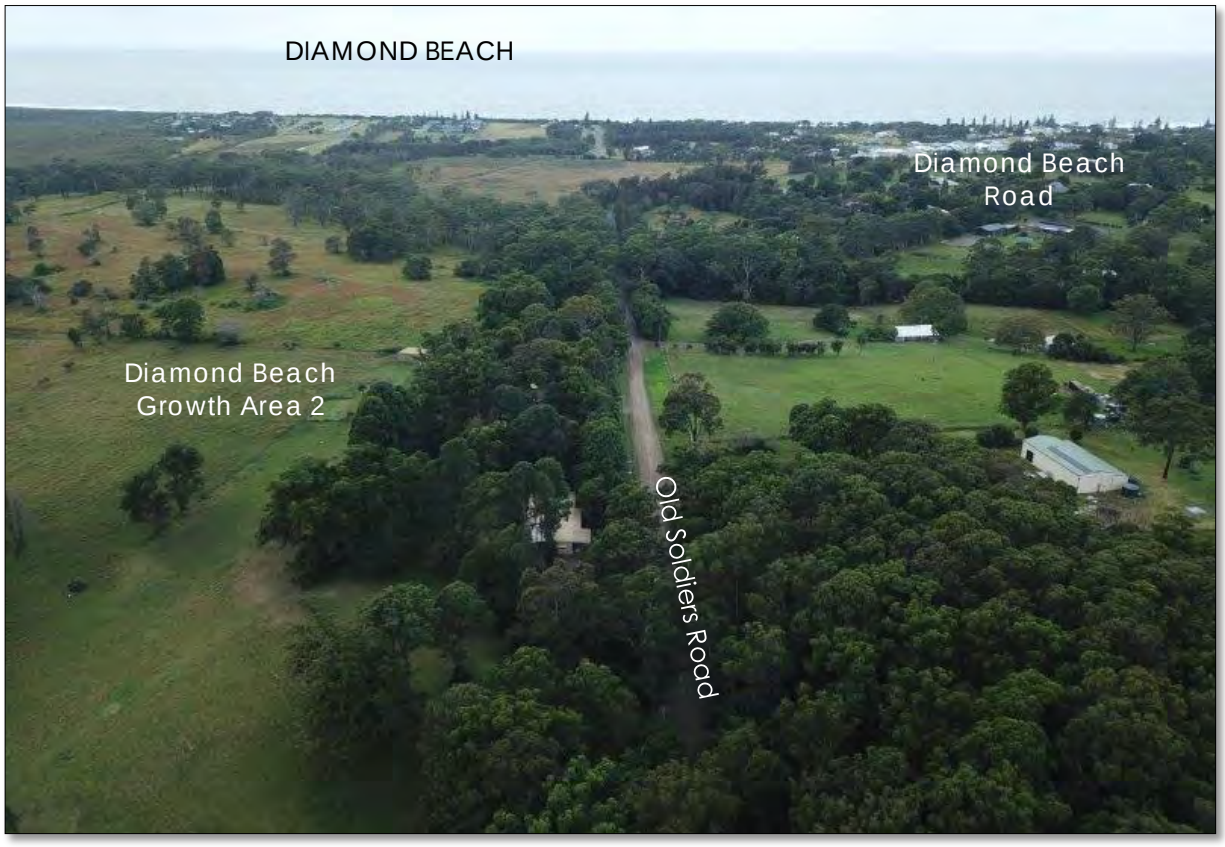


Plate 8: Upgrade or realignment of Old Soldiers Road would provide alternate access to The Lakes Way from Diamond Beach



Plate 9: Intersection of Diamond Beach Road and Blackhead Road



Plate 10: Tallwoods Golf Club is an RFS registered Neighbourhood Safer Place



Plate 11: RFS signage identifying a Bushfire NSP

Appendix C: Darawank Nature Reserve Fire Management Strategy 2005 (NPWS)

Hunter Region

Darawank Nature Reserve

Fire Management Strategy

2005

This strategy should be used in conjunction with aerial photography and field reconnaissance during incidents and the development of incident action plans.

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The NSW National Parks and Wildlife Service is part of the Department of Environment and Conservation.

Published by the Department of Environment and Conservation (NSW), January 2005.
Contact: NSW National Parks and Wildlife Service, Hunter Region,
Locked Bag 99, Nelson Bay Delivery Centre, NSW 2315.

ISBN 1 7412 2188 9 **Last Updated:** 03/02/2005

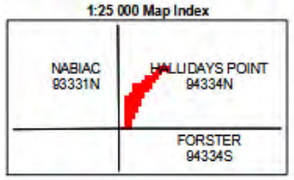
Department of Environment and Conservation (NSW)

This strategy is a relevant Plan under Section 33 (4) and Section 44 (3) of Rural Fires Act 1997.

