Bushfire Risk Management Plan

DRAFT

2019 - 2024

Contents

Document Control

Document Name	Bushfire Risk Management Plan	Current Version	1.0
Document Owner	City of Kalamunda CEO	Issue Date	
Document Location	City of Kalamunda	Next Review Date	

Document Endorsements

City of Kalamunda Council endorses that the Bushfire Risk Management Plan (BRM Plan) has been reviewed and assessed by the Office of Bushfire Risk Management as compliant with the standard for bushfire risk management planning in Western Australia, the Guidelines for Preparing a Bushfire Risk Management Plan. City of Kalamunda is the owner of this document and has responsibility, as far as is reasonable, to manage the implementation of the BRM Plan and facilitate the implementation of bushfire risk management treatments by risk owners. The endorsement of the BRM Plan by City of Kalamunda Council satisfies their endorsement obligations under section 2.3.1 of the *State Hazard Plan for Fire* (*Westplan Fire*).

Local Government	Representative	Signature	Date
City of Kalamunda	City of Kalamunda CEO		

Amendment List

Version	Date	Author	Section
1.0		Katelyn Roddy-Dixon	
1.0	April 2019	Michael Hall	
1.0	May 2019	Dale Burgess	

Publication Information

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1.   Introduction

1.1   Background

Under the *State Hazard Plan for Fire* (formerly *Westplan Fire*) an integrated Bushfire Risk Management Plan (BRM Plan) is to be developed for local government areas with significant bushfire risk. This BRM Plan has been prepared for the City of Kalamunda in accordance with the requirements of *Westplan Fire* and the *Guidelines for Preparing a Bushfire Risk Management Plan* (Guidelines). The risk management processes used to develop this BRM Plan are aligned to the key principles of *AS/NZS ISO 31000:2009 Risk management – Principles and guidelines* (AS/NZS ISO 31000:2009), as described in the Second Edition of the *National Emergency Risk Assessment Guidelines* (NERAG 2015). This approach is consistent with the policies of the State Emergency Management Committee, specifically State Emergency Management Policy 3.2– Emergency Risk Management Planning.

This BRM Plan is a strategic document that identifies assets at risk from bushfire and their priority for treatment. The Treatment Schedule sets out a broad program of coordinated multi-agency treatments to address risks identified in the BRM Plan. Government agencies and other land managers responsible for implementing treatments participate in developing the BRM Plan to ensure treatment strategies are collaborative and efficient, regardless of land tenure.

1.2   Aim and Objectives

The aim of the BRM Plan is to document a coordinated and efficient approach toward the identification, assessment and treatment of assets exposed to bushfire risk within the City of Kalamunda.

The objective of the BRM Plan is to effectively manage bushfire risk within the City of Kalamunda in order to protect people, assets and other things of local value. Specifically, the objectives of this BRM Plan are to:

- Guide and coordinate a tenure blind, multi-agency bushfire risk management program over a five-year period;
- Document the process used to identify, analyse and evaluate risk, determine priorities and develop a plan to systematically treat risk;
- Facilitate the effective use of the financial and physical resources available for bushfire risk management activities;
- Integrate bushfire risk management into the business processes of local government, land owners and other agencies;
- Ensure there is integration between land owners and bushfire risk management programs and activities;
- Monitor and review the implementation of treatments to ensure treatment plans are adaptable and risk is managed at an acceptable level.

1.3   Legislation, Policy and Standards

The following legislation, policy and standards were considered to be applicable in the development and implementation of the BRM Plan.

1.3.1   Legislation

- *Aboriginal Heritage Act 1972*
- *Biodiversity Conservation Act 2016*
- *Biodiversity Conservation Regulations 2018*

- *Building Act 2011*
- *Bush Fires Act 1954*
- *Bush Fires Regulations 1954*
- *Conservation and Land Management Act 1984*
- *Country Areas Water Supply Act 1947*
- *Emergency Management Act 2005*
- *Emergency Management Regulations 2006*
- *Environmental Protection Act 1986*
- *Environmental Protection and Biodiversity Conservation Act 1999 (cth)*
- *Fire and Emergency Service Act 1998*
- *Fire Brigades Act 1942*
- *Metropolitan Water Supply, Sewerage and Drainage Act 1909*
- *Planning and Development (Local Planning Scheme) Regulations 2015*

1.3.2   Policies, Guidelines and Standards

- AS 3959-2009 Construction of buildings in bushfire-prone areas
- AS/NZS ISO 31000:2009 - Risk management – Principles and guidelines
- Asset Protection Zone Standards (DFES)
- Bushfire Risk Management Planning – Guidelines for preparing a Bushfire Risk Management Plan (2015)
- Firebreak Location, Construction and Maintenance Guidelines (DFES)
- Guidelines for Planning in Bushfire Prone Areas (2017)
- Guidelines for Plantation Fire Protection (DFES 2011)
- National Emergency Risk Assessment Guidelines (NERAG) (Second Edition 2015)
- State Emergency Management Policy 2.5 - Emergency Management in Local Government Districts Local Arrangements
- State Emergency Management Policy 3.2 - Management of Emergency Risks Management Planning
- State Emergency Management Prevention and Mitigation Procedure 1 – Emergency Risk Management Planning
- State Emergency Preparedness Procedure 7 – Local Emergency Management Committee
- State Emergency Preparedness Procedure 8 – Local Emergency Management Arrangements
- State Hazard Plan for Fire (Interim)
- State Planning Policy 3.4: Natural Hazards and Disasters
- State Planning Policy 3.7: Planning in Bushfire Prone Areas
- Western Australian Emergency Risk Management Guidelines (OEM 2015)

1.3.3   Other Related Documents

- Bushfire Risk Management Planning Handbook (DFES)
- Bushfire Risk Management System (BRMS) User Guide (DFES)
- City of Kalamunda Bushfire Safety
- City of Kalamunda Environmental Land Use Planning Strategy 2019
- City of Kalamunda Fire Hazard Reduction Notice
- City of Kalamunda Local Biodiversity Strategy (under review)
- City of Kalamunda Local Environment Strategy 2019

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- City of Kalamunda Local Emergency Management Arrangements
- City of Kalamunda Local Planning Strategy 2010
- Code of Practice for Timber Plantations in Western Australia (Forest Products Commission 2006)
- National Statement of Capability for Fire and Emergency Services (AFAC 2015)
- National Strategy for Disaster Resilience
- Public Service Circular No. 88 Use of Herbicides in Water Catchment Areas (Dept. of Health 2007)

2.   The Risk Management Process

The risk management processes used to identify and address risk in this BRM Plan are aligned with the international standard for risk management, AS/NZS ISO 31000:2009, as described in NERAG (2015). This process is outlined in Figure 1 below.
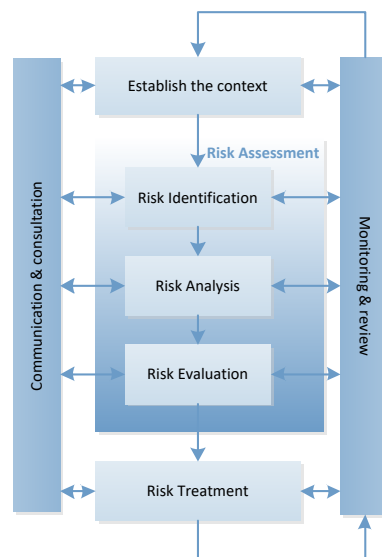
Figure 1 – An overview of the risk management process [1]

2.1   Roles and Responsibilities

Table 1 – Roles and Responsibilities

Stakeholder Name	Roles and Responsibilities
City of Kalamunda	- As custodian of the BRM Plan, coordination of the development and ongoing review of the integrated BRM Plan. - Negotiation of commitment from land owners to treat risks identified in the BRM Plan. - As treatment manager, implementation of treatment strategies. - As part of the approval process, submission of the draft BRM Plan to the Office of Bushfire Risk Management (OBRM) to review it for consistency with the Guidelines. - As part of the approval process, submission of the final BRM Plan to council for their endorsement and adoption.
Department of Fire and Emergency Services (DFES)	- Participation in and contribution to the development and implementation of BRM Plans, as per their agency responsibilities as the Hazard Management Agency for fire. - Support to local government through expert knowledge and advice in relation to the identification, prevention and treatment of bushfire risk. - Facilitation of local government engagement with state and federal government agencies in the local planning process.

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[1] Source: AS/NZS ISO 31000:2009, Figure 3, reproduced under SAI Global copyright Licence 1411-c083.

Stakeholder Name	Roles and Responsibilities
	▪ Undertake treatment strategies, including prescribed burning on behalf of Department of Lands for Unmanaged Reserves and Unallocated Crown Land within gazetted town site boundaries. ▪ In accordance with Memorandums of Understanding and other agreements, implementation of treatment strategies for other landholders.
Office of Bushfire Risk Management (OBRM)	▪ Ensure bushfire risk is managed in accordance with AS/NZS ISO 31000 and reporting on the state of bushfire risk across Western Australia. ▪ Review BRM Plans for consistency with the Guidelines prior to final endorsement by council.
Department of Biodiversity, Conservation and Attractions (DBCA)	▪ Participation in and contribution to the development and implementation of BRM Plans. ▪ Providing advice for the identification of environmental assets that are vulnerable to fire and planning appropriate treatment strategies for their protection. ▪ As treatment manager, implementation of treatment strategies on department managed land and for Unmanaged Reserves and Unallocated Crown Land outside gazetted town site boundaries. ▪ In accordance with Memorandums of Understanding and other agreements, implementation of treatment strategies for other landholders.
Other State and Federal Government Agencies -Refer to Appendix 1	▪ Assist the local government by providing information about their assets and current risk treatment programs. ▪ Participation in and contribution to the development and implementation of BRM Plans. ▪ As treatment manager, implementation of treatment strategies.
Public Utilities -Western Power -Water Corporation	▪ Assist the local government by providing information about their assets and current risk treatment programs. ▪ Participation in and contribution to the development and implementation of BRM Plans. ▪ As treatment manager, implementation of treatment strategies.
Corporations and Private Land Owners -Telstra	▪ As treatment manager, implementation of treatment strategies. ▪ Assist the local government by providing information about their assets and current risk treatment programs.
Other – Local knowledge, technical advice and Interested Parties -Refer to Appendix 1	▪ Participation in and contribution to the development and implementation of BRM Plans and treatment schedules. ▪ Providing advice for the identification of assets that are vulnerable to fire. ▪ Providing advice on appropriate treatment strategies for asset Protection.

2.2   Communication & Consultation

As indicated in Figure 1 (page 8), communication and consultation throughout the risk management process is fundamental to the preparation of an effective BRM Plan. To ensure appropriate and effective communication occurred with relevant stakeholders in the development of the BRM Plan, a *Communication Strategy* was prepared. The strategy is provided at **Appendix 1**.

3.   Establishing the Context

3.1   Description of the Local Government and Community Context

3.1.1   Strategic and Corporate Framework

The BRM Plan has been developed to document and establish strategies to assist in effectively undertaking risk assessments and planning and implementing mitigation treatments within the City of Kalamunda. The effectiveness of this plan for the City of Kalamunda will depend upon the engagement of multiple stakeholders, helping to educate and advise stakeholders of potential mitigation and treatment plans to reduce possible risk. In addition, the BRM Plan will be referenced and integrated into the City's strategic documents.

The City of Kalamunda has multiple Strategic and Corporate documents to assist with addressing bushfire management and safety. These main documents include *Kalamunda Advancing: Strategic Community Plan to 2027, Kalamunda Achieving: Corporate Business Plan 2018-2022* and the *Environmental Land Use Planning Strategy 2019.*

Kalamunda Advancing – Strategic Community Plan 2027

Kalamunda Advancing is the City's long-term strategic planning document, which outlines how the City will achieve the vision and aspirations of its community. It has a 10-year duration (2017 – 2027) and is subject to minor reviews every two years and major reviews every four years. The Plan is structured around four Strategic Priorities, which each contain an overall Outcome, a set of Objectives and Strategies, and related key performance indicators to measure the effectiveness of the Plan over time.

