

# Fire Mitigation Plan ~ Tuncurry ~

August 2007





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~ Tuncurry ~

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## EXECUTIVE SUMMARY

Great Lakes Council's, Fire Mitigation Plan – Tuncurry has been prepared for the Tuncurry urban and rural environs.

Funding through the Natural Disaster Risk Management Studies Programme assisted in the preparation of this report. The administration of the funding is with the NSW State Emergency Management Committee, through the Department of Transport and Regional Services (DOTARS).

Greater understanding of fire management planning by the community and planners provides a primary mechanism to protect life and property during fire events.

The areas mapped Bush Fire Prone Land guide fire management strategies in development assessment and strategic planning tools for hazard reduction works.

The bushfire mitigation program within this report identifies fire management zones such as asset protection zones, strategic fire advantage zones, land management zones, fire exclusion zones and highlights fire prevention and mitigation.

The management of hazardous fuels, or mitigation against imminent bushfires through cooperative education programs, reduces the risk to life and property throughout the area.



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## PART 1 - SECTION 1

### *Introduction*

Great Lakes Council (Council) has prepared this Fire Mitigation Plan to provide a comprehensive guide for fire management planning within Tuncurry urban area. Council has the responsibility to manage community land in a manner that assists fire fighting authorities during fire operations and the protection of assets and life.

The Fire Mitigation Plan – Tuncurry (the Plan) covers the town of Tuncurry and encompasses Council land including road reserves and Crown land (managed by Council). The plan considers management by other authorities, agencies, private property owners and existing management strategies.

Bushfires are a natural phenomenon, which burn at various fire intensities depending on local factors, ultimately having more or less impact on life and property. The local bushfire risks vary due to fire behaviour, which is greatly influenced by slope, aspect and fuel types. Understanding the effects of fire with forest types, fuel arrangements and knowing the influence of these on fire behaviour is important when assessing fire hazards and risks when planning fire management strategies.

Within the study area, the main township is Tuncurry, situated on the northern edge of Wallis Lake (Figure 1). Tuncurry is accessed along the Lakes Way; north from the Pacific Highway and south from Forster. The coastal climate and the rural living setting within the Wallis Lake Region is also a well-known tourist destination.

Development of the Tuncurry area is predominantly residential with some rural residential properties situated amongst bushland areas and reserves for conservation and recreational use. The Wallamba River, Wallis Lake and the South Pacific Ocean border the study area.

Tuncurry has been developed within former cleared natural bushland areas. Retained Reserves are a mixture of existing undisturbed forests and regenerating forests from former disturbances. Although in some cases these are fragmented from various land management practices they provide corridors for local flora and fauna.



Figure 1: Location of Tuncurry and the study area boundary.

## **Scope and Purpose**

The Plan provides fire management guidelines and incorporates statutory obligations to protect life and property and to manage bushfire risks. Specifically the Plan, assists Council land managers in applying bushfire mitigation processes, using appropriate assessment methods and to identify strategic management programs within bushfire affected land<sup>1</sup>. It is also a tool to guide the community and managers to understand and apply the steps towards responsible fire protection measures.

The plan considers overall bushfire hazards and risks within Council owned and managed land (Council Land) within the Tuncurry area. These comprehensive fire management programs are necessary for Council to meet fire and environmental management responsibilities and obligations to protect life and community assets.

## **Fire Management Objectives**

Council's fire management objectives are consistent with statutory obligations and policies and is:

- ❑ To manage the potential fire threat from within Council Land, by identifying bushfire protection measures to protect life and property using ecological sustainable management practices in line with existing legislation and Council Policy.

## **Fire Management Strategies**

Council's proactive fire management programme takes steps by implementing preventative bushfire mitigation activities to meet key fire management strategies:

- ❑ Undertake strategic fire management planning and assess ongoing bushfire mitigation works effectiveness as set out within relevant legislation.
- ❑ Reduce the risk of damage, to life, property and environmental assets by identifying bushfire mitigation programs.
- ❑ Provide appropriate information to key government bodies and the community on Council fire management programs.
- ❑ Minimise the bushfire risk and reduce the threat of bushfires on fire-fighters and the community.
- ❑ Promote participation by the community for ongoing bushfire protection and review in relation to Council's adjacent proposed activities.
- ❑ Establish bushfire regimes to promote biodiversity thresholds.
- ❑ Maintain the biodiversity and integrity of the natural environment by minimising the impact of bushfire and mitigation measures on bushland.

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<sup>1</sup> Bushfire Affected Land – Where life and/or property is directly threatened from the spread of fire or impacted by bushfire, includes those within Bush Fire Prone Land.

### The planning process

The Plan has been guided by various documents, policies and procedures including those prepared by the NSW Rural Fire Service (RFS) and Council such as the:

- ❑ Bush Fire Environmental Assessment Code for NSW, February 2006 (commonly known as 'The Code' and referred to as the BFEAC);
- ❑ Planning for Bush Fire Protection, A guide for Councils, Planners, Fire Authorities and Developers, 2006 (PBP);
- ❑ *Rural Fires Act 1997* (RF Act) and the Rural Fires Regulation 2002 (RF Reg);
- ❑ *Threatened Species Conservation Act 1995* (TSC Act);
- ❑ *Environmental Planning and Assessment Act 1979* (EP&A Act) and Environmental Planning and Assessment Regulations 2000 (EP&A Reg); and
- ❑ Great Lakes Council Management Plan (Extract within Appendix I).

These have assisted in formulating outcomes specifically for fire protection for life and property. The flow chart (Figure 2) demonstrates the steps in the preparation of the plan.

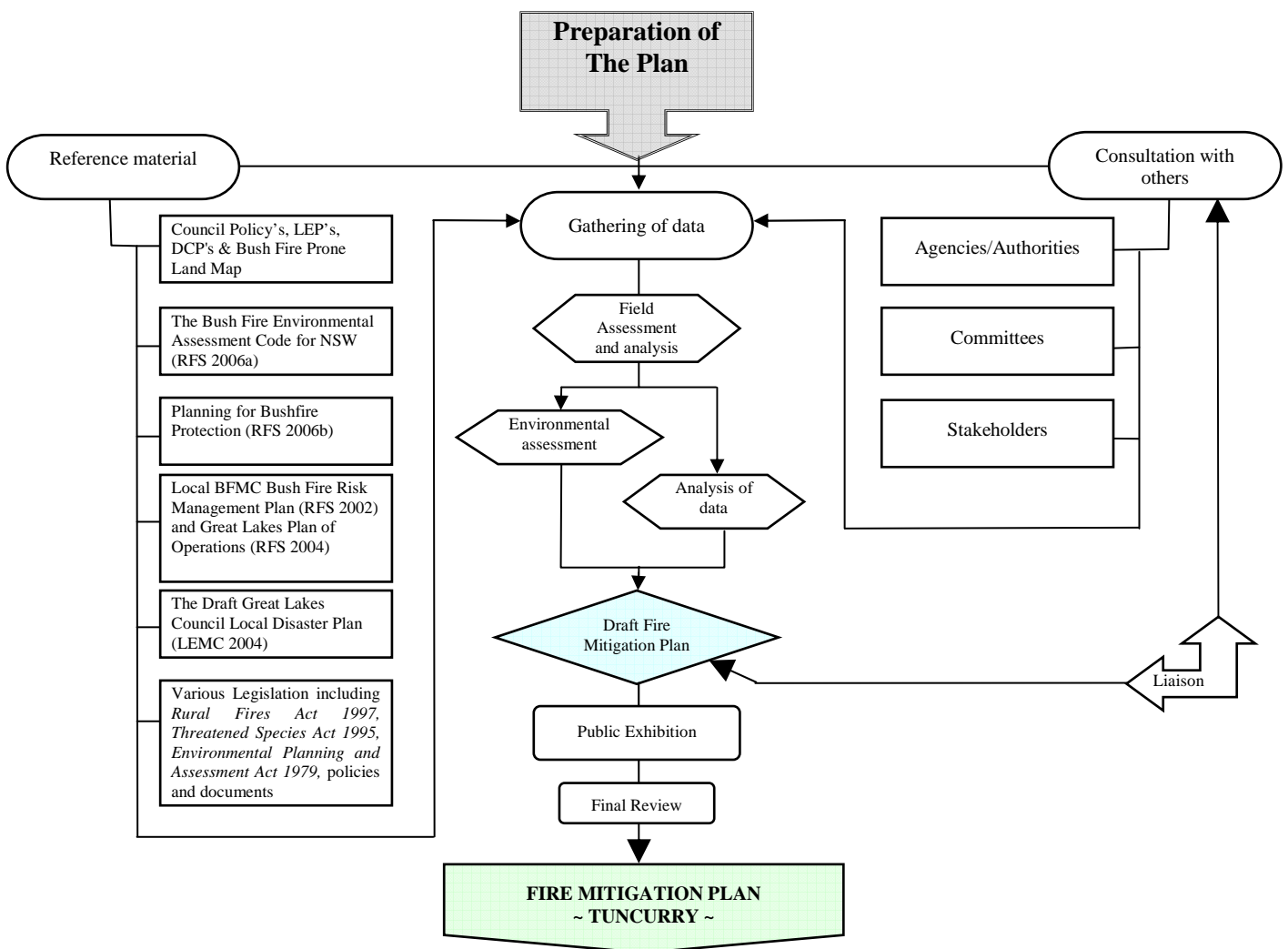


Figure 2: The planning process.

The fire mitigation plan meets fire responsibilities of Council, provides an educational tool for managers and the community and identifies on-ground operational works.

The plan also provides additional information to assist bushfire operations and concurrently meets the objectives of the RF Act. The fire fighting functions are undertaken by the various fire fighting authorities, during bushfires and emergency incidents during suppression and mitigation of bushfires on adjacent to or within Council Managed Land.

### **Understanding the document**

The plan has been divided into 3 parts, with 8 sections to assist in the interpretation of the process and prepared outcomes.

#### **Part 1 - Background Information**

- Section 1** — Introduces the processes.
- Section 2-6** — Provides background information for fire management

#### **Part 2 - The Strategy**

- Section 7** — Identifies and discusses the local environment, features and local fire issues.
- Section 8** — Identifies management strategies for fire management zones relating to assets in the area.

#### **Part 3 - Other related fire information**

- Appendices** — Provides background information on fire management planning referred to within the body of the Plan, and information to assist in the interpretation of the plan.
- References** — Reference material.





## SECTION 2

### *Fire Management Responsibilities and Obligations*

Under the RF Act public authorities and all land managers are responsible for preventing the occurrence of bushfires on and to mitigate the spread of fires from entering or leaving their land.

#### **Great Lakes Council**

Council manages land within the local government area (LGA) including parks and reserves, formed and unformed road reserves and individual parcels of land.

Under various Acts such as, the RF Act, the *State Emergency and Rescue Management Act 1989*, and the *Rural Fires Regulation 2002* the EP&A Act and the Environmental Planning and Assessment Regulations 2000 Council are:

- ❑ A certifying authority to issue Bush Fire Hazard Reduction Certificates for Council managed land.
- ❑ Responsible for the identification of Bush Fire Prone Lands (Appendix II) within the Council Area under section 146 of the EP&A Act which is certified by the Commissioner of the NSW RFS.
- ❑ Responsible for regulating property development & building construction through Local Environmental Plans (LEP) & Development Control Plans (DCP) to reduce hazards from bush, grass or rural fires. The Council refer developments under Section 100B to the Commissioner for certification of Bush Fire Safety Authorities.
- ❑ Responsible to ensure each DCP addresses bushfire hazard management and Council development controls in Bush Fire Prone Areas and
- ❑ A consenting authority for development with consultation with the RFS in compliance with the RF Act under Section 79B.

Council contributes funds towards the operating costs of the RFS and the Emergency Services, to provide and maintain such items as fire fighting vehicles and facilities provide equipment and training of volunteers. Council also contributes towards employment of officers within the RFS to facilitate emergency services and mitigate hazards within LGA.

#### **Bush Fire Management Committee**

A Bush Fire Management Committee for the LGA's is required to meet specific requirements under the RF Act. A Council officer and an elected Councillor represent Great Lakes Council on the Local, Bush Fire Management Committee (BFMC). The committee prepares the Bush Fire Risk Management Plan (BFRMP) and the Plan of Operations (Ops Plan) and meets reporting requirements within the RF Act. The BFRMP identifies the bushfire risk to assets within the local area and is a key document in providing information for the preparation of the Plan.

### **Great Lakes Local Emergency Management Committee**

As constituted under the State Emergency and Rescue Management Act, 1989 and within the State DISPLAN, Council has a committee member on the Great Lakes Local Emergency Management Committee (LEMC). The Local Disaster Plan guides determination of a local emergency and appointment of the Incident controller of the appropriate combat agency during fires in urban and rural areas. The plan guides arrangements at a local level to prevent, prepare for, respond to and recover from emergencies.

### **NSW Rural Fire Service**

The NSW Rural Fire Service (RFS) works cooperatively with Council to ensure the effective allocation of funding, management, maintenance and support, of fire and emergency operations. The RFS also assists other emergency service organisations at incidents and at emergencies under the control of those organisations.

The RFS also provides community education, fire fighters and specialist to mitigate and suppress fires by assisting in emergencies and daily incidents such as wild fires, motor vehicle accidents, floods and storm damage events.

### **NSW Fire Brigade**

The NSW Fire Brigade (NSWFB) responds to and manages emergency incidents, provides fire protection, as well as educating the community through prevention programs and to build community resilience by preparing for emergencies. The NSWFB also provides urban search and rescue, hazardous material response, natural hazards response, emergency life support, terrorist consequence management and other emergency management capabilities.

### **Department of Environment and Climate Change (NSW)**

The Parks and Wildlife Division of the Department of Environment and Climate Change (NSW), (DECC) (formerly Department of Environment and Conservation (NSW)) (commonly known as the National Parks and Wildlife Service (NPWS)) are a recognised fire fighting authority and public land manager who implement fire and environmental management obligations under relevant legislation. The organisation prepares fire management plans and identifies fire management strategies in accordance with DECC plans, policies and procedures such as those detailed in the "NPWS Fire Management Manual" (NPWS 2001).

### **Department of Planning and Infrastructure (Forests)**

Department of Planning and Infrastructure (DPI), (Forests) formerly State Forests (SF) provide resources and support for emergency fire management, to protect life, property, community assets and forest values. Their Fuel Management Plans identify fire management zones, appropriate fire regimes, and hazard reduction works including the use of prescribed burns as a management tool for reducing forest fuels and to identify practices that are economically and ecological sustainable.



## NSW Department of Lands

NSW Department of Lands (DL) has a responsibility for bushfire management on Crown Land, Crown Roads and Crown Reserves. This land is often fragmented, by settlements or are linear (foreshores, roadways, waterway areas), with varying conservation values. The Crown Reserve System promotes "...the cooperative care, control, and management of Crown reserves by the community with assistance from the Department of Lands, other government agencies and reserve users." (DL 2005). By Crown Land managers delegating to the local government authority (managers of crown land), enable Council to cooperatively plan and implement fire management objectives.

Hazard reduction, environmental assessment and the preparation of a fire plans (by Reserve Trustee's) during the management of reserves assist in protecting assets, neighbouring assets and communities as required by the DL (DL 2005b).

## Country Energy/TransGrid

The authority, TransGrid is responsible for the high voltage transmission lines and associated assets, which traverse the state and are generally, located in rural and semi-rural areas. TransGrid has also prepared a Bush Fire Risk Management Plan that identifies strategies, policies and procedures that are based on the principles of bushfire risk management (TransGrid 2003).

Country Energy recognises that vegetation management is important to prevent the spread of bushfires and prevent the ignition from electricity lines. Country Energy environmental policy and commitment to meeting legislative requirements ensures the environment is protected and enhanced for future generations, during service operations and fire prevention management.

## MidCoast Water

MidCoast Water is responsible for the supply of reticulated water and sewage system within some areas in Great Lakes LGA. During fire fighting operations, authorised personnel access fire hydrants throughout some localities to supply fire appliances with fire fighting water. The readily available supply in some urban and rural areas assists in the suppression of wild fires or use during hazard reduction activities.

## Private Landholders

The broader community actively undertakes hazard reduction works in and around their properties. As landholders become aware of changes to fire regulations alternative hazard reduction works are implemented. These works complement works by other landholders or land managers in and around villages, townships and rural areas.

The emphasis on the responsibility for owner/occupiers to minimise the occurrence and the spread of fire, and to meet legislative requirements when bushfire hazard reduction is required, is highlighted through community education programs. Hazard reduction works

can provide reduced fuels, safer environs and protection of community assets including biodiversity within forested areas.

Appendix III can assist landholders with being prepared for bushfires by providing steps and options to take and assist in fire prevention and hazard reduction. Additional information can be sourced on the RFS website or the local fire control centres and Rural Fire Brigades.

## SECTION 3

### *Bushfire Risk Description*

#### **Overview of the Bushfire Risk Management Plan**

Bushfire risk analysis is a mechanism to undertake risk assessments (in the field) on assets including the threat to life and property as well as natural and cultural heritage. By preparing for the imminent advancement of a bushfire, hazard reduction activities can serve to quell the intensity and subsequent detrimental affects on the community or the asset.

The BFRMP is an indicator for Council in prioritising bushfire mitigation works. Within this document the resultant bushfire risk ranking (extreme, major, moderate, minor or insignificant) identifies ranking of an area (or special area) depending on the ability for assets (built/natural) to withstand or recover from a fire event.

As described within the BFRMP, the bushfire risk categories within Tuncurry are a consequence of the proximity of bushland areas to the township.

**Bushfire risk** is defined as the chance of the bushfire igniting, spreading and causing damage to assets within the community or reducing biodiversity of areas within natural areas.

#### **Bush Fire Risks**

The management of bushfire hazards, through reducing fuels within bushland areas, assists in the protection of the community. By maintaining FMZ's adjacent to assets the bushfire risk is reduced as there is less available fuels present. This subsequently reduces fire intensity and/or ease of ignitions.

Urban development is amongst these bushland interface areas and adjoins reserves retained for conservation and public recreation. These areas if ignited are likely to sustain bushfires, and may affect adjoining properties. Some of these areas protect environmental assets such as, key habitats (including SEPP 14), or are part of fauna corridors which link with existing regional reserve systems.

Active vegetation management lessens the impact on residents, visitors and fire fighters during a bushfire incident. As there is a chance of the adjacent bushland to burn and potentially be a source for ember attack, this re-enforces the importance and requirement for householders themselves to be prepared, and undertake their own fire mitigation works to reduce the fire threat.

The frequency of ignitions for bushfires is known to be greater near populated areas, as the opportunity is increased from accidental ignitions (motor vehicles; machinery; equipment;

ember attack) or deliberate ignitions (arson) (due to close proximity to residential areas). Other ignition sources include motor vehicle accidents, lightning or escaped hazard reductions. The likelihood of ignitions varies and can be reduced by educating the community to be fire wise. In addition, by preventing bushfires to spread rapidly or be of high intensity, reduces the likelihood and subsequent impact of bushfire on the community.

The spread of bushfire may be reduced by utilising existing fire advantages lines, both natural and man made including roads and tracks, transmission lines, waterways, lakes and wet gullies. These may be used as control lines during incidents, however spotting which can occur during extreme fire weather conditions, may extend as far as 5 kilometres from the source. Having these within urban and rural areas, or adjacent to assets reduces the bushfire risk as the fire run is limited.

Hazard reduction activities and seasonal influences affect vegetation growth rates and the resultant rating of the existing hazard. Variations in growth rates affect overall fuel loads; the ability to ignite and the rate the fire could spread. The preferred fire intensity within fire management zones (FMZ's) adjacent to assets is ideally low—moderate. Fires may spread from adjoining areas or ignite as spot fires within the FMZ's.

Topography affects the fire intensity and spread of fire. Steeper slopes enable fires to run in places at a greater rate of spread than those with lesser slope. Fires travel much faster uphill than downhill and with every 10 degree increase in slope; it doubles the rate at which the fire travels.

The type and arrangement of fuels available affect fire spread and fire behaviour in an area. Drier sclerophyll forests can burn more frequently and more intensively (depending on years since last fire) than Wet sclerophyll forests as fuel availability and accumulation rates differ for each vegetation community. Also the moisture content and quantity of fuel is important to fire behaviour as the ROS alters with aspect i.e. North-westerly aspects have lower fuel loads and are generally drier.

### **Bushfire Weather**

The Australian Bureau of Meteorology (BOM) identifies climate zones by rainfall incidents and defines the Great Lakes LGA to be within a warm humid, mainly summer rainfall sub tropical zone.

The BOM assist fire-fighting authorities to predict fire weather and monitor bushfire weather during fire fighting operations. These fire-weather warnings (bushfire alerts) distributed during the bushfire danger period to the RFS who then broadcasts extreme bushfire conditions and requirements, such as total fire bans and the cancellations on the issuing of fire permits for the lighting of fires during this period.

The drought indices (forest/grassland) are derived from the Keetch Byram Drought Indices (KBDI) and collectively with temperature, relative humidity, wind speed, rainfall and duration

identifies the fire danger rating. This assists in fire authorities being prepared for a particular level of alertness for existing bushfire weather conditions.

The fire danger indices assist authorities to declare fire danger ratings (none, low, moderate, high, very high & extreme) and to work out fire behaviour in relation to predicted rates of spread that is affected by the soil dryness (KBDI). As the forest fire drought index (FFDI) increases so does the fire rating (RFS 2003c) and therefore risks of bushfire.

BOM records have shown that major fires in New South Wales such as the January 1994 experienced the worst conditions such as when a deep low-pressure systems occurring near Tasmania, brought strong, dry, westerly winds to the coast (BOM 2005b). This is evident by the number of fires recorded in the local area during this period. Similar weather patterns may strike at any time, causing higher fire risks as weather conditions; increased soil dryness, extremely low humidity's and high temperature are ideal fire conditions.

### **Field Assessment Methodology**

The Plan incorporates site inspections; capture hazard assessments; potential localised bushfire risks and local environmental effects. The outcomes, details hazard reduction requirements for fuel reduction with applicable techniques, which meet legislative requirements, with limited impact to local ecological values, yet simultaneously, consider protection of life and property.

Field assessments are undertaken to provide data for analysis by managers. The assessment process follows guidelines provided by the RFS, and is an acceptable process for fire managers to determine and analyse the hazard and risk of bushfire within and adjacent to bushfire affected Council managed land.

The contributing factors to the assessment include; the distance of the bushfire hazard to the asset (Threat) and, where the potential severity is influenced by the bushfire or by bushfire hazards (Risk). The quantitative assessment of overall fuel hazards (OFL), are given as low, moderate, high, very high and extreme ratings.

The field assessment includes using factors such as:

- Vegetation type and separation distance of canopies.
- Overall fuel loads, (bark, surface, elevated).
- Slope.
- Fuel quantity and
- Size of combined risk areas.

The hazard assessment also considers fire resistance construction standard of a building (or asset) (i.e. no standard, level 1, 2 or 3), Bush Fire Prone Land, BFRMP ratings including the hazard and risk rating and the risk management zone. The assessment outcomes are based on potential extreme weather conditions, and the ability of an asset to recover from or withstand a bushfire.

Hazard reduction activities and seasonal influences affect vegetation growth rates and the resultant rating of the existing hazard. Variations in growth rates affect overall fuel loads; the ability to ignite and the rate the fire could spread. The preferred fire intensity within FMZ adjacent to assets is ideally low—moderate. Fires may spread from adjoining areas or ignite as spot fires within the FMZ's.

The fire management strategies included within section 8 identify fire mitigation works proposed in FMZ's including asset protection zones (APZ's), strategic fire management zones (SFAZ's), land management zones (LMZ's) and when necessary fire exclusion zones (FEZ's) within the study area.

### **Local features**

Fragmented remnant bushland areas are a result of either extensive clearing for urban development or for agricultural purposes. This increases the complexity of fire fighting as land management is within multiple forested areas rather than a single unit. Subsequently this has increased the number of adjoining properties, the probability of ignition sources and potential impact on assets and the community.

The existing management and land use practices vary within each property. Property owners implement hazard reduction on individual properties, which assists in reducing fire intensity, and therefore threat to neighbouring assets. It also assists in dissecting potential fire paths, and increases the access to bushfires.

Having fire management zones within these fragmented bushland areas adjacent to residential areas assists in providing fuel reduced areas. Fire mitigation works that are implemented regularly on managed land within bushland areas or as part of the maintenance schedule for open space recreational area's, ensures improved fire management planning and a higher chance of limiting the impact from bushfire on the community.

Fire advantage lines exist within urban and rural areas including roads, tracks, transmission lines, waterways, lakes and wet gullies, which all can assist in fire operations. The provision of reticulated water assists fire fighters to suppress fires. Larger water bodies such as large dams or lakes can also provide additional water source for fire fighters and aerial water bombing craft.

With coastal sea breezes and movement of major fronts moving northward, fire paths can move 180 degrees during a bushfire depending on prevailing weather patterns (Figure 3). The coastal weather patterns including the onset of the afternoon sea breeze can bring with it a moister environment, which increases the relative humidity and associated conditions to slow the movement and reduce longevity of fires on the coastal areas.

Seasonal thunderstorms occur locally along the coastline and further inland, which are common in summer and are known to be a source of ignition of bushfires.

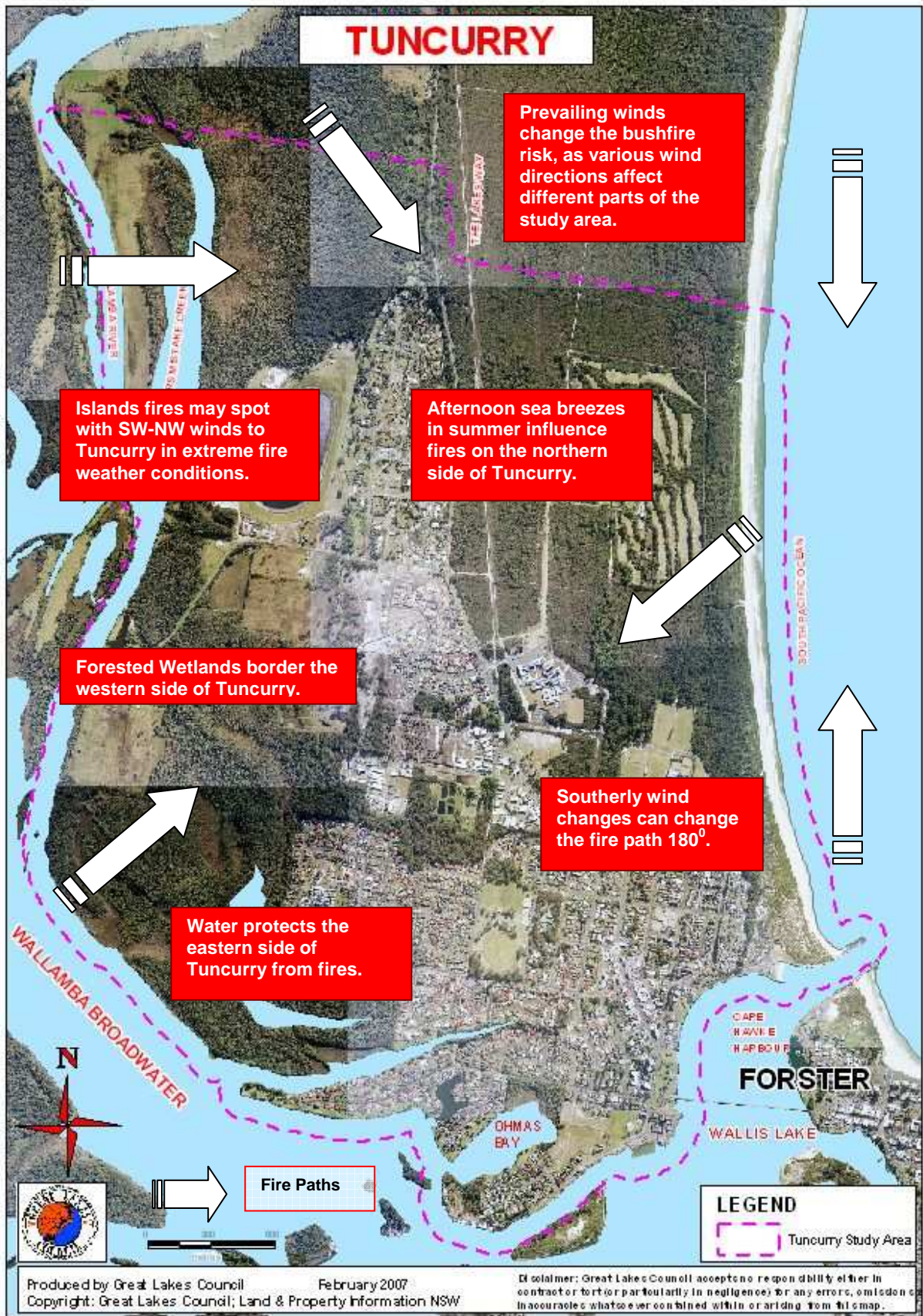


Figure 3: Bushfire Risk to Tuncurry.



## **Risk to Life and Property**

The BFRMP identifies the bushfire risk rankings at various locations within the LGA including areas being within an insignificant, minor, moderate and major bushfire risk areas. The higher the risk (i.e. the closer the bushfire threat) the more chance fire has a greater impact on the asset or the community. The BFRMP assessment identified and used set criteria in determining the bushfire risk. Council has summarised the assessment of both urban and rural developments (Appendix IV). This assists planners when implementing fire management under the various legislative documents and procedures.

## **Risk to Natural Heritage**

A field assessment of the fire risk to adjacent assets from Council bushfire affected land and the identification of fire threats is part of the analysis within the plan. On site environmental assessment within these bushland areas often reveal the importance for the protection of these habitats for local species, and at times individual threatened species or their habitat. In addition an environmental assessment and review of the significance and the impact on local reserve system ensures a greater understanding of environmental assets/values.

The North East Comprehensive Regional Assessment (CRA) assessed the regional status of ecosystems within the LGA, and identified vegetation communities that require further protection. Mapped Key Habitat or Regional Corridors have a high conservation value as a result of regionally mapped significant vegetation and the proximity of the regional status of ecosystems within the LGA is derived from the CRA. Reference to this data is important when implementing fire management planning (Appendix V).

When implementing fire management planning it is important to protect or limit the impact on vegetated areas with conservation values. Areas, which have high conservation values (Key Habitat or Regional Corridors) and subsequently higher environmental bushfire risks, require special management practices, both within and nearby, to ensure their ongoing environmental protection and enhancement. Any area classified as, SEPP 14 (Coastal Wetlands), and SEPP 26 (Littoral Rainforest) are environmentally significant and management of these areas is important to ensure the continued enhancement of conservation values.

Biodiversity–burning practices has been identified within the table (Appendix VI), which assists planners to review, by desktop, vegetation types, their vegetation formations and subsequent fire frequencies. Keith (2006) describes the vegetation formations (Appendix VII), which are also used widely for fire management and for bushfire protection assessment within the Code and the PBP.

Hazard reduction burning prescriptions for SFAZ and LMZ's are also included from the Code, which consider biodiversity in the determination of burning practices and intervals. The final determination for burning regimes uses this information in conjunction with a site assessment.



This table and the digitally mapped interpretation (further within the plan) of this data assist planners when identifying fire management requirements for existing and new developments and subdivisions during the development assessment process.

### **Risk to Cultural heritage**

The conservation and protection of significant cultural heritage is important when undertaking any activity as fire can have a detrimental affect on a heritage site or an aboriginal site. Management practices must be in place to ensure this when planning to undertake fire mitigation activities.

When interpreting approved fire management activities in relation to the DECC (Parks and Wildlife Division) maintained Cultural Heritage database (being the Aboriginal Heritage Information Management System, AHIMS), consideration to their impacts is important when planning Councils fire mitigation works. A request to search for Aboriginal Objects and Aboriginal Sites within the study area is part of the process.

*Clause 21 of Great Lakes Local Environmental Plan, 1996* makes provision for significant 'Heritage items' and guides their enhancement and protection within the LEP. Within Great Lakes LEP, Schedule 2 lists heritage items as local and regional (but not of state significance) within the LGA.



## SECTION 4

### *Hazard Reduction*

#### Guidelines for hazard reduction

Hazard reduction works are carried out to protect dwellings, buildings or other assets susceptible to fire. This provides a safer environment for fire fighters to work around whilst protecting people and assets during a fire.

**Hazard reduction** reduces fuel levels to minimise potential damage to life, property and the environment if a bushfire does occur.

The BFEAC and the PBP guides hazard reduction work requirements for fire management zones of existing buildings and future developments and subdivisions by specifying hazard reduction areas, requirements for roads and perimeter fire trails.

Hazard reduction options include:

- Hand removal of shrubs.
- Tree removal.
- Clearing away fuels such as leaves, pruning and clippings.
- Clearing out gutters.
- Mechanical mowing, slashing, ploughing, trittering<sup>2</sup>; bulldozing.
- Reducing fuels by grading or and
- Hazard reduction burning including pile burning (1.5m high piles) or prescribed burning of vegetation.

#### Management of fuels

Graduated fuel management of hazards adjacent to development is important to ensure provisions are in place to assist in reducing the risk and the threat of fire whilst still maintaining at least a degree of the visual and environmental amenity of the area. These zones are commonly referred to as FMZ's including APZ, SFAZ, LMZ and FEZ's.

**Asset Protection Zone (APZ)** is an area surrounding an asset where ground fuel (often including the shrub layer) has been reduced to minimise the ignition and spread of fire and provide a refuge area for fire fighters and landowners to fight a bushfire.

**Strategic Fire Management Zone (SFAZ)** is the area adjacent to the APZ or is strategically located within fire paths (where APZ's are not in place) to reduce the severity of fires and the impact on the community. These areas complement works within APZ or other SFAZ and provide protection for fire fighters, watering points, significant sites or essential services.

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<sup>2</sup> Trittering – mechanical mulching of the vegetation into smaller pieces

**Land Management Zone (LMZ)** is the area of conservation and heritage value.

**Fire Exclusion Zone (FEZ)** is the area where fire is excluded from the area as fire regime thresholds have been met.

Each zone has specific management strategies that can be implemented to meet management objectives (Table 1). Council has adopted the FMZ's and strategies as defined within the BFRMP. New developments with APZ's comprise of two components, being the outer protection area (OPA) and the inner protection area (IPA).

