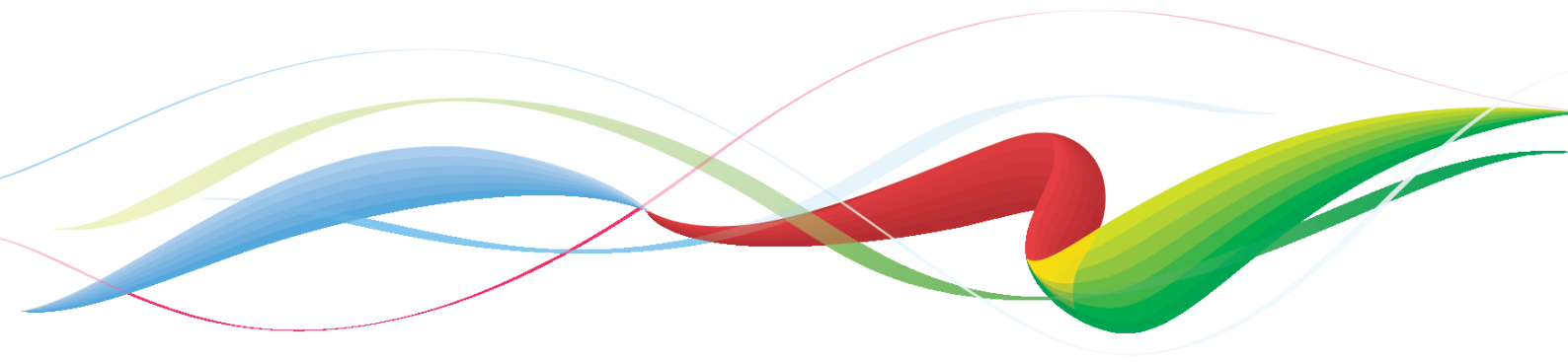


Bushfire Risk Management Plan



2021 - 2026

DISCLAIMER

This Bushfire Risk Management Plan has been produced by the City of Armadale in good faith, and is derived from sources believed to be reliable and accurate at the time of publication. Nevertheless, the reliability and accuracy of information cannot be guaranteed and the City of Armadale expressly disclaims any liability for any act or omission done or not done in reliance on the information and for any consequences whether direct or indirect arising from such omission.

BUSHFIRE RISK MANAGEMENT PLAN

v1.1 Endorsed by:
Tim McNaught | Director
Office of Bushfire Risk Management (OBRM)

10 February 2022


.....
Approved by Council
Resolution Number: CS3/2/22

28 February 2022

The City of Armadale Council approves the Bushfire Risk Management Plan (BRM Plan) which has been reviewed, assessed and approved by the Office of Bushfire Risk Management (OBRM) as compliant with the standard for bushfire risk management planning in Western Australia and the Guidelines for Preparing a Bushfire Risk Management Plan.

The City of Armadale is the owner of this document and has responsibility, as far as is reasonable, to manage the implementation of the BRM Plan on land under its care and control, and facilitate the implementation of bushfire risk management treatments by risk owners. The endorsement of the BRM Plan by the City of Armadale Council satisfies their endorsement obligations under the *State Hazard Plan – Fire* (formerly WESTPLAN Fire).

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AMENDMENT RECORD

#	Amendment Date	Amendment Details	Author / Amended By
v1.0	28 April 2020	OBRM approval A/ Director ORBM G. DANIEL	Chief Bushfire Control Officer D. COLE
v1.1	10 February 2022	OBRM re-approval Director ORBM T. McNAUGHT	Manager Ranger and Emergency Services R. PORTER
v1.2	28 February 2022	Council endorsed	Emergency Services Coordinator C. COMER

DOCUMENT CONTROL

Document Name	Bushfire Risk Management Plan	Current Version	v1.2
Document Custodian	City of Armadale Coordinator Emergency Management	Issue Date	28 February 2022
Location	CD/28075/21		

REVIEW

Following endorsement by Council, the City of Armadale Emergency Services Coordinator (ESC) and the DFES District Bushfire Risk Management Officer – Perth South (BRMO), are jointly responsible for developing, reviewing and facilitating the implementation of the BRM Plan.

The content of the BRM Plan is under review on an ongoing basis with revised versions of the plan to be presented to Council for endorsement as required. While the requirement is for the BRM Plan to be reviewed, and therefore presented to Council every five years it may be prudent for Council to be more involved in the review process within that timeframe.

Given that the State government is constantly reviewing relevant guidelines, a full review of this plan will commence as soon as it is endorsed with a revised version of the BRM Plan to be presented to Council on the completion of that review. This immediate review represents a commitment from the City to update its BRM Plan against the Department of Fire and Emergency Services Guidelines for Preparing a Bushfire Risk Management Plan (Guidelines) that are current at the time of commencing the review, incorporating the updated templates for preparing a BRM Plan, Communication Strategy, Local Government-Wide Controls and Multi-Agency Treatment Work Plan.

The review and update process will follow the established approval process as identified in the current Guidelines and shown below:



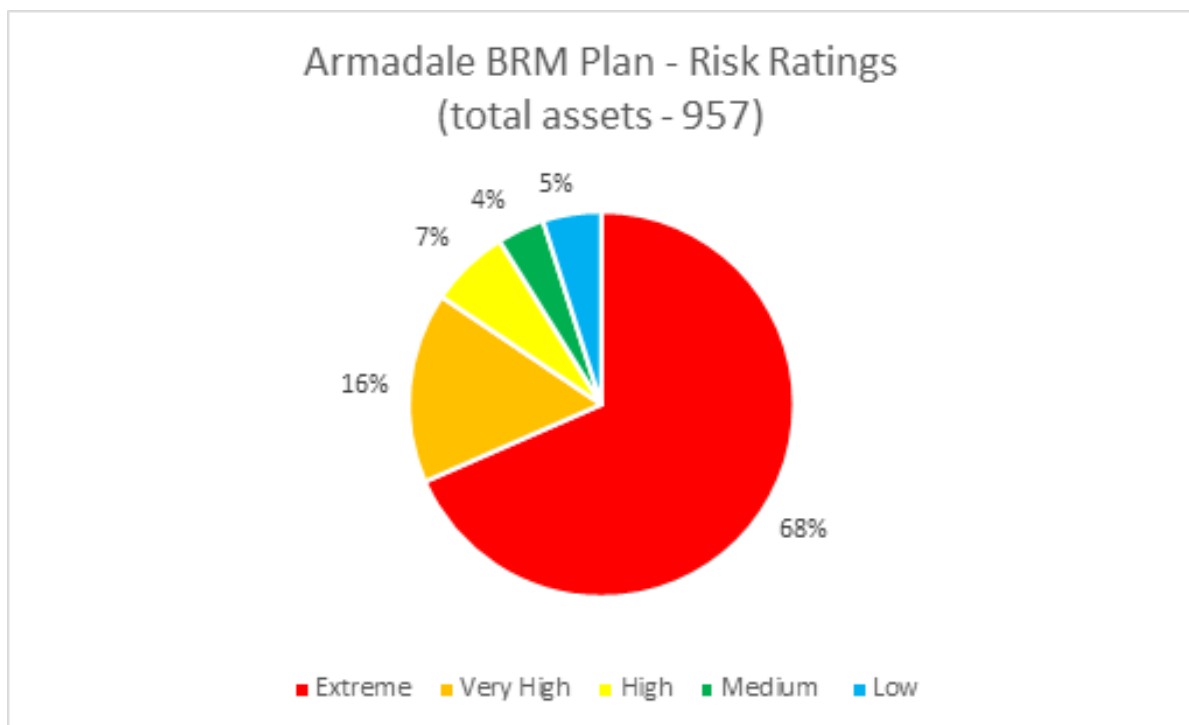
BUSHFIRE RISK MANAGEMENT PLAN

Executive Summary

Under the *State Hazard Plan – Fire*, local governments with significant bushfire risk are required to develop an integrated Bushfire Risk Management Plan (BRM Plan) outlining a strategy to treat bushfire-related risk across all land tenure.

A quality assurance review of the City of Armadale bushfire risks was conducted by the Department of Fire and Emergency Services (DFES) Superintendent - South East Region in January 2020. The City of Armadale received a risk rating that is the highest in the state. The graph below indicates the following:

- 68% of assets and / or asset groupings¹ within the City of Armadale are an extreme bushfire risk
- 16% of assets and / or asset groupings within the City of Armadale are a very high bushfire risk
- 7% of assets and / or asset groupings within the City of Armadale are a high bushfire risk
- **91% of assets and / or asset groupings within the City of Armadale are a high to extreme bushfire risk**



The City of Armadale Bushfire Risk Management Plan has been prepared in accordance with the DFES Office of Bushfire Risk Management (OBRM) *Guidelines for Preparing a Bushfire Risk Management Plan* (Guidelines) applicable at the time of OBRM endorsement. The Guidelines describe the process and requirements for identifying and assessing bushfire-related risk and preparing a BRM Plan. This BRM Plan has been written in the standard format template developed by DFES for use by all local governments, using *Australian / New Zealand Standard 31000:2009 Risk management – Principles and Guidelines*.

The initial development of the City's BRM Plan commenced in 2018, in conjunction with identifying the requirements for the state-wide Bushfire Risk Management System (BRMS). The BRMS is used to record and map assets, undertake risk assessments and record the

¹ The term 'asset grouping', as referred to in the OBRM Guidelines, allows for assets of the same category and similar risk characteristics to be grouped together for the purpose of risk assessments and determining appropriate treatments.

treatments associated with specific assets. BRMS generate reports and maps that provide a summary of the assets identified as being at risk from bushfire and their associated risk ratings and treatments. The Guidelines current at the time of developing the BRM Plan were the 2015 version. A full review of the current 2020 Guidelines and the methodology used in BRM Planning is currently being conducted by OBRM and DFES.

OBRM reviewed the City of Armadale Draft BRM Plan for consistency with the Guidelines in April 2020 and provided their endorsement. Furthermore, an independent audit of the City of Armadale bushfire risk was completed in November 2021 by Bushfire Works Principal Consultant and Managing Director, Dr David Deeley, concluding that the City's risk is *“essentially the same as had been determined previously.”*

The City of Armadale Council approval of the BRM Plan, as detailed in the Guidelines, is the final step in the process and provides formal adoption of the BRM Plan. An OBRM endorsed BRM Plan makes the City of Armadale eligible to apply for a State Government Mitigation Activity Fund (MAF) grant to reduce the bushfire risk through the DFES Bushfire Risk Management Planning (BRMP) program. The program supports local governments in developing and implementing tenure-blind BRM Plans so that community assets are identified, risks are assessed and appropriate mitigation activities are assigned. This program has been established to treat extreme, very high or high bushfire risks.

Mitigation treatments may include mechanical and chemical treatments to reduce fuel levels, creating firebreaks and / or conducting hazard-reduction burns. An overview of mitigation treatments aligned to this BRM Plan are detailed in part 6, City-wide Mitigation Treatments and Multi-agency Mitigation Treatments.

Terminology within this BRM Plan aligns to the BRMS, developed by DFES as a recommendation of the Keelty Report *A Shared Responsibility*, commissioned after the 2011 Kelmscott/Roleystone fires. This risk rating system is used throughout Western Australia by all local governments using the BRMS.

Risk ratings used are as follows:

Low	Medium	High	Very High	Extreme
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The BRM Plan seeks to guide the City of Armadale through the next five years of reducing the City's bushfire risk.

PART 1 Introduction

1.1 Background

Under the *State Hazard Plan – 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 for the City of Armadale has been prepared in accordance with the requirements of the *State Hazard Plan – Fire* and the Office of Bushfire Risk Management (OBRM) Guidelines for Preparing a Bushfire Risk Management Plan. 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 (SEMC) and *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. As a strategic document, this BRM Plan serves to outline the City of Armadale's plan to address and reduce the bushfire risk. This BRM Plan does not detail actual, on-ground operational works at individual reserves or land managed by the City of Armadale. Operational work plans are created within the Bushfire Risk Management System (BRMS) and detailed in section 3.8. It sets out a broad program of coordinated multi-agency treatments to address risks identified in the BRM Plan. The BRMS sets out yearly operational works that have been developed after thorough internal consultation with Parks and Reserves, Environment, and Ranger and Emergency Services via the Fire Mitigation Working Group.

Government agencies and other land managers responsible for implementing treatments, have participated in developing the BRM Plan for the City of Armadale 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 towards the identification, assessment and treatment of assets exposed to bushfire risk within the City of Armadale.

The objective of the BRM Plan is to identify and manage bushfire risk within the City of Armadale in order to protect people, assets and things of local value.