Kalamunda Achieving - Corporate Business Plan 2018-2022

This document is responsible for translating the strategic direction of the City into detailed actions that will be achieved through projects or service delivery programs. Kalamunda Achieving also draws together actions contained within the City's informing strategies and plans. The purpose of the Corporate Business Plan is to provide a medium-term overview of operational actions and priorities as a starting point for informing the annual planning and budgeting process. The objective in the business plan that outlines the City's responsibility to bushfire risk management is:

> **Objective 1.2** To provide safe and healthy environments for community to enjoy

> **Strategy 1.2.1** Facilitate a safe community environment

Activities included in **Strategy 1.2.1** include Implementing fire mitigation plans, enforcement of various local laws relating to fire prevention (City of Kalamunda Fire Hazard Reduction Notice), community bushfire readiness programs and other aspects of public safety including emergency services.

Environmental Land Use Planning Strategy 2019

The City of Kalamunda contains a high proportion of natural areas and remnant vegetation as compared to other Local Governments in Western Australia. This so called 'green infrastructure' informs the distinctive character of the area and is an asset that requires protection, preservation and management. The Bushfire Risk Management Plan will support an integral part of the **Environmental**

Land Use Planning Strategy 2019 Strategy by working to strengthen the City's capacity to achieve the following objective.

Bushfire - Objective		
1. To preserve, enhance, connect and rehabilitate natural areas and protect biodiversity values.		
Strategy	**Action**	**Timeline**
7.1 Where there is a conflict between bushfire guidelines and existing biodiversity values provide appropriate design alternatives to maintain effective ecosystem functions and resident safety.	7.2.1 Develop criteria within a vegetation protection local planning policy to outline performance objectives where biodiversity is seen to conflict with bushfire management requirements, with regard to State Planning Policy and guidelines.	**Priority:** High **Timeframe:** 1-2 years **Partners:** DFES. WAPC **Indicator:** Bushfire and biodiversity criteria incorporated as part of a vegetation protection policy.
7.2 Review the Biodiversity Strategy to consider any conflicts between biodiversity protection and the new bushfire requirements.	7.3.1 Prepare an updated Local Biodiversity Strategy to assess risk to biodiversity through implementation of the bushfire regulations and determine appropriate planning mechanisms for balancing biodiversity protection and protection of life and property.	**Priority:** High **Timeframe:** 1-2 years **Partners:** DFES. WAPC **Indicator:** Local Biodiversity Strategy updated and implemented.

Source: City of Kalamunda Environmental Land Use Planning Strategy.

The **Environmental Land Use Planning Strategy 2019** also references the impacts of climate change which will result in more frequent extreme weather events including bushfire. This may require future improvements to emergency management, infrastructure and built environments to accommodate weather conditions.

The Parks and Environmental Services is responsible for overseeing the preparation of the BRM Plan. The Directorates of Asset Services and Development Services are the responsible areas for its ongoing implementation. Accepting that there are multiple stakeholders inside and outside of the Local Government involved in the effective implementation of the BRM Plan process. The BRM Plan will be utilised in the review and refinement of existing works programs that are designed to reduce bushfire risk in the local government area.

3.1.2   Location, Boundaries and Tenure

The City of Kalamunda is a local government area within the eastern metropolitan region of Perth. The City is 24 kilometres east of the Perth CBD and encompasses an area of 324km². Bordering the east metropolitan region and the edge of the wheatbelt, the City encompasses a broad array of land usages and topography.
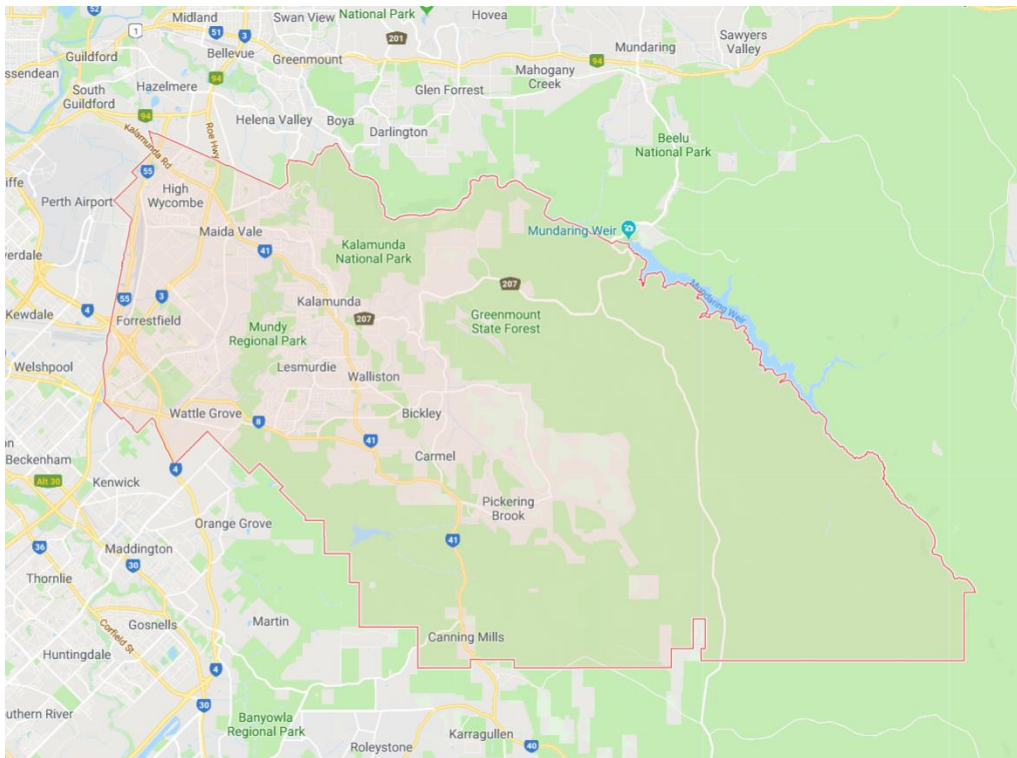
Figure 2 - Map showing the location of the City of Kalamunda

The City encompasses the Darling Scarp, Jarrah Forest, National Parks, residential housing, lifestyle blocks, Aged Care and Nursing Home facilities, Hospital, Industrial and Commercial zoning, many Orchards and hobby farms.

67% of the City's land is in conservation reserves and is comprised mainly of endemic vegetation, this area includes Bush Forever sites, Regional Parks and State Forest. These areas are managed by DBCA, this poses a challenge for the City as the management of this vegetation is not in the direct the control of the City.

The City has three distinct regions – The Foothills, The Escarpment and the Eastern Rural Districts (City of Kalamunda, 2018)

The Foothills – Located in closest proximity to the Perth CBD, the Foothills is bounded by the City of Swan to the North, City of Kalamunda to the East, Tonkin Highway and the City of Gosnell's to the South and Perth International Airport, City of Canning and City of Belmont to the West (idCommunity, 2018). The land area of the region is 45km² with the highest population density within the City of 8.18 persons per hectare (idCommunity, 2018) mainly living in urban areas/low density rural landscapes/small town areas dispersed throughout the vegetation/other description of how population occur in the landscape. Wetlands can be found in the low-lying areas of the Swan Coastal Plain with water levels interlinked to underling ground water levels. Areas experiencing expediential growth such as High Wycombe, Maida Vale and Wattle Grove. Mixture of new and old development, industrial and semi-rural lifestyle blocks. The Foothills are located within the planning area of Forrestfield.

The Escarpment – The Escarpment is nestled on the edge of the Darling Scarp, with a land area of 35km² with a population density of 5.81 persons per hectare (idCommunity, 2018) mainly living in urban areas/low density rural landscapes/small town areas dispersed throughout the vegetation/other description of how population occur in the landscape. The region is bounded by the City of Swan and Shire of Mundaring to the North, the City of Kalamunda Eastern Rural District to the East, City of Gosnell's to the South and the Foothills to the West (idCommunity, 2018). The Escarpment is located within the planning area of Lesmurdie.

The Eastern Rural District – The Eastern Rural District is primarily a rural area with some residential, semi-rural and industrial usage. Land area of the district is 205km² with a population density of 0.13 persons per hectare (idCommunity, 2018) mainly living in urban areas/low density rural landscapes/small town areas dispersed throughout the vegetation/other description of how population occur in the landscape. The region is located on the western edge of the Darling Plateau. A large proportion of the district is State Forest and water catchment areas. The district is bounded by the Shire of Mundaring to the North, to the East the Shire of Mundaring and the Shire of York, the City of Armadale to the South and City of Gosnell's and the Escarpment within the City of Kalamunda to the West (idCommunity, 2018). The Eastern Rural District is located within the planning area of Bickley and Pickering Brook.

Table 2 – Overview of Land Tenure and Management within the BRM Plan Area

Land Manager/Agency	Area (Ha)	% of Plan Area
Total Urban Area (housing & utilities)	8,273	26
Total Conservation Area	24,081	74
• **Bush Forever**	291	0.9
• **DBCA Conservation**	9,091	28.1
• **DBCA State Forest**	11,011	34
• **Regional Parks**	1,467	4.5
• **Local Natural Areas (City of Kalamunda managed)**	2,110	6.5

Source: City of Kalamunda Local Biodiversity Strategy

The City is responsible for safeguarding Local Natural Areas, some of which are in City reserves and some of which are on private land. The City also has responsibility for managing public open space reserves in the urban areas.

3.1.3   Population and Demographics

The City of Kalamunda is an emerging and growing Local Government within the Perth metropolitan region. The 2016 Census estimates a population forecast of 61,623 in 2019 and estimates the City's population to grow by 23.62% to a population total of 76,179 by 2036 (idCommunity, 2017). With the increase in population, the City needs to plan for the bushfires and associated risks within a growing population. A key aim of the City of Kalamunda is to deliver targeted education campaigns to improve residents' resilience to bushfire events.

The City of Kalamunda has an aging population with the greatest percentage of residents being aged between 65-69 years old (idCommunity, 2018). On average, the elderly community members are more fragile, have limited mobility, suffer from health conditions and/or require the care of others. Elderly population often have specific needs or requirements during evacuation, limited ability to prepare properties and lesser access to information. There is a need to ensure that elderly people have prepared evacuation plans specific to their situation.

The foothills areas included the suburbs of Forrestfield, Maida Vale, Wattle Grove and High Wycombe this area has greater access to Perth and tend to attract young families and couples which results in a higher level of young workers and babies/pre-schoolers." (idCommunity, 2017). This region within the City has experienced a 9.9% population increase between 2011 to 2016 (idCommunity). This region of the City is expected to have the most amount of residential growth within the next few years.

The escarpment encompassing Gooseberry Hill, Kalamunda, Lesmurdie and Walliston tend to attract retirees and mature families (idCommunity, 2017). Rural East Walliston comprises of Pickering Brook, Piesse Brook, Paulls Valley, Bickley, Carmel and Canning Mills. This area is primarily rural with land used for agriculture, tourism and lifestyle blocks.

Table 3 - Population and density by suburb within the City of Kalamunda

Suburb	Land area	Population	Percentage of the City	Population density person per ha
Forrestfield	17km²	13,274	22.36%	7.66
Gooseberry Hill	9km²	3,466	5.83%	3.87
High Wycombe	10km²	12,632	21.28%	12.08
Kalamunda	11km²	7,244	12.20%	6.81
Lesmurdie	14km²	8,570	14.43%	6.28
Maida Vale	8km²	4,635	7.85%	5.51
Raul East - Walliston	246km²	3,395	5.72%	0.14
Wattle Grove	9km²	6,134	10.33%	7.08

The City proposed an amendment to the Metropolitan Regional Scheme to rezone the Pickering Brook Town Site Expansion from Rural to Urban Zoning under Local Planning Scheme No.3. The proposal was refused due to an extreme bushfire hazard existing, making the location unsuitable and inappropriate for intensification.

There is the future development of Forrestfield North and the implementation of transport-oriented development with the construction of the Perth Airport link. Located on the Swan Coastal Plain, Bushfire risk is still prevalent due to proximity of the Darling Scarp.

The City of Kalamunda has a diverse demographic with vulnerabilities in certain profiles. The City of Kalamunda's Public relations, Fire Mitigation, Community Safety and Volunteer Bushfire brigade assist in addressing bushfire safety and management within the City. Programs such as hazard reduction, public consultation, education and bushfire ready programs assist. The City of Kalamunda and its community, to plan for and prepare their properties to be as defendable as possible in the event of a fire.