The widths of APZ fuel reduced areas are calculated using predetermined widths appropriate for various slopes (Appendix VIII). Vegetation types and the floristic structure affect the implementation of mechanical on ground works. Retaining hospices (clumps/groups of trees/shrubs) of existing plants is to minimise impact on conservation values and improve community protection from the fires by providing a shield against strong winds, radiant heat and flying embers.

The BFEAC or other environmental assessment may be required to undertake mechanical fuel reduction activities or to initiate low-moderate intensity hazard reduction burns or biodiversity burns within APZ, SFAZ and LMZ's.

SFAZ can consist of fire advantages or fire trails within or surrounding a development or in remote areas in larger bushland areas. Fire trails are designed to provide access for fire fighting personnel and fire fighting units during incidents or planned fire operations or provide routes for evacuation for the community. Council and private property have a variety of fire trails and fire advantages (including unformed roadways) within the study area that are identified as strategic fire advantages.

These fire trails have a classification system applied to them as defined by the Bushfire Management Committee. The categories of fire trails that exist within Great Lakes LGA include primary (access for heavy, medium and light fire appliances) and secondary (access by light fire appliances (sometimes medium-heavy)) Dormant—trails are those that are regenerating or have been rehabilitated but can be used as a control line in the event of a bushfire.

Table 1: Fire management zones.

Fire Management Zones <sup>3</sup>	Objectives	Type of works	Notes
<b>Asset Protection Zone (APZ)</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Protect life and property</li> <li><input type="checkbox"/> Mitigate against ignition of fires</li> <li><input type="checkbox"/> Prevent the spread of fires</li> <li><input type="checkbox"/> Reduce intensity of fires</li> <li><input type="checkbox"/> Minimise impact to conservation values within the area</li> </ul>	<ul style="list-style-type: none"> <li>✓ Reduce fuel levels by mechanical means</li> <li>✓ Reduce fuels by hazard reduction burning</li> <li>✓ Reduce fuels by grazing</li> <li>✓ Works authorised within approved development applications</li> <li>✓ Works certified by environmental impact assessment/the code</li> </ul>	<ul style="list-style-type: none"> <li>▪ Existing assets maintain fuel levels 8t/ha or below &amp; retain 30% for hospices</li> <li>▪ Burn to reduce 80% fine fuels when appropriate</li> <li>▪ Maintain OFL at moderate levels (8t/ha or below) in OPA and 5t/ha and below in the IPA for new developments.</li> </ul>
<b>Strategic Fire Advantage Zone (SFAZ)</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Protect life and property</li> <li><input type="checkbox"/> Mitigate against ignition of fires</li> <li><input type="checkbox"/> Prevent the spread of fires</li> <li><input type="checkbox"/> Reduce intensity of fires</li> <li><input type="checkbox"/> Minimise impact to conservation values within the area</li> <li><input type="checkbox"/> Enhance adjacent APZ works</li> </ul>	<ul style="list-style-type: none"> <li>✓ Reduce fuel levels by mechanical means</li> <li>✓ Reduce fuels by hazard reduction burning</li> <li>✓ Reduce fuels by grazing</li> <li>✓ Maintain or construct fire advantages/fire trails</li> <li>✓ Works authorised within approved development applications</li> <li>✓ Works certified by environmental impact assessment/the code</li> </ul>	<ul style="list-style-type: none"> <li>▪ Maintain average overall fuel levels at high and below. Burn to reduce fine fuels by approximately 50-80%</li> </ul>
<b>Land Management Zone (LMZ)</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Minimise impact to conservation values within the area</li> </ul>	<ul style="list-style-type: none"> <li>✓ Reduce fuels by hazard reduction burning</li> <li>✓ Maintain existing fire advantages/fire trails</li> <li>✓ Construct fire advantages/fire trails</li> <li>✓ Works certified by environmental impact assessment/The code for ecological burning</li> </ul>	<ul style="list-style-type: none"> <li>▪ Minimise works except for rehabilitation when required</li> <li>▪ Burn to provide a mosaic pattern of burnt areas</li> </ul>
<b>Fire Exclusion Zone (FEZ)</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Minimise impact to conservation values within the area</li> </ul>	<ul style="list-style-type: none"> <li>✓ Maintain existing fire advantages/fire trails</li> <li>✓ Construct fire advantages/fire trails</li> <li>✓ Works certified by environmental impact assessment/the code</li> </ul>	<ul style="list-style-type: none"> <li>▪ Minimise works except for rehabilitation when required</li> <li>▪ Hazard reduction &amp; biodiversity burning excluded</li> </ul>

<sup>3</sup> These zones are equivalent to the those defined within the Lower Hunter Zone, BFMC Bush Fire Risk Management Plan, 2002



## SECTION 5

### *Fire Preparedness and Community Education*

#### **Preparedness**

The community is responsible for providing protection for themselves and their respective assets on their land from fire threat. By actively preparing property and homes against fires, possible fire ignitions and threats is a proactive approach to fire management.

Having a background to bushfire regulations, how to prepare for grass and bushfires, what to do when fire approaches, what actions to take and consider, and the equipment required to assist during a fire event, is part of being prepared.

There are several actions that can be undertaken including:

- Reduce possible ignition sources within properties.
- Reduce risk of ignition of the building and objects.
- Ensure designated access is clear for fire fighters.
- Reduced ground/fine fuels within the area.

Statistic shows, that by properly preparing a home and implementing appropriate strategies before the fire event, extensive damage can be reduced or even prevented.





## SECTION 6

### *Ecological Considerations*

#### **Introduction**

The plan promotes the integration of the protection and enhancement of the environment to ensure continued provision of environmental services and biodiversity whilst concurrently protecting life, property and community assets. Legislative guidelines initiate and explicitly require specific responses to meet these principles.

Further to these basic conservation requirements, is the completion of an environmental assessment to identify and consider potential environmental impacts of any, proposed fire management activities.

Fire and biodiversity in the Australian landscape is known to play an important role in determining the health and integrity of vegetation communities and fauna. This relates to both inter fire intervals (over and under frequent fire) and fire severity. Consideration to fire regimes and the management of fire on the environment is important when implementing fire management practices within natural areas.

#### **Biodiversity Thresholds**

Fire is a natural phenomenon however some landscapes are more adapted to fire whilst others are generally intolerant of fires, such as rainforests. Those that burn less frequently are moist forests but fires are more common in coastal heath, drier forests and woodland areas (Native Vegetation Advisory Council 1999).

Fire frequency affects the survival of plants and animals and longevity of populations. Minimal fire frequency enables enhancement of the environment whereas, inappropriate fire frequency disrupts the existing processes and thus biodiversity. *"Clearing of vegetation; and high frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition"* are recognised as key threatening processes (TSC Act 1995).

Species loss is expected when frequency of fires goes beyond known biodiversity thresholds. Recurrent disturbance interrupts plant life cycle processes such as maturation, seed production and development of fire resistant organs (Bradstock *et al* 1995). Also, too infrequent fire intervals promote species loss and reduced diversity to both plant and animal communities.

The fire history (intensity and regularity) of an area directly influences the future requirement for a particular fire regime. A mosaic of burns (age classes) within a localised area varies existing fuel loads and resultant fire intensity within each vegetation community. Mosaic burns, also creates habitat complexity and diversity and assists floral and faunal

assemblages. Interruptions to natural systems from unplanned fires in bushland areas adjacent to urban fringes, recreational areas and road easements affect planning decisions. Consideration of these effects when planning hazard reduction burning reduces the impact on biodiversity.

The management of ground fuels is directly related to the years since individual fire events. Field analysis to assess fuel loadings enables managers to identify predicted fire behaviour from field assessments (NPWS 2003b) and therefore appropriately manages against risks.

Appendix IX, is an example of the quantitatively analysis of fine fuel accumulation that has been projected for the Sydney Region (NPWS unpub.). The managers accept the use of these tables to guide fuel accumulation using the age since last fire parameter. These fine fuel load graphs (including litter, herbs & shrub layer) can be applied to forested areas within the Great Lakes LGA. The graph demonstrates that immediately after fire open forests have a marked increase in fuels to year 5, whereby after this period accumulation slows and exponentially increases to a point where decomposition and successive changes eventually has minimal variation from its standard range (15 years +). Within rainforest formations fuel accumulates rapidly in the first 2 years then remains static as decomposition maintains a balanced environment. Fire behaviour and intensity is affected by such factors as fuel accumulation and fuel loads.

Fire management objectives must ensure that there is, within an area, a mosaic pattern of burns with a range of age classes (time since fire) within each different vegetation community type (Bradstock et al 1995). This ensures seedlings mature and deposit viable seeds in the seed bank before the next fire.

Bradstock *et al* 1995 defined fire regimes desirable to met conservation objectives and enhance species diversity. The related plant responses to fire frequency are seen below. A decline in population of plant species can be generally be expected in fire-tolerant communities (except rainforests, etc) when:

- There are more than 2 consecutive fires less than 6–8 years apart (fire sensitive shrubs decline).
- Intervals between fires exceed 30 years (herbs and shrubs with short lived individuals and seed bank decline).
- 3 or more consecutive fires occur at intervals of 15 – 30 years (sub-dominant herbs and shrubs decline).
- Occurrence of more than 2 consecutive fires, which consume less than 8–10 tonnes/hectare of surface fuel (species with heat-simulated seed banks in the soil decline) (Bradstock et al 1995).

Appendix VI identifies the currently accepted biodiversity thresholds for vegetation formations (Keith 2006) for all 65 vegetation communities within Great Lakes LGA, (as

identified within the Draft Great Lakes Vegetation Survey 2004a: 2004b) as adopted from the DEC (Parks and Wildlife Division) (DEC 2005a; Bradstock *et al* 1995). Within this table specific minimum fire regime for SFAZ's and LMZ's from within the Code has been collated.

The threatened species hazard reduction list within the Code (NSW RFS 2004g) are also referred to during the decision making process to identify the type of hazard reduction work that can be applied including hand removal, tree removal, slashing, trittering and burning.

### Conservation Values

The Great Lakes area has demonstrated important and recognised significant ecological values, as described in documented reports and studies. On a local level the management of habitats and enhancement of conservation corridors, promotes diversity within the environment. This is enhanced by the adaption of appropriate fire management. The Great Lakes Council area has existing fauna corridors and key habitat areas, which have been defined by the DEC (DEC 2005b). Great Lakes LGA has very significant faunal species diversity locally with four hundred and ninety-nine (499) faunal species identified. Also there is significantly high floral species diversity with one thousand four hundred and twenty-eight (1,428) floral species present. There is also twenty four (24) threatened species and seven (7) ROTAP species in the LGA.

The mechanism for national and state environment protection and biodiversity conservation is the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) and the TSC Act.

The TSC Act lists endangered populations (Schedule 1, Part 2 of the TSC Act) and endangered ecological communities (Schedule 1, Part 3 of the Act) in NSW. Three (3) endangered populations and ten (10) listed ecological communities occur locally. This includes:

- Endangered Koala, Hawks Nest and Tea Gardens population.
- Endangered Emu population in the NSW North Coast Bioregion.
- Rhizanthella slateri* in the Great Lakes LGA.
- Lowland Rainforest on floodplain in the NSW North Coast Bioregion.
- Lowland Rainforest in the NSW North Coast Bioregion
- Littoral Rainforest in the NSW North Coast Bioregion.
- Coastal Saltmarsh in the NSW North Coast Bioregion.
- Swamp Oak Flood Plains in the NSW North Coast Bioregion.
- Freshwater Wetland on Coastal Floodplains in the NSW North Coast Bioregion.
- River-flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast Bioregion.
- Sub-tropical Coastal Floodplain Forest of the NSW North Coast Bioregion.
- Swamp Oak Floodplains in the NSW North Coast Bioregion.
- Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast Bioregion and
- Themeda grassland on seacliffs and coastal headlands in the NSW North Coast Bioregion (TSC Act 1995)

There are some mapped vegetation communities types that are known or likely to constitute EEC. In a regional context those forest community types considered vulnerable are; Paperbark (31); Swamp Mahogany/ Paperbark (30/ 31); and Paperbark/ Swamp Oak (31/32). In addition, those forest types that may also constitute ECC includes Fig/Giant Stinger (6); Myrtle (23) and Myrtle and Fig/Myrtle (6/ 23); Palm (7), Palm/Myrtle (7/ 23) and Palm/Flooded Gum (7/ 48); Yellow Tulipwood (22); Tuckeroo (24); and Headland Brushbox (25) forests within Littoral Rainforest in the NSW North Coast Bioregion, and in the NSW North Coast Bioregion or within Lowland Rainforest on floodplain. Swamp (231) is considered to occur within Coastal Saltmarsh or Freshwater Wetland in the NSW North Coast Bioregion.

The NSW Scientific Committee determines those species considered to be endangered (Schedule 1, Part 1), presumed extinct (Part 4), vulnerable (Schedule 2) and also activities deemed to be key threatening processes (Schedule 3). Such determinations are listed within the TSC Act. Table 2 shows the conservation significance within Great Lakes.

Table 2: Conservation significance within Great Lakes.

Conservation significance within Great Lakes LGA	Status – EPBC. Listed as Endangered (E) & Vulnerable (V)	Status – TSC. Listed as Endangered (E) & Vulnerable (V)
State & Nationally Threatened flora species	3 (E) & 8 (V)	5 (E) & 10 (V)
State & Nationally Threatened fauna species (26 mammals, 2 reptiles, 7 frogs & 47 birds)	4 (E) & 7 (V)	12 (E) & 70 (V)
International migratory wader species (JAMBA <sup>4</sup> , CAMBA <sup>5</sup> , Bonn Convention <sup>6</sup> )	35	-
International migratory waterbird species (JAMBA, CAMBA, Bonn Convention)	21	-
International migratory near-shore seabird species (JAMBA, CAMBA, Bonn Convention)	7	-

The Draft Great Lakes Council Vegetation Strategy, Volume 1 and 2, 2004, details vegetation community descriptions and regional and local status as well as the significance and conservation values of vegetation communities. It also details the association with vegetation communities of threatened fauna and flora, International migratory species, and rare or threatened plants (ROTAP). Also from within this report the regional status of vegetation within Great Lakes has been determined (Refer to Appendix V) for consideration when identifying fire management strategies.

Fire managers need to have regard to conservation guidelines and consider management of various species and the impact through hazard reduction work, wildfire and disturbances, as well as key management guidelines from threat abatement plans.

<sup>4</sup> Japan–Australia Migratory Bird Agreement (JAMBA)

<sup>5</sup> China–Australia Migratory Bird Agreement (CAMBA)

<sup>6</sup> Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention)

## Environmental Considerations

During the preparation of the fire mitigation plan and the subsequent operational works, planners have gathered field data and reviewed available background information. By referring to the following checklist (which includes reports and various documents) planners can ensure the process considers the range of potential issues and that hazard reduction activities on Council land meet both legislative and policy objectives:

Checklist	Reference Material Source
✓ Planning for Bush Fire Protection.	RFS
✓ Bush Fire Environmental Assessment Code for NSW.	RFS
✓ Threatened Species/Threatened species hazard reduction list for the Code within each LGA.	DECC/ RFS
✓ Geographic information system layers.	GLC/ RFS
✓ Documentation on threatened and vulnerable species that have specific management consideration to fire or mechanical impacts.	RFS/DECC
✓ Updated Atlas of the NSW Wildlife records/Local records.	DECC/GLC
✓ Updated fire history records.	RFS/DECC
✓ Species impact statements.	GLC/DECC
✓ Environmental impact assessments or reviews of environmental factors.	GLC
✓ Eight part tests that apply to the area.	GLC
✓ Management plans for the area.	GLC/DECC
✓ Strategic plans.	GLC
✓ Detailed Local Environmental Studies.	GLC/DECC
✓ Local Environmental Plans (LEP's).	GLC
✓ Updated changes to planning zones.	GLC
✓ Development controls and conditions on private development.	GLC
✓ Consideration to State Environmental Planning.	Commonwealth & State Gov
✓ Changes relating to the <i>Native Vegetation Act, 2003</i> .	DOP



## PART 2 - SECTION 7

### *Tuncurry Bushfire Strategy*

#### **Location**

Within the study area, Tuncurry is situated between Wallis Lake and east to the Coastal hinterland, adjacent to Forster. Access is along the Lakes Way from the Pacific Highway north from Nabic and Rainbow Flat. The study area includes 1251 hectares of predominantly urban land, bushland areas and some rural areas with an estimated population in 2001 of approximately 5,794 (GLC 2003).

One hundred and twenty-six (125), Council managed land properties are recorded within the study area. This includes rural, residential and commercial properties, road reserves (unformed) and parks for recreation and environmental protection, which cover approximately 255 hectares. Of these, thirty-six (35) properties, 154 hectares are bushfire affected including Bushfire Prone Land (Table 3, Figure 6). The information tabulated includes those such as the property name, Council reserve number and the corresponding vegetation community type present.

The remaining 101 hectares of remnant bushland areas or cleared areas are used for recreational reserves or sports fields and are considered not to be a hazard. In addition 1,222 hectares of remaining forested land are within private holdings, or other government agencies and authorities' properties.

#### **Community Assets**

The Tuncurry urban area comprises of residential, commercial, special purpose and rural properties that are at times adjacent to bushland areas (Figure 4). Before legislative changes took affect in 2003, Council approved buildings complied with current policies at the time.

Dwellings built to meet requirements within the document "Planning for Bushfire Protection", and the Australian Building Standard AS 3959 has a bushfire standard structure, which can withstand a higher radiant heat flux. These fire regulations for development approvals have conditions to protect building in the event of a fire including hazard reduction requirements.

Additionally the Code provides guidelines for fire protection of existing buildings, which affects adjoining property owner's fuel reduction works.

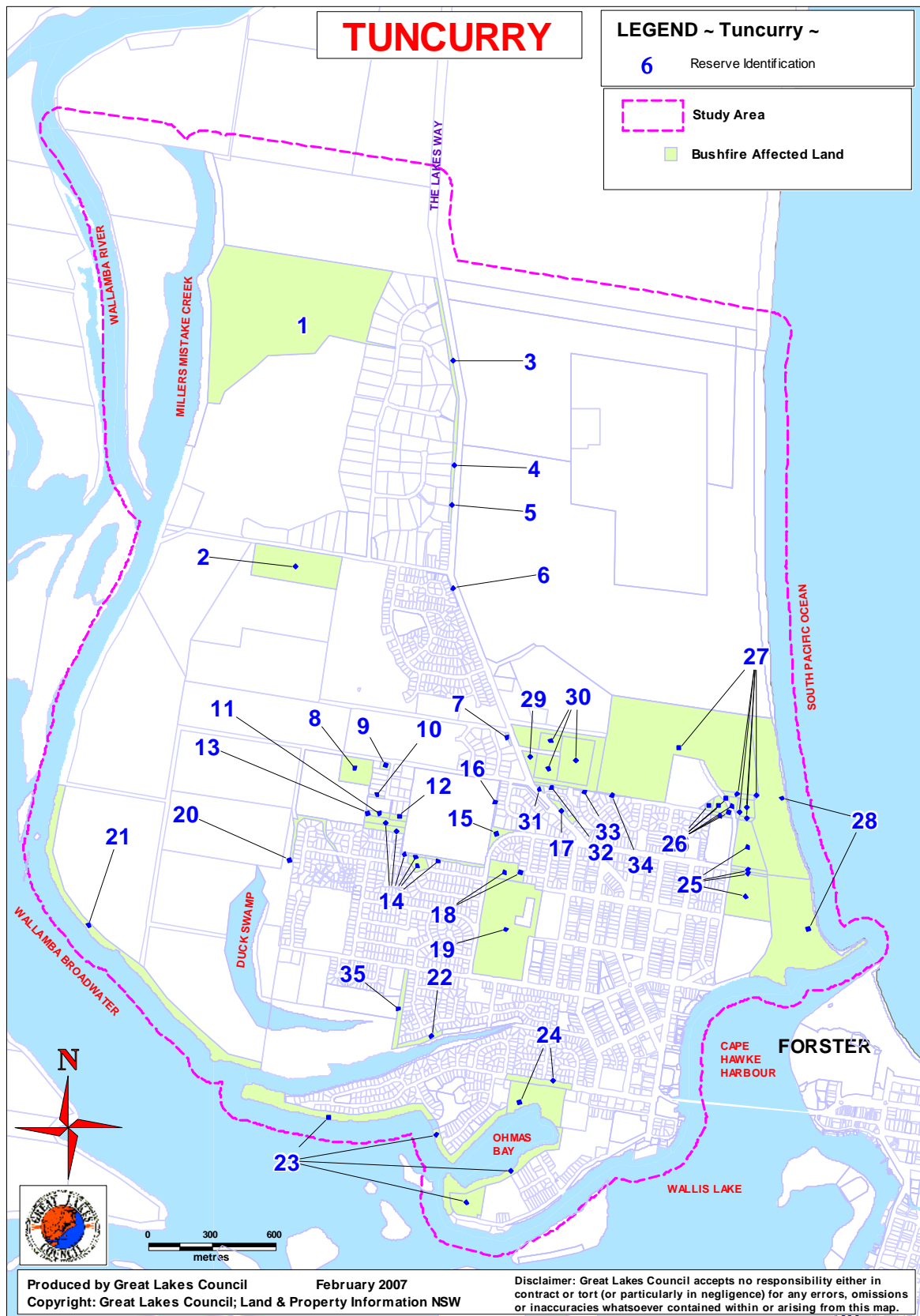


Figure 4: Location of Council managed land affected by bushfire in Tuncurry.



Table 3: Bushfire affected Council Managed Land within the study area.

ID	Property Name	Reserve Number	Lo t/ DP	Ha	Vegetation Community Type	Land Type	Managed by
1	Lot 1 The Lakes Way	Lot 1 DP 1029928	Lot 1 DP 1029928	37.733	<ul style="list-style-type: none"> <li>▪ Paperbark/Swamp Oak</li> </ul>	Operational Land	Council
2	Lot 1 Chapmans Road	Lot 1 DP 304132	Lot 1 DP 304132	6.127	<ul style="list-style-type: none"> <li>▪ Swamp Mahogany</li> <li>▪ Cleared</li> <li>▪ Fresh Water Swamp</li> </ul>	Operational Land	Council
3	Public Reserve	Lot 35 DP 777764	Lot 35 DP 777764	1.307	<ul style="list-style-type: none"> <li>▪ Paperbark/Swamp Oak</li> </ul>	Community Land	Council
4	Lot 19 The Lakes Way	Lot 19 DP 749986	Lot 19 DP 749986	0.321	<ul style="list-style-type: none"> <li>▪ Paperbark/Swamp Oak</li> </ul>	Community Land	Council
5	Lot 9 DP 778263	Lot 9 DP 778263	Lot 9 DP 778263	0.239	<ul style="list-style-type: none"> <li>▪ Scrub</li> <li>▪ Cleared</li> </ul>	Council	Council
6	Public Reserve	Lot 9 DP 778263	Lot 9 DP 778263	0.151	<ul style="list-style-type: none"> <li>▪ Urban</li> </ul>	Community Land	Council
7	Public Reserve	RES 5006	Lot 19 DP 262222	0.065	<ul style="list-style-type: none"> <li>▪ Urban</li> </ul>	Community Land	Council
8	Council Works Depot	RES 125 (R 96748)	Lot 296 DP 45877	1.798	<ul style="list-style-type: none"> <li>▪ Urban</li> <li>▪ Swamp Mahogany</li> </ul>	Community Land	Council
9	Lot 1 DP 859322	Lot 1 DP 859322	Lot 1 DP 859322	0.141	<ul style="list-style-type: none"> <li>▪ Urban</li> </ul>	Operational Land	Council
10	Drainage Reserve	Drainage Reserve	Lot 21 DP 859322	0.077	<ul style="list-style-type: none"> <li>▪ Urban</li> </ul>	Drainage Reserve	Council
11	Lot 9 DP 859322	Lot 9 DP 859322	Lot 9 DP 859322	0.273	<ul style="list-style-type: none"> <li>▪ Urban</li> <li>▪ Blackbutt-Bloodwood/Apple</li> </ul>	Operational Land	Council
12	Lot 10 DP 859322	Lot 10 DP 859322	Lot 10 DP 859322	0.225	<ul style="list-style-type: none"> <li>▪ Urban</li> </ul>	Operational Land	Council
13	Public Reserve	Lot 22 DP 859322	Lot 22 DP 859322	0.024	<ul style="list-style-type: none"> <li>▪ Blackbutt-Bloodwood/Apple</li> </ul>	Standard	Council
14	Environmental Protection	RES 5266 (R 210040)	Lot 319 DP 729822	0.624	<ul style="list-style-type: none"> <li>▪ Blackbutt-Bloodwood/Apple</li> </ul>	Community Land	Council
	Public Reserve	RES 5322 (R 210040)	Lot 321 DP 822669	0.587	"	Community Land	Council
	RES 5364	RES 5364	Lot 36 DP 720802	0.516	"	Standard	Council
	RES 5267 (R 210040)	RES 5267 (R 210040)	Lot 309 DP 722	0.041	"	Community Land	Council
	"	RES 5267 (R 210040)	Lot 310 DP 722603	0.098	"	Standard	Council
	"	RES 5267 (R 210040)	Lot 311 DP 722603	0.346	"	Standard	Council
15	Reserve For Environmental Protection	RES 5296	Lot 21 DP 729820	0.476	<ul style="list-style-type: none"> <li>▪ Blackbutt-Bloodwood/Apple</li> </ul>	Community Land	Council
16	Lane Way	Lane Way	Lot 22 DP 729820	0.065	<ul style="list-style-type: none"> <li>▪ Urban</li> </ul>	Standard	Council
17	Public Reserve	Lot 18 DP 1016222	Lot 18 DP 1016222	0.359	<ul style="list-style-type: none"> <li>▪ Scrub</li> <li>▪ Urban</li> </ul>	Standard	Council
18	Lot 20 DP 729820	Lot 20 DP 729820	Lot 20 DP 729820	1.299	<ul style="list-style-type: none"> <li>▪ Blackbutt-Bloodwood/Apple</li> <li>▪ Blackbutt-Bloodwood/Apple</li> </ul>	Standard	Council
	Wollomba Avenue	Wollomba Avenue	Wollomba Avenue	0.0565	<ul style="list-style-type: none"> <li>▪ Urban</li> </ul>	Road Reserve	Council
19	Tuncurry Sports Reserve	RES 89453	Lot 276 DP 753207	10.572	<ul style="list-style-type: none"> <li>▪ Blackbutt-Bloodwood/Apple</li> <li>▪ Cleared</li> <li>▪ Dry Blackbutt</li> </ul>	Council	Council

ID	Property Name	Reserve Number	Lo t/ DP	Ha	Vegetation Community Type	Land Type	Managed by
20	Drainage Reserve	Drainage Reserve	Lot 25 DP 711833	0.672	<ul style="list-style-type: none"> <li>▪ Urban</li> <li>▪ Swamp Mahogany</li> </ul>	Operational Land	Council
21	Tuncurry Foreshore	RES 138	Lot 7031 DP 1107421	6.23	<ul style="list-style-type: none"> <li>▪ Mangrove</li> <li>▪ Salt Water Swamp</li> <li>▪ Swamp Oak</li> </ul>	Standard	Council
22	Public Reserve	RES 5247	Lot 70 DP 804777	0.511	<ul style="list-style-type: none"> <li>▪ Urban</li> <li>▪ Cleared</li> </ul>	Community Land	Council
23	Wallis Lake Foreshore	RES 92 (Pt R 88335)	Lot 7036 DP 1066318	4.062	<ul style="list-style-type: none"> <li>▪ Mangrove</li> </ul>	RES 92 (Pt R 88335)	Council
	“	RES 92 (Pt R 88335)	Lot 7038 DP 1066318	1.63	<ul style="list-style-type: none"> <li>▪ Urban</li> </ul>	Community Land	Council
	Ohmas Bay Recreation Reserve	RES 92 (Pt R 88335)	Lot 234 DP 753207	1.675	<ul style="list-style-type: none"> <li>▪ Salt Water Swamp</li> </ul>	Community Land	Council
	Wallis Lake Foreshore	RES 92 (Pt R 88335)	Lot 7037 DP 1066318	2.743	<ul style="list-style-type: none"> <li>▪ Cleared</li> </ul>	Community Land	Council
	“	RES 92 (Pt R 88335)	Lot 1623 DP 736647	0.01		Community Land	Council
24	Ohmas Bay Foreshore - Road Reserve	Taree Street	Taree Street	0.9493	<ul style="list-style-type: none"> <li>▪ Palm</li> <li>▪ Paperbark/Flooded Gum</li> <li>▪ Salt Water Swamp</li> <li>▪ Urban</li> <li>▪ Mangrove</li> </ul>	Road Reserve	Council
	Ohmas Bay Foreshore	RES 12 (R 54990)	Lot 7039 DP 1066318	3.463		Community Land	Council
25	Tuncurry Caravan Park	RES 72 ( R86531)	Lot 160 DP 753207	2.431	<ul style="list-style-type: none"> <li>▪ Scrub</li> </ul>	Community Land	Council
	Closed Road - R 86531	“	Lot Sec 12 DP 759005	0.306	<ul style="list-style-type: none"> <li>▪ Disturbed Heath</li> </ul>	Community Land	Council
	Closed Road	“	Lot Sec 12 DP 759005	0.209	<ul style="list-style-type: none"> <li>▪ Urban</li> </ul>	Community Land	Council
	Tuncurry Caravan Park & Camping Res	“	Lot Sec 12 DP 759005	3.986		Community Land	Council & Crown
26	BEACH STREET OVAL	RES 73 (R 86532)	Pt Lot 140 DP 753207	0.003	<ul style="list-style-type: none"> <li>▪ Cleared</li> </ul>	Community Land	Council
	“	“	Lot 7052 DP 93503	0.1389	<ul style="list-style-type: none"> <li>▪ Scrub</li> </ul>	Community Land	Council & Crown
	“	“	Pt Lot 254 DP 753207	0.017	<ul style="list-style-type: none"> <li>▪ Heath</li> </ul>	Community Land	Council & Crown
	“	“	Pt Lot 140 DP 753207	0.195	<ul style="list-style-type: none"> <li>▪ Urban</li> </ul>	Community Land	Council
	“	“	Pt Lot 140 DP 753207	0.189		Community Land	Council & Crown
27	Closed Road	RES 124 (R 96632)	Lot 265 DP 753207	0.211	<ul style="list-style-type: none"> <li>▪ Cleared</li> </ul>	Community Land	Council
	Road Reserve-unformed	Road Reserve-unformed	Road Reserve-unformed	0.307	<ul style="list-style-type: none"> <li>▪ Urban</li> </ul>	Road Reserve	Council
	PUBLIC RECREATION-Pt	RES 124 (R 96632)	Lot 265 DP 753207	0.4608	<ul style="list-style-type: none"> <li>▪ Heath</li> </ul>	Community Land	Council & Crown
	RES 124 (R 96632)	“	Pt Lot 140 DP 753207	0.526	<ul style="list-style-type: none"> <li>▪ Dry Blackbutt</li> </ul>	Standard	Council
	“	“	Pt Lot 254 DP 753207	26.36	<ul style="list-style-type: none"> <li>▪ Disturbed Heath</li> </ul>	Community Land	Council
	Closed Road - R 86531	“	Lot 265 DP 753207	0.025	<ul style="list-style-type: none"> <li>▪ Scrub</li> </ul>	Standard	Council
“	“	Lot 265 DP 753207	0.129		Community Land	Council	

ID	Property Name	Reserve Number	Lo t/ DP	Ha	Vegetation Community Type	Land Type	Managed by
28	Tuncurry Rock Pool & Nth Beach	RES 80 (R 86904)	Rockpool Road	11.683	<ul style="list-style-type: none"> <li>▪ Sand Ridge</li> <li>▪ Cleared</li> </ul>	Community Land	Council
	"	"	Rockpool Road	11.025	<ul style="list-style-type: none"> <li>▪ Scrub</li> <li>▪ Disturbed Heath</li> </ul>	Community Land	Council
29	Cemetery Plantation and Closed Road	Cemetery Plantation and Closed Road	Lot 7009 DP 1056915 & 7010 DP 1056913	3.945	<ul style="list-style-type: none"> <li>▪ Urban</li> <li>▪ Heath</li> <li>▪ Cleared</li> <li>▪ Dry Blackbutt</li> </ul>	Standard	Council & Crown
30	Cemetery	Church of England	Lot 7045 DP 1056915	1.216	<ul style="list-style-type: none"> <li>▪ Urban</li> </ul>	Standard	Council & Crown
	Church of England Roman Catholic	Roman Catholic	Lot 7045 DP 1056915	0.823	<ul style="list-style-type: none"> <li>▪ Heath</li> </ul>	Standard	Council
	General	General Cemetery	Lot 7045 DP 1056915	3.205	<ul style="list-style-type: none"> <li>▪ Cleared</li> </ul>	Standard	Council & Crown
31	Lot 17 DP 1016222	Lot 17 DP 1016222	Lot 17 DP 1016222	0.072	"	Standard	Council
32	Road Reserve - CL	Road Reserve - CL	Road Reserve - CL	0.16	<ul style="list-style-type: none"> <li>▪ Heath</li> </ul>	Standard	Council & Crown
33	Lot 2 DP 1050517	Lot 2 DP 1050517	Lot 2 DP 1050517	0.036	<ul style="list-style-type: none"> <li>▪ Cleared</li> </ul>	Standard	Council
34	Road Reserve - CL	Road Reserve - CL	Road Reserve - CL	0.044	"		Council & Crown
35	Road Reserve - Near Oasis Parade	Road Reserve	Road Reserve	0.7379	<ul style="list-style-type: none"> <li>▪ Cleared</li> <li>▪ Urban</li> <li>▪ Swamp Mahogany</li> <li>▪ Paperbark</li> <li>▪ Mangrove</li> </ul>	Road Reserve	Council
			<b>TOTAL</b>	<b>153.91ha</b>			

## **Public Utilities**

Country Energy maintains electricity infrastructure in the study area. Reticulated water and sewage is available within Tuncurry and is maintained by MidCoast Water.

Telstra provides and maintains the communication network services through underground and overhead lines.

Service localities, maintenance points or junction boxes and underground electricity and telephone access points are identified by posts or marked on the ground within the vicinity of site, on roadways or easements.

