Draft Fire Mitigation Plan
~ Shearwater ~

Great Lakes Council

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Prepared by Great Lakes Council
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EXECUTIVE SUMMARY

Great Lakes Council, Fire Mitigation Plan – Shearwater has been prepared for Shearwater Estate, Industrial Estate and environs.

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

The insight and greater understanding into fire management planning by community and planners, provides the mechanism primarily to protect life and property.

The extreme, major and moderate bush fire risk in Shearwater Estate and the area mapped as being Bush Fire Prone Land guides fire management strategies in development assessment and strategic planning as well as planning for and implementing hazard reduction works.

The outcomes of this Plan have been based on fire risk assessments and implementation of hazard reduction within and adjacent to Shearwater Estate and Industrial Estate led.

The bush fire mitigation program identifies fire management zones such as asset protection zones, strategic fire advantage zones, land management zones and exclusion zones and highlights fire prevention, mitigation and suppression of bush fires.

The management of hazardous fuels or mitigation against imminent bush fires through cooperative education programs with other fire authorities prepares the community for such events.

ACKNOWLEDEMENTS

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SECTION 1

Introduction

Great Lakes Council has prepared this Draft Fire Mitigation Plan, to provide a comprehensive guide for fire management planning within the Nerong Area. Council have a responsibility to plan for the prevention, suppression and mitigation of fires and is assisted by the fire fighting authorities during fire operations in an event of a bush fire or an emergency.

The *Fire Mitigation Plan – Shearwater* (The Plan) covers Shearwater Estate and the Industrial Estate environs including the rural residential areas and encompasses road reserves and Council land in and around the Estates. The plan considers management by other authorities, agencies and private property objectives and management strategies.

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.

Scope and Purpose

This report is a tool to guide fire management planning. Specifically it assists land managers in, applying processes, using appropriate assessment methods and to identify strategic management programs, including resource requirements, and annual projects and maintenance programs.

The plan identifies the overall bush fire hazards within Council owned and managed land (Council Land) within the Estate and Industrial area and promotes hazard reduction works and coordinated fire planning through inter-agency liaison and Committees. The fire management strategies are detailed and the plan identifies programs and activities necessary for Council to protect life and property, community assets and to meet fire and environmental management responsibilities and obligations. The Plan has been prepared with reference to various legislative and planning controls. These include specific fire legislation such as the *Rural Fires Act 1997* (RF Act) and the *Rural Fires Legislation 2002*.

The *Local Government Act 1993* and other planning instruments such as the *Environmental Planning & Assessment Act 1979* (EP&A Act) guide Council functions and provisions of services. In preparing Local Environmental Plans (LEPs), zoning controls identify which areas require consent for bushfire hazard reduction.

The plan provides a resource for the community, agencies and other local authorities to refer to during the control and suppression of fires and when cooperatively planning hazard reduction works. The Lower Hunter Zone Bush Fire Management Committee (BFMC) can be

guided by the plan, for future reviews of legislative planning documents such as *the Lower Hunter, Bush Fire Risk Management Plan* (BFRMP) *and Operations Plan* (Ops Plan).

The field assessments and analysis on Council Land incorporates threats to life and property from adjoining properties, overall bush fire risks and subsequent bush fire hazard ratings, existing land management practices, approved fire management works, vegetation types and fire history. The proposed mechanical hazard reduction and fire regimes incorporate scientific analysis, fire threat to life and property, fire frequencies and the anticipated bush fire impact on the community.

Active management and involvement in ongoing hazard reduction by the community is important. The reduction of ground fuels and implementation of fire protection plans to prepare the home against the effects of fires, complements neighbouring hazard reduction works and improves the success of overall fire mitigation works within an area, in readiness for a likely fire event.

Specific hazard reduction activities and management tools have been identified by Council to implement within the plan. These strategies have been guided by documents prepared by the NSW Rural Fire Service (RFS) in consultation with Planning NSW[1] and the Parks and Wildlife Division of the NSW Department of Conservation (DEC) (and formerly NSW National Parks and Wildlife Service[2] (NPWS))including:

- ✓ *Bush Fire Environmental Assessment Code (commonly known as 'The Code') for asset protection and strategic fire advantage zones 2003* (BFEAC) and
- ✓ *Planning for Bush Fire Protection, A guide for Councils, planners fire authorities, developers and home-owners, 2001* (PFBFP).

In addition an environmental assessment considers and reports on the environmental impacts of proposed hazard reduction works, under such legislation as the *Threatened Species Conservation Act 1995 (TSC Act) and* EP&A Act.

Consultation with the stakeholders, neighbours, RFS and of the DEC, enabled a coordinated approach between Council, fire specialists and affected neighbours.

Specific policies, strategies and plans considered during the preparation of the fire management plan are tabulated below.

[1] Planning NSW is now the Department of Planning (DOP).

[2] National Parks and Wildlife Service (NPWS) is now part of the of the NSW Department of Environment and Conservation (DEC), Parks and Wildlife Division.

Plans, Policies and Strategies			
Local Government	**Fire related**	**Natural resource**	**Building Environment**
Council Policy for Bush Fire Protection for Rural dwellings and subdivisions 1993	*Planning for Bushfire Protection* (RFS 2001)	*Integrated Catchment Management Plan for the Lower North Coast 2002 (DIPNR 2002)*	*Building Code of Australia - AS3959 Construction of Building in bush fire prone areas Standards Australia, 1999*
Great Lakes Council Current Policy Register	*Bush Fire Environmental Assessment Code for Asset Protection Zones* (NSWRFS 2003a).	Supplementary State *of the Environmental Report (GLC 2004)*	*Planning for Bushfire Protection* (RFS 2001)
Councils Policy for *Fire Management for Council Controlled Natural Areas 1996*	*Lower Hunter Zone Bush Fire Risk Management Plan* (BFRMC 2004*)*	*Draft Pacific Palms Local Environmental Study 2002 (GLC 2002)*	*Building in bush fire prone areas*. (NSW Rural Fire Service 2004g).
Great Lakes Local Environmental Plan 1996 (LEP)	*Great Lakes Plan of Operations.* (NSW RFS 2004d).	*Mall Lakes National Park and Myall Coast Reserves Plan of Management.2002 (NPWS 2002)*	*Building in bush fire prone areas. Guidelines for single dwellings development applications* (NSW RFS 2004e).
Mapped Bushfire Prone Land	*Fire Management Strategy - Myall Lakes National Park and Island Reserves (NPWS 2003)*	*Fire Management Strategy, Mall Lakes National Park and Island Reserves (NPWS 2003)*	*Building in bush fire prone areas. Guidelines for subdivisions applications.* (NSW RFS 2004f).
Council Development Control Plans (DCP)	*DPI (Forests) Fire Management Policy (DPI (Forests) 2005)*		
Council Tree Preservation Order (TPO)	*Bush Fire Management Plan for the Village of Smiths Lake* (Conacher Travers 2000)		
(GLC 2004b*) Draft Vegetation Strategy, Eastern Portion. Great Lakes Council. Volume 1 & 2.*	*Bush Fire Review of the Villages of Pindimar and Pindimar South* (Conacher Travers 2001*)*		

Understanding the document

The fire management plan has been prepared to give strategic and operational input to fire prevention, mitigation and suppression and during emergencies provide advice and direction to prevent, prepare, respond and ultimately to recover. Each section enables a clear understanding of fire mitigation by Council and landholders.
Section 1 introduces the processes.
Section 2 — 6 provides background information for fire management.
Section 7 identifies and discusses the local environment, features and local fire issues.
Section 8 overviews the bush fire risks to Shearwater.
Section 9 identifies management strategies for fire management zones relating to assets in the area.
Section 10 identifies the works program.

The plan incorporates objectives and functions of legislative instruments, documents, and management committees, fire authorities and directions given by the Commissioner of the NSW Rural Fire Service. Figure 1 demonstrates these links and the steps in the preparation of the plan.

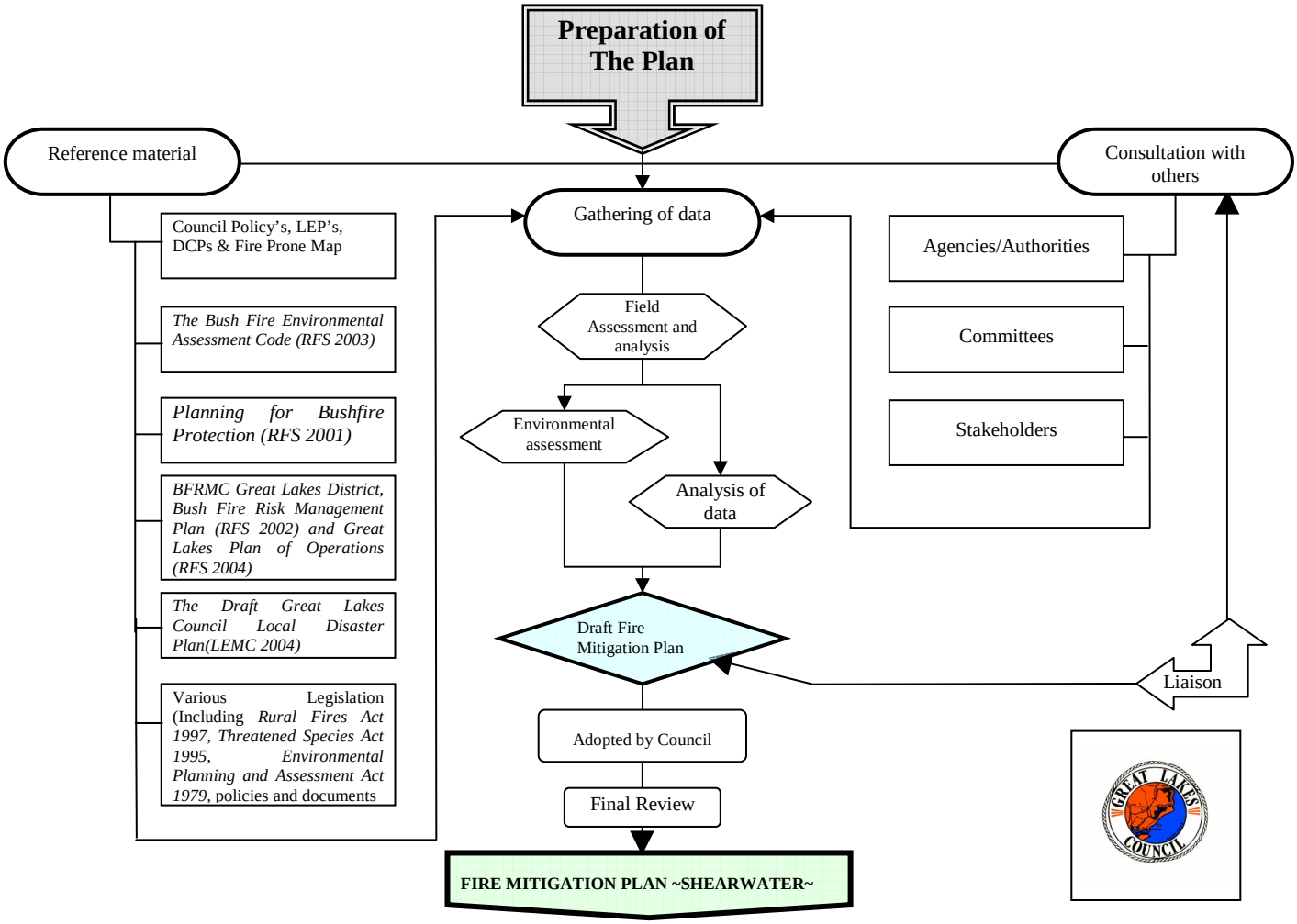

Figure 1: The planning process.

The fire fighting functions apply to the various fire authorities, during bush fires and emergency incidents. The plan provides additional information available for use during operational process, but concurrently meet the objectives of the RF Act.

Fire Management Objectives

Councils overall fire management objectives are defined within the *Great Lakes Council Management Plan, 2004-2007* (Appendix II), and Councils policy for *Fire Management for Council Controlled Natural Areas.* Councils fire management objectives are consistent with statutory obligations and policies and are to:

- Protect life and property in or immediately adjacent to Council Land from bush fires.
- Minimise the spread of bush fire into or from Council Land.
- Minimise risk and reduce threat of bush fires on fire fighters and the community.
- Suppress or contain bush fire on Council Land.
- Reduce the risk of damage to assets and the environment.
- Maintain biodiversity and integrity of the natural environment.
- Promote participation of the community in implementing property fire management and Home Bush Fire Survival Planning.
- Inform the community of bush fire hazards and promote fire management planning in Bush Fire Prone Areas.
- Provide financial support and resourcing requirements to the NSW Rural Fire Service.
- Provide financial support and resourcing requirements to the State Emergency Service and
- Continue to annually evaluate and review the *Disaster Management Plan*.

Key Fire Issues

Key fire issues are identified through the preparation of the plan.

- ❖ *Fire management zones assist in providing fuel reduced areas adjacent to assets.*
- ❖ *Implementation of fire mitigation programs ensure ongoing fuel management continued for protection of community assets.*
- ❖ *The education of the community is essential to facilitate bush fire preparedness.*
- ❖ *There are potential ignition risks of bushfires within parks and adjacent roadsides.*
- ❖ *Environmental assessment is required for hazard reduction works.*

SECTION 2

Fire Management Responsibilities and Obligations

The fire management guidelines within the Plan specifically apply to Council land, however the neighbouring fire management strategies on adjacent land were considered, when identifying strategies for bush fire mitigation.

Under the RF Act public authorities and all land managers are responsible for complying with the Act, to prevent the occurrence of fires and to mitigate against the spread of fires from entering or leaving managed or maintained land.

Requirements of the RF Act include:

- ✓ In the event of a fire, owners/occupiers are required to extinguish when aware of a fire, and if possible, regardless of the fire being lit by the occupier, notify the RFS of of the fires existence or requirement of assistance to prevent the spread onto neighbouring properties.
- ✓ When landholders light fires and they obliged to notify public authorities that are located on lands within 8 kilometres of there estate. This includes notifying the Parks and Wildlife Division of DEC (formerly NPWS) and the DPI (Forests) (formerly State Forests), in addition to contacting the RFS and neighbours.
- ✓ During the Bush Fire Season persons who wish to light a fire require a current Fire Permit to be issued by the RFS.
- ✓ Additionally landholder's are obliged to implement hazard reduction works when notified by the RFS to undertake bush fire hazard works, under *section 66 of the* RF Act.

Within Great Lakes a large number of assets are adjacent to and within forested areas (often of high conservation value), which are managed by various agencies, authorities and private landholders. As a coordinated approach, the RFS promotes cooperation through legislation and the preparation of *Bush Fire Risk Management Plan* and the *Operations Plan*, through the Lower Hunter Zone Bush Fire Risk Management Committee (BFMC). Consultation with representatives is very important to the BFMC and Council is one of the key stakeholders on this committee.

Fire management plans and fire mitigation policies are prepared and implemented by various stakeholders as discussed further within this section.

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. Pro-active fire planning and implementation to mitigate against fires and their affects, allows Council and the RFS to cooperatively achieve sound and rational fire management planning results.
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 the LGA.

Council promotes and provides community education throughout the year to residents and the wider community through reference to documents, fire information from other authorities, and the provision of resources, brochures and signs to improve awareness and preparedness. Community awareness strategically assists in managing the risk as guided by the *Bush Fire Risk Management Plan* (BFRMP).

Under the RF Act, the State Emergency and Rescue Management Act 1989, and the Rural Fires Regulation 2002 Council is;

- ✓ *A certifying authority to issue Bush Fire Hazard Reduction Certificates for Council managed land;*
- ✓ *Responsible for the identification of Bush Fire Prone Lands within the Council Area under section 146 of the EP&A Act. The BFRMP incorporates this information, meeting obligations under theRF Act and certifying 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;*
- ✓ *Ensures DCP address 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 and the EP&A Act and the Environmental Planning and Assessment Regulations 2000.*

Being adequately prepared for fires and their effects on home—owners, land mangers, residents, rural properties and essential services, ensures that during extreme fire events the probability for the survival of life and property is duly achieved.

Council actively undertakes fuel reduction programs on Council Land by staff and volunteer programs, where maintenance has been identified within asset protection zones. The Council value the support of volunteers and volunteer schemes in undertaking fire protection works.

Bush Fire Management Committee

Bush Fire Management Committee's meet requirements under the RF Act and are responsible for fire management within the local rural fire district. Great Lakes are within the Lower Hunter Zone Bush Fire Management Committee which includes members from 3 LGA's. Great Lakes Council are represented on the Committee by an officer and a Councillor. The Committeeis responsible for the coordination of fire suppression, hazard reduction activities as part of the statutory requirements of the RF Act.

The committee prepares the *Bush Fire Risk Management Plan*, the *Plan of Operations,* meets reporting requirements within the RF Act and is responsible for the promotion of public education programs relating to the bush and grass fire threat throughout the local area, jointly with the RFS.

Great Lakes Council Local Disaster Plan

Within the State DISPLAN, Council has a committee member on the Great Lakes Local Emergency Management Committee (LEMC) which is responsible for determination of a local emergency and appointment of the Incident controller of the appropriate combat agency during fires in urban and rural areas.

Overall control and the coordination of support resources for bush fire operations is the responsibility of an Incident Controller selected, or appointed by the Commissioner of the NSW Rural Fire Service, from the RFS, DEC, DPI (Forests) or NSW Fire Brigades. During a Section 44 bush fire emergency, a (LEOCON) Local Emergency Operations Controller (LEOCON) may be requested to coordinate non-fire fighting support to an Incident controller.

The *Great Lakes Council Local Disaster Plan* (DISPLAN) assists in the arrangements at local level to prevent, prepare for, respond to and recover from emergencies in compliance with *Section 29(1).* the *State Emergency and Rescue Management Act, 1989 (SE&RM Act)* Council must establish and maintain a Local Emergency Operations Centre (LEOC) for the Local Emergency Operations Controller (LEOCON) as required.

During any incident or emergency Council also provides: support to combat agencies and functional area agencies as required; facilities for reception and registration of evacuees; assist, at their request, the Police Service, NSWFB, Ambulance Service, RFS, Bulahdelah Volunteer Rescue Association (VRA) and the State Emergency Service (SES).

Fire authorities, agencies and representatives of stakeholder groups work cooperatively to develop evacuation plans identified in the *Lower Hunter Bush Fire Risk Management Plan*. Within the DISPLAN evacuation arrangements and plans are prepared that identify and specify areas likely to require evacuation, identifies egress, notification arrangements, refugee areas and provision for the care of injured animals.

Council also assists in other emergency management prevention, preparedness or recovery operations, including emergency management training, for which the Council's training and equipment is suitable.

NSW Rural Fire Service

The NSW Rural Fire Service (RFS) work cooperatively with Council to ensure the effective management with Council and RFS funding, management, maintenance, support, of fire and emergency operations. The RFS is responsible for the coordination of bush fire fighting and provides the resources including appliances and personnel resources to combat fires within the LGA, rural fire district. The network of Rural Fire Brigade Stations and equipment across the Great Lakes Area are managed by the RFS and maintained through Council depots. The RFS also assist other emergency service organisations at incidents and at emergencies under the control of those organisations.

The coordinated fire suppression and mitigation of fire with Council and with other authorities and land managers, ensures villages and rural areas have fire combat agencies to provide the ability to protect life and property within the rural fire district.

Bush fire prevention and mitigation works by the community have been assisted by legislative changes, whereby RFS have been authorised to undertake environmental assessments on private property and certify hazard reduction works. Bush Fire Hazard Reduction Certificates (BFHRC) issued under *Section 100F and 100G* of the RF Act enable works to be authorised and guided by specific conditions.

This authorises private property owners to implement hazard reduction works either as preventative hazard reduction works or works that have been initiated by the RFS as strategic bush fire hazard works within bush fire prone lands guided by the BFRMP.

Council has conferred to the RFS the responsibility of assessing bush fire hazards on private land or lands managed by authorities. The issuing of bush fire hazard advice notices are accompanied by the RFS authorised BFHRC for private landholders to undertake works

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 ensures rapid, efficient and effective management of emergency incidents, as well as educating the community through prevention programs and to build community resilience by preparing for emergencies.

✓ *The NSWFB provides fire protection, urban search and rescue, hazardous material response, natural hazards response, emergency life support, terrorist consequence management and other emergency management capabilities. The NSWFB works cooperatively to develop and implement plans for emergency services throughout NSW, through the maintenance of strategic working alliances with other emergency and support services (NSW Fire Brigade 2004).*

The NSWFB assists the community to recover after emergencies and cooperatively works with other emergency and support services (NSW Fire Brigade 2004).

The NSWFB have stations located in the Great Lakes LGA at Forster and Tea Gardens, which are able to be deployed to rural areas for cooperative emergency response with other fire authorities.

Department of Environment and Conservation (Parks and Wildlife Division)

The Parks and Wildlife Division of the DEC is a recognised fire authority and public land manager whom implement fire and environmental management obligations that meet legislation under the TSC Act and other legislation. The organisation prepares fire management plans and identifies fire management strategies in accordance with DEC plans, policies and procedures such as those detailed in the *NPWS Fire Management Manual* (NPWS 2001).

DEC undertake operational fire fighting cooperatively with other agencies and landholders. Fire management planning is integrated with Estate management and objectives and policies directed by various committees. Fire management planning identifies the DEC approach to fire suppression, mitigation and prevention that also sustains ecological processes and principles, meets planning objectives and maintain the protection of life and property and environmental assets.

Department of Planning and Infrastructure (Forests)Department of Planning and Infrastructure (DPI), (DPI (Forests) formerly NSW State Forests (SF) provide resources and support for emergency fire management, to protect life, property, community assets and forest values.

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 forests fuels and identify practices that are economically and ecological sustainable.

DPI (Forests) have established independently or where appropriate, cooperatively with other fire authority strategies for controlling wild fires quickly. Emphasis is on training and preparedness to combat fires through a fast deployment system, ability to detect fires early through fire towers and participate in simultaneous joint emergency operations, and integrate resources with other fire authorities.

Country Energy/TransGrid

Country Energy recognises that vegetation management is important to prevent the spread of bush fires 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.

To comply with bush fire prevention regulation minimum distances for vegetation removal beneath power lines are established and maintained. Such distances are for powerlines up to 22kV, where the minimum clear distance is 20m and for 33kV to 132kV it is 30 to 45 metres respectively. Distances to prune from poles and bare and covered insulated services of various voltages are also documented. When landholders undertake bush fire prevention works, beneath electricity wires, they should be in accordance with the *Vegetation Management Plan, 2001* (Country Energy 2001).

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's risk approach to asset management assumes that every transmission line has the potential to be impacted by fire, or to initiate fire, including bush fire.

TransGrid is also obliged to provide a safe service and be environmental responsible, provide a reliable and secure Network in accordance with its obligations to the community and the National Electricity Market (NEM). Issues including bush fire risk management are encompassed within asset management and operational strategies (TransGrid 2003).

TransGrid has also prepared the Bush Fire Risk Management Plan that identifies strategies, policies and procedures that are based on the principles of risk management and specifically on bush fire risk management.

MidCoast Water

MidCoast Water is responsible for the supply of water within Great Lakes LGA and the management of waste water through the facilities in Foster, Tuncurry, Hawks Nest, Bulahdelah and Stroud.

During fire events, authorised personnel access fire hydrants throughout the area during fire fighting operations to supply fire appliances with fire fighting water. The readily available supply in urban areas assists in the suppression of wild fires or use during hazard reduction activities.

MidCoast Water ensures the provisions of adequate facilities and fire mitigation works so that fuels are managed as required in the various fire management zones.

Private Landholders

The broader community is actively undertaking hazard reduction works in and around homes. As landholders become aware of changes to fire regulation principally when building new structures or modifying an existing building, further hazard reduction works are implemented. These works complement works by other landholders or land managers in and around villages, townships and rural areas.

The RFS assists landholders in the implementation of hazard reduction works by authorising works. A standard application is submitted to the RFS, accompanying a plan for hazard reduction works through which the RFS assesses and undertakes an environmental assessment. The proposal is authorised through issuing a hazard reduction certificate, which is current for a 12-month period.

The emphasis on the responsibility for owner/occupiers to minimise the occurrence and the spread of fire, and to meet legislative requirements when bush fire 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.

The RFS provides advice on what to do in the event of a fire approaching homes and encourages people to be prepared for fire and undertake a bush fire safety check. By having home, *"bush fire survival plans",* and undertaking planning to protect homes, this ensures that families are better able to protect themselves by following pre-determined steps and actions in the event of a fire."

Home bush fire survival plans:

- ✓ Consider available and required fire fighting water supplies and fire equipment around the home.
- ✓ Ensure personnel safety and survival, and decide the survival capability of the home and options of those not capable to stay to participate in protection works around the home.
- ✓ Early evacuation (or relocation) should be considered well before the bush fire event (RFS 2005).

Research has shown that those that are able to be in attendance in a well prepared home have a higher likely hood of survival (RFS 2005).

Appendix III guides landholders with being prepared for bush fires by providing steps and options to take and assist in fire prevention and hazard reduction. Other sources such as the RFS website or the local fire control centres and Rural Fire Brigades ensures information brochures are widely accessible and available to the wider community.

- ❖ *Key Fire Issue - Implementation of fire mitigation programs ensure ongoing fuel management continued for protection of community assets.*
- ❖ *Key Fire Issue - The education of the community is essential to facilitate bush fire preparedness.*

SECTION 3

Bush Fire Risk Description

Bush Fire Risk

Legislation, fire planning documents, policies and procedures from various authorities and agencies including Council, RFS, DEC, DPI (Forests), NSWFB, provide the guidance to assist in protecting life and property, and to reduce fire threat to assets. They collectively aid direction during fire prevention, mitigation, and suppression and provide detailed specifications for reducing hazards, improving the preparedness for emergencies in the community with minimal negative impact on the environment.

A bush fire risk analysis and environmental assessment have been undertaken by Council to identify assets at risk and identify fire management strategies to mitigate fire and the effects on the community.

Bush fire risk is defined as the chance of the bush fire igniting, spreading and causing damage to assets within the community or reducing biodiversity of areas with inappropriate fire regimes.

Within the Bush Fire Risk Management Plan, the bush fire risk is ranked from extreme, major, moderate, minor and insignificant depending on the ability for assets (built/natural) to have the capability to withstand or recover from a fire event. The hazard rating is assessed as low medium or high (RFS 2002c).

Methodology

Field assessments are undertaken to provide data for analysis for land managers. The assessment process follows guidelines provided by the RFS, and is an acceptable process for fire managers to determine the bush fire hazard and risk analysis of bush fire. The assessment includes areas that are able to sustain fire, that as a result of igniting, cause damage to assets or the community.

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 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.

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 construction standard. This is when the most damage is expected as fire intensity is at its greatest and has the highest probability of causing uncontrollable destruction.

Hazard reduction activities and seasonal influences affect vegetation growth rates and the resultant rating of the existing hazard. Variations in growth rates effect overall fuel loads, the ability to ignite and the rate of spread of fire. The preferred fire intensity within fire management zones adjacent to assets is ideally low—moderate. Fires may spread from adjoining areas or ignite as spot fires within the FMZ. Fire ignitions may either be natural (electrical) or by intervention from people either intentionally as arson or accidentally by mechanical mishap, sparks or from cigarettes.

The Commissioner of the NSW Rural Fire Service has certified Bush Fire Prone Land within Great Lakes Council under *section 146* of the RF Act. Bush Fire Prone Land was identified using bushfire vegetation mapping categories[3]. This provides a basis for planners and fire manager's to identify areas where specific conditions apply to new developments and where hazard reduction activities are implemented to reduce the impact of bushfire on life and property.

Detailed site inspections capture hazard assessments and local environmental effects. Outcomes incorporate legislative requirements for fuel reduction and apply techniques with limited impact to local ecological values, yet simultaneously considering conservation and protection of life and property.

Recommendations for bush fire risk mitigation works are described within section 9 The environmental impact assessment reviews the impact of proposed works or a BFHRC (when minimal impact is determined a) will certify works before commencement.

- ❖ *Key Fire Issue - There are potential ignition risks ofbush fires within reserves and adjacent roadsides.*

[3] Refer to Appendix 1 for Criteria for mapping bushfire prone land

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 or removes fuel to minimise potential damage to life, property and the environment if a bush fire does occur.

Hazard reduction is also undertaken to protect economic resources (native and plantation forests of the DPI (Forests)) and to protect environmental assets (National Park Estate, State Forest Flora Reserves and State Forests).

A coordinated approach to fire management improves the effectiveness fuel management zones by linking like works over multiple ownership or management. Strategies can then achieve the collective outcomes that Council, agencies, authorities and landholders whilst also meeting broad outcomes of the BFMC.

The *Bush Fire Environmental Assessment Code, 2003 and the Planning for Bush Fire Protection, 2001* guide hazard reduction work requirements for existing buildings as well as future developments and subdivisions. Hazard reduction options include; hand removal of shrubs; tree removal; clearing away fuels, raking up leaves and clippings, clearing out gutters; clearing by mechanical mowing, slashing, ploughing, trittering[4]; bulldozing; or by grading of fuels.

Removed or fallen timber that is sorted into small, 1.5 metre high piles may be burnt. Alternately, the deliberate burning of abroad area (known as controlled or hazard reduction burning) can be used to reduce the amount of flammable fuel (Table 1).

[4] Trittering – mechanical mulching of the vegetation into small pieces

Pre fire planning and the active reduction of ground fuels assists in reducing the severity of an oncoming fire and the subsequent effect on land and householders. Fire intensity and flame height are reduced thus slowing the fire spread on the ground and reducing the opportunity for the front to move into the tree canopy. Such planning consequently reduces the risk of ember attack on assets and the ability to spot into adjacent areas and properties.

The BFEAC or other environmental assessment may be required to undertake mechanical fuel reduction activities or to initiate low—moderate intensity hazard reduction burns.

The RFS promotes the use of hand and mechanical methods when reducing fuels adjacent to assets, as these methods are easily executed by land managers and is typically safer than burning.