1:250 000 Location Map



1:25 000 Map Index



Local Government Areas



Contacts and Communications

CONTACT DETAILS

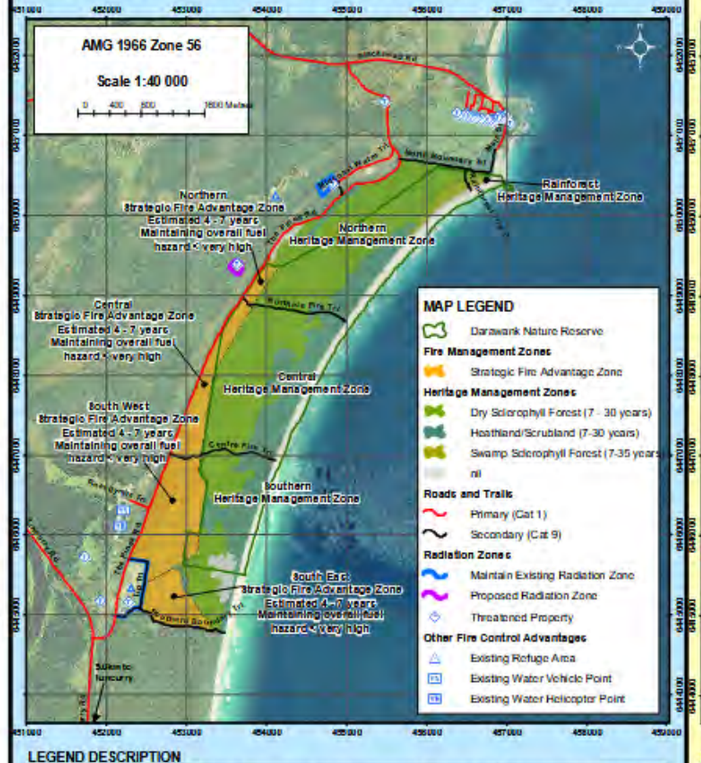
Agency	Position	Number
NPWS	Hunter Region Duty Officer (24 hr)	016 301161 / 0429 144880
	Great Lakes Area Manager	6591 0301 / 0429 144874
	Fire Management Officer	4984 8206 / 0429 144870
	Operations Coordinator	4984 8212 / 0429 144872
	Great Lakes Area Office	6591 0300 / (fax) 6554 0489
	Hunter Regional Office	4984 8200 / (fax) 4961 5515
RFS	Great Lakes	6555 5782 / 0428 242748
		6555 8888 / (fax) 6555 8899
NSW Fire Brigade	Newcastle Communications (24 hr)	4927 1777 / (fax) 4927 2580
State Forests	Resource Protection Manager	4927 0977 / (fax) 4927 8030
	Fire Officer	4927 0977 / 0427 762772
	Fire Mobile	0429 491868
	Bulahdelah Office	4997 4206 / (fax) 4997 4812
SES	Forster	6554 8716
Police	Forster-Tuncurry	6555 1299 / (fax) 6555 1222
	Emergency	000
Ambulance	Bookings	131233
	Emergency	000
Hospital	Forster	6554 8077
	Taree	6592 9111
DIPNR	Newcastle	4929 4348
Councils	Great Lakes	6591 7222 / (fax) 6591 8200

COMMUNICATION RESOURCES

Service	Channel	Location/Comments
NPWS - VHF	26	• Mt Cabbage Tree
	21	• Nerong Mountain
NPS-PMR	31	• Coolongolook
	32	• Cabbage Tree Mountain
NPS - GRN	1-71	• Hunter Region NPS
UHF - CB	1-99	• Available in most NPS vehicles • Choose clearest on fire-ground with RFS
NPWS-VHF Portable Repeater	15	• Can be located anywhere. • Kept at Regional Office
Mobile Phone	-	• Generally good coverage

Bushfire Risk Management Strategies

This map illustrates the strategies NPWS plans to implement between 2004 - 2009 in the reserve.



LEGEND DESCRIPTION

Fire Management Zones	• Note that some fire management zones extend beyond the boundaries of the reserve onto adjacent land. While the strategies proposed for adjacent land are not binding on the neighbouring property owner/occupier, NPWS will pursue these strategies with neighbours because if they are not implemented it may result in assets remaining at high risk. Where possible, NPWS will assist neighbours to undertake the proposed strategies. • Strategic Fire Advantage Zones: The objective of strategic fire management zones is to help reduce fire behaviour to reduce the chance of bushfire moving into or out of the reserve. This will be achieved by conducting prescribed burning at the frequency required to maintain the overall fuel hazard below very high. The estimated frequency of burning required to achieve this is indicated on the adjacent map. In many cases, the boundaries of strategic fire management zones are defined by roads and trails indicating a solid control line. Thus the mapped extent of strategic fire management zones should be viewed as the maximum area that is likely to be burnt in any prescribed burn. • Heritage Management Zones: The objective of heritage management zones is to conserve biodiversity and protect cultural heritage. The proposed burning frequency for heritage management zones is that which is required to conserve biodiversity in the vegetation communities occurring within the zone (see Bushfire Risk Management Strategies Map Legend above).
Roads & Trails	• The above map illustrates existing trails that are considered important for fire management and are proposed to be maintained. In general, it is proposed that NPWS maintains trails within the reserve and the owner/occupier maintain trails on their properties. However, NPWS may enter into agreements with neighbouring property owners about maintenance of trails on their property. • Note the illustration of roads and trails on this map does not necessarily indicate a right of way and unless there is an existing access agreement permission should always be sought from the relevant land holders before using trails on their property. • Primary Category 1 Trails are existing trails that will be maintained to a standard sufficient to allow the passage of Category 1 fire tankers (4wd Heavy Tanker up to 3000 litre capacity). • Secondary Category 9 Trails are existing trails that will be maintained to a standard sufficient to allow the passage of Category 9 fire tankers (4wd ute up to 400 litre capacity).
Radiation Zones	• There are a large number of rural residential properties close to the reserve. Many of these properties do not have existing radiation zones. It is recommended that the Rural Fire Service pursue the construction and maintenance of radiation zones around structures on all private properties surrounding the reserve.
Other Fire Control Advantages	• Other fire control advantages are features that may be used to support bushfire suppression operations and include water points (both helicopter and vehicle accessible), helipads, landing grounds, staging areas and refuge areas. Other fire control advantages that will be maintained or constructed in and around the reserves are illustrated in the adjacent map.