## **Road Access**

Within Tuncurry the bituminised roadways (primary and secondary) enable fire appliances to have good access throughout the urban area and from other areas such as Nahiab, Forster, Pacific Palms, and further south to Bulahdelah. This egress provides good access for fire fighting units, residents, and visitors for use during fires fighting or use as an escape route.

## **Fire Trails/Fire Advantages/Control Lines**

Council has a variety of fire trails and fire advantages within the study area that can be used as strategic fire advantages. Fire advantages that are used during fire operations to limit the spread of bushfires or used as a control line (line or an area) provide fuel reduced areas (which limiting fire spread), whether natural (like rainforests; rivers; lakes; rocks) or man made (fire trails; roadways; unformed road reserves; APZ's and SFAZ's).

During fire operations primary and secondary roadways are available, which is within the internal road system, providing both primary and secondary (unformed road reserves) fire access around Tuncurry. Wallis Lake prevents fires directly spreading into the study area from the south, however in extreme fire events, spotting may occur across the lake or river in other directions.

## **Water Supply/Fire Fighting Water Supply/Aerial Access**

Tuncurry has reticulated water which is available throughout the urban area. Fire hydrants provide water to fire fighters in the event of fire incidents. Alternative water supplies on residential or rural properties are often from on site water tanks or farm dams. Wallis Lake and Wallamba River also provides an unlimited water supply for protection and suppression during aerial operations.

There is a designated helicopter-landing pad within Forster located within a public reserve adjacent to Cape Hawke Private Hospital. There are also various other helipad opportunities in the investigation area (e.g. Tuncurry Touch Football Fields)

## Fire history

Fires are known to have regularly occurred within and neighbouring the study area and being within the vicinity the coast, fires are often influenced by variable coastal weather. Planned prescribed burns and wild fires have also burnt the forested and coastal heath areas. Locally fires have occurred mostly in spring, when the relative humidity is lower. Wildfires may also occur in late winter and early spring.

Wildfires have occurred in the vicinity of Tuncurry during various bushfire seasons including 2002–2004 bushfire seasons and south of Forster in 1984–85, 1986–87, 1991–92, 1994–95, 2000–01 (DEC 2005b; NSW RFS 2005b; Pers. Comm.).

In 2002/03 fire season the rural area of Darawank experienced a major bushfire through coastal heath and forested areas adjoining The Lakes Way. On the northern edge of Tuncurry, a wildfire in the 1930's burnt the Pine Plantation at the time on the eastern side of the Lakes Way.

Private and government properties owners are known to undertake burning for land management purposes and hazard reduction through the non-bushfire season. These low or moderate intensity burns, do not threaten Tuncurry and the rural areas during optimum manageable weather conditions. A hazard reduction burn within Heathlands, north of Tuncurry has occurred within the 2006–07–fire season.

## Bushfire Weather

Typically the local climate is warm-temperate; with generally warm to very warm summers and mild to cool winters. However, the Tuncurry area is at the boundary of the uniform rainfall and the mostly summer rainfall zones. Climatic data is available within or immediately adjacent to the LGA and historical relative humidity records (1961–1990) for Williamtown are documented in Appendix X (Bureau of Meteorology).

The local fire season is typically during the spring early summer, when the climate is hot with occasional strong winds from summertime cold fronts, which can lead to extreme fire danger periods. Lack of rain, low relative humidities and high winds contribute to increased fire danger (BOM 2005b). In most years, the summer rainfall in January brings the normal fire season to an end, although in some drier years fire periods have extended beyond this time.

During the fire season the mean daily minimum temperature, on the coast is 13°C in October and rises to a mean daily maximum of 27.5°C in February. Monthly rainfall is highest in February and reducing from highest to lowest in January, December, March, November, April, and October respectively.

The local coastal wind patterns distinctly change from the morning to the afternoon in which patterns are affected by coastal sea breezes. Generally prevailing fire weather winds during winter and spring within Great Lakes LGA are predominantly from the southwest-northwest.

The shifting winds in summer from the west–northwest to the southeast–northeast are influenced by afternoon sea breezes. Southerly changes up the coast also cause unpredictable fire weather conditions, which push strong hot winds preceding the cold front, often followed by moister cooler conditions.

### **Natural and Cultural Heritage**

Tuncurry's urban interface is nestled amongst forested land adjoining both private and public lands. These bushland corridors link with the fragmented parks, road reserves and undeveloped residential properties.

The 316 hectares of development within the township of Tuncurry (not forested) is generally within and surrounded by natural bushland areas (1,349ha) including approximately 154 hectares of which is Council managed land affected by bushfire and assessed within the plan. Fragmented vegetation communities are now set amongst urban developments and represent the forest types that originally existed in the area or altered forms of such. Although fragmented, these areas are significant for vegetation and fauna habitat and thus serve to enhance conservation values of the local area. Fire management in these areas must consider the existing environmental values.

Within the study area the vegetation formations are predominantly Heathlands, Forested wetlands and Grasslands with some areas of Dry sclerophyll forest. Some areas lack sub dominant and ground cover layers or possess altered structure as a consequence of human interaction (i.e. logging, slashing). Limited smaller areas support Rainforest and Freshwater or Saline wetlands. The wetlands integrate with the adjacent Forested wetlands. The open undeveloped cleared areas have a mixture of landscapes including maintained parks; regenerating forests; or consist of natural grasslands.

Former vegetation survey and mapping projects involved a review of aerial photograph interpretation and targeted traverse (ground–truthing). Vegetation communities were delineated on the basis of the structure and floristic of the canopy as well as other structural descriptors and land use influences.

From these surveys and the vegetation community types described within the Draft Great Lakes Vegetation Strategy 2004, within the study area 20 natural vegetation communities were identified, which cover approximately 1,349 hectares. The forest types are those described in the Research Note 17 (Forest Commission of NSW 1989) and a map of the location of the vegetation communities is provided in Figure 5.

The provided vegetation data is expected to have local variation, as detailed ground–truthing would provide further floristic details, in addition to the existing mapped vegetation. This information is evolving and amended as ground truthing and survey work leads to maps being updated and enhanced.

Grasslands (Cleared land) cover approximately 21% of the study area. The vegetation formations within and adjacent to residential properties of villages include in decreasing order; Heathlands (27%); Forested wetland (24% cover); Dry sclerophyll forest (4% cover); with the remaining areas (each with less than 3% cover of the mapped area) including; Rainforests, Freshwater or Saline wetlands, Mixed Pine and Wet sclerophyll forests.

All naturally vegetated areas require the appropriate hazard reduction management practice to be implemented with respect of environmental sensitivities, in due recognition of risk management and ecological values and thresholds.

From these analyses, it is evident that there are several vegetation communities' that exist that would satisfy the definition of Endangered Ecological Communities (EEC) on the TSC Act or are recorded by the State of Environmental Planning Policy (SEPP) as Coastal swamps (SEPP 14). These include Coastal Saltmarsh, Swamp Oak or Swamp Sclerophyll Forest on Coastal Floodplain. These areas are of high conservation value and require management practices to protect these areas.

Other vegetation communities mapped in the study area are also considered regionally rare, regionally vulnerable, severely depleted, a private land priority for conservation, and/or have a 100% conservation target within the Lower North Coast of NSW (refer to Appendix V).

The conservation values of Council natural areas within the study area provide an important buffer and contribute to habitat and environmental services in the local landscape. As such, proper recognition of the inherent values of such vegetation is considered essential in any fire management regime for the study area. For example Reserve identification number 1, 14, 20 and 27–28 are within the area defined by DECC as Key Regional Habitat and Reserve 25–30 are within the Regional Corridor, which extends into the surrounding bushland areas. Reserve identification number 1 particularly is also a relatively large area of EEC that is intact.

By recognising local vegetation types and understanding the complexity of fire, the enhancement and conservation of the environment can be achieved. These forest types have been grouped as vegetation formations (Keith 2005) (Figure 6) and are used to identify the desired targets for the frequency and intensity of prescribed or biodiversity burns (Figure 7). The RFS specify within the Code, minimum fire regimes to meet biodiversity thresholds<sup>7</sup> within strategic and land management zones specific to the study area (Table 4) which assist fire management decisions by land managers.

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<sup>7</sup> Refer to Table 4 (Specific to Tuncurry) or appendix VI (Entire Great Lakes LGA)

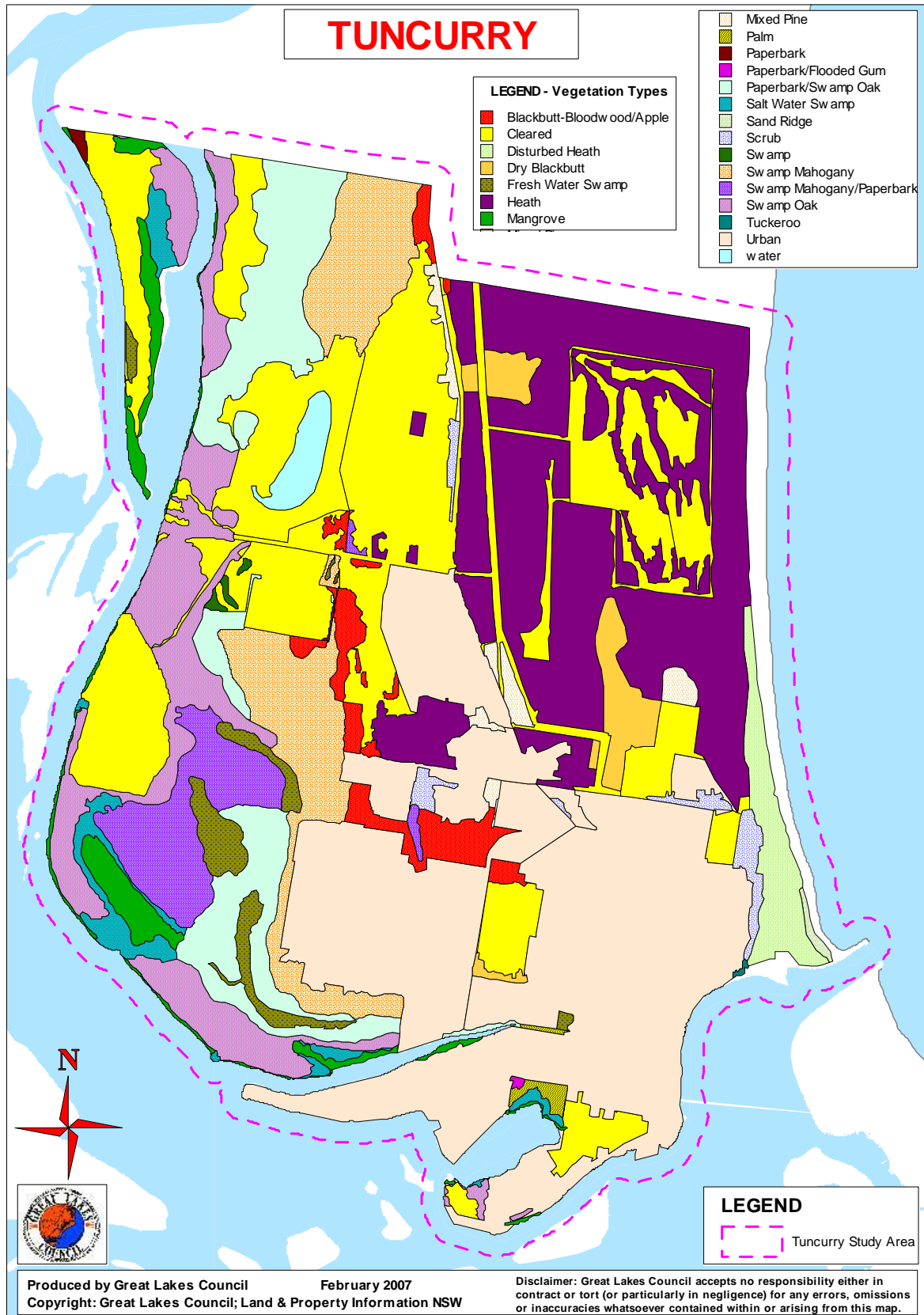


Figure 5: Vegetation Community Type within the study area.



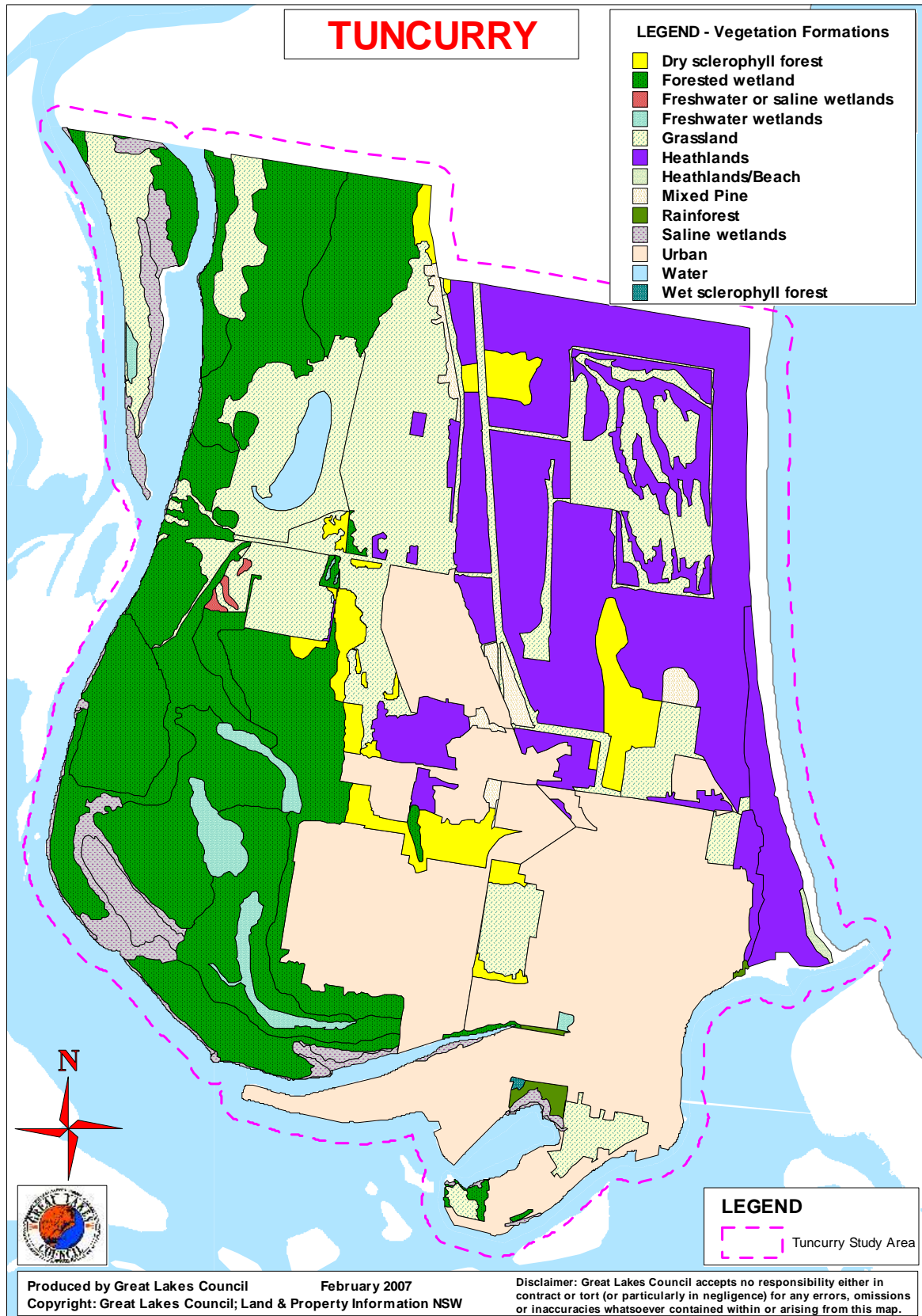


Figure 6: Vegetation formation for fire management

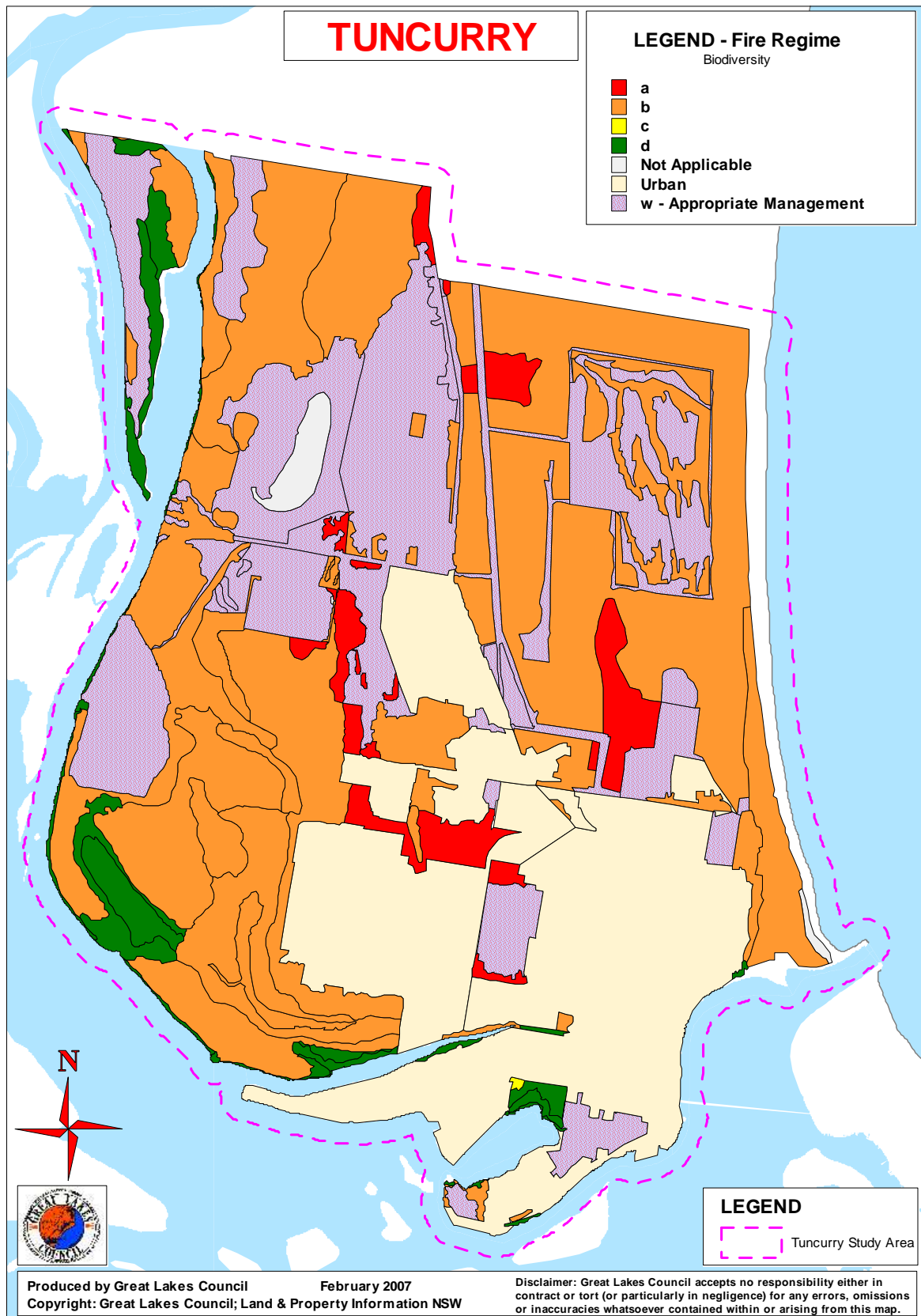


Figure 7: Biodiversity fire regimes applied to local vegetation

Table 4: Biodiversity thresholds and fire regimes to be applied to vegetation in Tuncurry.

Fire Regime	Biodiversity Thresholds *Within Strategic Fire Advantage (NPWS 2001) and Land Management Zones	Vegetation Community Type (Council 2004) *[#1 and #2 indicate options for the same community]	Forest Type (Council, DVS, 2003)	The Vegetation Formation (Keith 2004) Described By The RFS For Minimum Fire Frequency For SFAZ (BFEAC)	Minimum Year Fire Interval (BFEAC) <sup>9</sup> (SFAZ/LMZ)
a	<ul style="list-style-type: none"> <li>❖ Avoid 3 or more consecutive fires, with each of &lt;5 years apart</li> <li>❖ Avoid inter fire periods of &gt;30 years</li> <li>❖ Avoid 2 or more successive fires that totally scorch or consume the tree canopy</li> <li>❖ Avoid 3 or more consecutive fires of low intensity</li> </ul>	Blackbutt – Bloodwood/ Apple	41	Dry sclerophyll forests	5 / 8
		Dry Blackbutt	37	Dry sclerophyll forests	5/8
b	<ul style="list-style-type: none"> <li>❖ Avoid 3 or more consecutive fires, with each of &lt;8 years apart</li> <li>❖ Avoid 3 or more consecutive fires, with each of the fires &gt;15 years apart</li> <li>❖ Avoid inter fire periods of &gt; 30 years</li> <li>❖ Avoid 2 or more consecutive fires that consume &lt; 10t/ha of surface fuels</li> </ul>	Heath	223	Heathlands	7/10
		Disturbed Heath	219/223	Heathlands	7/10
		Paperbark	31	Forested wetland	7/10
		Paperbark/ Swamp Oak	31/32	Forested wetland	7/10
		Scrub	224	Heathlands	7/10
		Swamp - #1	231	Freshwater wetlands	7/10
		Swamp Mahogany	30	Forested wetland	7/10
		Swamp Mahogany/ Paperbark	30/31	Forested wetland	7/10
		Swamp Oak	32	Forested wetland	7/10
c	<ul style="list-style-type: none"> <li>❖ Avoid more than 1 fire every 30 years</li> <li>❖ Avoid inter-fire periods &gt; 200 years</li> </ul>	Flooded Gum/ Paperbark	48/31	Wet sclerophyll forests	25/30
d	Any fire occurrence (a limited recovery ability exists)	Mangrove	33	Saline wetlands	n/a
		Palm	7	Rainforest	n/a
		Swamp - #1	231	Freshwater wetlands	n/a
		Swamp - #2	231	Saline wetlands	n/a
		Tuckeroo	24	Rainforest	n/a
NA	Not Applicable (Primary/fore dune landscape)	Pine Sand Ridge	- 233	Other Heathlands/Beach	n/a n/a, w
w	Use a, b, c, d options for biodiversity thresholds	Cleared/Grassland	220	Appropriate management practice	n/a w

<sup>8</sup> Biodiversity thresholds adapted from Bradstock et al 1995; NSW National Parks and Wildlife Service described within *the Draft Fire Management Strategies for Myall Lake National Park and Island Reserves, 2003a*.

<sup>9</sup> The Code specifies criteria and conditions when issuing a BFHRC for hazard reduction burning

## **Resources**

Within the LGA there is a fleet of fire fighting appliances from 23 locations. The distances to Tuncurry from other brigade stations, local to the area are shown in Figure 9. Tuncurry has well maintained roadways including the main tourist drive being The Lakes Way providing access and egress by the community and fire fighters. This allows efficient response time throughout the township when neighbouring brigades are required.

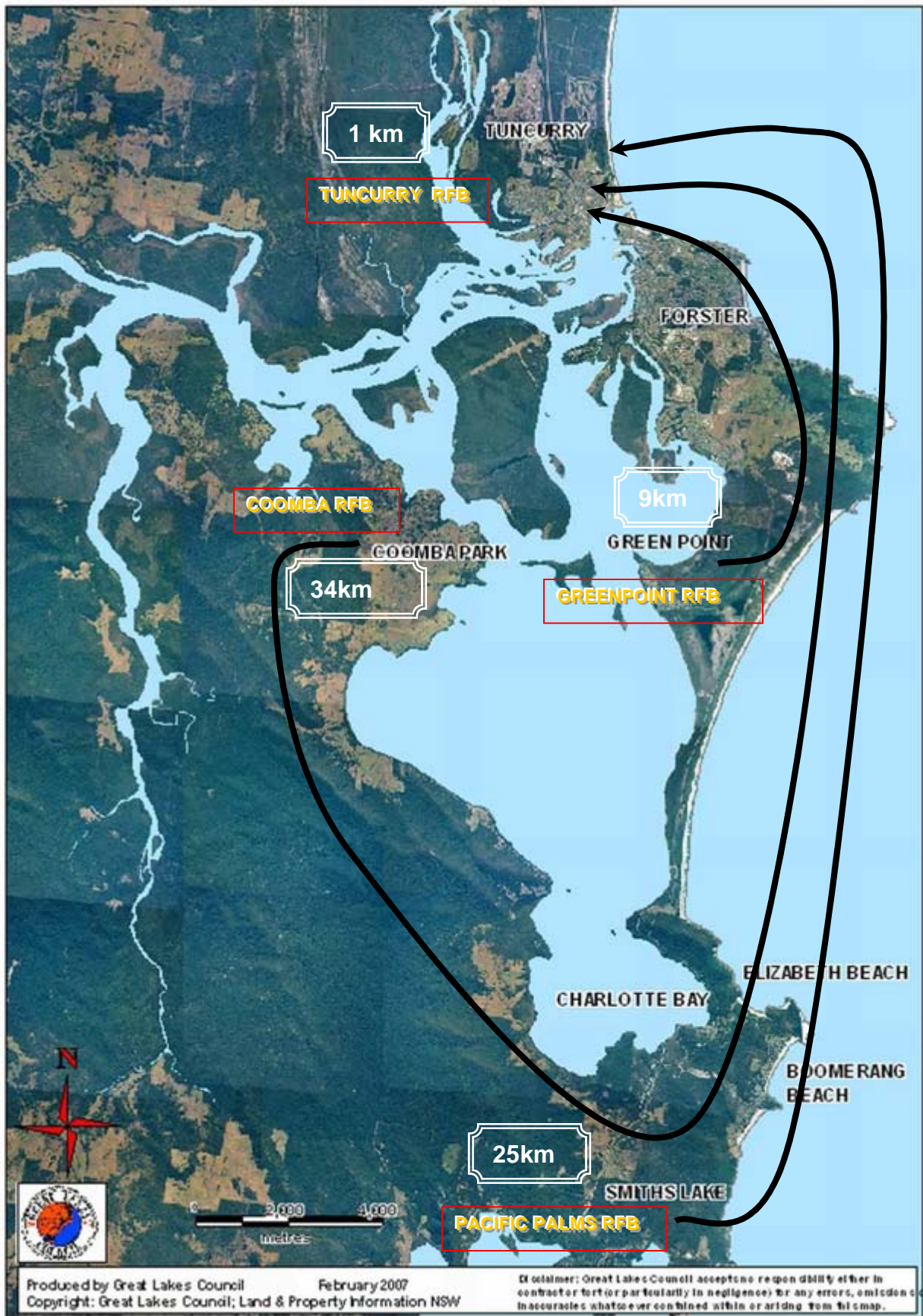


Figure 8: Distance to Tuncurry from other Rural Fire Brigade Station locations.



### Risk to Life and Property

The BFRMP identifies Tuncurry as having all five bushfire risk rankings at various locations. The higher the risk (i.e. the closer the bushfire threat) the more chance fire has a greater impact on the asset or the community.

Seven (7) localities have been identified where life and property<sup>10</sup> (LP) are directly threatened from the spread of fire or impacted by bushfire, from adjacent bushland to the urban interface (Table 5) (Figure 9). The urban area of Tuncurry has dissected the coastal leaving fragmented remnant bush. These surrounding bushland areas contain Heathlands, Forested wetland and Dry sclerophyll forests communities which are able to support fire. These forested areas are on coastal low-lying floodplains and sand dunes, occasionally on steeper slope. Tuncurry is nestled between the coastline and Wallis Lake, which assists in providing control lines, reduces the spread of fire and the threat from nearby bushfires (Figure 10).

North within the study area forested private land and Crown Land link with Tuncurry where historically, bushfires are influenced in summer by north-southeast sea breezes and to a lesser degree southeast-southwest winds.

Table 5: Risk to Life and Property.

Code	Location	Description of risk	BFRMP Risk Rating
LP1	Tuncurry (North west)	Western & northern bushland interface west of The Lakes Way within rural/residential properties of Tuncurry, north of Chapmans Road.	Insignificant / Moderate
LP2	Tuncurry (West)	Western residential edge, bushland and open space interface of Tuncurry, south of Chapmans Road.	Insignificant / Moderate
LP3	Tuncurry (Ohmas Bay)	Southern residential edge, north of Ohmas Bay, bushland and open space interface of Tuncurry.	Insignificant / Moderate / Major / Extreme
LP4	Tuncurry (South)	Southern bushland/grassland and Foreshore interface, within residential properties.	Insignificant / Minor
LP5	Tuncurry (East)	Eastern bushland/grassland interface along the coastal foreshore adjacent to residential properties west of the reserve.	Insignificant / Minor
LP6	Tuncurry (North)	Northern bushland interface of rural/residential properties of Tuncurry.	Moderate / Major / Extreme
LP7	Tuncurry (North east)	Eastern & northern bushland interface, east of The Lakes Way within rural/residential properties of Tuncurry.	Moderate / Major / Extreme

<sup>10</sup> Life and Property is identified on figures as LP with corresponding number identified in Table 1



Figure 9: Location of Life and Property Risk.





Figure 10: Examples of Developments within Tuncurry.



## Risk to Natural Heritage

The BFRMP identifies and classifies Council reserves within Tuncurry as having *insignificant, minor and major bushfire environmental and ecological risks*<sup>11</sup>. Those Council managed areas affected by bushfire have been included within the table in appendix XI. The risk rating indicates the effects of fire on the land identified or the actual level of impact of fire on the environment.

The protection and enhancement of local reserves will assist in conserving habitats for local species, including threatened species recorded or likely to exist locally. The Wallis Lake foreshore and the Wallamba River being a riparian zone and part of the Wallis Lake Catchment requires protection as well as community types where the existing fire regime has either exceeded or does not support burning for biodiversity. Protection of forests adjoining these areas and corridors linking these to known reserve systems are all very important to conserve.

Within the study area there are also communities that appear to satisfy the criteria for listing as endangered ecological communities (EEC). The TSC Act guides the conservation and enhancement of these areas. Fire management planning incorporates legislation and objectives of biodiversity enhancement in areas nearby or within communities such as these.

SEPP 14 (Coastal Wetlands) is nearby to Ohmas Bay recreation Reserve, Wallis Lake Foreshore (ID 23), drainage reserve (ID 20) and the road reserve (ID 36), which require sensitive hazard reduction activities to ensure the continued enhancement of these significant areas. Reserve (ID) 25—30, 32—34 support Heathlands, Wetland forests and Dry sclerophyll forests together are part of an important corridor linking with Darawank Nature Reserve to the North. Vegetation communities that require further protection recorded in the study area in a decreasing priority includes, Swamp oak (vulnerable, severely depleted community), paperbark (vulnerable), swamp and rainforest (rare).

Fire regimes have been identified for forest type within the study area (Table 4, Appendix VI), which incorporates fire frequencies from Bradstock *et al* (1995) and the RFS guidelines within the Code (2006a), which has provisions for the protection of biodiversity by defining guidelines for burning in SFAZ's and LMZ's.

The type of technique used to implement hazard reduction assists in meeting these requirements, having minimal impact on the environment and equally meeting legislation in a sensitive manner. Table 6 particularly focuses on conservation principles to be applied activities in the field. In addition the review for environmental assessment (appendix XII) specifies environmental safeguards and mechanical conditions when implementing activities on the ground.

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<sup>11</sup> Environmental & ecological risk rating is the affect on the biodiversity and natural values of the area

Table 6: Conservation principles applied to hazard reduction works within each zone.

Type of Zone	Conservation Principle	Implementation	Monitoring
<b>Asset Protection Zone - Slashing - Tree removal</b>	Provide hospices within the area to maintain biodiversity; promote longevity of plants; buffer radiant effects from fire; reduce wind and provide habitat for fauna. Minimal thinning to meet canopy width specifications by the RFS. Tree removal of smaller, unhealthy, species with minimal impact on species using the habitat, in particular the Koala. Maintain habitat trees, seed trees and significant trees within zone.	Mechanical slashing of areas to protect assets. Retain 25-30% of total area of ground cover/elevated fuels for habitat. Tree removal by retaining stumps is preferred. Approval for stump removal of smaller trees assessed during site evaluation. Maximum overall fuel loads average is moderate.	Monitor fuels loads and changing vegetation community to guide slashing regimes to maintain appropriate fuel loads. Assess conservation values of the area and assess regrowth of slashed area and the impact on the local environment. Survey for threatened species.
<b>Asset Protection Zone - Burning</b>	Burn area prescription to reduce fine fuels by 50-70% and elevated fuels by <50%. Ensure buffer zones within the burn area to protect impacts of erosion on steeper and riparian areas.	Fire regime is applied as frequently as needed to ensure the maximum overall fuel loads average is moderate.	Monitor fuels loads. Survey for threatened species.
<b>Fire Advantages (Can be within Strategic Fire Advantages Zones or Asset Protection Zones) - Slashing - Tree removal</b>	Natural or mechanical reduced fuels to provide corridors of lineal barriers or improved access to assist fire fighters to combat fire. Minimise soil erosion and ensure stumps are retained (below ground level) with approved tree removal.	Recognition of natural barriers or areas previously disturbed (not maintained). Within existing maintained areas (APZ/SFAZ), implement mechanical slashing of areas to reduce fuels to compliment management within APZ or SFAZ or adjacent zones.	Monitor accessibility and conservation values. Survey for threatened species.
<b>Strategic Fire Advantage Zone - Slashing - Tree removal (Mechanical or hand removal)</b>	Reduce fuels to provide corridors of lineal barriers or improved access to assist fire fighters to combat fire. Often related to drainage reserves, access & Services easements. Provide hospices within the area to compliment adjacent APZ or SFAZ. Minimise soil erosion and ensure stumps are retained (below ground level) with approved tree removal.	Mechanical slashing of areas to reduce fuels to compliment adjacent APZ. Maximum overall fuel loads average is high. Frequency less than within an APZ.	Monitor fuels loads. Survey for threatened species.
<b>Strategic Fire Advantage Zone - Burning</b>	Burn area prescription to reduce fine fuels by 50-70% and elevated fuels by <50%. Mosaic burn 50-70% of the total area. Consider biodiversity thresholds for fire intensity and regularity.	Ecological based fire regimes of irregular mosaic burn areas integrated with protection of the community by providing fuel reduced areas, to compliment adjacent APZ or SFAZ. Maximum overall fuel loads average is high.	Monitor fuels loads. Survey for threatened species. Record fire frequency and intensity to meet prescriptions.
<b>Land Management Zone - Burning</b>	Mosaic burn of up to 50% of the area to be burnt. Consider biodiversity thresholds for fire intensity and regularity.	Ecological based fire regimes of irregular mosaic burn areas. Protect riparian area conservation values.	Record fire frequency and intensity to meet prescriptions.
<b>Fire Exclusion Zone</b>	Hazard reduction and biodiversity burning excluded.	Conservation area.	Record fires.