Encouraging a discontinuous vegetation layer ensures the environment is protected, when incorporating conservation of the remnant vegetation and reduction of elevated and ground fuels. Retaining a stand of vegetation is important as this can often act as a shield against strong winds, flying embers, and radiant heat on assets and provides protection on leeward side of these hospices.

Hazard reduction burning, although an option, is limited in its practical applications. Successful implementation is affected by availability of resources, meeting approved prescriptions of the burn (directed by RFS), meeting specific fire intensity requirements and is particularly influenced by the prevailing weather conditions on the day.

Table 1. Options for hazard reduction.

Methods of Hazard Reduction	Type of Activity
Raking or manual removal of fine fuels:	Remove fuels such as fallen leaves, twigs and bark on a regular basis.

Methods of Hazard Reduction	Type of Activity
Mowing grass:	Keep grass short and green.
Slashing and trittering:	This is an economical method of fuel reduction. To be effective, the cut material must be removed or allowed to rot before summer starts. Slashing and mowing may leave grass in rows, increasing fuel in some places. Trittering or turbo mowing also mulches the vegetation leaving the fuel where it is cut.
Removal or pruning of trees and shrubs:	The management of existing vegetation involves selective fuel reduction (removal, thinning and pruning) and retention of vegetation, which may have beneficial effects by acting as windbreaks and radiant heat barriers. Refer to the landscaping section of the RFS document, How to Establish and Maintain an Asset Protection Zone for Bushfire Protection.
Hazard reduction burning:	Removes excess ground litter and hazards through the use of fire. Controlled burning or prescribed burning of vegetation is more often used for strategic bushfire management by land management agencies. Before burning any vegetation the type of fire should be determined. Is it a pile to be burnt or burning an area of bushland? Call your RFS fire control centre or NSW Fire Brigade for advice on burning. Consult RFS Guidelines for Pile Burning and Guidelines for Low Intensity Burning

(Source: How can you reduce bushfire hazards?, RFS 2004c)

The RFS provide a selection of pamphlets and brochures to help managers and property owners understand hazard reduction. These include information on how to go about planning to reduce hazards, the steps required to be undertaken, who to go to for further information, how to get environmental approvals for hazard reduction works and the management of fuel reduced zones.

These can be sought at various locations and offices or on the RFS web site www.rfs.nsw.gov.au. These include publications such as *Guideline for asset protection zones, Application instruction for a bush fire hazard reduction certificate, Before you light that fire*, *Guidelines for low intensity bush fire hazard reduction burning (for private landholders),* and *guideline for pile burning.*

The RFS assist landholders by actively promoting and encouraging the community to reduce hazards within Great Lakes Council LGA and provide the application form and environmental assessment for approvals.

Council has conferred the responsibility to RFS to assess and issue bush fire hazard advice notices to owners and occupiers to reduce hazards on a property, under the RF Act, *1997*. Bush fire hazard reduction works meet works authorised under the *Lower Hunter Bush Fire Risk Management Plan, 2003.*

Management of Fuels

Graduated fuel management of hazards adjacent to developments 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 fire management zones including asset protection zones, strategic fire management zones, land management zones and exclusion zones.

- ✓ ***Asset Protection Zone (APZ)*** *is an area surrounding an asset where ground and elevated fuel has been reduced to minimise the ignition and spread of fire and provide a refuge area for firefighters and landowners to fight a bushfire.*
- ✓ ***Strategic Fire Management Zone (SFAZ)*** *is the area adjacent to the APZ or are strategically located within fire paths (where APZ's are not in place) to reduce the impact on the community and severity of wild fires. . These complement works within APZ or other SFAZ and provide protection for fire fighters, egress and access to: assets, fire advantages, watering points, significant sites or essential services.*
- ✓ ***Land Management Zone (LMZ)*** *is the area of conservation and heritage value.*
- ✓ ***Exclusion Zone (EZ)*** *is the area where fire is excluded from the area as fire regime thresholds have been met.*

(RFS 2003a ,2004a, 2004b,)

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 (Table 2). Council has adopted these fire management zones and strategies as defined within the Lower Hunter Bush Fire Risk Management Plan.

Identification and implementation of hazard reduction activities for existing buildings are guided by conditions within the RFS publication of the *Bush Fire Environmental Assessment Code in 2003*. The widths of APZ fuel reduced areas are calculated using predetermined widths appropriate for various slopes. Vegetation types and the floristic structure affect the implementation of mechanical on ground works. Retaining hospices (clumps) of existing plants is assessed site by site, to minimise impact on conservation values and improve community protection from the fires radiant heat and floating ember attack.

*The Planning for Bush fire Protection, 2001 (PBFP) identifies s*pecifications for asset protection zones, perimeter roads and fire trails, access and their construction standards for new developments. Reference to this manual is important for planners, developers and the community to understand bush fire protection and preparedness in bush fire prone land.

❖ *Key Fire Issue: Fire management zones assist in providing fuel reduced areas adjacent to assets.*

Table 2: Fire management zones.

Fire Management Zones[5]	Objectives	Type of works	Notes
Asset Protection Zone	❑ Protect life and property ❑ Mitigate against ignition of fires ❑ Prevent the spread of fires ❑ Reduce intensity of fires ❑ Minimise impact to conservation values within the area	✓ reduce fuel levels by mechanical means ✓ reduce fuels by hazard reduction burning ✓ reduce fuels by grazing ✓ works authorised within approved Development Applications ✓ works certified by Environmental Impact Assessment/The Code	▪ maintain average overall fuel levels (OFL) at medium whereby levels are below 8t/ha in OPA ▪ maintain fuels 5t and below per hectare in IPA ▪ Burn to reduce fine fuels by approximately 70-100%
Strategic Fire Advantage Zone	❑ Protect life and property ❑ Mitigate against ignition of fires ❑ Prevent the spread of fires ❑ Reduce intensity of fires ❑ Minimise impact to conservation values within the area ❑ Enhance adjacent APZ works	✓ reduce fuel levels by mechanical means ✓ reduce fuels by hazard reduction burning ✓ reduce fuels by grazing ✓ construct fire advantages/fire trails ✓ maintain existing fire advantages/fire trails ✓ works authorised within approved Development Applications	▪ maintain average overall fuel levels at high and belowBurn to reduce fine fuels by approximately 50-80%

[5] These zones are equivalent to the those defined within the Lower Hunter Zone Bush Fire Risk Management Plan, 2002

			✓ works certified by Environmental Impact Assessment/The Code	
Land Management Zone	❑ Minimise impact to conservation values within the area		✓ reduce fuels by hazard reduction burning ✓ environmental assessment to be undertaken ✓ maintain existing fire advantages/fire trails ✓ construct fire advantages/fire trails ✓ works certified by Environmental Impact Assessment/The Code for ecological burning	▪ minimise works except for rehabilitation when required ▪ Burn to provide a mosaic pattern of burnt areas
Exclusion Zone	❑ Minimise impact to conservation values within the area		✓ none applicable	▪ minimise works except for rehabilitation when required

SECTION 5

Fire Preparedness and Community Education

Preparedness

The community is responsible for providing protection for themselves and fire fighters from fire threat. By being *"Fire Wise"* and actively preparing property and homes against fires, possible fire ignitions and threats are reduced.The RFS promote publications such as:

- ✓ Bush Fire Wise.
- ✓ Home safety checklist.
- ✓ Bush Fire Home Survival Plan.
- ✓ Use of sprinkler systems.

The information provides a background to regulations, how to prepare for grass and bush fires, what to do when fire approaches, what actions to take and consider and equipment required to assist during a fire event. There are several actions that can be undertaken when in a fire Readiness State 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.

This will assist residents and fire fighters to combat the fire, reduce fire intensity, increase the capability of buildings to with stand ember attack and prevent or reduce the spread of fires to neighbouring properties or assets.

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

These strategies and those undertaken by Council to prepare *before fires* occur curtail potentially volatile situation where properties may be threatened or worst case, be destroyed by fire.

❖ *Key Fire Issue: The education of the community is essential to facilitate bush fire preparedness.*

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 potential impacts and considerations to the environment, when planning to implement fire mitigation activities.

The *National Strategy for the conservation of Australia's biodiversity, 1996* promotes an integrated approach to conserve biological diversity and to meet community objectives. Ecologically sustainable development (ESD) meets the needs of Australians today, while conserving our ecosystems for the benefit of future generations (Department of Environment and Heritage 1992).

Consideration throughout the fire planning process to conservation objectives is important such as those referred to within the National objectives and targets for biodiversity conservation 2001-2005 (DEC 2001).

Fire and biodiversity in the Australian landscape is known to play an important role to 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 frequent 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 high frequency fires go beyond known biodiversity thresholds. Recurrent disturbance interrupts plant life cycle processes such as maturation 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.

Plant species that vegetatively regenerates (sprouters) are less vulnerable to fire. Fire sensitive plants, namely those killed by fire (kills crown or whole plant) tend to be seeders and such plants rely on regeneration by dormant seed in the soil. Too frequent fire can eliminate this seed source (Gill and Bradstock 1995). This fire response by plants makes the application of fire regimes a complex task, as the methods of survival of each species, must be considered to ensure persistence after fire.

Researchers conclude that the parallel between plant and animal populations is that high frequency fires alter vegetation structure and composition and subsequently can eliminate animal populations (Bradstock *et al* 1995).

The fire history 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. 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.

RFS and Parks and Wildlife Division of DEC (and the former NPWS) geographic records of known and recorded fire history assist in identifying fire paths, known history of fire threats adjacent to communities and historical records of managed fires (hazard reduction burning) to reduce ground fuels.

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 XIII, 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) are able to 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 (Refer to Appendix XIII). 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 meet 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).*
- ✓ *more than 2 consecutive fires occur which consume less than 8-10 tonnes/hectare of surface fuel (species with heat-simulated seedbanks in the soil decline) (Bradstock et al 1995).*

Appendix XI identifies the currently accepted biodiversity thresholds for all 65 vegetation communities within Great Lakes LGA, (as identified within the *Draft Great Lakes Vegetation Survey 2003) as* adopted from the NPWS (DEC 2005a; Bradstock *et al 1995*).

The fire regime threshold for the management of flora and fauna within the SFAZ and land management zones has been adopted from the Parks and Wildlife Division of the DEC (and the former NPWS). These guide desirable ecological sustainable fire frequencies, and identify which identifies biodiversity thresholds for various vegetation communities. Fire regimes outside this domain are predicted to cause significant declines in populations, particularly if they prevail over 50% or more of the area of each community (NPWS 2003a; NPWS adopted table from Bradstock *et al* 1995 and Keith 1996; NSW Forestry Commission 1989; Great Lakes Council 2004a, 2004b).

This has been correlated with vegetation formation from Appendix A of the BFEAC and vegetation group categories from Appendix 2 of the Planning for Bushfire Protection, 2001 (Category 1,2, or 3). The table also displays specific minimum fire regimes for SFAZ specifically defined within the Code when undertaking bush fire hazard reduction works.

The threatened species hazard reduction list within the Code (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 locally 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 through appropriate fire management. The Great Lakes Council area has existing fauna corridors and predicted key habitat areas, which have been defined by the DEC (DEC 2005b).
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) and endangered ecological communities (Schedule 1, Part 3) in NSW. Two (2) endangered populations and eight (8) endorsed ecological communities potentially occur locally. This includes:

- ✓ Endangered Koala, Hawks Nest and Tea Gardens population.
- ✓ Endangered Emu population in the NSW North Coast Bioregion.
- ✓ Lowland Rainforest on floodplain 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 Sclerophyll Forest on Coastal Floodplains of the NSW North Coast Bioregion (TSC Act 1995).

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 3 shows the conservation significance within Great Lakes (Great Lakes Council 2003, 2004a).

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

Table 3: 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)	Total Number
State & Nationally Threatened flora species	3 (E) & 8 (V)	5 (E) & 10 (V)	15
State & Nationally Threatened fauna species (26 mammals, 2 reptiles, 7 frogs & 47 birds)	4 (E) & 7 (V)	12 (E) & 70 (V)	82
International migratory wader species (JAMBA[6], CAMBA[7], Bonn Convention[8])	35	-	35
International migratory waterbird species (JAMBA, CAMBA, Bonn Convention)	21	-	21
International migratory near-shore seabird species (JAMBA, CAMBA, Bonn Convention)	7	-	7
Rare or threatened Australian plants (ROTAP)	-	-	7
Flora species recorded in Great Lakes LGA	-	-	1,428
Fauna species recorded in Great Lakes LGA	-	-	499

The Draft Great Lakes Council Vegetation Strategy, Volume 1 and 2, 2003, 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 XII).

[6] Japan-Australia Migratory Bird Agreement (JAMBA)
[7] China-Australia Migratory Bird Agreement (CAMBA)
[8] Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention)

Recommendations

Assessors are able to refer to the following reports and documentation within the checklist before finalising hazard reduction activities:

Checklist	Reference Material Source
✓ Planning for Bush Fire Protection, 2003.	NSW RFS
✓ Environmental Assessment Code For Asset Protection Zones And Strategic Fire Advantage Zones, 2003.	NSW RFS
✓ Threatened Species/Threatened species hazard reduction list for The Code within each LGA.	DEC/NSW RFS
✓ Geographic information system layers	GLC/NSW RFS
✓ Documentation on threatened and vulnerable species that have specific management consideration to fire or mechanical impacts.	NSW RFS/DEC
✓ Updated Wildlife Atlas records as recorded by the NPWS.	GLC/DEC
✓ Updated fire history records.	RFS/DEC
✓ Species impact statements.	GLC/DEC
✓ Environmental impact assessments or reviews of environmental factors.	GLC/RFS
✓ Eight part tests that apply to the area.	GLC
✓ Management plans for the area.	GLC/NPWS
✓ Strategic plans.	GLC
✓ Detailed Local Environmental Studies.	GLC/NPWS
✓ 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 to the *Native Vegetation Act, 2003.*	DIPNR

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❖ *Key Fire Issue - Environmental assessment required for hazard reduction works.*

PART 2

Draft Fire Mitigation Plan

~ Shearwater ~

SECTION 7

Shearwater and our Living Environment

Location

Shearwater is approximately 2 kilometres north of Tea Gardens (Figure 2). The Estate, industrial area and reserve area cover approximately 127 hectare and consist of rural – residential (78), industrial properties, road reserves and various Council reserves and parks for recreation and environmental protection (Table 4, Figure 2,3&4).

Table 4: Parks and managed land within Shearwater and environs.

Public Reserves	Lot/ DP	Size (m²)	Recreation type
Shearwater Estate			
Elovera Park - Reserve No 5238	Lot 351 DP 734061	12140.0	Public Reserve
Reserve No 5200 (Viney Creek Road)	Lot 8 DP 733241	1636.738	Public Reserve
Reserve No 5199 (Viney Creek Road)	Lot 7 DP 733241	3536.0	Public Reserve
Reserve No 5202 (Viney Creek Road)	Lot 6 DP 733241	1654.0	Public Reserve
Reserve No 5201 (Toonang Drive)	Lot 9 DP 733241	170600.0	Public Reserve
Reserve No 5249(Toonang Drive)	Lot 18 DP 804975	112500.0	Public Reserve
Public Reserve (Toonang Drive)	Lot 21 DP 738450	842.3	Public Reserve
Reserve No 5208 (Toonang Drive)	Lot 29 DP 738450	4082.0	Public Reserve
Reserve No 5209 (Toonang Drive)	Lot 31 DP 738450	1180.0	Public Reserve
Reserve No 5210 (Toonang Drive)	Lot 32 DP 738450	1183.0	Public Reserve
Reserve No 5211 (Toonang Drive)	Lot 33 DP 738450	303.0	Public Reserve
Reserve No 5212 (Toonang Drive)	Lot 34 DP 738450	3260.0	Public Reserve
Reserve No 5213 (Toonang Drive)	Lot 35 DP 738450	1397.0	Public Reserve
Reserve No 5215 (Toonang Drive)	Lot 37 DP 738450	973.0	Public Reserve
Reserve No 5216 (Toonang Drive)	Lot 38 DP 738450	1082.0	Public Reserve
Reserve No 5217 (Toonang Drive)	Lot 39 DP 738450	716.0	Public Reserve
Reserve No 5218 (Toonang Drive)	Lot 40 DP 738450	1633.0	Public Reserve
Reserve No 5219 (Toonang Drive)	Lot 41 DP 738450	2639.0	Public Reserve
Reserve No 5214 (Toonang Drive)	Lot 182 DP 77180	957.8	Public Reserve
Public Reserve (Wom Bourne Road)	Lot 59 DP786548	909.6	Public Reserve
TOTAL		323224m²	(32.32 hectares)
Tea Gardens Industrial Estate			
RFS Brigade Station	Lot 40 DP 630478	1808.0	RFS
Tea Gardens Works Depot	Lot 26 DP585363	41560.0	Depot
Tea Gardens Works Depot - Yard	Lot 18 DP 249203	6199.0	Yard
Tea Gardens Tip	Lot 1 FP 392421	14941.056	Tip
Tea Gardens Tip	Lot 2 FP 392421	39364.366	Tip
TOTAL		103872m²	(10.39 hectares)

The adjacent public reserves within Shearwater are available for community recreational use.

The rural living setting that attracts residents to Shearwater can provide elevated coastal views across the Estate. The undulating terrain provides secluded localities and a spacious feeling within Shearwater. The current statistics show 86% of the properties have dwellings.

Cleared agricultural areas surrounding Shearwater, to the north and west provide an open space buffer to remnant vegetation in the west and the established Softwood Pine plantation in the north.

Fires are a natural occurrence in Shearwater and are greatly influenced by slope, aspect and fuel types. Knowing and understanding the influence of these on fire behaviour is important when reviewing fire management in these areas.

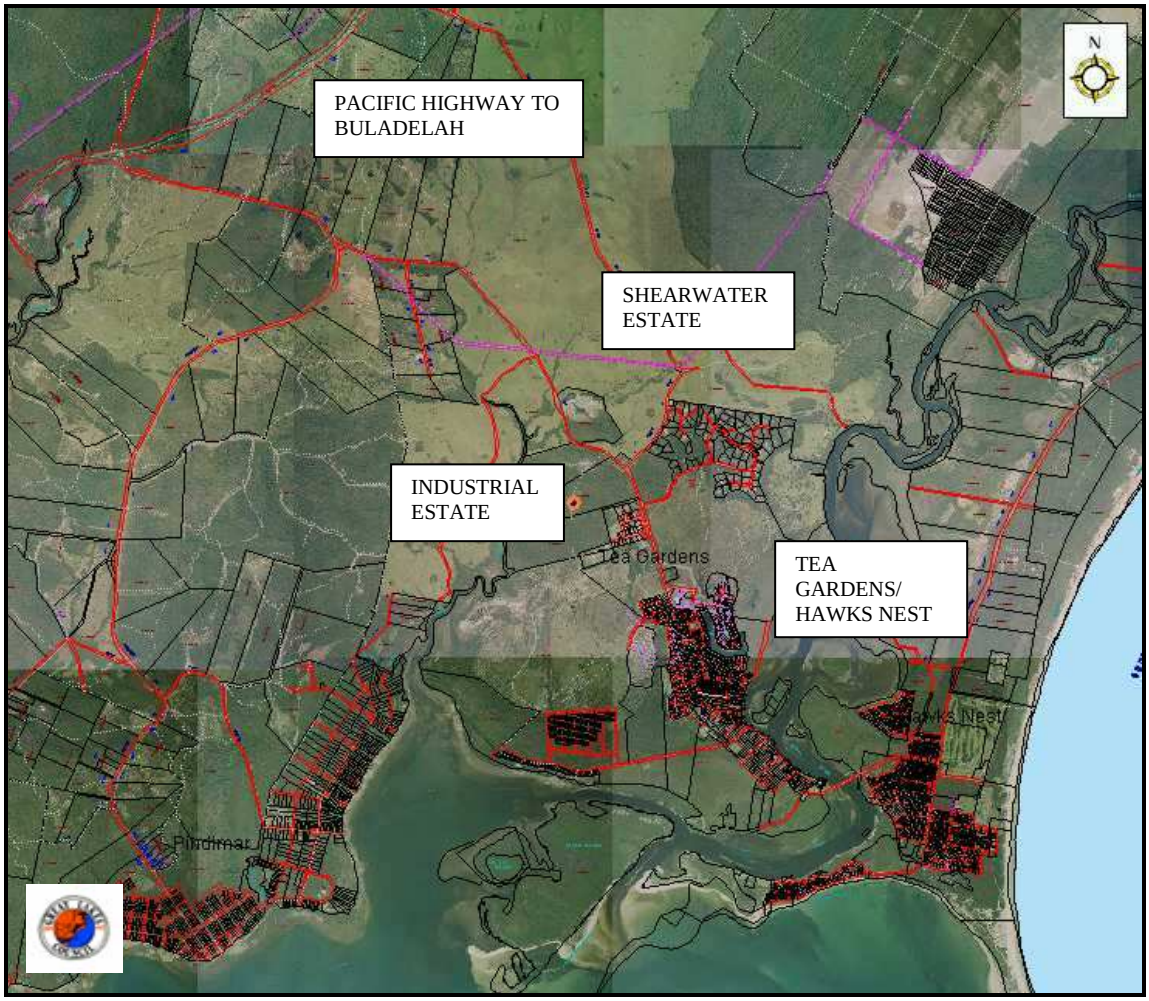


Figure 2: Location of Shearwater Estate and the Industrial Estate

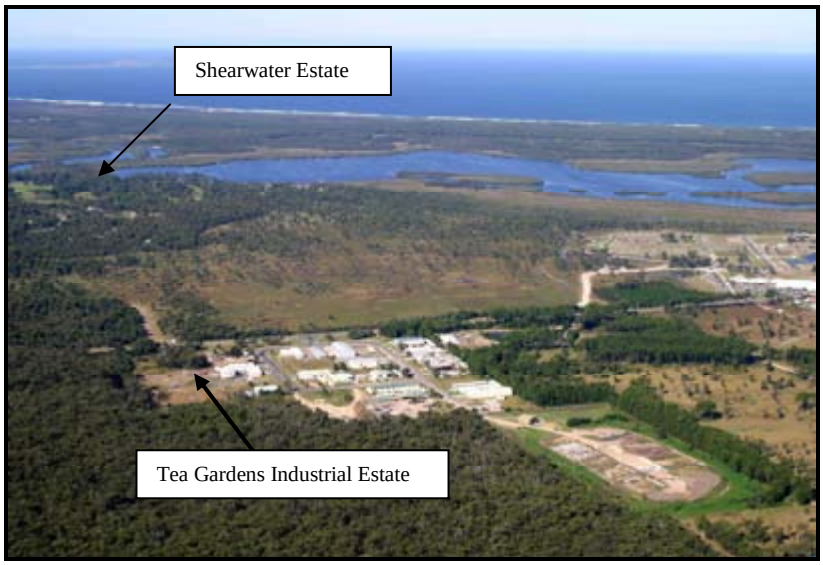


Figure 3: Aerial view of Shearwater Estate and the Industrial Estate (left on photograph)

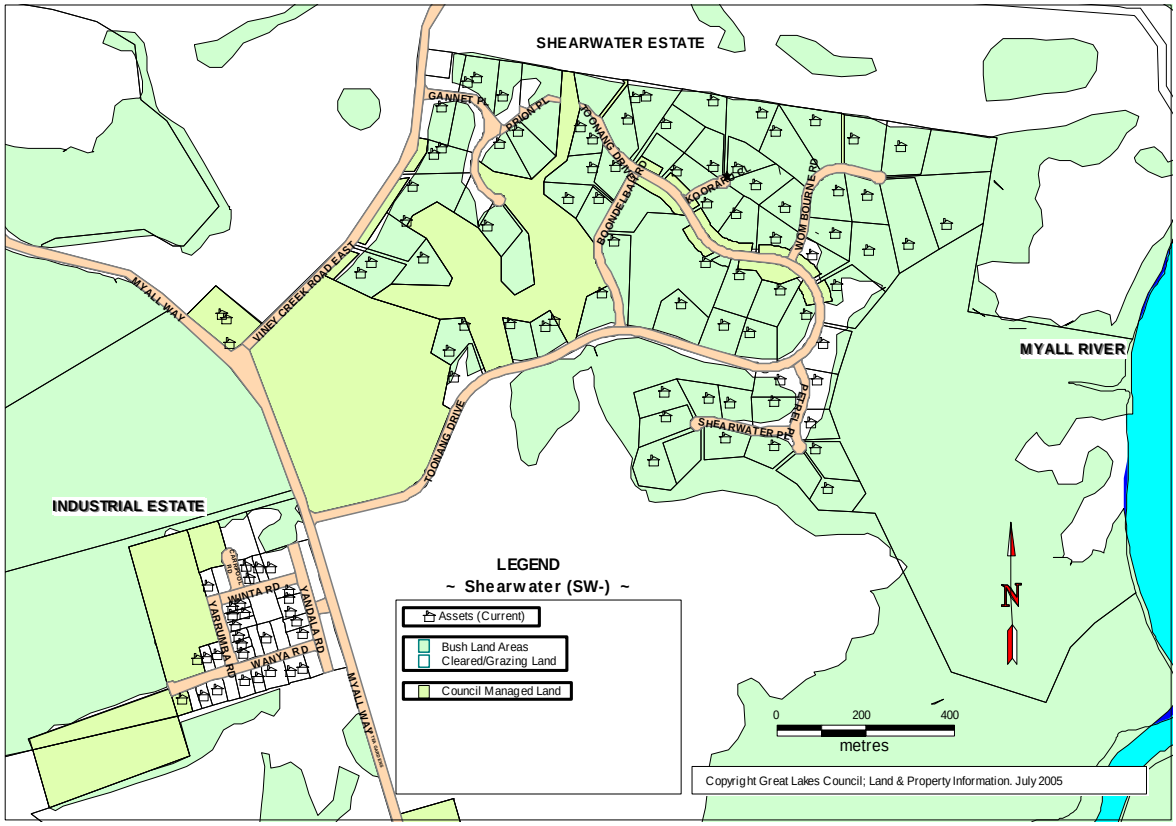


Figure 4: Council managed land in Shearwater

Road Access

Shearwater is accessed via two roadways west, from Viney Creek Road East and south through Toonang Drive from Myall Way. The network of roadways within the inner area makes access for fire fighting very accessible. The wide formed bitumen roadways (7-12 metre) are edged with coarse road metal. Council and neighbouring property owners maintain the road verge, which provides additional fuel reduced areas and protected areas adjacent to residential properties.

The furthermost distance to the east side of Shearwater via the roadway is 1.9 kilometres. The roadways within Shearwater are generally looped and provide two-way access throughout. The relative close proximity to the Pacific Highway (approximately 7km) enables support fire appliances to quickly be en-route from Bulahdelah and North Arm Cove Brigades. The Myall Way allows good egress for fire fighting units from Tea Gardens, and residents, visitors, to escape to Tea Gardens/Hawks Nest.

Community Assets

The Great Lakes Local Environmental Plan 1996 define zones within the Shearwater Estate environs as: Small holdings (Zone No. 1(d)); Industrial Estate as General industrial (Zone No. 4 (a)); Council Land as Rural (Zone No. 1a); surrounded by a Council managed lands for Open space and recreation (Zone No. 6(a)).

Neighbouring Shearwater is land being used as agriculture (Zone No. 1(a)) which has been predominantly cleared and land for future development. These comprise amixture of residential-commercial ((Zone No. 2(f)), formerly burnt and partially cleared.

Current statistic shows 66 rural properties with dwellings exist within Shearwater,mostly comprising of permanent residents. The Great Lakes Council, Supplementary State of the Environmental Report, 2002/2003 records the population distribution for Tea Gardens including Shearwater Estate areas being 1,372.

Shearwater has a mixture of dwellings built to the Australian Building Standard AS 3959 since the approval of the subdivisions between 1986-1990. Additionally Council approved buildings complied with the following Council bush fire protection policies and guides by the Department of Bush Fire Services before legislative changes took affect in 2003 to improve building in bush fire prone lands:

- Policy for Bush Fire Protection for Rural dwellings/subdivisions (1993),
-
- Policy for fire management for council controlled natural areas (1996), and
- The Department of Bush Fire Services, “Planning for Bush Fire Protection, A guide for land use planners, fire authorities, developers and home owners”(1991).

Since the enforcement of the document "Planning for Bushfire Protection 2003", development within the area meet legislative building standards that comply with both standard and non-bush fire standards (depending on the criteria of the fire assessment). Additionally, The Code provides guidelines for fire protection of existing buildings.

The maintained road reserves provide fire protection by reducing available fuels in an APZ and SFAZ's.

Public Utilities

Electricity infrastructure in the area is maintained by Country Energy who are responsible for domestic transmission lines adjacent to Shearwater along Myall Way and Viney Creek Road. This Service line is the main feeder line, which provides services to properties within Shearwater, the Industrial Estate and south into Tea Gardens and Hawks Nest.

Reticulated sewage is not available therefore sewage management within Nerong is maintained by individual property owners (on-site systems). These systems require a license by Council and are to comply with operational monitoring processes. However, MidCoast Water have undertaken community consultation to gain an understanding on community needs within Great Lakes LGA (MidCoast Water 2003).

Telstra provides and maintains the communication network services to Shearwater through underground and overhead lines. The main service lines are black plastic coated which supply the underground wires supplies to householders.

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. Throughout Shearwater hydrant points area accessible for use during fire fighting, visibly marked with blue cats eyes on adjacent roadway.

Natural and Cultural Heritage

The 127 hectares of the rural - residential zone, which includes approximately 40 hectares of Council parks, is located entirely totally within the Myall Lakes Catchment (NSW Department of Land and Water Conservation 2003a) and is within a kilometre of the Myall River that links with the Myall Lake system. While Shearwater Estate is relatively small, the remnant vegetation links with corridors within the catchment area. It therefore requires ongoing management to enhance and manage biodiversity and influences environmental values within and adjacent to the Estates.