Specifically, the objectives of this BRM Plan are to:

- Guide and coordinate a tenure-blind, multi-agency bushfire risk management and treatment mitigation 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 the City of Armadale, 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*
- *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*
- *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*
- *Wildlife Conservation Act 1950*

1.3.2 Policies, Guidelines and Standards

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

1.3.3 Other Related Documents

- National Strategy for Disaster Resilience
- National Statement of Capability for Fire and Emergency Services (AFAC 2015)
- Public Service Circular No. 88 Use of Herbicides in Water Catchment Areas (Dept. of Health 2007)
- Code of Practice for Timber Plantations in Western Australia (Forest Products Commission Second Edition 2014)
- Bushfire Risk Management Planning Handbook (DFES)
- Bushfire Risk Management System (BRMS) User Guide (DFES)
- City of Armadale Strategic Community Plan 2020-2030
- City of Armadale Firebreak Notice
- City of Armadale Local Emergency Management Arrangements 2021
- City of Armadale Local Planning Strategy (2016)
- City of Armadale Town Planning Scheme No.4
- Perth and Peel at 3.5 million South Metropolitan Peel Sub-regional Planning Framework March 2018 (WAPC)

PART 2 The Risk Management Process

The risk management process used to identify and address risk in this BRM Plan is aligned with the international standard for risk management, AS/NZS ISO 31000:2009, as described in the *National Emergency Risk Assessment Guidelines* (NERAG) 2015. This process is outlined in **Figure 1** below.

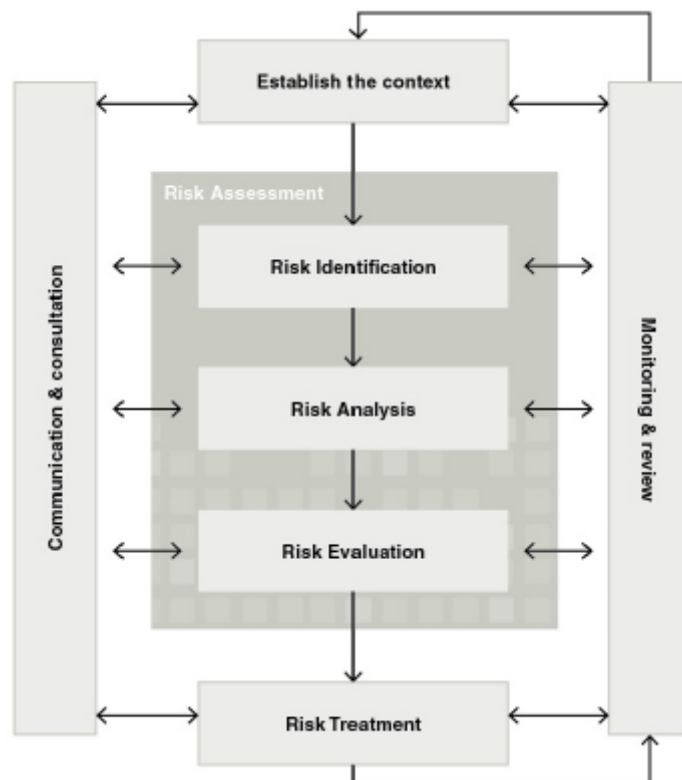


Figure 1: Risk management process.

2.1 Stakeholder Roles and Responsibilities

The table below outlines the roles and responsibilities of all stakeholders involved in the development and implementation of this BRM Plan.

Stakeholder	Roles and Responsibilities
City of Armadale	<ul style="list-style-type: none"> ▪ Coordination of the development and ongoing review of the integrated BRM Plan. ▪ Custodian of the BRM Plan. ▪ To facilitate commitment from land owners to treat risks identified in the BRM Plan. ▪ Treatment manager for implementation of treatment strategies on land under the care and control of the City ▪ Submission of the draft BRM Plan to the Office of Bushfire Risk Management (OBRM) for review of consistency with <i>the Guidelines for Preparing a Bushfire Risk Management Plan</i>. ▪ Submission of the final BRM Plan to Council for their endorsement and adoption.
Department of Fire and Emergency Services (DFES)	<ul style="list-style-type: none"> ▪ Participation in and contribution to the development and implementation of the BRM Plan, as per their agency responsibilities as the Hazard Management Agency for bushfire. ▪ Provide support to the City of Armadale through expert knowledge and advice in relation to the identification, prevention and treatment of bushfire risk. ▪ Facilitation of City of Armadale engagement with state and federal government agencies in the local planning process. ▪ 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, implement treatment strategies for other landholders. ▪ Ensure bushfire risk is managed in accordance with AS/NZS ISO 31000:2009 and report on the state of bushfire risk across Western Australia. ▪ Review BRM Plans for consistency with <i>the Guidelines for Preparing a Bushfire Risk Management Plan</i> prior to final endorsement by Council.
Department of Biodiversity, Conservation and Attractions (DBCA) Parks and Wildlife Service (PWS)	<ul style="list-style-type: none"> ▪ Participate in and contribute to the development and implementation of this BRM Plan. ▪ Provide advice for the identification of environmental assets that are vulnerable to fire, and planning appropriate treatment strategies for their protection. ▪ Implement 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, implement treatment strategies for other landholders.
Other State and Federal Government Agencies	<ul style="list-style-type: none"> ▪ Assist the City of Armadale by providing information about their assets and current risk treatment programs. ▪ Participate in and contribute to the development and implementation of this BRM Plan. ▪ Implement treatment strategies.
Public Utilities	<ul style="list-style-type: none"> ▪ Assist the City of Armadale by providing information about their assets and current risk treatment programs.

Stakeholder	Roles and Responsibilities
	<ul style="list-style-type: none"> Participate in and contribute to the development and implementation of this BRM Plan. Implement treatment strategies.
Corporations and Private Land Owners	<ul style="list-style-type: none"> Implement treatment strategies.
Local Emergency Management Committee (LEMC)	<ul style="list-style-type: none"> Provide important advice and feedback to assist in guiding the BRM Plan.
Consultant	<ul style="list-style-type: none"> Audit the accuracy of the City's asset assessments and risk ratings.

Land owners and occupiers are ultimately responsible for treatments implemented on their own land. Those that own or occupy the land, own the risk. This includes any costs associated with the treatment and obtaining the relevant approvals, permits or licences to undertake an activity. The Keelty Report '*A Shared Responsibility*', commissioned after the 2011 Kelmscott / Roleystone fires, noted that "*the shared responsibility between government agencies both at the State and Local levels needs to be matched by a shared responsibility embraced by the community*". This report additionally referenced The National Strategy for Disaster Resilience definition of a disaster resilient community as one where people have taken steps to anticipate disasters and to protect themselves. Fundamental to the concept of disaster resilience, is that individuals and communities be more self-reliant and prepared to take responsibility for the risks they live with.

Local Government and communities alike must share the responsibility to keep their communities safe. Building community resilience will require some inconvenience from time to time, however it is important to ensure that this responsibility is taken on by everybody so that the community can enjoy the collective freedom of a lifestyle choice that is for everyone.

2.2 Communication & Consultation

Communication and consultation throughout the risk management process is fundamental to the preparation of an effective BRM Plan. In development of this BRM Plan, the City of Armadale engaged with the abovementioned stakeholders to ensure appropriate and effective consultation occurred.

PART 3 Establishing the Context

Description of the City of Armadale and Community Context

3.1 Strategic and Corporate Framework

The *City of Armadale Strategic Community Plan* (SCP) –2020-2030 is a blueprint for the future direction of the City and its community members. It represents a shared community vision and sets out long term strategies designed to strengthen and build on the City of Armadale's unique assets.

Inspired and driven by community input, the SCP will help guide the City of Armadale's policies and actions as it seeks to meet the needs of the current and future population. The plan identifies shared community objectives and priorities, taking into account current and expected changes in community demographics, social issues and local, national and global influences.

The community's goals and aspirations for the City of Armadale are integral to the development and implementation of the Strategic Community Plan. The values reflect what is important to residents as they live, work and play in the region. Structured around four key focus areas, it provides a framework to direct resourcing and funding decisions and assists in delivering beneficial and affordable outcomes for the community in the long term.

The four key areas are:

- **Community** - The City of Armadale will continue to foster and strengthen the community spirit that has been a binding force in the region since its earliest days. It is this sense of connectivity and vitality that has made Armadale a desirable and welcoming community where people continue to choose to make their home.
- **Environment** - The City of Armadale is proud of its natural environment and the significance on many of its bushland areas, wetlands and waterways. Two key river systems, the Wungong and Canning Rivers, flow through the City. The internationally significant RAMSAR wetland site, Forrestdale Lake, is home to four known species of Declared Rare Flora, and is located in Armadale.
- **Economy** - Armadale in 2030 is home to a strong local economy with diverse employment opportunities. It is also a strategic for services (health, education and training) that is well connected to other centres in Perth through good transport links.
- **Leadership** - In order to attract and sustain the private sector investment required to ensure people are able to access the jobs and services required from a Strategic City Centre, the City must lobby and collaborate with State and Federal government and industry for investment.

This BRM Plan supports the following outcomes objectives of the City's SCP:

Outcome	Objective
1.2 Improve Community Wellbeing	1.2.1 Advocate for the delivery of services and programs as well as increased resources to contribute to improvements in community safety.
1.4 An inclusive and Engaged Community	1.4.1 Support a culture of volunteerism in the community and celebrate the contribution volunteers make to the community.
2.1: Conservation and restoration of the natural environment	2.1.7 Biodiversity is managed to preserve and improve ecosystem health
	2.1.9 Ensure that the health of the City's natural environment is regularly monitored and the effectiveness of environmental programs are periodically assessed.
3.4 Thriving Tourism Industry	3.4.1 Ensure the City has contemporary strategies and dynamic planning frameworks to be responsive to tourism opportunities and trends
4.3 Financial Sustainability	4.3.3 Consider environmental, social and local content objectives in procurement.

The Integrated Planning and Reporting Framework (IPRF) outlines and details the direction of all future economic, social and environmental development within the City of Armadale. The IPRF consists of a Strategic Community Plan, Corporate Business Plan, Annual Budget and Informing Strategies. The Informing Strategies are an integral part used to assist the decision making process and achieve the objectives incorporated into the framework. This BRM Plan will form an important part of the Informing Strategies used to achieve the City of Armadale's objectives.

The BRM Plan is an Issue Specific Strategy that will reduce the City of Armadale's bushfire risk and facilitate the safe and perpetual development of the City of Armadale into the future. The BRM Plan aims to reduce the potential impacts from bushfire across all land tenures within the City.

3.2 Stakeholders

The BRM Plan involves multiple stakeholders and requires the cooperation of all landowners and land managers within the City of Armadale.

1. The City of Armadale
2. DFES
3. DBCA – Parks and Wildlife Service
4. Other State and Federal agencies
5. Public utilities providers
6. Corporations and private land owners
7. Community groups and the broader community
8. Local Emergency Management Committee (LEMC)

Landowners and land managers are responsible for implementing bushfire risk management land treatments within their tenure and are encouraged to work across a whole of community and whole of government approach. Private property landowner responsibilities do not differ under legislation from any other local or State government, agency or organisation responsibilities. The coordinated implementation of treatments across all land tenures is critical to the BRM Plan process in order to reduce bushfire related risk in the City of Armadale.

The City of Armadale LEMC will be actively involved during the life cycle of the BRM Plan. The LEMC represent stakeholder groups that will provide important advice and feedback to assist in guiding the BRM Plan. Advice from the LEMC will be received in relation to the selection and implementation of appropriate land treatments and during the review stages.

3.3 Location, Boundaries and Tenure

Located 30km from the CBD in Perth's south-east, the City of Armadale covers an area of 560km² and consists of 19 suburbs and localities. The City of Armadale is bordered by the Cities of Gosnells and Kalamunda to the north, the Shires of York and Beverley to the east, the Shires of Serpentine-Jarrahdale and Wandering to the south and the Cities of Cockburn and Kwinana to the west. **Figure 2** below shows a map of the City of Armadale.