### **Risk to Cultural heritage**

Council has liaised with the DECC (Parks and Wildlife Division) regarding a search of information within the maintained Aboriginal Heritage Information Management System (AHIMS) for Aboriginal Objects and Aboriginal Sites within the study area. In conclusion, the hazard reduction proposals identified within the plan meet guidelines by the DECC and have no impact on existing recorded sites on Council managed land.

Within Great Lakes LEP, Schedule 2 does list 3 heritage items within the study area however these heritage items are not associated with bushfire affected land within Tuncurry.

### Key Fire Issues

The key fire issues (Table 7) have been identified through preparing the plan, which reiterates the direction of Councils fire management planning and the necessity to implement the bushfire mitigation work program to reduce the bushfire risk.

Table 7: Bushfire Risk Management.

Key Fire Issues	Actions
❖ A large number of properties are adjacent to bushland areas, which occur within the urban area.	✓ Provide FMZ's to reduce fuels by providing adjacent to assets, fuel reduced areas.
❖ In the event of a fire, adjoining properties with reserves will be fire affected.	✓ Strategically undertake fuel reduction activities to assist in minimising the spread of bushfire.
❖ Large bushland areas or significant vegetation communities are recorded locally.	✓ Monitor fire fuel loads within asset protection zones through work programs.
❖ Spotting may occur across the urban areas, within fragmented bushland areas.	✓ Ensure asset protection zones within reserves are maintained to reduce bushfire hazards and impact from radiant heat on assets.
❖ Bushland areas require active fire management works to reduce fire potential.	✓ Apply sensitive hazard reduction works to maintain biodiversity.
❖ Adjoining properties need to be aware of adjoining FMZ's within reserves.	✓ Meet biodiversity requirements within bushland areas by programming fuel reduction burns to meet prescriptions.
❖ Increase community fire awareness and the importance of property protection from fire.	✓ Minimise tree removal and retain hospices for habitat.
❖ Minimise impact on bushland areas from inappropriate management techniques applied.	✓ Minimise the impact on bushland areas by applying environmentally sensitive activities, when implementing manual hazard reduction works
	✓ Implement community education for active property protection to reduce the chance and likelihood of bushfires occurring.
	✓ Educate the community to be bushfire aware and that the community can take steps to maintain and reduce the fire risk and impact on properties.

Outcomes
<input type="checkbox"/> Implemented strategic fire management planning.
<input type="checkbox"/> Reduced bushfire risk.
<input type="checkbox"/> Reduced bushfire hazards.
<input type="checkbox"/> Increased protection within bushland areas.
<input type="checkbox"/> Mapped bushfire regimes.
<input type="checkbox"/> Increased bushfire awareness.
<input type="checkbox"/> Coordinated bushfire management.

## SECTION 8

### *Management Strategies*

Management strategies for each APZ, SFAZ, LMZ or FEZ are outlined and guide manager's decisions for each property. These have been mapped and identified within each reserve or managed land. To assist with understanding the codes on the figures, refer to identification (ID) seen within Table 8, which identifies the relationship with the figures.

Table 8: Terminology used on figures within the plan.

ID	Description
8	Reserve identification number for bushfire affected land
LP	Life and property
A1	Asset Protection Zone reference number (preceded by locality code <sup>12</sup> )
S1	Strategic Fire Management Zone reference number (preceded by locality code)
C1	Land Management Zone for conservation reference number (preceded by locality code)
E1	Fire exclusion zone reference number (preceded by locality code)

The key elements to hazard reduction activities are those strategies identified by Council within Table 9.

Table 9: Specific strategies applied to fire management zones.

1	Create and/or maintain APZ and SFAZ specifications on Council land for adjacent existing developments.
2	Create and/or maintain fire advantage lines to provide access for fire fighters.
3	Promote to the community, education on importance of hazard reduction and Council proposed works.

Table 10–14 contains relevant fire objectives and hazard reduction works applied to a particular zone, which may vary depending on the proposed management techniques.

Council has taken into consideration neighbouring fire management strategies adjacent to Council land. It is recognised that private landholders and other authorities have evolving management practices and fire strategies may alter from existing works in the future. Change is imminent and references to any other reports are intended as a guide only, as other management and planning decisions by managers may alter suitability in the future.

Therefore an annual review of fire management strategies both in the field and those referenced within other contemporary planning documents is important to ensure management is cohesive and evolutionary.

#### **Asset protection zones**

Using the criteria described within the Plan for determining APZ's a total of twenty-seven (27) APZ's have been identified within Council Land and reserves (Table 10–11 and Figure 11–16).

<sup>12</sup> Locality Code - An abbreviation of villages by letter (Tuncurry = T)

Mechanical slashing within APZ's within bushland areas including public reserve areas, drainage reserves and road reserves, assists in providing fuel reduced areas and increased protection of assets.

### **Strategic Fire Advantages**

Mechanical slashing within SFAZ's and strategic fire advantages within bushland areas including public reserve areas, drainage reserves and road reserves, assist in protecting assets, strengthening adjacent APZ's or providing strategic areas to be used during fire operations.

Two (2) SFAZ's are recorded within Council land, which are fire trails (Table 12 and Figure 17).

Mechanical hazard reduction methods within Council road reserves adjacent to managed major and minor roads are authorised. This roadside slashing of SFA's, along the road verge to a distance of 2.5 metres either side in both urban and rural areas widens the existing fire break (being the bitumen or gravel roadways) and assists in mitigating the spread of fire to adjacent properties. This information is reported to the BFMC annually providing invaluable information to fire managers.

### **Land Management Zones**

Council has mapped these zones and identified the vegetation communities within the identified 31 LMZ's within Council Managed Land. The fire management objectives in each LMZ vary depending on existing use (e.g. recreation) and/or environmental sensitivity are identified within Table 13.

Thirty-one (31) LMZ's (C) have been identified within Council Land and reserves (Table 13 and Figure 11-17).

Biodiversity thresholds are described within (Table 4, Appendix IV) for the study area. The implementation of ecological based fire regimes of irregular mosaic burn patterns and minimal intervals between burns is important for managing bushland areas within larger zones.

Regeneration of disturbed areas within reserves consistent with management of public reserves and recreation areas objectives is important when managing for fire and the conservation of areas.

Where existing management within this zone, promotes cleared land, the land management type: whether lease area or commercial buildings, fire protection legislation applies to developments.

### **Environmental Constraints**

The environmental assessment within appendix XII identifies environmental issues relating to fire mitigation works and identifies conditions and specifications of hazard reduction activities. The on-ground management of mapped fire management zones, described by width and length gives an indicative size. Reference to the map size and shape overcomes any discrepancies to the fire management zone.

Slashing too frequently in bushland areas encourages introduced grasses and weeds to invade and in the long-term, changes vegetation structure as grasses become more abundant with increased slashing frequencies.

As part annual works program, monitoring of fire hazards is important as this guides the slashing and mowing regimes within FMZ's. Assessment is in accordance with this Plan guidelines and using reference material such as the Overall Fuel Hazard Guide Sydney Basin (NPWS 2003) or equivalent to assess fuel loads within Council Land.

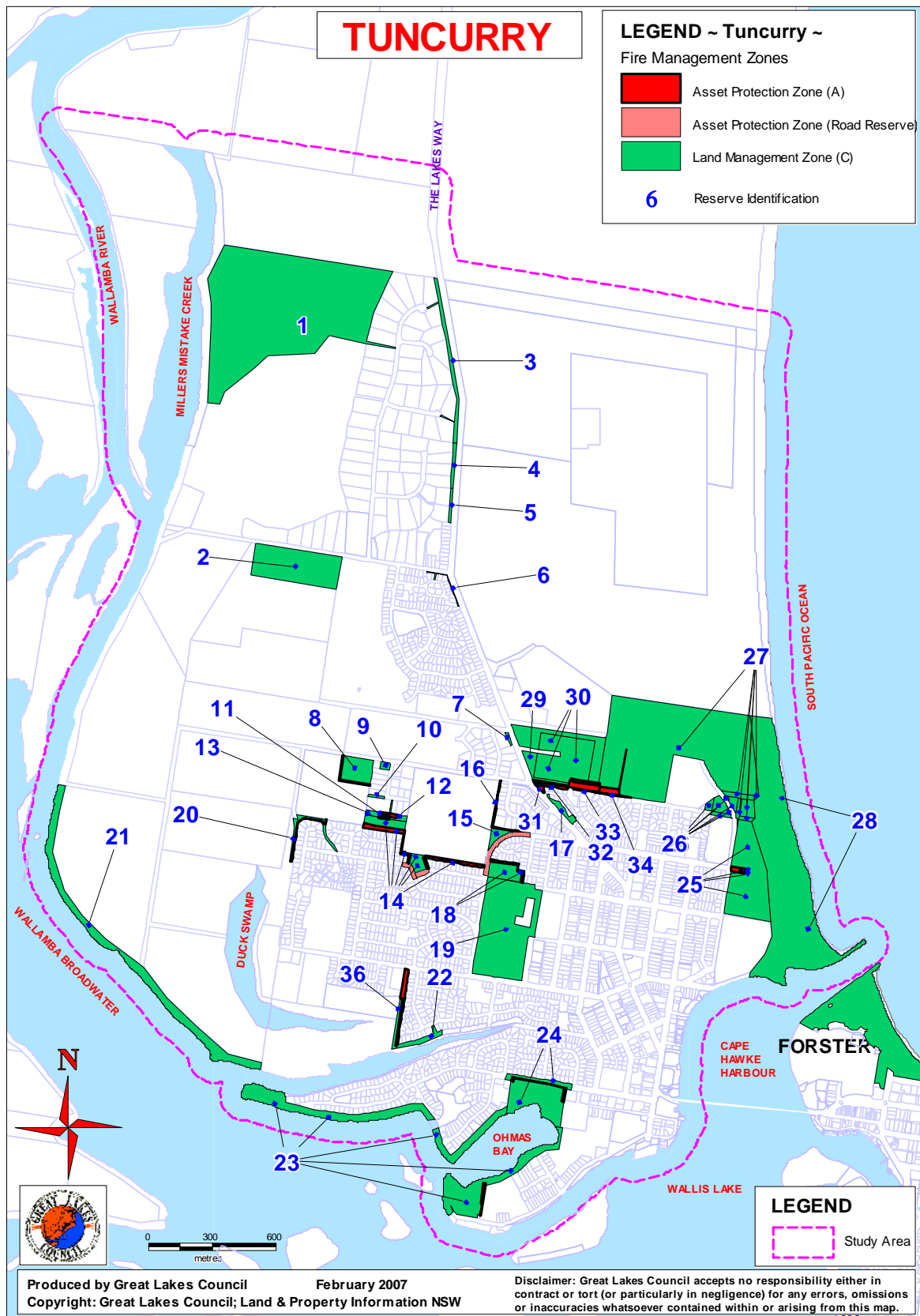


Figure 11: The overview of FMZ's within bushfire affected land in Tuncurry.



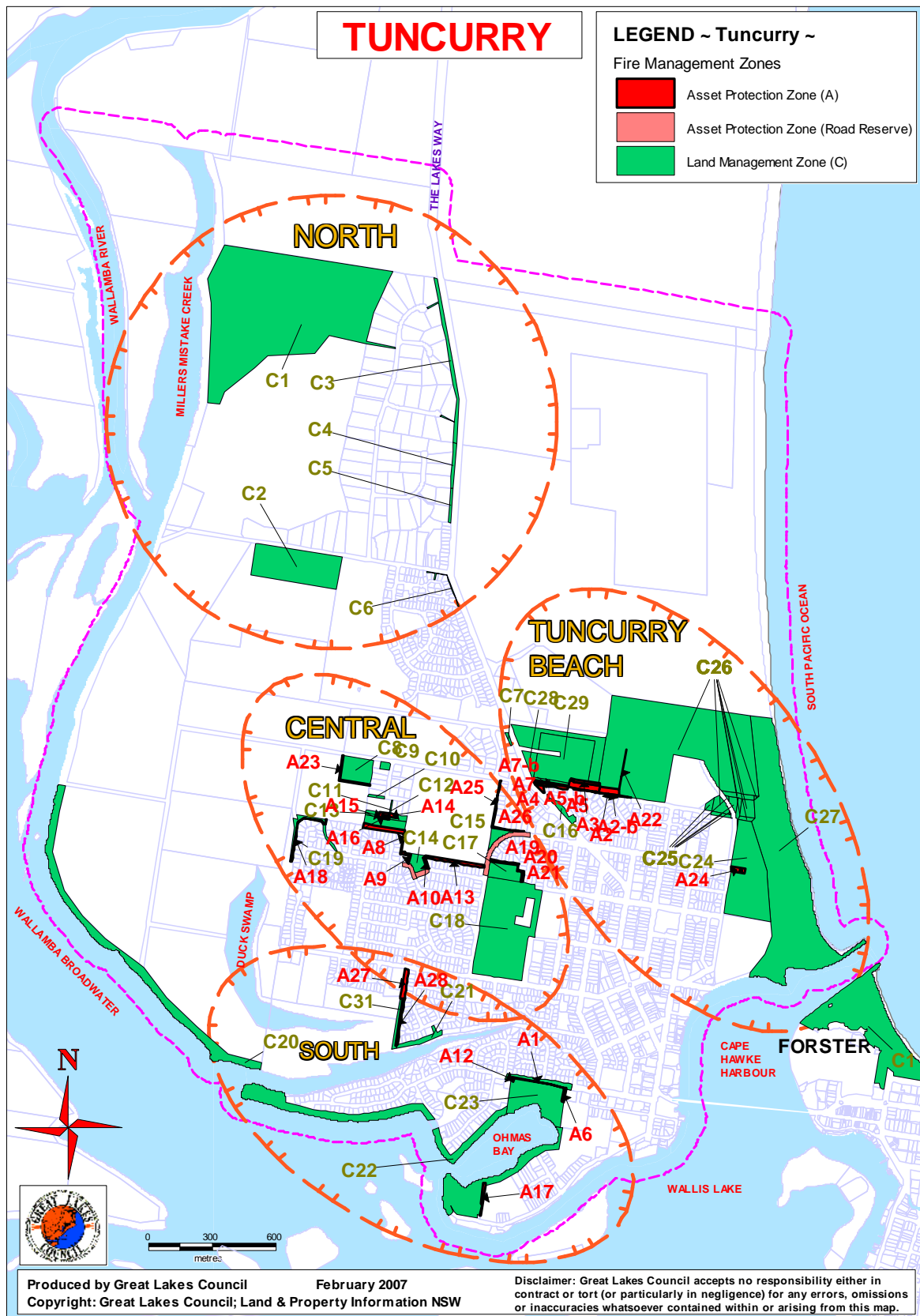


Figure 12: The overview of FMZ's within bushfire affected land in Tuncurry.

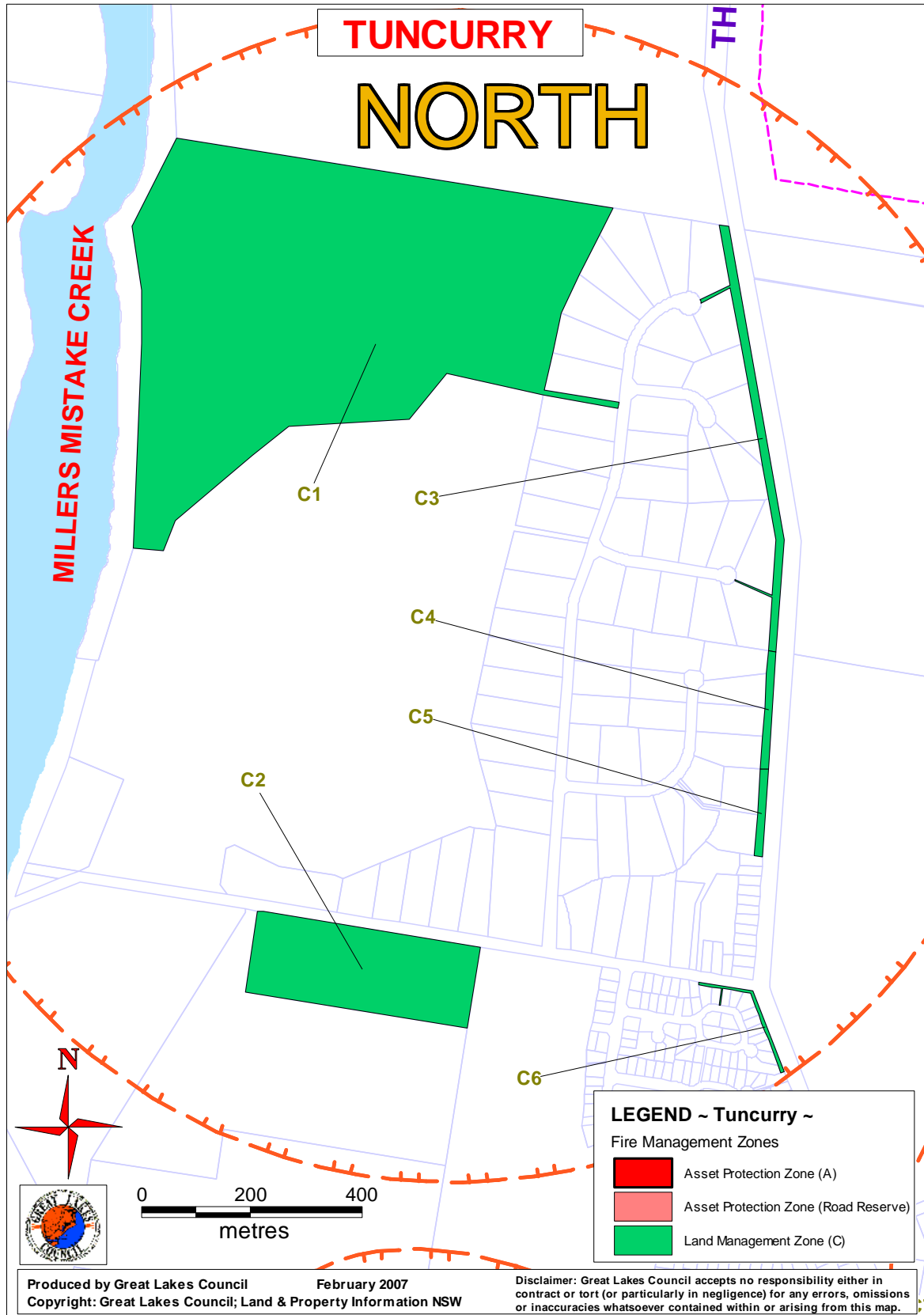


Figure 13: Fire management zones within the northern area of Tuncurry.

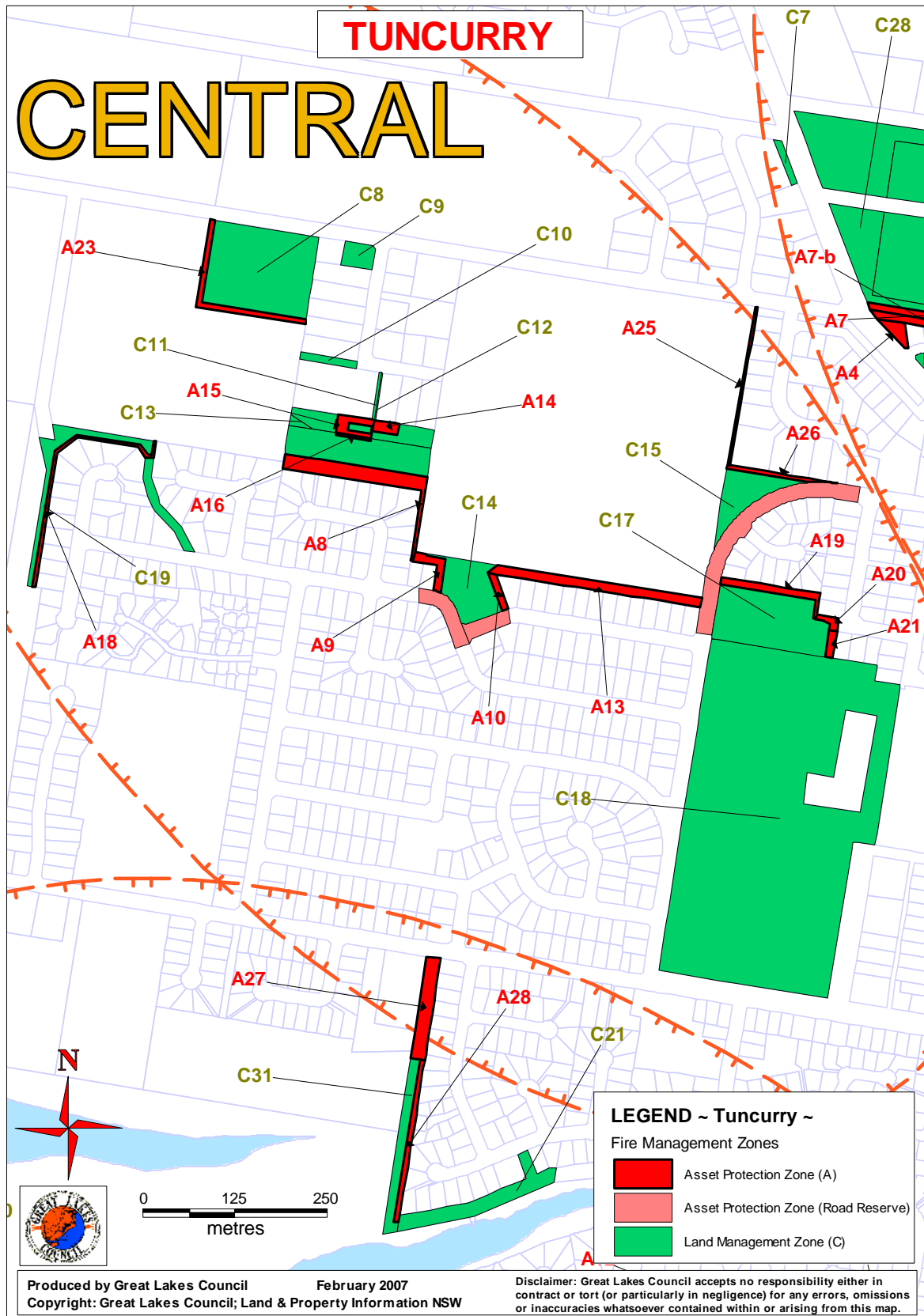


Figure 14: Fire management zones within the central area of Tuncurry.

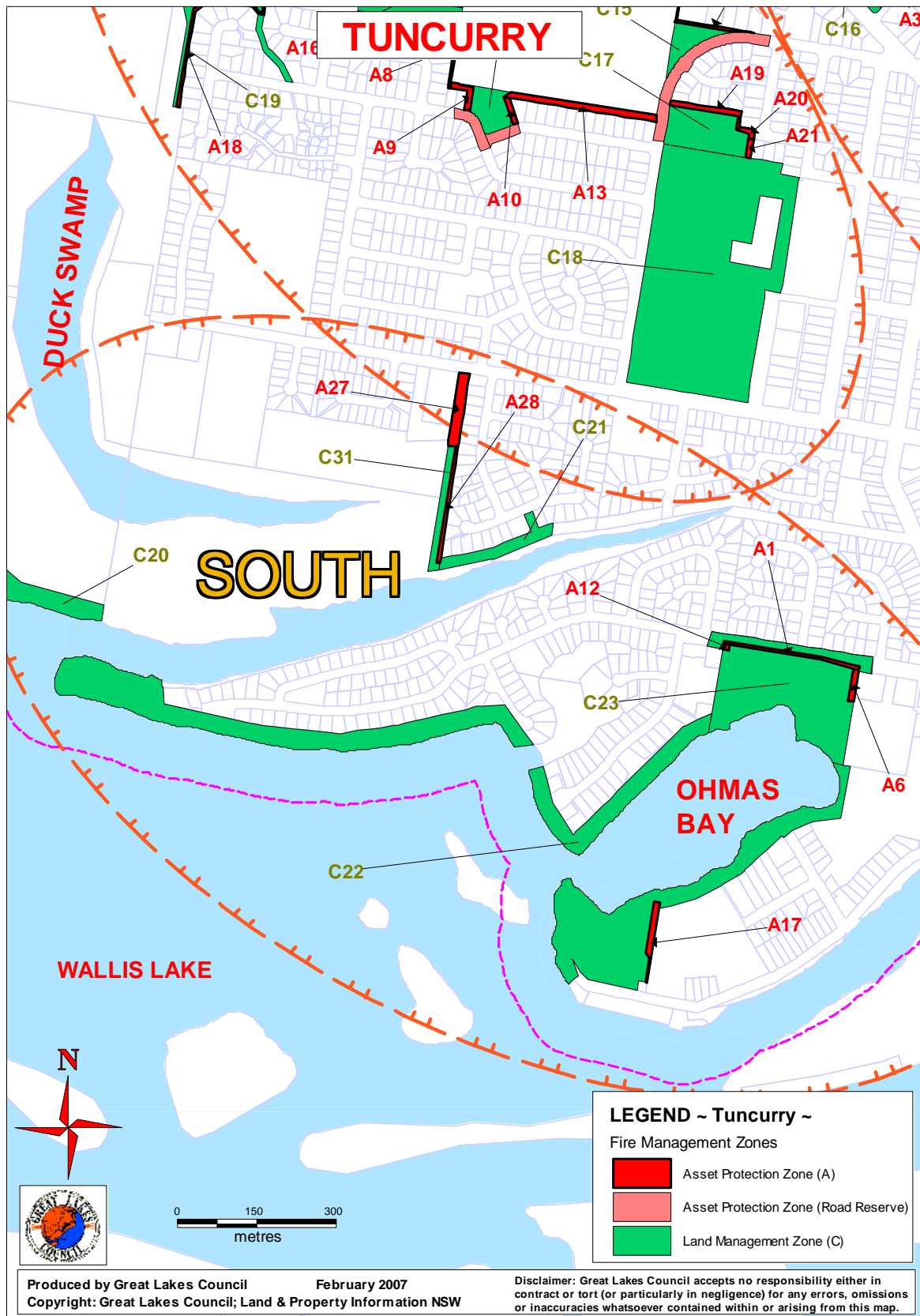


Figure 15: Fire management zones within the southern area of Tuncurry.

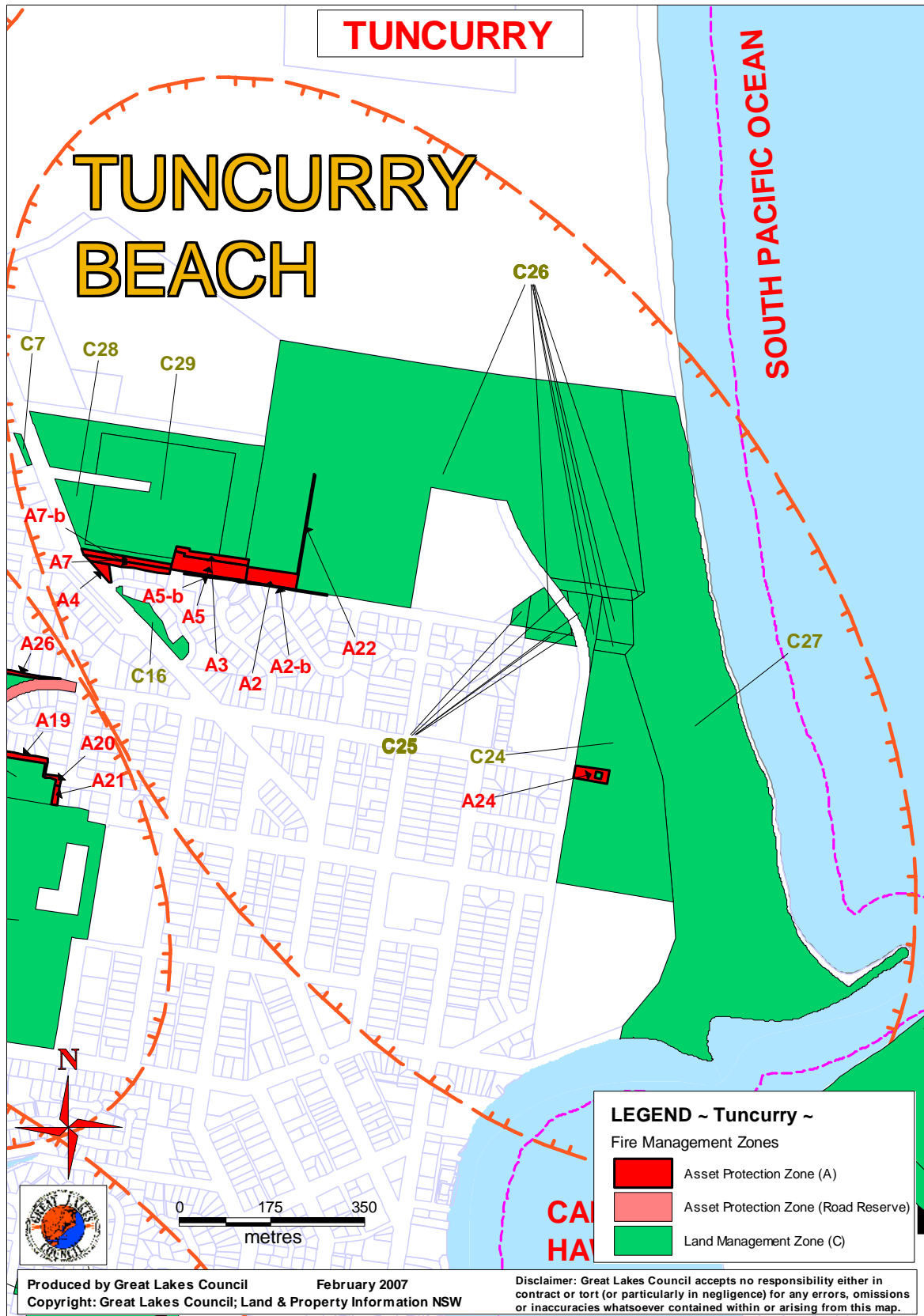


Figure 16: Fire management zones within the eastern area of Tuncurry.





Figure 17: Fire trails within Tuncurry.

Table 10: Specific fire objectives applied to asset protection zones.

Reserve ID	APZ Code	Council Managed Land	Reserve	Zone Objective	Width (m)	Length (m)	Area (Ha)	Maintenance Type	Frequency of Maintenance <sup>13</sup>
<b>Tuncurry (T)</b>									
24	A1	Charlotte Ohmas Reserve – Taree Street	RES 54990	<ul style="list-style-type: none"> <li>To protect the bushland interface south of the properties on Taree Street linking with the reserve.</li> </ul>	5	260	0.125	Hand removal / Slashing	Annual (Herb/shrub cover)
27	A2	Public Recreation Reserve (Pt R 96632)	Pt 265 DP 753207 (Part R 96632)	<ul style="list-style-type: none"> <li>To protect the bushland interface northeast of GLAICA and nearby properties linking with the reserve.</li> </ul>	27-28	96	0.2744	Hand removal / Mowing / Slashing	Annual (Herb/shrub cover)
34	A2-b	Road Reserve - CL	Road Reserve - CL	<ul style="list-style-type: none"> <li>To protect the bushland interface north of GLAICA and nearby properties linking with the reserve.</li> </ul>	1-4	185	0.044	Hand removal / Slashing	Annual (Herb/shrub cover)
27, 29 & 30	A3	Road Res/Cemetery	Road Res/Res 21902 - GLAICA OPA Lot 7045 DP 1056915	<ul style="list-style-type: none"> <li>To protect the bushland interface north of GLAICA and nearby properties linking with the reserve and provide an OPA for GLAICA.</li> </ul>	10	141	0.1439	Hand removal / Slashing	Annual (Herb/shrub cover)
31	A4	Public Reserve - Adjacent to Cemetery	Public Reserve Lot 17 DP 1016222	<ul style="list-style-type: none"> <li>To protect the bushland interface west of GLAICA property linking with the reserve.</li> </ul>	20	35	0.0724	Mowing / Slashing	Annual (Grassy ground cover)
27, 29 & 30	A5	Road Res/Res 21902	Road Res/Res 21902 - GLAICA IPA Lot 7045 DP 1056915	<ul style="list-style-type: none"> <li>To protect the bushland interface north of GLAICA and nearby properties linking with the reserve and provide an IPA for GLAICA.</li> </ul>	29-30	141	0.435	Hand removal / Slashing	Annual (Herb/shrub cover)
33	A5-b	Lot 2 DP 1050517	Lot 2 DP 1050517	<ul style="list-style-type: none"> <li>To protect the bushland interface north of GLAICA and nearby properties linking with the reserve.</li> </ul>	4-5	89	0.0358	Hand removal / Slashing	Annual (Herb/shrub cover)
24	A6	Charlotte Ohmas Reserve	R 54990 Lot 7039 DP 1066318	<ul style="list-style-type: none"> <li>To protect the bushland interface west of the properties linking with the reserve.</li> </ul>	10	63	0.053	Hand removal / Slashing	Annual (Herb/shrub cover)
29	A7	Tuncurry Cemetery/ Road Reserve	Tuncurry Cemetery	<ul style="list-style-type: none"> <li>To protect the bushland interface north of the properties linking with the reserve.</li> </ul>	10	173	0.17	Hand removal / Slashing	Annual (Herb/shrub cover)

<sup>13</sup> Frequency of maintenance: Monitor fuel loads within APZ's and adapt frequency of mechanical fuel reduction to meet the maximum average fuel hazard level to be 8 tonnes/hectare.