The road reserves and rural-residential properties link with surrounding vegetation within Council parks. Within Shearwater, the vegetation structure is predominantly dry sclerophyll shrub/grass forest, with some areas being dry sclerophyll grassy woodland and steeper wetter area being wet sclerophyll forests and rainforest. Existing fire management zones

lack some of the sub dominant and ground cover layers as a consequence of human interaction (ie slashing).

Vegetation community types described within the Draft Great Lakes Vegetation Strategy 2003, that occur within Shearwater include: Blackbutt/Scribbly Gum; Blackbutt/Sydney peppermint/Smooth-barked apple; Ironbark/Smooth-barked apple/Stringy bark; Spotted gum – Ironbark/Grey gum; White mahogany/Red mahogany/Grey ironbark/Grey gum; Grey gum /Grey ironbark/ White mahogany; Spotted gum; Paperbark/Blackbutt; Paperbark/Swamp oak; Swamp mahogany; Swamp mahogany/Paperbark; Swamp oak; Moist blackbutt; Tallowwood/Grey gum; Flooded gum; Inland brush box; Sydney blue gum; Tallowwood/Sydney blue gum/Brush box; Fig/Myrtle; Palm/Myrtle and Fig/Myrtle (Figure 5).

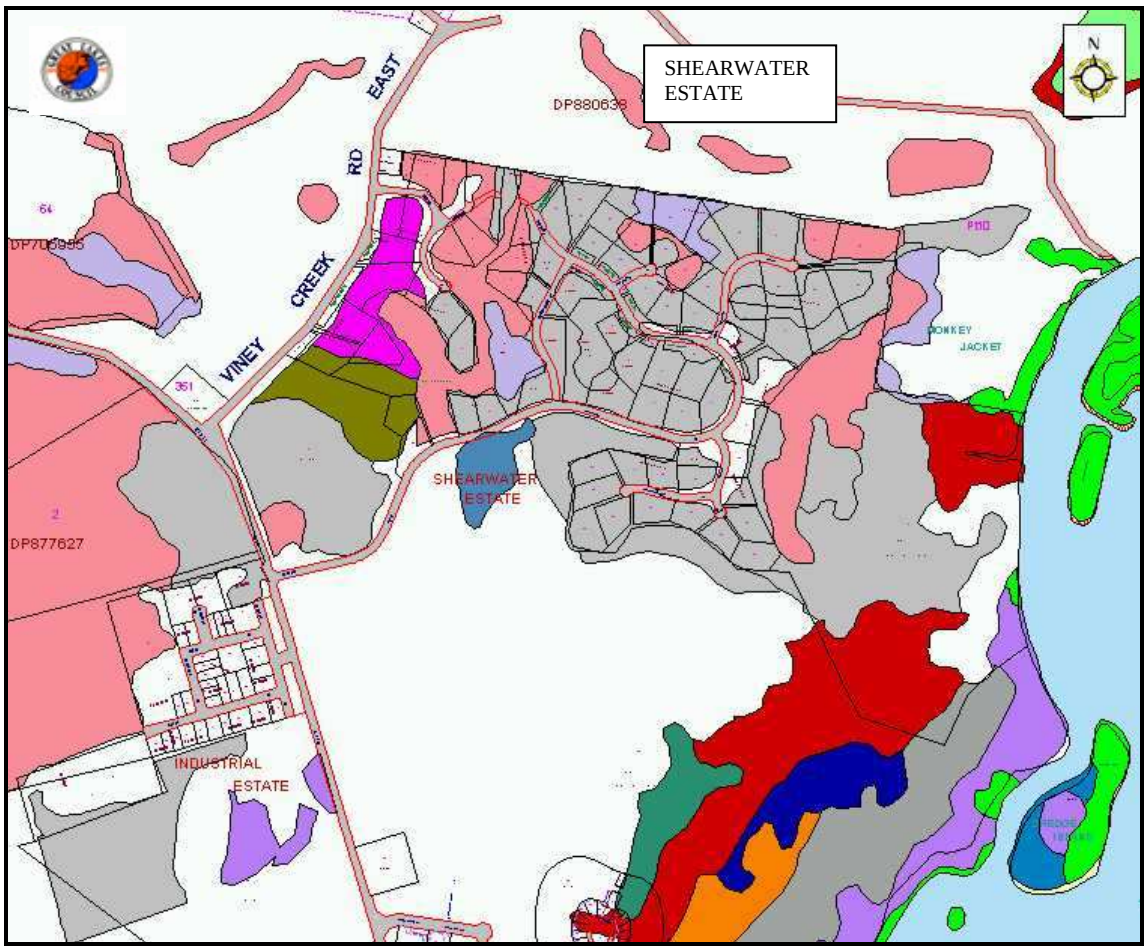
Vegetation formations present include dry sclerophyll scrub forest, dry sclerophyll grassy woodland, dry sclerophyll scrub/grass forest, swamp sclerophyll forest, wet sclerophyll forest, semi mesic grassy forests and rainforest within and adjacent to residential properties of Shearwater.

The conservation value of the local landscape is significant as remnant and regenerating vegetation protects many environmental communities including those recorded to be endangered, severely depleted or inadequately conserved in the NSW North Coast. As such, proper recognition of the inherent values of such vegetation is considered essential in any fire management regime for Shearwater."

The high conservation values of Council natural areas within Shearwater are contiguous with significant forested areas within adjacent private property. These areas therefore 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 essentialin any fire managemetn regime for Shearwater.

Sections of Shearwater are within the area defined as Key Habitat and part of the study area is within Regional Corridor, which extends into the nearby conservation area of MLNP (NPWS 2005b).

The conservation and protection of significant cultural heritage (Aboriginal and non-Aboriginal heritage) is important when undertaking any activity. *Clause 21 of Great Lakes Local Environmental Plan, 1996* makes provision for significant 'Heritage items' and guides their enhancement and protection. Within Great Lakes, Schedule 2 does not list any heritage items as local, regional or of state significance within the study area. There are no known, recorded archaeological sites within or neighbouring Shearwater.



LEGEND

Figure 5: Vegetation within Shearwater

Water Supply/Fire Fighting Water Supply/Aerial Access

The town water reservoir located within Shearwater Estate supply residents. In addition some households have installed rainwater tanks water for private use. Since the introduction of the more recent fire regulations, new residential properties are required to provide an additional specified fire fighting water tank and connections, which are available for fire appliance use during a fire event for protection of dwellings. Hydrants throughout Shearwater are easily accessed providing water supply for fire protection and suppression operations.

There are no designated helicopter landing pads within Shearwater however there are various ones located within Tea Gardens/Hawks Nest. The nearby Myall River provides continuous supply of water for aerial water bombing by helicopters.

Fire history

Fires are known have regularly occurred within Shearwater during the past 16—years and being within 4 kilometres of the coast is often influenced by coastal weather. Planned prescribed burns and wild fires have burnt the forested areas. Fires locally have occurred mostly in spring, when relative humidity's are lower in late winter and early spring, often without known cause or from suspected arson..

Fire have occurred in the vicinity of Shearwater during various bush fire seasons including; 1989–1980, 1980–81, 1993–1994, 1994–95, 2000–2001, 2001–2002, 2002–2003 and 2004–2005. During this 16—year period, fires were recorded during 8 fire seasons (DEC 2005b; RFS 2005b). Wild fires have occurred in heathland, dry sclerophyll scrub forest, swamps forest, rainforest, semi mesic grassy forest types that occur on the coastal area north and south of Hawks Nest.

The fire that occurred within Shearwater occurred during the 1998–1999, fire season where backburning operations occurred adjacent to private assets to protect property. Historically within 2 kilometres of Shearwater 5 major wild fires with various smaller fires have occurred during the 1980–81, 1988–89, 1989–1980, 1990–91, 1993–1994, 1994–95, 2000–2001, 2001–2002, 2002–2003, 2003–2004 fire seasons which threatened Shearwater burning within a short distance of the village. The use of existing fire trails and fire advantage lines such as a constructed dozer lines behind residential properties in Shearwater, assisted in preventing fire spreading into the residential area.

The RFS have undertaken hazard reduction burns in Council land management zones in the southern area of Shearwater Estate in 2004 to reduce the risk of fire entering Shearwater from the south and south west as part of cooperatively working Council to protect the community. Further afield, within 3 kilometres of Shearwater landholders have also undertaken prescribed burning activities in the local area in 2003.

Rural properties are known to undertake burning for land management purposes and hazard reduction through the non-bush fire season for strategic fire advantages zone to limit the spread of fire through traditional fire paths. These low or moderate intensity burns, do not threaten Shearwater during optimum manageable weather conditions.

Fire Trails/Fire Advantages/Control Lines

Fire trails are designed to provide access for fire fighting personnel and fire fighting units during incidents or planned fire operations. The fire trail register managed by the RFS records registered fire trails across the State. Council have a variety of existing and proposed, fire trails and fire advantages within Shearwater that are identified as strategic fire advantages.

Fire advantages can be natural or man made and are for the purpose of providing a control line during fire operations to assist in fire suppression.

Fire advantage's can be used for access, backburning, or providing a barrier for the oncoming fire to burn too. Natural features such as creek lines, rivers, swamps, wet gullies, rainforests, moist forests, rocky areas, cliff lines, water bodies, are sought during fire operations to provide strategic suppression options.

Other features such as dozer/grader lines, contour banks, dams, ploughed fire breaks, access tracks (existing/dormant), APZ's, SFAZ's all assist during operations and in reducing the spread of fires either during wildfire's or when undertaking hazard reducing burning.

Various existing fire advantage lines to the south, west, which includes the Estate's road system, and Myall Way all assist in fire operations. The grazing country to the north and largely cleared land to the south of Shearwater generally assist in preventing the spread of fires into the estate.

There are fire trails within Council managed land in Shearwater, and within adjacent private property. The RFS category of fire trails that exist within Shearwater are recorded as being of primary access for all (heavy, urban, medium and light) fire appliances sizes and secondary access for light fire appliances.

Fire advantage lines are also located within Shearwater Estate residential area and on neighbouring property which may be accessed by small—medium size fire appliances or utilised as fire control lines during fire incidents.

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. However the area is at the boundary of the uniform rainfall and the mostly summer rainfall zones. Typically the local climate is warm temperate, with generally warm to very warm summers and mild to cool winters.
The BOM assist fire authorities to predict fire weather and monitor bush fire weather during fire fighting operations. 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 humilities and high winds contribute to increased fire danger. (Australian Bureau of Meteorology, 2005b). The Parks and Wildlife Division of the DEC fire records reflect 70% of fires in Myall Lakes National Park occur in spring (National Parks and Wildlife Service, 2003a) when weather conditions are more conducive to spreading easily.

The Keetch-Byram Drought Indices (KBDI) index increases with time since rain (thus facilitating a reduction in soil moisture). The range is from 0-200 which is a measure in millimetres (saturation-dry ie amount in millimetres required to saturate soil). The drought indices (forest/grassland) are derived from the KBDI and collectively with temperature, relative humility, wind speed, rainfall and duration identifies the fire danger rating.

The type and arrangement of available fuel, topographic parameters and climatic conditions collectively affect fire behaviour. Fire behaviour can be predicted once the fire rating is derived. 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. As the forest fire drought index (FFDI) increases so does the fire rating. Hazard reduction burning can be carried out within particular drought indices providing environmental and climatic conditions can be applied to meet fire prescriptions. The RFS preferred FFDI for undertaking low intensity hazard reduction burns is between 2 and 15 depending on fuel loads (RFS 2003c).

BOM provide fire weather warnings (bush fire alerts) during the bush fire danger period to the NSW RFS who broadcasts conditions and requirements, such as total fire bans and issuing of fire permits for the lighting of fires. These are suspended during total fire bans.

BOM assist fire authorities by predicting fire weather during fire incidents and hazard reduction burns. This updated fire weather information assists in operational decisions and implementation of strategies and of crew placement. Wind shifts can be 90 degrees from cold fronts moving across the fire ground that can dramatically affect tactics and safety.
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).

Climatic data is available for four areas within or immediately adjacent to the LGA, at Forster, Coolongolook, Girvan State Forest and Nelson Bay (Bureau of Meteorology). Climatic details of these areas are documented in Appendix VIII.

During the fire season the mean daily minimum temperature, on the coast is 13 °Cin October and rises to a mean daily maximum of 27.5 °Cin February. Monthly rainfall is highest in February and reducing from highest to lowest in January, December, March, November, April, and October. Historical relative humidly records (1961- 1990) for Williamtown from the BOM show that records range from 66-82% and 50-62%, 9am and 3pm respectively (BOM 2005d).

The driest seasons are during winter and spring, during which hazard reduction burning can be implemented. The KBDI however influences the ability to safely undertake these works. Records from the BOM show that variability over the years does do not provide a consistent pattern of ideal conditions needed for hazard reduction. Drought conditions during the winter and spring period during some of the past few years have not been conducive for control burns. In most years, the summer rainfall in January brings the normal fire season to an end, although some drier years have extended beyond this period.

The coastal wind patterns distinctly change from the morning to the afternoon in which patterns are affected by coastal sea breezes. Comparison of Williamtown and Port Macquarie show the wind shifts from west to the north-west to south-east to the east for Williamtown and south-west to the north-east, 9am and 3pm respectively (BOM 2005e).

Generally prevailing fire weather winds during winter and spring within Great Lakes LGA are predominantly from the south-west to north-west and shifting winds in summer from the west to north-west to the south-east to north- east in the afternoon's. Southerly changes up the coast also cause unpredictable fire weather conditions, which push strong hot winds preceding the cold front that often experiences moist cooler conditions.

Resources

The responsibility of identification and of supply of adequate resources within the rural fire district lies with the RFS to ensure communities affected by a fire event are protected against injury or damage from fire. In the event of an incident, other fire fighting authorities such as the NSW FB, DEC can provide additional resources to combat fires within bushland areas and structure fires. Appliances within a 30 kilometres are available (Figure 6) to combat fires within Shearwater environs or as support units to RFS fire fighting resources within Shearwater.

RFS brigades outside the local area within the Lower Hunter Zone are available to assist as additional resources during incidents. Appliances from Great Lakes, Port Stephens and Dungog LGA, can be 'out of area crews' depending on requirements and circumstances at the time.

Shearwater is adjacent to a well-maintained secondary roadway being Myall Way 8 kilometres from the Pacific Highway. This allows response time to be reduced when travelling on the highway from Bulahdelah and North Arm Cove rather than when on a secondary road.

Various plans and policies of the RFS assist in guiding fire suppression, planning and mitigation of fires. These include documents such as, *Plan of Operations, Standard Operating Procedures 5.1.7, and Fire Ground Standard Operating Procedures, 1999,* which define vehicle requirement type and the number to be responded for various incidents (Refer to Appendix VII for Fire fighting appliance size). The standard operating procedures operationally guide RFS managers and volunteer fire fighters.

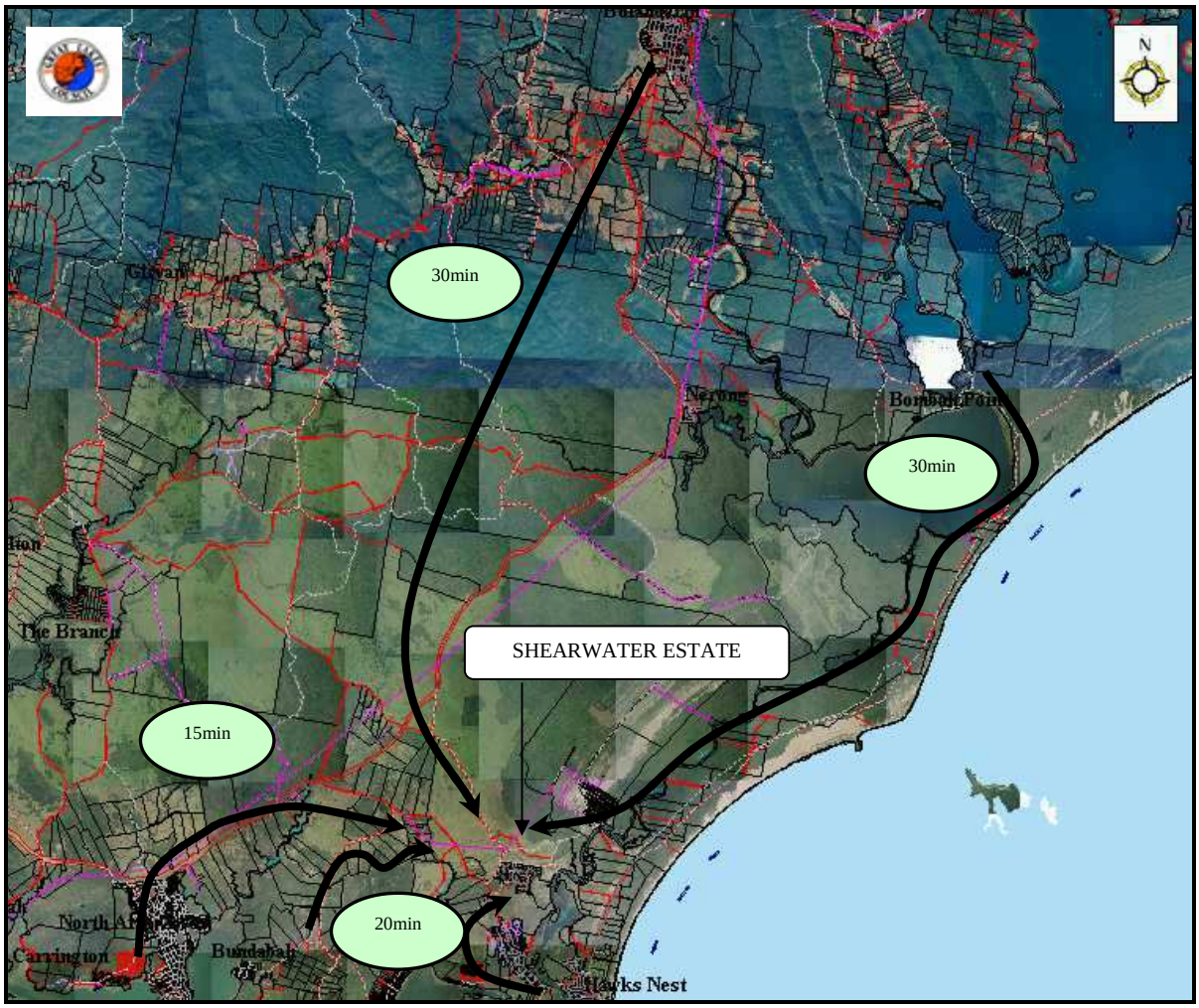


Figure 6: Distance to Shearwater.

The RFS is able to provide fire fighting appliances to Shearwater for both bush and structural fires. Tea Gardens Rural Fire Brigade provides the 1st response and Pindimar and Bundabah Rural Fire Brigade provide the 2nd response to fires within this area (Table 5). Additional resources (not listed) are sourced locally when required to assist in incidents.

Table 5: Response of resources to Shearwater.

Fire Authority	Brigade/Depot	Fire Appliance Location	Travel Distance to Shearwater	Run Time (minutes)	Fire Appliance Type
NSW RFS	Tea Gardens	Tea Garden	3 km	3	Category 1 & 9
NSW RFS	Bulahdelah	Bulahdelah	32 km	25	Category 10, 1 & 9
NSW RFS	North Arm Cove	North Arm Cove	10 km	8	Category 2 & 9
DEC	Bombah Point	Bombah Point	30 km	30	Category 2 & 9 (X2)
DEC	Booti Booti	Booti Booti	46 km	50	Category 2 & 9 (X2)
NSW FB	Tea Gardens	Tea Gardens	6 km	5	Urban Pumper

Key Fire Issues for Shearwater

Throughout the preparation of the strategy key fire issues have been highlighted, being both of a positive and negative nature. From this summary of fire issues land managers can easily identify, both at a planning level and during operational fire management, issues to be considered.

Key Fire Issues
❖ A large number of assets occur within Shearwater rural environment.
❖ Shearwater is within 1 kilometres of contiguous vegetation and pine plantation, rated as a major fire risk by the NSW Rural Fire Service.
❖ In extreme fire weather conditions the fire path is aligned with coastal north-easterly winds.
❖ Parks and reserves contain recreational facilities that need protection.
❖ Adjacent private landholders have asset protection zones, strategic fire advantage zones, fire trails and fire advantage to assist in fire operations.
❖ Hazard reduction burning occurs in Reserve areas.
❖
❖ There is a need for landholders to be prepared as as fire fighting resources are sought from outside Shearwater.
❖ Area is serviced by fire fighting vehicles from nearby towns and locations.
❖ Potential fire ignitions adjacent to Myall Way or Viney Creek Road or from lightning strikes during the spring and summer months.
❖ The majority of Shearwater is mapped as Bush Fire Prone Land.
❖ Bushfire Prone building standards apply to some structures that occur in Shearwater with on site water supplies available.

SECTION 8

Overview of Bush Fire Risks to Shearwater

Shearwater's extreme, major and moderate bush fire risk category is a result of the close proximity of bush land areas directly adjacent to the Estate and Industrial area. Protection of Shearwater is Councils priority to ensure protection and to lessen the impact on residents and fire fighters during a fire incident.

Bush fire risk analysis is a mechanism to undertake risk assessments on assets including life and property, natural heritage and cultural heritage. By preparing for the imminent advancement of a bush fire incident, hazard reduction activities can serve to quell the intensity and subsequent detrimental affects on the community. During fire suppression operations offensive and defensive fire suppression techniques are applied to protect assets, depending on fire intensity and fuel loads and the existence of APZ's and SFAZ's.

The Australian landscape has adapted and evolved due to fires. Lightning strikes are a natural phenomenon and have been known historically to occur throughout the area. Seasonal thunderstorms range along the coastline and further inland other ignition sources range from arson, escaped hazard reduction, accidental ignition and motor vehicle accidents.

Existing Features

There is an extensive coverage of continuous vegetation communities south and disjunct from Shearwater which are sufficiently large enough to sustain fires within spotting distances to Shearwater during wild fires.

The sclerophyll forest links the larger forested areas to the estate from the southwest, across Myall Way along the ridgeline. The rest of the surrounding area is predominantly cleared agricultural paddocks or south into under scrubbed and thinned forested land extending into the wetter gullyand low lying coastal heathland areas across Myall River to MLNP. Cleared grazing country north extends to the Softwood Pine Plantation that adjoins the MLNP. These areas are likely to sustain bush fires if ignited, and have a fire path leading to Shearwater. (Figure 7).

Various advantage lines exist both naturally and man made including roads, transmission lines, waterways, rivers, creeks and wet gullies. These are all used during fires as control lines however spotting which can occur during extreme fire weather conditions, with low humidity, high air temperatures, high winds and fuel levels, may be as far as 5 kilometres across such advantage lines.

Shearwater abuts private property before extending to Myall River that flows through Tea Gardens. This river provides a water source for fire fighters and aerial water bombing craft. This existing moister coastal influence can assist in providing environmental conditions to slow the movement of fires and reduce the longevity of fires by providing sea breezes, moist conditions and changes in vegetation type and available ground fuels.

The pattern of development, surrounded by vegetated strategic fire advantage zones is conducive to ignition of fires from ember attack (Figure 7-10). Fire fingers are able to extend amongst both developed and undeveloped properties, along road verges, through rural properties and open space areas.

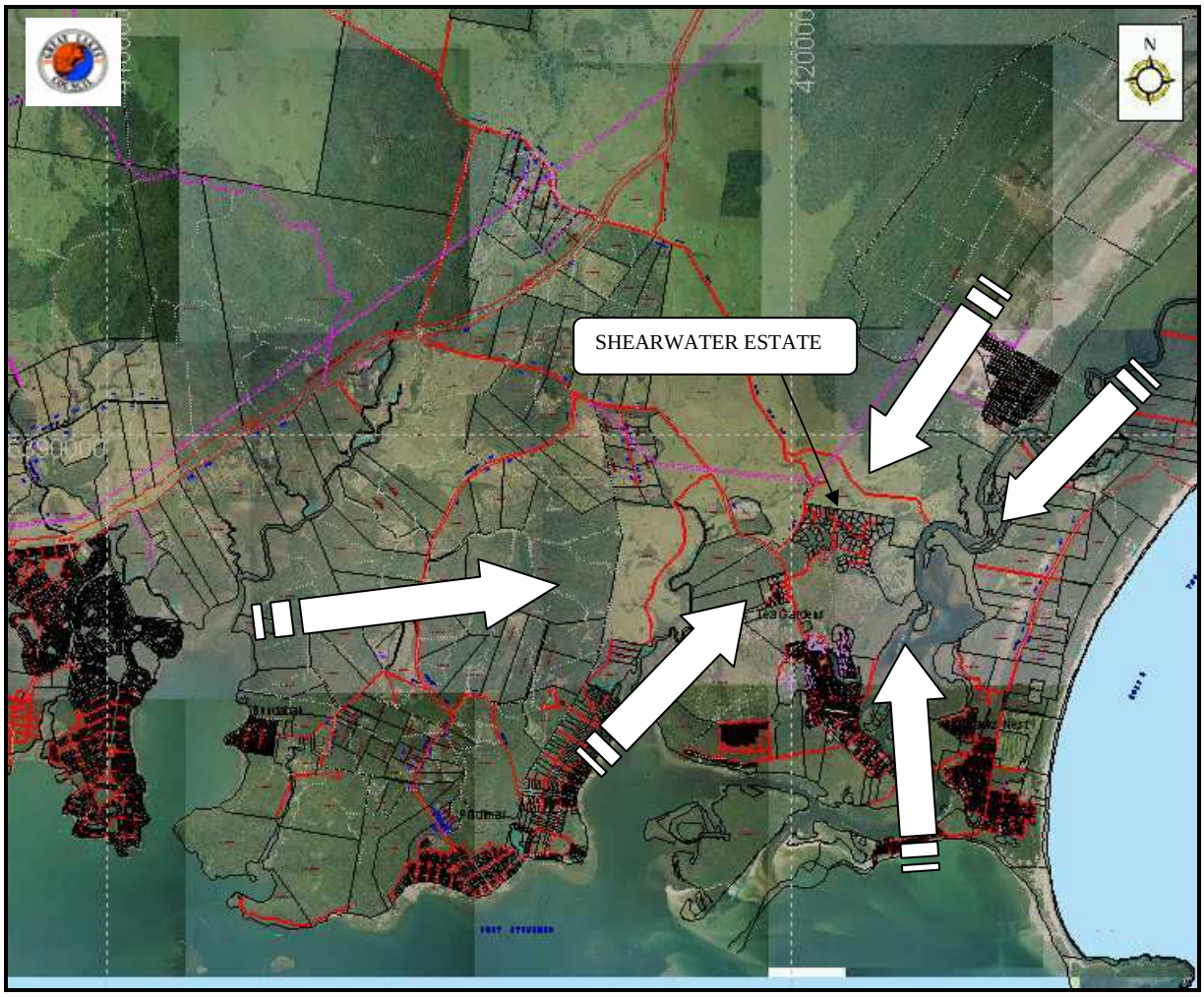


Figure 7: Bush fire risk surrounding Shearwater.

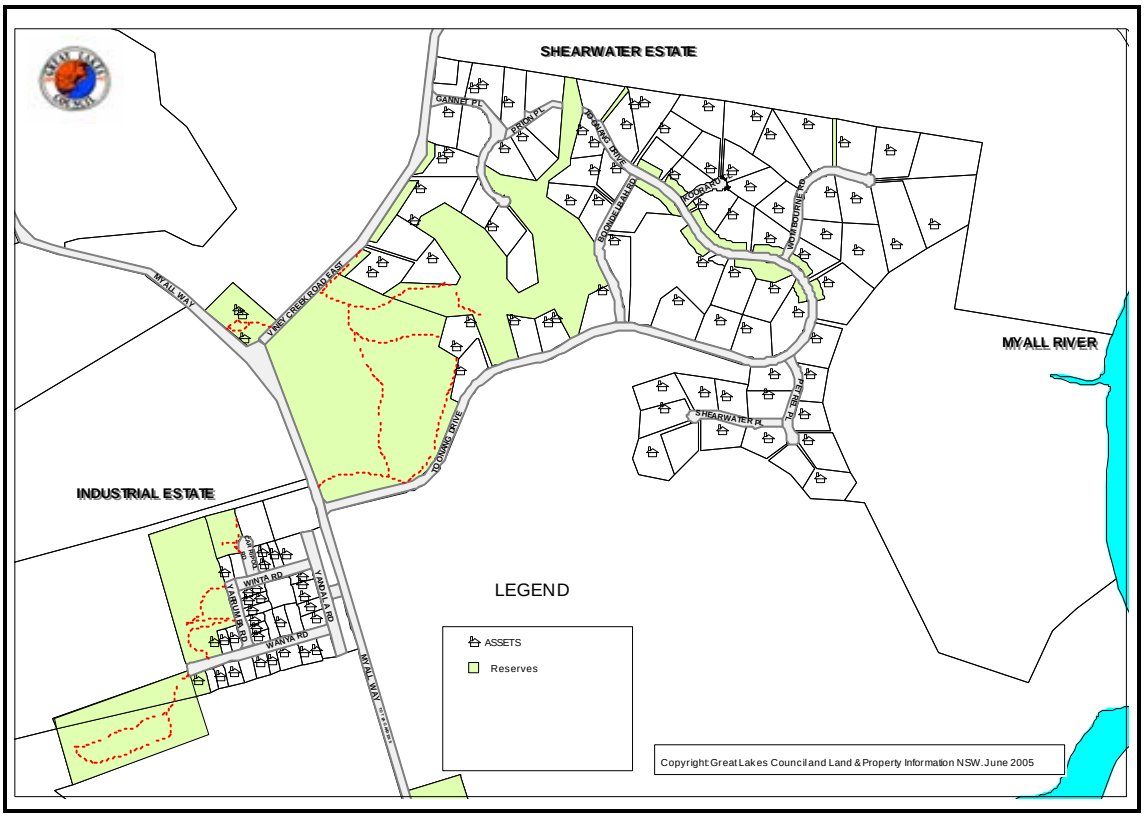


Figure 8: Locations of recorded dwellings and other structures established within Shearwater.