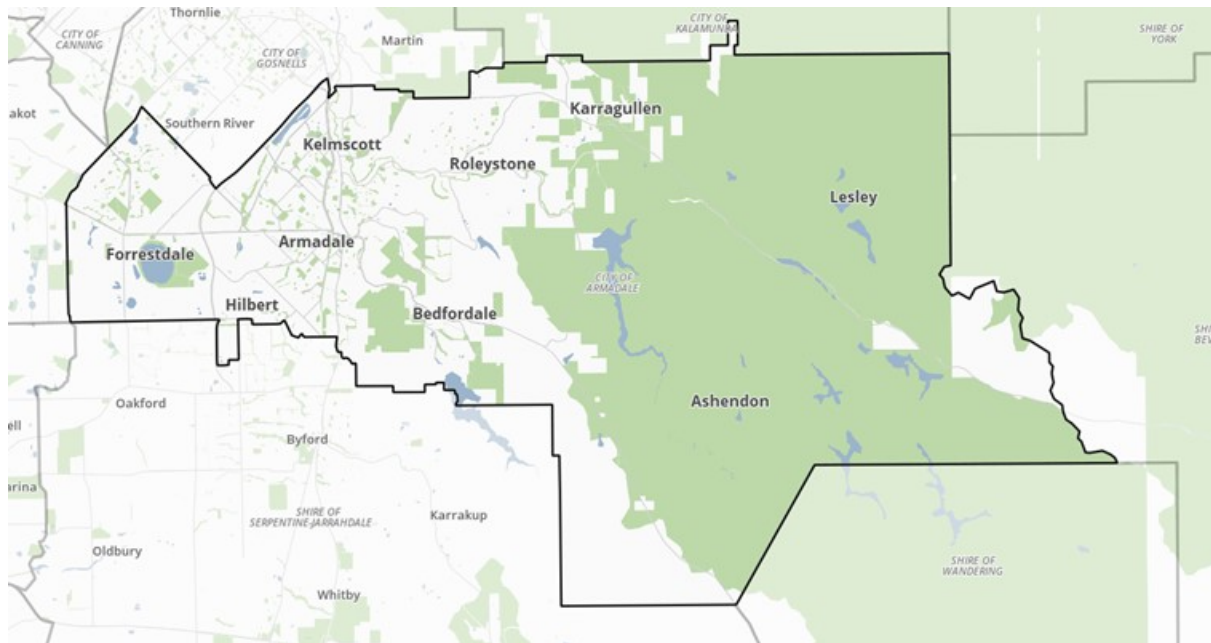


Figure 2: Map of the City of Armadale

The general topography of the City varies from the flat coastal plain in the West, to the Darling Range hills area in the East. Certain areas of the coastal plain are only just above sea level, whilst the hills area rises to a height of 400-500m above sea level.

DBCA manages 46% of public land area within the City of Armadale. DBCA manage land on behalf of other State government departments such as Department of Water and Education. The other 54% of tenure is a combination of local government, other government agencies and private landowners.

Distribution of public land tenure within the City of Armadale is described in **Figure 3** below. This data was sourced from Reserve Dataset Reserves (LGATE-227) Data.wa.gov.au.

Management authority	Number of land parcels managed	~Area ha	~ % of the City of Armadale area
Reserves with no management order	120	213.3	0.38
Araluen Botanic Park Foundation Inc. and Araluen Trust	2	6.6	0.011
Attorney General	1	0.3	0.0005
City of Armadale	787	1542.9	2.7
Commissioner Of Main Roads	1	8.3	0.014
Conservation Commission of WA	27	3138.1	5.57
Metropolitan Water Authority	4	0.06	0.13
Metropolitan Redevelopment Authority	1	0.4	0.0007
Minister For Community Services	1	0.5	0.0009
Minister For Education	15	74.5	0.1
Minister For Health	2	15.4	0.02
Minister For Police	3	1.8	0.011
Minister For Water Resources	37	23846.6	42.6
Minister For Works	2	95.6	0.1
National Parks And Nature Conservation Authority	9	2376.7	4.7
RSL WA	1	0.1	0.0002
Swan River Trust	1	19.7	0.03
Water Corporation	103	1358.3	2.31
Western Australian Planning Commission	1	0.4	0.0007
YHA Ltd	1	2.05	0.003

Figure 3: Distribution of public land tenure within the City of Armadale

3.4 Population and Demographics

On 16 November 1985, the Town of Armadale was granted City status. At that time the City of Armadale population was 42,000. Data from the 2016 census showed the City of Armadale's official population as 79,602 and the estimated residential population in 2021 to be 97,700. The City of Armadale is predicted to continue to have high population growth over the next 20 years and forecasted to be over 140,000 by 2036, as shown in the Australian Census Quickstats **Figure 4** below.

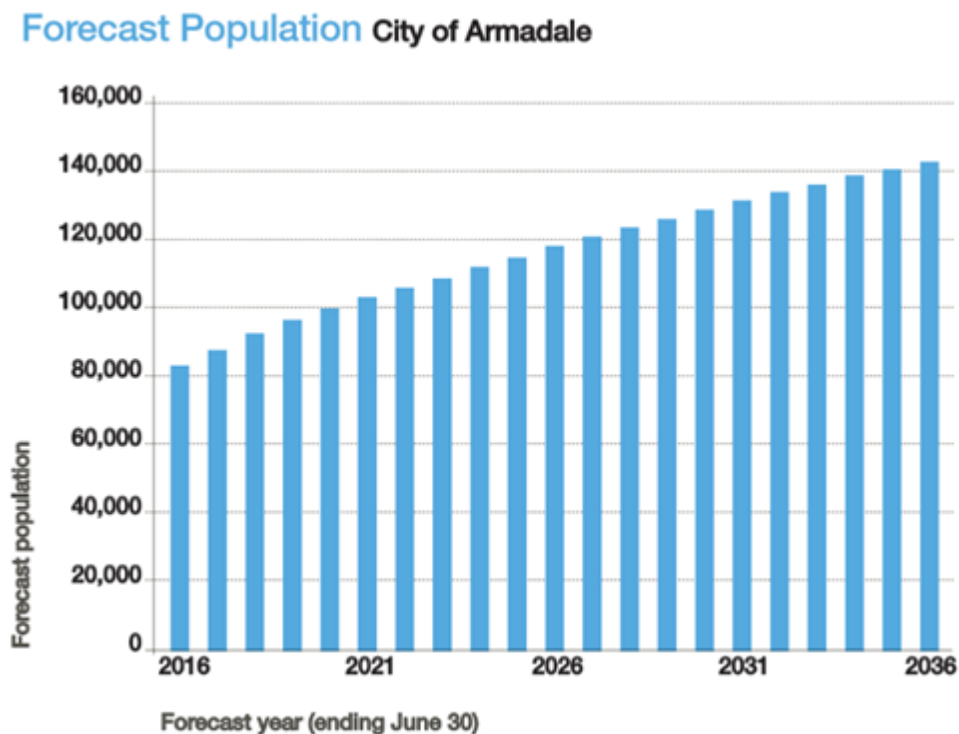


Figure 4: City of Armadale population forecast

Significant development will continue in the flatter country of the Swan Coastal Plain around Haynes, Hilbert, Harrisdale and Piara Waters, with some development occurring in the hills.

Bushfire risk is a key issue in the planning of new development areas and closer settlement. Fire Management Plans are required to identify and mitigate bushfire risks to acceptable levels, prior to subdivision and development. Bushfire risk is assessed and managed at all stages of the land planning, development and building processes to manage bushfire risks at acceptable levels.

Population growth in the City of Armadale is driven by State government strategic plans such as Perth and Peel at 3.5 million South Metropolitan Peel Sub-regional Planning Framework March 2018 (WAPC) in conjunction with the City of Armadale Local Planning Strategy and Town Planning Scheme.

The key socio-economic characteristics of the population from 2016 census data are shown in **Figure 5** below.

Key socio-economic characteristics of the population from 2016 census data include:

	City of Armadale	Greater Perth	Western Australia	Australia
Non-English speaking backgrounds	18%	19.3%	16.6%	17.9%
University attendance	3.4%	5.1%	4.3%	5%
Bachelor or Higher degree	16%	22.9%	20.5%	22%
Vocational qualification	23.6%	19.4%	20.4%	18.8%
Public transport (to work)	8.1%	10.3%	9.2%	11.4%
Unemployment	9.2%	8.1%	7.8%	6.9%
SEIFA index of disadvantage	994	1026	1015	1001.9

Figure 5: Key socio-economic characteristics

Information provided in the 2016 Australian Census Quickstats shows 24.9% of people who do not speak English in the home. The main languages spoken include:

Language	%
Mandarin	1.7
Punjabi	1.3
Malayalam	1.1
Tamil	0.9

It is recognised that residents who are culturally and linguistically diverse (CALD) are at higher risk during emergency events such as bushfires if they are not able to access community information and warnings.

Approximately 23% of the City of Armadale population is under 15 years old, the greater Perth average is 19%. This relatively high proportion of young people is important in bushfire management as children are particularly vulnerable in emergency events when reliant on adults for decision making, evacuation and care.

A budget proposal is under consideration to appoint an Emergency Services Community Education Officer in order to implement a range of actions including support for new residents unfamiliar with bushfire planning and preparedness, CALD communities and the younger population.

The City's volunteer bush fire brigades are committed to cadet programs which focus on building skills and resilience in young people in these high risk areas.

3.5 Economic Activities and Industry

The City of Armadale has a diverse range of industries across the district. **Figure 6** below was produced by .idcommunity and shows the breakdown of employment by industry.

City of Armadale - Employed persons (Usual residence)	2016			2011			Change
	Number	%	Greater Perth %	Number	%	Greater Perth %	2011 to 2016
Agriculture, Forestry and Fishing	325	0.9	0.8	302	1.0	0.6	+23
Mining	1,656	4.6	5.0	1,203	4.0	4.8	+453
Manufacturing	2,603	7.2	5.7	3,225	10.8	8.5	-622
Electricity, Gas, Water and Waste Services	442	1.2	1.1	364	1.2	1.1	+78
Construction	3,746	10.3	9.9	3,237	10.9	10.0	+509
Wholesale trade	1,257	3.5	2.7	1,480	5.0	3.9	-223
Retail Trade	3,931	10.8	9.8	3,371	11.3	10.4	+560
Accommodation and Food Services	1,923	5.3	6.5	1,398	4.7	5.8	+525
Transport, Postal and Warehousing	2,476	6.8	4.6	1,954	6.6	4.4	+522
Information Media and Telecommunications	335	0.9	1.1	278	0.9	1.2	+57
Financial and Insurance Services	709	2.0	2.7	545	1.8	2.9	+164
Rental, Hiring and Real Estate Services	590	1.6	1.8	518	1.7	1.8	+72
Professional, Scientific and Technical Services	1,801	5.0	7.2	1,602	5.4	8.3	+199
Administrative and Support Services	1,145	3.2	3.3	900	3.0	3.2	+245
Public Administration and Safety	2,164	6.0	6.4	1,767	5.9	6.4	+397
Education and Training	2,711	7.5	8.8	2,081	7.0	8.1	+630
Health Care and Social Assistance	4,546	12.5	12.3	3,183	10.7	10.9	+1,363
Arts and Recreation Services	450	1.2	1.7	306	1.0	1.5	+144
Other Services	1,656	4.6	4.0	1,313	4.4	3.9	+343
Inadequately described or not stated	1,833	5.0	4.7	722	2.4	2.2	+1,111
Total employed persons aged 15+	36,299	100.0	100.0	29,749	100.0	100.0	+6,550

Figure 6: Employment by industry

The Forrestdale Business Park is surrounded by mixed land uses, many of which have limited management. The management of vegetation around this area is challenging due to the range of land managers and different land status. This area was threatened by a bushfire in January 2019 which burnt to the edge of the industrial estate. There were no significant impacts on the businesses, however, it highlights the risk to these areas and other similar industrial areas around the City of Armadale.

The City of Armadale is a gateway to the south west of the state and contains a number of key arterial transport routes. Albany Highway, Brookton Highway and South West Highway all pass through the City of Armadale. Road closures due to bushfires continue to impose significant delays on trucking routes, tourism and the local economy

Each year there are several festivals held in the extreme and very high bushfire prone localities of Karragullen, Roleystone and Bedforddale during the bushfire season, potentially effecting significant numbers of people at risk should there be a bushfire during the festival event. Careful event planning including evacuation plans, is required for any tourism related activities

The localities of Roleystone, Karragullen and Bedforddale have a number of fruit orchards and market gardens in the highest bushfire prone areas and the inherent risk to business and property requires careful planning, management and mitigation of bushfire risks.

Description of the Environment and Bushfire Context

3.6 Topography and Landscape Features

The general topography of the district varies from the flat Swan Coastal Plain in the west to the Darling Range hills area in the east. Certain areas of the Swan Coastal Plain are only just above sea level, whilst the hills area rises to a height of almost 450 metres above sea level as shown in **Figure 7** below.