3.1.4 Economic Activities and Industry

The City of Kalamunda is near the Perth CBD and presents a number of tourism opportunities due to the character and nature of the City including scenic valleys, hobby farms, vineyards, restaurants and orchards.

Over the last 5 years, the City of Kalamunda visitor numbers have averaged 295,000 annually, 75% are day visitors. 22% are domestic overnight visitors and only 3% are international visitors. Some of the recreation and visitor related activities within the City that may increase bushfire ignitions include camping, off-road motor vehicle movement, illegal cigarette disposal and arson. Kalamunda is home

to the Northern Terminal of the world renowned Bibblumun Track, which may attract visitors to the region who are not familiar with the landscape or level of bushfire risk. Bushfires and smoke may negatively impact local agriculture and affect the Perth Hills wine region this said the City liaises with wine growers and orchardists to ascertain the appropriate seasons to conduct prescribed burns so not to affect crops. Large bushfires often result in lower visitor numbers to a region, which would impact the local economy and affect gross domestic product.

Based on the 2016 Australian Bureau of Statistics census, the top industry sectors of employment within the City of Kalamunda are Construction (10.4%), Health Care and Social assistance (10.4%), and Retail trade (9.2%). The Health Care and Social Assistance Industry is on a rise within the City due to the aging population and social assistance needs.

The City has numerous private and public education facilities which range from early learning centres to adult learning facilities. Many of these schools face high bushfire risk due to location, proximity to dense bushlands and the vulnerability of the occupants.

3.2   Description of the Environment and Bushfire Context

3.2.1   Topography and Landscape Features

There are three distinctive landscapes within the City of Kalamunda, being the Swan Coastal Plain, Darling Scarp and the Darling Plateau (Shire of Kalamunda, 1995). Each of these landscapes influences the fire risk differently.

The Coastal Plain comprises of the Foothills region of the City with "Low relief terrain made up of alluvial and aeolian deposits and includes the Forrestfield, Southern River and Guilford soil units" (Shire of Kalamunda, 1995, p. 2). Soils within the plain become more fertile on the eastern fringe of the Foothills. Wetlands are found in low lying areas on the Swan Coastal Plain and their water levels are usually interlinked to the underlying ground water levels. The main threat of bushfire for this region is that of an ember attack.

The Darling Scarp was created by the Darling Fault Line, one of the longest and most significant seismic faults in Australia. Landform characteristics of the Scarp have eroded over thousands of years. Due to this, landform characteristics include exposed granite, sands, gravel and quartzite.

The Darling Plateau, found within the Escarpment and Eastern Rural District, "is dominated by lateritic uplands and duricrust gravels and sand which form a gently undulating surface" (Shire of Kalamunda, 1995, p. 2). Extensive surface erosion has resulted in "steep sided valleys with bare granite faces and rounded hilltops" (Western Austalian Planning Commission, 2010, p. 17). Within the area there are many detached houses set back into the bush, with tall trees, rugged terrain, narrow roads with houses above/below the roads (idCommunity, 2018).

Topography has a significant effect on bushfire behaviour and its management. Steep valleys can create localised wind patterns which make predicting fire behaviour more challenging while also limiting access to the landscape which can reduce suppression efforts. Topography also affects bushfire behaviour with increased rates of spread, larger flame length and increased radiant heat when travelling up a slope. With these factors affecting bushfire behaviour and management, exposed assets in these areas are at increased likelihood of damage or loss. Table 5 shows some of the significant areas in the City of Kalamunda that are affected by slope.

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Table 4 - Locations and Degree of Elevation

Location	Suburb	Degree of Elevation
Hartfield Road/Sussey Road	Forrestfield	1.4° - 0.8° (Down Hill)
Evergreen Gove (The Hales Satterley Estate)	Forrestfield	1.6° - 1.8°
Kalamunda Road	High Wycombe	0.1° - 0.3°
Melaleuca Road/ Graelou Road	Lesmurdie	15.0° - 25.0°
Lesmurdie Falls	Lesmurdie	28.0°
Top of the Zig Zag (South)	Gooseberry Hill	15.0°
Middle of the Zig Zag	Gooseberry Hill	10.0°
Ocean View Parade	Gooseberry Hill	22°
Walnut Road	Bickley	9.1°-9.6°
Hummerston Road	Piesse Brook	15.0° - 25.0°
Glen Isla Road	Carmel	11.0° (Uphill) / 5.0°-12.0° (Downhill)
McCorkhill Road	Pickering Brook	5.0° - 10.0°
Paulls Valley Road	Paulls Valley	15.0°
Railway Parade	Kalamunda	5.0°

Water Catchment

There are two major water catchments areas within the City of Kalamunda. The first in the Coastal Plain/Scarp Catchments. This catchment occurs in the North Western area of the City and drains into the Swan River. High intensity fire can affect the water catchment in a detrimental way. As well as destroying the ground cover, hydrology, landscape behaviour, the soil erosion and chemical reactions triggered by the fire can release nutrients, toxins and minerals into the water catchment area (Commonwealth of Australia, 2016). The majority of the Darling Range Catchment within the City is gazetted as public water supply. There is a need to balance the bushfire risk in the water catchment with mitigation works to reduce the risk of landscape fires, the Department of Biodiversity Conservation and Attractions currently manage these areas with seasonal mosaic burns as part of their mitigation strategy.

Dams	*Wetland and Lake System*	*Wetland and Lake System*
Victoria Reservoir – Catchment area of 37km²	**Tomah Road Sump lands** – High Conservation (Seasonally inundated/ Basin)	**Crumpet Creek** – Kalamunda and Forrestfield
Bickley Pump back Dam	**Hartfield Park** – High Conservation (Dampland)	**Helena River** – Piesse Brook and Gooseberry Hill
Piesse Gully Sub-Catchment (61% of the long term average flow of the Helena River downstream to Mundaring Weir)	**Munday Swamp** – High Conservation (Lake/Sump land)	**Woodlupine Brook** – Forrestfield and Wattle Grove
	Forrestfield Palusplain Components – High Conservation	**Yule Brook** – Wattle Grove
		Toornart Creek – Gooseberry Hill
		Quenda Creek – Gooseberry Hill
		Posion Gully – Maida Vale
		Piesse Brook – Piesse Brook
		Nestle Brae Creek – Gooseberry Hill
		Lower Lesmurdie Falls – Forrestfield
		Kadina Brook – Gooseberry Hill and Maida Vale

FIGURE 6
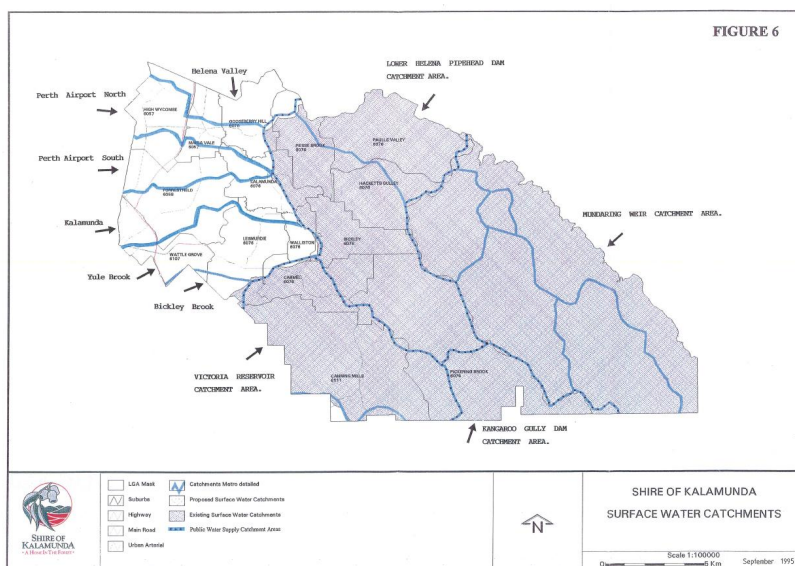
3.2.2 Climate and Bushfire Season

The City of Kalamunda has a dry Mediterranean climate consisting of hot, dry summers and mild, wet winters. Majority of the rainfall within the City falls from late autumn through to late spring. The average annual rainfall within the City is 1061.1mm per year (WeatherZone, 2018). December, January and February are the hottest months within the Perth metropolitan and when the risk of bushfire is at its highest. In summer, the City experiences strong easterly winds in the mornings, which change to a southerly wind during the afternoon. The City often experiences temperatures a few degrees cooler than Perth due to the southerly winds and elevation ranging from 10-400m above sea level.

Bushfire risk is determined by the combination of a number of factors including climatic conditions such as air temperature, relative humidity, wind speed and rainfall.

Climatic data provides an indication of fuel availability and predicted fire behaviour throughout the year, but in particular during the fire season. It is used to calculate the Fire Danger Index (FDI) daily,

which provides advice about the level of bushfire threat on a particular day under the forecast conditions. Increased bushfire threat is typically associated with very hot (above average temperatures), dry (less than 20% humidity), windy (above 12 – 15 Km per hour) conditions and high fuel loads. Figure 3 shows the Mean and Median temperature and rainfall for Kalamunda (weather station 3.6 km away).

Perth Metro (009225) 2019 Rainfall (millimetres)
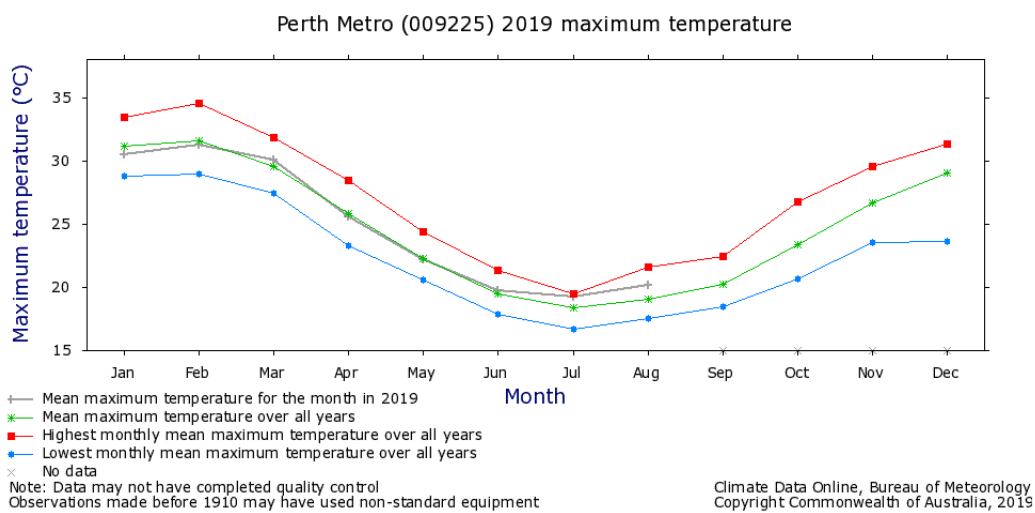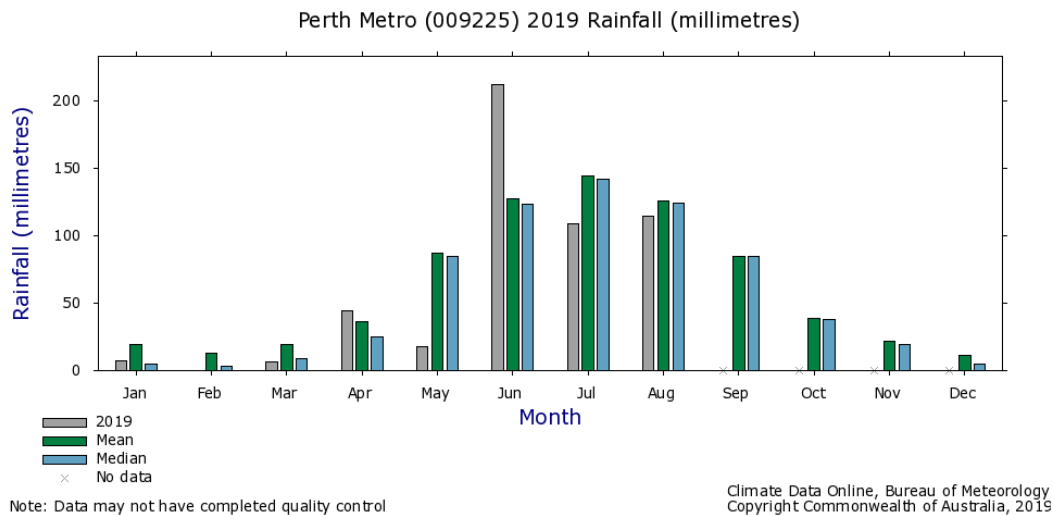

Perth Metro (009225) 2019 maximum temperature

Figure 3 - Kalamunda Annual Temperature and Rainfall (bureau of meteorology)

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Bushfire Season

The City of Kalamunda implements gazetted restricted burning times and prohibited burning times as per sections 17 and 18.