GENERAL OPERATIONAL GUIDELINES

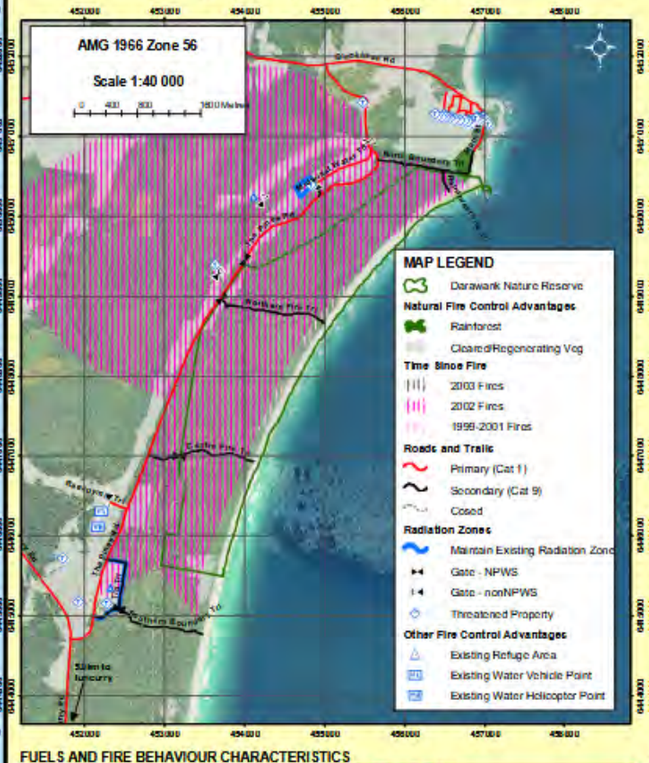
Issue/Area	Operational Guidelines
Aerial Ignition	• May be used where considered appropriate. • May be ineffective in heathlands due to a poorly developed surface fuel layer. • Will be ineffective and should not be used when there is surface water covering the soil.
Backburning	• As far as possible, backburning should take account of threatened species and cultural heritage guidelines. • On days when the fire danger > High, as far as possible delay backburning until early evening. • Backburning may be safely undertaken during the day when the fire danger < High. • Take particular care backburning when there are fibrous/paper bark trees close to control lines.
Command and Control	• ICS system will be implemented during all fire suppression activities.
Water Bombing	• Can be used to slow the spread of a fire but will not extinguish a fire without support from ground crews. • Ground crews must be warned of water bombing operations. • As far as possible, foam should be used to increase the effectiveness of the water. • Foam/water should not be used for building control lines because it is ineffective.
Trails	• Many trails have a sandy surface and may become impassable when heavy use. • Develop a traffic plan that minimises use of trails, especially by heavy vehicles.
Restoration	• All new fire breaks will be restored as part of the fire suppression operation.
Earth Moving Machinery	• Can only be used with consent of NPWS and only if the probability of success is considered high. • As far as possible, restrict use to dormant trails and other previously disturbed areas. • Subject to operational constraints, minimise the length of break constructed. • As far as possible, take account of threatened species and cultural heritage management guidelines. • The route to be taken by earth moving machinery must be scouted to identify possible cultural heritage sites.
Foams & Wetting Agents	• Use permitted where considered appropriate. • As far as possible, minimise use in rainforest communities.
Fire Advantage Recording	• All fire advantages used during wildfire suppression operations are to be mapped so they can be added to the database.
Retardant	• Retardant is ineffective and should not be used in communities with a dense canopy cover. • Retardant is ineffective and should not be used against high intensity fires producing large numbers of spot fires. • Retardant is most applicable to building short lengths of control line to link existing control lines. • Areas where retardant has been used shall be mapped.
Forster Land Fill Site	• As far as possible, ensure fires do not ignite the tip face as it is extremely difficult to extinguish. • If the tip face is ignited, extinguish using earth moving machinery and flooding with water.

Bushfire Suppression Information 2005/06

The information in this section will be updated annually based on fire history and completed fire management works.

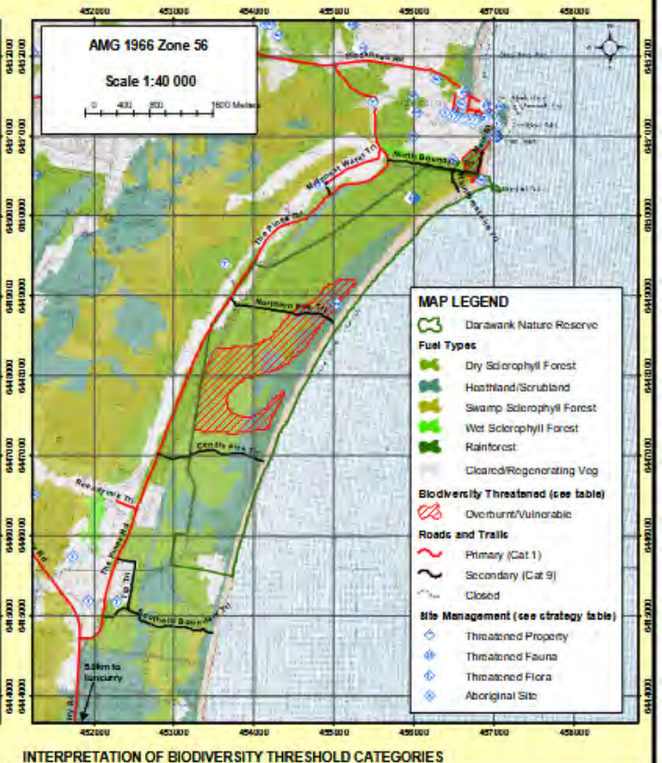
Fire Control Advantages

This map illustrates fire control advantages that may be used during bushfire suppression operations.



Assets & Fire Fuels

This map illustrates fire fuels and the location of assets for use in bushfire suppression operations.



FUELS AND FIRE BEHAVIOUR CHARACTERISTICS

Fuel Type	Fire Behaviour Characteristics
Dry Sclerophyll Forest	• Flammable under a wide range of conditions. • High fire intensity and flame heights under hot, dry, windy conditions. • Heavy short distance spotting (<500m), occasional long distance spotting (>500m). • Forests and woodlands with a heathy understorey typically exhibit higher levels of fire behaviour than those with a more open understorey. • Use McArthur Mark 5 Forest Fire Behaviour Model to estimate ROS.
Heathland/ Shrubland	• High intensity, high ROS fires under most conditions, even shortly after rain. • ROS and intensity highly sensitive to wind speed. • At low wind speeds (<10 km/h) fires may not sustain, particularly in fuels <3 yrs. • Heavy short distance spotting (<500m) common. • Use Catchpole et al. Heathland Fire Behaviour Model to estimate ROS.
Swamp Sclerophyll Forest	• Seasonally inundated. • When inundated, requires winds >20km/h to sustain spread through aerial fuels. • When not inundated, burns with high ROS, intensity and heavy short distance spotting (>500m). • Crown fires and very high flame heights (3-5 x tree height) common due to high level of vertical fuel continuity. • When inundated backfires usually self extinguish at night. • Ground (peat) fires common when not inundated and soils dry. • Use Catchpole et al. Heathland Fire Behaviour Model to estimate ROS.
Wet Sclerophyll Forest	• Generally only flammable when DKDI > 80. • May function as control line when DKDI < 50. • Ground (peat) fires common when DKDI > 125. • When flammable, often burns at extreme intensities (higher than any other fuel type). • When flammable, often results in long distance spotting (>500m).
Rainforest	• Generally only flammable when DKDI > 100. • May function as control line when DKDI < 60. • Ground (peat) fires common when DKDI > 125. • When flammable, fires are usually slow and of low intensity, although vines may allow flames to climb trees. • Due to palms dropping large numbers of dead fronds, palms may be flammable when other rainforest species are not.
Cleared	• Only flammable when grass >50-70% cured. • May function as control line when grass <50% cured. • When grass >70% cured, burns with the highest ROS of any fuel type but comparatively low flame height and intensity. • When grass <70% cured, ROS highly sensitive to wind speed. • When grass >70% cured, flame height and intensity, but not ROS, strongly influenced by grass height and continuity. • Spotting >100m uncommon. • Use CSIRO Grassland Fire Behaviour Model to estimate ROS.
Sand/Rock/Bare Ground or Water	• Not flammable.