Reserve ID	APZ Code	Council Managed Land	Reserve	Zone Objective	Width (m)	Length (m)	Area (Ha)	Maintenance Type	Frequency of Maintenance <sup>13</sup>
32	A7-b	Road Reserve - CL	North-west GLAICA - Road Reserve CL	<ul style="list-style-type: none"> <li>To protect the bushland interface north of the properties linking with the reserve.</li> </ul>	10	166	0.16	Hand removal / Slashing	Annual (Herb/shrub cover)
14	A8	Flora Reserve	RES 5322 (R 210040) Lot 319 DP 729822	<ul style="list-style-type: none"> <li>To protect the bushland interface north of the properties linking with the reserve.</li> </ul>	4-20	302	0.4305	Hand removal / Mowing / Slashing	Annual (Herb/shrub cover)
14	A9	Flora Reserve	RES 5322 (R 210040) Lt 36 DP 720802 & Lt 310 DP 722603	<ul style="list-style-type: none"> <li>To protect the bushland interface north and east of the properties linking with the reserve.</li> </ul>	10-12	76	0.0824	Hand removal / Mowing / Slashing	Annual (Herb/shrub cover)
18	A10	Flora Reserve	RES 5322 (R 210040) Lot 36 DP 720802	<ul style="list-style-type: none"> <li>To protect the bushland interface west of the properties linking with the reserve.</li> </ul>	10	56	0.0528	Hand removal / Mowing / Slashing	Annual (Herb/shrub cover)
35	A11	Road Res - Near Oasis Parade	Road Reserve	<ul style="list-style-type: none"> <li>To protect the bushland interface west of the properties linking with the reserve.</li> </ul>	6	224	0.146	Hand removal / Mowing / Slashing	Annual (Herb/shrub cover)
24	A12	Ohmas Bay Foreshore	RES 12 (R 54990) Lot 7039 DP 1066318	<ul style="list-style-type: none"> <li>To protect the bushland interface east of the properties linking with the reserve.</li> </ul>	10	12	0.0118	Hand removal / Mowing	Annual (Herb/shrub cover)
19	A13	RES 5267 (R 210040)	RES 5267 (R 210040) Lot 311 DP 722603	<ul style="list-style-type: none"> <li>To protect the <b>buildings</b> and bushland interface surrounding the property.</li> </ul>	12	297	0.354	Mowing / Slashing	Annual (Herb/shrub cover)
12	A14	Lot 10 DP 859322	Lot 10 DP 859322	<ul style="list-style-type: none"> <li>To protect the bushland interface north of the properties linking with the reserve.</li> </ul>	15	35	0.0532	Hand removal / Slashing	Annual (Herb/shrub cover)
11	A15	Lot 9 DP 859322	Lot 9 DP 859322	<ul style="list-style-type: none"> <li>To protect the bushland interface north of the properties linking with the reserve.</li> </ul>	1-10	146	0.0927	Hand removal / Slashing	Annual (Herb/shrub cover)
14	A16	Public Reserve	RES 5322 (R 210040) Lot 321 DP 822669	<ul style="list-style-type: none"> <li>To protect the <b>buildings</b> and bushland interface surrounding the property.</li> </ul>	4	45	0.02	Hand removal / Mowing	Annual (Herb/shrub cover)
23	A17	Ohmas Bay Recreation Reserve	RES 92 (Pt R 88335) Lot 234 DP 753207	<ul style="list-style-type: none"> <li>To protect the bushland interface east of the Tuncurry Caravan Park linking with the reserve.</li> </ul>	3	149	0.1172	Hand removal / Mowing / Slashing	Annual (Herb/shrub cover)
20	A18	Drainage Reserve	Lot 25 DP 711833	<ul style="list-style-type: none"> <li>To protect the bushland interface north and west of the properties linking with the reserve.</li> </ul>	4	354	0.1592	Hand removal / Mowing	Annual (Grassy ground cover)



Reserve ID	APZ Code	Council Managed Land	Reserve	Zone Objective	Width (m)	Length (m)	Area (Ha)	Maintenance Type	Frequency of Maintenance <sup>13</sup>
18	A19	Lot 20 DP 729820	Lot 20 DP 729820	<ul style="list-style-type: none"> <li>To protect the bushland interface south and west of the properties linking with the reserve.</li> </ul>	5-10	162	0.1501	Mowing / Slashing	Annual (Herb/shrub cover)
18	A20	Road Reserve - unformed	Wollomba Avenue	<ul style="list-style-type: none"> <li>To protect the bushland interface south of the properties linking with the reserve.</li> </ul>	7-10	49	0.0345	Mowing / Slashing	Annual (Herb/shrub cover)
18	A21	Lot 20 DP 729820	Lot 20 DP 729820	<ul style="list-style-type: none"> <li>To protect the bushland interface west of 1 property linking with the reserve.</li> </ul>	10	37	0.0371	Hand removal / Mowing / Slashing	Annual (Herb/shrub cover)
27	A22	Public Recreation Reserve (Pt R 96632)	RES 124 (R 96632) Lot 265 DP 753207	<ul style="list-style-type: none"> <li>To protect the fence, west of the playing field linking with the reserve.</li> </ul>	3	203	0.0594	Hand removal / Slashing	Annual (Herb/shrub cover)
8	A23	Council Works Depot	RES 125 (R 96748) Lot 296 DP 45877	<ul style="list-style-type: none"> <li>To protect the Council buildings and bushland interface surrounding the property.</li> </ul>	6	270	0.1589	Hand removal / Mowing / Slashing	Annual (Ground cover/Maintained surface)
25	A24	Closed Road - R 86531	RES 72 (R86531) Lot Sec 12 DP 759005	<ul style="list-style-type: none"> <li>To protect the building and bushland interface surrounding the property.</li> </ul>	24	65	0.1401	Hand removal / Slashing	Annual (Ground cover/Maintained surface)
16	A25	Lane Way - Lot 22 DP 729820	Lot 22 DP 729820	<ul style="list-style-type: none"> <li>To protect the industrial area <b>buildings</b> and bushland interface west of the properties.</li> </ul>	3	219	0.065	Hand removal / Slashing	Annual (Herb/shrub cover)
15	A26	Lot 21 DP 729820	RES 5296 Lot 21 DP 729820	<ul style="list-style-type: none"> <li>To protect the industrial area <b>buildings</b> and bushland interface south of the properties.</li> </ul>	6	152	0.0755	Hand removal / Slashing	Annual (Herb/shrub cover)
35	A27	Road Res - Near Oasis Parade	Road Reserve	<ul style="list-style-type: none"> <li>To protect the bushland interface west and east of the properties linking with the reserve.</li> </ul>	20	141	0.2741	Mowing / Slashing	Annual (Grassy ground cover)
<b>Study Area - Total</b>						<b>4343m</b>	<b>4.028ha</b>		

Table 11: Specific fire objectives applied to APZ's within road reserves.

APZ Code	Council Managed Land	Zone Objective	Total Area of Road Reserve (Ha)	Width of APZ	Maintenance Type	Existing Management
<b>Tuncurry (T)</b>						
Rd-A1	Rennie Crescent	<ul style="list-style-type: none"> <li>To protect adjacent residential properties.</li> <li>To assist in mitigating the spread of bushfire from adjacent bushland interface.</li> </ul>	0.1318	As per guideline within Plan. <sup>14</sup>	Mowing/ Slashing	Public-sealed road (Edges mowed – 2.5m each side)
Rd-A2	Mayers Drive	“	0.1988	“	Mowing/ Slashing	“
Rd-A3	Wilson Street	“	0.7145	“	Mowing/ Slashing	“
Rd-A4	Taree Street	“	0.5729	“	Mowing/ Slashing	“

Table 12: Specific fire objectives applied to SFAZ's.

Reserve ID	SFAZ Code	Council Managed Land	Fire Trail ID	Zone Objective	Width (m)	Length (m)	Maintenance Type	Vegetation Community
<b>Tuncurry (T)</b>								
<b>Fire Trails (300m in Total)</b>								
29	S1 (Rd – S1)	Cemetery Plantation and Closed Road (Lot 7009 DP 1056915 & 7010 DP 1056913)	Banksia Fire Trail (Southern Part)	<ul style="list-style-type: none"> <li>To provide fire trail access for fire fighting from the urban area of Tuncurry to the adjacent bushland areas north along the power easement.</li> </ul>	6	523	Slashing / access trail	<ul style="list-style-type: none"> <li>Heath</li> <li>Grassland</li> </ul>
29	S2 (Rd – S2)	Public Recreation Reserve RES 124 Lot 265 DP 753207 (Pt R 96632)	Banksia Fire Trail (Northern Part)	<ul style="list-style-type: none"> <li>To provide fire trail access for fire fighting from the urban area of Tuncurry to the adjacent bushland areas east of Tuncurry High School.</li> </ul>	6	261	Slashing / access trail	<ul style="list-style-type: none"> <li>Heath</li> </ul>
				<b>Total</b>		<b>784m</b>		

<sup>14</sup> Width of APZ: Variable widths depending on setback of adjacent assets and adjacent relevant hazard reduction works.

Table 13: Fire management objectives applied to LMZ's

Zone Objective:	This will be achieved by:
❖ To protect the environmental values within the reserve and maintain biodiversity thresholds.	✓ Maintain adjacent FMZ's as per Tables 10-12 to minimize impact within LMZ's.
❖ To protect cultural heritage values within the reserve.	✓ Implement hazard reduction burns to maintain biodiversity.
❖ Conserve and protect the integrity of areas with high conservation values or areas with highest regional priority status for conservation targets.	✓ Implement hazard reduction activities to meet guidelines and conditions within the Code and the TSC Act, relating to mechanical and the use of fire within FMZ's to protect and enhancement of threatened species and their habitats.
❖ Protect riparian areas from inappropriate burning regimes.	✓ Implement Catchment management objectives adjacent Wallis Lake to enhance conservation objectives.
❖ To manage reserves as per management plans or existing use.	✓ Regenerate disturbed areas and promote re-establishment within FMZ to minimise any negative impact.
	✓ Suppress bushfires to maintain fire regimes to enhance biodiversity.
	✓ Implementing current land management practices as per policies, procedures and management plans.

Table 14: LMZ's within the Tuncurry study area.

Reserve ID	LMZ Code <sup>15</sup>	Property Name	Reserve Number	Lot/ DP	Ha	Vegetation Community
<b>Tuncurry (T)</b>						
1	C1	Lot 1 The Lakes Way	Lot 1 DP 1029928	Lot 1 DP 1029928	37.733	▪ Paperbark/Swamp Oak
2	C2	Lot 1 Chapmans Road	Lot 1 DP 304132	Lot 1 DP 304132	6.127	▪ Swamp Mahogany ▪ Cleared ▪ Fresh Water Swamp
3	C3	Public Reserve	Lot 35 DP 777764	Lot 35 DP 777764	1.307	▪ Paperbark/Swamp Oak
4	C4	Lot 19 The Lakes Way	Lot 19 DP 749986	Lot 19 DP 749986	0.321	▪ Paperbark/Swamp Oak
5	C5	Lot 9 DP 778263	Lot 9 DP 778263	Lot 9 DP 778263	0.239	▪ Scrub ▪ Cleared
6	C6	Public Reserve	Lot 9 DP 778263	Lot 9 DP 778263	0.151	▪ Urban

<sup>15</sup> Locality abbreviation for each village (T)

Reserve ID	LMZ Code <sup>15</sup>	Property Name	Reserve Number	Lot/ DP	Ha	Vegetation Community
7	C7	Public Reserve	RES 5006	Lot 19 DP 262222	0.065	<ul style="list-style-type: none"> <li>▪ Urban</li> </ul>
8	C8	Council Works Depot	RES 125 (R 96748)	Lot 296 DP 45877	1.642	<ul style="list-style-type: none"> <li>▪ Urban</li> <li>▪ Swamp Mahogany</li> </ul>
9	C9	Lot 1 DP 859322	Lot 1 DP 859322	Lot 1 DP 859322	0.141	<ul style="list-style-type: none"> <li>▪ Urban</li> </ul>
10	C10	Drainage Reserve	Drainage Reserve	Lot 21 DP 859322	0.077	<ul style="list-style-type: none"> <li>▪ Urban</li> </ul>
11	C11	Lot 9 DP 859322	Lot 9 DP 859322	Lot 9 DP 859322	0.1817	<ul style="list-style-type: none"> <li>▪ Urban</li> <li>▪ Blackbutt-Bloodwood/Apple</li> </ul>
12	C12	Lot 10 DP 859322	Lot 10 DP 859322	Lot 10 DP 859322	0.1724	<ul style="list-style-type: none"> <li>▪ Urban</li> </ul>
13	C13	Public Reserve	Lot 22 DP 859322	Lot 22 DP 859322	0.024	<ul style="list-style-type: none"> <li>▪ Blackbutt-Bloodwood/Apple</li> </ul>
14	C14	Environmental Protection/ Public Reserve/ RES 5364/ RES 5267 (R 210040)	RES 5266 (R 210040)/ RES 5322 (R 210040)/ RES 5364/ RES 5267 (R 210040)/ RES 5267 (R 210040)	Lot 319 DP 729822/ Lot 321 DP 822669/ Lot 36 DP 720802/ Lot 309-311 DP 722603	1.276	<ul style="list-style-type: none"> <li>▪ Blackbutt-Bloodwood/Apple</li> </ul>
15	C15	Reserve For Environmental Protection	RES 5296	Lot 21 DP 729820	0.476	<ul style="list-style-type: none"> <li>▪ Blackbutt-Bloodwood/Apple</li> </ul>
17	C16	Public Reserve	Lot 18 DP 1016222	Lot 18 DP 1016222	0.359	<ul style="list-style-type: none"> <li>▪ Scrub</li> <li>▪ Urban</li> </ul>
18	C17	Lot 20 DP 729820 & Wollomba Avenue	Lot 20 DP 729820 & Wollomba Avenue	Lot 20 DP 729820	13.25	<ul style="list-style-type: none"> <li>▪ Blackbutt-Bloodwood/Apple</li> <li>▪ Urban</li> </ul>
19	C18	Tuncurry Sports Reserve	RES 89453	Lot 276 DP 753207	10.572	<ul style="list-style-type: none"> <li>▪ Blackbutt-Bloodwood/Apple</li> <li>▪ Cleared</li> <li>▪ Dry Blackbutt</li> </ul>
20	C19	Drainage Reserve	Drainage Reserve	Lot 25 DP 711833	0.5138	<ul style="list-style-type: none"> <li>▪ Urban</li> <li>▪ Swamp Mahogany</li> </ul>
21	C20	Tuncurry Foreshore	RES 138	Lot 7031 DP 1107421	6.23	<ul style="list-style-type: none"> <li>▪ Mangrove</li> <li>▪ Salt Water Swamp</li> <li>▪ Swamp Oak</li> </ul>
22	C21	Public Reserve	RES 5247	Lot 70 DP 804777	0.511	<ul style="list-style-type: none"> <li>▪ Urban</li> <li>▪ Cleared</li> </ul>
23	C22	Wallis Lake Foreshore/ Ohmas Bay Recreation Reserve	RES 92 (Pt R 88335)	Lot 7036-7038 DP 1066318/ Lot 234 DP 753207/ Lot 1623 DP 736647	10.02	<ul style="list-style-type: none"> <li>▪ Swamp Oak</li> <li>▪ Mangrove</li> <li>▪ Urban</li> <li>▪ Salt Water Swamp</li> <li>▪ Cleared</li> </ul>
24	C23	Ohmas Bay Foreshore & Road Reserve	RES 12 (R 54990)/Taree Street	Lot 7039 DP 1066318/ Taree Street	4.212	<ul style="list-style-type: none"> <li>▪ Palm</li> <li>▪ Paperbark/Flooded Gum</li> <li>▪ Salt Water Swamp</li> <li>▪ Urban</li> <li>▪ Mangrove</li> </ul>

Reserve ID	LMZ Code <sup>15</sup>	Property Name	Reserve Number	Lot/ DP	Ha	Vegetation Community
25	C24	Tuncurry Caravan Park/ Closed Road - R 86531/ Tuncurry Caravan Park & Camping Res	RES 72 ( R86531)	Lot 160 DP 753207/ Lot Sec 12 DP 759005	6.803	<ul style="list-style-type: none"> <li>▪ Scrub</li> <li>▪ Disturbed Heath</li> <li>▪ Urban</li> </ul>
26	C25	BEACH STREET OVAL	RES 73 (R 86532)	Pt Lot 140 DP 753207/ Lot 7052 DP 93503/ Pt Lot 254 DP 753207	0.5429	<ul style="list-style-type: none"> <li>▪ Cleared</li> <li>▪ Scrub</li> <li>▪ Heath</li> </ul>
27	C26	Closed Road/ Road Reserve-unformed/ PUBLIC RECREATION-Pt / RES 124 (R 96632)/ Closed Road - R 86531	RES 124 (R 96632)/ Road Reserve-unformed	Lot 265 DP 753207/ Road Reserve-unformed/ Pt Lot 140 DP 753207/ Pt Lot 254 DP 753207/	27.6588	<ul style="list-style-type: none"> <li>▪ Cleared</li> <li>▪ Urban</li> <li>▪ Heath</li> <li>▪ Dry Blackbutt</li> <li>▪ Disturbed Heath</li> <li>▪ Scrub</li> </ul>
28	C27	Tuncurry Rock Pool & Nth Beach	RES 80 (R 86904)	Rockpool Road	22.74	<ul style="list-style-type: none"> <li>▪ Sand Ridge</li> <li>▪ Cleared</li> <li>▪ Scrub</li> <li>▪ Disturbed Heath</li> </ul>
29	C28	Cemetery Plantation and Closed Road	Cemetery Plantation and Closed Road	Lot 7009 DP 1056915 & 7010 DP 1056913	3.407	<ul style="list-style-type: none"> <li>▪ Urban</li> <li>▪ Heath</li> <li>▪ Cleared</li> <li>▪ Dry Blackbutt</li> </ul>
30	C29	Cemetery Church of England / Roman Catholic/ General	Cemetery Church of England / Roman Catholic/ General	Lot 7045 DP 1056915	5.077	<ul style="list-style-type: none"> <li>▪ Urban</li> <li>▪ Heath</li> <li>▪ Cleared</li> <li>▪ Dry Blackbutt</li> </ul>
35	C30	Road Res - Near Oasis Parade	Road Reserve	Road Reserve	0.3181	<ul style="list-style-type: none"> <li>▪ Cleared</li> <li>▪ Urban</li> <li>▪ Swamp Mahogany</li> <li>▪ Paperbark</li> <li>▪ Mangrove</li> </ul>
				<b>TOTAL</b>	<b>162.15ha</b>	



## PART 3 - APPENDICES

### APPENDIX I - Council Fire Management

Council's overall fire management objectives are defined within the Great Lakes Council Management Plan<sup>16</sup>, as seen below from an extract within the report.

**Purpose:**

'To protect life and assets through the provision of services which prevent and mitigate the occurrence of fires and other emergencies. (Assets include but not restricted to economic, social, environmental and heritage values found on both public and private lands).

**Objectives:**

'Council shall provide financial support and resourcing requirements, as necessary, to enable the Rural Fire Service to effectively perform their responsibilities in accordance with the negotiated service level agreement.

'Council shall provide financial support and resourcing requirements, as necessary, to enable the State Emergency Service to effectively perform their responsibilities in our local government area.

'Council shall continue to evaluate and review the Disaster Management Plan for our local government area, in collaboration with the local Rural Fire Service, State Emergency Service and other relevant agencies, annually and where necessary due to legislative changes occurring from time to time.'

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<sup>16</sup> The current GLC Management Plan needs to be referred to for amendments to the purpose and objectives, which may be changed from time to time

## APPENDIX II - Mapping Bushfire Prone Land

In August 2002 amendments came into effect to the Environmental Planning and Assessment Act 1979 and the Rural Fires Act 1997 (RF Act) to improve protection of people, property and the environment from bushfires.

Councils are required to map bushfire prone lands within their local government areas with consultation with the Commissioner of the NSW Rural Fire Service. Councils are also required to place specification of bushfire prone land on section 149 Planning Certificate. Through development consent process the Commission issues fire safety authority (section 100B of the RF Act) for special purpose developments on bushfire prone land.

The criteria for bushfire prone land mapping requires vegetation to be divided into 3 groups as per Appendix 2 in the Planning for Bush Fire Protection (2001) document:

- a) Vegetation Group 1 – Forest;
- b) Vegetation Group 2 – Woodlands, tall heath and wetlands; and
- c) Vegetation Group 3 – Rainforests, open woodlands, grasslands, shrublands and mallee.

Once vegetation classes have been determined and mapped across a council area, application of bushfire vegetation categories to the vegetation groups must be completed. *The Guideline – Bush Fire Prone Land Mapping*<sup>17</sup>, NSW Rural Fire Service, 2004 defines the criteria for Bush Fire Vegetation Categories using the above mapped Vegetation Groups and is as follows: –

- i) Vegetation Group 1 and 2, greater than 1 hectare – **Bush fire Vegetation Category 1**;
- ii) A 100 metre external buffer to Bush fire Vegetation Category 1 vegetation polygon – **Buffer zone Category 1**; and
- iii) Vegetation Group 3, greater than 1 hectare – **Bush fire Vegetation Category 2**
- iv) A 30 metre external buffer to Bushfire Vegetation Category 2 vegetation polygon – **Buffer zone Category 2**

Areas less than 1 hectare within, or partially within: –

- v) 100m lateral separations from a bushfire vegetation category 1, are – **Bush fire Vegetation Category 2** or
- vi) 30m lateral separations from a bushfire vegetation category 2 are – **Bush fire Vegetation Category 2**.

Vegetation excluded from the above mentioned vegetation groups include:

- vii) Areas of "Vegetation groups" 1, 2 and 3, less than 1 hectare and not less than 100m lateral separation from a Bushfire Vegetation Category 1, or not less than 30m lateral separation from a Bushfire Vegetation Category 2, **are excluded**; or
- viii) Areas of "Managed grassland" including grassland on, but not limited to, public lands, grazing land, recreational areas, commercial/industrial land, airports/airstrips and the like are excluded; or
- ix) Areas of managed gardens and lawns within curtilage of buildings;
- x) Managed botanical gardens;
- xi) "Agricultural lands" used for annual and/or perennial cropping, orchard, market gardens, nurseries and the likes are excluded; or
- xii) Mangroves.

Areas of national parks and state forest estate should be mapped as **Vegetation Category 1** in recognition of the land use and management regimes.

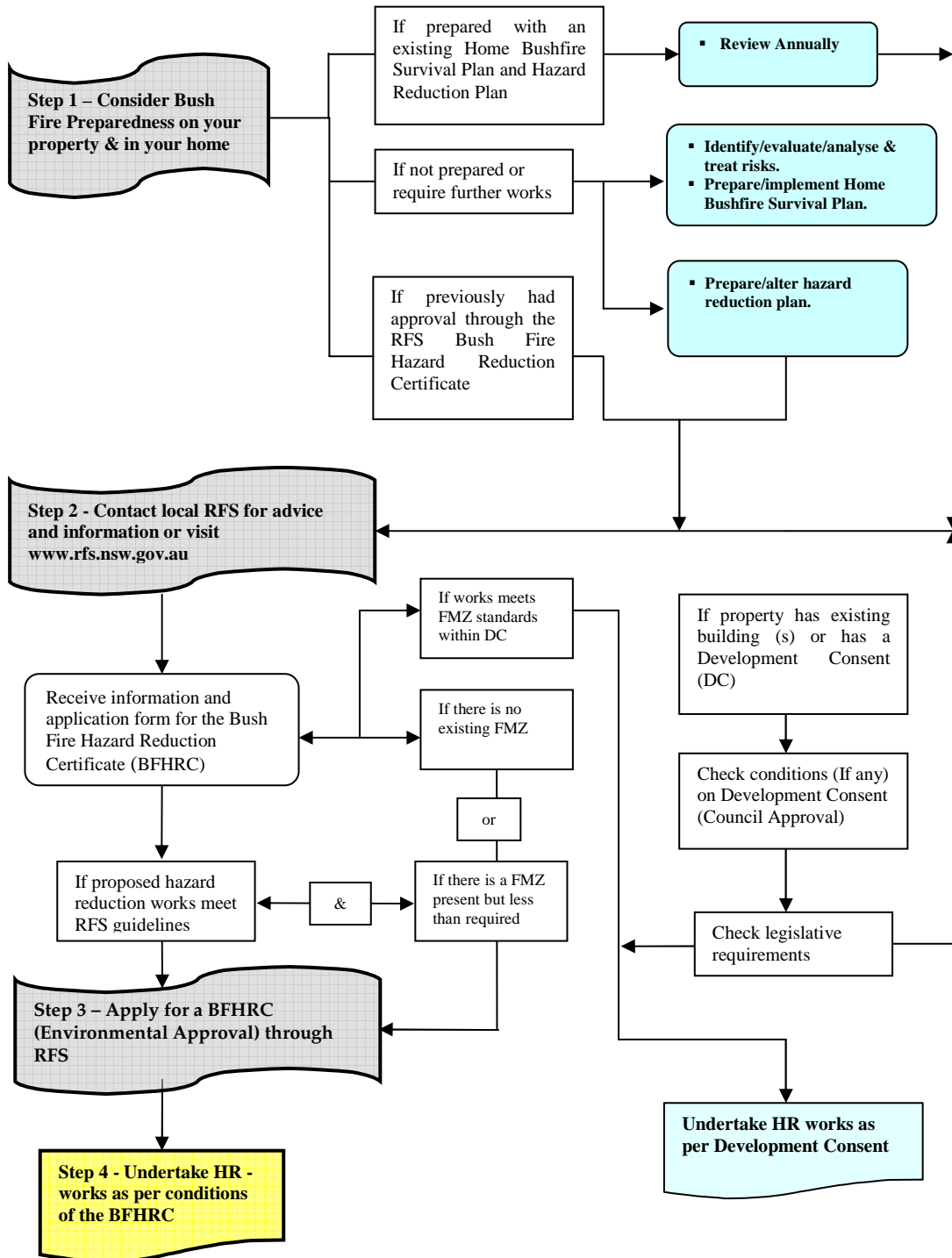
(RFS 2004e; 2004h)

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<sup>17</sup> The NSW Rural Fire Service owns bushfire prone mapping and is held in custody by Council



APPENDIX III- What You Can do to Assist with Bushfire Mitigation.



HR – Hazard Reduction

FMZ – Fire Management Zone

BFHRC – Bush Fire Hazard Reduction Certificate

DC – Development Consent through Council

Bush Fire Preparedness – Readiness of householders/property owners in the event of an imminent bushfire

**APPENDIX IV - Bushfire Risk Description**

A summary of the criteria for the identification of bushfire risk of an area, from the Lower Hunter Zone, Bush Fire Management Committee, Bush Fire Risk Management Plan can be seen within the table below:

**Bush Fire Risk Description**

<i>Development Type</i>	<i>Bushfire Threat</i> <sup>18</sup>	<i>Bushfire Risk</i> <sup>19</sup>	<i>Consideration to Asset Protection/ Building Design</i> <sup>20</sup> x – absent, ✓ – present
<i>Urban/bushland interface/ Multiple Occupancies</i>	Within 100m	Extreme	x
<i>Urban/bushland interface/ Multiple Occupancies</i>	Within 100m	Major	✓
<i>Urban/bushland interface</i>	100m – 2.5km	Major	x and ✓
<i>Environmental/Ecological Assets</i>	Any	Major	✓
<i>Remote Rural Residential Development</i>	Any	Major	x and ✓
<i>Agricultural areas</i>	Any	Moderate	x

<sup>18</sup> How close assets are located to the hazard

<sup>19</sup> Level of risk as defined within the Lower Hunter Zone BFMC, *Bushfire Risk Management Plan 2004*

<sup>20</sup> Consideration to fuel reduced areas (property protection), housing design and perimeter roads

**APPENDIX V - CRA Vegetation Unit Distribution and Conservation Value**

The Lower North East Comprehensive Regional Assessment (CRA) and DEC (Parks and Wildlife Division) used broad scale mapping to assess the status of the ecosystem. The local vegetation community were ranked from highest regional priority to the lowest, including those ecosystems that are known to be vulnerable, rare, severely depleted and those that have private land priority.

Forest Type	CRA Name	Current area Lower North East CRA (Ha)	% of Original Extent Remaining	Status	RFA Cons. Target Met
92	Escarpment Red Gum	20,498	27.4%	<ul style="list-style-type: none"> <li>▪ Vulnerable</li> <li>▪ Severely Depleted</li> <li>▪ Highly Inadequately Reserved</li> <li>▪ Private land priority</li> </ul>	No
129	Rough-barked Apple	2,636	18.8%	<ul style="list-style-type: none"> <li>▪ Vulnerable</li> <li>▪ Severely Depleted</li> <li>▪ Private land priority</li> </ul>	No
32	Swamp Oak	4,868	22.7%	<ul style="list-style-type: none"> <li>▪ Vulnerable</li> <li>▪ Severely Depleted</li> <li>▪ Private land priority</li> </ul>	No
107	Banksia	4,196	47.8%	<ul style="list-style-type: none"> <li>▪ Vulnerable</li> <li>▪ Private land priority</li> </ul>	No
31	Paperbark	12,866	NA	<ul style="list-style-type: none"> <li>▪ Vulnerable</li> </ul>	No
224	Scrub	3,073	NA	<ul style="list-style-type: none"> <li>▪ Vulnerable</li> </ul>	Yes
68	Red Mahogany	65	100	<ul style="list-style-type: none"> <li>▪ Rare</li> <li>▪ Highly inadequately Reserved</li> <li>▪ Private land priority</li> </ul>	No (*)
45	Tallowwood	746	85.3%	<ul style="list-style-type: none"> <li>▪ Rare</li> <li>▪ Private land priority</li> </ul>	No (*)
33	Mangrove	1,001	NA	<ul style="list-style-type: none"> <li>▪ Rare</li> <li>▪ Private land priority</li> </ul>	No (*)
223	Heath	14,286	NA	<ul style="list-style-type: none"> <li>▪ Rare</li> <li>▪ Private land priority</li> </ul>	No (*)
126	Red Bloodwood	5	100%	<ul style="list-style-type: none"> <li>▪ Rare</li> </ul>	Yes (*)
230	Natural Grassland	138	NA	<ul style="list-style-type: none"> <li>▪ Rare</li> </ul>	No (*)
231	Swamp	9,130	NA	<ul style="list-style-type: none"> <li>▪ Rare</li> </ul>	No (*)
6, 7, 22, 23, 24, 25	Rainforest	256,326	NA	<ul style="list-style-type: none"> <li>▪ Rare</li> </ul>	No (*)
36	Dry Grassy Blackbutt-Tallowwood	59,390	44.0%	<ul style="list-style-type: none"> <li>▪ Severely Depleted</li> <li>▪ Highly Inadequately Reserved</li> <li>▪ Private land priority</li> </ul>	No
60, 62	South Coast Shrubby Grey Gum	151,030	42.2%	<ul style="list-style-type: none"> <li>▪ Severely Depleted</li> <li>▪ Highly Inadequately Reserved</li> <li>▪ Private land priority</li> </ul>	No
42	Blackbutt-Sydney Peppermint-Smooth-barked Apple	1,382	38.8%	<ul style="list-style-type: none"> <li>▪ Severely Depleted Private land priority</li> </ul>	No
106	Stringybark-Apple	81,300	38.9%	<ul style="list-style-type: none"> <li>▪ Severely Depleted</li> <li>▪ Private land priority</li> </ul>	No
84	Ironbark	89,985	43.0%	<ul style="list-style-type: none"> <li>▪ Severely Depleted</li> </ul>	Yes
30	Swamp Mahogany	2,177	46.9%	<ul style="list-style-type: none"> <li>▪ Private land priority</li> </ul>	No
48, 48/31	Wet Flooded Gum-Tallowwood	6,161	65.6%	<ul style="list-style-type: none"> <li>▪ Private land priority</li> </ul>	No
48	Coastal Flooded Gum	8,753	57.7%	<ul style="list-style-type: none"> <li>▪ Private land priority</li> </ul>	No
70, 74	Dry Foothills Spotted Gum	17,688	53.8%	<ul style="list-style-type: none"> <li>▪ Private land priority</li> </ul>	No
47	South Coast Tallowwood-Blue Gum	71,217	67.1%	<ul style="list-style-type: none"> <li>▪ Private land priority</li> </ul>	No
106, 128	Smooth-barked Apple-Sydney Peppermint-Stringybark	9,517	57.6%	-	No
41?	Dry Heathy Blackbutt-Bloodwood	2,889	58.5%	-	Yes
53	Open Coastal Brushbox	64,878	62.8%	-	Yes
37	Coastal Sands Blackbutt	17,312	64.0%	-	Yes
60	Dry Grassy Tallowwood-Grey Gum	178,516	67.6%	-	No

Forest Type	CRA Name	Current area Lower North East CRA (Ha)	% of Original Extent Remaining	Status	RFA Cons. Target Met
62	Grey Gum-Stringybark	16,056	69.5%	-	Yes
46	Southern Wet Sydney Blue Gum	41,695	72.8%	-	Yes
105	Smooth-barked Apple	18,751	73.7%	-	No
40, 117	Heathy Scribbly Gum	23,471	74.8%	-	Yes
117	Lowlands Scribbly Gum	9,724	84.3%	-	Yes
36	Mid Elevation Wet Blackbutt	6,981	88.6%	-	Yes
62	Moist Open Escarpment White Mahogany	38,495	90.2%	-	Yes
36	Wet Foothills Blackbutt-Turpentine	50,264	92.6%	-	Yes
115	Sydney Peppermint-Stringybark	13,778	99.4%	-	Yes
234	Rock	6,576	NA	-	Yes

(Great Lakes Council 2004a)

**APPENDIX VI - Biodiversity Thresholds for Vegetation Communities**

Biodiversity thresholds and fire regime to be applied to vegetation communities in Great lakes LGA.