Restricted burning times, during which a permit to burn is required, begins 1 April to 31 May and also from 1 of October to 30 November. Prohibited burning times, during which no burning is permitted, begins 1 December to 31 March. This said these dates are dependent on seasonal weather conditions and are subject to change.

Table 5 - Key dates within the City of Kalamunda

FIRE BURNING Timetable*	
FIRE BREAK REQUIRED	1 November - 31 March
BURNING PROHIBITED	1 December - 31 March
PERMIT REQUIRED	1 October - 30 November 1 April - 31 May
BURNING PERMITTED	1 June - 30 September

3.2.3   Vegetation

Broad vegetation types found within the City of Kalamunda provide an overview of the major fuels that will influence fire behaviour in the region and indicate potential rates of spread and spotting distances. This assists in evaluating the likely influence proposed mitigation activities and treatments will have on the overall risk rating for an asset. Vegetation types also determine the suitability, timing and frequency for mitigation treatments such as prescribed burns.

There are eleven vegetation complexes (Heddle et al. 1980) occurring within the City of Kalamunda. Vegetation complexes group vegetation types on the basis of patterns in soil and geomorphology. The eleven vegetation complexes and their locations within the BRM Plan area are briefly summarised in Table 7. Each vegetation complex will influence potential fire behaviour based on its unique vegetation structure, fuel loading and the slope under the vegetation.

Table 6 - Vegetation (Heddle et al. 1980)

Vegetation Type	Hectares in City Of Kalamunda
Fringing woodland with localized occurrence of low open forest	32.02
Low open woodland to sedgelands	54.04
Open Forest to tall open forest and woodland	78.01
Open forest to heath and herbland to lichens	691.96
Low open woodland to lichens	1612.00
Open forest to fringing woodland	1706.17
Open forest and fringing woodland	1811.69
Open woodland	2331.88
Open forest and woodland to heath and herbland to lichens	2844.95
Open forest to woodland	3936.38
Open forest	17479.41
Total Hectares	32578.51

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Figure 4 - City of Kalamunda Vegetation Structure (Heddle 1980)

Environmental Considerations – Flora and Fauna

Within the City there is a several number of threatened flora and fauna that would be affected in the event of a bushfire. This is where the species are protected under the identifiable threat of extinction. There are 14 species within the City that have been listed under state or federal legislation, these are as listed below.

Birds
- o Baudin's Cockatoo / *Calyptorhynchus baudinii*
- o Carnaby's Black Cockatoo / *Calyptorhynchus latirostris*
- o Forest Red-tailed Black Cockatoo / *Calyptorhynchus banksia naso*
- o Peregrine Falcon / *Falco peregrinus*

Mammals
- o Chuditch / *Dasyurus geoffroii*
- o Brush-tailed Phascogale */ Phascogale tapoatafa ssp*

Reptiles
- o Carpet Python / *Morelia spilota imbricta*

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Plants

- o *Acacia anomala* - Grass Wattle
- o *Acacia aphylla* - Leafless Rock Wattle
- o *Conospermum undulatum* - Wavy-leaved Smokebush
- o *Darwinia apiculata* - Scarp Darwinia
- o *Banksia mimica* - Summer Honeypot
- o *Lasiopetalum pterocarpum* - Wing-fruited Lasiopetalum
- o *Macarthuria keigheryi* - Keighery's Macarthuria

There are also several threatened ecological communities within the City of Kalamunda. To be classed as a threatened ecological community, they must be assessed by the Federal and State Governments and assigned a threat status. The City has ecological communities listed under the *Environmental Protection and Biodiversity Conservation (EPBC) Act 1999* and the State *Biodiversity Conservation Act 2016.*

- o *Banksia attenuata* woodland over species-rich dense shrublands **(Endangered)**
- o Shrublands and woodlands of the eastern side of the Swan Coastal Plain **(Critically Endangered)**
- o *Eucalyptus calophylla – Kingia australis* woodlands on heavy soils of the Swan Coastal Plain **(Critically Endangered)**
- o *Eucalyptus Calophylla – Xanthorrhoea preissi* shrublands and woodlands on Swan Coastal Plain **(Critically Endangered)**
- o Southern Wet Shrublands, Swan Coastal Plain **(Endangered)**
- o Central Northern Darling Scarp Granite Shrubland Communities

On City managed lands, the City performs proactive fire mitigation works through numerous processes including inspections, hazard reduction burning, spraying of invasive weeds and slashing that are focussed on implementing an effective, risk-based planning land use to preserve life and reduce the impact of fire on property and infrastructure. An annual program of inspecting all reserves within the city is performed by the Fire Mitigation Crew prior to the restricted burn seasons. From this review, works are allocated to other areas of Parks & Environment for review in preparation for the annual fire season as well being used by the City's Fire Mitigation Crew for its annual works program. Maintaining a balance between bushfire prevention and protection, and biodiversity is an area that must be addressed on individual merit. In some cases, interpretation of the legislation has caused unnecessary clearing of native vegetation on private land that could have been alternatively managed at reasonable fuel levels to comply with bushfire requirements. As such the City is endeavouring to provide education and resources to best inform residents of their options when it comes to protecting lives and assets, and ensuring the environment is reasonably managed.

3.2.4 Bushfire Frequency and Causes of Ignition

A report provided by DFES' Operational Information System Branch identifies that from the period starting 1 July 2007 to 30 June 2018, there have been a total of 1,253 landscape fire ignitions within the City of Kalamunda, at an average of 125 per year, which can be seen in Table 9. The number of ignitions has trended downward since 2010/11 by an average of 19 less per year. The 2017/2018 period saw 71 landscape fire ignitions, which is 37 ignitions less than the 2016/2017 financial year and 29 ignitions below the previous 5 year average of 100 fires. This downward trend may be attributed to any number of factors, ranging from differences in weather/seasonal conditions, to increased community awareness, targeted arson programs and improved reporting. It does not however prompt a lesser need to plan and prepare for bushfire events.

As seen in Table 7, 43.1% of all ignitions across the City are suspicious/deliberately lit (541) and is the most common cause. Cigarettes (111), undetermined causes (89), reigniting of previous fires (106), cause unreported (46) and other open flames or fire (160) combined account for another 32% of all ignitions.

Table 7 - City of Kalamunda Landscape Ignition Data Summary Years 2007/08-2017/18 (DFES)

Bushfire Ignition Cause	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	Total
Total Number of Bushfires:	136	131	137	144	101	105	97	119	104	108	71	1253
Burn off fires	5	6	5	7	5	2	6	7	7	15	6	**71**
Campfires/bonfires/outdoor cooking	0	5	0	2	2	1	2	0	0	2	1	**15**
Children misadventure	1	1	0	0	1	0	0	0	1	0	0	**4**
Cigarette	10	3	11	2	2	2	16	9	22	12	22	**111**
Electrical distribution (excl. power lines)	2	3	2	2	0	0	2	0	0	0	0	**11**
Equipment - Mechanical or electrical fault	0	0	3	0	1	1	0	0	0	0	0	**5**
Equipment - Operational deficiency	0	0	1	0	1	0	1	0	1	0	0	**4**
Fireworks/flares	0	0	1	0	0	1	0	0	0	0	0	**2**
Heat from other hot objects or friction	1	0	0	0	0	0	0	0	0	0	0	**1**
Hot works (grinding, cutting, drilling etc..)	1	0	1	0	1	1	0	0	3	0	1	**8**
Human Error (Left on, knock over, unattended etc.)	0	0	0	0	1	0	0	2	1	1	1	**6**
Improper Fuelling/Cleaning/Storage/Use of material ignited	0	0	0	0	0	0	1	1	0	0	0	**2**
Other open flames or fire	15	19	19	20	19	24	12	12	5	10	5	**160**
Power lines	1	1	0	1	2	1	3	0	3	1	1	**14**
Reignition of previous fire	9	7	13	26	5	9	8	3	9	11	6	**106**
Sleeping/Alcohol/Drugs/Physical-Mental impairment	0	0	0	0	0	0	0	1	0	1	1	**3**
Suspicious/Deliberate	76	73	59	48	34	43	35	57	40	49	27	**541**
Undetermined	11	5	17	23	14	8	7	2	1	1	0	**89**
Unreported	2	6	3	5	9	2	3	13	2	1	0	**46**
Vehicles (incl. Farming Equipment/Activities)	1	0	1	1	0	3	0	0	0	0	0	**6**
Weather Conditions - Lightning	0	1	0	1	1	1	0	6	6	0	0	**16**
Weather Conditions (High winds, natural combustion etc. Excludes Lightning)	0	1	1	6	3	6	1	6	3	3	0	**30**
Yard maintenance, hand held equipment	1	0	0	0	0	0	0	0	0	1	0	**2**

4.   Asset Identification and Risk Assessment

4.1   Planning Areas

The City of Kalamunda has been divided into four planning areas as specified earlier. These areas included Forrestfield (Foothills), Lesmurdie (The Escarpment), Bickley (Eastern Rural District) and Pickering Brook (Eastern Rural District). Attached at **Appendix 2** is a map showing the boundaries of the planning areas identified within the City of Kalamunda. Each of the planning area's unique attributes are discussed in following sections.

Forrestfield Planning Area: The Forrestfield planning area encompasses Forrestfield, Wattle Grove, High Wycombe and Maida Vale. A large proportion of the area is suburban, single residential housing, ranging between R-Codes 2.5 to 60. R-Codes are predominantly R20, R25 and R30, requiring a minimum lot size of 270 to 440sqm. Dual Coding is also available to facilitate a better development outcome. Topography within the Planning area is predominantly flat. The degree of elevation within the Foothills ranges between 0.8° - 1.8°. Vegetation within the area can be described as grassland and woodlands. Banksia Woodlands are common within the planning area. Wetlands and lake systems can be found in the area. The four wetlands are all classed as high conservation status (Tomah Road Sumplands), Hartfield Park (Dampland), Munday Swamp (Lake/Sumpland) and Forrestfield Palusplain Components (Palusplain).

Figure A – Hawtin Road, Forrestfield

Figure B – 'The Hales', Forrestfield

Figure C – Kalamunda Road, High Wycombe

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Pickering Brook Planning Area

Planning within the area has a variety of different zonings – from Lifestyle/Special Rural. These lot sizes range from a minimum of 1 hectare to Rural Agricultural, Rural Conservation or special interest all having a 6-hectare minimum lot size.

Located within the Darling Plateau, the landscape is characterised by rolling, hilly landscapes and highlands with major valleys along the scarp.