Figure 9: Development within Shearwater Estate.

Figure 10: Development within Industrial Estate.

Risk to Life and Property

The Lower Hunter Zone Bush Fire Risk Management Plan (BFRMP) identifies Shearwater as being within; *extreme, major and moderate bushfire risk* areas (Table 6), and is also entirely within *bush fire prone land*, where legislation requires new development to met standards within the *Planning for Bush Fire Protection Guidelines, 2001.* The spread of fire from adjacent bushland to the rural/residential interface and the spread of fire from road verges are a risk to 78 rural-residential properties within Shearwater (Figure 11).

Six localities have been identified where life and property[9]are directly threatened in Shearwater (Table 6) Within these areas fire management zones have been identified including APZ and SFAZ's and management strategies within Section 9.

Potential ember attack during a bushfire incident from adjacent burning bushland re-enforces the importance and requirement for householders to mitigate against possible fire threat and for residents to undertake their own fire preparedness activities.

[9] Life and Property is identified on figures as LP with corresponding number identified in Table 6

Table 6: Risk to life and property.

Code	Location	Description of risk	BFRMP Risk Rating (2002)
LP1	Shearwater – South	Southern residential edge including 22 residential properties (18 houses).	Extreme/Major/ Moderate
LP2	Shearwater – East	Eastern residential edges adjacent to private properties including 10 residential properties (9 houses).	Extreme/Major/ Moderate
LP3	Shearwater – Internal West	Internal residential edge adjacent to Reserve No 5249 (Lot 18 DP 804975) including 22 residential properties (17 houses).	Extreme/Major/ Moderate
LP4	Shearwater – West	Western rural interface across Viney Creek Road including 8 residential properties (6 houses).	Extreme/Major/ Moderate
LP5	Shearwater -North	Northern residential edges adjacent to private property grazing grasslands including 11 residential properties.	Extreme/Major/ Moderate
LP 6	Industrial Estate	Surrounding area of the Industrial Area	Major/Moderate

- *Key Fire Issue - Bushfire Prone building standards apply to some structures that occur in Shearwater with on site water supplies available for fire fighting*

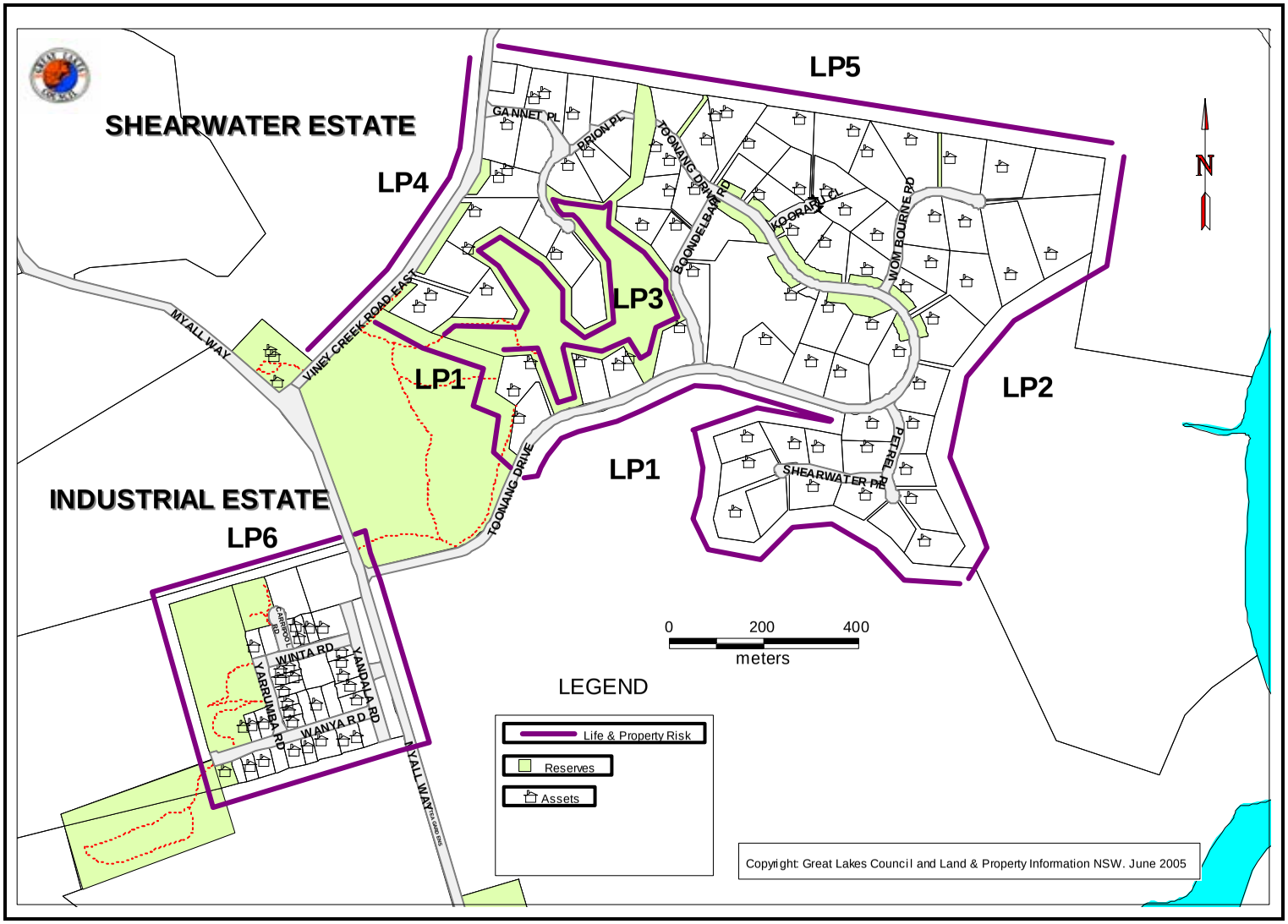


Figure 11: Location of life and property risk to Shearwater.

Risk to Natural Heritage

The Lower Hunter Zone Bushfire Risk Management Plan identifies Council Reserves as being of both major and moderate environmental and ecological risk rating[10] (Figure 11 and Table 7). Inappropriate fire regimes can impact the natural heritage values within local vegetation formations neighbouring the area, along with disturbances such as clearing or extensive under scrubing.

Table 7: Risk to natural heritage

Key	Location of Council Public Reserve/Properties	Location	Vegetation Community Effected by Bush Fire Events	Lower Hunter Zone Bush Fire Risk Management Plan Environmental & Ecological Risk Rating (2002)
N1	Reserve No 5138	Lot 351 DP 734061	dry sclerophyll scrub/ forest	Major
N2	Reserve No 5200 (Viney Creek Rd)	Lot 8 DP 733241	dry sclerophyll scrub/ forest	Moderate
N3	Reserve No 5199 (Viney Creek Rd)	Lot 7 DP 733241	dry sclerophyll scrub/ forest	Moderate
N4	Reserve No 5202 (Viney Creek Rd)	Lot 6 DP 733241	dry sclerophyll scrub/ forest	Moderate
N5	Reserve No 5201	Lot 9 DP 733241	dry sclerophyll scrub/ forest	Major
N6	Reserve No 5249	Lot 18 DP 804975	Disturbed dry sclerophyll scrub/ forest, wet sclerophyll forests and rainforest	Major
N7	Reserve No 5208 (Toonang Dr)	Lot 29 DP 738450	Disturbed dry sclerophyll scrub/ forest	Moderate
N8	Reserve No 5209 (Toonang Dr)	Lot 31 DP 738450	Disturbed dry sclerophyll scrub/ forest	Moderate
N9	Reserve No 5219 (Toonang Dr)	Lot 41 DP 738450	Disturbed dry sclerophyll scrub/ forest	Moderate

Risk to Cultural heritage

The Lower Hunter Zone Bushfire Risk Management Plan does not identify any archaeological or aboriginal heritage sites in or around Shearwater. In addition the DEC (Parks and Wildlife Division) maintained Aboriginal Heritage Information Management System (AHIMS) did not identify any aboriginal sites within Council land.

Table 8: Risk to cultural heritage

Key	Location	Historic Site	Lower Hunter Zone Bush Fire Risk Management Plan Risk Rating (2002)
HS1	N/A	N/A	Not identified in the plan

[10] Environmental & ecological risk rating is the affect on the biodiversity and natural values of the area

SECTION 9

Management Strategies

Specific management strategies for each zone are outlined in Tables 10-15, with corresponding fire management zone locations in Figure 12 and 13. From these, annual works programs are identified and scheduled on land under the control of Council. The identification code seen within Table 9 identifies the relationship with various zones.

Council has considered adjacent fire management strategies in determining FMZ's on Council land and have in addition taken into consideration neighbouring fire management strategies adjacent to Council land.

It is recognised that other authorities have evolving management practices and fire strategies which may alter from currently recorded strategies included within this plan. Council acknowledges that these may changes in the future and reference to planning documents is important to ensure contemporary management is continually being undertaken.

Table 9: Terminology and identification used on maps.

ID	Description
LP	Life and property
A-Z	Locality code of **town or village** [11]
A1	Asset Protection Zone reference number (preceded by locality code)
S1	Strategic Fire Management Zone reference number (preceded by locality code)
C1	Land Management Zone for conservation reference number (preceded by locality code)
E1	Exclusion Zone reference number (preceded by locality code)
Hs	Cultural heritage including Cultural Heritage and Aboriginal Heritage
Fl	Threatened flora
Fa	Threatened fauna
EEP	Endangered populations
ECC	Endangered ecological communities

Management Areas

Council is responsible for management of these FMZ, however the Lower Hunter Bush Fire Management Committee has a responsibility to manage fuels within the whole of Great Lakes with a coordinated approach. This has led to the inclusion of adjacent mapped adjacent fire management zones proposed or identified (when available) by other fire authorities within other planning documents.

[11] Refer to Appendix VII

Asset protection zones

Using the criteria identified by the RFS for determining APZ's, 27 APZ's have been identified on Council Land within Shearwater Estate and the Industrial Estate (Table 11, Figure 11 & 12). Consideration to existing APZ's on private properties enable Council fire management strategies meet fire protection requirements.

The responsibility for maintenance of the existing APZ's on private property within Shearwater lie with private landholders (inner and outer fire protection areas when associated with new and existing dwellings). This is monitored by the RFS. These zones have not been mapped but meet legislative requirements and are guided by other planning documents referred to earlier within this plan.

The overall fire mitigation plan objectives have led to the identification of specific objectives and strategies to be implemented. Standard strategy options that can be applied to individual APZ's are detailed below in Table 10. Table 11 contains relevant objectives and strategy(s) that are applied to each zone, which accordingly varies depending on the proposed management techniques. To meet management objectives, assist in the prevention of fires and to reduce the risk of bush fire. Implementation and maintenance by Council is managed as part of annual work program.

Table 10: Options for specific strategies applied to asset protection zones.

Strategies	1	Maintain APZ specifications on Council land for adjacent existing developments to meet specifications of the BFEAC (RFS 2003a)
	2	Provide and maintain fuel reduced areas to help prevent the spread of fires and reduce fire intensity
	3	Monitor Overall Fuel Hazards to ensure they are maintained to meet prescribed levels (NPWS 2003b)
	4	Create and/or maintain existing fire advantage lines to provide access for fire fighters
	5	Promote to the Community, education on importance of hazard reduction & Home Bush Survival Plans
	6	Liaison with adjoining land managers for a coordinated approach to monitoring and management of adjacent zone for bush fire risks and fuel hazards
	7	Provide a refuge area for fire fighters, visitors and residents in the event of a fire
	8	Enhance adjacent asset protection zone or strategic fire advantage zone
	9	Maintain APZ by mechanical hazard reduction within existing DC to meet APZ specification to the BFEAC (RFS 2003a) and/or to the PBFP guidelines (RFS 2002b)[12]
	10	Ensure Buildings and fire standards to comply with Australian Standards AS3959 (Ramsey and Dawkins 1993) and PBFP for new developments

[12] Council approval required for APZ to coexist on private development and Council Land.

	11	Prescribe burn at a frequency to maintain the prescribed Overall Fuel Hazard within a APZ (NPWS 2003b)

Table 11: Specific fire objectives and strategies applied to asset protection zones for Shearwater (SW).

APZ Code (SW)	Life & Property Code	Map Figure	HR Name/ Location	Zone Objective	Strategy	Maintenance	Vegetation
A1	LP1	8	Reserve No 5201 ---------- Lot 9 DP 733241	• To protect the bushland interface south & eats of 1 property linking with the reserve.	1,2,3,4,5,7,8,9 within the reserve.	Width – 5-16m Length – 92m Area – 0.0554ha Mowing/Hand removal	Smooth-barked Apple/Sydney Peppermint/Stringy bark (106)
A2	LP1	8	Reserve No 5201 ---------- Lot 9 DP 733241	• To protect the bushland interface south & westof 1 property linking with the reserve.	11,2,3,4,5,7,8,9 within the reserve.	Width – 14m Length – 72m Area – 0.0943ha Slashing/Hand removal	Smooth-barked Apple/Sydney Peppermint/Stringy bark (106)
A3	LP4	8	Reserve No 5249 ---------- Lot 18 DP 804975	• To protect the bushland interface north of 1 property linking with the reserve.	1,2,3,4,5,7,8,9 within the reserve.	Width – 8m Length –20m Area – 0.0100ha Mowing/Hand removal	Smooth-barked Apple/Sydney Peppermint/Stringy bark (106)
A4	LP4		Reserve No 5199 (Viney Creek Road) Lot 7 DP 733241	• To protect the bushland interface west of 1 property linking with the reserve.	1,2,3,4,5,7,8,9 within the reserve.	Width - 10m Length - 40m Area – 0.0373ha Mowing	Ironbark - Smooth-barked Apple-Stringybark (84/106)
A5	LP4	8	Reserve No 5202 (Viney Creek Road) Lot 6 DP 733241	• To protect the bushland interface west of 1 property linking with the reserve.	11,2,3,4,5,7,8,9 within the reserve.	Width - 3m Length - 38m Area – 0.0088ha Mowing	Ironbark - Smooth-barked Apple-Stringybark (84/106)
A6	LP3	8	Reserve No 5249 ---------- Lot 18 DP 804975	• To protect the bushland interface south of 1 property linking with the reserve.	1,2,3,4,5,7,8,9 within the reserve.	Width – 10m Length –20m Area – 0.0204ha Mowing/Hand	Spotted Gum-Ironbark/Grey Gum (74)

APZ Code (SW)	Life & Property Code	Map Figure	HR Name/ Location	Zone Objective	Strategy	Maintenance	Vegetation
						removal	
A7	LP3	8	Reserve No 5249 ---------- Lot 18 DP 804975	• To protect the bushland interface south of 1 property linking with the reserve.	1,2,3,4,5,7,8,9 within the reserve.	Width – 7m Length –49m Area – 0.0349ha Mowing/Slashing	Spotted Gum-Ironbark/Grey Gum (74)
A8	LP3	8	Reserve No 5249 ---------- Lot 18 DP 804975	• To protect the bushland interface west of 1 property linking with the reserve.	11,2,3,4,5,7,8,9 within the reserve.	Width – 25m Length –55m Area – 0.0969ha Hand Removal/Mowing/ Slashing	White Mahogany/ Red Mahogany/ Grey Ironbark/ rey Gum (60)
A9	LP3	8	Reserve No 5249 ---------- Lot 18 DP 804975	• To protect the bushland interface north & westof 1 property linking with the reserve.	1,2,3,4,5,7,8,9 within the reserve.	Width – 10m Length –46m Area – 0.072ha Mowing/Slashing	Smooth-barked Apple/Sydney Peppermint/ Stringybark (106)
A10	LP3	8	Reserve No 5249 ---------- Lot 18 DP 804975	• To protect the bushland interface east & west of 1 property linking with the reserve.	1,2,3,4,5,7,8,9 within the reserve.	Width – 10m Length –25m Area - 0.0245ha Mowing	Spotted Gum-Ironbark/ Grey Gum (74)
A11	LP5	8	Reserve No 5210 (Toonang Dr) Lot 32 DP 738450	• To protect the bushland interface north of 1 property linking with the reserve.	11,2,3,4,5,7,8,9 within the reserve.	Width - 20m Length - 65m Area – 0.0787ha Mowing	Smooth-barked Apple/Sydney Peppermint/ Stringybark (106)
A12	LP5	8	Reserve No 5213 (Toonang Dr) Lot 35 DP 738450	• To protect the bushland interface south of 1 property linking with the reserve.	1,2,3,4,5,7,8,9 within the reserve.	Width – 15m Length –64m Area – 0.0899ha Mowing	Smooth-barked Apple/Sydney Peppermint/ Stringybark (106)
A13	LP5	8	Reserve No 5214 (Toonang Dr) Pt Lot 182 DP 771180	• To protect the bushland interface south of 1 property linking with the reserve.	1,2,3,4,5,7,8,9 within the reserve.	Width – 20m Length –30m Area – 0.0888ha	Smooth-barked Apple/Sydney Peppermint/

APZ Code (SW)	Life & Property Code	Map Figure	HR Name/ Location	Zone Objective	Strategy	Maintenance	Vegetation
						Mowing	Stringybark (106)
A14	LP5	8	Reserve No 5215 (Toonang Dr) Lot 37 DP 738450	• To protect the bushland interface south of 1 property linking with the reserve.	11,2,3,4,5,7,8,9 within the reserve.	Width – 10m Length –49m Area – 0.0536ha Mowing	Smooth-barked Apple/Sydney Peppermint/ Stringybark (106)
A15	LP5	8	Reserve No 5208 (Toonang Dr) Lot 29 DP 738450	• To protect the bushland interface north of 1 property linking with the reserve.	1,2,3,4,5,7,8,9 within the reserve.	Width – 10m Length –29m Area – 0.0228ha Mowing	Smooth-barked Apple/Sydney Peppermint/ Stringybark (106)
A16	LP5	8	Reserve No 5208 (Toonang Dr) Lot 29 DP 738450	• To protect the bushland interface north of 1 property linking with the reserve.	1,2,3,4,5,7,8,9 within the reserve.	Width – 5m Length –35m Area – 0.0177ha Mowing	Smooth-barked Apple/Sydney Peppermint/ Stringybark (106)
A17	LP5	8	Reserve No 5217 (Toonang Dr) Lot 39 DP 738450	• To protect the bushland interface north of 1 property linking with the reserve.	11,2,3,4,5,7,8,9 within the reserve.	Width – 10m Length –42m Area – 0.0413ha Mowing	Smooth-barked Apple/Sydney Peppermint/ Stringybark (106)
A18	LP5	8	Reserve No 5218 (Toonang Dr) Lot 40 DP 738450	• To protect the bushland interface north of 1 property linking with the reserve.	1,2,3,4,5,7,8,9 within the reserve.	Width – 10m Length – 10m Area – 0.0099ha Hand/Removal	Smooth-barked Apple/Sydney Peppermint/Stringy bark (106)
A19	LP5	8	Reserve No 5211 (Toonang Dr) Lot 33 DP 738450	• To protect the bushland interface south of 1 property linking with the reserve.	1,2,3,4,5,7,8,9 within the reserve.	Width – 17m Length –37m Area – 0.0160ha Mowing	Smooth-barked Apple/Sydney Peppermint/ Stringybark (106)
A20	LP5	8	Reserve No 5212 (Toonang Dr) Lot 34 DP 738450	• To protect the bushland interface south of 1 property linking with the reserve.	11,2,3,4,5,7,8,9 within the reserve.	Width – 10m Length –127m Area – 0.0592ha Mowing	Smooth-barked Apple/Sydney Peppermint/ Stringybark (106)
A21	LP4	8	Reserve No 5238	• To protect the bushland interface	1,2,3,4,5,7,8,9	Width – 24m	Spotted Gum-

APZ Code (SW)	Life & Property Code	Map Figure	HR Name/ Location	Zone Objective	Strategy	Maintenance	Vegetation
			Lot 351 DP 734061	surrounding visitor facilities within the reserve.	within the reserve.	Length – 38m Area – 0.0757ha Slashing	Ironbark/ Grey Gum (74)
A22	LP6	8	Council Depot Lot 26 DP585363	• To protect adjacent industrial properties. • To assist in mitigating the spread of bush fire through the industrial estate.	1,2,3,4,5,7,8,9 within the reserve.	Width – 7m Length –51m Area – 0.0359ha Hand Removal/ Mowing	Cleared/ Depot Grounds
A23	LP6	8	Council Depot Lot 26 DP585363	• To protect adjacent industrial properties. • To assist in mitigating the spread of bush fire through the industrial estate.	11,2,3,4,5,7,8,9 within the reserve.	Width – 10m Length –51m Area – 0.0534ha Maintenance of gravel carpark	Cleared/ Depot Grounds
A24	LP6	8	Council Depot Lot 26 DP585363	• To protect adjacent industrial properties. • To assist in mitigating the spread of bush fire through the industrial estate.	1,2,3,4,5,7,8,9 within the reserve.	Width – 20m Length –66m Area – 0.1351ha Maintenance of gravel carpark	Cleared/ Depot Grounds
A25	LP6	8	Public Reserve Lot 59 DP786548	• To protect the bushland interface west of a property linking with the reserve.	1,2,3,4,5,7,8,9 within the reserve.	Width – 8m Length –38m Area – 0.0309ha Maintenance of gravel carpark	Disturbed Smooth-barked Apple/ Sydney Peppermint/ Stringybark (106)
A26	LP6	8	Reserve No 5238 Lot 351 DP 734061	• To protect the bushland interface surrounding visitor facilities within the reserve.	11,2,3,4,5,7,8,9 within the reserve.	Width – 24m Length –24m Area – 0.0432ha Maintenance of gravel carpark	Spotted Gum-Ironbark/ Grey Gum (74)
A27	LP6	8	RFS Brigade Station Lot 40 DP 630478	• To protect the bushland interface surrounding the Shed within the property.	1,2,3,4,5,7,8,9 within the reserve.	Width – 10m Length – 37m Area – 0.0882 ha	White Mahogany/ Red Mahogany/ Grey Ironbark/

APZ Code (SW)	Life & Property Code	Map Figure	HR Name/ Location	Zone Objective	Strategy	Maintenance	Vegetation
						Slashing	Grey Gum

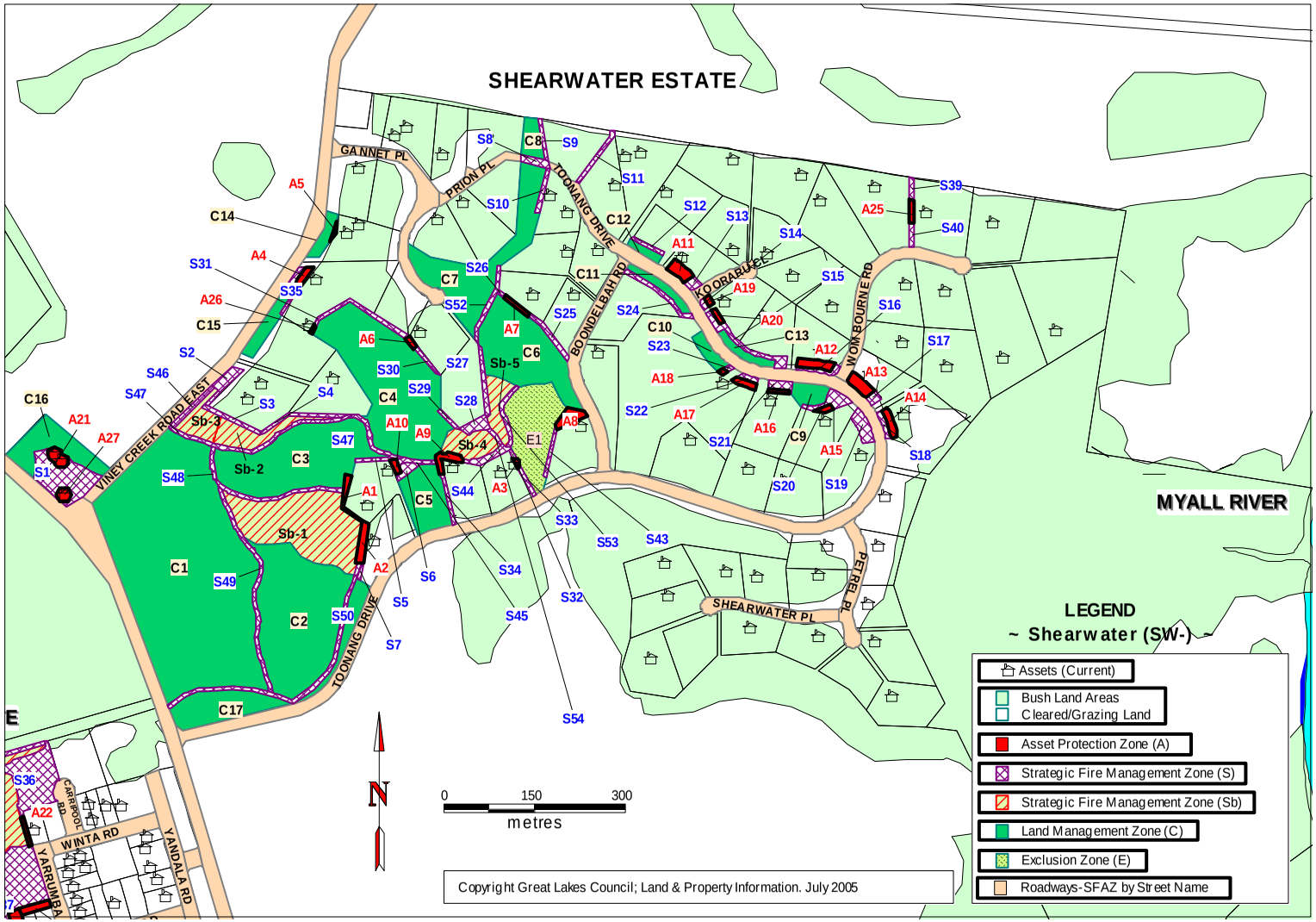


Figure 12: Fire management zones within Council managed land in Shearwater Estate.

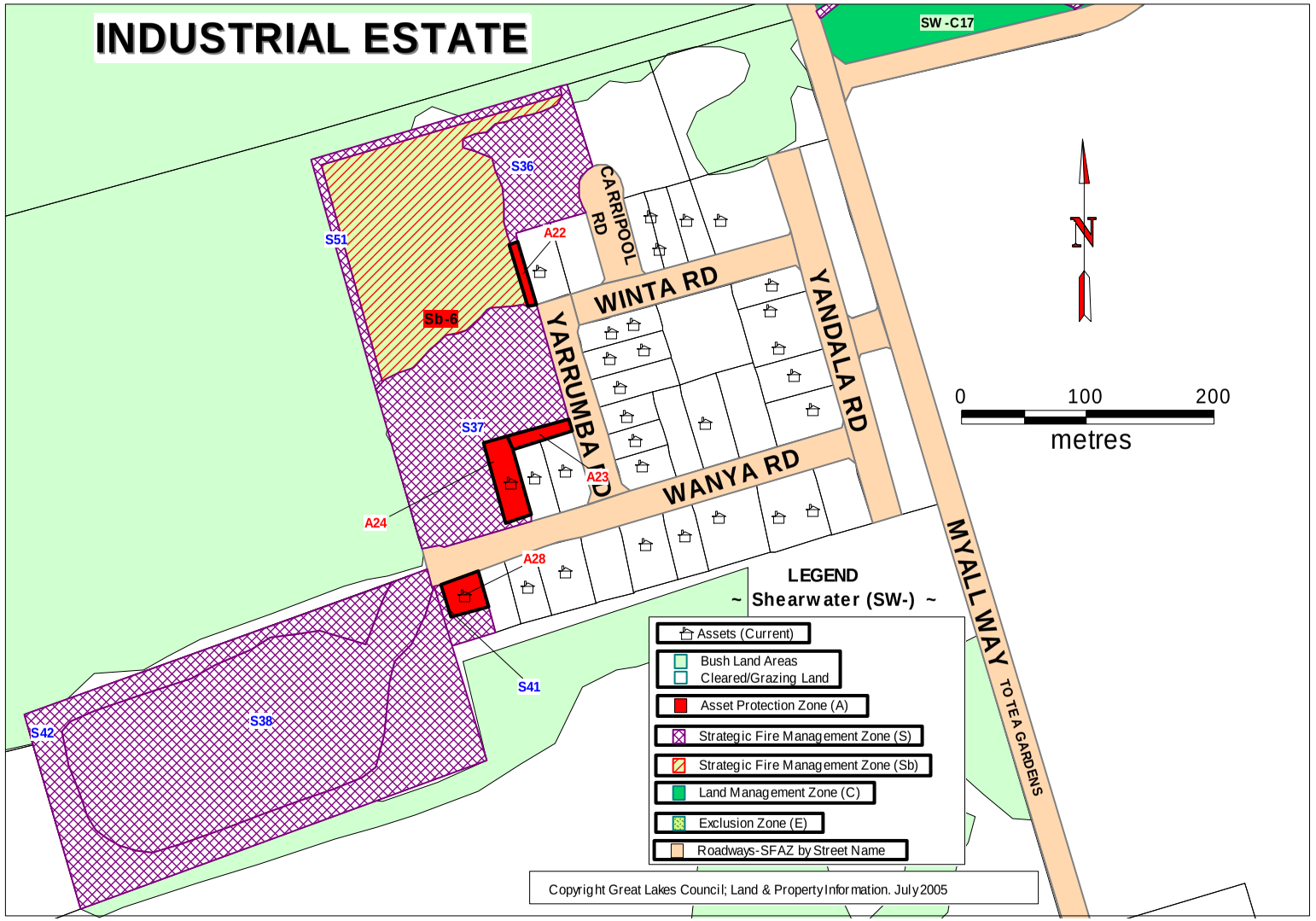


Figure 13: Fire management zones within Council managed land in the Industrial Estate.