FIRE SUPPRESSION STRATEGIES

Current Fire Danger	Forecast Fire Danger	Guidelines
Low - Mod	**Low - Mod**	• As far as possible, undertake indirect, parallel or direct attack along existing control lines taking advantage of Natural Fire Control Advantages (NFCA). • As far as possible, maximise area burnt without threatening assets, including biodiversity • Identify and survey backup control lines.
Low - Mod	**>= High**	• Undertake indirect, parallel or direct attack to minimise the time taken to contain the fire. • Identify and survey backup control lines taking advantage of NFCA.
High	**All**	• Undertake indirect attack along existing or newly constructed control lines taking advantage of NFCA. • Secure and deepen control lines along the next predicted downwind side of the fire. • Identify and survey backup control lines taking advantage of NFCA.
All	**All**	• Ensure there is sufficient time to secure control lines before the fire gets to them. • If there is insufficient time to secure control lines, fall back to the next potential control line. • As far as possible, implement threatened species and cultural heritage management guidelines. • Test NFCA before relying on them.

INTERPRETATION OF BIODIVERSITY THRESHOLD CATEGORIES

Category	Interpretation
Overburnt	• Protect from fire as far as possible. • Past fire frequency has already exceeded biodiversity thresholds.
Vulnerable	• Protect from fire as far as possible. • The occurrence of fire this year will result in biodiversity thresholds being exceeded.
Underburnt	• If possible, allow area to burn. • Fire frequency has already been too low to conserve biodiversity.
Almost Underburnt	• If possible, allow area to burn. • The absence of fire this year will result in a fire frequency outside biodiversity thresholds.

ABORIGINAL SITE MANGEMENT STRATEGIES

Label	Treatment
AH1	• As far as possible protect site from fire. • Do not cut down trees. • Use of foams, wetting agents & retardant is acceptable.
AH2	• As far as possible protect site from fire. • Avoid ground disturbance including handtools, dozers. • Avoid water bombing which may cause ground disturbance.
AH3	• Avoid ground disturbance including handtools, dozers. • Avoid water bombing which may cause ground disturbance. • Site may be burnt by wildfire, backburn, prescribed burn.

THREATENED FAUNA MANAGEMENT STRATEGIES

Label	Treatments
FA1	• Protect large and hollow bearing trees.
FA2	• Protect large and hollow bearing trees. • Avoid interfire intervals of < 10 yrs. • Avoid high intensity fires that consume tree canopies and fallen logs.
FA3	• Avoid interfire intervals of < 10 yrs.
FA4	• Habitat unlikely to be effected by fire. • Avoid use of earth moving machinery in wetland habitats. • Avoid use of retardant and foam in wetland habitats.
FA5	• Habitat unlikely to be effected by fire. • Avoid use of earth moving machinery in dune habitats.
FA8	• Avoid fire, including wildfire, backburning & MR, as far as possible in wetland habitat. • Avoid use of earth moving machinery in wetland habitats. • Avoid use of retardant and foam in wetland habitats.
FA7	• Avoid high intensity fires that consume tree canopies and fallen logs.
FA8	• Avoid fire, including wildfire, backburning & MR, as far as possible. • Avoid use of earth moving machinery.

THREATENED FLORA MANAGEMENT STRATEGIES

Label	Treatments
FL1	• Avoid interfire intervals of < 10 yrs. • Avoid the use of earthmoving machinery. • Avoid the use of retardant.
FL2	• Avoid fire, including wildfire, backburn, MR, as far as possible. • Avoid the use of earthmoving machinery. • Avoid the use of retardant.
FL3	• Avoid high intensity fire. • Avoid interfire intervals <10 years, effect unknown. • Avoid the use of earth moving machinery.
FL4	• Avoid summer fire. • Avoid high intensity fire. • Avoid earth moving machinery.
FL5	• Avoid low intensity fire. • Avoid interfire intervals <5 years. • Avoid earth moving machinery. • Avoid the use of retardant.

Appendix D: Khappinghat Nature Reserve & Talawahl Nature Reserve Fire Management Strategy 2005 (NPWS)

Mid North Coast Region
Khappinghat Nature Reserve & Talawahl Nature Reserve
Fire Management Strategy (Type 2) 2005
Sheet 1 of 2

This strategy should be used in conjunction with aerial photography and field reconnaissance during incidents and the development of incident action plans.

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ISBN: 1 74137 434 0 **DEC Number:** 2005/285 **Last Updated:** 20/07/2005

Department of Environment and Conservation (NSW)

This strategy is a relevant Plan under Section 38 (4) and Section 44 (3) of Rural Fires Act 1997.