Current land usage includes that of lifestyle blocks. Orchards, Restaurants and low residential housing within the Pickering Brook town site (R2.5)

Vegetation within the planning area consists of open Jarrah and Marri Forest with a mixture of Yarri (WA Blackbutt). Given the vegetation within the zone, it is crucial that fire risk is accounted for. A recent proposed amendment to the Pickering Brook town site was refused as an extreme bushfire hazard existing making the location unsuitable and inappropriate for intensification.
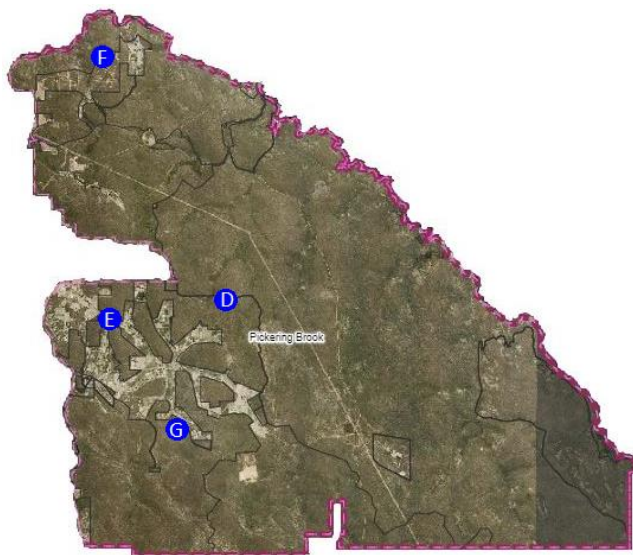
Figure D – Walnut Road, Bickley

Figure E – Glenisla Road, Bickley

Figure F – Paulls Valley Road, Paulls Valley

Figure G – McCorkhill Road, Pickering Brook

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Lesmurdie Planning Area

The Lesmurdie Planning area comprises primarily of residential properties and the Kalamunda Town site. Recent planning amendments included the introduction of dual zoning within the precinct. Dual zoning ranges from R10/20, R20/40 and R30/40 (along with zonings of R20 and R40). The remaining residential areas within the planning area are R Codes between 2.5 to R10, showing the low residential density within the City. Located on the edge of the Darling Scarp. The degree of elevation within the area ranges between 5.0° - 28.0°. Vegetation present includes open heath shrubland, open forest and woodlands. Residents located on the Scarp identify with the lifestyle of 'a home in the forest'. Mitigation within these areas can prove difficult as the Residents wish to see the vegetation stay the same.

Figure H – Melaleuca Road, Lesmurdie

Figure I – Lesmurdie Falls, Lesmurdie

Figure J – Zig Zag Scenic Drive, Gooseberry

Figure K – Lascelles Parade, Gooseberry Hill

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Bickley Planning Area

Located on the Darling Scarp, the Bickley planning area comprises of low density residential housing, lifestyle blocks and National Parks. Zoning ranges from R2.5 to R20.

Topography of the landscape is rolling valleys with steep granite outcrops ranging in gradient of 15.0° - 22.0°. Vegetation in the planning zone consists of open forest and woodlands.

A major bushfire risk within the area is the limit of access to the forest in the case of a Fire.

Figure L – Hummerston Road, Piesse Brook

Figure M – Hummerston Road, Piesse Brook

Figure N – Ocean View Parade, Gooseberry Hill

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4.1.1   Priorities for Asset Identification and Assessment

The *Planning Area Assessment Tool* was applied to each planning area to determine the priorities for asset identification and assessment. Using the tool, each planning area was rated against six risk factors, with the highest scoring planning area being the first priority for asset identification and risk assessment.

Assets were identified and assessed in each planning area, based on the results of the planning area assessment outlined in the following table.

Table 8 - Planning Area Assessment Summary

Risk Factor	Forrestfield	Lesmurdie	Bickley	Pickering Brook
1. % of LG Population in Planning Area	160	80	20	20
2. Fuel Structures	40	80	100	100
3. Assets	80	80	60	40
4. Rural Urban Interface	40	60	80	80
5. Suppression response times	20	20	20	20
6. Suppression strategies	80	80	40	40
TOTAL	420	400	320	300
PRIORITY	1	2	3	4

4.2   Asset Identification

Asset identification and risk assessment has been conducted at the local level using the methodology described in the Guidelines. Identified assets have been mapped, recorded and assessed in the Bushfire Risk Management System (BRMS). Identified assets are categorised into the following subcategories:

Table 9 - Asset Categories and Subcategories

Asset Category	Asset Subcategories
Human Settlement	• **Residential areas** Rural urban interface areas and rural properties. • **Places of temporary occupation** Commercial, mining and industrial areas located away from towns and population centres (that is, not adjoining residential areas). • **Special risk and critical facilities** Hospitals, nursing homes, schools and childcare facilities, tourist accommodation and facilities, prison and detention centres, government administration centres and depots, incident control centres, designated evacuation centres, police, fire and emergency services.
Economic	• **Agricultural** Pasture, grazing, livestock, crops, viticulture, horticulture and other farming infrastructure.

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Asset Category	Asset Subcategories
	• **Commercial and industrial** Major industry, waste treatment plants, mines, mills and processing and manufacturing facilities and cottage industry. • **Critical infrastructure** Power lines and substations, water and gas pipelines, telecommunications infrastructure, railways, bridges, port facilities and waste water treatments plants. • **Tourist and recreational** Tourist attractions and recreational sites that generate significant tourism and/or employment within the local area. • **Commercial forests and plantations** • **Drinking water catchments**
Environmental	• **Protected** Rare and threatened flora and fauna, ecological communities and wetlands. • **Priority** Fire sensitive species and ecological communities. • **Locally important** Nature conservation and research sites, habitats, species and communities, areas of visual amenity.
Cultural	• **Aboriginal heritage** Places of indigenous significance. • **Recognised heritage** Assets afforded legislative protection through identification by the National Trust, State Heritage List or Local Planning Scheme Heritage List. • **Local heritage** Assets identified in a Municipal Heritage Inventory or by the community. • **Other** Other assets of cultural value, for example community centres and recreation facilities.

4.3   Assessment of Bushfire Risk

Risk assessments have been undertaken for each asset or group of assets identified using the methodology described in the Guidelines.

The percentage of assets within the local government in each asset category at the time of BRM Plan endorsement is shown in the following table.

Table 10 - Asset Category Proportions

Asset category	Proportion of identified assets
Human Settlement	80.75%
Economic	13.87%
Environmental	0.22%
Cultural	5.16%

4.3.1   Likelihood Assessment

Likelihood is described as the chance of a bushfire igniting, spreading and reaching an asset. The approach used to determine the likelihood rating is **the same for each asset category**: Human Settlement, Economic, Environmental and Cultural.

There are four possible likelihood ratings: almost certain, likely, possible, and unlikely.

Table 11 - Likelihood Ratings

Likelihood Rating	Description
Almost Certain (Sure to Happen)	• Is expected to occur in most circumstances; • High level of recorded incidents and/or strong anecdotal evidence; and/or • Strong likelihood the event will recur; and/or • Great opportunity, reason or means to occur; • May occur more than once in 5 years.
Likely (Probable)	• Regular recorded incidents and strong anecdotal evidence; and /or • Considerable opportunity, reason or means to occur; • May occur at least once in 5 years.
Possible (feasible but < probable)	• Should occur at some stage; and/or • Few, infrequent, random recorded incidents or little anecdotal evidence; and/or • Some opportunity, reason or means to occur.
Unlikely (Improbable, not likely)	• Would only occur under exceptional circumstances.

4.3.2   Consequence Assessment

Consequence is described as the outcome or impact of a bushfire event. The approach used to determine the consequence rating is **different for each asset category**: Human Settlement, Economic, Environmental and Cultural.

There are four possible consequence ratings: minor, moderate, major and catastrophic.

Table 12 - Consequence Ratings

Consequence Rating	Descriptions
Minor	• No fatalities. • Near misses or minor injuries with first aid treatment possibly required. • No persons are displaced. • Little or no personal support (physical, mental, emotional) required. • Inconsequential or no damage to an asset, with little or no specific recovery efforts required beyond the immediate clean-up. • Inconsequential or no disruption to community. • Inconsequential short-term failure of infrastructure or service delivery. (Repairs occur within 1 week, service outages last less than 24 hours.) • Inconsequential or no financial loss. Government sector losses managed within standard financial provisions. Inconsequential business disruptions.
Moderate	• Isolated cases of serious injuries, but no fatalities. Some hospitalisation required, managed within normal operating capacity of health services.

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Consequence Rating	Descriptions
	• Isolated cases of displaced persons who return within 24 hours. • Personal support satisfied through local arrangements. • Localised damage to assets that is rectified by routine arrangements. • Community functioning as normal with some inconvenience. • Isolated cases of short to mid-term failure of infrastructure and disruption to service delivery. (Repairs occur within 1 week to 2 months, service outages last less than 1 week.) • Local economy impacted with additional financial support required to recover. Government sector losses require activation of reserves to cover loss. Disruptions to businesses lead to isolated cases of loss of employment or business failure. • Isolated cases of damage to environmental or cultural assets, one-off recovery efforts required, but with no long term effects to asset.
Major	• Isolated cases of fatalities. • Multiple cases of serious injuries. Significant hospitalisation required, leading to health services being overstretched. • Large number of persons displaced (more than 24 hours duration). • Significant resources required for personal support. • Significant damage to assets, with ongoing recovery efforts and external resources required. • Community only partially functioning. Widespread inconvenience, with some services unavailable. • Mid to long-term failure of significant infrastructure and service delivery affecting large parts of the community. Initial external support required. (Repairs occur within 2 to 6 months, service outages last less than a month.) • Local or regional economy impacted for a significant period of time with significant financial assistance required. Significant disruptions across industry sectors leading to multiple business failures or loss of employment. • Significant damage to environmental or cultural assets that require major rehabilitation or recovery efforts. • Localised extinction of native species. This may range from loss of a single population to loss of all of the species within the BRM Plan area (for a species which occupies a greater range than just the BRM Plan area).
Catastrophic	• Multiple cases of fatalities. • Extensive number of severe injuries. • Extended and large number requiring hospitalisation, leading to health services being unable to cope. • Extensive displacement of persons for extended duration. • Extensive resources required for personal support. • Extensive damage to assets that will require significant ongoing recovery efforts and extensive external resources. • Community unable to function without significant support.

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Consequence Rating	Descriptions
	• Long-term failure of significant infrastructure and service delivery affecting all parts of the community. Ongoing external support required. (Repairs will take longer than 6 months, service outages last more than 1 month.) • Regional or State economy impacted for an extended period of time with significant financial assistance required. Significant disruptions across industry sectors leading to widespread business failures or loss of employment. • Permanent damage to environmental or cultural assets. • Extinction of a native species in nature. This category is most relevant to species that are restricted to the BRM Plan area, or also occur in adjoining areas and are likely to be impacted upon by the same fire event. 'In nature' means wild specimens and does not include flora or fauna bred or kept in captivity.

The methodology used to determine the consequence rating for each asset category is based on the following:

- **Consequence Rating - Human Settlement Assets**
  The outcome or impact of a bushfire event on the asset, or a group of assets, measured by the hazard posed by the classified vegetation and the vulnerability of the asset.

- **Consequence Rating - Economic Assets**
  The outcome or impact of a bushfire event on the asset, or a group of assets, measured by the hazard posed by the classified vegetation and the vulnerability of the asset.

- **Consequence Rating - Environmental Assets**
  The outcome or impact of a bushfire event on the asset, or a group of assets, measured by the vulnerability of the asset and the potential impact of a bushfire or fire regime.

- **Consequence Rating - Cultural Assets**
  The outcome or impact of a bushfire event on the asset, or a group of assets, measured by the hazard posed by the classified vegetation and the vulnerability of the asset.

4.3.3   Assessment of Environmental Assets

Using available biological information and fire history data, environmental assets with a known minimum fire threshold were assessed to determine if they were at risk from bushfire, within the five year life of the BRM Plan. Environmental assets that would not be adversely impacted by bushfire within the five-year period have not been included and assessed in the BRM Plan. The negative impact of a fire on these assets (within the period of this BRM Plan) was determined to be minimal and may even be of benefit to the asset and surrounding habitat.

4.3.4   Local Government Asset Risk Summary

A risk profile for the local government is provided in the summary table below. This table shows the proportion of assets at risk from bushfire in each risk category at the time the BRM Plan was endorsed.

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Table 13 - Local Government Asset Risk Summary

Risk Rating / Asset Category	Low	Medium	High	Very High	Extreme
Human Settlement	14%	6%	10%	15%	35%
Economic	2%	3%	2%	3%	3%
Environmental			0.5%	0.5%	
Cultural	2%	1%	1%	1%	1%
Total	**18%**	**10%**	**13.5%**	**19.5%**	**39%**

5.   Risk Evaluation

5.1   Evaluating Bushfire risk

The risk rating for each asset has been assessed against the likelihood and consequence descriptions to ensure:

- The rating for each asset reflects the relative seriousness of the bushfire risk to the asset;
- Likelihood and consequence ratings assigned to each asset are appropriate; and
- Local issues have been considered.