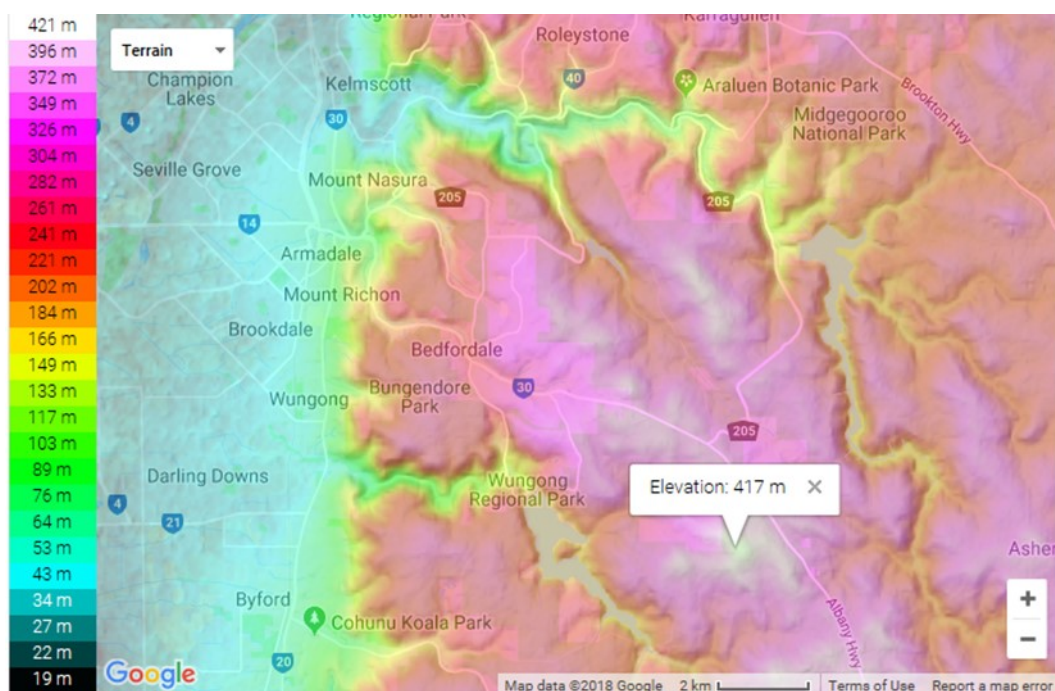


Figure 7: Topography and landscape of the City of Armadale.

The hills region has significant slope, often below houses and other assets. This creates a significant bushfire risk due to bushfire spreading faster as it moves upslope. A 10° slope will double the rate of spread of a fire. The complex topography, especially around valleys, is a challenge for fire management. This limits egress and access for both residents and responders, as well as creating localised weather patterns and wind effects that can make fires hard to predict and control. The prevailing strong summer easterlies from November to February pose the most challenging bushfire control environment.

The Swan Coastal Plain has several peat swamp areas containing large amounts of organic soils and acid sulphate soils. Organic soils smoulder because their compact nature limits the oxygen available to the fire. This means they produce an increased amount of smoke for a

longer period of time, compared to a vegetation fire of the same size. The smoke from an organic soil fire also contains chemicals and fine particulates that may cause irritation or other serious health impacts for firefighters and nearby residents.

This poses particular risk for the western growth areas such as Harrisdale Swamp, Forrestdale Lake and the Anstey-Keane Damplands.

Acid sulphate soils contain iron sulphides that have not been exposed to air. These soils react when exposed to air to form sulphuric acid. When burnt this acidity releases elements such as metals and nutrients from the soil profile that can then be transported to waterways, wetlands and groundwater systems, often with harmful environmental and economic impacts.

Within the hills there is a complex system of small creeks which join the Canning River, and to a lesser extent the Neerigen and Wungong Brooks.

This is particularly challenging when bushfires occur in these areas. Bushfires often spot across the watercourses where fire fighters cannot easily access.

The City of Armadale has approximately 350 square kilometres of water catchment area. Three major water catchment dams within the City of Armadale are a significant challenge for bushfire mitigation.

There is the priority need to protect people visiting the recreational areas at the dams, as well the need to ensure that mitigation works carried out by the responsible agency are carefully managed to prevent impacts on the catchment and water quality.

3.6.1 Canning Dam

The Canning Dam and reservoir provide a major fresh water resource for the Perth metropolitan area. The dam is situated on the Darling Scarp and is an impoundment of the Canning River. Currently the dam supplies approximately 20% of Perth's fresh water.

Since its completion in 1940, the Canning Dam has contributed to a wide range of environmental and ecological problems in surrounding regions, including more frequent algal blooms, habitat loss and sedimentation. Despite these issues, Canning Dam and the adjacent parks and forests provide a variety of recreational activities for the public such as bushwalking, historic walks and picnic facilities.

3.6.2 Wungong Dam

In 1925, a small concrete pipe-head dam was built at Wungong Brook as part of the visionary "Hills Scheme" to solve the growing city's problem of chronic water shortages.

Wungong Dam, including the dam structure and environs, is of aesthetic significance to the community as a destination for picnics and recreation. It has significant historic value as the site of the first Wungong pipe-head dam established in 1925, followed by the Wungong Dam in 1979. Along with the other dams located in the Darling Ranges, it has continued to provide Perth with its water supply.

3.6.3 Churchman Brook Dam

Work commenced on the "Hills Scheme" with a pipe-head diversion structure at the Churchman site linked to Perth in February 1925. Churchman Brook Dam, was completed in 1929, and provided Perth with a substantial portion of "Hills" water supply until 1937.

Churchman Brook Dam is a substantial engineering structure set within a picturesque valley landscape surrounded by State Forest, and features attractive landscaped areas in front of the dam wall. Churchman Brook Dam is valued by the community for its historic associations, and as a place for bushwalking, picnics and social recreation.

Canning, Wungong and Churchman Brook dams could be severely impacted by bushfire due to run off and contamination to the water that results from firefighting measures. These facilities supply a significant amount of drinking water to the Perth and Kalgoorlie regions.

3.7 Climate and Bushfire

The City is located in a temperate zone and enjoys a Mediterranean type climate with a mean annual maximum temperature of 35°C during the summer period between December and January and a mean annual minimum temperature of 16°C. The annual average rainfall for the district is approximately 800 mm.

Climatic data provides an indication of fuel availability for bushfires throughout the year. Particularly during the fire season, the *Grassland Fire Danger Index* (GFDI) and *Forest Fire Danger Index* (FFDI) are used to calculate the likely fire behaviour associated with the forecast GFDI / FFDI.

Weather conditions influence the size, intensity, speed, and predictability of bushfires and how dangerous they can be to the community. Vegetation growth can be encouraged by periods of wet weather, increasing the amount of fuel available (grass, leaf litter, twigs, bark).

Lower rainfall and increased summer temperatures resulting from climate change are likely to increase the potential risk from bushfires which needs to be taken into account in planning and mitigation efforts.

3.7.1 Humidity

Relative humidity is commonly used to measure atmospheric moisture. It is defined as the ratio of the amount of water vapour measured to what the air could hold at saturation point. Very low relative humidity, less than 20%, causes fuels to dry out and become more flammable.

3.7.2 Wind

Strong gusty winds help fan the flames and cause a bushfire to spread faster across the landscape. Strong winds can carry hot embers long distances which can start spot fires many kilometres ahead of the main bushfire front. A change in wind direction can bring a period of dangerous bushfire activity, this is often seen as a trough or cold front known as a cool change.

As a cold front passes, the wind direction will often swing 90 degrees. Usually, the winds ahead of a cold front are hot Northwesterlies, while cooler Southwesterlies follow the front, with significant effects on the behaviour and structure of existing fires.

3.7.3 Vegetation

Vegetation complex mapping illustrates local, naturally occurring patterns of vegetation at a regional scale. These are associated with soils, hydrology, landform and climate. Local natural tree species in these ecological communities have co-evolved to form strong relationships and mutual dependencies with the flora and fauna of the community and have adapted to suit the specifics of the local physical environment.

A list of the vegetation complexes found within the City of Armadale is provided in **Figure 8** below.

	The Swan Coastal Plain					The Town and foothills		The Hills	
	Bassendean swamps (Southern River)	Bermullah	Bassendean	Guildford	Forrestfield	Swan	Darling Scarp	Darling Valleys (Murray, Helena, Yargil min swamp)	Darling Plateau Laterite (Dwellingup)
<i>Acacia saligna</i>									
<i>Eucalyptus rudis</i>									
<i>Melaleuca preissiana</i>									
<i>Melaleuca raphiophylla</i>									
<i>Banksia littoralis</i>									
<i>Acacia rostellifera</i>									
<i>Banksia attenuata</i>									
<i>Banksia menziesii</i>									
<i>Casuarina obesa</i>									
<i>Corymbia calophylla</i>									
<i>Eucalyptus todtiana</i>									
<i>Allocasuarina fraseriana</i>									
<i>Banksia grandis</i>									
<i>Eucalyptus marginata</i>									
<i>Eucalyptus lane-poolei</i>									
<i>Eucalyptus wandoo</i>									
<i>Agonis flexuosa</i>									
<i>Eucalyptus gomphocephala</i>									
<i>Melaleuca cuticularis</i>									
<i>Allocasuarina huegeliana</i>									
<i>Corymbia haematoxylon</i>									
<i>Eucalyptus accedens</i>									
<i>Eucalyptus laeliae</i>									
<i>Eucalyptus patens</i>									
<i>Acacia acuminata</i>									
<i>Eucalyptus loxophleba</i>									
<i>Eucalyptus megacarpa</i>									
	Champion Lakes Forrestdale Harrisdale Piara Waters	Hilbert	Forrestdale	Haynes Armadale Seville Grove	Camillo Wungong Brookdale	Kelmscott river road area	Armadale Town Kelmscott Mount Nasura Mount Richon	Roleystone Bedfordale	Roleystone Bedfordale

Figure 8: vegetation complexes of the City of Armadale

The vegetation of the escarpment is predominantly Jarrah / Marri forests with Wandoo forests found along the rivers and waterways. These forests are made up of tall Eucalyptus species, a mid-story of acacia and banksia species, as well as larger grass trees and understory of native grasses and herbs, including grevilleas, bracken and native orchids. These forests can have significant leaf litter which have the potential to lead to extreme fuel loads. The fuel loads in some of these areas can contain a portion of dead dry fine fuels, indicating that fire will easily start and spread quickly in this vegetation. Bushfires in this vegetation will quickly reach the canopy due to the horizontal distribution of fuels. The trees in these forests have fine fibrous loose bark which easily ignites and can be blown by the winds to carry the fires forward. This spotting can occur over long distances and start new bushfires ahead of the main bushfire front. Combined with the topography on which it occurs, these forest vegetation types can create very intense and fast moving bushfires. Once started, bushfires in this vegetation are difficult to access and suppress.

Forest vegetation types are the highest risk to life and property in the City of Armadale. The hills communities of Roleystone and Bedfordale for example, are townships made up of homes within heavily wooded forest. The fragmented land ownership and nature of these town properties (individually fenced with continuous vegetation and assets directly adjoining vegetation) makes a widespread, integrated burning program difficult. These blocks which range from 0.5 -10 ha in size, present a number of risks to treat whilst collectively accounting for the majority of the overall local bushfire risk. The larger forest areas around these towns can be well mitigated, but the contiguous nature of vegetation through semi-urban towns means that private property owners are critical in managing their own bushfire risks.

Invasive species such as watsonia, tagasaste, cotton bush and non-indigenous wattle species are problematic in the City of Armadale. These species are common throughout the escarpment but particularly on roadsides and significantly increase the fuel loads. These create corridors that will carry intense fires which can impact the ability of people to evacuate from these areas in bushfires.

Figure 9 below provides the following details:

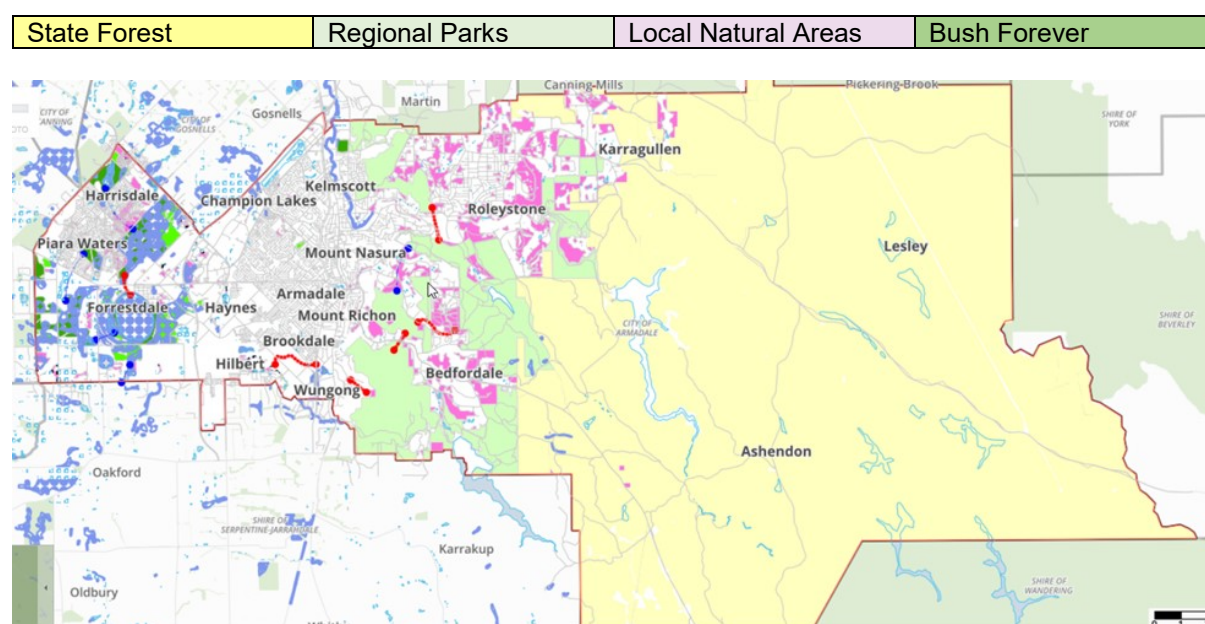


Figure 9: City of Armadale by natural area

3.8 Causes of Ignition and Bushfire Frequency

Forrestdale Lake is an area of common ignitions. Bushfires in this area have been caused by lightning, motorbikes, arson, dumping and burning of vehicles. Forrestdale Lake is in a semi-rural area close to urban settlements that poses significant bushfire risk to the more densely populated areas of Piara Waters and Harrisdale, as well as the significant rare and threatened flora and fauna within the Forrestdale Lake Nature Reserve.