Endorsed by: _____ **Date:** / /

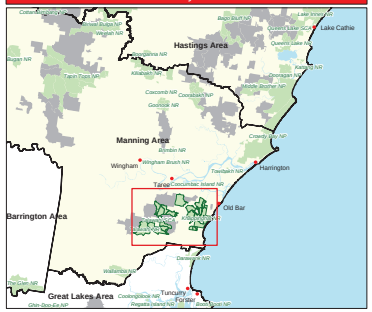
Director Northern, Parks & Wildlife Division

Produced by MNC GIS

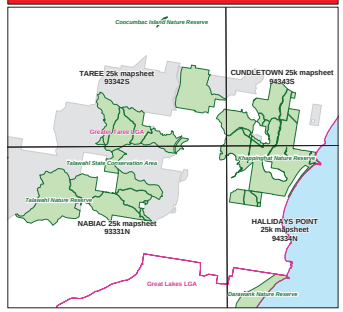
Datum: AGD66
Projection: UTM
Grid: AMG Zone 56

Noted scales are true when this map is printed on A0 paper

Locality



Index



Contact Information

Agency	Position / Location	Phone
NPWS	Regional Duty Officer / After Hours Pager	016 301 161
		6586 8300
	Area Manager	0539 4101
		0407 758 804
	Fire Management Officer	6586 8329
		0417 497 031
	Regional Operations Coordinator	6586 8317
		0417 260 055
	Manning Area Office	6552 4097
	Fax	6551 0575
	Regional Office	6586 8300
RFS	Operations Officer	6592 6990
		0427 229 131
	Team Manager	6558 9222
		0427 260 383
	Taree Fire Control 24hr Number	6592 6999
NSW Fire Brigade	Emergency	000
	Taree Station	6551 5246
SES	Emergency	000
	Taree Unit	6552 5866
Police	Emergency	000
	Taree Station	6552 0399
Ambulance	Emergency	000
	All Stations	13 1233
Hospital	Manning Base	6592 9111
Forests NSW	Wauchope Regional Office	6585 3744
	Taree Operations Office	6551 0074
Council	Greater Taree City Council	6592 5399
	Emergency AH Number	0428 654 025
Local Aboriginal Land Councils	Purfleet/Taree	6552 4106
	Forster	6555 5411
Bee Licensees	Please Contact Regional Office for further details	6586 8300

Strategy Information

Fire Season Information

Wildfires	• Have been known to start as early as late August, but usually the potential for a large fire event is greatest between October and December. This period may extend into January in more severe years.
Prescribed Burning (NPWS Fire Management Manual 4.7)	• General season is Autumn to late Winter. Burning is possible in early Spring but not desirable on a regular basis from an ecological point of view.

Suppression Strategies

Current FDR	Forecast FDR	
Low - Mod	Low - Mod	• Undertake direct, parallel or indirect attack along existing containment lines. • Where practicable consider maximising the fire area in accordance with the requirements of any proposed prescribed burns.
Low - Mod	= > High	• In order to minimise the fire area and secure the flanks as soon as possible, undertake direct, parallel or indirect attack along the closest containment lines. • Pay particular attention to the flank on the next predicted down wind side.
High	All	• Undertake indirect attack along existing or newly constructed containment lines. • Secure and deepen containment lines along the next predicted downwind side of the fire. • If applicable consider broader than normal containment strategies to avoid wasted effort and high risk of failure.
All	All	• Ensure there is sufficient time to secure containment lines prior to the fire impacting upon them; otherwise fall back to the next potential line.

Communications Information

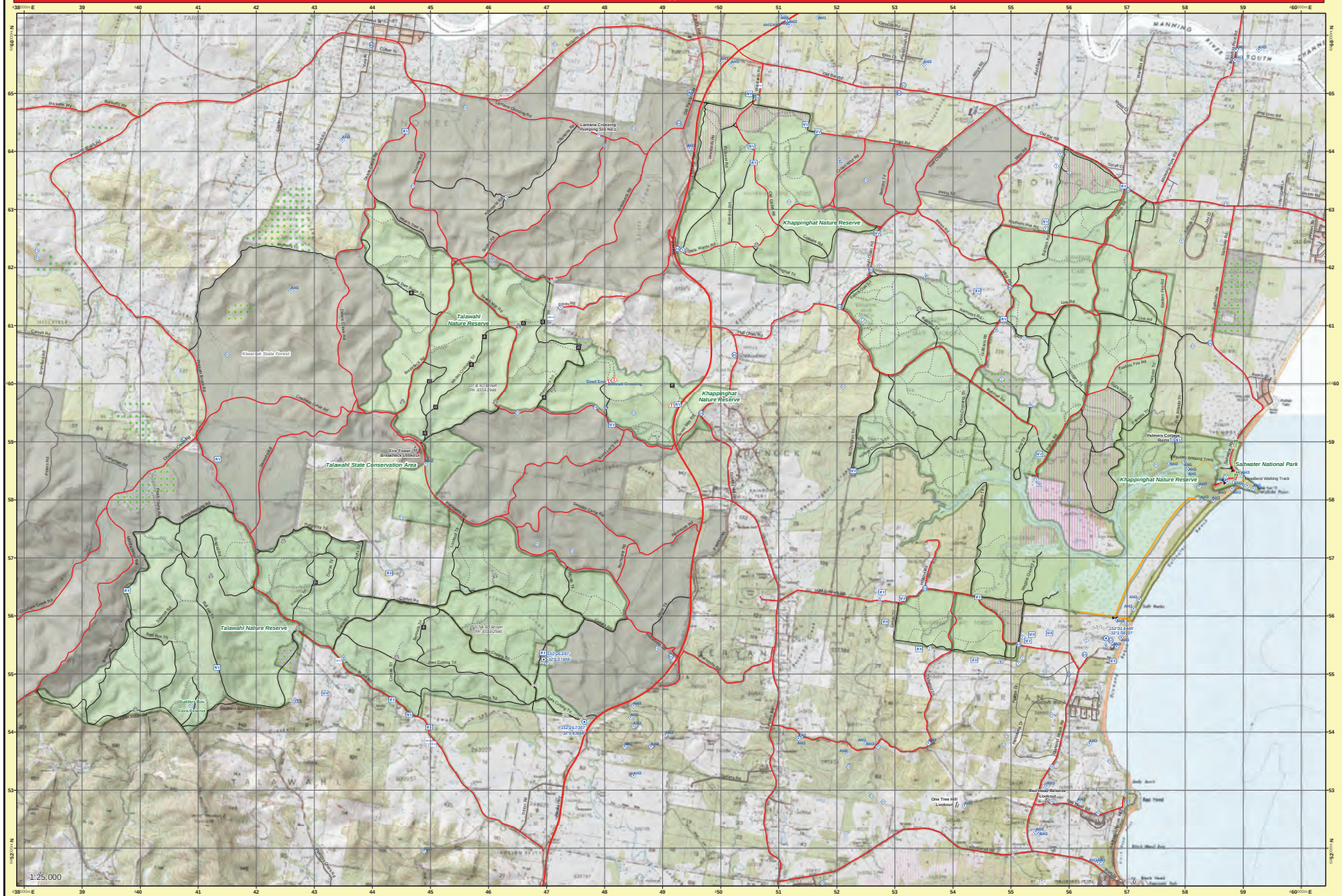
Service	Channel	Location and Comments
NPWS - VHF	7	Mt Marie, Channel 9 as alternate
NPWS - VHF (Fireground Comms)	39	Channel 41 as alternate
NPWS - VHF (Portable Repeater)	13	Held at Hastings Depot in Port Macquarie.
RFS - PMR - UHF	34	Channel 19 as alternate
RFS - GRN		Not Available
SF - VHF	18	NPWS Channel 86
CB - UHF	23	
Aircraft - VHF		Not Available
Mobile Phone - CDMA	Yes	
Mobile Phone - GSM	Yes	