Fire Regime	Biodiversity Thresholds <sup>21</sup> Within Strategic Fire Advantage (NPWS 2001) and Land Management Zones	Vegetation Community Type (Council 2004) *[#1 and #2 indicate options for the same community]	Forest Type (Council, DYS, 2003)	Vegetation Formation (Keith 2004)	Minimum Fire Interval (years) (BFEC) <sup>22</sup> (SFAZ/LMZ)
a	<ul style="list-style-type: none"> <li>❖ Avoid 3 or more consecutive fires, with each of &lt;5 years apart</li> <li>❖ Avoid inter fire periods of &gt;30 years</li> <li>❖ Avoid 2 or more successive fires that totally scorch or consume the tree canopy</li> <li>❖ Avoid 3 or more consecutive fires of low intensity</li> </ul>	Blackbutt – Bloodwood/ Apple	41	Dry sclerophyll forests	5 / 8
		Blackbutt/ Scribbly Gum	40	Dry sclerophyll forests	5/8
		Blackbutt/ Sydney Peppermint/ Smooth-barked Apple	42	Dry sclerophyll forests	5/8
		Dry Blackbutt	37	Dry sclerophyll forests	5/8
		Coastal Sands Blackbutt	37	Dry sclerophyll forests	5/8
		Forest Red Gum - #1	92	Grassy woodlands	5/8
		Grey Gum/ Grey Ironbark/ White Mahogany	62	Dry sclerophyll forests	5/8
		Ironbark	84	Dry sclerophyll forests	5/8
		Ironbark/ Smooth-barked Apple/ Stringybark	84/106	Dry sclerophyll forests	5/8
		Mahogany/ Ironbark/ Grey Gum/ Blackbutt	60/37	Dry sclerophyll forests	5/8
		Red Bloodwood	126	Grassy Woodlands	7/10
		Scribbly Gum	117	Dry sclerophyll forests	5/8
		Smooth-barked Apple	105	Dry sclerophyll forests	5/8
		Smooth-barked Apple/ Sydney Peppermint/ Stringybark	106	Dry sclerophyll forests	5/8
		Spotted Gum	70	Dry sclerophyll forests	5/8
		Spotted Gum – Ironbark/ Grey Gum	74	Dry sclerophyll forests	5/8
		Sydney Peppermint	128	Dry sclerophyll forests	5/8
Sydney Peppermint/ Stringybark	115	Dry sclerophyll forests	5/8		
White Mahogany/ Red Mahogany/ Grey Ironbark/ Grey Gum	60	Dry sclerophyll forests	5/8		
b	<ul style="list-style-type: none"> <li>❖ Avoid 3 or more consecutive fires, with each of &lt;8 years apart</li> <li>❖ Avoid 3 or more consecutive fires, with each of the fires &gt;15 years apart</li> <li>❖ Avoid inter fire periods of &gt; 30 years</li> <li>❖ Avoid 2 or more consecutive fires that consume &lt; 10t/ha of surface fuels</li> </ul>	Banksia	107	Heathlands	7/10
		Disturbed Heath	219/223	Heathlands	7/10
		Forest Red Gum - #2	92	Grassy woodlands	10/15
		Heath	223	Heathlands	7/10
		Heath Paperbark	31/223	Heathlands or Freshwater wetland	7/10
		Sand Ridge (Relic dune landscape)	233	Heathlands	
		Paperbark	31	Forested wetland	7/10
		Paperbark/ Blackbutt	31/37	Forested wetland	7/10
		Paperbark/ Smooth-barked Apple/ Sydney Peppermint	31/106	Forested wetland	7/10
		Paperbark/ Swamp Oak	31/32	Forested wetland	7/10
		Red Mahogany	68	Forested wetlands / Dry sclerophyll forests	7/10
		Red Mahogany/ Smooth-barked Apple	68/105	Forested wetlands / Dry sclerophyll forests	7/10
		Rough-barked Apple	129	Grassy woodland or Forested wetland	7/10
		Scrub	224	Heathlands	7/10
		Swamp - #1	231	Freshwater wetlands	7/10
Swamp Mahogany	30	Forested wetland	7/10		

<sup>21</sup> Biodiversity thresholds adapted from Bradstock et al 1995; NSW National Parks and Wildlife Service described within *the Draft Fire Management Strategies for Myall Lake National Park and Island Reserves, 2003a*.

<sup>22</sup> The Code specifies criteria and conditions when issuing a BFHRC for hazard reduction burning

Fire Regime	Biodiversity Thresholds <sup>21</sup> Within Strategic Fire Advantage (NPWS 2001) and Land Management Zones	Vegetation Community Type (Council 2004) *[#1 and #2 indicate options for the same community]	Forest Type (Council, DVS, 2003)	Vegetation Formation (Keith 2004)	Minimum Fire Interval (years) (BFEAC) <sup>22</sup> (SFAZ/L/MZ)
<b>b</b>		Swamp Mahogany/ Forest Red Gum	30/92	Forested wetland	7/10
		Swamp Mahogany/ Grey Gum	30/60	Forested wetland	7/10
		Swamp Mahogany/ Paperbark	30/31	Forested wetland	7/10
		Swamp Mahogany/ Swamp Oak	30/32	Forested wetland	7/10
		Swamp Mahogany/ Palm	30/7	Forested wetland	7/10
		Swamp Oak	32	Forested wetland	7/10
		Tallowwood - #1	45	Wet sclerophyll forests	10/15
		Tallowwood/ Grey Gum	45/60	Wet sclerophyll forests	10/15
<b>c</b>	❖ Avoid more than 1 fire every 30 years ❖ Avoid inter-fire periods > 200 years	Flooded Gum	48	Wet sclerophyll forests	25/30
		Flooded Gum/ Paperbark	48/31	Wet sclerophyll forests	25/30
		Inland Brush Box	53	Wet sclerophyll forests	25/30
		Ironbark/ Grey Gum/ Flooded Gum	60/48	Wet sclerophyll forests	25/30
		Moist Blackbutt	36	Wet sclerophyll forests	25/30
		Sydney Blue Gum	46	Wet sclerophyll forests	25/30
		Sydney Blue Gum/ Paperbark	46/31	Wet sclerophyll forests	25/30
		Tallowwood - #2	45	Wet sclerophyll forests	25/30
		Tallowwood/ Sydney Blue Gum	47	Wet sclerophyll forests	25/30
		Tallowwood/ Sydney Blue Gum/ Brushbox	47/53	Wet sclerophyll forests	25/30
<b>d</b>	Any fire occurrence (a limited recovery ability exists)	Fig/ Giant Stinger	6	Rainforest	n/a
		Fig/ Myrtle	6/23	Rainforest	n/a
		Headland Brushbox	25	Rainforest	n/a
		Mangrove	33	Saline wetlands	n/a
		Myrtle	23	Rainforest	n/a
		Palm	7	Rainforest	n/a
		Palm/ Myrtle	7/23	Rainforest	n/a
		Swamp - #1	231	Freshwater wetlands	n/a
		Swamp - #2	231	Saline wetlands	n/a
		Tuckeroo	24	Rainforest	n/a
Yellow Tulipwood	22	Rainforest	n/a		
<b>NA</b>	Not Applicable  (Primary/fore dune landscape)	Maritime Grassland	230	Grasslands. No prescribed fire on headlands <sup>23</sup>	n/a
		Pine	-	Other	n/a
		Rock/Sand Sand Ridge	233	Other Heathlands/Beach	n/a, w
<b>w</b>	Use a, b, c, d options for biodiversity thresholds	Introduced Scrub	221	Appropriate management practice <sup>24</sup>	n/a
		Mixed Forest Regrowth Mixed Pine Mixed Woodland Vine Cleared/Grassland	220	Appropriate management practice	n/a    w

<sup>23</sup> Not described in BFEAC schedule

<sup>24</sup> W. Variable within each vegetation formation

## APPENDIX VII - Vegetation Formations for NSW

Vegetation Formations for NSW (Keith 2004)	
Vegetation dominated by trees (generally more than 5 m tall when mature).	
<b>Wet sclerophyll forests (Grassy &amp; shrubby subformation)</b>	Tall forests (typically >30 m) dominated by tall straight-trunked eucalyptus, usually with soft-leaved shrubs, ferns or herbs in the understorey. Largely confined to moderately fertile soils in sheltered locations on the coast and escarpments where average annual rainfall exceeds 900 mm.
<b>Forested wetlands</b>	Forests or woodlands with an abundance of plant groups in the understorey that are unable to tolerate periodic inundation or waterlogging, particular sedges, rushes and reeds. Confined to damp, low-lying parts of the coast or adjacent to rivers, lakes or swamps in the inland.
<b>Dry sclerophyll forests (shrubby &amp; shrub/grass subformation)</b>	Forests or rarely woodlands with in abundance of hard-leaved (sclerophyllous) shrubs in the understorey. Only rarely dominated by 'box' eucalypts. Ground cover often sparse and typically by sclerophyllous sedges, but may sometimes include reasonably continuous swards of grasses. Confined to coast, tablelands, and the western slopes where average annual rainfall exceed 500 mm, largely on infertile sandy or loamy soils.
<b>Grassy Woodland</b>	Woodlands, or rarely forests, typically 15–35 m tall through shorter at subalpine elevations. Ground cover continuous and dominated by perennial tussocks grasses, and are interspersed perennial herbs including 'geophytic' orchids and lilies, but few ephemeral herbs and grasses. Shrubs generally sparse and typically not including chenopods or other drought tolerant species. Widespread on relatively fertile loam and clay loams of the coastal lowlands.
<b>Saline Wetlands</b>	Trees tolerant of (subjected to) tidal inundation, understorey sparse to non-existent. Restricted to tidal estuaries along the coast. (Mangrove Swamps)
<b>Rainforests</b>	Trees belonging to various plant families, their leaves broad and soft. Vines often occur in the tree canopies or understorey. Understorey typically includes ferns and herbs. Found on the coastal lowlands, islands and escarpment on fertile soils extending to restricted locations on the north-western slopes.
Trees absent, or present only as scattered emergent individuals.	
<b>Freshwater wetlands</b>	Dominated by shrubs, sedges, grasses or non-succulent herbs that tolerate permanent or periodic inundation or waterlogging with freshwater. Restricted to swamps with humic or gleyed soils on the coast, tablelands, western slopes and plains.
<b>Saline Wetlands</b>	Dominated by herbs (including succulents), grasses or rarely shrubs that tolerate periodic inundation or waterlogging with saline water. Restricted to tidal estuaries on the coast.
<b>Heathlands</b>	Vegetation dominated by hard leaved but not drought-tolerate shrubs, usually also with perennial sedges, herbs and grasses, though generally lacking ephemeral plants. Restricted to fertile soils, often on exposed sites along the coast and tablelands where average rainfall exceeds 800 mm.
<b>Grasslands</b>	Vegetation dominated by perennial tussock grasses with herbs. Shrubs rarely present. Generally found on clay soils on flat to undulating terrain on the coast, tablelands, western slopes and plains.

### APPENDIX VIII - Fire Mitigation - A Guide to Requirement

The Local Environmental Plan (LEP) permits strategic bushfire hazard reduction within applicable zones across the Great Lakes LGA.

The LEP provides the mechanism to achieve bushfire objectives and protection measures and identifies criteria specified in bushfire prone areas appropriate to the potential level of the hazard.

DCP's support the objectives of the LEP and can detail bushfire protection measures necessary for the protection of life and property in the event of a bushfire event.

Two core documents including the NSW Rural Fire Service Planning for Bushfire Protection (2006b) and the Bushfire Environmental Assessment Code (2006a) assist with guiding specific fuel management practices and fire prevention works on both new and existing developments.

Referral to these along with other reference material from the NSW Rural Fire Service assist in planning for bushfire mitigation works.

The Building Code of Australia (BCA) provides guidelines to building in bushfire prone areas within the AS 3959 Construction of buildings in bushfire prone areas.

These guides collectively assist the community and managers to:

- assess bushfire protection of properties.
- recognise vegetation type and fire effects.
- identify building setbacks.
- consider the local environment.
- reduce the impact of imminent bushfire attack.
- provide adequate fire management zones.
- implement fuel management practices and
- promote fire prevention programs to the community.



The bushfire risk assessment of hazards is undertaken which assist in the development of fire management zones known as Asset Protection Zones (APZ) and the Strategic Fire Advantage Zones (SFAZ).

#### Asset Protection Zones for existing structures

An APZ represents the area surrounding a development, which is managed to reduce the bushfire hazard to an acceptable level. Its main purpose is to provide a buffer between any habitable structure and the bushfire hazard, and progressively reduce fuel loads.

For bushfire planning purposes APZ's are generally included within the property being developed, however it may incorporate areas of land off the development site where such land has a compatible use (e.g. road, sporting field, or developed lot). Each APZ varies in form and width, according to vegetation type, slopes and form of construction. When slopes are greater, depths are increased to reduce impact from higher intensity fires.

Where existing assets require fire mitigation works the guidelines within the BFEAC assists in preparing fire management strategies for an area. Guidelines for maximum distances for APZ can be seen following:

<i>Maximum Distance of an Asset Protection Zone from the Asset (or Adjacent Asset)</i>		
<i>Residential &amp; Major Special Purpose Buildings</i>		
Upslope		
<18°	20 metres	20 metres
Downslope		
< 10°	20 metres	20 metres
>10 – 15°	30 metres	20 metres
>15 °	40 metres	20 metres

(RFS 2006a)



**Asset Protection Zones for new developments**

When considering "new development" including new, alterations or additions to residential or industrial buildings refer to Planning for Bushfire Protection (2006b) to define fire management zones.

The tables below have been extracted from this document, which shows the APZ minimum requirements that apply to both class 1 and 2 buildings and special protection purpose developments, for each vegetation formation and slope variations.

The APZ can comprise of two components, being the Outer Protection Area (OPA) and the Inner Protection Area (IPA) with reduced ground fuels, as required within PBP. Forest and Woodland vegetation have distinct IPA and OPA. For all other vegetation the APZ is all managed as an IPA.

**Inner Protection Area**

The IPA is the area providing a defensible space and managing heat intensities at the building surface. Vegetation management priority is to prevent flame impingement by not allowing fine debris to accumulate close to the building. Secondly, removal of ground fuels and loose bark to reduce flame height and likely canopy fire also reduces heat output and ember generation.

While trees and shrubs or other vegetation may occur, the tree canopy does not overhang the roof, is not continuous and be far enough away from the dwelling not to ignite the house by direct flame or radiant heat emission.

Within this area, fuel loads are reduced with tree cover of less than 15%, located greater than 2 metres from any part of the roof line of the dwelling. Trees should have lower limbs removed up to the height of 2 metres above the ground. Garden beds of flammable shrubs not located under trees, with a continuous link, or within 10 metres from an exposed door or window.

Retention of taller trees with canopies will assist in filtering out embers. The use of trees as windbreaks to trap embers and flying debris reduces wind spread, slows the rate of spread and traps bushfire radiant heat.

**Outer Protection Area**

When required, the OPA is narrower than the IPA and is located between the bushfire hazard and the IPA often linking with the bushland side of the perimeter road. In this area, vegetation is managed with a tree canopy cover of less than 30% and should have ground fuels managed (mowed) to treat shrubs and grasses annually (usually in September).

The fine fuel loadings are maintained so that the intensity of a fire is reduced along with a corresponding reduction in the level of direct flames, radiant heat, slowing the rate of spread and filtering embers on the IPA.

**Perimeter Road, Fire Trail and Access Roads**

The perimeter road or fire trail may be within APZ's surrounding buildings or be on the boundary of the allotment or the reserve.

The fire trail can form part of the IPA that provides fire fighters access to structures and a strategic control line. This can be then used to conduct back burning or hazard reduction, property protection or provide refuge for fire fighters. Property access roads provide safe access to rural landholdings for fire fighting and occupants.

The PBP identifies specifications and design including construction standards, turn around areas, signage and environmental controls for perimeter road, fire trail and access roads.

The following tables are extracts from the PBP; however for a much greater understanding and depth into bushfire protection, refer to the full document.

Extract from Appendix 2 – PBP: Table A2.5 Minimum specifications for Asset Protection zones (m) for Residential and Rural residential subdivisions Purposes (for Class 1 and 2 buildings in FDI 80 Areas [ $\leq 29\text{kW/m}^2$ ])								
Vegetation Formation (Keith 2004)								
Vegetation Formations	Rainforest	Forests	Woodland	Plantation (Pine)	Tall Heath (Scrub)	Short Heath (Open Scrub)	Freshwater Wetlands	Forested Wetlands
Upslope/Flat	10	20	10	15	15	10	10	15
Effective Slopes - Downslope	>0 – 5°	10	20	15	20	15	10	20
	>5° – 10°	10	30	15	25	20	10	20
	>10° – 15°	10	40	20	35	20	15	30
	>15° – 18°	20	45	25	40	20	15	35

(RFS 2006b)

Extract from Appendix 2 – PBP: Table A2.6 Minimum specifications for Asset Protection zones (m) for Special Fire Purposes in Bushfire Prone Areas ( $\leq 10\text{kW/m}^2$ )								
Vegetation Formation (Keith 2004)								
Vegetation Formations	Rainforest	Forests	Woodland	Plantation (Pine)	Tall Heath (Scrub)	Short Heath (Open Scrub)	Freshwater Wetlands	Forested Wetlands
Upslope/Flat	10	20	10	15	15	10	10	15
Effective Slopes - Downslope	>0 – 5°	10	20	15	20	15	10	20
	>5° – 10°	10	30	15	25	20	10	20
	>10° – 15°	10	40	20	35	20	15	30
	>15° – 18°	20	45	25	40	20	15	35

(RFS 2006b)

Extract from Appendix 2 – PBP: Table A2. Minimum specifications for Asset Protection zones (m) for Residential and Rural residential subdivisions Purposes (for Class 1 and 2 buildings in FDI 80 Areas [ $\leq 29\text{kW/m}^2$ ])								
Vegetation Formation (Keith 2004)								
Vegetation Formations	Rainforest	Forests	Woodland	Plantation (Pine)	Tall Heath (Scrub)	Short Heath (Open Scrub)	Freshwater Wetlands	Forested Wetlands
Upslope/Flat	10	20	10	15	15	10	10	15
Effective Slopes - Downslope	>0 – 5°	10	20	15	20	15	10	20
	>5° – 10°	10	30	15	25	20	10	20
	>10° – 15°	10	40	20	35	20	15	30
	>15° – 18°	20	45	25	40	20	15	35

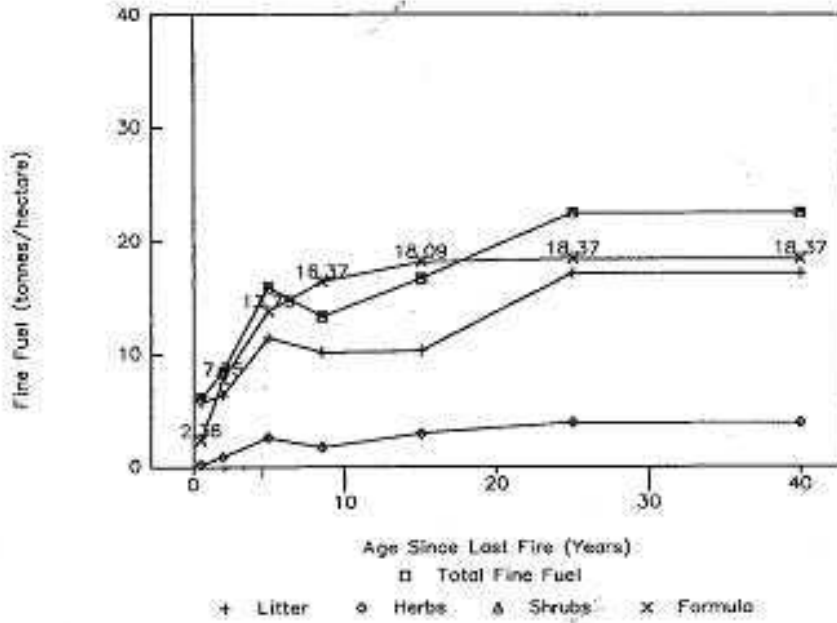
(RFS 2006b)

Extract from Appendix 2 – PBP: Table A2.7 Determining Allowable Outer Protection Area (m) for Forest Vegetation within an APZ		
Vegetation Formation (Keith 2004)		
Vegetation Formations	Forests/Woodlands	Forests/Woodlands – Special Fire Protection Purpose in Bushfire Prone Areas
Upslope/Flat	10	20
Effective Slopes - Downslope	>0 – 5°	5
	>5° – 10°	15
	>10° – 15°	20
	>15° – 18°	20

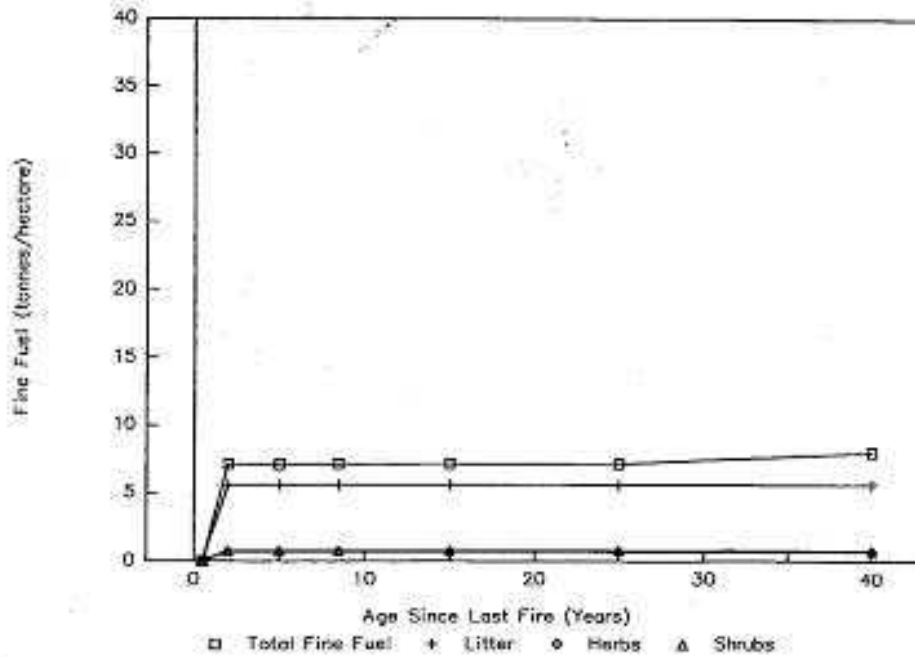
(RFS 2006b)

APPENDIX IX- Fine Fuel Accumulation

FOREST FINE FUEL ACCUMULATION



RAINFOREST FINE FUEL ACCUMULATION



(NPWS unpub.)

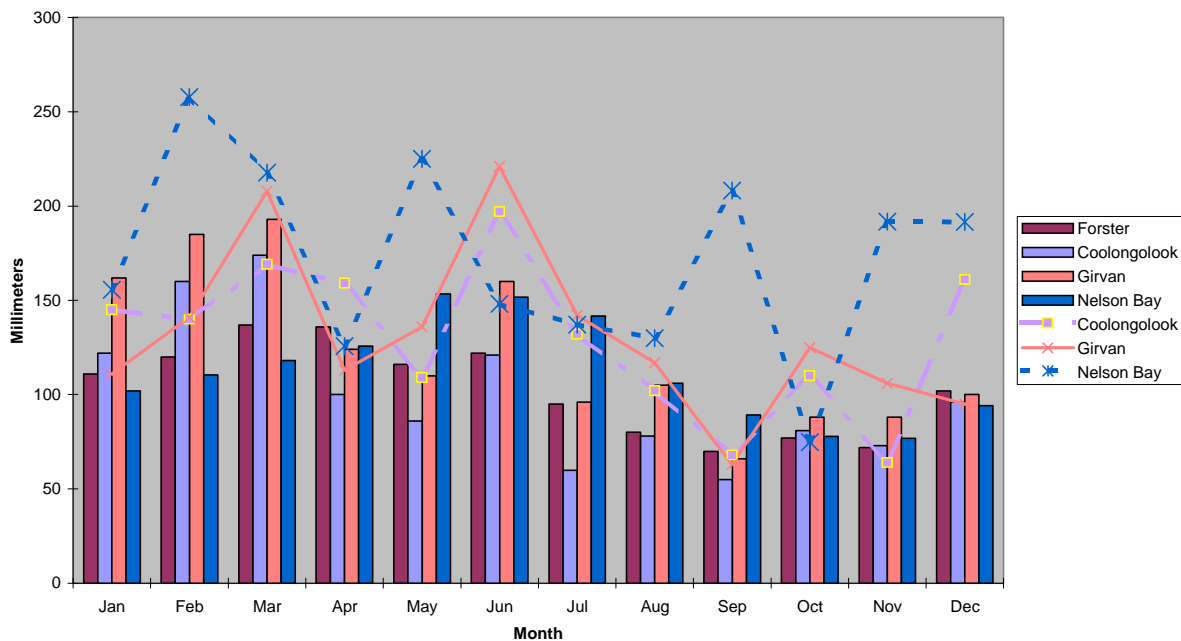
APPENDIX X - Climate

Climatic details of the Upper Hunter and Lower Hunter weather districts.

Climate Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ANN
<b>Mean Daily Max. Temp (°C)</b>													
Forster	27.0	27.5	26.0	24.5	23.0	21.0	20.0	20.0	22.0	24.0	25.5	26.0	23.9
Coolongolook	27.7	27.6	26.7	23.7	20.5	18.1	17.7	19.1	21.8	23.8	26.4	27.8	23.5
Girvan	27.4	26.9	25.6	22.5	19.5	16.8	16.3	18.0	20.9	23.1	25.7	27.7	22.6
Nelson Bay	27.4	27	26	23.7	20.9	18.6	17.6	18.8	21.4	23.2	24.9	26.3	23
<b>Mean Daily Min. Temp (°C)</b>													
Forster	18.0	18.5	14.5	14.0	12.5	9.5	8.0	8.5	10.0	13.0	15.5	17.0	13.3
Coolongolook	15.8	16.3	14.7	10.8	7.4	5.2	3.6	4.6	6.6	9.6	12.1	14.3	10.3
Girvan	17.8	18.0	16.9	13.9	10.9	8.8	7.6	8.4	10.3	13.0	15.0	16.8	13.1
Nelson Bay	17.7	18.1	16.7	14.2	11.4	9.1	7.9	8.7	10.7	12.9	14.9	16.8	13.3
<b>Mean. Rainfall (mm)</b>													
Forster	111	120	137	136	116	122	95	80	70	77	72	102	1238
Coolongolook	122	160	174	100	86	121	60	78	55	81	73	96	1205
Girvan	162	185	193	124	110	160	96	105	66	88	88	100	1477
Nelson Bay	102	110.4	118.1	125.8	153.4	151.7	141.7	106	89.2	77.9	76.8	94.3	1347.4
<b>Highest Daily Rain</b>													
Forster	-	-	-	-	-	-	-	-	-	-	-	-	-
Coolongolook	145	140	169	159	109	197	132	102	68	110	64	161	197
Girvan	111	141	208	113	136	221	142	117	63	125	106	95	221
Nelson Bay	155.7	257.8	217.7	125.7	225	148.1	137.2	130	208.3	74.9	191.8	191.5	257.8

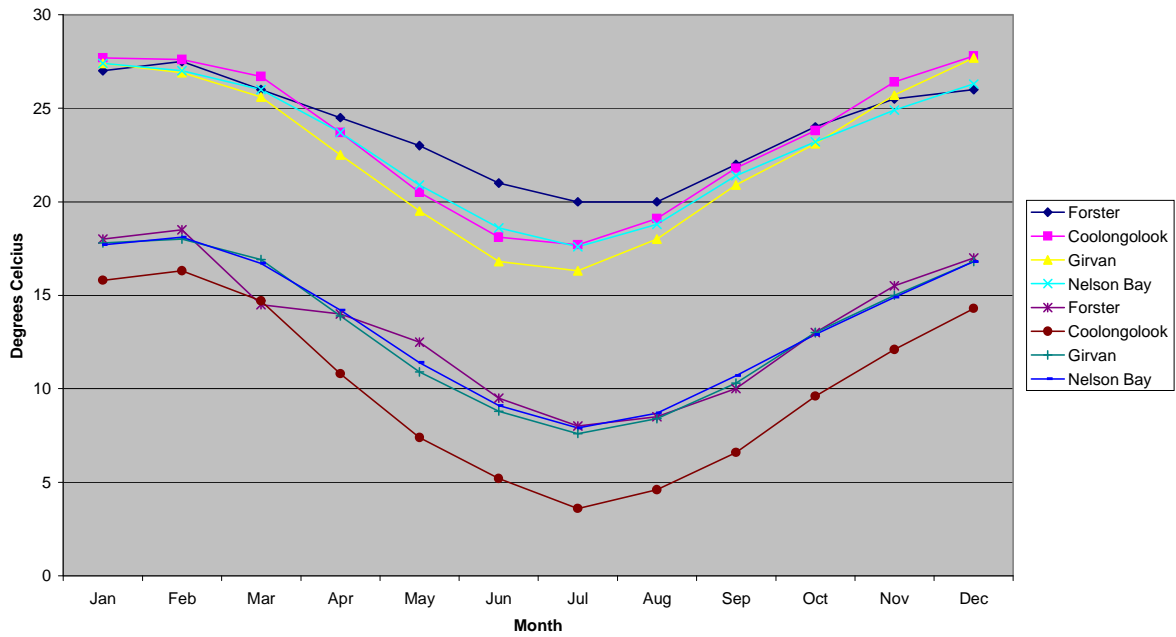
(Commonwealth of Australia, Bureau of Meteorology 2005a; Great Lakes Council 2004a)

Rainfall - Mean maximum (bar) and highest daily rain (line)

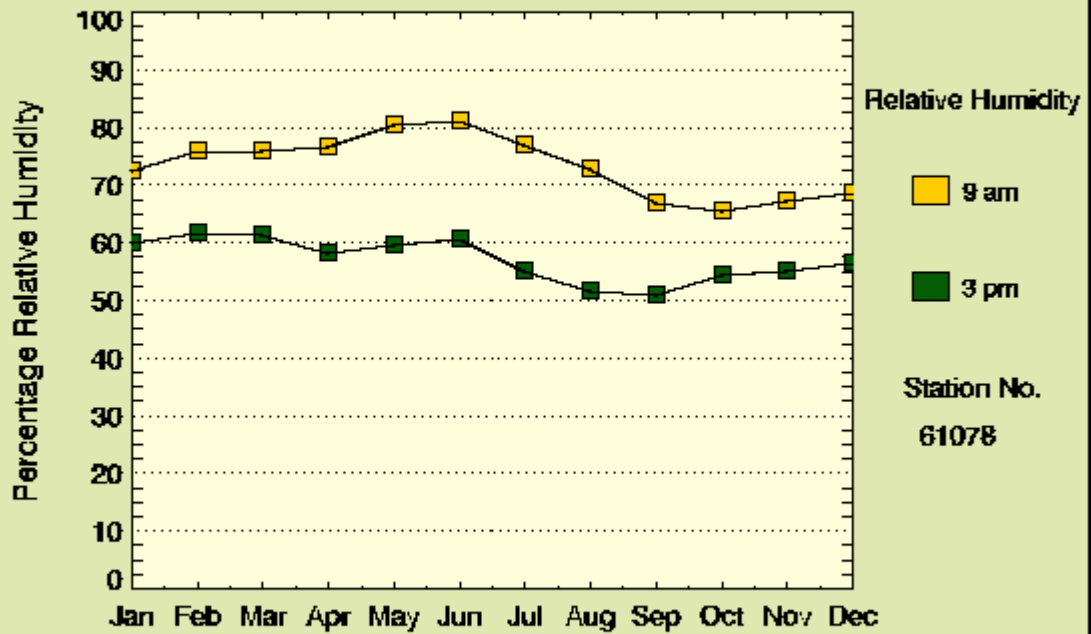


(Commonwealth of Australia, Bureau of Meteorology 2005a; Great Lakes Council 2004a)

Temperature - Mean Daily Maximum and Minimum



Average daily relative humidity - January to December  
Williamstown



Australian Bureau of Meteorology

Based on the 30 - year period 1961-90.