Strategic Fire Advantages

A total of forty-nine (49) individual SFAZ's (within an area of 10.53ha) are recorded within Shearwater (including14 mechanically fuel reduced SFAZ's such as fire advantage lines and fire trails) and an additional 14 individual SFAZ's on road reserves that that are managed by Council.. Six (6) SFAZ's where hazard reduction burning has been identified to compliment the adjacent mechanical slashed SFAZ and APZ's or to provide strategically located fuel reduced areas.

The overall fire mitigation plan objectives have led to the identification of specific objectives and strategies to be implemented. Standard strategy options that can be applied to individual SFAZs are detailed in Table 12. Table 13, 14 and 15 contain relevant objectives and the strategy(s) applied to a particular zone, which accordingly varies depending on the proposed management techniques, To meet management objectives, assist in the prevention of fires and to reduce the risk of bush fire, implementation and maintenance by Council is managed as part of annual work program.

Table 12: Options for specific strategies applied to strategic fire advantage zones.

Strategy	1	Maintain SFAZ specifications on Council land for adjacent existing developments to meet specifications of the BFEAC (RFS 2003a)
	2	Provide and maintain fuel reduced areas to help prevent the spread of fires and reduce fire intensity
	3	Monitor Overall Fuel Hazards to ensure they are maintained to meet prescribed levels (NPWS 2003b)
	4	Create and/or maintain existing fire advantage lines to provide access for fire fighters
	5	Maintain SFAZ specifications on Council land for adjacent existing developments to meet specifications of the Environmental Impact Assessment (Council 2005a)
	6	Liaison with adjoining land managers for a coordinated approach to monitoring and management of adjacent zone for bush fire risks and fuel hazards
	7	Provide a refuge area for fire fighters, visitors and residents in the event of a fire
	8	Enhance adjacent asset protection zone or strategic fire advantage zone
	9	Maintain SFAZ by mechanical hazard reduction within existing DC to meet APZ specification to the BFEAC (RFS 2003a) and/or to the PBFP guidelines (RFS 2002b)[13] (Boundary fire breaks and existing trails)
	10	Ensure Buildings and fire standards to comply with Australian Standards AS3959 (Ramsey and Dawkins 1993) and PBFP for new developments

[13] Only for Council Approval of APZ to coexist on private development and Council Land.

	11	Prescribe burn at a frequency to maintain the prescribed Overall Fuel Hazard within SFAZ (NPWS 2003b) Meet biodiversity thresholds for vegetation communities described in Table 17
	12	Meet biodiversity thresholds for vegetation communities described in Table 17

Table 13: Specific fire objectives and strategies applied to strategic fire advantage zones in Shearwater (SW).

SFAZ Code (SW)	Life & Property Code	Map Figure	HR Name/ Location	Zone Objective	Strategy	Maintenance	Vegetation
S1	LP4	12,13 &14	Reserve No 5238 Lot 351 DP 734061	• To protect the bushland interface surrounding visitor facilities within the reserve.	1,2,3,4,5,7,8 within the reserve.	Width – 73m Length – 100m Area – 0.4958ha Mowing/ Slashing/Hand removal	Spotted Gum-Ironbark/ Grey Gum (74)
S2	LP4	12,13 &14	Reserve No 5200 (Viney Creek Road) ---------- Lot 8 DP 733241	• To protect the bushland interface west of the adjacent property linking with the reserve.	1,2,3,4,5,7,8 within the reserve.	Width - 5m Length - 37m Area – 0.1132 ha Mowing	Scribbly Gum (117)/ Part disturbed
S3	LP4	12,13 &14	Reserve No 5201 ---------- Lot 9 DP 733241	• To protect the bushland interface on the south boundary of the adjacent property linking with the reserve.	1,2,3,4,5,7,8 within the reserve.	Width – 6m Length – 103m Area – 0.0598ha Slashing/Hand removal	Scribbly Gum (117)
S4	LP3	12,13 &14	Reserve No 5249 ---------- Lot 18 DP 804975	• To protect the bushland interface on the boundary east of the adjacent property linking with the reserve.	1,2,3,4,5,7,8 within the reserve.	Width – 8m Length –155m Area – 0.0785ha Slashing/Hand removal	Smooth-barked Apple/ Sydney Peppermint/ Stringybark (106)
S5	LP3	12,13 &14	Reserve No 5249 ---------- Lot 18 DP 804975	• To protect the bushland interface on the boundary north of the adjacent property linking with the reserve.	1,2,3,4,5,7,8 within the reserve.	Width – 8m Length –68m Area – 0.0378ha Slashing/Hand removal	Smooth-barked Apple/ Sydney Peppermint/ Stringybark (106)
S6	LP3	12,13 &14	Reserve No 5249 ---------- Lot 18 DP 804975	• To protect the bushland interface on the boundary northeast of the adjacent property linking with the reserve.	1,2,3,4,5,7,8 within the reserve.	Width – 20m Length –50m Area – 0.057ha Slashing/Hand	Smooth-barked Apple/ Sydney Peppermint/ Stringybark (106)

SFAZ Code (SW)	Life & Property Code	Map Figure	HR Name/ Location	Zone Objective	Strategy	Maintenance	Vegetation
						removal	
S7	LP1	12,13 &14	Reserve No 5201 ---------- Lot 9 DP 733241	• To protect the bushland interface on the boundary west of the adjacent property linking with the reserve.	1,2,3,4,5,7,8 within the reserve.	Width – 6m Length – 27m Area – 0.0107ha Slashing/Hand removal	Smooth-barked Apple/ Sydney Peppermint/ Stringybark (106)
S8	LP3	12,13 &14	Reserve No 5249 ---------- Lot 18 DP 804975	• To provide access and protect the reserve areas to the nort & south.	1,2,3,4,5,7,8 within the reserve.	Width – 12m Length –45m Area – 0.0567ha Slashing/Hand removal	Smooth-barked Apple/ Sydney Peppermint/ Stringybark (106)
S9	LP3	12,13 &14	Reserve No 5249 ---------- Lot 18 DP 804975	• To protect the bushland interface on the boundary west of the adjacent property linking with the reserve.	1,2,3,4,5,7,8 within the reserve.	Width – 6m Length –70m Area – 0.0399ha Slashing/Hand removal	Smooth-barked Apple/ Sydney Peppermint/ Stringybark (106)
S10	LP3	12,13 &14	Reserve No 5249 ---------- Lot 18 DP 804975	• To protect the bushland interface on the boundary west of the property linking with the reserve.	1,2,3,4,5,7,8 within the reserve.	Width – 6m Length –75m Area – 0.0454ha Slashing/Hand removal	Smooth-barked Apple/ Sydney Peppermint/ Stringybark (106)
S11	LP5	12,13 &14	Public Reserve (Toonang Dr) Lot 21 DP 804975	To protect the bushland interface northwest of the adjacent property linking with the reserve.	1,2,3,4,5,7,8 within the reserve.	Width - 8m Length - 108m Area - 0.084ha Slashing	Spotted Gum-Ironbark/ Grey Gum (74)/ part disturbed
S12	LP5	12,13 &14	Reserve No 5209 (Toonang Dr) Lot 31 DP 738450	• To protect the bushland interface south of the adjacent property linking with the reserve.	1,2,3,4,5,7,8 within the reserve.	Width – 6m Length –60m Area – 0.0365ha Mowing/Slashing	Spotted Gum-Ironbark/ Grey Gum (74)/ part disturbed
S13	LP5	12,13 &14	Reserve No 5210 (Toonang Dr)	• To protect the bushland interface south of the adjacent property	1,2,3,4,5,7,8 within the reserve.	Width – 19m Length –20m	Spotted Gum-Ironbark/

SFAZ Code (SW)	Life & Property Code	Map Figure	HR Name/ Location	Zone Objective	Strategy	Maintenance	Vegetation
			Lot 32 DP 738450	linking with the reserve.		Area – 0.0387ha Mowing/Slashing	Grey Gum (74)/ part disturbed
S14	LP5	12,13 &14	Reserve No 5211 (Toonang Dr) Lot 33 DP 738450	• To protect the bushland interface south of the adjacent property linking with the reserve.	1,2,3,4,5,7,8 within the reserve.	Width – 10m Length –16m Area – 0.0143ha Mowing/Slashing	Spotted Gum-Ironbark/ Grey Gum (74)/ part disturbed
S15	LP5	12,13 &14	Reserve No 5212 (Toonang Dr) Lot 34 DP 738450	• To protect the bushland interface south of the adjacent property linking with the reserve.	1,2,3,4,5,7,8 within the reserve.	Width – 7m Length –267m Area – 0.1505ha Mowing/Slashing	Spotted Gum-Ironbark/ Grey Gum (74)/ part disturbed
S16	LP5	12,13 &14	Reserve No 5213 (Toonang Dr) Lot 35 DP 738450	To protect the bushland interface south of the adjacent property linking with the reserve.	1,2,3,4,5,7,8 within the reserve.	Width – 5m Length –97m Area – 0.045ha Mowing/Slashing	Spotted Gum-Ironbark/ Grey Gum (74)/ part disturbed
S17	LP2	12,13 &14	Reserve No 5214 (Toonang Dr) Lot 36 DP 738450	• To protect the bushland interface south of the adjacent property linking with the reserve.	1,2,3,4,5,7,8 within the reserve.	Width – 18m Length –20m Area – 0.034ha Mowing/Slashing	Spotted Gum-Ironbark/ Grey Gum (74)/ part disturbed
S18	LP3	12,13 &14	Reserve No 5215 (Toonang Dr) Lot 37 DP 738450	• To protect the bushland interface south of the adjacent property linking with the reserve.	1,2,3,4,5,7,8 within the reserve.	Width – 10m Length –49m Area – 0.0439ha Mowing/Slashing	Spotted Gum-Ironbark/Grey Gum (74)/part disturbed
S19	LP2	12,13 &14	Reserve No 5216 (Toonang Dr) Lot 38 DP 738450	• To protect the bushland interface north of the adjacent property linking with the reserve.	1,2,3,4,5,7,8 within the reserve.	Width –20m Length –63m Area – 0.0439ha Mowing/Slashing	Spotted Gum-Ironbark/ Grey Gum (74)/ part disturbed
S20	LP2	12,13 &14	Reserve No 5208 (Toonang Dr) Lot 29 DP 738450	• To protect the bushland interface north of the adjacent property linking with the reserve.	1,2,3,4,5,7,8 within the reserve.	Width –28m Length –69m Area – 0.1063ha	Spotted Gum-Ironbark/ Grey Gum (74)/ part disturbed

SFAZ Code (SW)	Life & Property Code	Map Figure	HR Name/ Location	Zone Objective	Strategy	Maintenance	Vegetation
						Mowing/Slashing	
S21	LP2	12,13 &14	Public Reserve No 5208 (Toonang Dr) Lot 29 DP 738450	• To protect the bushland interface north of the adjacent property linking with the reserve.	1,2,3,4,5,7,8 within the reserve.	Width –17m Length –38m Area – 0.0597ha Mowing/Slashing	Spotted Gum-Ironbark/ Grey Gum (74)/ part disturbed
S22	LP2	12,13 &14	Public Reserve No 5218 (Toonang Dr) Lot 39 DP 738450	• To protect the bushland interface north of the adjacent property linking with the reserve.	1,2,3,4,5,7,8 within the reserve.	Width –10m Length –33m Area – 0.0302ha Mowing/Slashing	Spotted Gum-Ironbark/ Grey Gum (74)/ part disturbed
S23	LP2	12,13 &14	Public Reserve No 5219 (Toonang Dr) Lot 40 DP 738450	• To protect the bushland interface northwest of the adjacent property linking with the reserve.	1,2,3,4,5,7,8 within the reserve.	Width –11m Length –12m Area – 0..0114ha Mowing/Slashing	Spotted Gum-Ironbark/ Grey Gum (74)/ part disturbed
S24	LP2	12,13 &14	Public Reserve No 5218 (Toonang Dr) Lot 41 DP 738450	• To protect the bushland interface north of the adjacent property linking with the reserve.	1,2,3,4,5,7,8 within the reserve.	Width –7m Length –136m Area – 0.088ha Mowing/Slashing	Spotted Gum-Ironbark/ Grey Gum (74)/ part disturbed
S25	LP5	12,13 &14	Reserve No 5249 ---------- Lot 18 DP 804975	• To protect the bushland interface on the boundary west of the adjacent property linking with the reserve.	1,2,3,4,5,7,8 within the reserve.	Width – 6m Length –100m Area – 0.0579ha Slashing/Hand removal	Smooth-barked Apple/ Sydney Peppermint/ Stringybark (106)
S26	LP3	12,13 &14	Reserve No 5249 ---------- Lot 18 DP 804975	• To protect the bushland interface on the boundary west of the adjacent property linking with the reserve.	1,2,3,4,5,7,8 within the reserve.	Width – 6m Length –70m Area – 0.0092ha Slashing/Hand removal	Smooth-barked Apple/ Sydney Peppermint/ Stringybark (106)
S27	LP3	12,13 &14	Reserve No 5249 ---------- Lot 18 DP 804975	• To protect the bushland interface on the boundary west of the adjacent property linking with the reserve.	1,2,3,4,5,7,8 within the reserve.	Width – 6m Length –126m Area – 0.0904ha	Smooth-barked Apple/ Sydney Peppermint/ Stringybark (106)

SFAZ Code (SW)	Life & Property Code	Map Figure	HR Name/ Location	Zone Objective	Strategy	Maintenance	Vegetation
						Slashing/Hand removal	
S28	LP3	12,13 &14	Reserve No 5249 ---------- Lot 18 DP 804975	• To protect the bushland interface on the boundary west of the adjacent property linking with the reserve.	1,2,3,4,5,7,8 within the reserve.	Width – 20m Length –46m Area – 0.0904ha Slashing/Hand removal	Smooth-barked Apple/ Sydney Peppermint/ Stringybark (106)
S29	LP3	12,13 &14	Reserve No 5249 ---------- Lot 18 DP 804975	• To protect the bushland interface on the boundary west of the adjacent property linking with the reserve.	1,2,3,4,5,7,8 within the reserve.	Width – 6m Length –46m Area – 0.0247ha Slashing/Hand removal	Smooth-barked Apple/ Sydney Peppermint/ Stringybark (106)
S30	LP3	12,13 &14	Reserve No 5249 ---------- Lot 18 DP 804975	• To protect the bushland interface on the boundary west of the adjacent property linking with the reserve.	1,2,3,4,5,7,8 within the reserve.	Width – 6m Length –62m Area – 0.0335ha Slashing/Hand removal	Smooth-barked Apple/ Sydney Peppermint/ Stringybark (106)
S31	LP3	12,13 &14	Reserve No 5249 ---------- Lot 18 DP 804975	• To protect the bushland interface on the boundary west of the adjacent property linking with the reserve.	1,2,3,4,5,7,8 within the reserve.	Width – 6m Length –190m Area – 0.1092ha Slashing/Hand removal	Smooth-barked Apple/ Sydney Peppermint/ Stringybark (106)
S32	LP3	12,13 &14	Reserve No 5249 ---------- Lot 18 DP 804975	• To protect the bushland interface on the boundary west of the adjacent property linking with the reserve.	1,2,3,4,5,7,8 within the reserve.	Width – 6m Length –20m Area – 0.0094ha Slashing/Hand removal	Smooth-barked Apple/ Sydney Peppermint/ Stringybark (106)
S33	LP3	12,13 &14	Reserve No 5249 ---------- Lot 18 DP 804975	• To protect the bushland interface on the boundary west of the adjacent property linking with the reserve.	1,2,3,4,5,7,8 within the reserve.	Width – 6m Length –51m Area – 0.0311ha Slashing/Hand	Smooth-barked Apple/ Sydney Peppermint/ Stringybark (106)

SFAZ Code (SW)	Life & Property Code	Map Figure	HR Name/ Location	Zone Objective	Strategy	Maintenance	Vegetation
						removal	
S34	LP3	12,13 &14	Reserve No 5249 ---------- Lot 18 DP 804975	• To protect the bushland interface on the boundary west of the adjacent property linking with the reserve.	1,2,3,4,5,7,8 within the reserve.	Width – 6m Length –85m Area – 0.0558ha Slashing/Hand removal	Smooth-barked Apple/ Sydney Peppermint/ Stringybark (106)
S35	LP4	12,13 &14	Reserve No 5199 (Viney Creek Road) ---------- Lot 7 DP 733241	• To protect the bushland interface west of the adjacent property linking with the reserve.	1,2,3,4,5,7,8 within the reserve.	Width - 8m Length - 68m Area – 0.0558ha Mowing	Ironbark (84)/ Scribbly Gum (117)/ Part disturbed
S36	LP6	12,13 &14	Council Depot Lot 26 DP585363	• To protect adjacent depot assets. • To assist in mitigating the spread of bush fire through the industrial estate.	1,2,3,4,5,7,8 within the reserve.	Width – 74m Length –86m Area – 0.6439ha Maintenance of gravel carpark	Cleared/ Depot Grounds
S37	LP6	12,13 &14	Council Depot Lot 18 DP249203	• To protect adjacent depot assets. • To assist in mitigating the spread of bush fire through the industrial estate.	1,2,3,4,5,7,8,9 within the reserve.	Width – 140m Length –160m Area – 1.716ha Maintenance of gravel carpark	Cleared/ Depot Grounds
S38	LP6	12,13 &14	Council Refuge Area Lot 1 FP392421	• To prevent the spread of fire from the tip area. • To assist in mitigating the spread of bush fire through the industrial estate.	1,2,3,4,5,7,8 within the reserve.	Width – 130m Length –320m Area – 3.231ha Maintenance of tip area	Cleared/ Refuge Area
S39	LP5	12,13 &14	Public Reserve Lot 59 DP786548	• To protect the bushland interface east & west of adjacent properties linking with the reserve.	1,2,3,4,5,7,8 within the reserve.	Width – 8m Length –37m Area – 0.0299ha Mowing/Slashing	Disturbed Smooth-barked Apple/ Sydney Peppermint/ Stringybark (106)
S40	LP5	12,13 &14	Public Reserve	• To protect the bushland interface east & west of adjacent properties	1,2,3,4,5,7,8 within the reserve.	Width – 8m Length –40m	Disturbed Smooth-barked Apple/

SFAZ Code (SW)	Life & Property Code	Map Figure	HR Name/ Location	Zone Objective	Strategy	Maintenance	Vegetation
			Lot 59 DP786548	linking with the reserve.		Area – 0.0319ha Mowing/Slashing	Sydney Peppermint/ Stringybark (106)
S41	LP6	812,13 &14	RFS Brigade Station Lot 40 DP 630478	• To protect the bushland interface surrounding the Shed within the property.	1,2,3,4,5,7,8 within the reserve.	Width – 36m Length – 48m Area – 0.0942ha Slashing/Hand removal	Partly cleared Smooth-barked Apple/ Sydney Peppermint/ Stringybark (106)
S42	LP6	12,13 &14	Council Refuge Area Lot 2 FP392421	• To prevent the spread of fire from the tip area. • To assist in mitigating the spread of bush fire through the industrial estate.	1,2,3,4,5,7,8 within the reserve.	Width – 22m Length –954m Area – 3.231ha Maintenance of tip area	Cleared/ Refuge Area
S43	LP3	12,13 &14	Reserve No 5249 ---------- Lot 18 DP 804975	• To protect the bushland interface on the boundary west of the adjacent property linking with the reserve.	1,2,3,4,5,7,8 within the reserve.	Width – 6m Length –78m Area – 0.0486ha Slashing/mowing	Smooth-barked Apple/ Sydney Peppermint/ Stringybark (106)
S44	LP3	12,13 &14	Reserve No 5249 ---------- Lot 18 DP 804975	• To protect the bushland interface on the boundary north of the adjacent property linking with the reserve.	1,2,3,4,5,7,8 within the reserve.	Width – 10m Length –86m Area – 0.0767ha Slashing/mowing	Smooth-barked Apple/ Sydney Peppermint/ Stringybark (106)
S45	LP3	12,13 &14	Reserve No 5249 ---------- Lot 18 DP 804975	• To provide an advantage line to access the internal area of the reserve. • To divide the reserve to mitigate against the spread of bush fire.	1,2,3,4,5,7,8 within the reserve.	Width – 6m Length –66m Area – 0.0471ha Slashing	Smooth-barked Apple/ Sydney Peppermint/ Stringybark (106)
S46	LP4	12,13 &14	Reserve No 5200 & 5201 (Viney Creek Road) ---------- Lot 8 DP 733241 Lot 9 DP 7333241	• To provide fire trail access to the internal area of the reserve.	1,2,3,4,5,7,8,9 within the reserve.	Width - 5m Length - 37m Area – 0.1132 ha Mowing	Scribbly Gum (117)/ Part disturbed
S47	LP3	12,13	Reserve No 5249	• To provide fire trail access to the	1,2,3,4,5,7,8,9	Width – 6m	Smooth-barked

SFAZ Code (SW)	Life & Property Code	Map Figure	HR Name/ Location	Zone Objective	Strategy	Maintenance	Vegetation
		&14	---------- Lot 9 DP733241 & Lot 18 DP 804975	internal area of the reserve.	within the reserve.	Length –446m Area – 0.2636ha Slashing	Apple/ Sydney Peppermint/ Stringybark (106)
S48	LP3	12,13 &14	Reserve No 5201 ---------- Lot 9 DP 733241	• To provide fire trail access to the internal area of the reserve.	1,2,3,4,5,7,8,9 within the reserve.	Width – 6m Length – 284m Area – 0.1671ha Slashing	Smooth-barked Apple/ Sydney Peppermint/ Stringybark (106)
S49	LP3	12,13 &14	Reserve No 5201 ---------- Lot 9 DP 733241	• To provide fire trail access to the internal area of the reserve.	1,2,3,4,5,7,8,9 within the reserve.	Width – 6m Length – 268m Area – 0.2184ha Slashing	Smooth-barked Apple/ Sydney Peppermint/ Stringybark (106)
S50	LP3	12,13 &14	Reserve No 5201 ---------- Lot 9 DP 733241	• To provide fire trail access to the internal area of the reserve.	1,2,3,4,5,7,8,9 within the reserve.	Width – 6m Length – 545m Area – 0.3246ha Slashing	Smooth-barked Apple/ Sydney Peppermint/ Stringybark (106)
S51	LP6	12,13 &14	Council Depot Lot 26 DP585363	• To provide fire trail access along the boundary of the reserve.	1,2,3,4,5,7,8,9 within the reserve.	Width – 6m Length –397m Area – 0.2312ha Slashing	Spotted Gum-Ironbark/ Grey Gum (74)
S52	LP3	12,13 &14	Reserve No 5249 ---------- Lot 18 DP 804975	• To prevent the spread of bush fire north & south within the reserve. • To provide an advantage line to access the internal area of the reserve.	1,2,3,4,5,7,8,9 within the reserve.	Width – 6m Length –136m Area – 0.0842ha Slashing	Smooth-barked Apple/ Sydney Peppermint/ Stringybark (106)
S53	LP3	12,13 &14	Reserve No 5249 ---------- Lot 18 DP 804975	• To prevent the spread of bush fire north & south into the exclusion zone within the reserve. • To provide an advantage line to access the internal area of the reserve.	1,2,3,4,5,7,8,9 within the reserve.	Width – 6m Length –113m Area – 0.0663ha Slashing	Smooth-barked Apple/ Sydney Peppermint/ Stringybark (106)
S54	LP3	12,13 &14	Reserve No 5249	• To prevent the spread of bush fire north & south into the exclusion	1,2,3,4,5,7,8,9 within the	Width – 6m Length –34m	Smooth-barked Apple/

SFAZ Code (SW)	Life & Property Code	Map Figure	HR Name/ Location	Zone Objective	Strategy	Maintenance	Vegetation
			---------- Lot 18 DP 804975	zone within the reserve. • To provide an advantage line to access the internal area of the reserve.	reserve.	Area – 0.0185ha Slashing	Sydney Peppermint/ Stringybark (106)
S55	LP6	12,13 &14	Council Depot Lot 18 DP249203	• To provide fire trail access along the boundary of the property and link with S51 fire trail. • To assist in mitigating the spread of bush fire through the industrial estate.	1,2,3,4,5,7,8,9 within the reserve.	Width – 6m Length –606m Area – 0.3636ha Slashing	Spotted Gum-Ironbark/ Grey Gum (74)/ Disturbed forest
S56	LP6	12,13 &14	Council Depot Lot 18 DP249203	• To provide fire trail access along the boundary of the property and link with S51 fire trail. • To assist in mitigating the spread of bush fire through the industrial estate.	1,2,3,4,5,7,8,9 within the reserve.	Width – 6m Length –168m Area – 0.1008ha Slashing	Spotted Gum-Ironbark/ Grey Gum (74)/ Disturbed forest
Strategic Fire Advantage Zones within Road Reserves							
Rd-S1	LP1, LP6	12,13 &14	Myall Way	• To assist in mitigating the spreading of bush fire throughout. • To provide access and refuge areas. • To protect or enhance adjacent APZ and/or SFAZ; LMZ; EZ.	2,3,4,7,8,9 within Myall Way.	Width – 20m Length –1160m Area – 2.32ha Mowing/road maintenance	Public-sealed Road with slashed 5m road verge abutting adjacent forest area.
Rd-S2	LP4	12,13 &14	Viney Road East	• As above	2,3,4,7,8,9 within Viney Road East.	Width – 20m Length –767m Area – 1.534ha Mowing/road maintenance	As above
Rd-S3	LP5	12,13 &14	Prion Place	• As above	2,3,4,7,8,9 within Prion Place.	Width – 20m Length –209m Area – 0.4180ha Mowing/road maintenance	As above
Rd-S4	LP4 & LP5	12,13 &14	Gannet Place	• As above	2,3,4,7,8,9 within Gannet Place.	Width – 20m Length –394m Area – 0.7880ha Mowing/road maintenance	As above

SFAZ Code (SW)	Life & Property Code	Map Figure	HR Name/ Location	Zone Objective	Strategy	Maintenance	Vegetation
Rd-S5	LP3	12,13 &14	Bondelbah Road	• As above	2,3,4,7,8,9 within Bondelbah Road.	Width – 20m Length –399m Area – 0.798ha Mowing/road maintenance	As above
Rd-S6	LP5	12,13 &14	Kooraru Close	• As above	2,3,4,7,8,9 within Kooraru Close.	Width – 20m Length –116m Area – 0.2320ha Mowing/road maintenance	As above
Rd-S7	LP5	12,13 &14	Won Bournie Road	• As above	2,3,4,7,8,9 within Won Bournie Road.	Width – 20m Length –352m Area – 0.7040ha Mowing/road maintenance	As above
Rd-S8	LP1	12,13 &14	Toonang Drive	• As above	2,3,4,7,8,9 within Toonang Drive.	Width – 20m Length –1977m Area – 3.954ha Mowing/road maintenance	As above
Rd-S9	LP2	12,13 &14	Petrel Place	• As above	2,3,4,7,8,9 within Gannet Place.	Width – 20m Length –215m Area – 0.43ha Mowing/road maintenance	As above
Rd-S10	LP3	12,13 &14	Shearwater Place	• As above	2,3,4,7,8,9 within Bondelbah Road.	Width – 20m Length –236m Area – 0.472ha Mowing/road maintenance	As above
Rd-S11	LP5	12,13 &14	Yandala Road	• As above	2,3,4,7,8,9 within Kooraru Close.	Width – 20m Length –286m Area – 0.572ha Mowing/road maintenance	As above
Rd-S12	LP5	12,13 &14	Winta Road	• As above	2,3,4,7,8,9 within Won Bournie	Width – 20m Length –262m	As above

SFAZ Code (SW)	Life & Property Code	Map Figure	HR Name/ Location	Zone Objective	Strategy	Maintenance	Vegetation
					Road.	Area – 0.524ha Mowing/road maintenance	
Rd-S13	LP1	12,13 &14	Wanya Road	• As above	2,3,4,7,8,9 within Toonang Drive.	Width – 20m Length –368m Area – 0.736ha Mowing/road maintenance	As above
Rd-S14	LP1	12,13 &14	Yarrumba Road	• As above	2,3,4,7,8,9 within Toonang Drive.	Width – 20m Length –160m Area – 0.32ha Mowing/road maintenance	As above

Table 14: Specific fire objectives and strategies applied to fire trails and strategic fire advantages.