Operational Guidelines

Refer to Strategy for Fire Management 2003 and Fire Management Manual 2004.
Brief all personnel involved in suppression operations on the following issues:

Resource	Guidelines
Aboriginal Cultural Heritage Site Management (NPWS FMM 4.11)	• AH1 - As far as possible protect site from fire, Do not cut down trees. • AH2 - As far as possible protect site from fire, Avoid all ground disturbance including the use of earthmoving machinery, handline construction and driving over sites, Avoid water bombing which may cause ground disturbance. • AH3 - Avoid all ground disturbance, Avoid water bombing, Site may be burnt by bushfire, back-burn or prescribed burn without damage.
Historic Heritage Management (NPWS FMM 4.10)	• There are no historic sites within the reserves that are threatened by fire.
Threatened Fauna Management (NPWS FMM 4.12 & 5.2)	• FA - Wildlife rescue program to be implemented when the IC declares it safe to undertake on-ground rescue operations • If new sites are located consult with a senior NPWS officer.
Threatened Flora Management (NPWS FMM 4.12)	• No known sites in Reserve. If new sites are located consult with a senior NPWS officer.
Threatened Property	• Where possible property owners with assets at risk from a wildfire event should be kept informed regarding the progress of the fire; and asked for an assessment of their current level of asset protection preparedness. • **Beekeepers must be notified within the first four hours of a reported ignition.** For their safety bee keepers are to be accompanied by a Cat 9 and crew, if the bee sites are either in the predicted path of the fire, on, or adjacent to, the fireground. Contact MNC Regional Office for telephone numbers of Beekeepers • Licensee No. 1- Bees Sites at: Taree Mapsheet GR E449400 N6462300, E450600 N6462400, E451800 N6463000, Cundletown Mapsheet GR E453400 N6461300 and Nabiac Mapsheet GR E442700 N6455800, E439900 N6454400, E442400 N6457400 & E444400 N6455300 • Licensee No. 2 - CAN BE CONTACTED ON (02) 6559 2946. Bee sites at: Nabiac Mapsheet GR E445700 N 6455800 & E446100 N6456700 AND Taree Mapsheet gr E 446500 N6446200 & E446100 N6459700. • Licensee No. 3 Bee sites at: Nabiac Mapsheet E441200 N6456700 AND Taree Mapsheet E447100 N6459000. • Licensee No. 4 Bee site at: Tyaree Mapsheet E 444500 N6459700
General	**Guidelines**
Aerial Water Bombing (NPWS FMM 4.4 / NSW Fire Agencies Aviation SOPs O2 / NPWS Guidelines for Effective Aircraft Management)	• The use of bombing aircraft should support ground based suppression crews engaged in containment operations by aggressively attacking hotspots and spot-overs. • Where practicable foam should be used to increase the effectiveness of the water. • Ground crews must be alerted to water bombing operations.
Aerial Ignition (NPWS FMM 4.2.20 & 4.4 / NSW Fire Agencies Aviation SOPs O2-4 / NPWS Guidelines for Effective Aircraft Management)	• Aerial ignition may be used during back-burning or fuel reduction operations where practicable, but only with the prior consent of a senior NPWS officer. • Utilise incendiaries to rapidly progress back-burns down slope where required.
Backburning (NPWS FMM 4.8)	• Temperature and humidity trends must be monitored carefully to determine the safest times to implement back-burns. Generally, when the FDI is Very High or greater, backburning should commence when the humidity begins to rise in the late afternoon or early evening. With a lower FDI backburning may be safely undertaken during the day. • Where practicable, clear a 1m radius around dead and fibrous barked trees adjacent to containment lines prior to backburning, or wet down these trees as part of the backburn ignition. • Avoid ignition of backburns at the bottom of slopes where a long and intense up slope burn is likely.
Command & Control (NPWS FMM 4.2)	• The first combatant agency on site may assume control of the fire, but then must ensure the relevant land management agency is notified promptly. • On the arrival of other combatant agencies, the initial incident controller will consult with regard to the ongoing command, control and incident management team requirements as per the relevant BFMC Plan of Operations.
Containment Lines (NPWS FMM 2.2 & 3.9)	• Construction of new containment lines should be avoided, where practicable, except where they can be constructed with minimal environmental impact. New containment lines require the prior consent of a senior NPWS officer. • Where practicable, containment lines should be stabilised and rehabilitated as part of the wildfire suppression operation. • All containment lines not required for other purposes should be closed at the cessation of the incident. • All personal involved in containment line construction should be briefed on both natural and cultural heritage sites in the location.
Earthmoving Equipment (NPWS FMM 4.2.20 & 4.3)	• Earthmoving equipment may only be used with the prior consent of a senior NPWS officer, and then only if the probability of its success is high. • Earthmoving equipment must be always guided and supervised by an experienced officer, and accompanied by a support vehicle. When engaged in direct or parallel attack this vehicle must be a firefighting vehicle. • Earthmoving equipment should be washed down, where practicable, prior to it entering NPWS estate.
Fire Advantage Recording	• All fire advantages used during wildfire suppression operations must be mapped and where relevant added to the database.
Fire Suppression Chemicals (NPWS FMM 4.2.20 & 4.9)	• Wetting and foaming agents (surfactants) are permitted for use in wildfire suppression. • The use of fire retardant is only permitted with the prior consent of the senior NPWS officer, and should be avoided where reasonable alternatives are available. • Exclude the use of surfactants and retardants within 50m of rainforest, watercourses, dams and swamps. • Areas where fire suppression chemicals are used must be mapped and the used products name recorded. • The Threatened Species Operational Guidelines are to be observed.
Rehabilitation (NPWS FMM 5.1)	• Where practicable, containment lines should be stabilised and rehabilitated as part of the wildfire suppression operation.
Smoke Management (NPWS FMM 3.4)	• The potential impacts of smoke and possible mitigation tactics must be considered when planning for wildfire suppression and prescribed burning operations. • If smoke becomes a hazard on local roads or highways, the police and relevant media must be notified. • Smoke management must be in accordance with relevant RTA traffic management guidelines.
Visitor Management (NPWS FMM 3.6 & 4.13)	• The reserve may be closed to the public during periods of extreme fire danger or during wildfire suppression operations.