5.2   Treatment Priorities

The treatment priority for each asset has been automatically assigned by BRMS, based on the asset's risk rating. Table 15 shows how likelihood and consequence combine to give the risk rating and subsequent treatment priority for an asset.

Table 14 - Treatment Priorities

Consequence / Likelihood	Minor	Moderate	Major	Catastrophic
Almost certain	3D (High)	2C (Very High)	1C (Extreme)	1A (Extreme)
Likely	4C (Medium)	3A (High)	2A (Very High)	1B (Extreme)
Possible	5A (Low)	4A (Medium)	3B (High)	2B (Very High)
Unlikely	5C (Low)	5B (Low)	4B (Medium)	3C (High)

5.3   Risk Acceptability

Risks below a certain level were not considered to require specific treatment during the life of this BRM Plan. They will be managed by routine local government wide controls and monitored for any significant change in risk.

In most circumstances risk acceptability and treatment will be determined by the land owner, in collaboration with local government and fire agencies. However, as a general rule, the following courses of action have been adopted for each risk rating.

Table 15 - Criteria for Acceptance of Risk and Course of Action

Risk Rating	Criteria for Acceptance of Risk	Course of Action
Extreme (Priorities 1A, 1B, 1C)	Only acceptable with excellent controls. Urgent treatment action is required.	Routine controls are not enough to adequately manage the risk. Immediate attention required as a priority. Specific action is required in first year of BRM Plan. Existing controls do not provide sufficient protection. Existing treatment strategies must be reviewed, and additional treatments should be implemented urgently. Specific action(s) required in the first 2 years of BRM Plan. Treatments will be approached by: • Priorities will be made for treatments that will have maximum benefit to multiple assets and critical infrastructure • Identification of partnerships with other agencies for strategic mitigation • Communication with asset owners will be as per the Communications Plan and focus on increasing understanding of the risk facing these assets.
Very High (Priorities 2A, 2B, 2C)	Only acceptable with excellent controls. Treatment action is required.	Routine controls are not enough to adequately manage the risk. Specific action will be required during the period covered by the BRM Plan.
High (Priorities 3A, 3B, 3C, 3D)	Only acceptable with adequate controls. Treatment action may be required.	Specific action may be required. Risk may be managed with routine controls and monitored annually.
Medium (Priorities 4A, 4B, 4C)	Acceptable with adequate controls. Treatment action is not required but risk must be monitored regularly.	Specific action may not be required. Risk may be managed with routine controls and monitored periodically throughout the life of the BRM Plan.

Low (Priorities 5A, 5B, 5C)	Acceptable with adequate controls. Treatment action is not required, but risk must be monitored	Need for specific action is unlikely. Risk will be managed with routine controls and monitored as required.

6.   Risk Treatment

The purpose of risk treatment is to reduce the likelihood of a bushfire occurring and/or the potential impact of a bushfire on the community, economy and environment. This is achieved by implementing treatments that modify the characteristics of the hazard, the community or the environment.

There are many strategies available to treat bushfire risk. The treatment strategy (or combination of treatment strategies) selected will depend on the level of risk and the type of asset being treated. Not all treatment strategies will be suitable in every circumstance.

6.1   Local Government-Wide Controls

Local government-wide controls are activities that reduce the overall bushfire risk within the City of Kalamunda These types of treatments are not linked to specific assets and are applied across all or part of the local government as part of normal business or due to legislative requirements. The following controls are currently in place across the City of Kalamunda:

- *Bush Fires Act 1954* Section 33 notices, including applicable fuel management requirements, firebreak standards and annual enforcement programs undertaken by the City's Compliance and Emergency Liaison team;
- Declaration and management of Prohibited Burn Times, Restricted Burn Times and Total Fire Bans for the local government;
- Public education campaigns and the use of P&W and DFES state-wide programs, tailored to suit local needs - Including Community Bushfire Ready Groups facilitated by local volunteers, the City of Kalamunda and DFES; and distribution of promotional messages, flyers and consultation activities;
- State-wide arson prevention programs developed in conjunction with WA Police and DFES;
- State planning framework and local planning schemes, implementation of appropriate land subdivision and building standards in line with DFES, Department of Planning and Building Commission policies and standards;
- Monitoring performance against the BRM Plan and reporting annually to the local government council and OBRM.
- Vegetation management and annual works programs undertaken by the City of Kalamunda, State agencies and other land managers, including:
  - o Water Corporation Bushfire Risk Mitigation Program - Assessment and management of Water Corporation sites within the City of Kalamunda by Water Corporation staff. (Risk mitigation works on 'High' to 'Extreme' risk sites are communicated to City of Kalamunda once complete);
  - o The City of Kalamunda Parks and Environment team annual works programs – fuel management undertaken on the City's lands and reserves;
  - o DFES' annual mitigation program for Unallocated Crown Land and Unmanaged Reserves within gazetted town site boundaries, undertaken on behalf of the Department of Planning, Lands and Heritage;

o   The Department of Biodiversity, Conservation and Attractions annual mitigation works programs - includes mechanical works and prescribed burns (known works are captured in the Bushfire Risk Management Plan's Treatment Schedule via BRMS);

o   Western Power's annual vegetation management and asset inspection activities in 'Extreme' and 'High' bushfire zones as identified in their Bushfire Risk Management Plan.

A multi-agency work plan has been developed and is attached at **Appendix 4.** The plan details work to be undertaken as a part of normal business, to improve current controls or to implement new controls to better manage bushfire risk across the local government.

6.2   Asset-Specific Treatment Strategies

Asset-specific treatments are implemented to protect an individual asset or group of assets, identified and assessed in the BRM Plan as being at risk from bushfire. There are six asset specific treatment strategies:

- **Fuel management** - Treatment reduces or modifies the bushfire fuel through manual, chemical and prescribed burning methods;
- **Ignition management** - Treatment aims to reduce potential human and infrastructure sources of ignition in the landscape;
- **Preparedness** - Treatments aim to improve access and water supply arrangements to assist firefighting operations;
- **Planning** - Treatments focus on developing plans to improve the ability of firefighters and the community to respond to bushfire; and
- **Community Engagement** - Treatments seek to build relationships, raise awareness and change the behaviour of people exposed to bushfire risk.
- **Other** - Local government-wide controls, such as community education campaigns and planning policies, will be used to manage the risk. Asset-specific treatment is not required or not possible in these circumstances.

6.3   Determining the Treatment Schedule

Efforts will be made to finalise the Treatment Schedule within six months of this BRM Plan being endorsed by council. The Treatment Schedule will be developed in broad consultation with land owners and other stakeholders.

Land owners are ultimately responsible for treatments implemented on their own land. This includes any costs associated with the treatment and obtaining the relevant approvals, permits or licences to undertake an activity. Where agreed, another agency may manage a treatment on behalf of a land owner. However, the onus is still on the land owner to ensure treatments detailed in this BRM Plan are completed.

7.   Monitoring and Review

Monitoring and review processes are in place to ensure that the BRM Plan remains current and valid. These processes are detailed below to ensure outcomes are achieved in accordance with the *Communication Strategy* and *Treatment Schedule*.

7.1   Review

A comprehensive review of this BRM Plan will be undertaken at least once every five years, from the date of council endorsement. Significant circumstances that may warrant an earlier review of the BRM Plan include:

- Changes to the BRM Plan area, organisational responsibilities or legislation;
- Changes to the bushfire risk profile of the area; or
- Following a major fire event.

7.2   Monitoring

BRMS will be used to monitor the risk ratings for each asset identified in the BRM Plan and record the treatments implemented. Risk ratings are reviewed on a regular basis. New assets will be added to the *Asset Risk Register* when they are identified.

7.3   Reporting

The City of Kalamunda will submit an annual report to OBRM each year summarising progress made towards implementation of the BRM Plan.

8.   Glossary

Asset   A term used to describe anything of value that may be adversely impacted by bushfire. This may include residential houses, infrastructure, commercial, agriculture, industry, environmental, cultural and heritage sites.

Asset Category   There are four categories that classify the type of asset – Human Settlement, Economic, Environmental and Cultural.

Asset Owner   The owner, occupier or custodian of the asset itself. Note: this may differ from the owner of the land the asset is located on, for example a communication tower located on leased land or private property.

Asset Register   A component within the Bushfire Risk Management System used to record the details of assets identified in the Bushfire Risk Management Plan.

Asset Risk Register   A report produced within the Bushfire Risk Management System that details the consequence, likelihood, risk rating and treatment priority for each asset identified in the Bushfire Risk Management Plan.

Bushfire   Unplanned vegetation fire. A generic term which includes grass fires, forest fires and scrub fires both with and without a suppression objective.[2]

Bushfire Hazard   The hazard posed by the classified vegetation, based on the vegetation category, slope and separation distance.

Bushfire Management Plan   A document that sets out short, medium and long term bushfire risk management strategies for the life of a development.[3]

Bushfire risk management   A systematic process to coordinate, direct and control activities relating to bushfire risk with the aim of limiting the adverse effects of bushfire on the community.

Consequence   The outcome or impact of a bushfire event.

Draft Bushfire Risk Management Plan   The finalised draft Bushfire Risk Management Plan (BRM Plan) is submitted to the OBRM for review. Once the OBRM review is complete, the BRM Plan is called the 'Final BRM Plan' and can be progressed to local government council for endorsement.

Emergency Risk Management Plan   A document (developed under *State Emergency Management Policy and Procedures*) that describes how an organisation(s) intends to undertake the activities of emergency risk management based on minimising risk. These

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[2] Australasian Fire and Emergency Service Authorities Council 2012, *AFAC Bushfire Glossary*, AFAC Limited, East Melbourne.
[3] Western Australian Planning Commission 2015, *State Planning Policy 3.7: Planning in Bushfire Prone Areas*, WAPC, Perth.

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	plans help inform the ongoing development of Local Emergency Management Arrangements (LEMA) and Westplan.
Geographic Information System (GIS)	A data base technology, linking any aspect of land-related information to its precise geographic location.[4]
Geographic Information System (GIS) Map	The mapping component of the Bushfire Risk Management System. Assets, treatments and other associated information is spatially identified, displayed and recorded within the GIS Map.
Land Owner	The owner of the land, as listed on the Certificate of Title; or leaser under a registered lease agreement; or other entity that has a vested responsibility to manage the land.
Likelihood	The chance of something occurring. In this instance, the chance of a bushfire igniting, spreading and reaching the asset.
Locality	The officially recognised boundaries of suburbs (in cities and larger towns) and localities (outside cities and larger towns).
Planning Area	A geographic area determined by the local government which is used to provide a suitable scale for risk assessment and stakeholder engagement.
Priority	See Treatment Priority.
Recovery Cost	The capacity of an asset to recover from the impacts of a bushfire.
Responsible Person	The person responsible for planning, coordinating, implementing, evaluating and reporting on a risk treatment.
Risk acceptance	The informed decision to accept a risk, based on the knowledge gained during the risk assessment process.
Risk analysis	The application of consequence and likelihood to an event in order to determine the level of risk.
Risk assessment	The systematic process of identifying, analysing and evaluating risk.
Risk evaluation	The process of comparing the outcomes of risk analysis to the risk criteria in order to determine whether a risk is acceptable or tolerable.
Risk identification	The process of recognising, identifying and describing risks.

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[4] Landgate 2015, *Glossary of terms*, Landgate, Perth

Risk Manager	The organisation or individual responsible for managing a risk identified in the Bushfire Risk Management Plan; including review, monitoring and reporting.
Risk Register	A component within the Bushfire Risk Management System used to record, review and monitor risk assessments and treatments associated with assets recorded in the Bushfire Risk Management Plan.
Risk treatment	A process to select and implement appropriate measures undertaken to modify risk.
Rural	Any area where in residences and other developments are scattered and intermingled with forest, range, or farm land and native vegetation or cultivated crops.[5]
Rural Urban Interface (RUI)	The line or area where structures and other human development adjoin or overlap with undeveloped bushland.[6]
Slope	The angle of the ground's surface measured from the horizontal.
Tenure Blind	An approach where multiple land parcels are considered as a whole, regardless of individual ownership or management arrangements.
Treatment	An activity undertaken to modify risk, for example a prescribed burn.
Treatment Objective	The specific aim to be achieved or action to be undertaken, in order to complete the treatment. Treatment objectives should be specific and measurable.
Treatment Manager	The organisation, or individual, responsible for all aspects of a treatment listed in the Treatment Schedule of the Bushfire Risk Management Plan, including coordinating or undertaking work, monitoring, reviewing and reporting.
Treatment Priority	The order, importance or urgency for allocation of funding, resources and opportunity to treatments associated with a particular asset. The treatment priority is based on an asset's risk rating.
Treatment Schedule	A report produced within the Bushfire Risk Management System that details the treatment priority of each asset identified in the Bushfire Risk Management Plan and the treatments scheduled.