(Commonwealth of Australia, Bureau of Meteorology 2005a; Great Lakes Council 2004a)

APPENDIX XI- Bushfire Risk to Natural Heritage

ID	Council Managed Land	Lot / DP	Vegetation Community Type	Vegetation Formation	Environmental & Ecological Risk Rating (FMZ)
<b>Tuncurry (T)</b>					
1	Lot 1 The Lakes Way	Lot 1 DP 1029928	▪ Paperbark/Swamp Oak	▪ Forested wetland	Major (C1)
2	Lot 1 Chapmans Road	Lot 1 DP 304132	▪ Swamp Mahogany ▪ Cleared ▪ Fresh Water Swamp	▪ Forested wetland ▪ Freshwater wetlands ▪ Grasslands	Minor / Major (C2)
3	Public Reserve	Lot 35 DP 777764	▪ Paperbark/Swamp Oak	▪ Forested wetland	Minor (C3)
4	Lot 19 The Lakes Way	Lot 19 DP 749986	▪ Paperbark/Swamp Oak	▪ Forested wetland	Major C4)
5	Lot 9 DP 778263	Lot 9 DP 778263	▪ Scrub ▪ Cleared	▪ Grassland ▪ Heathlands	Minor (C5)
6	Public Reserve	Lot 9 DP 778263	▪ Urban	▪ Urban	Insignificant (C6)
7	Public Reserve RES 5006	Lot 19 DP 262222	▪ Urban	▪ Urban	Insignificant (C7)
8	Council Works Depot RES 125 (R 96748)	Lot 296 DP 45877	▪ Urban ▪ Swamp Mahogany	▪ Urban ▪ Forested wetlands	Insignificant / Minor (C8)
9	Lot 1 DP 859322	Lot 1 DP 859322	▪ Urban	▪ Urban	Insignificant (C9)
10	Drainage Reserve	Lot 21 DP 859322	▪ Urban	▪ Urban	Insignificant (C10)
11	Lot 9 DP 859322	Lot 9 DP 859322	▪ Urban ▪ Blackbutt-Bloodwood/Apple	▪ Urban ▪ Dry sclerophyll forest	Insignificant / Minor (C11)
12	Lot 10 DP 859322	Lot 10 DP 859322	▪ Urban	▪ Urban	Insignificant (C12)
13	Public Reserve	Lot 22 DP 859322	▪ Blackbutt-Bloodwood/Apple	▪ Dry sclerophyll forest	Major C13)
14	Environmental Protection RES 5266 (R 210040)	Lot 319 DP 729822	▪ Blackbutt-Bloodwood/Apple	▪ Dry sclerophyll forest	Major (C14)
	Public Reserve RES 5322 (R 210040)	Lot 321 DP 822669	“	“	“
	RES 5364	Lot 36 DP 720802	“	“	“
	RES 5267 (R 210040)	Lot 309 DP 722603	“	“	“
	“	Lot 310 DP 722603	“	“	“
“	Lot 311 DP 722603	“	“	“	
15	Reserve For Environmental Protection RES 5296	Lot 21 DP 729820	▪ Blackbutt-Bloodwood/Apple	▪ Dry sclerophyll forest	Minor / Major (C15)
16	Lane Way – Lot 22 DP 729820	Lot 22 DP 729820	▪ Urban	▪ Urban	Insignificant (A25)
17	Public Reserve	Lot 18 DP 1016222	▪ Scrub ▪ Urban	▪ Heathlands ▪ Urban	Insignificant / Minor / Major (C16)
18	Lot 20 DP 729820	Lot 20 DP 729820	▪ Blackbutt-Bloodwood/Apple “	▪ Dry sclerophyll forest “	Minor / Major (C17)
	Wollomba Avenue	Wollomba Avenue	▪ Urban	▪ Urban	Minor / Major
19	Tuncurry Sports Reserve R 89453	Lot 276 DP 753207	▪ Blackbutt-Bloodwood/Apple	▪ Dry sclerophyll forest	Minor / Major (C18)
			▪ Cleared	▪ Grassland	
			▪ Dry Blackbutt	▪ Urban	
20	Drainage Reserve	Lot 25 DP 711833	▪ Urban ▪ Swamp Mahogany	▪ Urban ▪ Forested wetlands	Insignificant / Minor (C19)
21	Tuncurry Foreshore RES 138	Lot 7031 DP 1107421	▪ Mangrove ▪ Swamp Oak	▪ Saline wetlands ▪ Forested wetlands	Minor / Major (C20)

ID	Council Managed Land	Lot / DP	Vegetation Community Type	Vegetation Formation	Environmental & Ecological Risk Rating (FMZ)
			<ul style="list-style-type: none"> <li>Salt Water Swamp</li> </ul>		
22	Public Reserve RES 5247	Lot 70 DP 804777	<ul style="list-style-type: none"> <li>Urban</li> <li>Cleared</li> </ul>	<ul style="list-style-type: none"> <li>Urban</li> <li>Grassland</li> </ul>	Insignificant / Minor (C21)
23	Wallis Lake Foreshore - Water	Lot 7036 DP 1066318	<ul style="list-style-type: none"> <li>Urban</li> </ul>	<ul style="list-style-type: none"> <li>Urban</li> </ul>	Insignificant
	Wallis Lake Foreshore RES 92 (Pt R 88335)	Lot 7038 DP 1066318	"	"	Insignificant / Minor
	Ohmas Bay Recreation Reserve RES 92 (Pt R 88335)	Lot 234 DP 753207	<ul style="list-style-type: none"> <li>Urban</li> <li>Cleared</li> <li>Urban</li> <li>Cleared</li> <li>Swamp Oak</li> <li>Salt Water Swam</li> </ul>	<ul style="list-style-type: none"> <li>Urban</li> <li>Grassland</li> <li>Urban</li> <li>Grassland</li> <li>Forested wetlands</li> <li>Saline wetlands</li> </ul>	Insignificant / Minor
	"	Lot 7037 DP 1066318	<ul style="list-style-type: none"> <li>Swamp Oak</li> <li>Salt Water Swam</li> </ul>	<ul style="list-style-type: none"> <li>Forested wetlands</li> <li>Saline wetlands</li> </ul>	Insignificant / Minor / Major (C22)
24	Ohmas Bay Foreshore - Taree Street	Taree Street	<ul style="list-style-type: none"> <li>Palm</li> <li>Paperbark/Flooded Gum</li> <li>Salt Water Swamp</li> <li>Mangrove</li> </ul>	<ul style="list-style-type: none"> <li>Rainforest</li> <li>Wet sclerophyll forest</li> <li>Saline wetlands</li> <li>Rainforest</li> </ul>	Minor / Major (C23)
	Ohmas Bay Foreshore RES 12 (R 54990)	Lot 7039 DP 1066318	<ul style="list-style-type: none"> <li>Urban</li> <li>Palm</li> <li>Paperbark/Flooded Gum</li> </ul>	<ul style="list-style-type: none"> <li>Wet sclerophyll forest</li> <li>Urban</li> </ul>	Insignificant / Minor / Major
25	Tuncurry Caravan Park RES 72 (R 86531)	Lot 160 DP 753207	<ul style="list-style-type: none"> <li>Scrub</li> <li>Disturbed Heath</li> <li>Scrub</li> </ul>	<ul style="list-style-type: none"> <li>Heathlands</li> </ul>	Minor / Major
	Closed Road – RES 72 (R 86531)	Lot Sec 12 DP 759005	<ul style="list-style-type: none"> <li>Disturbed Heath</li> <li>Urban</li> </ul>	<ul style="list-style-type: none"> <li>Heathlands</li> <li>Urban</li> </ul>	Insignificant / Minor / Major
	Closed Road – RES 72 (R 86531) Tuncurry Caravan Park & Camping Reserve RES 72 (R86531)	" Lot Sec 12 DP 759005	"	"	(C24)
26	BEACH STREET OVAL RES 73 (R 86532)	Pt Lot 140 DP 753207	<ul style="list-style-type: none"> <li>Cleared</li> <li>Cleared</li> <li>Urban</li> <li>Scrub</li> </ul>	<ul style="list-style-type: none"> <li>Grasslands</li> <li>Grassland</li> <li>Heathlands</li> <li>Urban</li> </ul>	Minor (C25)
	"	Lot 7052 DP 93503	<ul style="list-style-type: none"> <li>Scrub</li> </ul>	<ul style="list-style-type: none"> <li>Urban</li> </ul>	Insignificant / Minor / Major
	"	Pt Lot 254 DP 753207	<ul style="list-style-type: none"> <li>Heath</li> </ul>	<ul style="list-style-type: none"> <li>Heathlands</li> </ul>	Minor / Major
	"	Pt Lot 140 DP 753207	"	"	"
	"	Pt Lot 140 DP 753207	<ul style="list-style-type: none"> <li>Urban</li> <li>Cleared</li> </ul>	<ul style="list-style-type: none"> <li>Grassland</li> <li>Urban</li> </ul>	Insignificant / Minor
27	Closed Road Pt RES 124 (R 96632)	Lot 265 DP 753207	<ul style="list-style-type: none"> <li>Cleared</li> <li>Cleared</li> <li>Heath</li> <li>Disturbed Heath</li> <li>Cleared</li> <li>Heath</li> <li>Dry Blackbutt</li> </ul>	<ul style="list-style-type: none"> <li>Grasslands</li> <li>Grasslands</li> <li>Heathlands</li> <li>Grasslands</li> <li>Heathlands</li> <li>Dry sclerophyll forest</li> </ul>	Minor (C26)
	Road Reserve- unformed	Road Reserve- unformed	<ul style="list-style-type: none"> <li>Disturbed Heath</li> <li>Cleared</li> <li>Heath</li> <li>Dry Blackbutt</li> </ul>	<ul style="list-style-type: none"> <li>Grasslands</li> <li>Heathlands</li> <li>Grasslands</li> <li>Heathlands</li> </ul>	Minor / Major
	PUBLIC RECREATION - Pt RES 124 (R 96632)	Lot 265 DP 753207	<ul style="list-style-type: none"> <li>Disturbed Heath</li> <li>Cleared</li> <li>Scrub</li> </ul>	<ul style="list-style-type: none"> <li>Grasslands</li> <li>Heathlands</li> <li>Grasslands</li> <li>Urban</li> </ul>	Minor / Major
	"	Pt Lot 140 DP 753207	<ul style="list-style-type: none"> <li>Disturbed Heath</li> <li>Cleared</li> <li>Urban</li> </ul>	<ul style="list-style-type: none"> <li>Grasslands</li> <li>Grasslands</li> <li>Urban</li> </ul>	Minor / Major Insignificant / Minor
	"	"	"	"	"
	Closed Road Pt RES 124 (R 96631)	Lot 265 DP 753207	<ul style="list-style-type: none"> <li>Disturbed Heath</li> <li>Scrub</li> </ul>	<ul style="list-style-type: none"> <li>Heathlands</li> <li>Heathlands</li> </ul>	Minor / Major Minor / Major



ID	Council Managed Land	Lot / DP	Vegetation Community Type	Vegetation Formation	Environmental & Ecological Risk Rating (FMZ)
28	Tuncurry Rock Pool & Nth Beach RES 80 (R 86904)	Rockpool Road	<ul style="list-style-type: none"> <li>▪ Sand Ridge</li> <li>▪ Disturbed Heath</li> <li>▪ Cleared</li> <li>▪ Scrub</li> <li>▪ Disturbed Heath</li> </ul>	<ul style="list-style-type: none"> <li>▪ Grasslands</li> <li>▪ Heathlands</li> <li>▪ Sand Ridge</li> </ul>	Minor / Major (C27)
	"	"		<ul style="list-style-type: none"> <li>▪ Heathlands</li> </ul>	Minor / Major
29	Cemetery Plantation and Closed Road	Lot 7009 & 7010 DP 1056915	<ul style="list-style-type: none"> <li>▪ Urban</li> <li>▪ Heath</li> <li>▪ Cleared</li> <li>▪ Dry Blackbutt</li> </ul>	<ul style="list-style-type: none"> <li>▪ Heathlands</li> <li>▪ Urban</li> <li>▪ Grasslands</li> <li>▪ Dry sclerophyll forest</li> </ul>	Insignificant / Minor / Major (C28)
30	Cemetery Church of England	Lot 7045 DP 1056915	<ul style="list-style-type: none"> <li>▪ Urban</li> <li>▪ Heath</li> <li>▪ Cleared</li> </ul>	<ul style="list-style-type: none"> <li>▪ Heathlands</li> <li>▪ Urban</li> </ul>	Insignificant / Minor / Major (C29)
	Roman Catholic  General Cemetery	"  "	<ul style="list-style-type: none"> <li>▪ Dry Blackbutt</li> </ul>	<ul style="list-style-type: none"> <li>▪ Grasslands</li> <li>▪ Dry sclerophyll forest</li> </ul>	"
31	Lot 17 DP 1016222	Lot 17 DP 1016222	<ul style="list-style-type: none"> <li>▪ Urban</li> <li>▪ Heath</li> <li>▪ Cleared</li> </ul>	<ul style="list-style-type: none"> <li>▪ Heathlands</li> <li>▪ Urban</li> <li>▪ Grasslands</li> </ul>	Insignificant / Minor (C30)
32	Road Reserve - CL	Road Reserve - CL	<ul style="list-style-type: none"> <li>▪ Heath</li> </ul>	<ul style="list-style-type: none"> <li>▪ Heathlands</li> </ul>	Minor / Major
35	Road Reserve - Near Oasis Parade	Road Reserve	<ul style="list-style-type: none"> <li>▪ Cleared</li> <li>▪ Urban</li> <li>▪ Swamp Mahogany</li> <li>▪ Paperbark</li> <li>▪ Mangrove</li> </ul>	<ul style="list-style-type: none"> <li>▪ Urban</li> <li>▪ Grasslands</li> <li>▪ Forested wetlands</li> <li>▪ Saline wetlands</li> </ul>	Insignificant / Minor / Major (C30)



## APPENDIX XII - Environmental Assessment

## REVIEW OF ENVIRONMENTAL FACTORS

## GREAT LAKES COUNCIL

<b>Activity Name:</b>	Hazard reduction works within fire management zones including asset protection zone (APZ) and strategic fire advantage zone (SFAZ).
<b>Plan Name:</b>	Fire Mitigation Plan – Tuncurry
<b>Location of Activity:</b>	Tuncurry
<b>Activities:</b>	The creation and ongoing maintenance within the APZ and SFAZ as described within Section 8 of the Plan.
<b>Reserves and managed land:</b>	Refer to section 7 within the Plan. There is a total of 127 hectares of thirty-six (36) reserves/managed lands affected by bushfire.

## (1) Planning – Relevant Legislation

No	Act/Regulation	Comments
1.1	<b>Local Government Act 1993</b>	The proposed activities are compatible with the <i>Local Government Act 1993</i> and Great Lakes Council management practices.
1.2	<b>Environmental Planning and Assessment Act 1979</b>	Part 5 of the <i>Environmental Planning and Assessment Act 1979</i> requires an 'Environmental Assessment' to be conducted for all 'activities'. This REF is an 'Environmental Assessment' for the purpose of Part 5 of the Act. A 7-Part Test of significance for potential threatened species is required under the <i>Environmental Planning and Assessment Act 1979</i> . This REF is the assessment of the activities.  Section 5A of the <i>Environmental Planning and Assessment Act 1979</i> requires the application of a 7-Part Test to assess the impact of 'activities' on threatened species, populations or ecological communities, or their habitats as declared under the <i>Threatened Species Conservation Act 1995</i> .
1.3	<b>Threatened Species Conservation (TSC) Act 1995</b>	All preliminary assessments within attachment 1 and 2, to determine the requirement for a 7-Part Test were conducted as part of this REF. This concluded that the proposed activities will have minimal impact on threatened species, populations or ecological communities, or their habitats as declared under the <i>Threatened Species Conservation Act 1995</i> and hence the proposed activities is permitted under the Act and an SIS is not deemed required
1.4	<b>Local Environmental Plans, DCP's</b>	Proposed activities comply with Local Environmental Plan and Development Control Plans.
1.5	<b>Rural Fires Act 1997</b>	The proposed activities will assist Council to meet its statutory obligations under the <i>Rural Fires Act 1997</i> , and Regulations that specifically requires land owners/occupiers to prevent and minimise the spread of bush fires.
1.6	<b>NSW Heritage Act 1977</b>	There are no items listed under the <i>NSW Heritage Act 1977</i> within Council managed land affected by the activities.
1.7	<b>Plan of Management</b>	Council has generic plans of management (POM) for bushland reserves. The activities proposed are not inconsistent with approved generic POM. The proposed activities are also in accordance with providing ongoing protection of life and property of the community and within Councils management objectives.
1.8	<b>Council Policies</b>	The proposed activities are in accordance with "Fire Management For Council Controlled Natural Areas, 1996" and the Fire Mitigation Plan –

No	Act/Regulation	Comments
		Tuncurry (The Plan). The Plan provides fire management guidelines and incorporates statutory obligations to manage bush fire risks, to protect life and property, prevent and control bush fires. Concurrently, it considers and provides for public recreation, biodiversity and the conservation of the natural and cultural heritage of the area.
1.9	<b>Regional/District Strategies of Plans</b>	Darawank Nature Reserve and Darawakh Swamp are within 3 kilometres north of the study area and are managed by the DECC and Council respectively.
1.10	<b>Other Planning Controls or Agency approvals</b>	<ul style="list-style-type: none"> <li>• <i>SEPP 14 (Coastal Wetlands)</i> – Under Section 4 of State Environmental Planning Policy No.14 (Coastal Wetlands). There are recorded sites that occur within the study area.</li> <li>• <i>SEPP 26 (Littoral Rainforest)</i> – Under Section 4 of State Environmental Planning Policy No.16 (Littoral Rainforests). There are no recorded littoral rainforest areas that occur within the study area.</li> <li>• <i>SEPP 44 (Koala Habitat)</i> – Under Section 5 of State Environmental Planning Policy No.44 (Koala Habitat Protection). Koalas have been recorded locally and both potentially and core Koala habitat may occur within the study area.</li> </ul>
1.11	<b>Commonwealth Matters (eg Ramsar, World Heritage, National Estate)</b>	<ul style="list-style-type: none"> <li>• <i>RAMSAR</i> – Proposed activities are not within a site listed under the RAMSAR convention.</li> <li>• <i>World Heritage</i> – Proposed activities is not within a World Heritage Area.</li> <li>• <i>National Estate</i> – Proposed activities is not in an area listed on the National Estate Register.</li> </ul>
1.12	<b>Protection Of The Environment Operations Act 1997 (the POEO Act)</b>	<p>s133 Prohibition by EPA of burning in open air or incinerators –</p> <p>(1) EPA is of the opinion that weather conditions are such that the burning of fires in the open while those conditions persist will contribute or is likely to contribute to air pollution to such an extent that the making of an order under this section is warranted.</p> <p>(2) The EPA may, by order published in accordance with this section, prohibit, unconditionally or conditionally, the burning of fires in the open or in all or any specified classes of incinerators.</p> <p>s134 Directions by authorised officers concerning fires</p> <p>1 (b) air pollution from the fire is injurious to the health of any person or is causing or is likely to cause serious discomfort or inconvenience to any person.</p> <p>s139 Operation of plant</p> <p>The occupier of any premises who operates any plant (other than control equipment) at those premises in such a manner as to cause the emission of noise from those premises is guilty of an offence if the noise so caused, or any part of it, is caused by the occupier’s failure:</p> <p>(a) to maintain the plant in an efficient condition, or</p> <p>(b) to operate the plant in a proper and efficient manner.</p> <p>s145 Littering generally – (1) Offence of littering.</p> <p>A person who deposits litter in or on a public place or an open private place is guilty of an offence.</p> <p>Schedule 2 Regulation-making powers – 6 Open fires or incinerators.</p> <p>The regulation or prohibition of the burning of fires in the open or in incinerators.</p> <p>6B Emission of air impurities</p> <p>air impurity includes smoke, dust (including fly ash), cinders, solid particles of any kind, gases, fumes, mists, odours and radioactive substances.</p>

No	Act/Regulation	Comments
1.13	<b><i>Native Vegetation Act 2003/ Tree Preservation Order (TPO), The Bush Fire Environmental Assessment Code for NSW (RFS 2006)</i></b>	<p>The Bush Fire Environmental Assessment Code for NSW, 2006 (the Code) is an environmental assessment where certified authorities are consenting bodies including Local Governments. Conditions for hazard reduction works under these guidelines enable works to be undertaken without the requirement for a review of environmental factor (REF).</p> <p>If the proposed works are beyond the Codes guidelines then reference to the <i>Native Vegetation Act</i> or the Councils TPO is required. Most of the existing works meet the guidelines of the Code however; more detailed environmental assessment is required for some works. Council has undertaken the preparation of a REF, to clarify works in more detail. Any additional fire mitigation works in Tuncurry would either require a HRC or a more detailed REF.</p>

## (2) The Activities

### Assessment

Council managed land within the study area has been assessed for fuel loads, bush fire risk, fire threat and ecological considerations. The field environmental and habitat assessment enables details within each reserve to be collated to ensure hazard reduction works comply with legislative constraints and biodiversity thresholds. Further, within the Plan section 4 details guidelines for hazard reduction and section 6 for ecological consideration.

The assessment outcomes are based on likely extreme weather conditions, and the ability of an asset to recover from or withstand the expected bush fire as a consequence on its fire resistance standard. This period is when the most damage is expected as fire intensity is at its greatest.

To determine local habitat attributes a field assessment was undertaken to determine:

Structural vegetation;

- Presence and frequency of habitat trees;
- Size class of trees;
- Density of shrub and ground covers;
- Presence of fallen timber;
- Presence of rock outcrops;
- Presence of wet area and water bodies;
- Extent of movement corridors;
- Extent of faunal refugia; and
- Implied conservation significance.

From these site assessments, and desktop analysis it is possible to identify if any potential significant habitat features exist. A list of potential threatened species assists in determining the effects on species and the local biodiversity.

### Fire assessment

Bushfire management and mitigation measures are also guided by other documents such as the Lower Hunter Zone, Bush Fire Management Committee, Bush Fire Risk Management Plan (BFRMP).

Within section 3 of the Plan it states: *'Field assessments are undertaken to provide data for analysis for managers. The assessment process follows guidelines provided by the RFS, and is an acceptable process for fire managers to determine the hazard and risk analysis of bushfire within and adjacent to bushfire affected Council managed land.'*

The contributing factors to the assessment include the distance of the bush fire hazard to the asset (Threat) and, where the potential severity is influenced by the bush fire or by bush fire hazards (Risk).

The overall fuel hazards are given as low, moderate, high, very high and extreme ratings. The assessment includes using factors such as;

- Vegetation type and separation distance of canopies;
- Overall fuel loads, (bark, surface, elevated);
- Slope;
- Fuel quantity; and
- Size of combined risk areas.

The assessment is assisted by using the guide NSW National Parks and Wildlife Service, (2003b) Overall Fuel Hazard Guide Sydney Basin NSW Edition May 2003 (Ed. G. McCarthy). NSW National Parks and Wildlife Service, Hurstville.

The hazard assessment also considers fire resistance construction standard of a building (or asset) (no standard, level 1, 2 or 3), Bush Fire Prone Land, BFRMP ratings including the hazard and risk rating and the risk management zone.

Assessment	Tuncurry
<b>Bush Fire Prone Land</b>	Approximately 70% of the study area is recorded as having bushfire prone lands (BFPL). The majority of the bushland areas within BFPL are noted as bushfire affected land.
<b>Life and Property Bush Fire Risk Rating (Extracted from the BFRMP)</b>	Insignificant, Moderate, Major and Extreme
<b>Environmental and ecological risks</b>	Insignificant, Minor and Major
<b>Construction standard of neighbouring assets</b>	No standard, Level, 1–3

Potential bushfire hazard can also be derived by undertaking assessment using the RFS guidelines for Bush Fire Risk Management Planning. Council, being part of this Committee is committed to the prevention and mitigation of bushfires and development of fire management plans. Appendix XIII tables the bush fire hazard and risks with particular relationships to assets around Council managed land using this methodology. This specifically uses the combination of known vegetation types, slopes and potential fire run distances to determine a bush fire hazard (in relation to vegetation type). This is the first step to identifying community risks, bushfire threat, hazards and consequences of hazards to the local community. The BFMC in time will amend the existing BFRMP using this information and guidelines.

**Future Management**

The public reserves, reserves, drainage reserves and road reserves will be continued to be managed for the protection of life and property and to mitigate the spread of fire within the reserves.

**Impact on neighbouring properties**

Graduated fuel management of hazards adjacent to development is important to ensure provisions are in place to assist in reducing the risk and the threat of fire whilst still maintaining at least a degree of the visual and environmental amenity of the area. These zones are commonly referred to as FMZ’s including asset protection zones, strategic fire management zones, land management zones and fire exclusion zones.

The management of these zones is a tool to assist in the monitoring and management of fuels that impact on a development, either nearby or at a distance from the asset. Each zone has specific management strategies that can be implemented to meet management objectives (Refer to section 4 of the Plan for further details).

**Signs**

Community education plays an important part to Councils management and implementation of fire mitigation works. Notification of neighbouring properties of intended work ensures mitigation works are promoted and encouraged with adjoining property owners.

Public education through signage of asset protection zones promotes fire management objectives to the wider community and assists in the long-term maintenance of the fire management zones (FMZ’s).

### **Reversibility of Proposed Activities**

According to the Fire Mitigation Plan – Tuncurry the dominant vegetation formations surrounding the Tuncurry are forested wetlands and heathlands.

The Code certifies the mechanical mowing/ slashing and hand removal within APZ's and slashing within APZ's and SFAZ's. There are no conditions as part of the Code relating to any known threatened species within the areas of proposed works.

Mechanical hazard reduction by machinery may be reversed, as regeneration of forested areas is possible if slashing is removed from the area. Minimal impact by mowing/ slashing and hand removal on the vegetation ensures the biodiversity of the whole area is retained/appropriately managed.

By reducing fuels adjacent to assets and within other FMZ's this assists in reducing the fire intensity, which ultimately reduces the fire effect on the fauna and flora at the time of the fire.

### **(3) Alternatives**

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#### **Hazard Reduction by Burning verses mechanical slashing:**

While this alternative would achieve fire management objective hazard reduction by burning would have a greater environmental impact than frequently slashing these relatively small areas within identified APZ's and SFAZ's. Despite this, Coronial recognises that appropriate bushfire intervals are beneficial to ecological integrity.

The area that has been identified to be hazard reduced provides adequate protection for residences of Tuncurry by mechanical slashing.

#### **Do nothing:**

Council have an obligation to protect life and property around and within Tuncurry. Council are required to meet its statutory obligation under Section 63 of the Rural Fires Act (1997) to minimise the spread of fire.

Fire fighting authorities would also have less ability to contain fires that within the rural/urban interface or access fire advantages around the township if no fuel reduction works were undertaken.

**(4) The Existing Environment**

**4.1 The location**

<b>Area (ha)</b>	The proposed activities cover within APZ's approximately 4 hectares in managed lands and reserves. Within SFAZ's, approximately 0.5 hectares for fire trails.
<b>General Location</b>	Within the urban and rural area of Tuncurry.
<b>Neighbouring properties</b>	Private property with variable setbacks with adjoining reserves.
<b>Implied conservation values</b>	Low, medium and high conservation values within the various reserves.
<b>DECC Key Habitat</b>	Recorded through bushland areas within the western section of the study area, and the area north (east of The Lakes Way) into the surrounding rural areas, Crown Land Reserves and conservation areas such as Darawank Nature Reserve and Darawakh/ Frogalla Swamp.
<b>Key Corridor (Fauna)</b>	Occurs within the eastern section of the study area and links north with the nearby Darawank Nature Reserve and Darawakh/ Frogalla Swamp.
<b>Soils</b>	Tuncurry have a variety of soils landscapes including; Beach soil landscapes (fore dune); Aeolian landscape (may be windblown sand dunes); Swamp Landscapes (west of Tuncurry); Estuarine Landscape in low-lying areas on the lake and river fringe and disturbed landscapes from urban development.  Acid sulphate soils occur in low-lying areas of Tuncurry.

**4.2 Field assessment**

<b>Slope (°)</b>	Generally 0-10 degrees slopes in low-lying areas. Some areas undulating within Beach soil landscapes. Conditions apply to steeper slopes >18 degrees.
<b>Drainage/ Watershed</b>	The APZ's and SFAZ's mechanical works including mowing, slashing and hand removal are within most areas of 0-5 degrees and 5-10 degrees slopes.
<b>Riparian areas</b>	Several of the reserves have riparian zones. Conditions on hazard reduction works apply within these areas.
<b>Vegetation</b>	The detailed vegetation survey by Council identified 20 forest types within the study area as described within the GLC Vegetation Strategy, 2004 in summary these include; Dry Blackbutt, Blackbutt Bloodwood/Apple, Heath, Disturbed Heath, Scrub, Paperbark, Paperbark/ Swamp Oak, Paperbark/Flooded Gum, Swamp (Freshwater), Swamp Mahogany, Swamp Mahogany/ Paperbark, Swamp Oak, Mangrove, Swamp (Estuarine), Palm, Tuckeroo, Mixed Pine, Sand Ridge and Cleared/Grassland.  APZ works are predominantly within Blackbutt Bloodwood/Apple, Swamp Mahogany, Heath, Disturbed Heath and grassland (cleared areas). Smaller isolated areas altered by APZ works include Paperbark/ Flooded Gum, Palm, Mixed Pine and Paperbark vegetation community types.



<b>Habitat trees (Hollows / dead)</b>	Hollow bearing trees are present within the local area but not impacted by fire mitigation works. Therefore, negative impacts on the habitat values for hollow-dependant fauna are minimal as a consequence of the planned works.
<b>Size class of trees</b>	Tree heights are generally between 8–15 metres for forested wetland forest; 12–20 metres dry Sclerophyll Forest; with generally a 40–60% cover in drier communities (occasionally 30%) and 60% cover in wetter communities.
<b>Shrub and ground cover</b>	Small trees and shrubs present, with ground covers present in most communities. Within dry sclerophyll forests shrubs are dry in nature and are sparse to moderate (due to under scrubbing), to a height of 3–metres, occasionally 5–metres within Blackbutt Bloodwood/Apple. Ground cover is sparse to moderate to 0.5–metres in height. The ground cover layer can also be dense to 2–metre in height. Within the Forested wetlands, shrubs may form a moderately dense layer 2–5 metres in height. Within heathlands/dry sclerophyll forest shrubs are moderate to dense (2–5–metres) with an over storey of Banksia and Coastal Blackbutt. Within some regrowth areas relict pine are intermixed and emerge above the tree canopy from 15–20–metres in height. Within each vegetation community, the species diversity is variable.
<b>Fallen timber</b>	There is evidence of some larger timber retained on the ground as well as smaller timber found amongst the litter layer, across most natural communities.
<b>Rocky outcrops</b>	None present.
<b>Wet areas</b>	Riparian zones are adjacent to the lake and in low-lying areas within forested wetlands. Introduced garden escapes can be found in these wetter areas within some reserves. Conditions apply to these and within drainage lines within FMZ's.
<b>Corridors</b>	The reserve areas although disjunct provide a habitat corridor which links with the adjoining bushland areas and provide corridors through and around the urban and rural areas. These are mapped key regional corridors in the study locality based on mapping by the DECC.
<b>Faunal refugia</b>	Within the various public reserves and drainage easement remnant vegetation provides habitat for birds and smaller arboreal animals. Larger reserves are very important to local species for habitat and refuge. It provides movement, dispersal through the reserves and into the very large high value remnant habitats. Important refuge habitat exists across most reserves including tree hollows.
<b>Evidence of Threatened species</b>	None recorded in the field during this assessment.
<b>Noxious weeds</b>	Noxious weeds have been recorded within the Tuncurry area including; Bitou Bush, Blackberry, Crofton Weed (W3 category weeds); Mist Flower, Mother-of-Millions, Pampas Grass (W2 category weeds). There are also environmental weeds within some of the reserves including Lantana, Asparagus Weed (Ferny and Ground), Morning Glory (Coastal and Dunny Creeper) and Cassia.
<b>Cave, mines or tunnels</b>	None recorded.
<b>Past Disturbance</b>	Clearing and mowing has occurred in areas maintained as open space areas and reserve areas. In addition (authorised and in some cases unauthorised) clearing by neighbours has encroached within the adjoining reserve, and often leads to the dumping of rubbish (garden refuse) and establishment of escaped garden plants. There is minimal invasion of weeds or noxious weeds identified within FMZ's within natural bushland areas. Authorised maintenance by mowing/slashing of former FMZ occur within some areas
<b>Water points</b>	Rivers, creeks, dams, boat ramps or Wallis Lake.

<b>Fire disturbances</b>	There is evidence of wildfires having occurred within some of the reserves.
<b>Fire Assessment</b>	<p>Within proposed FMZ's; there is a variation of fuel loads within the reserves in Tuncurry. Ongoing maintenance in managed open space areas or former FMZ's resulted in having low fuel loads. Reserves conserved for environmental protection and not managed for open - space had higher fuel loads present.</p> <p>Bark fuels - Low, moderate, high and very high (0 to 5t/ha)                  Surface fuels - Low. Moderate, high and very high (&lt;4 to 12 t/ha)                  Elevated fuels - Low. Moderate, high, very high and extreme (0 to 10t/ha)</p> <p><b>Overall Fuel Loads = Low to high/very high where bark hazard is low-moderate.</b>  <b>Overall Fuel Loads = Low to high/very high where bark hazard is high.</b>  <b>Overall Fuel Loads = Moderate to extreme where bark hazard is very high.</b></p>
<b>Fire advantages</b>	The APZ's and SFAZ's provide advantage lines for fire fighters behind residential properties, along laneways and unformed roadways. Access on managed reserves across mown open space areas enable fire fighters good egress in the event of a fire.
<b>Additional comments regarding fire assessment</b>	Adjoining properties are required to undertake hazard reduction works, which is certified by the NSW Rural Fire Service.