Bushfire Suppression



Contour Interval 10 metres
Pacific Highway
NPWS Roads
Primary (Cat 1)
Secondary (Cat 9)
Closed
Not classified
Walking Track
Slashed Trail
NPWS Estate
State Forest
State Forest Plantation
Fires 2004-2005
Fires 2003-2004
Fires 2001-2003
Aboriginal Sites
Control Centre
Endangered Fauna
Endangered Flora
Escape Route
Helipad
Potential Helipad
Historic Site
Refuge Area
Staging Area
Threatened Property
Water Point Helicopter
Water Point Vehicle
Water Point - H & V
Caution
Gate - NPWS
Gate - non NPWS
Loading Ramp - Old
Sign
Turning Point
Vantage Point
Bee Sites
Assume all gates locked

Mid North Coast Region
Khappinghat Nature Reserve & Talawahl Nature Reserve
Fire Management Strategy (Type 2) 2005
Sheet 2 of 2

This strategy should be used in conjunction with aerial photography and field reconnaissance during incidents and the development of incident action plans.

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Department of Environment and Conservation (NSW)

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Endorsed by: _____ **Date:** / /

Director Northern, Parks & Wildlife Division

Produced by MNC GIS

Datum: AGD66
Projection: UTM
Grid: AMG Zone 56

Noted scales are true when this map is printed on A1 paper

Fire Management Zones

Asset Protection Zones

The objective of APZs is the protection of human life and property. This will have precedence over guidelines for the management of biodiversity. Maintain Overall Fuel Hazard at Moderate or below.

Zone	Action
Old Bar APZ	Prescribed burn on 3-5 year intervals
Reservoir APZ	Prescribed burn on 3-5 year intervals
Highway APZ	Prescribed burn on 3-5 year intervals
Half Chain APZ	Prescribed burn on 3-5 year intervals
Ramseys APZ	Prescribed burn on 3-5 year intervals

Strategic Fire Advantage Zones

The objective of SFAZs is to reduce fire intensity across larger areas. Maintain Overall Fuel Hazard at High or below, however adherence to guidelines for biodiversity will take precedence where practical.

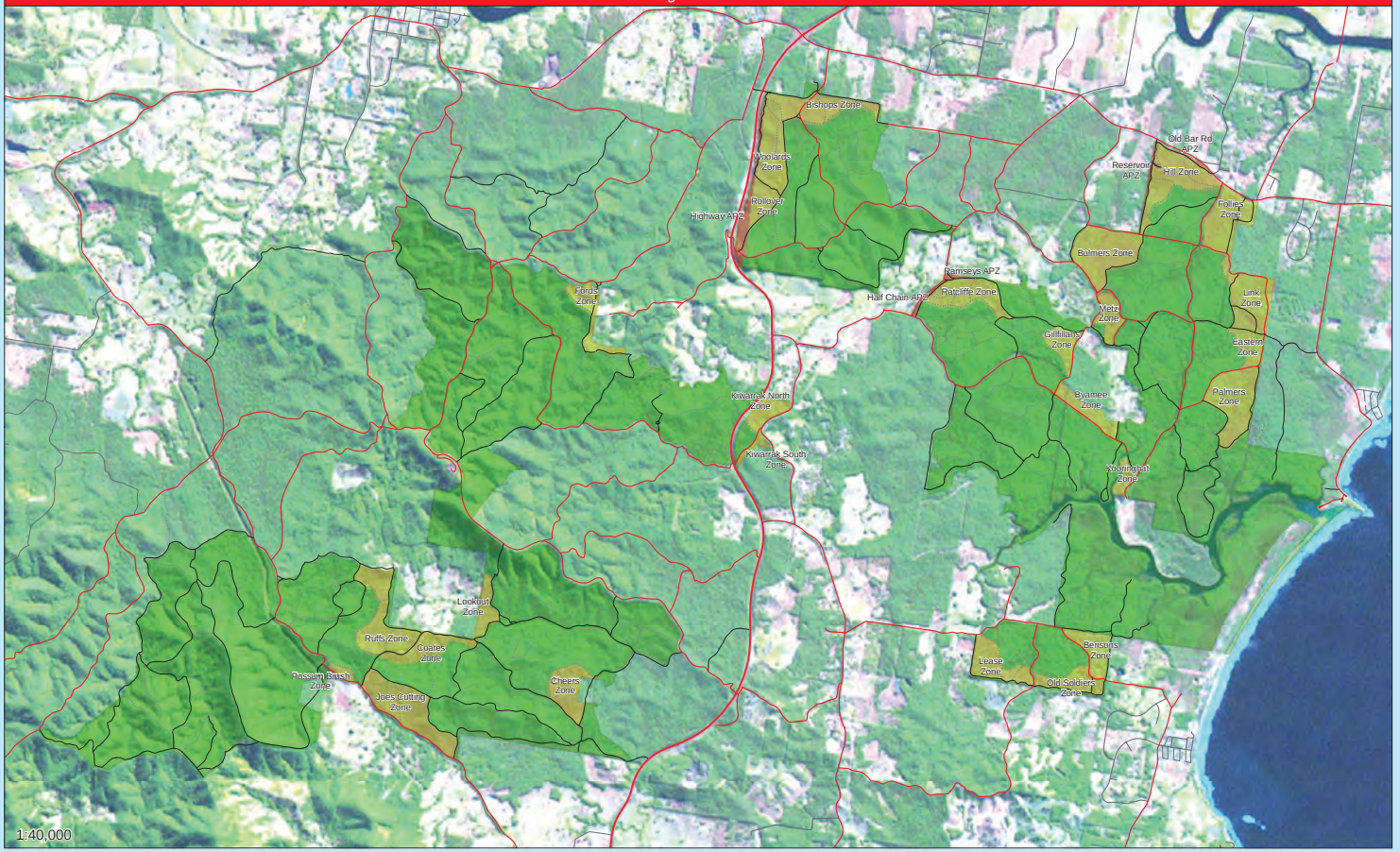
Zone	Action
Hill SWZ	Prescribed burn when lower threshold is reached
Follies Road SWZ	Prescribed burn when lower threshold is reached
Link SWZ	Prescribed burn when lower threshold is reached
Eastern SWZ	Prescribed burn when lower threshold is reached
Palmers SWZ	Prescribed burn when lower threshold is reached
Bulmers SWZ	Prescribed burn when lower threshold is reached
Metz SWZ	Prescribed burn when lower threshold is reached
Ramseys East SWZ	Prescribed burn when lower threshold is reached
Byamee SWZ	Prescribed burn when lower threshold is reached
Kooringhat SWZ	Prescribed burn when lower threshold is reached
Ratcliff SWZ	Prescribed burn when lower threshold is reached
Benson's SWZ	Prescribed burn when lower threshold is reached
Old Soldiers SWZ	Prescribed burn when lower threshold is reached
Lease SWZ	Prescribed burn when lower threshold is reached
Bishops SWZ	Prescribed burn when lower threshold is reached
Woolards SWZ	Prescribed burn when lower threshold is reached
Rollover SWZ	Prescribed burn when lower threshold is reached
Kwarrak North SWZ	Prescribed burn when lower threshold is reached
Kwarrak South SWZ	Prescribed burn when lower threshold is reached
Fords SWZ	Prescribed burn when lower threshold is reached
Lookout SWZ	Prescribed burn when lower threshold is reached
Ruffs SWZ	Prescribed burn when lower threshold is reached
Coates SWZ	Prescribed burn when lower threshold is reached
Cheers SWZ	Prescribed burn when lower threshold is reached
Possum Brush SWZ	Prescribed burn when lower threshold is reached
Joes Cutting SWZ	Prescribed burn when lower threshold is reached