The top two causes of bushfire in the City of Armadale are suspicious / deliberately lit bushfires and fires resulting from cigarettes. The DFES determined cause of bushfires from 2015-2020 is shown in **Figure 10** below.

Bushfires with Causes

From Date: 01/07/2015

To Date: 10/02/2020

Area Selected: ARMADALE (C)

This report shows the number of Bushfire incidents recorded in IRS within the area selected.

Year:	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020
No. of Bushfires of all sizes.	146	155	161	144	103
Suspicious/Deliberate	59	75	94	58	56
Cigarette	26	28	26	30	16
Burn off fires	7	13	14	16	8
Reignition of previous fire	11	5	9	12	3
Undetermined	11	5	4	6	4
Power lines	4	3	7	2	2
Weather Conditions - Lightning	8	3	1	4	0
Campfires/bonfires/outdoor cooking	2	5	1	1	2
Vehicles (incl. Farming Equipment/Activities)	5	1	0	1	3
Hot works (grinding, cutting, drilling etc..)	2	3	0	2	2
Other open flames or fire	1	3	2	1	1
Unreported	1	2	1	2	2
Weather Conditions (High winds, natural combustion etc. Excludes Lightning)	2	3	0	1	1
Sleeping/Alcohol/Drugs/Physical-Mental impairment	2	1	1	2	0
Improper Fuelling/Cleaning/Storage/Use of material ignited	2	1	1	0	1
Electrical distribution (excl. power lines)	1	0	0	4	0
Human Error (Left on, knock over, unattended etc.)	0	2	0	0	2
Yard maintenance, hand held equipment	1	1	0	0	0
Fireworks/flares	1	1	0	0	0
Children misadventure	0	0	0	1	0
Equipment - Operational deficiency	0	0	0	1	0

Figure 10: Cause of bushfire

In 2019, the Forrestdale area was subject to significant bushfires threatening properties and Forrestdale Primary School. Tonkin Highway was closed, cutting off access for vehicles. Infrastructure was under threat including high voltage power lines and a large Water Corporation facility. Forrestdale Primary School was evacuated and numerous houses were also under threat, with residents and livestock evacuated from the area.

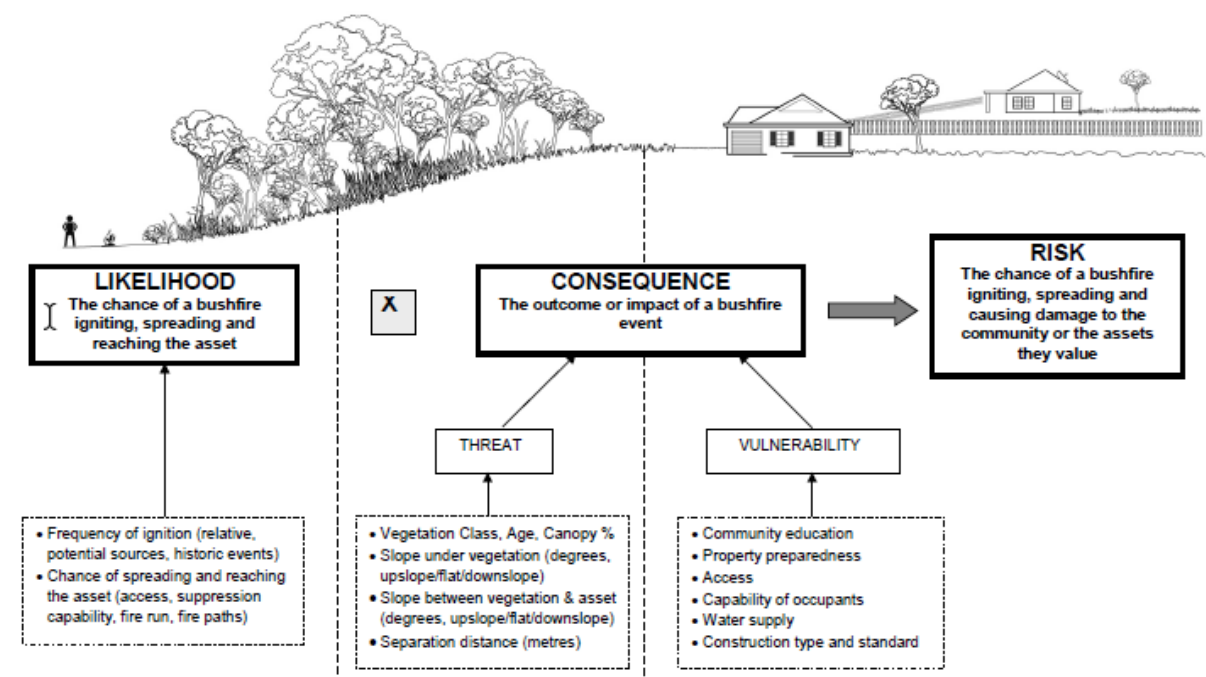
In February 2011, the City of Armadale experienced one of the most significant bushfires this state has ever seen resulting in a number of changes being made to the way bushfires are dealt with. The Keelty Report, *A Shared Responsibility*, identified a number of downfalls within the fire services in Western Australia. The Report made 55 recommendations for change throughout the fire services. Some of these recommendations have now been implemented at various levels of government and have had a significant impact on the way bushfires are fought, mitigation and training.

One of the most significant changes to come out of the Keelty Report recommendations was the development and implementation of the Bushfire Risk Management System (BRMS). The BRMS is a DFES managed software application that supports the development and implementation of a BRM Plan. The BRMS is used to identify and map assets, complete risk assessments and record information about risk treatments. It is an essential component of an integrated BRM planning process, providing for enhanced coordination, analysis and oversight of BRM information in Western Australia.

3.9 The Bushfire Risk Management System (BRMS)

The state-wide BRMS, which was developed by DFES, enables the City of Armadale to identify and record assets, perform risk assessments against those assets, assign treatments and evaluate treatments to ensure they meet the expected outcomes. BRMS is widely used across local and State government organisations. DFES provides training and support for the BRMS. The Emergency Services Team has three officers trained in the use of the system.

BRMS requires an individual or group of assets to be assessed, with the results of the assessment entered into the system. Risk assessment uses a combination of consequence and likelihood to determine the level of risk. The bushfire hazard for individual or groups of assets is calculated using the following factors:



An example of how information is registered in the BRMS is shown in **Figure 11** below and demonstrates the Bedfordale Hall, owned by the City of Armadale, in the human settlement category and priority 1B.

ARMBED044	Admiral Rd 102 Bedfordale	Private	Bedfordale	Human Settlement	1C
ARMBED043	Southern Hills Christian College	Private	Bedfordale	Human Settlement	1A
ARMBED042	Bedfordale Hall	Local Government	Bedfordale	Human Settlement	1B
ARMBED041	Blake St 2-21 Bedfordale	Private	Bedfordale	Human Settlement	1C

Figure 11: BRMS Asset Summary

Figure 12 below further demonstrates how the Roleystone Theatre is represented within the BRMS as an extreme bushfire risk rating.

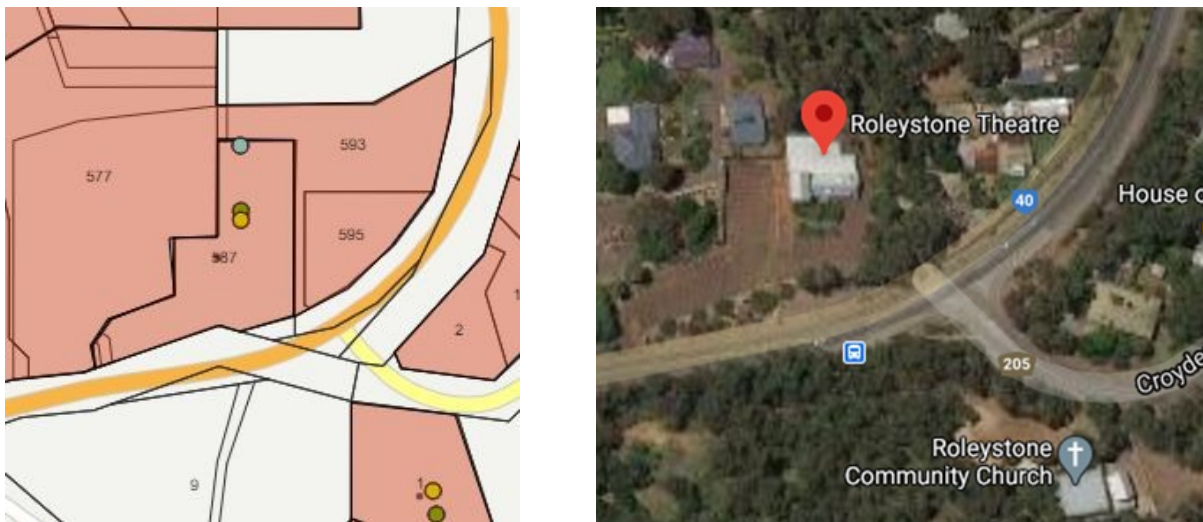


Figure 12: Roleystone Theatre BRMS risk rating

In January 2020, the BRMS rated the City of Armadale as the highest bushfire risk area in the State. The BRMS assessed the City of Armadale to have a 68% extreme rating. Analysis by the DFES Bushfire Risk Management Branch (BRMB) indicated that factors contributing to this rating include:

- Topographic conditions. Steep slopes and valleys, high fuel loads in and around houses, wetland areas with increasing surrounding development.
- Extensive interface areas. Large tracts of vegetation adjacent to subdivisions, with areas of heavy fuel that run into developed areas, or areas that have significant tree canopy amongst or surrounding housing.
- Complexity around fuel management programs and resourcing over multiple land parcels under varied ownerships can make it more difficult to implement integrated reduction strategies.

The BRMS groups properties of similar risk into 'groupings'. For example, a grouping may be a street of similar sized residential properties that border a reserve. They all have the same risk and are therefore assessed the same as one group. In 2019/20, the BRMS assessed the City of Armadale to have 957 asset groupings. The asset groupings are made up of the assessment categories of human settlement, economic, environmental and cultural. Asset

groupings may be as small as two houses and up to 60 +/- houses grouped together. The graph below will show that 91% of properties within the City of Armadale are a high – extreme bushfire risk broken down as shown:

- 68% of assets and / or asset groupings within the City of Armadale are an extreme bushfire risk
- 16% of assets and / or assets groupings within the City of Armadale are a very high bushfire risk.
- 7% of assets and / or asset groupings within the City of Armadale are a high bushfire risk.

This is further illustrated in the 2019/20 BRMS produced **Figure 13** below.