SFAZ Code (SW)	Life & Property Code	Map Figure	HR Name/ Location	Zone Objective	Strategy	Maintenance	Vegetation Type
Fire Trails (4.614km in total)							
S46	LP4	14	Reserve No 5200 & 5201 (Viney Creek Road) ---------- Lot 8 DP 733241 Lot 9 DP 7333241	• To provide fire trail access to the internal area of the reserve.	1,2,3,4,7,8,9 within the reserve.	Width - 6m Length - 140m Area – 0.084ha Slashing	Scribbly Gum (117)/ Part disturbed
S47	LP3	14	Reserve No 5249 ---------- Lot 9 DP733241 & Lot 18 DP 804975	• To provide fire trail access to the internal area of the reserve.	1,2,3,4,5,6,7,8,9 within the reserve.	Width – 6m Length –446m Area – 0.2636ha Slashing	Smooth-barked Apple/ Sydney Peppermint/ Stringybark (106)
S48	LP3	14	Reserve No 5201 ---------- Lot 9 DP 733241	• To provide fire trail access to the internal area of the reserve.	1,2,3,4,5,6,7,8,9 within the reserve.	Width – 6m Length – 284m Area – 0.1671ha Slashing	Smooth-barked Apple/ Sydney Peppermint/ Stringybark (106)
S49	LP3	14	Reserve No 5201 ---------- Lot 9 DP 733241	• To provide fire trail access to the internal area of the reserve.	1,2,3,4,5,6,7,8,9 within the reserve.	Width – 6m Length – 268m Area – 0.2184ha Slashing	Smooth-barked Apple/ Sydney Peppermint/ Stringybark (106)
S50	LP3	14	Reserve No 5201 ---------- Lot 9 DP 733241	• To provide fire trail access to the internal area of the reserve.	1,2,3,4,5,6,7,8,9 within the reserve.	Width – 6m Length – 545m Area – 0.3246ha Slashing	Smooth-barked Apple/ Sydney Peppermint/ Stringybark (106)
S51 & S55	LP6	14	Council Depot Lot 26 DP585363 Lot 18 DP249203	• To provide fire trail access along the boundary of the reserve.	1,2,3,4,5,6,7,8,9 within the property.	Width – 6m Length –1003m Area – 0.6018ha Slashing	Spotted Gum-Ironbark/ Grey Gum (74)
S56	LP6	14	Council Depot Lot 18 DP249203	• To provide fire trail access along the boundary of the property and link	1,2,3,4,5,6,7,8,9 within the	Width – 6m Length –168m	Spotted Gum-Ironbark/

SFAZ Code (SW)	Life & Property Code	Map Figure	HR Name/ Location	Zone Objective	Strategy	Maintenance	Vegetation Type
				with S51 fire trail.	property.	Area – 0.1008ha Slashing	Grey Gum (74)/ Disturbed forest
Fire Advantage Lines (1.482km in total)							
S1	LP4	14	Reserve No 5238 Lot 351 DP 734061	• To provide an advantage line to access the internal area of the property.	1,2,3,4,5,6,7,8,9 within the reserve.	Width – 6m Length – 174m Area – 0.1044ha Grading	Spotted Gum-Ironbark/ Grey Gum (74)
S37	LP6	14	Council Depot Lot 18 DP249203	• To provide an advantage line to access the internal area of the property.	1,2,3,4,5,6,7,8,9 within the property.	Width – 6m Length –501m Area – 0.3006ha Grading	Cleared/ Depot Grounds
S38	LP6	14	Council Refuge Area Lot 1 FP392421	• To provide an advantage line to access the internal area of the property.	1,2,3,4,5,6,7,8,9 within the property.	Width – 6m Length –754m Area – 0.4524ha Maintenance of tip area	Cleared/ Refuge Area
S45	LP3	14	Reserve No 5249 ---------- Lot 18 DP 804975	• To provide an advantage line to access the internal area of the reserve.	1,2,3,4,5,6,7,8,9 within the reserve.	Width – 6m Length –90m Area – 0.054ha Slashing	Smooth-barked Apple/ Sydney Peppermint/ Stringybark (106)
S52	LP3	14	Reserve No 5249 ---------- Lot 18 DP 804975	• To provide an advantage line to access the internal area of the reserve.	1,2,3,4,5,6,7,8,9 within the reserve.	Width – 6m Length –128m Area – 0.0768ha Slashing	Smooth-barked Apple/ Sydney Peppermint/ Stringybark (106)
S53	LP3	14	Reserve No 5249 ---------- Lot 18 DP 804975	• To provide an advantage line to access the internal area of the reserve.	1,2,3,4,5,6,7,8,9 within the reserve.	Width – 6m Length –126m Area – 0.0756ha Slashing	Smooth-barked Apple/ Sydney Peppermint/ Stringybark (106)
S54	LP3	14	Reserve No 5249	• To provide an advantage line to access the internal area of the	1,2,3,4,5,6,7,8,9 within the	Width – 6m Length –180m	Smooth-barked Apple/

SFAZ Code (SW)	Life & Property Code	Map Figure	HR Name/ Location	Zone Objective	Strategy	Maintenance	Vegetation Type
			---------- Lot 18 DP 804975	reserve.	reserve.	Area – 0.108ha Slashing	Sydney Peppermint/ Stringybark (106)

Fire advantages are used during fire operations to limit the spread of bush fires or used as a control line. The line/area constitutes fuel reduced areas (limiting fire spread), whether natural (like rainforests; rivers; lakes; rocks) or man made (fire trails; road; APZ's and SFAZ's). These are recorded as existing features available for use during fire incidents and are not necessarily maintained as fire trails or require specific maintenance regimes. Change is imminent and reference to these are intended as a guide only, as other management and planning decisions by managers may alter suitability in the future. Liaison with the responsible manager is required to confirm presence/absence of such a fire advantages for fire control lines. Consideration to fire fighter safety is imperative when working under or near power lines.

Table 15: Specific fire objectives and strategies applied to strategic fire advantage zones applying biodiversity thresholds.

SFAZ Code (SW)	Life & Property Code	Map Figure	HR Name/ Location	Zone Objective	Strategy	Required Maintenance Size by GLC	Vegetation Type
Shearwater Estate (3.234ha in total)							
Sb1	LP3	12 & 13	Reserve No 5201 --- Lot 9 DP 733241	• To assist in reducing the intensity (upslope) and mitigating the spread of fire into the adjacent APZ and Conservation Zone from the fire trail.	2,3,8,11 within the reserve.	Area – 1.891ha Prescribe burn (2011-2012)	Smooth-barked Apple/ Sydney Peppermint/ Stringybark (106)
Sb2	LP3	12 & 13	Reserve No 5201 and Reserve No 5249 Shearwater --- Lot 9 DP733241 & Lot 18 DP 804975	• To strengthen the adjacent APZ and mitigating the spread from the Conservation Zone towards assets.	2,3,8,11 within the reserve.	Area – 0.3925ha Prescribe burn (2007-2009)	Smooth-barked Apple/ Sydney Peppermint/ Stringybark (106)
Sb3	LP3	12 & 13	Reserve No 5201 --- Lot 9 DP 733241	• To strengthen the adjacent APZ and mitigating the spread from the LMZ towards assets.	2,3,8,11 within the reserve.	Area – 0.3106ha Prescribe burn (2010-2011)	Smooth-barked Apple/ Sydney Peppermint/ Stringybark (106)
Sb4	LP3	12 & 13	Reserve No 5249 --- Lot 18 DP 804975	• To dissect the reserve and mitigate the spread of fire, in conjunction with the slashed SFAZ between assets to the north and south. To increase the size of the strategic burn with adjacent SFAZ.	2,3,8,11 within the reserve.	Area – 0.3502ha Prescribe burn (2008-2010)	Smooth-barked Apple/ Sydney Peppermint/ Stringybark (106)
Sb5	LP3	12 & 13	Reserve No 5249 --- Lot 18 DP 804975	• To dissect the reserve and limit the spread of fire ,in conjunction with the slashed SFAZ between assets to the west and south. Increase the size of the strategic burn with adjacent SFAZ to enhance the exclusion zone.	2,3,8,11 within the reserve.	Area – 0.2897ha Prescribe burn (2009-2011)	Smooth-barked Apple/ Sydney Peppermint/ Stringybark (106)
Industrial Estate (2.122ha in total)							
Sb6	LP6	12 & 13	Council Depot Lot 26 DP585363	• To protect adjacent depot assets. • To assist in mitigating the spread of bush fire through the industrial estate.	2,3,8,11 & 12 within the reserve.	Area – 2.122ha Prescribe burn (2006-2008)	Spotted Gum-Ironbark/ Grey Gum (74)

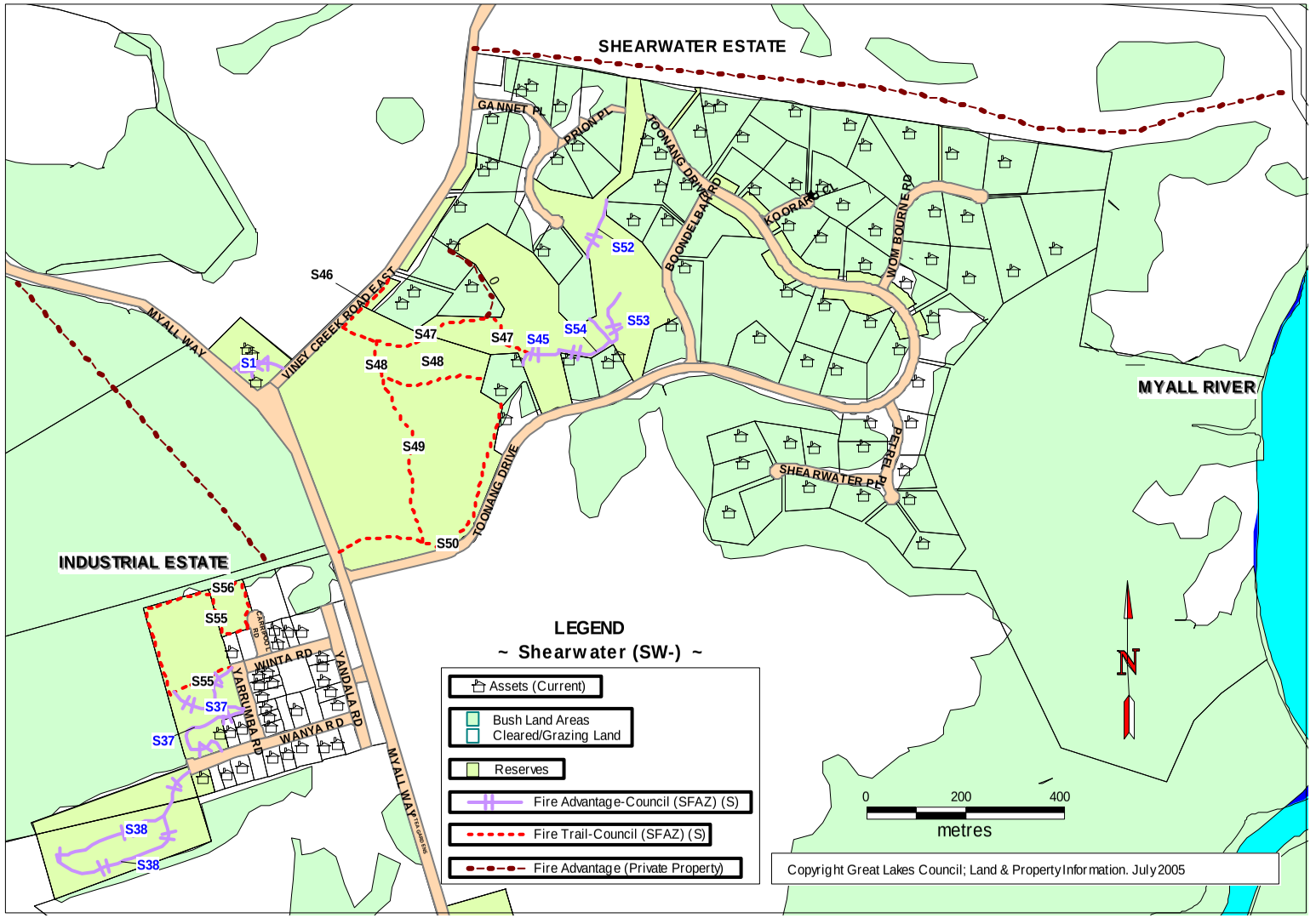


Figure 14: Fire trails and fire advantages in Shearwater.

Land Management Zone

Seventeen17 LMZ's have been identified within Council Land adjacent to Shearwater and Tea Gardens Industrial estates (Table 16, Figure 12) that cover 23 hectares of Council reserves. Council individually coded these zones identified objectives within these zones along with biodiversity thresholds (Table 17)in implementing fire regimes identified Shearwater . The implementation of ecological based fire regimes of irregular mosaic burn patterns and minimal intervals between burns is important for managing larger zones containing species that require fire for enhancement of biodiversity of the area.

Table 16: Specific fire objectives applied to land management zones in Shearwater.

LMZ Code (SW)	Area (Hectare)	Figure	Location	Zone Objective	Vegetation Formation
C1	7.9317	12	Reserve No 5201 (Toonang Drive)	• To protect the environmental values within the reserve and maintain biodiversity thresholds. • To protect cultural heritage values within the reserve. • Suppress bush fires. • Implement burns to maintain biodiversity. • Protect riparian areas from inappropriate burning regimes. • Conserve and protect the integrity of areas with high conservation values or areas with highest regional priority status for conservation targets.	Dry sclerophyll scrub/grass forests
C2	2.8909	12	Reserve No 5201 (Toonang Drive)	• As above	Dry sclerophyll scrub/grass forests
C3	2.2206	12	Reserve No 5201 & Reserve No 5249 (Toonang Drive)	• As above	Dry sclerophyll scrub/grass forests
C4	2.9924	12	Reserve No 5249 (Toonang Drive)	• As above	Dry sclerophyll scrub/grass forests
C5	0.6774	12	Reserve No 5249 (Toonang Drive)	• To protect the environmental values within the reserve and maintain biodiversity thresholds. • To protect cultural heritage values within the reserve. • Suppress bush fires. • Conserve and protect the integrity of areas with high conservation values or areas with highest regional priority status for conservation targets. • Regenerate disturbed area.	Dry sclerophyll scrub/grass forests
C6	1.5787	12	Reserve No 5249	• To protect the environmental values within the reserve and maintain	Dry sclerophyll

LMZ Code (SW)	Area (Hectare)	Figure	Location	Zone Objective	Vegetation Formation
			(Toonang Drive)	biodiversity thresholds. • To protect cultural heritage values within the reserve. • Suppress bush fires. • Implement burns to maintain biodiversity. • Protect riparian areas from inappropriate burning regimes. • Conserve and protect the integrity of areas with high conservation values or areas with highest regional priority status for conservation targets.	scrub/grass forests
C7	1.5729	12	Reserve No 5249 (Toonang Drive)	• As above	Dry sclerophyll scrub/grass forests
C8	0.1963	12	Reserve No 5249 (Toonang Drive)	• As above	Dry sclerophyll scrub/grass forests
C9	0.1997	12	Reserve No 5208 (Toonang Drive)	• To protect the environmental values within the reserve and maintain biodiversity thresholds. • To protect cultural heritage values within the reserve. • Suppress bush fires. • Conserve and protect the integrity of areas with high conservation values or areas with highest regional priority status for conservation targets.	Dry sclerophyll scrub/grass forests
C10	0.1422	12	Reserve No 5218 (Toonang Drive)	• To protect the environmental values within the reserve and maintain biodiversity thresholds. • To protect cultural heritage values within the reserve. • Suppress bush fires. • Implement burns to maintain biodiversity. • Protect riparian areas from inappropriate burning regimes. • Conserve and protect the integrity of areas with high conservation values or areas with highest regional priority status for conservation targets.	Dry sclerophyll scrub/grass forests
C11	0.1783	12	Reserve No 5219 (Toonang Drive)	• To protect the environmental values within the reserve and maintain biodiversity thresholds. • To protect cultural heritage values within the reserve. • Suppress bush fires. • Conserve and protect the integrity of areas with high conservation values or areas with highest regional priority status for conservation targets.	Dry sclerophyll scrub/grass forests
C12	0.0818	12	Reserve No 5209 (Toonang Drive)	• As above	Dry sclerophyll scrub/grass forests
C13	0.1514	12	Reserve No 5212 (Toonang Drive)	• As above	Dry sclerophyll scrub/grass forests
C14	0.1537	12	Reserve No 5202	• As above	Dry sclerophyll

LMZ Code (SW)	Area (Hectare)	Figure	Location	Zone Objective	Vegetation Formation
			(Viney Creek Road)		scrub/grass forests
C15	0.2323	12	Reserve No 5199 (Viney Creek Road)	• As above	Dry sclerophyll scrub/grass forests
C16	0.6658	12	Reserve No 5238	• To protect the environmental values within the reserve and maintain biodiversity thresholds. • To protect cultural heritage values within the reserve. • Suppress bush fires. • Implement burns to maintain biodiversity. • Protect riparian areas from inappropriate burning regimes. • Conserve and protect the integrity of areas with high conservation values or areas with highest regional priority status for conservation targets.	Dry sclerophyll scrub/grass forests
C17	1.1086	12	Reserve No 5201 (Toonang Drive)	• As above	Dry sclerophyll scrub/grass forests

Ecological Considerations

Within the study area there are communities that appear to satisfy the criteria for listing as endangered ecological communities (EEC) (Figure 10). The conservation and enhancement of these areas is guided by the TSC Act. Fire management planning incorporates legislation and objectives of biodiversity enhancement in areas nearby or within communities such as these.

Exclusion Zone

Three (3) EZ's have been identified within Council Land within the study area. The fire regime has either been exceeded (within areas of high conservation values) or the vegetation type does not support burning for biodiversity (Table 16, Figure nmnmn). This includes areas where any occurrence of fire inhibits the ability of vegetation to fully recover to former complexity within vegetation types including estuarine and saline wetlands and rainforest. Areas classified as being SEPP 26 or SEPP 14 are significant and management of theses areas is important to ensure their continued enhancement to conservation values.

Table 17: Biodiversity thresholds[14] and fire regime to be applied to vegetation communities within Shearwater.

Fire Regime	Biodiversity Thresholds Within Strategic Fire Advantage and Land Management Zones [NPWS, 2001]	Vegetation Community Type (Council 2003) *[#1 and #2 indicate options for the same community]	Forest Type (Council, DVS, 2003)	Vegetation Group (Category 1,2,3) PBFP	The Vegetation Formation Described By The RFS For Minimum Fire Frequency For SFAZ (BFEAC)	Minimum Year Fire Frequency (BFEAC)
a	❖ Avoid 3 or more consecutive fires, with each of <5 years apart ❖ Avoid inter fire periods of >30 years ❖ Avoid 2 or more successive fires that totally scorch or consume the tree canopy Avoid 3 or more consecutive fires of low intensity	Blackbutt/ Scribbly Gum	40	1	E1. Dry sclerophyll shrub/grass forest	5
		Blackbutt/ Sydney Peppermint/ Smooth-barked Apple	42	1	D. Sclerophyll grassy woodlands	5
		Forest Red Gum - #1	92	1	D. Sclerophyll grassy woodlands	5
		Grey Gum/ Grey Ironbark/ White Mahogany	62	1	E1. Dry sclerophyll shrub/grass forest	5
		Ironbark	84	1	E1. Dry sclerophyll shrub/grass forest	5
		Ironbark/ Smooth-barked Apple/ Stringybark	84/106	1	E1. Dry sclerophyll shrub/grass forest	5
		Mahogany/ Ironbark/ Grey Gum/ Blackbutt	60/37	1	E1. Dry sclerophyll shrub/grass forest	5
		Scribbly Gum	117	1	E1. Dry sclerophyll shrub/grass forest	5
		Smooth-barked Apple	105	1	E1. Dry sclerophyll shrub/grass forest	5
		Spotted Gum	70	1	E1. Dry sclerophyll shrub/grass forest	5
		Spotted Gum – Ironbark/ Grey Gum	74	1	E1. Dry sclerophyll shrub/grass forest	5
		Sydney Peppermint/ Stringybark	115	1	E1. Dry sclerophyll shrub/grass forest	5
		White Mahogany/ Red Mahogany/ Grey Ironbark/ Grey Gum	60	1	E1. Dry sclerophyll shrub/grass forest	5
b	❖ Avoid 3 or more consecutive fires, with each of <8 years apart ❖ Avoid 3 or more consecutive fires, with each of the fires >15 years apart ❖ Avoid inter fire periods of > 30 years Avoid 2 or more consecutive fires that consume < 10t/ha of surface fuels	Disturbed Heath	219/223	2	G. Heathlands	7
		Heath Paperbark	31/223	2	G. Heathlands	7

[14] Biodiversity thresholds adapted from Bradstock et al 1995 by the NSW National Parks and Wildlife Service described within the Draft Fire Management Strategies for Myall Lake National Park and Island Reserves, 2003a.

Fire Regime	Biodiversity Thresholds Within Strategic Fire Advantage and Land Management Zones [NPWS, 2001]	Vegetation Community Type (Council 2003) *[#1 and #2 indicate options for the same community]	Forest Type (Council, DVS, 2003)	Vegetation Group (Category 1,2,3) PBFP	The Vegetation Formation Described By The RFS For Minimum Fire Frequency For SFAZ (BFEAC)	Minimum Year Fire Frequency (BFEAC)
b	~ continued	Paperbark	31	1	C. Swamp sclerophyll forests	7
		Paperbark/ Smooth-barked Apple/ Sydney Peppermint	31/106	1	C. Swamp sclerophyll forests	7
		Paperbark/ Swamp Oak	31/32	1	C. Swamp sclerophyll forests	7
		Red Mahogany/ Smooth-barked Apple	68/105	1	E2. Dry sclerophyll shrub/grass forest	7
		Rough-barked Apple	129	1	C. Swamp sclerophyll forests	7
		Swamp Mahogany	30	1	C. Swamp sclerophyll forests	7
		Swamp Mahogany/ Forest Red Gum	30/92	1	C. Swamp sclerophyll forests	7
		Swamp Mahogany/ Grey Gum	30/60	1	C. Swamp sclerophyll forests	7
		Swamp Mahogany/ Swamp Oak	30/32	1	C. Swamp sclerophyll forests	7
		Swamp Oak	32	1	C. Swamp sclerophyll forests	7
		Tallowwood - #1	45	1	B2. Semi mesic grassy forests	10
		Tallowwood/ Grey Gum	45/60	1	B2. Semi mesic grassy forests	10
c	❖ Avoid more than 1 fire every 30 years ❖ Avoid inter-fire periods > 200 years	Flooded Gum	48	1	B1. Wet sclerophyll forests	25
		Ironbark/ Grey Gum/ Flooded Gum	60/48	1	B1. Wet sclerophyll forests	25
		Moist Blackbutt	36	1	B1. Wet sclerophyll forests	25
		Sydney Blue Gum	46	1	B1. Wet sclerophyll forests	25
		Tallowwood - #2	45	1	B1. Wet sclerophyll forests	25
		Tallowwood/ Sydney Blue Gum/ Brushbox	47/53	1	B1. Wet sclerophyll forests	25
d	Any fire occurrence (a limited recovery ability exists)	Palm/ Myrtle	7/23	3	A. Rainforest	na
w	❖ **Use a, b, c, d** options for biodiversity thresholds	Introduced Scrub	221	1,2,3	W. Appropriate management practice[16]	na
		Mixed Forest Regrowth Mixed Pine Mixed Woodland Vine		1,2,3	W. Appropriate management practice	na

[16] W. Variable within each vegetation formation

Key Fire Issues

Through the preparation of this plan key fire issues have been identified with subsequent outcomes required to mitigate these issues (see below). The management strategy outcomes reflect management requirements by undertaking on ground works to specified requirements as discussed through various sections within the plan.

Key fire issues within Shearwater	Outcomes
❖ A large number of assets within Shearwater in rural environments.	✓ Promotion of fuel management to owners is important to promote mechanical works within Shearwater.
❖ A mixture of cleared and forested areas, rated as extreme, major and moderate fire risk by the RFS surrounds Shearwater.	✓ In the event of a fire Shearwater potentially could be partly surrounded by grass fire and remaining area by forest fire.
❖ In extreme fire weather conditions the fire path is aligned with the ridgeline.	✓ Potential threat from spotting across the ridge encourages land managers to reduce risks.
❖ Parks and reserves contain recreational facilities that need protection.	✓ Assets require protection from fire threat.
❖ Adjacent private landholders have APZ, SFAZ, fire trails and fire advantages to assist in fire operations.	✓ Maintenance of these areas is important to ensure continued fire mitigation works to reduce fire effects to the community.
❖ Hazard reduction burning occurs in Reserve areas.	✓ Strategic hazard reduction works reduces the fire risk to Shearwater. ✓ Maintain biodiversity and protect sensitive areas such as riparian areas.
❖ There is a need for landholders to be prepared as fire fighting resources are sought from outside Shearwater.	Landholders to implement hazard reduction programs and prepare fire protection plans.
❖ Area is serviced by fire fighting vehicles from nearby towns and locations.	✓ Resources are available to protect Shearwater are adequate.
❖ Potential fire ignitions adjacent to Myall Way or Viney Creek Road or from lightning strikes during the spring and summer months.	✓ Heightened awareness and diligence to fire preparedness knowing the increased threat in these periods.
❖ The majority of Shearwater is mapped as Bush Fire Prone Land.	✓ Development consents for building specifications are affected by fire provisions in this area. ✓ Provide APZ & SFAZ adjacent to assets as per the guidelines within the Code. ✓ Implement fuel reduction works as

	guided by the BFRMP.

SECTION 10

Operational Guidelines

Hazard Reduction Works

The implementation of fire mitigation activities by Council ensures guidelines within the plan are met. Ongoing programs that link with other management objectives ensure targeted outcomes are adhered too. In all cases, the conservation principles summarised in Table 18 should be applied to hazard reduction works within each zone.

Table 19 details specific work programs within APZ and SFAZ's for Shearwater, with operational emphasis. Section 9, (Table 11—16) should be referred to for detailed management of each fire management zone.

The on ground management of APZ and SFAZ's can be implemented by a variety of methods including;

- ✓ Council parks maintenance (primarily slashing)
- ✓ Council open space maintenance (primarily mowing)
- ✓ Council road maintenance
- ✓ Council drainage reserve maintenance

Monitoring of fire hazardswill guide slashing and mowing regimes within fire management zones which will be in accordance with this Plan guidelines and using reference material such as the *Overall Fuel Hazard Guide Sydney Basin* (NPWS 2003) to assess fuel loads within Council Land. Slashing too frequent in bushland areas encourages introduced grasses and weeds to invade and in the long-term, changes vegetation structure (as grasses become more abundant with increasedslashing frequency) s.

Disturbances in natural areas often encourage the invasion of weeds. These weeds are classified as being noxious or an environmental weed. Management of pest plants within these areas is guided by legislation to suppress, control or eradicate these species. The approved methods of application of registered herbicides on weed species is detailed within the NSW Agricultural, *'Noxious Environmental weed control handbook 2004-2005'.* Managers are able to integrate manual weed control, herbicide control and to specify weed management practices with fire mitigation works to ensure minimal impact of pest plant introductions to manage fire management zones.

Table 18: Conservation principles applied to hazard reduction works within each zone.

Type of Zone	Conservation Principle	Implementation	Monitoring
Asset Protection Zone **- slashing** **- tree removal**	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. 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 andassess regrowth of slashed area and the impact on the local environment. Survey for threatened species.
Asset Protection Zone **-burning**	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.
Fire Advantages(Can be within Strategic Fire Advantages Zones or Asset Protection Zones) **- slashing** **- tree removal**	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.
Strategic Fire Advantage Zone **-slashing** **-tree removal** **(Mechanical or hand removal)**	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.
Strategic Fire Advantage Zone – burning	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.
Land Management Zone **- burning**	Mosaic burn of up to 50% of the area to be burnt. Consider biodiversity thresholds for fire	Ecological based fire regimes of irregular mosaic burn areas. Protect riparian	Record fire frequency and intensity to meet prescriptions.

Type of Zone	**Conservation Principle**	**Implementation**	**Monitoring**
	intensity and regularity.	area conservation values.	
Exclusion Zone	APZ and SFAZ hazard reduction burning excluded.	Conservation area.	Record fires.

Table 19: Specific works program applied to fire management zones.