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[5] Australasian Fire and Emergency Service Authorities Council 2012, *AFAC Bushfire Glossary*, AFAC Limited, East Melbourne
[6] Australasian Fire and Emergency Service Authorities Council 2012, *AFAC Bushfire Glossary*, AFAC Limited, East Melbourne

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|		
Treatment Strategy	The broad approach that will be used to modify risk, for example fuel management.	
Treatment Type	The specific treatment activity that will be implemented to modify risk, for example a prescribed burn.	
Vulnerability	The susceptibility of an asset to the impacts of bushfire.	

9.   Common Abbreviations

APZ	Asset Protection Zone
BRM Plan	Bushfire Risk Management Plan
BRMP	Bushfire Risk Management Planning
BRMS	Bushfire Risk Management System
CALD	Culturally and Linguistically Diverse
DBCA	Department of Biodiversity, Conservation and Attractions
DEMC	District Emergency Management Committee
DFES	Department of Fire and Emergency Services
ERMP	Emergency Risk Management Plan
FFDI	Forest Fire Danger Index
FMP	Fire Management Plan
GFDI	Grassland Fire Danger Index
GIS	Geographic Information System
HSZ	Hazard Separation Zone
JAFFA	Juvenile and Family Fire Awareness
LEMA	Local Emergency Management Arrangements
LEMC	Local Emergency Management Committee
LG	Local Government
LMZ	Land Management Zone
OBRM	Office of Bushfire Risk Management
SEMC	State Emergency Management Committee
SLIP	Shared Land Information Platform
WAPC	Western Australian Planning Commission
WP	Western Power

Appendices

1   Communication Strategy
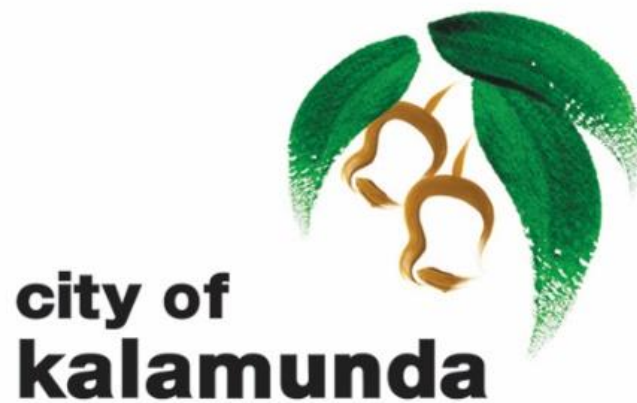
Bushfire Risk Management Planning

Communication Strategy

Document Control

Document Name	Bushfire Risk Management Plan Communications Strategy	Current Version	1.0
Document Owner	City of Kalamunda CEO	Issue Date	
Document Location	City of Kalamunda	Next Review Date	

Related Documents

Title	Version	Date
City of Kalamunda Bushfire Risk Management Plan	1.0	

1   INTRODUCTION

A Bushfire Risk Management Plan (BRM Plan) is a strategic document that outlines the approach to the identification, assessment and treatment of assets exposed to bushfire risk within the City of Kalamunda. This Communication Strategy accompanies the BRM Plan for the City of Kalamunda. It documents the communication objectives for the BRM Plan, roles and responsibilities for communication, key stakeholders, target audiences and key messages at each project stage, communication risks and strategies for their management, and communication monitoring and evaluation procedures.

2   COMMUNICATIONS OVERVIEW

Communication Objectives

The communication objectives for the development, implementation and review of the BRM Plan for the City of Kalamunda are as follows:

1. Key stakeholders understand the purpose of the BRM Plan and their role in the bushfire risk management planning process.
2. Stakeholders who are essential to the bushfire risk management planning process, or can supply required information, are identified and engaged in a timely and effective manner.
3. Relevant stakeholders are involved in decisions regarding risk acceptability and treatment.
4. Key stakeholders engage in the review of the BRM Plan as per the schedule in place for the local government area.
5. The community and other stakeholders engage with the bushfire risk management planning process and as a result are better informed about bushfire risk and understand their responsibilities to address bushfire risk on their own land.

Communication Roles and Responsibilities

City of Kalamunda is responsible for the development, implementation and review of the Communication Strategy. Key stakeholders support local government by participating in the development and implementation of the Communications Strategy as appropriate. An overview of communication roles and responsibilities follows:

- CEO, City of Kalamunda, responsible for endorsement of the BRM Plan Communications Strategy.
- Director, Communications and Media Team City of Kalamunda, responsible for external communication with the local government area.
- Bushfire Risk Management Planning Coordinator, City of Kalamunda, responsible for operational-level communication between the Shire and the Department of Fire and Emergency Services.

Key Stakeholders for Communication

The following table identifies key stakeholders in bushfire risk management planning. These are stakeholders that are identified as having a significant role or interest in the planning process or are likely to be significantly impacted by the outcomes.

Stakeholder	Role or interest	Level of impact of outcomes	Level of engagement
Department of Biodiversity, Conservation and Attraction	Major landholder, environmental assets	Med	Inform, Collaborate
Department of Planning, Lands and Heritage	Major landholder, environmental assets	Med	Inform, Collaborate
DFES	Major land manager	Med	Inform, Collaborate
State Housing Authority	Major landholder	Med	Inform, Collaborate
Landcorp	Major landholder	Med	Inform, Collaborate
Main Roads Western Australia	Major landholder, critical infrastructure	Med	Inform, Collaborate
Private Developers	Major landholder	Med	Inform, Educate, Collaborate
Water Corporation	Major landholder, critical infrastructure	Med	Inform, Collaborate
Western Power	Major landholder, critical infrastructure	Med	Inform, Collaborate
Community			
Private Land Owners (Residential, Special Residential, Rural, Special Rural, Commercial, Industrial)	Landholder, Human Settlement	High	Inform, Educate, Collaborate
Community Groups and Community Interest Groups			
Kalamunda Environmental Advisory Committee	Interested Party	Med	Inform, Educate, Collaborate
City of Kalamunda Friends of Groups	Interested Party	Med	Inform, Educate, Collaborate
Kanyana Wildlife Rehab Centre	Interested Party	Med	Inform, Educate, Collaborate
Local Government			
City of Kalamunda	Project Owner, major land owner	High	Inform
City of Swan	Neighbouring LGA	Low	Inform
Shire of Mundaring	Neighbouring LGA	Low	Inform
City of Belmont	Neighbouring LGA	Low	Inform
Shire of York	Neighbouring LGA	Low	Inform
City of Canning	Neighbouring LGA	Low	Inform
City of Gosnell's	Neighbouring LGA	Low	Inform

City of Armadale	Neighbouring LGA	Low	Inform
Shire of Beverley	Neighbouring LGA	Low	Inform
Volunteer Fire Brigades, State Emergency Service and Bushfire Ready Groups			
Kalamunda Volunteer Bushfire Brigade	Interested Party	Med	Inform, Collaborate
Kalamunda Volunteer Fire and Rescue Brigade	Interested Party	Med	Inform, Collaborate
Kalamunda State Emergency Service	Interested Party	Med	Inform, Collaborate
Bushfire Ready Groups	Interested Party's	Med	Inform, Collaborate

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Communications Plan

Timing of Communication	Stakeholder (s)	Communication Objective(s)	Communication Method	Key Message or Purpose	Responsibility	Identified Risks to Communication	Strategy to Manage Risks	Monitoring and Evaluation Method
Development of the BRM Plan								
What is the timeframe or date for this communication?	*Who is the stakeholder(s) or target audience?*	*Which communication objective(s) does this activity support or achieve?*	*How are you communicating (e.g. email, meetings) and how often? What resources are required?*	*What is the key message or purpose that needs to be understood?*	*Who is responsible for planning and undertaking the communication activity?*	*What could reduce the effectiveness of the communication?*	*What will be done to reduce the likelihood of this happening?*	*How will you know if your communication was successful?*
Life of Plan	City of Kalamunda CEO, Senior Leadership Team and Staff	All (1 – 5)	Emails Meetings City Website and Intranet	Informed Consulted Accountable or responsible Review and input into Plan	Senior Bushfire Mitigation Officer	Time constraints No clear message Incorrect audience	Careful planning and time management	Feedback, questions and level of support received
Life of Plan	Bushfire Advisory Committee (BFAC)	All (1 – 5)	Meetings Face to Face (presentations in council chambers)	Engaged in process of BRM Plan Treatment Schedule and Risk Analysis	Senior Bushfire Mitigation Officer	Plan not complete Treatments not negotiated Time constraints	Prepare presentation for each BFAC Give updates as required	Feedback, treatments negotiated and supported by committee
Life of Plan	BFB and FRS Captains	All (1 – 5)	Meetings to be organised as required	Engaged in process of BRM Plan Identify Risk, and share information	Senior Bushfire Mitigation Officer	Time constraints No plan Availability of volunteers	Availability of volunteers	Feedback, support for BRM Plan Process Engaged

| Life of Plan	Home Owners Land Managers & Interest groups or businesses	1 & 2	Media (Newspaper) City Website Face to face meetings Community workshops and forums	Inform of the BRM Plan process Identify valued assets Identify existing controls	Senior Bushfire Mitigation Officer Senior Fire and Emergency management officer.	Media not reaching majority Workshops and forums could get abstracted by other agendas	Newspaper and website details Chair meetings with strict agenda and purpose	Engaged throughout process Feedback received Success of outcomes
Life of Plan	State Agencies, Service providers and other Stakeholders (WP, WC, National Trust etc.)	All (1 – 5)	Emails Face to Face Meetings Telephone	Inform of BRM Plan process Identify assets at risk Identify existing controls/programs	Senior Bushfire Mitigation Officer	Time constraints and travel Level of interest and engagements in process	Select appropriate channel of communication Prepare materials and good planning	Engaged throughout process Feedback received Success of outcomes
Implementation of the BRM Plan								
Life of Plan	City of Kalamunda CEO, Senior Leadership Team and Staff	All (1 – 5)	Emails Meetings City Website and Intranet	Informed Consulted Accountable or responsible Review and input into Plan.	Senior Bushfire Mitigation Officer	Time constraints Availability Lack of understanding Budget (for LG mitigation)	Careful planning and time management Clear purpose Clear communication and regular updates	Feedback, questions and level of support received
Life of Plan	Bushfire Advisory Committee (BFAC)	All (1 – 5)	Meetings Face to Face (presentations in council chambers	Report on progress to plan Report issues/constraints	Senior Bushfire Mitigation Officer	Poor communication from stakeholders and LG on completion of works	Collate data and report on success to plan Compliance to plan	Feedback, treatments negotiated and supported by committee

| **Life of Plan** | Stakeholder groups | All (1 – 5) | Emails Website Telephone | Informed, consulted, accountable or responsible. Review and input into Plan. Progress to plan | Senior Bushfire Mitigation Officer

Senior Fire and Emergency management officer | Availability Located out of local/district area Commitment lost | Well planned and executed sharing of information Negotiations conducted | Good feedback received on works |
|---|---|---|---|---|---|---|---|---|
| **Review of the BRM Plan** | | | | | | | | |
| | City of Kalamunda CEO, Councillors and Staff OBRM, SBMO & LG Council | All (1 – 5) | Meetings Emails | Review, Monitor and Reporting Endorse plan Compliance to plan and acceptance of risk | Senior Bushfire Mitigation Officer | Poor reporting and recording of information Review not completed by BRMB and OBRM | Senior Bushfire Mitigation Officer to record data and information appropriately Approved by OBRM for LG | Feedback from Council received Work completed as a result of plan Good reporting |