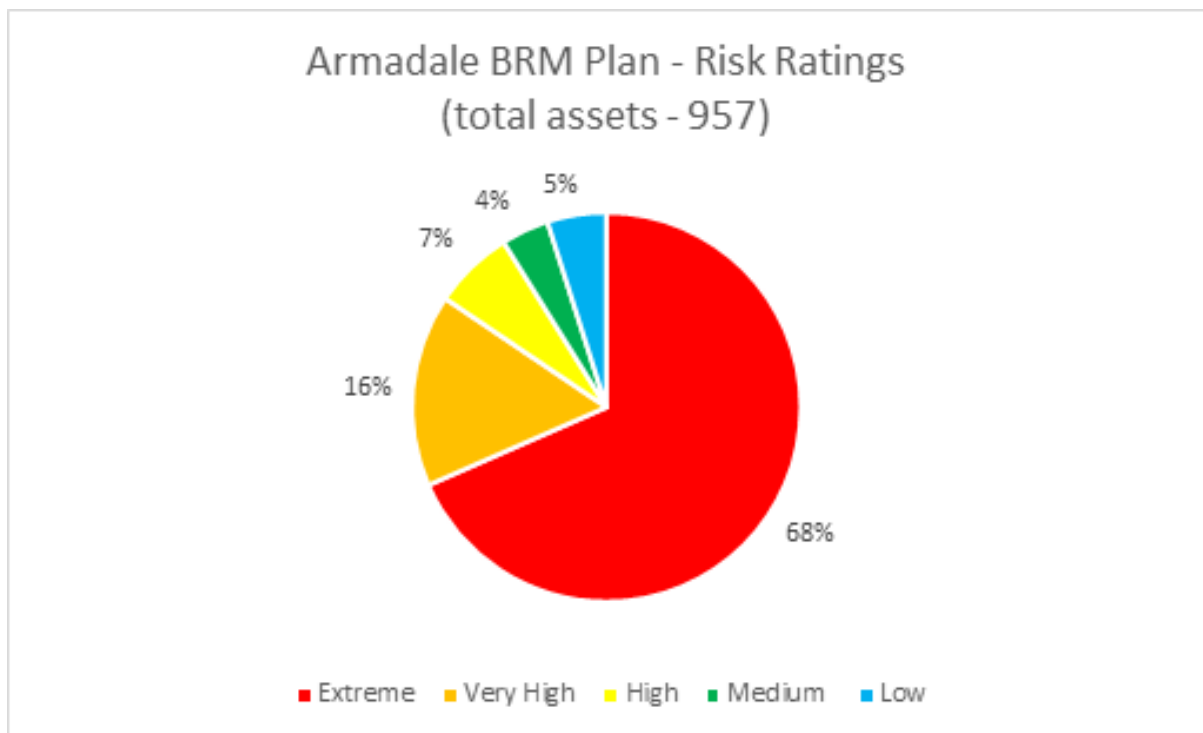


Figure 13: City of Armadale BRMS bushfire risk rating

3.10 Map of Bushfire Prone Areas

The intent of the Western Australia Government's Bushfire Prone Planning Policy is to implement effective risk based land use planning and development to preserve life and reduce the impact of bushfire on property and infrastructure. The *State Planning Policy 3.7 – Planning for Bushfire Prone Areas* ensures bushfire risk is given due consideration in all future planning and development decisions. The BRM Plan can help address risk for existing development and establish an effective treatment plan to manage the broader landscape and any unacceptable community risks.

The extensive assessment and fire mitigation requirements required by Planning in Bushfire Prone Areas also reduces risks faced by new developments and complement this BRM Plan. Planning to reduce bushfire risks occurs for strategic planning proposals at the Local Planning Strategy stage and at smaller scale statutory application stages such as building or subdivision applications. Controls are incorporated into the Town Planning Scheme, Structure Plans and Subdivision Plans. Well planned new developments can contribute to mitigating risks in legacy areas of historic subdivision by provision of additional road access, fuel reductions, water services and new fire breaks.

The State Land Information Portal (SLIP) maps bushfire prone areas in WA, marked in pink.

The City of Armadale bushfire prone areas as identified in the City of Armadale's Intramaps system are shown in **Figure 14** below.

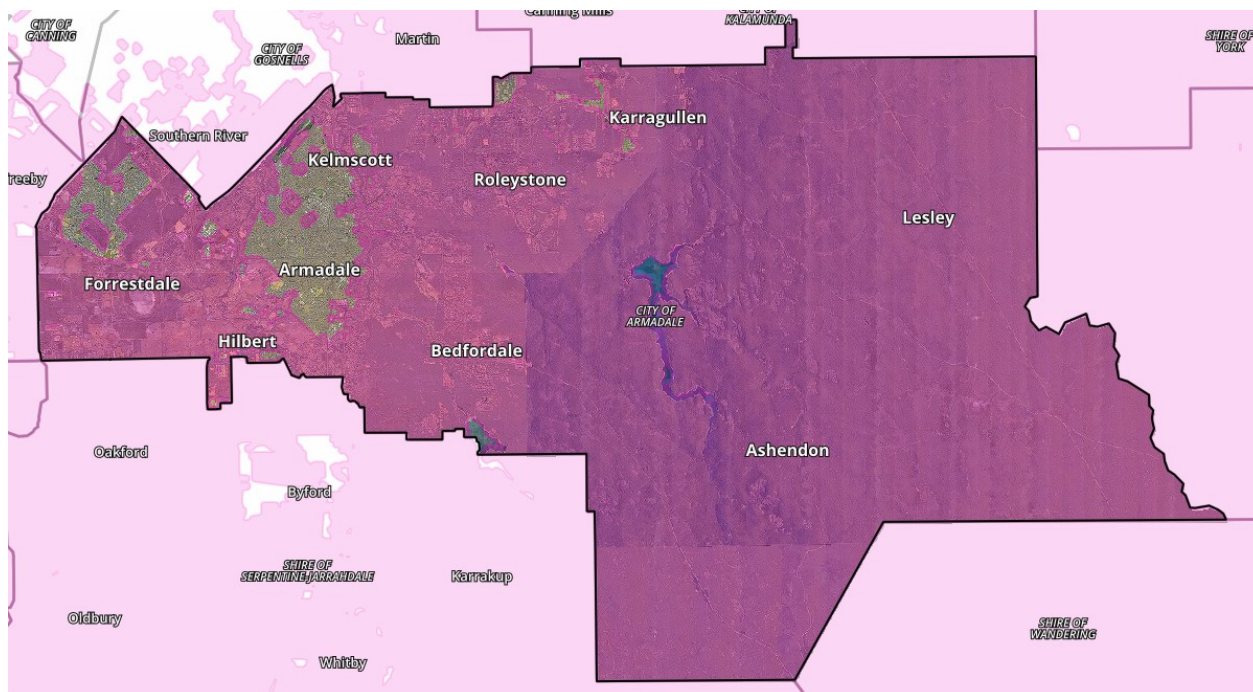


Figure 14: City of Armadale bushfire prone areas

3.11 Volunteer Fire Brigades

The City of Armadale has two volunteer bush fire brigades.

1. Bedforddale Volunteer Bushfire Brigade (VBFB) is located on Admiral Road, Bedforddale and currently have 58 senior members and 17 cadets. They respond to incidents using a 3.4 Urban and a Light Tanker.
2. Roleystone Karragullen Volunteer Bushfire Brigade (VBFB) are currently transitioning from a station at Jarrah Road, Roleystone where they were collocated with a DFES operated Volunteer Fire and Rescue Service, to a new station being constructed at Springdale Reserve, Roleystone. The Roleystone Karragullen VBFB has 43 members and is in process of establishing a cadet program. They respond to incidents using a 3.4 Urban and a Light Tanker.

Within the City of Armadale there is the aforementioned DFES operated Roleystone Volunteer Fire and Rescue Service and also a DFES career fire station where Armadale 1st and Armadale Volunteer Fire and Rescue Service operate from the same building.

3.12 Burning Restrictions

The bushfire season is typically from November through to April. For the 2021/2022 season, the City of Armadale gazetted the Restricted and Prohibited Burning Times as follows:

- 1 October to 30 November: Restricted (permits required)
- 1 December to 31 March: Prohibited
- 1 April to 31 May: Restricted (permits required)

3.13 *Bush Fires Act 1954* section 33 Fire Management Notice

Each year the City of Armadale communicates the requirements of the Firebreak Notice to residents. The aims of this notice is to ensure compliance with the *Bush Fires Act 1954* and

provide private property residents with information to increase their preparedness and ability to respond to bushfires.

3.14 Community Engagement Activities

The City's Bush Fire Brigades are active in promoting Bushfire Ready messages and community education initiatives including being a proactive presence at community festivals, shows and markets.

PART 4 Asset Identification and Risk Assessment

4.1 Bushfire Risk Management System Planning Areas

For the purpose of the BRMS, the City of Armadale has been divided into four main planning areas.

1. BRMS Planning Area 1 – Armadale
2. BRMS Planning Area 2 – Bedfordale
3. BRMS Planning Area 3 – Karragullen
4. BRMS Planning Area 4 – Roleystone

Figure 15 below shows these planning areas:

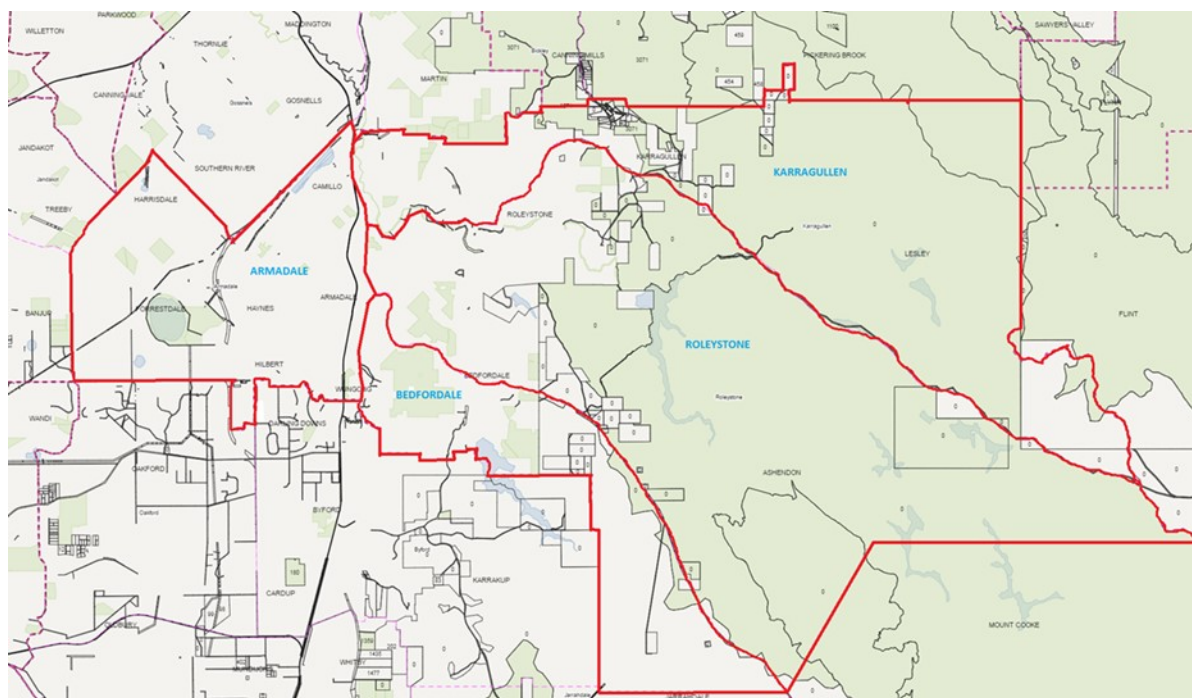


Figure 15: BRMS planning areas

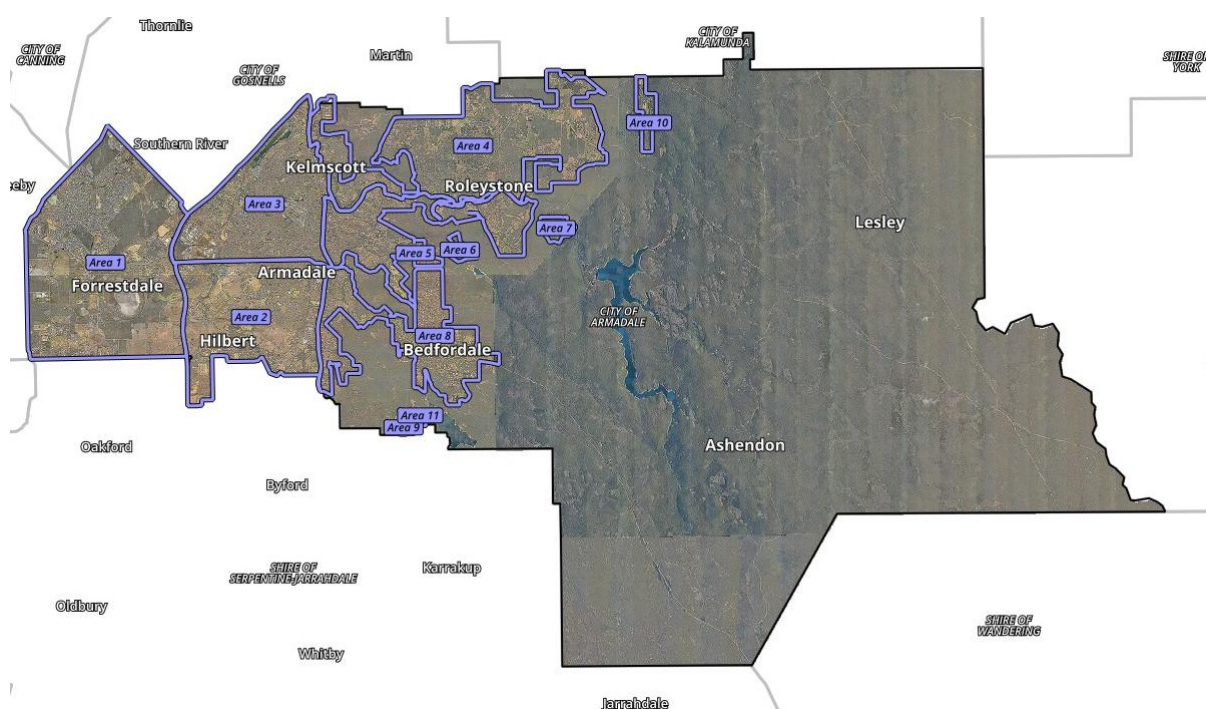
These areas were created for the purpose of the BRMS after consultation and input from the local DFES Bushfire Risk Management Officer. The areas have been delineated by the main arterial routes running through the City of Armadale. This process aligns with the BRMS as best practice, widely used by local government throughout Western Australia.