(Refer to Table 11—16 for related objectives and strategies)

APZ Code	HR Name/ Location	Required Maintenance Size by GLC	Maintenance Type
1. Council parks maintenance (primarily slashing) 2. Council open space maintenance (primarily mowing) 3. Council road maintenance 4. Council drainage reserve maintenance			**1 - 4 (and/or) maintenance type options**
ASSET PROTECTION ZONES IN SHEARWATER			
SW-A1	Reserve No 5201 Shearwater ---------- Lot 9 DP 733241	Width – 5-16m Length – 92m Area – 0.0554ha	1 Mowing/Hand removal
SW-A2	Reserve No 5201 Shearwater ---------- Lot 9 DP 733241	Width – 14m Length – 72m Area – 0.0943ha	1 Slashing/Hand removal
SW-A3	Reserve No 5249 Shearwater ---------- Lot 18 DP 804975	Width – 8m Length –20m Area – 0.0100ha	1 Mowing/Hand removal
SW-A4	Reserve No 5199 (Viney Creek Road) Lot 7 DP 733241	Width - 10m Length - 40m Area – 0.0373ha	1 Mowing
SW-A5	Reserve No 5202 (Viney Creek Road) Lot 6 DP 733241	Width - 3m Length - 38m Area – 0.0088ha	1 Mowing
SW-A6	Reserve No 5249 ---------- Lot 18 DP 804975	Width – 10m Length –20m Area – 0.0204ha	1 Mowing/Hand removal
SW-A7	Reserve No 5249 ---------- Lot 18 DP 804975	Width – 7m Length –49m Area – 0.0349ha	1 Mowing/Slashing
SW-A8	Reserve No 5249 ---------- Lot 18 DP 804975	Width – 25m Length –55m Area – 0.0969ha	1 Hand Removal/Mowing/Slashing
SW-A9	Reserve No 5249 ---------- Lot 18 DP 804975	Width – 10m Length –46m Area – 0.072ha	1 Mowing/Slashing
SW-A10	Reserve No 5249 ---------- Lot 18 DP 804975	Width – 10m Length –25m Area - 0.0245ha	1 Mowing
SW-A11	Reserve No 5210 (Toonang Dr) Lot 32 DP 738450	Width - 20m Length - 65m Area – 0.0787ha	1 Mowing

APZ Code	HR Name/ Location	Required Maintenance Size by GLC	Maintenance Type
1. Council parks maintenance (primarily slashing) 2. Council open space maintenance (primarily mowing) 3. Council road maintenance 4. Council drainage reserve maintenance			**1 - 4 (and/or) maintenance type options**
SW-A12	Reserve No 5213 (Toonang Dr) Lot 35 DP 738450	Width – 15m Length –64m Area – 0.0899ha	1 Mowing
SW-A13	Public Reserve No 5214 (Toonang Dr) Pt Lot 182 DP 771180	Width – 20m Length –30m Area – 0.0888ha	1 Mowing
SW-A14	Reserve No 5215 (Toonang Dr) Lot 37 DP 738450	Width – 10m Length –49m Area – 0.0536ha	1 Mowing
SW-A15	Reserve No 5208 (Toonang Dr) Lot 29 DP 738450	Width – 10m Length –29m Area – 0.0228ha	1 Mowing
SW-A16	Reserve No 5208 (Toonang Dr) Lot 29 DP 738450	Width – 5m Length –35m Area – 0.0177ha	1 Mowing
SW-A17	Public Reserve No 5217 (Toonang Dr) Lot 39 DP 738450	Width – 10m Length –42m Area – 0.0413ha	1 Mowing
SW-A18	Reserve No 5218 (Toonang Dr) Lot 40 DP 738450	Width – 10m Length – 10m Area – 0.0099ha	1 Hand Removal
SW-A19	Public Reserve No 5211 (Toonang Dr) Lot 33 DP 738450	Width – 17m Length –37m Area – 0.0160ha	1 Mowing
SW-A20	Public Reserve No 5212 (Toonang Dr) Lot 34 DP 738450	Width – 10m Length –127m Area – 0.0592ha	1 Mowing
SW-A21	Public Reserve No 5238 Lot 351 DP 734061	Width – 24m Length – 38m Area – 0.0757ha	1 Slashing
SW-A22	Council Depot Lot 26 DP585363	Width – 7m Length –51m Area – 0.0359ha	1 Mowing/Hand removal
SW-A23	Council Depot Lot 26 DP585363	Width – 10m Length –51m Area – 0.0534ha	1 Maintenance of gravel carpark
SW-A24	Council Depot Lot 26 DP585363	Width – 20m Length –66m Area – 0.1351ha	1 Maintenance of gravel carpark

APZ Code	HR Name/ Location	Required Maintenance Size by GLC	Maintenance Type
1. Council parks maintenance (primarily slashing) 2. Council open space maintenance (primarily mowing) 3. Council road maintenance 4. Council drainage reserve maintenance			**1 - 4 (and/or) maintenance type options**
SW-A25	Public Reserve Lot 59 DP786548	Width – 8m Length –38m Area – 0.0309ha	1 Maintenance of gravel carpark
SW-A26	Public Reserve No 5238 Lot 351 DP 734061	Width – 24m Length –24m Area – 0.0432ha	1 Maintenance of gravel carpark
SW-A27	RFS Brigade Station Lot 40 DP 630478	Width – 10m Length – 37m Area –0.0882 ha	1 Slashing
STRATEGIC FIRE MANAGEMENT ZONES IN SHEARWATER			
SW-S1	Public Reserve No 5238 Lot 351 DP 734061	Width – 73m Length – 100m Area – 0.4958ha	1 Mowing/ Slashing/Hand removal
SW-S2	Reserve No 5200 (Viney Creek Road) ---------- Lot 8 DP 733241	Width - 5m Length - 37m Area – 0.1132 ha	1 Mowing
SW-S3	Reserve No 5201 ---------- Lot 9 DP 733241	Width – 6m Length – 103m Area – 0.0598ha	1 Slashing/Hand removal
SW-S4	Reserve No 5249 ---------- Lot 18 DP 804975	Width – 8m Length –155m Area – 0.0785ha Slashing/Hand removal	1 Slashing/Hand removal
SW-S5	Reserve No 5249 Shearwater ---------- Lot 18 DP 804975	Width – 8m Length –68m Area – 0.0378ha Slashing/Hand removal	1 Slashing/Hand removal
SW-S6	Reserve No 5249 Shearwater ---------- Lot 18 DP 804975	Width – 20m Length –50m Area – 0.057ha Slashing/Hand removal	1 Slashing/Hand removal
SW-S7	Reserve No 5201 Shearwater ---------- Lot 9 DP 733241	Width – 6m Length – 27m Area – 0.0107ha Slashing/Hand removal	1 Slashing/Hand removal
SW-S8	Reserve No 5249 Shearwater ---------- Lot 18 DP 804975	Width – 12m Length –45m Area – 0.0567ha Slashing/Hand removal	1 Slashing/Hand removal
SW-S9	Reserve No 5249 Shearwater ---------- Lot 18 DP 804975	Width – 6m Length –70m Area – 0.0399ha Slashing/Hand removal	1 Slashing/Hand removal

APZ Code	HR Name/ Location	Required Maintenance Size by GLC	Maintenance Type
1. Council parks maintenance (primarily slashing) 2. Council open space maintenance (primarily mowing) 3. Council road maintenance 4. Council drainage reserve maintenance			**1 - 4 (and/or) maintenance type options**
SW-S10	Reserve No 5249 Shearwater ---------- Lot 18 DP 804975	Width – 6m Length –75m Area – 0.0454ha Slashing/Hand removal	1 Slashing/Hand removal
SW-S11	Public Reserve (Toonang Dr) Lot 21 DP 804975	Width - 8m Length - 108m Area - 0.084ha	1 Slashing
SW-S12	Reserve No 5209 (Toonang Dr) Lot 31 DP 738450	Width – 6m Length –60m Area – 0.0365ha	1 Mowing/Slashing
SW-S13	Reserve No 5210 (Toonang Dr) Lot 32 DP 738450	Width – 19m Length –20m Area – 0.0387ha Mowing/Slashing Mowing/Slashing	1 Mowing/Slashing
SW-S14	Public Reserve No 5211 (Toonang Dr) Lot 33 DP 738450	Width – 10m Length –16m Area – 0.0143ha Mowing/Slashing	1 Mowing/Slashing
SW-S15	Public Reserve No 5212 (Toonang Dr) Lot 34 DP 738450	Width – 7m Length –267m Area – 0.1505ha Mowing/Slashing	1 Mowing/Slashing
SW-S16	Reserve No 5213 (Toonang Dr) Lot 35 DP 738450	Width – 5m Length –97m Area – 0.045ha Mowing/Slashing	1 Mowing/Slashing
SW-S17	Public Reserve No 5214 (Toonang Dr) Lot 36 DP 738450	Width – 18m Length –20m Area – 0.034ha Mowing/Slashing	1 Mowing/Slashing
SW-S18	Public Reserve No 5215 (Toonang Dr) Lot 37 DP 738450	Width – 10m Length –49m Area – 0.0439ha Mowing/Slashing	1 Mowing/Slashing
SW-S19	Public Reserve No 5216 (Toonang Dr) Lot 38 DP 738450	Width –20m Length –63m Area – 0.0439ha Mowing/Slashing	1 Mowing/Slashing
SW-S20	Public Reserve No 5208 (Toonang Dr) Lot 29 DP 738450	Width –28m Length –69m Area – 0.1063ha Mowing/Slashing	1 Mowing/Slashing
SW-S21	Public Reserve No 5208 (Toonang Dr) Lot 29 DP 738450	Width –17m Length –38m Area – 0.0597ha Mowing/Slashing	1 Mowing/Slashing

APZ Code	HR Name/ Location	Required Maintenance Size by GLC	Maintenance Type
1. Council parks maintenance (primarily slashing) 2. Council open space maintenance (primarily mowing) 3. Council road maintenance 4. Council drainage reserve maintenance			**1 - 4 (and/or) maintenance type options**
SW-S22	Public Reserve No 5218 (Toonang Dr) Lot 39 DP 738450	Width –10m Length –33m Area – 0.0302ha Mowing/Slashing	1 Mowing/Slashing
SW-S23	Public Reserve No 5219 (Toonang Dr) Lot 40 DP 738450	Width –11m Length –12m Area – 0.0114ha Mowing/Slashing	1 Mowing/Slashing
SW-S24	Public Reserve No 5218 (Toonang Dr) Lot 41 DP 738450	Width –7m Length –136m Area – 0.088ha Mowing/Slashing	1 Mowing/Slashing
SW-S25	Reserve No 5249 Shearwater ---------- Lot 18 DP 804975	Width – 6m Length –100m Area – 0.0579ha	1 Slashing/Hand removal
SW-S26	Reserve No 5249 Shearwater ---------- Lot 18 DP 804975	Width – 6m Length –70m Area – 0.0092ha	1 Slashing/Hand removal
SW-S27	Reserve No 5249 Shearwater ---------- Lot 18 DP 804975	Width – 6m Length –126m Area – 0.0904ha	1 Slashing/Hand removal
SW-S28	Reserve No 5249 Shearwater ---------- Lot 18 DP 804975	Width – 20m Length –46m Area – 0.0904ha	1 Slashing/Hand removal
SW-S29	Reserve No 5249 Shearwater ---------- Lot 18 DP 804975	Width – 6m Length –46m Area – 0.0247ha	1 Slashing/Hand removal
SW-S30	Reserve No 5249 Shearwater ---------- Lot 18 DP 804975	Width – 6m Length –62m Area – 0.0335ha	1 Slashing/Hand removal
SW-S31	Reserve No 5249 Shearwater ---------- Lot 18 DP 804975	Width – 6m Length –190m Area – 0.1092ha	1 Slashing/Hand removal
SW-S32	Reserve No 5249 Shearwater ---------- Lot 18 DP 804975	Width – 6m Length –20m Area – 0.0094ha	1 Slashing/Hand removal
SW-S33	Reserve No 5249 Shearwater ---------- Lot 18 DP 804975	Width – 6m Length –51m Area – 0.0311ha	1 Slashing/Hand removal
SW-S34	Reserve No 5249 Shearwater ---------- Lot 18 DP 804975	Width – 6m Length –85m Area – 0.0558ha	1 Slashing/Hand removal

APZ Code	HR Name/ Location	Required Maintenance Size by GLC	Maintenance Type
1. Council parks maintenance (primarily slashing) 2. Council open space maintenance (primarily mowing) 3. Council road maintenance 4. Council drainage reserve maintenance			**1 - 4 (and/or) maintenance type options**
SW-S35	Reserve No 5199 (Viney Creek Road) ---------- Lot 7 DP 733241	Width - 8m Length - 68m Area – 0.0558ha Mowing	1 Mowing
SW-S36	Council Depot Lot 26 DP585363	Width – 74m Length –86m Area – 0.6439ha	1 Maintenance of gravel carpark
SW-S37	Council Depot Lot 18 DP249203	Width – 140m Length –160m Area – 1.716ha Maintenance of gravel carpark	1 Maintenance of gravel carpark
SW-S38	Council Refuge Area Lot 1 FP392421	Width – 130m Length –320m Area – 3.231ha Maintenance of tip area	1 Maintenance of gravel carpark
SW-S39	Public Reserve Lot 59 DP786548	Width – 8m Length –37m Area – 0.0299ha Mowing/Slashing	1 Maintenance of gravel carpark
SW-S40	Public Reserve Lot 59 DP786548	Width – 8m Length –40m Area – 0.0319ha Mowing/Slashing	1 Maintenance of gravel carpark
SW-S41	RFS Brigade Station Lot 40 DP 630478	Width – 36m Length – 48m Area – 0.0942ha	1 Slashing/Hand removal
SW-S42	Council Refuge Area Lot 2 FP392421	Width – 22m Length –954m Area – 3.231ha	1 Maintenance of tip area
SW-S43	Reserve No 5249 Shearwater ---------- Lot 18 DP 804975	Width – 6m Length –78m Area – 0.0486ha	1 Slashing/mowing
SW-S44	Reserve No 5249 Shearwater ---------- Lot 18 DP 804975	Width – 10m Length –86m Area – 0.0767ha	1 Slashing/mowing
SW-S45	Reserve No 5249 Shearwater ---------- Lot 18 DP 804975	Width – 6m Length –66m Area – 0.0471ha	1 Slashing
SW-S46	Reserve No 5200 & 5201 (Viney Creek Road) ---------- Lot 8 DP 733241 Lot 9 DP 7333241	Width - 5m Length - 37m Area – 0.1132 ha	1 Mowing

APZ Code	HR Name/ Location	Required Maintenance Size by GLC	Maintenance Type
1. Council parks maintenance (primarily slashing) 2. Council open space maintenance (primarily mowing) 3. Council road maintenance 4. Council drainage reserve maintenance			**1 - 4 (and/or) maintenance type options**
SW-S47	Reserve No 5249 Shearwater ---------- Lot 9 DP733241 & Lot 18 DP 804975	Width – 6m Length –446m Area – 0.2636ha	1 Slashing
SW-S48	Reserve No 5201 Shearwater ---------- Lot 9 DP 733241	Width – 6m Length – 284m Area – 0.1671ha	1 Slashing
SW-S49	Reserve No 5201 Shearwater ---------- Lot 9 DP 733241	Width – 6m Length – 268m Area – 0.2184ha	1 Slashing
SW-S50	Reserve No 5201 Shearwater ---------- Lot 9 DP 733241	Width – 6m Length – 545m Area – 0.3246ha	1 Slashing
SW-S51	Council Depot Lot 26 DP585363	Width – 6m Length –397m Area – 0.2312ha	1 Slashing
SW-S52	Reserve No 5249 Shearwater ---------- Lot 18 DP 804975	Width – 6m Length –136m Area – 0.0842ha	1 Slashing
SW-S53	Reserve No 5249 Shearwater ---------- Lot 18 DP 804975	Width – 6m Length –113m Area – 0.0663ha	1 Slashing
SW-S54	Reserve No 5249 Shearwater ---------- Lot 18 DP 804975	Width – 6m Length –34m Area – 0.0185ha	1 Slashing
SW-S55	Council Depot Lot 18 DP249203	Width – 6m Length –606m Area – 0.3636ha	1 Slashing
SW-S56	Council Depot Lot 18 DP249203	Width – 6m Length –168m Area – 0.1008ha	1 Slashing
STRATEGIC FIRE MANAGEMENT ZONES – Road Reserves (Rd) in Shearwater			
SW-Rd-S1	Myall Way	Length –1160m	3 Public-sealed Road with slashed 5m road verge abutting adjacent forest area.
SW-Rd-S2	Viney Road East	Length –767m	3 As above
SW-Rd-S3	Prion Place	Length –209m	3 As above
SW-Rd-S4	Gannet Place	Length –394m	3 As above

APZ Code	HR Name/ Location	Required Maintenance Size by GLC	Maintenance Type
1. Council parks maintenance (primarily slashing) 2. Council open space maintenance (primarily mowing) 3. Council road maintenance 4. Council drainage reserve maintenance			**1 - 4 (and/or) maintenance type options**
SW-Rd-S5	Bondelbah Road	Length –399m	3 As above
SW-Rd-S6	Kooraru Close	Length –116m	3 As above
SW-Rd-S7	Won Bournie Road	Length –352m	3 As above
SW-Rd-S8	Toonang Drive	Length –1977m	3 As above
SW-Rd-S9	Petrel Place	Length –215m	3 As above
SW-Rd-S10	Shearwater Place	Length –236m	3 As above
SW-Rd-S11	Yandala Road	Length –286m	3 As above
SW-Rd-S12	Winta Road	Length –262m	3 As above
SW-Rd-S13	Wanya Road	Length –368m	3 As above
SW-Rd-S14	Yarrumba Road	Length –160m	3 As above

APPENDICES

APPENDIX I – Dictionary

back burning: the application of fire to combustible matter so as to provide a fire break to control or suppress a fire or protect persons, property or the environment from an existing or imminent danger arising out of a fire, incident or other emergency.

bush fire: includes a grass fire.

bush fire danger period: a period fixed by or under section 81 or 82 of the *Rural Fires Act 1997.*as a bush fire danger period.

bush fire hazard reduction certificate (BFHRC): a certificate referred to in section 100D of the *Rural Fires Act 1997.*

bush fire hazard reduction notice: a notice under section 66 of the *Rural Fires Act 1997.* .

bush fire hazard reduction work:

(a) the establishment or maintenance of fire breaks on land, and
(b) the controlled application of appropriate fire regimes or other means for the reduction or modification of available fuels within a predetermined area to mitigate against the spread of a bush fire,
but does not include construction of a track, trail or road.

bush fire prone land has the same meaning as it has in the *Environmental Planning and Assessment Act 1979*.

bush fire risk management plan (BFRMP): a plan prepared under Division 4 of Part 3 for the purpose referred to in section 54 of the **Rural Fires Act 1997**.

fire fighting apparatus includes all vehicles, equipment and other things used for or in connection with the prevention or suppression of fire or the protection of life or property in case of fire.

fire fighting authority :means the following:

(a) the Service,
(b) New South Wales Fire Brigades,
(c) the National Parks and Wildlife Service,
(d) the Forestry Commission,
(e) any other body prescribed by the regulations for the purposes of this definition.

fire permit: a permit issued under section 89 of the *Rural Fires Act 1997.*

local authority means:

(a) in relation to land that is situated within an area within the meaning of the *Local Government Act 1993*—the council of the area.

managed bush fire hazard reduction work means bush fire hazard reduction work that is carried out in accordance with a bush fire risk management plan.

Management Committee: a Bush Fire Management Committee (BFMC) constituted under Part 3 of the *Rural Fires Act 1997.*

plan of operations: a plan prepared under Division 4 of Part 3 for the purposes referred to in section 53 of the *Rural Fires Act 1997.*

public authority means:

(a) any public or local authority constituted by or under an Act other than this Act, or
(b) any Government Department, or
(c) a statutory body representing the Crown, or
(d) a State owned corporation, or
(e) any person prescribed by the regulations as a public authority.

(*Source: Rural Fires Act 1997 No 65)*

Definitions within the *State Emergency and Rescue Management Act 1989*

combat agency *means the agency identified in Displan as the agency primarily responsible for responding to a particular emergency.*

Displan *means the State Disaster Plan*

emergency *means an emergency due to an actual or imminent occurrence (such as fire, flood, storm, earthquake, explosion, accident, epidemic or warlike action) which:*

(a) endangers, or threatens to endanger, the safety or health of persons in the State, or
(b) destroys or damages, or threatens to destroy or damage, property in the State,

being an emergency which requires a significant and co-ordinated response.

emergency services organisation *means the Police Service, Fire Brigades, Rural Fire Brigades, Ambulance Service, State Emergency Service, Volunteer Rescue Association or any other agency which manages or controls an accredited rescue* unit

APPENDIX II – Council fire management objectives

Council fire management objectives are defined within *the Great Lakes Council Management Plan, 2004–2007,* as seen below.

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).*

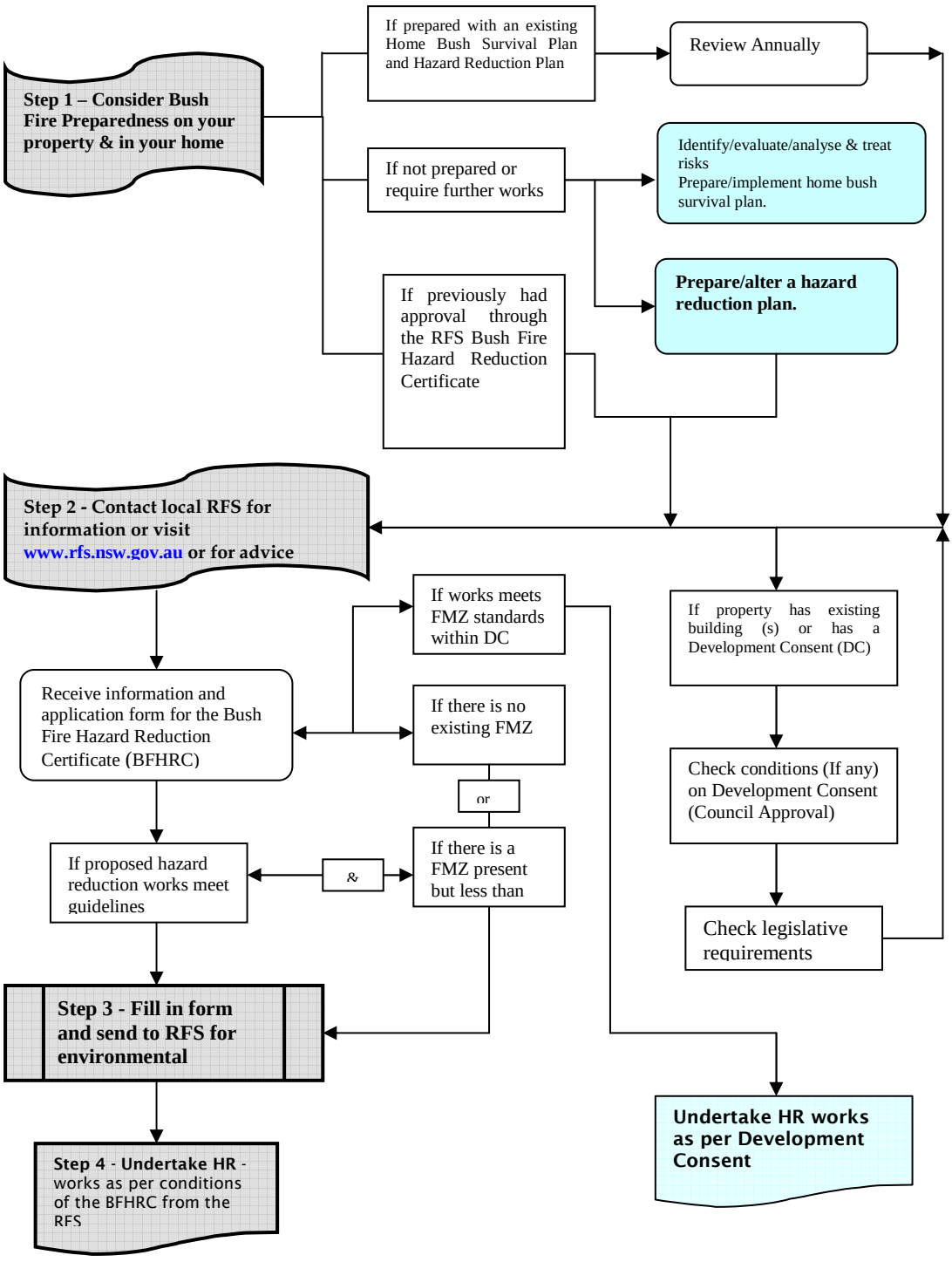
Objectives:

✓	*'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 accordance with the New South Wales State Emergency Service Annual Report for 2003/2004 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.'*

APPENDIX III – What you can do to assist with fire mitigation and hazard reduction.



HR – Hazard Reduction
BFHRC – Bush Fire Hazard Reduction Certificate
FMZ – Fire Management Zone
DC - Development Consent through Council

Bush Fire Preparedness - Readiness of householders/property owners in the event of an imminent bush fire

APPENDIX IV – Fire Mitigation

The Local Environmental Plan (LEP) permis strategic bush fire hazard reduction within applicable zones across the Great Lakes LGA.

The LEP provides the mechanism to achieve bush fire objectives and protection measures and identifies criteria specified in bush fire prone areas appropriate to the potential level of the hazard.
DCP's support the objectives of the LEP and can detail bush fire protection measures necessary for the protection of life and property in the event of a bush fire event.

Two core documents including the NSW Rural Fire Service *Planning for Bushfire Protection (2001b) and the Bushfire Environmental Assessment Code (2003a)* 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 bush fire mitigation works.

The Building Code of Australia (BCA) provides guidelines to building in bush fire prone areas within the AS3959 Construction of buildings in bush fire prone areas.

These guides collectively assist the community and managers to:

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

The bush fire 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 bush fire hazard to an acceptable level. Its main purpose is to provide a buffer between any habitable structure and the bush fires hazard, and progressively reduce fuel loads.

For bush fire 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 (eg. road, sporting field, 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 below:

Maximum Distance of an Asset Protection Zone from the Asset (or Adjacent Asset)		
	Residential Building	*Building - Shed*
Upslope		
<18	20 metres	10 metres
Downslope		
>0 – 5°	25 metres	10 metres
>5 – 10°	30 metres	10 metres
>10 – 15°	40 metres	10 metres
>15 – 18°	50 metres	10 metres

(RFS 2003a)

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 (NSW Planning 2001)* to define fire management zones.

The table below extracted from this document shows the APZ minimum requirements that apply to both residential and special protection developments, for each vegetation groups and slope variations.

The APZ will comprise of two components, being the Outer Protection Area (OPA) and the Inner Protection Area (IPA).

Within Bush Fire Prone Areas		APZ -Vegetation Group 1* (Forest [wet sclerophyll forest, dry sclerophyll forest])		APZ -Vegetation Group 2* (Woodlands, tall heath, and wetlands [scrub, open Shrub, closed heath])		Vegetation Group 3* (Rainforest [Closed Forest], open woodlands, grasslands †[17])
	Slope	Residential	Special Protection	Residential	Special Protection	Both
Upslope	>5°	20 m	60 m	20 m	30 m	20 m
	5°–0	30 m	75 m	30 m	40 m	20 m
Downslope	>0 – 5°	40 m	80 m	35 m	50 m	20 m
	>5 – 10°	50 m	90 m	40 m	60 m	20 m
	>10 – 15°	60 m	100 m	50 m	80 m	20 m
	>15 – 18°	70 m	100 m	60 m	100 m	20 m

Source: *(NSW Rural Fire Service 2001b)*

Outer Protection Area

The OPA is located between the hazard and the IPA often linking with the area originally forming part of the bushfire hazard and is located on the bushland side of the perimeter road. In this area, vegetation is managed so cover is not continuous and fuel loads generally do not exceed 8 tonnes per hectare or in grasslands height should be maintained below 10 centimetres.

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 and ember attack on the IPA. The depth of the OPA varies from 0–10 metres deep for residential development or up to 15 metres in depth for special protection developments.

Inner Protection Area

The IPA extends from the edge of the development to the edge of the OPA. Within this area, fuel loads are strictly managed so that there is minimal fine fuels **available** that can become involved in fire at close to the development and therefore minimises direct flame contact and radiant heat. Any vegetation within this area, they **must not provide a path for the transfer of fire** to the development — ie **fuels are discontinuous**.

While trees and shrubs or other vegetation may occur, the **canopy must not touch or over hang the building** and be far enough away from the dwelling not to ignite the house by direct flame or radiant

* The APZ requirements are based on **Level 3 construction** in accordance with AS3959–1999. Where opportunities exist to increase APZ depth, then the site assessment methodology for bush fire attack, required setbacks and construction levels set out in Appendix 3.3 (of the *Guidelines*) must be applied.

† scrubland, , mallee also are within Group 3 vegetation but occurs western NSW areas.

[17] Small remnants forests (less than 1ha) may be considered to be equivalent to the specifications for group 3 vegetation.

heat emission. In addition, species that produce excessive amounts of ground fuel in a short period or fire danger period.

There is a preference to retain smooth bark species over rough barked species. The more fibrous bark increases the fire hazard rating as they assist with the spread and spotting capabilities of a fire. Retain discontinuous vegetation to provide a barrier to reduce the effects from radiant heat and ember attack.

Perimeter Road, Fire Trail and Access Roads

The perimeter road or fire trail lies between the OPA and 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 APZ's to conduct back burning or hazard reduction, property protection or provide refuge for fire fighters.

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

APPENDIX V - Mapping bushfire prone land

In August 2002 amendments came into effect to the *Environmental Planning and Assessment Act 1979* and the *Rural Fires Act 1997to improve protection of people property and the environment from bush fires.*

*C*ouncils 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 required to place specification of bush fire prone land on section 149 Planning Certificate. The Commission issues fire safety authority (section 100B of the *Rural Fires Act*) for special purpose developments of bush fire 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
c) **Vegetation Group 3** –Rainforests, open woodlands, grasslands, shrubland and mallee.

Once vegetation classes have been determined and mapped across a council area, application of **bush fire vegetation categories** to the vegetation groups must be completed. The *Guideline – Bush Fire Prone Land Mapping, NSW Rural Fire Service, 2004* defines the criteria for **Bush Fire Vegetation Categories**[18] **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**
(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
(v) Areas less than 1 hectare within, or partially within
(vi) 100m lateral separations from a bushfire vegetation category 1, are — **Bush fire Vegetation Category 2.** or
(vii) 30m lateral separations from a bushfire vegetation category 2 are — **Bush fire Vegetation Category 2.**

Vegetation **excluded** from the above mentioned vegetation groups include:

i. 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
ii. 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
iii. Areas of managed gardens and lawns within curtilage of buildings;
iv. Managed botanical gardens;
v. "Agricultural lands" used for annual and/or perennial cropping, orchard, market gardens, nurseries and the likes are excluded; or
vi. Mangroves.

(RFS *2004b, 2004e)*

[18] The NSW Rural Fire Service owns bush fire prone mapping and is held in custody by Council

APPENDIX VI - Bush Fire Risk Description

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

Bush Fire Risk Description

Development Type *X — absent, ✔— present)*	*Bushfire Threat*[19]	*Bushfire Risk*[20]	*Consideration to Asset Protection/ Building Design*[21]
Urban/bushland interface/ Multiple Occupancies	Within 100m	Extreme	✗
Urban/bushland interface/ Multiple Occupancies	Within 100m	Major	✔
Urban/bushland interface	100m – 2.5km	Major	✗ and ✔
Environmental/Ecological Assets	Any	Major	✔
Remote Rural Residential Development	Any	Major	✗ and ✔
Agricultural areas	Any	Moderate	✗

APPENDIX VII - Terminology identification for localities

Terminology used to identify locations within fire management zones

Identification Key	Village/Town
BL	Blueys Beach
BB	Boomerang Beach
BU	Bulahdelah
BD	Bundabah
BW	Bungwahl
CP	Coomba Park
EB	Elizabeth Beach
F	Forster
HN	Hawks Nest
NB	Nabiac
N	Nerong
NA	North Arm Cove
PD	Pindimar
SR	Seal Rocks
SW	Shearwater
SL	Smiths Lake
TB	Tarbuck Bay
TG	Tea Gardens
T	Tuncurry

[19] How close assets are located to the hazard

[20] Level of risk as defined within the *Bushfire Risk Management Plan 2001*

[21] Consideration to fuel reduced areas (property protection), housing design and perimeter roads

[26] 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*.