4.3 Significant features

<b>Conservation Significance (National/state/local natural or cultural heritage values)</b>	<p>There is some mapped vegetation communities within the study area that have state significance, as they are known or likely to be endangered ecological communities (EEC). This includes 'Swamp Sclerophyll Forest on Coastal Floodplains of the North Coast Bioregions'; Swamp Oak on Coastal Floodplains; Littoral Rainforest and Coastal Saltmarsh.</p> <p>Forests communities within the LGA considered regionally vulnerable with a 100% conservation target in the Lower North East of NSW by the Lower North East Comprehensive Regional Assessment (CRA) and the DECC are:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> 31 Paperbark (including those within modified forests) is a highly significant forest community.</li> <li><input type="checkbox"/> 30/ 31 Swamp Mahogany/ Paperbark (APZ works)</li> <li><input type="checkbox"/> 31/32 Paperbark/ Swamp Oak (APZ works)</li> <li><input type="checkbox"/> 32 Swamp Oak (SFAZ works)</li> <li><input type="checkbox"/> 92 Escarpment Red Gum</li> </ul> <p>In a regional context those forest community considered regionally rare or with a 100% conservation target in the CRA are:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> 45 Tallowwood</li> <li><input type="checkbox"/> 33 Mangrove</li> <li><input type="checkbox"/> 68 Red Mahogany (APZ works)</li> <li><input type="checkbox"/> 223 Heath</li> <li><input type="checkbox"/> 231 Swamp</li> <li><input type="checkbox"/> 6-7,22-25 Rainforest</li> </ul> <p>In a regional context those forest community considered being severely depleted in the CRA are:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> 37 Dry Blackbutt /45 Tallowwood</li> <li><input type="checkbox"/> 42 Blackbutt/Sydney Peppermint/Smoothbarked Apple</li> </ul>
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	<p>Existing reserves and reserve management can serve to protect these areas from further degradation by unauthorised works. Authorised fire mitigation works occurs within 3 of these vegetation communities; however the impact is minimal and is often within the transitional zone, or areas which have been formerly disturbed.</p> <p>The activities will affect some wetland areas and/or riparian areas, but will have a minimal, short-term effect on the environment as works are conditioned and customised. The size of the works is minimal compared to the remaining area within the reserves.</p>
<b>State Environmental Protection Policy (SEPP)</b>	<p>Within the study area the SEPPS which occur includes: SEPP 14 - Coastal Wetlands (Duck Swamp and surrounding area &amp; Ohmas Wetland Reserve 626)</p>
<b>Plants (ROTAP's or threatened species, communities, critical habitats and regionally significant species) Cont -</b>	<p>Four (4) plant are listed under Schedule 2 of the <i>Threatened Species Conservation Act, 1995</i>, which occurs in the vicinity of Tuncurry being <i>Asperula asthenes</i> and <i>Lindernia alsinoides</i>; <i>Allocasuarina simulans</i> and <i>Allocasuarina defungens</i>, are associated with Forested Wetlands and Heathlands respectively. Three (3) of these plants species are listed as ROTAP's. ECC such as 'Swamp Sclerophyll Forest on Coastal Floodplains of the North Coast Bioregions'; 'Swamp Oak on Coastal Floodplains'; and 'Coastal Saltmarsh' occur within the wider study area. Due to the locality of these recordings no further assessment was required as there is no impact on these species and communities from proposed activities.</p>
<b>Animal (regionally rare or threatened species, communities, critical habitats)</b>	<p>Twenty-one (21) threatened species are known to occur within the study area or within 5km radius of activities within Tuncurry, based on site records and data contained in the Atlas of NSW Wildlife. A procedure for determining which of these species requires assessment under Section 5A of the EP&amp;A Act has been undertaken within Attachment 1 &amp; 2.</p>
<b>Water Catchment values including identified high conservation value subcatchment</b>	<p>Tuncurry study area is within the Wallis Lake Catchment area. Conservation of the transitional zones on the lake and river edge is important to many vegetation communities found within this zone. Council promote healthy waterways and activities in support of the management of the catchments values.</p>
<b>Known or potential for Indigenous heritage values</b>	<p>The Lower Hunter Zone, BFMC Bushfire Risk Management Plan does not identify any archaeological or aboriginal heritage sites in or near the urban area. In addition the DECC (Parks and Wildlife Division) maintained Aboriginal Heritage Information Management System (AHIMS) search for Aboriginal Objects and Aboriginal Sites did not identify any aboriginal sites within Council land where FMZ are proposed.</p>
<b>Historic heritage values (eg. historic places, movable heritage or relics)</b>	<p>The proposed activities do not impact on any areas of historic values recorded within the FMZ's in Tuncurry.</p>
<b>Recreation</b>	<p>There will be minimal impact to recreational pursuits as the activities within the reserves are mechanical works which can occur at the same time public are visiting the reserve due to the small area of the reserve is being maintained.</p>

<p><b>Scenic and visually significant</b></p>	<p>Forested Wetlands, Heathlands and Dry sclerophyll forests, surround the proposed activities within the various sites. The mechanical works will ensure the over storey shrubs and trees remains intact. The ground covers will be most affected with some impact on the shrub layer. The area will be slashed which ensure a ground cover remains within the FMZ's (although reduced in height) and that where appropriate 25-30% of the area is retained for habitat. There is minimal impact on the soil by slashing/ mowing or hand removal. Where appropriate slashing shall be conducted five (5) centimetres above the ground to protect the land surface.</p> <p>The regrowth of the area ensures that plants can continue to mature and set seed. The frequency of works in the forest area ensures the fuel loads are maintained below 8 tonnes per hectare and occur at least annually. Grassed areas are periodically mown more frequently to ensure grass height remains to meet the required guidelines.</p>
<p><b>Education</b></p>	<p>Council encourages community education, which meet Council policies and guidelines within the FMP. Asset protection zone signs promote Council fire management activities.</p>
<p><b>Interests of external stakeholders (eg. apiarists, leaseholders)</b></p>	<p>The proposed activities are within 20 different reserves and various road reserves in Tuncurry with adjacent residents being of most interest to the works. The public exhibition of the Fire Mitigation Plan- Tuncurry enables the community to make comments on the activities proposed. In addition neighbouring properties may be advised by letterbox drop of the proposed activity or notified through other media such as radio or press release.</p>

**(5) Environmental Impacts**

	Yes or No <sup>25</sup>	likely impact: negligible, low, medium or high adverse; positive, n/a	Justification for significance of impact including safeguards and receiving environment?
<b>5.1 Physical issues</b>			
1. Does the proposal disturb ground features including filling or excavation?	No	N/A	
2. Does the proposal affect a waterbody, watercourse or wetland?	Yes	Negligible, low	Minimal compaction by heavy machinery (tractor) when slashing. Removal of debris repeatedly on an area may result in minimal soil disturbance. Erosion will be monitored throughout the implementation and completion of the works. Appropriate erosion control measures (sediment traps) will be put into place to prevent soil erosion as necessary. Works in riparian zones will be strictly controlled and minimised.
3. Does the proposal change flood or tidal regimes, or is it affected by flooding?	No	N/A	
4. Does the proposal use or transport hazardous substances?	Yes	Negligible, low	A small amount of fuel will be used in mowers and whipper-snippers, which are carried in certified fuel containers in accordance with the Dangerous Goods Act.
5. Does the proposal generate or dispose of gaseous, liquid or solid wastes?	No	N/A	
6. Will activity emit dust, odours, noise, blasts or radiation in the proximity of residential areas?	Yes	Negligible	Increased noise generated from machinery mowing or slashing the areas.
7. Does the proposal affect coastline or dunes, alpine areas, karsts features, unique landforms or groundwater recharge areas?	Yes	Negligible	Undertake works >20 m from Mean HWM to retain soil stability in these sensitive estuarine areas.
8. Does the proposal affect erosion prone areas or areas with slopes greater than 18°?	No	N/A	No works present on steep slopes >18°. Those from 15-18° require erosion control netting or retention of fallen logs to reduce and prevent erosion.
9. Does proposal affect subsidence or slip areas?	No	N/A	
10. Does proposal affect areas with acid sulphate, sodic or highly permeable soils?	No	Negligible, low	Works below SL or 1-2m below SL affects acid sulphate soils. However the mechanical works within reserves will not be below SL and have minimal surface soil disturbance from machinery driving over the area while mowing or slashing. The acid sulphate soil risk only occurs within when works are below ground level.

<sup>25</sup> If yes is selected, both other columns need to be completed. If no, just select n/a in the likely impact column.

	Yes or No <sup>25</sup>	likely impact: negligible, low, medium or high adverse; positive, n/a	Justification for significance of impact including safeguards and receiving environment?
11. Does the proposal affect areas with salinity or potential salinity problems, or groundwater recharge areas?	No	N/A	
12. Is the proposal within a SEPP 14 – Coastal Wetland or SEPP 26 –Littoral Rainforest or equivalent?	No	N/A	No new works are proposed within SEPP 14 or SEPP 26.
<b>5.2 Biological Issues</b>			
<b>5.2.1 Flora</b>			
1. Have you accessed flora databases?	Yes		Refer to Attachment 2.
2. Has the site been surveyed for flora, including ROTAPs and threatened species?	Yes		No ROTAP or threatened species were found within the proposed FMZ's.
3. Were any habitats or species of significance or potential significance noted (eg. wildlife corridors, remnant vegetation, inadequately reserved plant communities)?	Yes	Low	Fire mitigation works occurs within two (2) vegetation communities considered vulnerable (Paperbark and Swamp Mahogany/ Paperbark) and one (1) regionally rare (Dry Blackbutt/Tallowwood) however the impact is minimal as activities are within the transitional zone where the land has been formerly disturbed. Activities are within recorded fauna wildlife corridors however the FMZ's area is small with minimal disturbance to the understorey and ground cover with no impact on the tree canopy.
4. Does the site have cultural landscape values?	No	N/A	
5. Is the vegetation to be cleared or modified including any ROTAPs, threatened species or communities?	Yes	Low	The vegetation is to be modified, within the ground and shrub layers with no impact on ROTAP species. There are no threatened plant species recorded where works are proposed, however one (1) species was recorded within the study area and three (3) within 5km radius of activities. No 7-Part Test of significance is required. Hospices are to be retained to provide habitat and discontinuous vegetation structure.
<b>5.2.2 Fauna</b>			
1. Have you accessed all available DECC (NSW) fauna databases (eg. Wildlife Atlas)?	Yes		DECC threatened fauna and flora records have been viewed and details in particular of threatened species are within Attachment 1.
2. Has the site been surveyed for fauna, including for threatened species?	Yes		No threatened species were found within the FMZ's.
3. Were any habitats or species of significance (including threatened species) or potential significance noted?	Yes		Ten (10) threatened species are known to occur within the study area and nineteen (19) within a 5km radius of activities in Tuncurry, based on site records and data

	Yes or No <sup>25</sup>	likely impact: negligible, low, medium or high adverse; positive, n/a	Justification for significance of impact including safeguards and receiving environment?
			contained in the wildlife Atlas NSW. No 7-Part tests of significance are required to assess the likely impact of the activity (Attachment 1 &2).
4. Does the activity displace or disturb fauna or create a barrier to movement?	Yes	Negligible, low	The mechanical slashing will disturb some fauna temporarily. The reduced habitat is very small in size. Hospices and adjacent conservation zone provides habitat for smaller reptiles, birds and insects.
<b>5.3 Community Issues</b>			
1. Does the proposal affect the existing use of community services or infrastructure including access or increased visitation?	Yes	Low/Positive	Some APZ's will allow access to the rear of houses. Leaving hospices to reduce visual access into these areas and thus discourage pedestrian access. Some areas require barriers such as bollards or gates to restrict access, where any such access is inappropriate. Policing of the private storage of equipment in any APZ will be conducted.
2. Does the proposal affect or change the transport requirements of an area?	Yes	Negligible	Machinery/ lawn mowers may be unloaded from vehicles on the roadside but disturbances are only temporary.
3. Does the proposal affect sites of importance to local or broader community for their recreational or other values?	No	N/A	
4. Has consultation with the potentially affected community been undertaken?	Yes	Low/Positive	The community has been notified of the Fire Mitigation Plan - Tuncurry that details the proposed activities. The Plan will be publicly exhibited.
5. Does the proposal affect the use of, or the community's ability to use, natural resources, especially water?	No	N/A	The public uses the open space areas that are also FMZ's. The community in these areas prefers the short grass.
6. Does the proposal affect the visual or scenic landscape?	Yes	Low	The proposed activities will cause short-term visual changes to the landscape, as the area will be able to be accessed and viewed from the adjoining properties.
<b>5.4 Ecological Communities and General Impact</b>			
1. Is the activity likely to cause a threat to the biological diversity or ecological integrity of a community?	No	N/A	
2. Is the activity likely to introduce noxious weeds, vermin, feral species or genetically modified organisms into an area?	Yes	Negligible	The disturbance of the ground layer species may enable weed species to invade. Targeted ongoing weed management will control the spread of weeds in these areas.

	Yes or No <sup>25</sup>	likely impact: negligible, low, medium or high adverse; positive, n/a	Justification for significance of impact including safeguards and receiving environment?
3. Is the activity likely cause a bushfire risk? or changes the fire regime	Yes	Medium/Positive	The FMZ's are primarily to provide protection to the community in the event of a fire. The reduced ground fuels reduce the chance of fire.
Is the activity likely to have any other potential impact on flora, fauna or ecological communities?	No	N/A	
Bushfire prone areas	Yes		Part of the study area (70%) is recorded and mapped as bushfire prone land.
<b>5.5 Cultural Heritage Issues</b>			
<b>5.5.1 Aboriginal heritage</b>			
1. Have you accessed the NPWS Aboriginal sites register?	Yes		A DECC Aboriginal Heritage Management System (AHIMS) search revealed no sites within the areas proposed for hazard reduction activities.
2. Has an assessment been carried out in order to determine the likelihood of occurrence of Aboriginal relics or places of significance?	Yes		No further aboriginal sites were located during field inspections.
3. Does the proposal affect Aboriginal relics or places of significance or importance to the Aboriginal community?	No	N/A	As some areas have not previously subject to slashing, trittering or removal of many trees (or significant trees) the DECC (Cultural Heritage Division) was contacted. No trees greater than 100cm were identified for removal.
4. Does the proposal affect areas nominated or declared as Aboriginal Places?	No	N/A	
5. Does the proposal affect areas subject to land claims or Native Title claims?	No	N/A	
<b>5.5.2 Historic heritage</b>			
1. Has the area been surveyed or assessed for heritage items or historical archaeological sites?	Yes		While there were known historic sites within Tuncurry, no known historic areas were identified as being within areas where hazard reduction works have been proposed.
2. Does the proposal affect known heritage items or historic archaeological relics?	No	N/A	
3. Has a conservation plan or other conservation assessment been prepared for the place? If so, is the proposed activity in accordance with the conservation plan or assessment?	No	N/A	



	Yes or No <sup>25</sup>	likely impact: negligible, low, medium or high adverse; positive, n/a	Justification for significance of impact including safeguards and receiving environment?
<b>5.6 Biological issues during construction</b>			
<b>5.6.1 Natural Resource Use Issues During Construction and Operation</b>			
1. Is the activity likely to result in the degradation of the reserve or any other area reserved for conservation purposes?	Yes	Negligible, low	The removal of some ground covers and shrubs within a small proportion of the reserves will have minimal effect on conservation values of the area.
2. Is the activity likely to involve the use, wastage, destruction or depletion of natural resources including water, fuels, timber or extractive materials?	Yes	Negligible	Removal of shrubs and ground covers from the area to a local refuge area ensures green waste does not remain in the FMZ's.
3. Is the activity likely to have any other impact on natural resources?	No	N/A	

**Summary of environmental impacts**

The overall impacts of the proposed activities are considered to be low. The activities are considered to have a positive impact on neighbouring properties. The main impacts will be the mechanical hazard reduction of the FMZ, which is localised, with short-term displacement of some fauna. These impacts, however, are not considered to be significant for the following reasons:

- The area that is involved is small compared to the total adjacent reserve area.
- Erosion controls will be implemented as required.
- No recorded threatened plant species are known to occur within the proposed activities area.
- The proposed activities will have no or minimal impact on the threatened fauna of the area (Refer to Attachment 1 & 2).

**(6) Environmental Safeguards**

The proposed activities within the FMZ's are to ensure activities meet legislative and policy guidelines. In addition to ensure environmental safeguards (Fire Mitigation Program) are implemented options for conditions guided by the Code, planning documents and legislation.

**Environmental Safeguards**

No.	Action
1	Prior to any hazard reduction works, the required APZ width within this plan is measured from the boundary of the reserve. N.B. In order to determine the required width of the APZ, the setback from the adjacent asset (house etc) combined with existing slope determines the maximum width as per the Code and defined specifically within the Plan. The APZ shall be staggered depending on the setback (of assets) within adjacent properties, to further minimise the area affected.
2	Under scrubbing shall be conducted sensitively, with selected understorey clumps marked to be retained. The area to be retained is approximately 30% of the total area.
3.	All trees and shrubs in excess of 3m to be retained, except where canopy separation or access trail is required. Determination for removal must be by an authorised Council Officer.
4.	Large fallen logs (where applicable) shall be retained, with care taken where epiphytes exist.
5.	Trees greater than 3m to be marked/approved for removal in consultation with the Parks and Recreation Section. In this case, trees shall be selected based on bark hazard (flammability), health, desirability (feed trees etc) and shall be clearly marked or area described for action.
6.	All Cabbage Tree Palms greater than 500mm in height shall be retained, as this is a protected plant.
7.	Rainforest shrubs and fire retardant plant species shall be selectively retained within the APZ.
8.	Protect & retain all bush rock.
9.	The works shall target noxious weeds and environmental weeds.
10.	Remove fuel reduction work debris from site to an authorised area for disposal. Approval to store removed fuel before disposal must be sought from an authorised officer.
11.	The DECC (Cultural Heritage Division) must be contacted to assess impact of proposed works when: <ul style="list-style-type: none"> <li>▪ Areas that have not previously been subject to slashing, trittering or removal of many trees (or significant trees) or trees are greater than 100cm diameter (at breast height) are identified for removal. Conditions will be given that apply to proposed works.</li> </ul>
12.	Skirting (removal of lower branches) to separate tree canopy from the ground or understorey vegetation should be used in preference to tree removal where appropriate in consultation with the Parks and Recreation Section.
13.	Undertake field survey for target threatened species when specified within the REF, to ensure safeguards can be implemented to protect species, which occur or have moved into the area (Refer to the REF for further details).
14	In steeper areas retain fallen logs to assist in reducing and preventing soil erosion by placing across the slope to slow soil movement.
15	Herb and shrub layer retention at the base of the trees or left as clumps or hospices to provide cover for fauna.

**(7) Conditions as Guided by the Code.**

The following mechanical hazard reduction conditions are for works formally identified in the Plan. The list is to be reviewed for various FMZ as alternative conditions apply to each zone.

**Hazard Reduction Conditions: Mechanical**

✓	Preference shall be given to the retention of smooth barked trees and large trees with hollows.
✓	Trees and shrubs up to 3 metres in height may be removed as part of the hazard reduction activity approved as described within this report or specified on site by an authorised Council Officer.
✓	Dangerous trees may be removed but only with the approval of Great Lakes Council.
✓	Slashing and trittering shall not be carried out on slopes exceeding 18 degrees.
✓	The works shall be carried out in a manner to ensure the retention of topsoil on the ground surface.
✓	Council shall comply with any relevant management actions identified in the NPWS Threatened Species Hazard Reduction schedule.
✓	Council shall comply with any relevant management actions identified through referral to NPWS Cultural Heritage Division with regard to Aboriginal heritage sites>.
✓	Soil moved by ploughing or blading shall be redistributed evenly over the effected area. Natural or assisted re-vegetation of the effected area is to be encouraged in order to prevent soil erosion.
✓	Where a fire break is to have a slope length greater than 60 metres, slashing/trittering is the preferred hazard reduction method. Mowing may be used when existing maintenance type compliments management objectives.
✓	This REF does not permit the use of graders and dozers to clear native vegetation.
✓	This=REF does not permit the re-shaping of the soil surface or the redirection of overland flows.
✓	Hazard reduction works are not permitted within 10 metres for APZ/ or 20 metres for SFAZ of a stream, wetland, lake or swamp.
✓	This certificate does not permit the removal of trees on slopes greater than 18 degrees.
✓	Herbicides shall not be permitted within 10 metres of any riparian area.
✓	Herbicides shall only be used in accordance with the <i>Pesticides Act 1999, the Protection of the Environment Operations Act 1997</i> and the directions on the herbicide container label.
✓	Restricted mechanical works within coastal dune vegetation within 100m of mean high water mark (HWM), freshwater wetlands and rainforests except the manual removal of noxious and environmental weeds.

**(8) Conclusion & Recommendation**

In considering the degree of impact of fire management works overall, high ranking is triggered if a number of individual categories are considered to be high, or if one particular category is particularly significant. Tick statement that applies.

<input type="checkbox"/>	The proposal is not likely to have a significant impact on the environment. No further assessment is required. The proposal is recommended for unconditional approval
<input checked="" type="checkbox"/>	<b>The proposal is not likely to have a significant impact on the environment. No further assessment is required. The proposal is recommended for conditional approval.</b>
<input type="checkbox"/>	The proposal is likely to have a significant (medium or high) impact on the environment. It is recommended that an EIS / an EIS and SIS be prepared.
<input type="checkbox"/>	The proposal will have a significant impact on the environment and or community/cultural values and it is recommended that the proposal not proceed

## Wildlife Atlas

## Attachment 1

Information was derived from Council records and a Search of the NSW Department of Environment and Conservation (DECC) Atlas of NSW Wildlife for threatened fauna and flora species present within the Tuncurry study area. [Data from the database was extracted in February 2007 and contains data from sources including government agencies, non-government organisations and private individuals. (N.B. These data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. (DECC 2007). 'Copyright NSW Department of Environment and Conservation']

## Flora

Family	Species	Within the Study Area	Within 5km of Study Area	Threatened Species	ROTAP Code <sup>26</sup>
Rubiaceae	<i>Asperula asthenes</i>	x	✓	V	3VC
Scrophulariaceae	<i>Lindernia alsinoides</i>	✓	✓	E1	
Casuarinaceae	<i>Allocasuarina simulans</i>	x	✓	V	3VC-
Casuarinaceae	<i>Allocasuarina defungens</i>	x	✓	E1	2E

## Fauna

Family	Scientific Name	Common Name	Within Study Area	5km of Study Area	Legal Status
<b>Class –Aves</b>					
Accipitridae	<i>Pandion haliaetus</i>	Osprey	✓	✓	V
Burhinidae	<i>Esacus neglectus</i>	Beach Stone-curlew	x	✓	E1
Ciconiidae	<i>Ephippiorhynchus asiaticus</i>	Black-necked Stork	x	✓	E1
Charadriidae	<i>Charadrius mongolus</i>	Lesser Sand Plover	x	✓	V
Haematopodidae	<i>Haematopus fuliginosus</i>	Sooty Oystercatcher	x	✓	V
Haematopodidae	<i>Haematopus longirostris</i>	Pied Oystercatcher	✓	✓	V
Laridae	<i>Sterna albifrons</i>	Little Tern	x	✓	E1
Psittacidae	<i>Lathamus discolor</i>	Swift Parrot	x	✓	E1
Scolopacidae	<i>Limosa limosa</i>	Black-tailed Godwit	x	✓	V
Scolopacidae	<i>Xenus cinereus</i>	Terek Sandpiper	x	✓	V
Scolopacidae	<i>Calidris tenuirostris</i>	Great Knot	✓	x	V
Strigidae	<i>Ninox strenua</i>	Powerful Owl	✓	✓	V
Tytonidae	<i>Tyto novaehollandiae</i>	Masked Owl	✓	x	V
Tytonidae	<i>Tyto capensis</i>	Grass Owl	✓	x	V
<b>Class – Mammalia</b>					
Phascolarctidae	<i>Phascogale tapoatafa</i>	Brush-tailed Phascogale	x	✓	V
Phascolarctidae	<i>Phascolarctos cinereus</i>	Koala	✓	✓	V
Petauridae	<i>Petaurus norfolcensis</i>	Squirrel Glider	✓	✓	V
Pteropodidae	<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	✓	✓	V
Pteropodidae	<i>Syconycteris australis</i>	Eastern Blossom Bat	x	✓	V
Vespertilionidae	<i>Miniopterus australis</i>	Little Bentwing-bat	x	✓	V
Vespertilionidae	<i>Miniopterus schreibersii oceanensis</i>	Eastern Bent-wing Bat	x	✓	V
Vespertilionidae	<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath tail-bat	x	✓	V

<sup>26</sup> ROTAP CODE: 2 Geographic range less than 100 km 3 Geographic range greater than 100 km  
 C- Adequacy of conservation not known but does occur in at least one conservation reserve.  
 K Poorly known species but considered likely to be rare, vulnerable or endangered.  
 R Rare species

Family	Scientific Name	Common Name	Within Study Area	5km of Study Area	Legal Status
Vespertilionidae	<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	*	✓	V
Vespertilionidae	<i>Vespadelus troughtoni</i>	Eastern Cave Bat	✓	*	V
<b>Class – Amphibia</b>					
Myobatrachidae	<i>Crinia tinnula</i>	Wallum Froglet	✓	✓	V

**Section 5A EP&A Act 1979 – 7-Part Test of Significance**

**Attachment 2**

Threatened Species Considerations:

- *Is the activity likely to significantly affect threatened species, populations or ecological communities, or their habitat (s.5A EP&A Act 1979).* (Note: A species impact statement (SIS) is required if activities is on land that is, or is part of critical habitat or there is likely to be a significant effect as determined under s.5A of the EP&A Act 1979).

There are a number of threatened species (flora and fauna) that has been identified within the study area (and 5km radius from activities). Those that pertain to estuarine and water way areas, which do not inhabit forest areas, have been excluded form the assessment as works are not within these areas.

Those remaining are those defined as potential subject threatened species “considered likely to occur within habitats of the study area that are impacted by hazard reduction works”. A preliminary assessment of the impact on species in the following table details a summary of habitat attributes and species requirements with regard to the impact of works on the species. A 7-Part Test is only required where there is a risk/chance of potential impact arising from the works such that significance of these risks can be ascertained.

Common Name / Status	Comments – Section 5A Assessment requirement	Assessment Not required <input type="checkbox"/> (No significant impact) Required <input checked="" type="checkbox"/>
<b>Swift Parrot</b>	Preferred habitat of this species is within dry sclerophyll forests utilising winter flowering trees for foraging (Forest Red Gums) and tree hollows for nesting. The proposed FMZ activities have limited impact on this species as no tree removal is recommended and the limited mechanical works has minimal impact on their life cycle.	*
<b>Masked Owl</b>	Relying on presence of high densities of tree hollows for nesting this species occupies drier more open forests than the Powerful Owl, where it forages mainly on ground mammals. Known to frequent modified forest areas and bushland fringes foraging for prey with a home range up to 1,100 hectares. The limited area modified for fire mitigation works has minimal impact on this species.	*
<b>Squirrel Glider</b>	In coastal areas, the nocturnal Squirrel Glider occupies Blackbutt, Bloodwood and Ironbark forest with heath understorey. The gliders are more likely to inhabit mature or old growth forest, as they require abundant tree hollows for refuge and nest sites. The proposed FMZ’s have minimal hollows present. Squirrel Gliders have been recorded nearby to the proposed fire mitigation works however works occur within the understorey and not within the canopy where roosting sites occur.	*

Common Name / Status	Comments – Section 5A Assessment requirement	Assessment Not required <input type="checkbox"/> (No significant impact) Required <input checked="" type="checkbox"/>
<b>Koala</b>	Being an arboreal marsupial inhabits forest and woodland communities. Koalas rely on over storey trees and shrubs for food and shelter, with preference to local species such as Tallowwood and Swamp Mahogany. There is both core and secondary habitat within the study area with recorded sightings of individual koalas locally. The activities are modifying the shrub and groundcover layers found within the FMZ's and do not affect Koalas preferred tree species for resting or feeding. Although under SEPP 44, there are listed Schedule 2 Koala feed trees, which do occur in some reserves. The minimal vegetation modification would not impact adversely on this species. When implementing hazard reduction burning undertake low intensity burning to minimise impact on habitat.	x
<b>Grey Headed Flying Fox</b>	The Grey-headed Flying fox predominantly occurs in subtropical and temperate rainforests, heaths and swamps. Locally recorded in Wetland Forests in the study area may utilise tree species during flowering periods. They forage on the nectar and pollen in particular in <i>Eucalyptus</i> , <i>Melaleuca</i> and <i>Banksia</i> 's, which do occur within the study area. The proposed activities will only modify surface (leaf litter) and near surface (shrubs) fuels and will have no impact on tree canopies where the Flying-fox feeds and roosts. However, no Grey-headed Flying-foxes have ever been sited within the proposed FMZ's.	x
<b>Little Bentwing Bat/Eastern Bentwing Bat</b>	Critically relying on caves for roosting sites, but forages through the understorey of woodlands and forest areas. No caves were located in the FMZ's for which these species may inhabit. No other structures locally are known to support this species in the study area. The small modification of the area would not adversely affect the lifecycles of this species. When implementing hazard reduction burning undertake low to medium intensity burning to minimise impact on habitat.	x
<b>Wallum Froglet</b>	Requirements of this species are within the fringes of freshwater swamps and forested wetlands, which are within low-lying areas. When water levels are high this species may frequent the surrounding fringes including those found within these vegetation formations. No populations were located or suitable habitat, which is exposed to ephemeral inundation, was present within or adjacent to fire mitigation work areas.	x

As a consequence it is concluded that there would be insignificant impact on the lifecycles, habitat disruptions or conservation status of the potential species due to factors such as:

- The small area of works in relation to the adjacent larger are of the reserve retained for conservation;
- The minimal impact on species as they do not inhabit the understorey which has minimal modification;
- The retention of key habitat features including the protection of tree hollows and important vegetation;
- The retention of hospices and over storey and canopy species;
- The environmental safeguards and conditions enclosed within the Plan; and
- The low impact nature of proposed activity and the ability of the bushland area to sustain fire within biodiversity thresholds.

**The discussion in the above table and the resultant conclusion; that there is not significant impact on species, additional Species Impact Statement (SIS) is not deemed required for any of the species.**

APPENDIX XIII – Bushfire Threat of Assets

Life & Property Code	EXISTING ASSETS - Human Settlement (Bushland interface with residential properties on roadways)	IDENTIFY RISKS		ANALYSE RISKS				
		Vegetation Community	Vegetation Formation	Classification of Vegetation Type (BFRMP)	Distance from Hazard (On GLC Land)	Fire Run Distance	(Potential Bushfire Hazard (Threat) Rating - non-hazard, low, medium, high, very high)	
							Bushfire Risk (Hazard Rating using Vegetation & Slope)	Threat rating (Bush Fire Risk vs Distance from Hazard)
LP1	Tulloch Road (North)	Swamp Mahogany	Forested wetland	Forest	30-100m	>200m	Very High	Low
LP2	Grey Gum Road (East)	Mixed Pine	Pine Plantation / Dry Sclerophyll Forest	Forest	<30m	100-200m	Moderate	Medium
LP2	Dee Crescent	Blackbutt – Bloodwood/ Apple	Dry sclerophyll forests	Forest	<30m	>200m	High	Medium
LP2	Grey Gum Road (West)	Swamp Mahogany	Forested wetland	Forest	<30m	>200m	Very High	Medium
LP2	Wilsons Street	Blackbutt – Bloodwood/ Apple	Dry sclerophyll forests	Forest	<30m	>200m	High	Medium
LP2	Rennie Street	Blackbutt – Bloodwood/ Apple	Dry sclerophyll forests	Forest	<30m	>200m	High	Medium
LP2	Mayers Drive	Blackbutt – Bloodwood/ Apple	Dry sclerophyll forests	Forest	<30m	>200m	High	Medium
LP2	Constable Place	Blackbutt – Bloodwood/ Apple	Dry sclerophyll forests	Forest	<30m	>200m	High	Medium
LP2	Bahama Place	Blackbutt – Bloodwood/ Apple & Swamp Mahogany	Dry sclerophyll forests / Forested wetland	Forest	<30m	>200m	High - Very High	Medium
LP2	Montego Place	Swamp Mahogany	Forested wetland	Forest	<30m	>200m	Very High	Medium
LP2	Banksia Parade	Blackbutt – Bloodwood/ Apple	Dry sclerophyll forests	Forest	<30m	100-200m	Moderate	Medium
LP2	Wollomba Avenue	Blackbutt – Bloodwood/ Apple	Dry sclerophyll forests	Forest	<30m	100-200m	Moderate	Medium
LP3	Oasis Parade	Swamp Mahogany	Forested wetland	Forest	<30m	>200m	Very High	Medium
LP3	Mirage Drive	Paperbark /Swamp Oak & Swamp Oak & Mangrove	Forested wetland	Forest	<30m	>200m	Very High	Medium
LP4	Taree Street (Ohmas Bay)	Swamp Mahogany & Paperbark	Forested wetland	Forest	<30m	>200m	Very High	Medium
LP4	Rest Point Parade	Paperbark & Mangrove	Forested wetland	Forest	<30m	>200m	Very High	Medium
LP4	Point Road	Swamp Oak & Mangrove	Forested wetland	Forest	<30m	100-200m	Very High	Medium
LP5	Beach Street (South)	Disturbed Heath & Heath	Heathlands	Closed Scrub	<30m	>200m	Moderate	Medium
LP5	Beach Street (North)	Disturbed Heath & Heath & Dry Blackbutt	Dry sclerophyll forests / Heathlands	Forest / Closed Scrub	<30m	>200m	High - Very High	Medium
LP6	Pacific Parade	Heath & Dry Blackbutt	Dry sclerophyll forests / Heathlands	Forest / Closed Scrub	<30m	>200m	High	Medium
LP6	Heath Avenue	Mixed Pine & Dry Blackbutt	Pine Plantation / Dry Sclerophyll Forest	Forest	<30m	>200m	High	Medium
LP6	Flora Parade	Heath	Heathlands	Closed Scrub	<30m	>200m	Moderate	Medium
LP6	Cassandra Crescent	Heath	Heathlands	Closed Scrub	<30m	>200m	Moderate	Medium
LP6	The Lakes Way	Heath & Blackbutt – Bloodwood/ Apple	Dry sclerophyll forests / Heathlands	Forest / Closed Scrub	<30m	>200m	Moderate - Very High	Medium
	<b>Special Fire Protection</b>							
LP3	Tuncurry Public School	Blackbutt – Bloodwood/ Apple	Dry sclerophyll forests	Forest	0.1-1km	100-200m	Moderate	Low
LP3	Pre School/Child Care/Early Intervention Centre/Museum	Blackbutt – Bloodwood/ Apple	Dry sclerophyll forests	Forest	0.1-1km	100-200m	Moderate	Low
LP4	Great Lakes Caravan Park (South)	Swamp Oak	Forested wetland	Forest	<30m	>200m	Very High	Medium
LP5	Tuncurry Caravan Park & Camping Reserve (East)	Disturbed Heath & Heath	Heathlands	Closed Scrub	<30m	>200m	High	Medium
LP6	GLAICA Aged Care	Heath / Mixed Pine	Dry sclerophyll forests / Heathlands	Forest / Closed Scrub	<30m	>200m	Moderate	Medium-High
LP6	Tuncurry High School/TAFE	Heath & Dry Blackbutt	Dry sclerophyll forests / Heathlands	Forest / Closed Scrub	30-100m	>200m	High	Medium



APPENDIX XIII - Bushfire Threat of Assets - continued

Life & Property Code	EXISTING ASSETS Economic
LP1-6	Urban Areas
LP1	Race Course
LP2	Depot (GLC)
LP2	Waste Water Treatment Plant
LP2	Tuncurry Industrial Area
LP2	Transfer Pump Station (MidCoast Water - Chapman Road)
LP3	Tuncurry Sports Centre
LP3	South Street Recreation Reserve
LP4	Great Lakes Caravan Park (South)
LP5	Tuncurry Caravan Park & Camping Reserve (East)
LP6	Sub Station - Electricity
LP6	Power Transmission Lines (East of Cemetery)
LP6	Golf Course
LP6	GLC Sport & Recreation Grounds - Forster/Tuncurry Leagues Club
LP6	Football Ground - R 86532 (East)

Life & Property Code	EXISTING ASSETS - Cultural Assets
LP1	Roman Catholic/Church of England (R 21902) Cemetery
LP1	General Cemetery (R 21902)
LP2	Tuncurry Beach Access & Lookout Platform

Life & Property Code	EXISTING ASSETS - Environmental
LP1	Wallamba Broadwater (Millers Mistake)
LP2	SEPP 14 - Coastal Wetlands (Duck Swamp)
LP2	Flora Reserve -
LP2	SEPP 44 - Koala Habitat
LP2	Endangered Ecological Community (EEC) Swamp Sclerophyll Forest on Coastal Floodplains of the North Coast Bioregions
LP2 - 4	Vulnerable Community - Paperbark/Swamp Oak (31/32)
LP2 - 4	Forests considered regionally rare with 100% conservation target
LP2 & LP3	Endangered Ecological Community (EEC) Swamp Oak on Coastal Floodplains
LP2 & LP3	Vulnerable Community - Swamp Mahogany/Paperbark (31)
LP2 & LP6	Dry Blackbutt (37) and Tallowwood (45)
LP3	Swamp Oak (32)
LP3 & LP4	Endangered Ecological Community (EEC) Coastal Saltmarsh
LP4	Wallis Lake
LP4	SEPP 14 - Coastal Wetlands (Ohmas Reserve (Wetlands 626))
LP4	Vulnerable Community - Paperbark (31)
LP4	Mangrove (33)
All	Reserves Refer to Section 3



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