The City has been divided into 11 areas for the purpose of implementing the City of Armadale firebreak notice inspections. The 11 areas were created based on logical land division of assets for inspection purposes. The five smaller areas represent outlying pockets of rural land holdings surrounded by the Darling Range Regional Park and the Canning Reservoir. The 11 areas are detailed in the table below.

City of Armadale Firebreak Notice Inspection Zones

Firebreak notice inspection area	Dominant bushfire risk rating	Area details
4	Extreme	Residential town properties and orchards of Roleystone north and Karragullen west.
5	Extreme	Residential and open pasture land, including the Araluen Golf Club and Mount Nasura locality.
6	Extreme	11 private properties in Roleystone surrounded by the Darling Range Regional Park.
7	Extreme	6 private properties in Roleystone surrounded by the Darling Range Regional Park.
8	Extreme	Residential and semi-rural properties in Bedfordale.
9	Extreme	2 private properties in Bedfordale surrounded by the Darling Range Regional Park.
10	Extreme	5 private properties in Bedfordale surrounded by the Canning Reservoir.
11	Extreme	4 private properties in Bedfordale surrounded by the Darling Range Regional Park.
1	Very high	Residential areas of Harrisdale, Piara Waters and Forestdale, flatter land topography.
2	Very high	Residential areas of Haynes, Brookdale, Hilbert, Wungong and Armadale. Old / new mix with pasture land.
3	Very high	High density residential and industrial areas of Camillo, Champion Lakes and Seville Grove.

The purpose of aligning the inspection areas to the BRM Plan is to ensure that the highest bushfire risk areas are prioritised for resource allocation and inspections. These areas are shown in **Figure 16** below.



4.2 Asset Identification & Risk Assessment

The BRMS 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.

4.3 Asset Categories and Subcategories

The BRMS categorises assets and / or asset groupings into the four categories of human settlement, economic, environmental and cultural. These categories and subcategories are further detailed and explained, with examples, in the table below.

Asset Category	Asset Subcategories
Human Settlement	<ul style="list-style-type: none"> ▪ 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. ▪ 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	<ul style="list-style-type: none"> ▪ Agricultural Pasture, grazing, livestock, crops, viticulture, horticulture and other farming infrastructure. ▪ 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 treatment 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	<ul style="list-style-type: none"> ▪ Protected Rare and threatened flora and fauna, threatened ecological communities and wetlands. ▪ Priority Fire sensitive species and ecological communities. ▪ Locally important Nature conservation and research sites, habitats, species and communities and areas of visual amenity.

Asset Category	Asset Subcategories
Cultural	<ul style="list-style-type: none"> ▪ 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.

Assets were identified and assessed across the City of Armadale using the BRMS, based on the following order of priority shown below:

Priority	Asset Category	Asset Subcategory	BRMS Planning Area
First Priority	Human Settlement	Special Risk and Critical Facilities	1-4
Second Priority	Human Settlement	All other subcategories	1-4
Third Priority	Economic	Critical Infrastructure	1-4
Fourth Priority	Economic	All other subcategories	1-4
Fifth Priority	Environmental	All subcategories	1-4
Sixth Priority	Cultural	All subcategories	1-4

4.4 Assessment of Bushfire Risk

Risk assessments have been undertaken for each asset or group of assets identified using the methodology described in the DFES Guidelines. This information has been entered into the BRMS for the City of Armadale.

4.4.1 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 of the four asset categories**.

There are four possible likelihood ratings and these are described in the table below.

Likelihood Rating	Description
Almost Certain	<ul style="list-style-type: none"> ▪ Is expected to occur in most circumstances. ▪ High level of recorded incidents and / or strong anecdotal evidence. ▪ Strong likelihood the event will recur. ▪ Great opportunity, reason or means to occur. ▪ May occur more than once in 5 years.
Likely	<ul style="list-style-type: none"> ▪ Regular recorded incidents and strong anecdotal evidence. ▪ Considerable opportunity, reason or means to occur. ▪ May occur at least once in 5 years.
Possible	<ul style="list-style-type: none"> ▪ Should occur at some stage. ▪ Few, infrequent, random recorded incidents or little anecdotal evidence. ▪ Some opportunity, reason or means to occur.
Unlikely	<ul style="list-style-type: none"> ▪ Would only occur under exceptional circumstances.

4.4.2 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 of the four asset categories**.

There are four possible consequence ratings and these are described below:

Consequence Rating	Description
Minor	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Isolated cases of serious injuries, but no fatalities. Some hospitalisation required, managed within normal operating capacity of health services. 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	<ul style="list-style-type: none"> 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

Consequence Rating	Description
	<p>industry sectors leading to multiple business failures or loss of employment.</p> <ul style="list-style-type: none"> ▪ 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	<ul style="list-style-type: none"> ▪ 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. ▪ 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.

4.4.3 The City of Armadale Risk Profile

The City of Armadale risk profile is provided in the summary table below. This table shows the number of assets, or grouping of assets, at risk from bushfire in each risk category as assessed by the BRMS 22 December 2021.

Risk Rating Asset Category	Low	Medium	High	Very High	Extreme
Human Settlement	34	37	66	161	622
Economic	12	5	4	11	24
*Environmental	2	6	1	0	0
**Cultural	1	1	0	0	4
Total	49	49	71	172	650

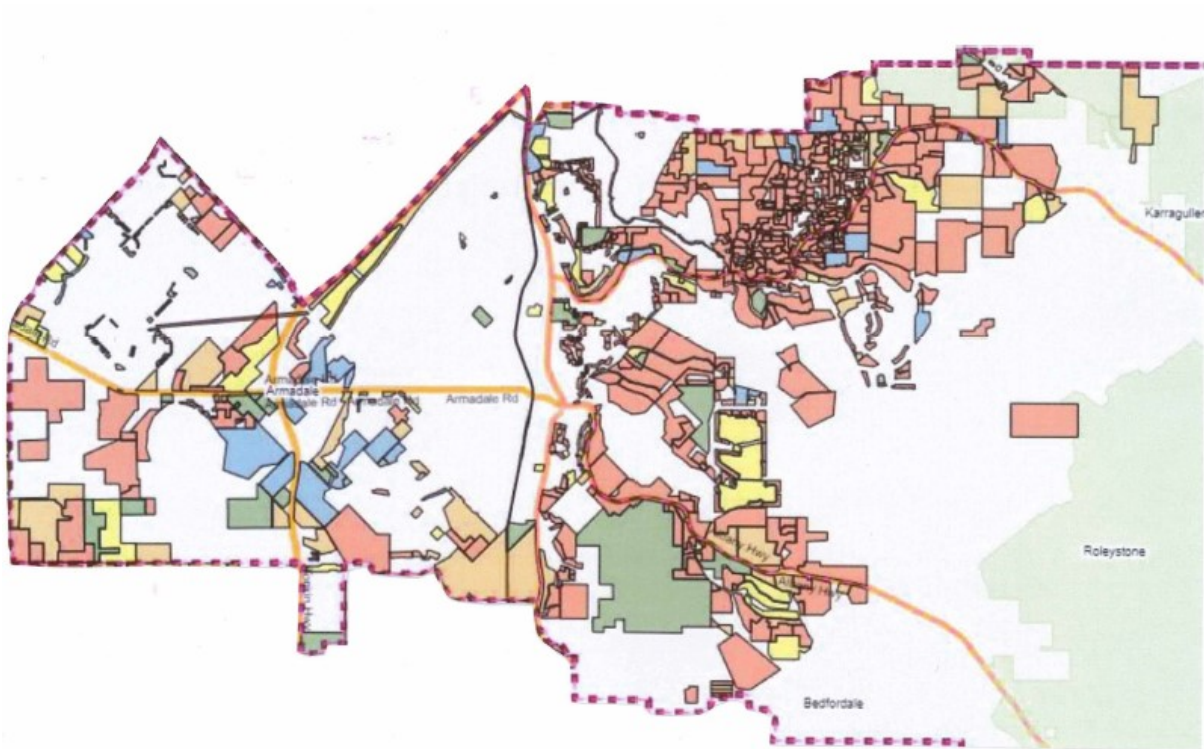
*As at December 2021 assessments of priority environmental assets has commenced as reflected in the preceding table. As further assets are identified and assessed, data will be inputted into the Bushfire Risk Management System as the working document used to guide operational mitigation activities

**The Department of Lands, Planning and Heritage is responsible for identifying cultural assets and is continually undertaking this work. Relevant assessment data as it becomes available, will be inputted in to the BRMS to guide relevant mitigation activities.

Note: The BRMP provides a snapshot of assets and their risk rating at a point in time. As conditions change; for example as new assets are identified and assessed, following mitigation activities or when development alters the risk profile, relevant data will be inputted into the BRMS as the working document used to guide the City's mitigation program.

In accordance with the *Guidelines*, the status of the BRMS risk profile will be reported to Council on an annual basis. Subsequent reviews of the BRMP will reflect the status of the BRMS at the time future reviews are undertaken.

The map below, extracted from the BRMS, depicts the assessment of the City's risk profile, colour coded as per risk rating table on the preceding page.



4.4.4 Assessment of Environmental Assets

Using available information and fire history data, identified environmental assets are assessed to determine the level of risk from bushfire.

This assessment is made using available environmental data in the City of Armadale Intramaps system and the Environmental Risk Assessment Tool developed by Environmental Services and Emergency Services.

The City of Armadale's environmental assets will predominantly comprise the following:

- Threatened Ecological Communities.
- Declared Rare Flora.
- Declared Rare Fauna and associated habitat.
- Conservation Category and Resource Enhancement Wetlands.
- Groundwater Monitoring Bores and associated equipment e.g. data loggers.
- Conservation Infrastructure e.g. fencing, phytophthora (dieback) monitoring stations, habitat / nesting boxes and watering stations.
- Interpretive signage and trail infrastructure.

PART 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.
- The likelihood and consequence ratings assigned to each asset are appropriate.
- Local issues have been considered.

5.2 Treatment Priorities

The treatment priority for each asset has been automatically assigned by the BRMS, based on the asset's risk rating. The table below shows the likelihood and consequence combined to give the risk rating and subsequent treatment priority for an asset with rating 1A being the highest and 5C the lowest.

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 the low risk category are not considered to require specific treatment. They will be managed by routine City of Armadale wide controls and monitored for any significant change in risk and reassessed if required.

In most circumstances risk acceptability and treatment will be determined by the City of Armadale, in collaboration with land owners and fire agencies. However, as a general rule, the following courses of action have been adopted for each risk rating and are described in the following table.

Risk Rating	Criteria for Acceptance of Risk	Course of Action
Extreme Priorities in order of: 1A 1B 1C	Only acceptable with excellent controls. Urgent treatment action is required.	<p>Routine controls are not enough to adequately manage the risk.</p> <p>These areas need to be immediately prioritised with action plans developed and implemented through the life of the plan. Continuous monitoring required.</p> <p>Treatments will be ordered by:</p> <ol style="list-style-type: none"> 1. Priorities will be made for treatments that will have maximum benefit to multiple assets and critical infrastructure. 2. Treatments that benefit vulnerable communities will be given priority. 3. Identification of partnerships with other agencies for strategic mitigation. 4. Engagement with asset owners will be as per the Community Engagement Strategy and focus on increasing understanding of the risk facing these assets.
Very High Priorities in order of: 2A 2B 2C	Only acceptable with excellent controls. Treatment action is required.	<p>Routine controls are not enough to adequately manage the risk.</p> <p>Specific action will be required during the period covered by this BRM Plan. Quarterly monitoring may be required.</p>
High Priorities in order of: 3A 3B 3C 3D	Only acceptable with adequate controls. Treatment action may be required.	Specific action may not be required. Risk may be managed with routine controls and / or specific procedures and is subject to annual monitoring.
Medium Priorities in order of: 4A 4B 4C	Acceptable with adequate controls. Treatment action is not required but risk must be monitored regularly.	<p>Specific action may not be required.</p> <p>Risk may be managed with routine controls and /or procedures and monitored as required throughout the life of the BRM Plan.</p>
Low Priorities in order of: 5A 5B 5C	Acceptable with adequate controls. Treatment action is not required but risk must be monitored.	<p>Need for specific action is unlikely.</p> <p>Risk will be managed with routine controls and monitored as required.</p>

PART 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 mitigation treatments available to treat bushfire risk. The mitigation treatment or combination of treatments selected, will depend on the level of risk and the type of asset being treated. Not all mitigation treatments will be suitable in every circumstance.