APPENDIX VIII – Fire Fighting Appliance Definitions

The following category identification of all NSW Rural Fire Service appliances apply:

CATEGORY	MAIN IDENTIFICATION	SUB IDENTIFICATION		
Category 1	Heavy Fire Appliance	AWD	3,001L – 4,000L	B – V – F – G / D – S
Category 2	Medium Fire Appliance	AWD	1,601L – 3,000L	B – V – F – G / D – S
Category 3	Heavy Fire Appliance		3,001L – 4,000L	B – V – F – G / D – S
Category 4	Medium Fire Appliance		1,601L – 3,000L	B – V – F – G / D – S
Category 5	Heavy Fire Appliance	AWD	4,001L+	B – V – F – G / D – S
Category 6	Heavy Fire Appliance		4,001L +	B – V – F – G / D – S
Category 7	Light Fire Appliance	AWD	801L – 1,600L	F – G / D – S
Category 8	Light Fire Appliance		801L – 1,600L	F – G / D – S
Category 9	Mop Up Appliance	AWD	350L – 800L D –	S
Category 10	Urban Fire Appliance		1,601L +	B
Category 11	Urban Fire Appliance	AWD	1,601L +	B
Category 12	Personnel Transport			
Category 13	Bulk Water Carriers			
Category 14	Tanker Trailers			
Category 15	Boats			
Category 16	Command Vehicles			
Category 17	General Cargo Vehicles			
Category 18	Catering Vehicles			
Category 19	Communication Vehicles			
Category 20	Other Appliances/Vehicles			

Key:

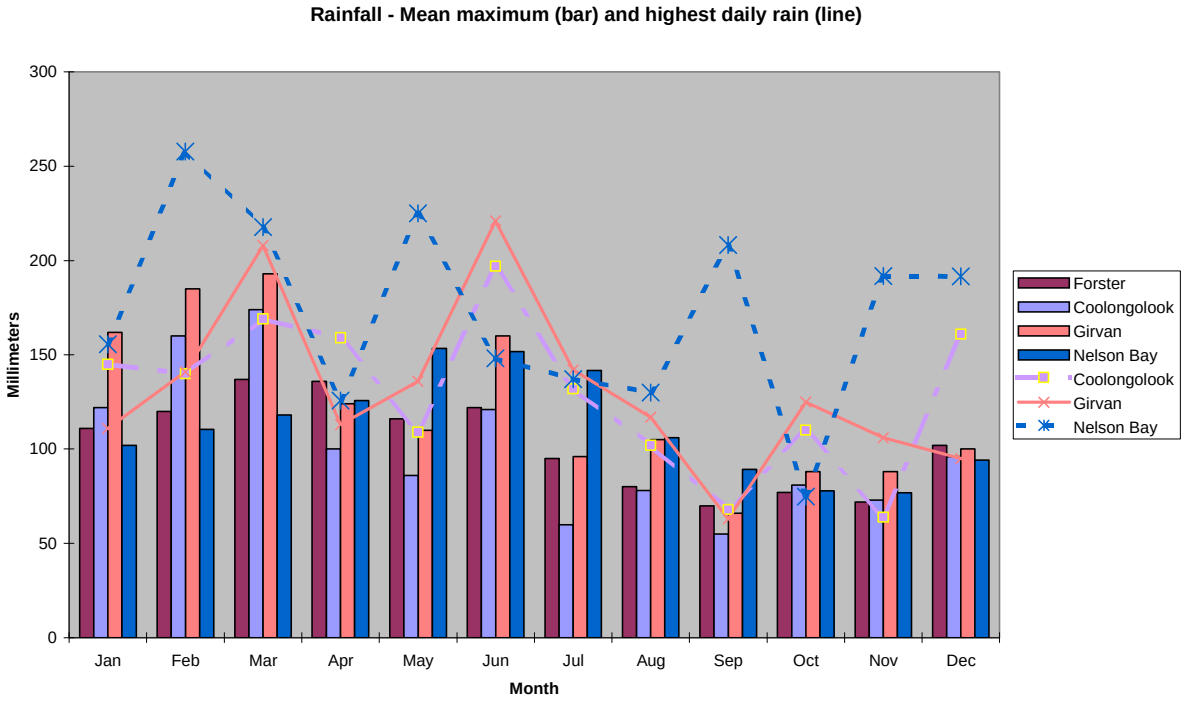
AWD = All Wheel Drive,
B = Breathing Apparatus (BA) Equipped,
V = Village (No BA),
F = Forest,
G = Grassland only
D = Dual/Crew Cabin,
S = Single Cabin

APPENDIX IX – Climate

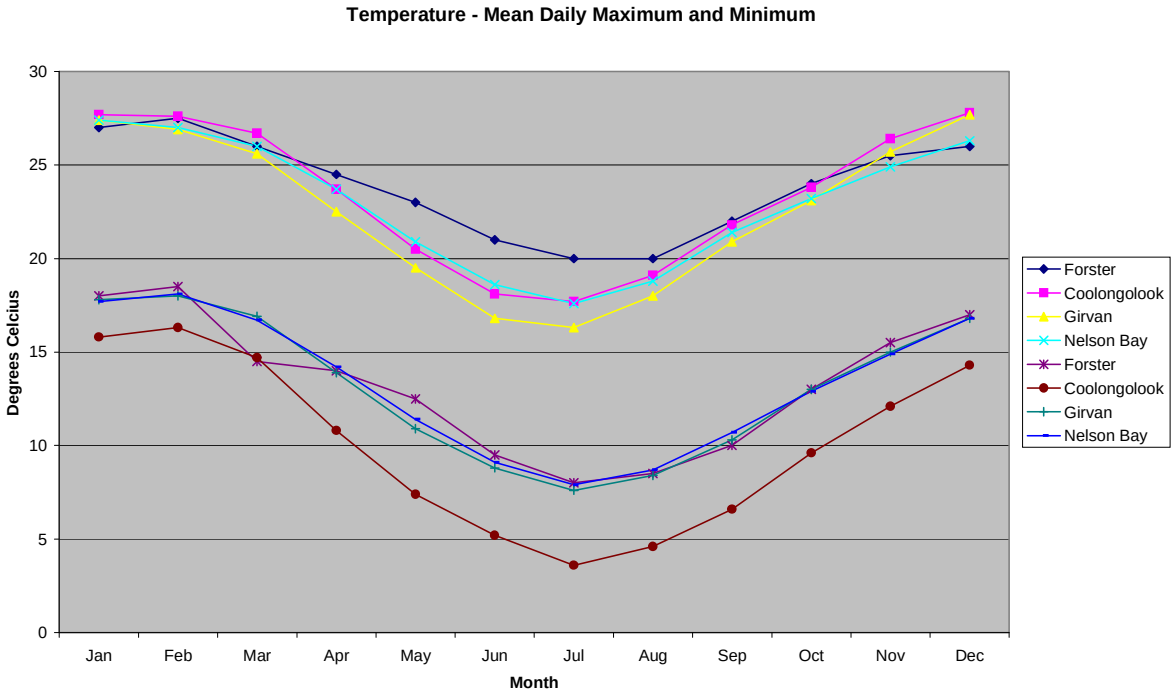
Climatic details of the Upper Hunter and Lower Hunter weather districts.

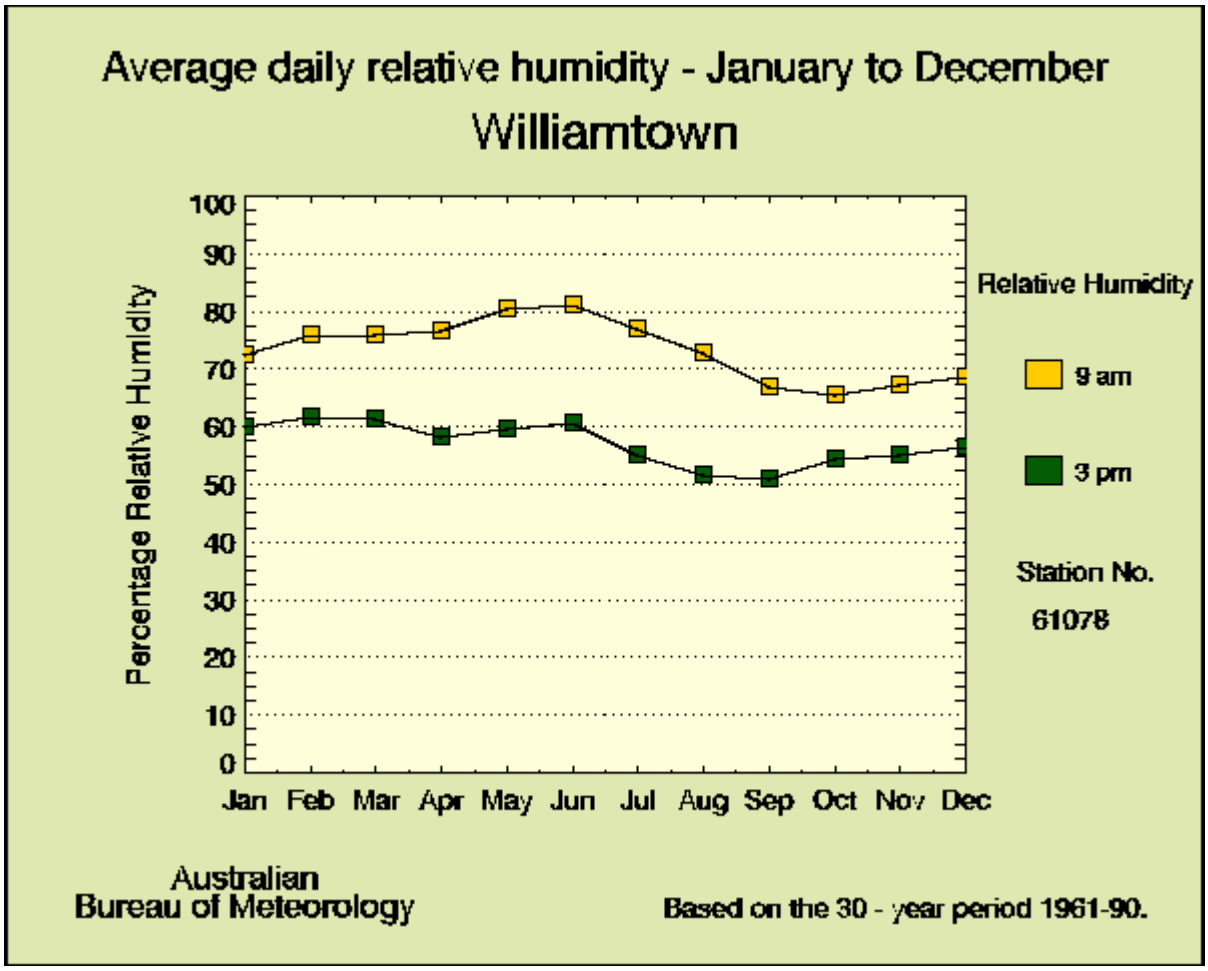
Climate Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	ANN
Mean Daily Max. Temp (°C)													
Forster	27.0	27.5	26.0	24.5	23.0	21.0	20.0	20.0	22.0	24.0	25.5	26.0	23.9
Coolongolook	27.7	27.6	26.7	23.7	20.5	18.1	17.7	19.1	21.8	23.8	26.4	27.8	23.5
Girvan	27.4	26.9	25.6	22.5	19.5	16.8	16.3	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
Mean Daily Min. Temp (°C)													
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
Mean. Rainfall (mm)													
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
Highest Daily Rain													
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)



(Commonwealth of Australia, Bureau of Meteorology 2005a)


Temperature - Mean Daily Maximum and Minimum
Degrees Celcius
30
25
20
15
10
5
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
Forster
Coolongolook
Girvan
Nelson Bay
Forster
Coolongolook
Girvan
Nelson Bay


Average daily relative humidity - January to December
Williamtown
Percentage Relative Humidity
100
90
80
70
60
50
40
30
20
10
0
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Relative Humidity
9 am
3 pm
Station No.
61078
Australian
Bureau of Meteorology
Based on the 30 - year period 1961-90.

APPENDIX X – Vegetation formations for NSW

Vegetation formations for NSW to be applied to the Bush Fire and Environmental assessment Code for asset protection zones and strategic fire advantage zones.

A. Rainforests	Forests dominated by trees with soft broad leaves (non eucalypts), with vines, ferns and palms in the understorey. Coast and tablelands in mesic sites on fertile soils.
B1. Wet sclerophyll forests	Tall forests of dominated by straight-trunked eucalypts with dense understories of shrubs with broad soft leaves, ferns and herbs. Relatively fertile soils in high rainfall parts of coast and tablelands.
B2. Semi-mesic grassy forests	Tall forests dominated by straight-trunked eucalypts, with mixed grassy understories and sparse occurrences of shrubs with broad soft leaves. Coast and tablelands in high rainfall regions and along major inland watercourses on relatively fertile soils.
C. Swamp sclerophyll forests	Forests of hard-leaved trees (eucalypts, paperbarks, casuarinas) with scattered shrubs and continuous groundcover of water-loving sedges and herbs. Floodprone flats and plains and riparian zones principally along the coast and inland rivers.
D. Sclerophyll grassy woodlands	Woodlands of eucalypt trees, with dry understories of grasses, herbs and sometimes scattered shrubs. Rolling terrain with fertile soils and moderate rainfall on the coast, tablelands and western slopes.
E1. Dry sclerophyll shrub/grass forests	Eucalypt forests with mixed understories of hard-leaved shrubs and grasses. Moderately fertile soils in moderate rainfall areas of the coast, tablelands and western slopes.
E2. Dry sclerophyll shrub forests	Low forests and woodlands dominated by eucalypts, with understories of hard-leaved shrubs and sparse groundcover (few grasses or sedges). Regions receiving high to moderate rainfall on the coast, tablelands and western slopes, often in steep areas.
F. Semi-arid woodlands	Open woodlands dominated by eucalypts, acacias and casuarinas, with open understories of hard-leaved shrubs, grasses and forbs, including many ephemeral species. Low-moderate rainfall regions of the near western plains, including infrequently flood-prone sites.
G. Heathlands	Dense to open shrublands dominated by shrubs with small, hard leaves and sedges. High rainfall regions of the coast and tablelands on infertile soils, often in exposed topographic positions.
H. Alpine complex	Mosaics of low herbfields, grasslands and shrublands. High, snow-prone parts of the southern ranges.
I. Grasslands	Closed tussock grasslands with a variable compliment of herbs and few if any woody shrubs or trees. Fertile soils of the tablelands and western floodplains.
J. Freshwater wetlands	Swamp forests, wet shrublands or sedgelands, usually with a dense groundcover of sedges. Throughout NSW on peaty or gleyed soils with impeded drainage.
K. Estuarine and saline wetlands	Low forests, shrublands and herbfields of mangroves, succulent shrubs (saltmarsh) or marine herbs (sea grasses). Coastal estuaries and saline sites of the western plains.
M. Arid and semi-arid shrublands	Open shrublands of hard-leaved shrubs, hummock or tussock grasses and ephemeral herbs. Low rainfall regions of the far western plains.

(RFS 2005)

APPENDIX XI – Biodiversity Thresholds for vegetation communities

Biodiversity thresholds[26] and fire regime to be applied to vegetation communities in Great Lakes LGA.

Fire Regime	Biodiversity Thresholds Within Strategic Fire Advantage and Land Management Zones [NPWS, 2001]	Vegetation Community Type (Council 2003) *[#1 and #2 indicate options for the same community]	Forest Type (Council, DVS, 2003)	Vegetation Group (Category 1,2,3) PBFP	The Vegetation Formation Described By The RFS For Minimum Fire Frequency For SFAZ (BFEAC)	Minimum Year Fire Frequency (BFEAC)
a	❖ Avoid 3 or more consecutive fires, with each of <5 years apart ❖ Avoid inter fire periods of >30 years ❖ Avoid 2 or more successive fires that totally scorch or consume the tree canopy ❖ Avoid 3 or more consecutive fires of low intensity	Blackbutt – Bloodwood/ Apple	41	1	E1. Dry sclerophyll shrub/grass forest	5
		Blackbutt/ Scribbly Gum	40	1	E1. Dry sclerophyll shrub/grass forest	5
		Blackbutt/ Sydney Peppermint/ Smooth-barked Apple	42	1	D. Sclerophyll grassy woodlands	5
		Dry Blackbutt	37	1	E1. Dry sclerophyll shrub/grass forest	5
		Forest Red Gum - #1	92	1	D. Sclerophyll grassy woodlands	5
		Grey Gum/ Grey Ironbark/ White Mahogany	62	1	E1. Dry sclerophyll shrub/grass forest	5
		Ironbark	84	1	E1. Dry sclerophyll shrub/grass forest	5
		Ironbark/ Smooth-barked Apple/ Stringybark	84/106	1	E1. Dry sclerophyll shrub/grass forest	5
		Mahogany/ Ironbark/ Grey Gum/ Blackbutt	60/37	1	E1. Dry sclerophyll shrub/grass forest	5
		Red Bloodwood	126	2	D. Sclerophyll grassy woodlands	5
		Scribbly Gum	117	1	E1. Dry sclerophyll shrub/grass forest	5
		Smooth-barked Apple	105	1	E1. Dry sclerophyll shrub/grass forest	5
		Spotted Gum	70	1	E1. Dry sclerophyll shrub/grass forest	5
		Spotted Gum – Ironbark/ Grey Gum	74	1	E1. Dry sclerophyll shrub/grass forest	5
		Sydney Peppermint	128	1	E1. Dry sclerophyll shrub/grass forest	5
		Sydney Peppermint/ Stringybark	115	1	E1. Dry sclerophyll shrub/grass forest	5
		White Mahogany/ Red Mahogany/ Grey Ironbark/ Grey Gum	60	1	E1. Dry sclerophyll shrub/grass forest	5

Fire Regime	Biodiversity Thresholds Within Strategic Fire Advantage and Land Management Zones [NPWS, 2001]	Vegetation Community Type (Council 2003) *[#1 and #2 indicate options for the same community]	Forest Type (Council, DVS, 2003)	Vegetation Group (Category 1,2,3) PBFP	The Vegetation Formation Described By The RFS For Minimum Fire Frequency For SFAZ (BFEAC)	Minimum Year Fire Frequency (BFEAC)
b	❖ Avoid 3 or more consecutive fires, with each of <8 years apart ❖ Avoid 3 or more consecutive fires, with each of the fires >15 years apart ❖ Avoid inter fire periods of > 30 years ❖ Avoid 2 or more consecutive fires that consume < 10t/ha of surface fuels	Banksia	107	2	G. Heathlands	7
		Disturbed Heath	219/223	2	G. Heathlands	7
		Forest Red Gum - #2	92	1	B2. Semi mesic grassy forests	10
		Heath	223	2	G. Heathlands	7
		Heath Paperbark	31/223	2	G. Heathlands	7
		Paperbark	31	1	C. Swamp sclerophyll forests	7
		Paperbark/ Blackbutt	31/37	1	C. Swamp sclerophyll forests	7
		Paperbark/ Smooth-barked Apple/ Sydney Peppermint	31/106	1	C. Swamp sclerophyll forests	7
		Paperbark/ Swamp Oak	31/32	1	C. Swamp sclerophyll forests	7
		Red Mahogany	68	1	E2. Dry sclerophyll shrub/grass forest	7
		Red Mahogany/ Smooth-barked Apple	68/105	1	E2. Dry sclerophyll shrub/grass forest	7
		Rough-barked Apple	129	1	C. Swamp sclerophyll forests	7
		Scrub	224	2	G. Heathlands	7
		Swamp - #1	231	3	J. Freshwater wetlands	6
		Swamp Mahogany	30	1	C. Swamp sclerophyll forests	7
		Swamp Mahogany/ Forest Red Gum	30/92	1	C. Swamp sclerophyll forests	7
		Swamp Mahogany/ Grey Gum	30/60	1	C. Swamp sclerophyll forests	7
		Swamp Mahogany/ Paperbark	30/31	1	C. Swamp sclerophyll forests	7
		Swamp Mahogany/ Swamp Oak	30/32	1	C. Swamp sclerophyll forests	7
		Swamp Oak	32	1	C. Swamp sclerophyll forests	7
		Tallowwood - #1	45	1	B2. Semi mesic grassy forests	10
		Tallowwood/ Grey Gum	45/60	1	B2. Semi mesic grassy forests	10

Fire Regime	Biodiversity Thresholds Within Strategic Fire Advantage and Land Management Zones [NPWS, 2001]	Vegetation Community Type (Council 2003) *[#1 and #2 indicate options for the same community]	Forest Type (Council, DVS, 2003)	Vegetation Group (Category 1,2,3) PBFP	The Vegetation Formation Described By The RFS For Minimum Fire Frequency For SFAZ (BFEAC)	Minimum Year Fire Frequency (BFEAC)
c	❖ Avoid more than 1 fire every 30 years ❖ Avoid inter-fire periods > 200 years	Flooded Gum	48	1	B1. Wet sclerophyll forests	25
		Flooded Gum/ Paperbark	48/31	1	B1. Wet sclerophyll forests	25
		Inland Brush Box	53	1	B1. Wet sclerophyll forests	25
		Ironbark/ Grey Gum/ Flooded Gum	60/48	1	B1. Wet sclerophyll forests	25
		Moist Blackbutt	36	1	B1. Wet sclerophyll forests	25
		Sydney Blue Gum	46	1	B1. Wet sclerophyll forests	25
		Sydney Blue Gum/ Paperbark	46/31	1	B1. Wet sclerophyll forests	25
		Tallowwood - #2	45	1	B1. Wet sclerophyll forests	25
		Tallowwood/ Sydney Blue Gum	47	1	B1. Wet sclerophyll forests	25
		Tallowwood/ Sydney Blue Gum/ Brushbox	47/53	1	B1. Wet sclerophyll forests	25
d	❖ Any fire occurrence (a limited recovery ability exists)	Fig/ Giant Stinger	6	3	A. Rainforest	na
		Fig/ Myrtle	6/23	3	A. Rainforest	na
		Headland Brushbox	25	3	A. Rainforest	na
		Mangrove	33	3	K. Estuarine & saline wetlands	na
		Myrtle	23	3	A. Rainforest	na
		Palm	7	3	A. Rainforest	na
		Palm/ Myrtle	7/23	3	A. Rainforest	na
		Swamp - #2	231	3	K. Estuarine & saline wetlands	na
		Tuckeroo	24	3	A. Rainforest	na
		Yellow Tulipwood	22	3	A. Rainforest	na
NA	❖ Not Applicable	Natural Grassland	230	3	No prescribed fire on headlands[27]	na
		Pine	-	1 or 2	Other	na
		Rock/Sand	-	na	Other	na
w	❖ **Use a, b, c, d** options for biodiversity thresholds	Introduced Scrub	221	1,2,3	W. Appropriate management practice[28]	na
		Mixed Forest Regrowth Mixed Pine Mixed Woodland Vine		1,2,3	W. Appropriate management practice	na

[27] Not described in BFEAC schedule
[28] W. Variable within each vegetation formation

APPENDIX XII - CRA Vegetation Unit Distribution and Conservation Value

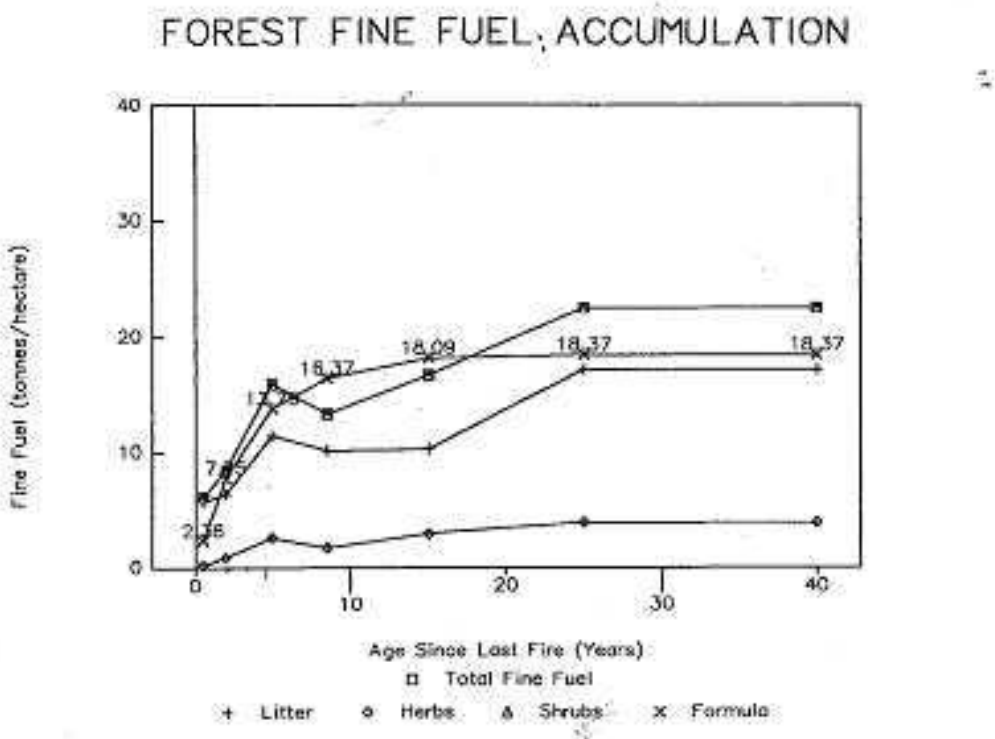
The Lower North East Comprehensive Regional Assessment (CRA) and DEC (Parks and Wildlife Division) used broad scale mapping to assess the status of the ecosystem. The local vegetation community were ranked from highest regional priority to the lowest, including those ecosystems that are known to be vulnerable,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

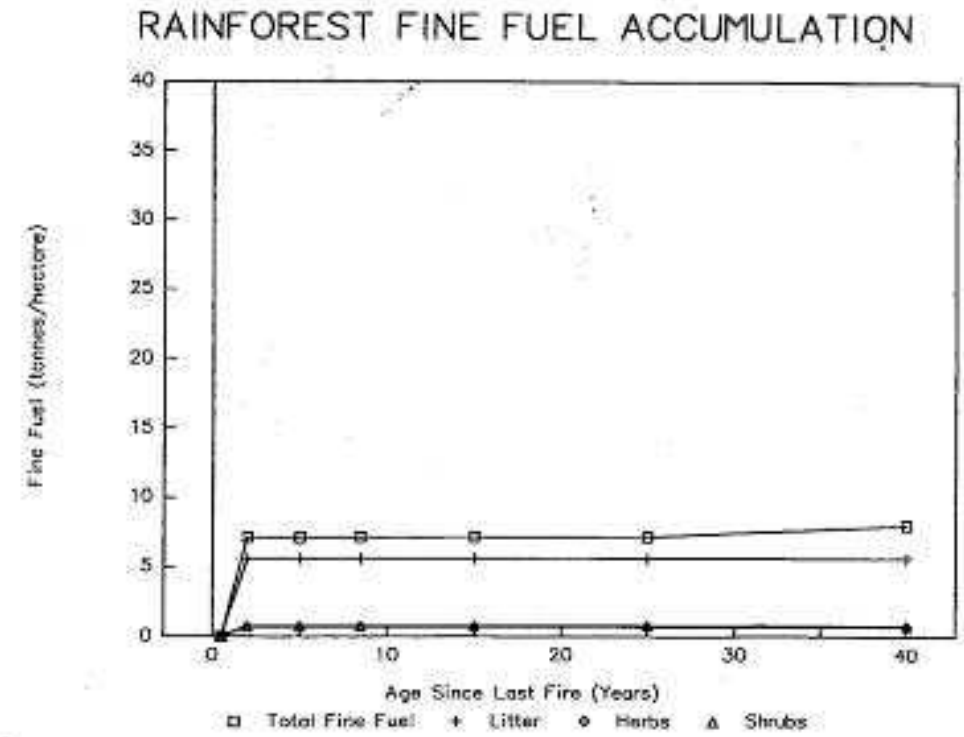
Forest Type	CRA Name	Current area Lower North East CRA (ha)	% of Original Extent Remaining	Status	RFA Cons. Target Met
92	Escarpment Red Gum	20,498	27.4%	▪ Vulnerable ▪ Severely Depleted ▪ Highly Inadequately Reserved ▪ Private land priority	No
129	Rough-barked Apple	2,636	18.8%	▪ Vulnerable ▪ Severely Depleted ▪ Private land priority	No
32	Swamp Oak	4,868	22.7%	▪ Vulnerable ▪ Severely Depleted ▪ Private land priority	No
107	Banksia	4,196	47.8%	▪ Vulnerable ▪ Private land priority	No
31	Paperbark	12,866	NA	▪ Vulnerable	No
224	Scrub	3,073	NA	▪ Vulnerable	Yes
68	Red Mahogany	65	100	▪ Rare ▪ Highly inadequately Reserved ▪ Private land priority	No (*)
45	Tallowwood	746	85.3%	▪ Rare ▪ Private land priority	No (*)
33	Mangrove	1,001	NA	▪ Rare ▪ Private land priority	No (*)
223	Heath	14,286	NA	▪ Rare ▪ Private land priority	No (*)
126	Red Bloodwood	5	100%	▪ Rare	Yes (*)
230	Natural Grassland	138	NA	▪ Rare	No (*)
231	Swamp	9,130	NA	▪ Rare	No (*)
6, 7, 22, 23, 24, 25	Rainforest	256,326	NA	▪ Rare	No (*)
36	Dry Grassy Blackbutt-Tallowwood	59,390	44.0%	▪ Severely Depleted ▪ Highly Inadequately Reserved ▪ Private land priority	No
60, 62	South Coast Shrubby Grey Gum	151,030	42.2%	▪ Severely Depleted ▪ Highly Inadequately Reserved ▪ Private land priority	No
42	Blackbutt-Sydney Peppermint-Smooth-barked Apple	1,382	38.8%	▪ Severely Depleted Private land priority	No
106	Stringybark-Apple	81,300	38.9%	▪ Severely Depleted ▪ Private land priority	No
84	Ironbark	89,985	43.0%	▪ Severely Depleted	Yes
30	Swamp Mahogany	2,177	46.9%	▪ Private land priority	No
48, 48/31	Wet Flooded Gum-Tallowwood	6,161	65.6%	▪ Private land priority	No
48	Coastal Flooded Gum	8,753	57.7%	▪ Private land priority	No
70, 74	Dry Foothills Spotted Gum	17,688	53.8%	▪ Private land priority	No
47	South Coast Tallowwood-Blue Gum	71,217	67.1%	▪ Private land priority	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

Forest Type	CRA Name	Current area Lower North East CRA (ha)	% of Original Extent Remaining	Status	RFA Cons. Target Met
37	Coastal Sands Blackbutt	17,312	64.0%	-	Yes
60	Dry Grassy Tallowwood-Grey Gum	178,516	67.6%	-	No
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 XIII- Fine Fuel Accumulation Tables





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