2 Planning Area Map
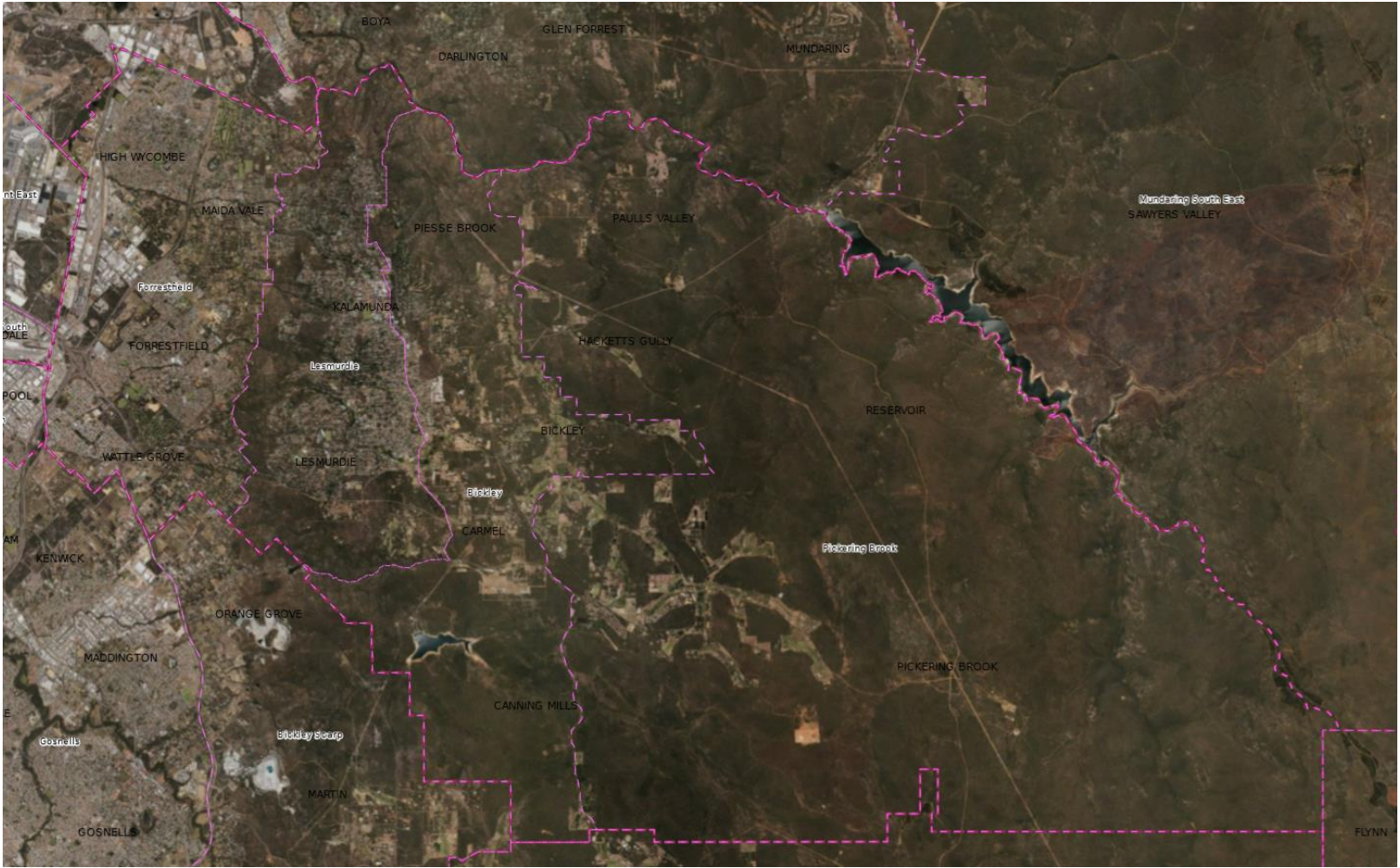
3   Bushfire Prone Map
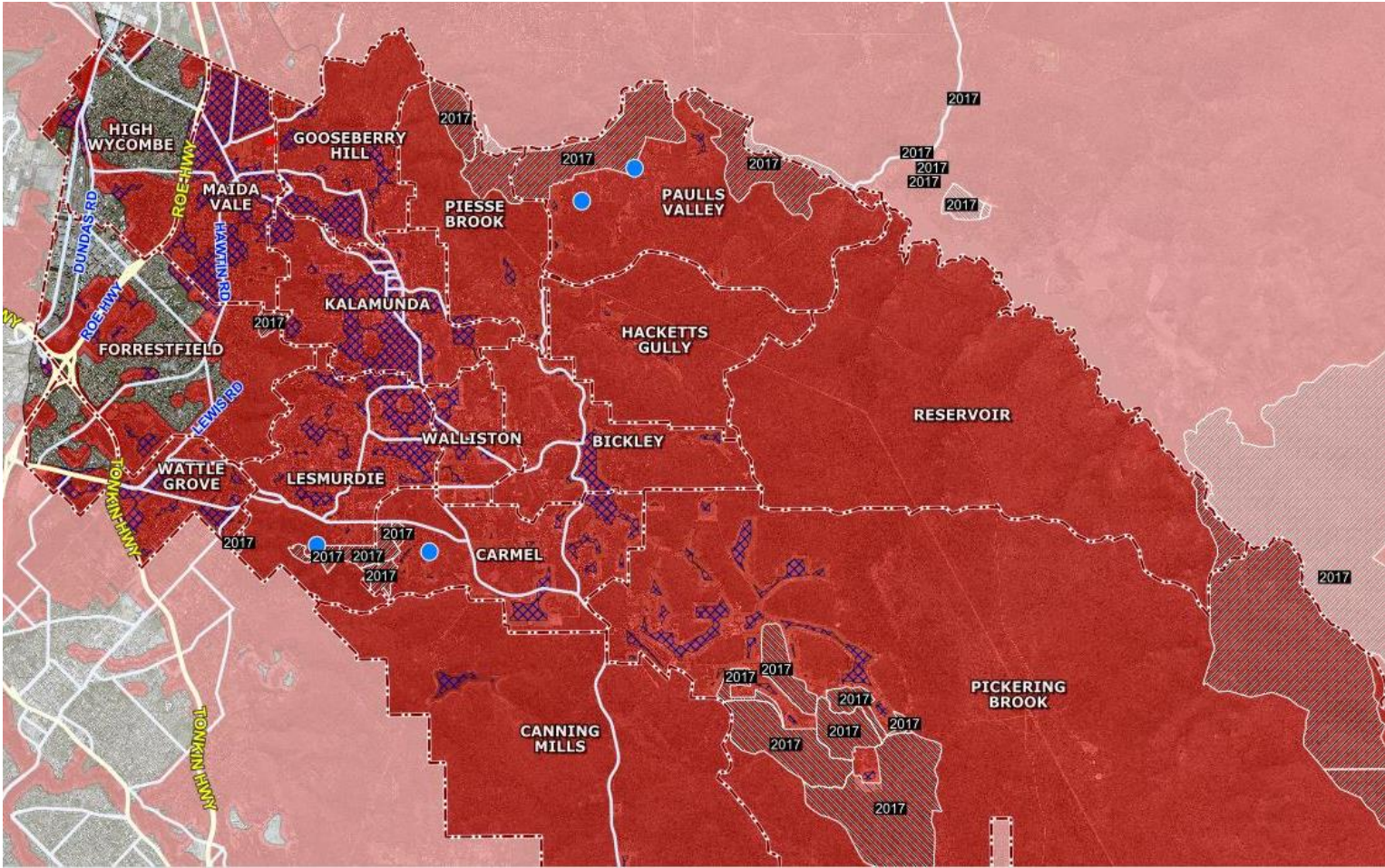
3   Treatment Schedule

As per Attached Treatment Schedule

4   Local Government-Wide Controls, Multi-Agency Treatment Work Plan

	Control	Action or Activity Description	Lead Agency	Other Stakeholder(s)	Notes and Comments
1	City of Kalamunda Bushfire Risk Management Plan 2019 – 2024	BRM Plan extreme and very high risks priority for treatment	DFES & Local Government	DFES and landowners/managers	Implementation of risk mitigation treatments
		Maintain and refine BRM Plan	Local Government	DFES and landowners/managers	Maintenance of BRM Plan and BRMS. BRM Plan performance monitoring and reporting progress to local government council and OBRM
2	Bush Fire Act 1954	Annual Firebreak Notice published	Local Government	-	Ensuring compliance with Annual Fire Control Notice, Fire Management Plans and other required works (i.e. issuing of infringement notices, work orders, abatement notices and education letters)
		Review of Annual Firebreak Notice		-	Review the effectiveness of the Annual Fire Control Notice
		Annual inspection target		-	Implementation of any changes to the Annual Fire Control Notice
		Burning on Crown Land		DFES	Continued liaison with land managers to ensure mitigation treatments are applied where required
		Total fire bans, prohibited and restricted burning times		DFES	Enforcing restrictions where required or deemed necessary
3	State Planning Policy 3.7: Planning in Bushfire Prone Areas Planning and Development (Local Planning Scheme) Regulations 2015 Australian Standard 3959 – Construction of Buildings in Bushfire-Prone Area	Implementation and compliance with SPP3.7 and the Bushfire Protection Criteria of the Guidelines for Planning in Bushfire Prone Areas where required	Local Government	WAPC	State planning framework and local planning schemes, implementation of appropriate subdivision and building standards in line with DFES, WAPC and Building Commission policies, guidelines and standards
4	City of Kalamunda Parks and Environment and		Local Government	-	

	Control	Action or Activity Description	Lead Agency	Other Stakeholder(s)	Notes and Comments
	Compliance and Emergency Liaison annual works	Management of road reserves, public open space and other local government owned lands.			Includes the reduction of fuels through various annual works programs such as slashing, clearing, burning or chemical application. The installation of firebreaks
5	DFES UCL/UMR land management	Preparedness, mitigation work conducted and lands owned by DoL and managed by DFES	DFES	Local Government and Local Fire Brigades	
6	Department of Biodiversity, Conservation and Attractions Annual Prescribed Burn Program	DBCA have an indicative burn program that is published on their website. Yearly plans are available	DBCA	DFES and Local Government	Plans can be accessed via the DBCA website
7	Department of Biodiversity, Conservation and Attractions mitigation works	DBCA conduct mulching and other mechanical treatments to reduce fuel load or provide fire access	DBCA	DFES and Local Government	No Formal plans exists however, works are completed as required, upon request or when identified
8	Water Corporation Bushfire Risk Management Program	Water Corporation is the custodian of a Bushfire Risk Management Plan that identifies areas for risk reduction treatment	Water Corporation	DFES and Local Government	High to Extreme risk areas are identified and treatments planned. Treatments and risk assessments are available through Water Corp Bushfire Risk Management department. Some risks have been identified in the City of Kalamunda for treatment.
9	Western Power annual asset inspection and vegetation management program	Western Power is the custodian of a Bushfire Risk Management Plan that identifies and prioritises areas for bushfire risk reduction treatments to be implemented.	Western Power, Private Landowners	DFES and Local Government	Areas of the City of Kalamunda have been identified as high bushfire risk by WP resulting in the prioritised mitigation program that endeavours to complete asset inspection and vegetation management works within a time period annually to reduce risk.
10	Main Roads	Main Roads have road 'Design Objectives', 'Design Requirements' and 'Design Considerations' that incorporate management objectives	Main Roads	DFES and Local Government	The management objectives for Main Roads landscaping and revegetation zones includes removal of hazards, maintaining clearances to utilities, weed control and fire control. All of which may be acknowledged and utilised when implementing bushfire risk reduction strategies.

	Control	Action or Activity Description	Lead Agency	Other Stakeholder(s)	Notes and Comments
		for landscaping and revegetation zones.			
11	State-wide arson prevention programs	Police infringement and reward schemes to prevent arson. Also various awareness campaigns and available information packages	DFES, WAPOL	Local Government	Utilisation of the Bush Fire Act 1954, Criminal Code 444 & 554. Programs developed by DFES and WAPOL such as Bushfire season 'Are You Ready?' Campaign and Bushfire Action Month. Prepare Act Survive information package.
12	Bushfire Ready Groups and Community Education	Community workshops and targeted education programs	Local Government	-	City of Kalamunda Officers participate as required, distributing information and educating residents.

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