The City has adopted a '*balanced approach*' to implementing mitigation treatments that put community safety as a priority, whilst also incorporating environmental, social and aesthetic values. This is done in part, by reducing fuel loads in order to provide a safer emergency evacuation exit for residents, and emergency services vehicles entry, in the event of a bush fire. Selective reduction of non-natives and removal of dead material additionally support the balanced approach. An integral part of any Council endorsed burning program, which is part of a fuel reduction strategy, is a longer term locality specific follow up treatment schedule to ensure the overall objectives of a balanced approach are achieved.

Examples of mitigation treatments are detailed in the table below.

Mitigation treatment	Suitable for	Purpose	Comments
Hazard Reduction Burn	Reducing fuel loads. Burns can be done using mosaic pattern, spotting, low intensity methods.	To reduce the availability, size, arrangement, connectivity, moisture content and type of flammable material available.	<ul style="list-style-type: none"> ▪ Low cost. ▪ Instant results. ▪ Can have a limited window of opportunity due to weather conditions.
Targeted grass tree burning or pruning	Xanthorrhoea genus of grass trees.	To reduce the availability, size, arrangement, connectivity, moisture content and type of flammable material available.	<ul style="list-style-type: none"> ▪ Low risk. ▪ Instant results.
Slashing and brush cutting	Light scrub land and grasses.	To reduce the availability, size, arrangement, connectivity, moisture content and type of flammable material available.	<ul style="list-style-type: none"> ▪ Instant results. ▪ Can be done by hand or mechanical methods. ▪ Not suitable for rocky outcrops.
Forestry mulching	Heavy vegetated areas of accessible land.	To reduce the availability, size, arrangement, connectivity, moisture content and type of flammable material available.	<ul style="list-style-type: none"> ▪ Large areas can be mitigated quickly ▪ Instant results ▪ Low risk ▪ Not suitable for forested areas
Creating and / or restricting access	Reserves	Reduce illegal access of unauthorized vehicles.	<ul style="list-style-type: none"> ▪ Protects reserves from possible causes of ignition associated with illegal activities.

Mitigation treatment	Suitable for	Purpose	Comments
			<ul style="list-style-type: none"> Provides access to firefighting crews.
Firebreak installation	All land types.	Provide access to firefighting crews.	<ul style="list-style-type: none"> Reduces fuel loads. Enforceable under s.33 of the <i>Bush Fires Act 1954</i>. Low cost to maintain.
Tree pruning and / or crown separation	Larger, tall trees.	Crown separation and provide access to firefighting crews.	<ul style="list-style-type: none"> Low cost to maintain
Herbicide spraying	Low grass and weed areas.	To reduce the availability, size, arrangement, connectivity, moisture content and type of flammable material available.	<ul style="list-style-type: none"> Reduces invasive weeds. Can be done by hard or mechanical methods.
Mulching	Verges	Reduce the intensity of fire and slows the run of a fire over a mulched area.	<ul style="list-style-type: none"> Reduces grass and weed growth.

6.1 City-wide Mitigation Treatments

City-wide mitigation treatments are actions that reduce the overall bushfire risk within the City of Armadale regardless of land ownership. These types of treatments, whilst not specifically linked to individual assets, are applied across the City of Armadale as part of normal core business or due to legislative requirements.

The following mitigation treatments are currently in place across the City of Armadale:

Mitigation Treatment No. 1	Action	Lead Agency	Responsibility and Stakeholders
City of Armadale, Local firebreak and hazard reduction laws (<i>Bush Fires Act 1954</i>).	Firebreak Notice	City of Armadale	City of Armadale Fire Control Officers (FCO), Roleystone and Bedforddale VBFB and all land owners.
Firebreak notice and information booklet established to ensure land owners understand and comply with firebreak specifications to appropriately reduce fuel load and bushfire risk on their property. Notice reviewed annually. Rangers and FCO inspect for compliance with the notice and fines may apply if non-compliant.			

Mitigation Treatment No. 2	Action	Lead Agency	Responsibility and Stakeholders
City of Armadale Prohibited and Restricted burn times (<i>Bush Fires Act 1954</i>) Section 17 & 18.	Firebreak Notice	City of Armadale	City of Armadale Chief Bushfire Control Officer (CBFCO), FCO, Rangers and the all landowners.

Prohibited burning and restricted burn times are designed to reduce the bushfire risk during very high to catastrophic fire danger rating days. The firebreak notice is reviewed annually and dates can be adjusted as required by the CBFCO.

Mitigation Treatment No. 3	Action	Lead Agency	Responsibility and Stakeholders
City of Armadale Annual mitigation works program. City of Armadale annual maintenance program.	The City's Parks and Reserves team, in conjunction with the Emergency Services Team, implements an annual works programs to reduce fuel load and remove hazards. Annual follow up treatments are implemented to maintain standards, reduce regrowth and weeds.	City of Armadale	Public reporting of hazards and concerns regarding risk. Rangers and Emergency Services and Parks and Reserves.

Tracked via the City of Armadale Authority System, Parks and Reserves and FCO target mitigation treatments in areas of highest population and / or as identified by the BRM Plan. Work may include slashing, spraying, mulching, pruning and other mechanical treatments.

Mitigation Treatment No. 4	Action	Lead Agency	Responsibility and Stakeholders
City of Armadale Burn Program	The City of Armadale implements an annual burn program for City owned or vested reserves.	City of Armadale	Roleystone Karragullen and Bedforddale VBFB, DFES, DBCA Parks and Wildlife and private land owners.

Prohibited burning and restricted burn times are designed to reduce the bushfire risk during very high to catastrophic fire danger rating days. The firebreak notice is reviewed annually and dates can be adjusted as required by the CBFCO.

Mitigation Treatment No. 5	Action	Lead Agency	Responsibility and Stakeholders
City of Armadale Town Planning Local Planning Strategy	Local planning schemes implementation of appropriate land subdivision and building standards in line with DFES, Department of Planning and Building Commission policies and standards. Bushfire Hazard Assessments are required for all proposed new Development Areas and currently planned but undeveloped areas to reduce and manage	City of Armadale	City of Armadale Development Services - building and planning and Environmental Services.

	risks to acceptable levels.		
Aligned to State Planning Policy 3.7 Policy and regional information for planning in bushfire prone areas.			

Mitigation Treatment No. 6	Action	Lead Agency	Responsibility and Stakeholders
New Areas of further Subdivision and Closer Development	Bushfire Management Plans required for new areas undergoing closer development to reduce and manage risks to acceptable levels.	City of Armadale	City of Armadale Development Services - building and planning and Environmental Services.
Aligned to State Planning Policy 3.7 Policy and regional information for planning in bushfire prone areas.			

Mitigation Treatment No. 7	Action	Lead Agency	Responsibility and Stakeholders
Local Planning Scheme Development and Building Controls	Implementation of appropriate land subdivision and building standards in line with DFES, Department of Planning and Building Commission policies and standards to reduce and manage risks to acceptable levels.	City of Armadale	City of Armadale Development Services - building and planning and Environmental Services.

6.2 Multi-agency Mitigation Treatments

Multi-agency mitigation treatments have been developed using the BRMS. These mitigation treatments are to be implemented by relevant land owners to improve current treatments, or to implement new treatments to better manage bushfire risk across the City of Armadale. All multi-agency treatments have been developed in consultation with the relevant stakeholders.

The following multi-agency mitigation treatments are currently entered into the City of Armadale's BRMS assessment:

Mitigation Treatment No. 1	Action	Lead Agency	Responsibility and Stakeholders
DFES Unallocated Crown Land (UCL) and Unmanaged Reserves (UMR) land management	Preparedness for bushfire season and mitigation treatments conducted on lands owned by Department of Lands and managed by DFES.	DFES South	DBCA Parks and Wildlife, Roleystone Karragullen and Bedfordale VBFB and the City of Armadale.
DFES South BRMO coordinates these plans in their annual scope of works.			

Mitigation Treatment No. 2	Action	Lead Agency	Responsibility and Stakeholders
DBCA Parks and Wildlife Master Burn Plans	DBCA Parks and Wildlife publish annually on the DFES website their 6 season burn program.	DBCA Parks and Wildlife	DBCA Parks and Wildlife, Roleystone Karragullen and Bedfordale VBFB and the City of Armadale.
All DBCA burn plans for the City of Armadale are accessible via the DBCA website, by sharing shape files (GIS) and are communicated to Roleystone Karragullen and Bedfordale VBFB via email.			

Mitigation Treatment No. 3	Action	Lead Agency	Responsibility and Stakeholders
DBCA Parks and Wildlife mitigation works	DBCA Parks and Wildlife conduct mulching and other mechanical treatments to reduce fuel load or to provide fire access.	DBCA Parks and Wildlife	DBCA Parks and Wildlife, DFES and the City of Armadale.
Works are completed as required, upon request or when identified by relevant agencies and communicated to DBCA			

6.3 Asset-specific Treatment Strategies

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

- **Fuel management** treatments reduce or modify the bushfire fuel through manual, chemical and prescribed burning methods.
- **Ignition management** treatments aim 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.
- **Community Engagement** treatments seek to build relationships, raise awareness and change the behaviour of people exposed to bushfire risk.
- **Other** - City of Armadale-wide controls, such as community education campaigns and planning policies that can be implemented to manage the risk.

PART 7 Monitoring and Review

Monitoring and review processes are in place to ensure that this 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. There are circumstances which may warrant an earlier review of the BRM Plan including:

- Changes to the BRM Plan area, organisational responsibilities or legislation.
- Changes to the bushfire risk profile of the area.
- Following a major fire event.
- At Council's direction

7.2 Monitoring

The 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 performance and progress of the BRM Plan over the financial year will be presented to the Local Emergency Management Committee (LEMC) and City of Armadale Council on an annual basis. The presentations can also be used as a platform to generate feedback and potential advice on ways to improve the outcomes generated by the BRM Plan. The feedback will be used to inform decision making when identifying the most appropriate bushfire risk treatments for the next financial year and to ensure the BRM Plan is in line with the City of Armadale values and goals. Finally, an annual report will be submitted to the Office of Bushfire Risk Management (OBRM) each year. This report will summarise the progress made towards implementation and the subsequent operational status of the BRM Plan.

PART 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 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.
BRMS Planning Area	A geographic area determined by the City of Armadale which is used to provide a suitable scale for risk assessment and stakeholder engagement.
Bushfire Hazard	The hazard posed by the classified vegetation, based on the vegetation category, slope and separation distance.
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 City of Armadale Council for endorsement.

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.

Emergency Risk Management Plan	A document (developed under <i>State Emergency Management Policy 2.9</i>) that describes how an organisation(s) intends to undertake the activities of emergency risk management based on minimising risk. These plans help inform the ongoing development of Local Emergency Management Arrangements (LEMA) and WESTPLAN's.
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 lease holder 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).
Priority	See Treatment Priority.
Recovery Cost	Cost of recovering an asset 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.
Risk Manager	The organisation or individual responsible for managing a risk identified in the Bushfire Risk Management Plan; including review, monitoring and reporting.

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

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.
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.

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

PART 9 Acronyms

BRMB	Bushfire Risk Management Branch
BRMO	Bushfire Risk Management Officer
BRM Plan	Bushfire Risk Management Plan
BRMS	Bushfire Risk Management System
CALD	Culturally and Linguistically Diverse
CBFCO	Chief Bushfire Control Officer
CEO	Chief Executive Officer
DBCA	Department of Biodiversity, Conservation and Attractions
DFES	Department of Fire and Emergency Services
ESC	Emergency Services Coordinator
FFDI	Forest Fire Danger Index
FCO	Fire Control Officer
GFDI	Grassland Fire Danger Index
LEMA	Local Emergency Management Arrangements
LEMC	Local Emergency Management Committee
MAF	Mitigation Activity Fund
NERAG	National Emergency Risk Assessment Guidelines
OBRM	Office of Bushfire Risk Management
SEMC	State Emergency Management Committee
VBFB	Volunteer Bushfire Brigade

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