Heritage Management Zones

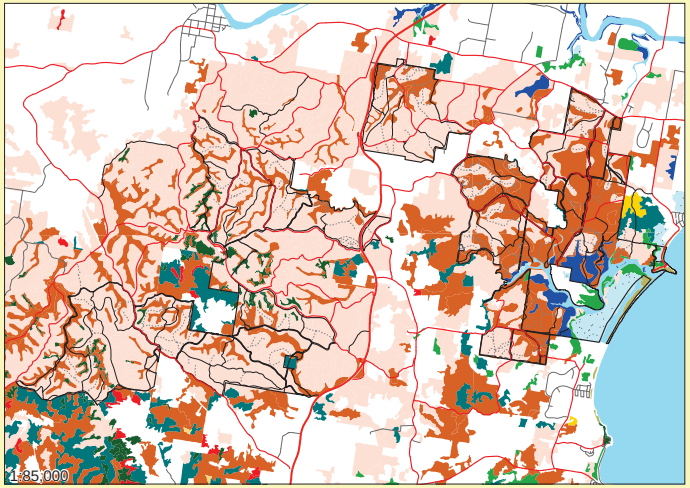
The objective of HMZs is to conserve biodiversity and protect cultural heritage. Manage fire consistent with fire thresholds.

Zone	Action
All	Prescribed burn after upper threshold is reached

Risk Management Information

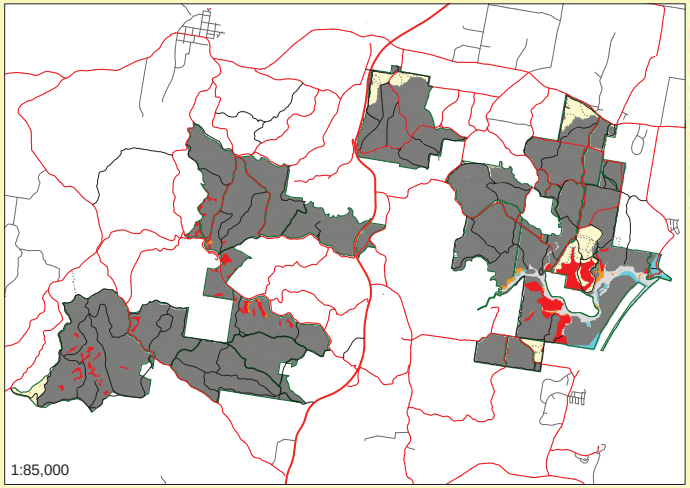


Vegetation



- Arid & semi-arid shrubland
- Freshwater wetland
- Freshwater wetland / Swamp sclerophyll forest
- Grassland
- Grassy dry sclerophyll forest
- Rainforest
- Saline wetland
- Semi-mesic grassy forest
- Shrubby dry sclerophyll forest
- Shrubby dry sclerophyll forest &/or Heathland
- Swamp sclerophyll forest
- Wet sclerophyll forest
- Water
- Not Applicable
- Cleared (<20% CCP)

Status of Fire Thresholds



Fire Thresholds	
Overburnt	Fire thresholds have been exceeded. *- Protect from fire as far as possible.*
Vulnerable	The area will be Overburnt if it burns this year. *- Protect from fire as far as possible.*
Recently Burnt	Time since fire is less than the optimum interval, but before that it was within threshold. *- Avoid fires if possible.*
Within Threshold	Fire history is within the threshold for vegetation in this area. *- A burn is neither required nor should one necessarily be avoided.*
Almost Underburnt	The area is close to its threshold and may become underburnt with the absence of fire. *- A prescribed burn may be advantageous. Consider allowing unplanned fires to burn.*
Underburnt	Fire frequency is below fire thresholds in the area. *- A prescribed burn may be advantageous. Consider allowing unplanned fires to burn.*
Unknown	Insufficient data to determine fire threshold.

NB. Fire thresholds are defined for vegetation communities to conserve biodiversity.