Biodiversity Strategy 2024 - 2029

CITY OF Armadale

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Front cover: Western Sprinebill. Photograph courtesy of Tony Kirkby.

The City of Armadale acknowledges the contribution of Focused Vision Consulting in the preparation of this Strategy.

ACKNOWLEDGEMENT OF COUNTRY

As part of the City of Armadale, we would like to acknowledge that the land we meet on is the traditional lands for the Noongar people, and that we respect their spiritual relationship with their country. We would like to acknowledge the Noongar people as the custodians of the Perth region and recognise that their culture and heritage is still important to the Noongar people today.

SUMMARY

The City of Armadale (the City) has prepared this Biodiversity Strategy (strategy) to contribute to the achievement of outcome 1 of the Strategic Community Plan 2020 – 2030 *conservation and restoration of the natural environment* and the City's Strategic Environment Commitment *to preserve and enhance the City's natural areas and ensure development outcomes are sensitive to pre-existing environmental values*.

STRATEGY OBJECTIVES

Through the implementation of actions, this strategy intends on achieving the following objectives.

1. Corporate activities are undertaken in a manner that protects and enhances the natural environment.
2. Biodiversity assets are protected during the land use change process.
3. Ecological condition of biodiversity assets is enhanced as part of the land use change process.
4. The condition of biodiversity assets in natural areas managed by the City of Armadale are enhanced.
5. Strong partnerships are fostered for the maintenance and enrichment of the natural environment across all tenures of land.
6. The condition of biodiversity assets infected with dieback in City managed natural areas is enhanced.
7. The ecological health of fauna populations in the City is enhanced.
8. The impact on feral animals on City of Armadale biodiversity values is reduced.
9. Private landowners are supported in the identification, management, and improvement of condition of biodiversity assets on private land.
10. Best practice biodiversity management is reviewed on an ongoing basis and the strategy adapts actions accordingly.

INDICATORS OF STATE

Data analysis was undertaken to describe (indicate) the state of biodiversity assets in the City, updating and replacing the *City of Armadale Local Biodiversity Strategy 2009* and *City of Armadale State of the Environment Report 2017*.

Native Vegetation

42,767 hectares (76%) of the City supports remnant vegetation and approximately 85% of this is east of Albany Highway (on the Darling Scarp). Vegetation represented by less than 10% of pre-European (pre-clearing) extent is considered at risk. There is one vegetation association and three vegetation complexes that are represented by less than 10% of their pre-European extent in the City.

There is a high representation of Threatened Ecological Communities in the reservation zone. Over 100 hectares (ha) of Commonwealth listed Banksia woodlands of the Swan Coastal Plain TEC occurs within the development zone.

Ecological Corridors and Key Habitat Areas

A number of ecological linkages have been identified through the City. The Perth Biodiversity Project identified 14 regional ecological linkages through the City, most of which run east-west. There are also numerous riparian corridors, new public open space areas and drainage corridors that connect patches of remnant habitat.

Native Fauna and Key Habitat

Much of the remaining vegetation within the City constitutes significant habitat for the three Threatened Black-Cockatoo species; Baudin's Black-Cockatoo, Carnaby's Black-Cockatoo and Forest Red-tailed Black-Cockatoo. Analysis determined that 46 significant fauna species are potentially present within the City, including 14 species 'Threatened', 15 migratory bird, 14 Priority, one other specially-protected fauna and one conservation-dependent species. Permanent water pools provide important habitat for aquatic fauna such as fish and invertebrate species, including Vulnerable Commonwealth listed Carter's Freshwater Mussel (*Westralunio carteri*) and DBCA listed Priority 4 Water Rat (*Hydromys chrysogaster*) (Ecoscape 2018).

Native Flora

There are 40 records of Threatened flora and records for 10 Priority 1, 27 Priority 2, 72 Priority 3 and 50 Priority 4 flora within the City. Up to 26 species of EPBC-listed flora could potentially occur within the City according to the EPBC Protected Matters Search Tool, however, not all of these are considered likely to occur.

Wetlands

One Ramsar wetland, Forrestdale Lake, occurs within the City, which occupies an area of 246 ha and provides important habitat for waterbirds on the Swan Coastal Plain. It forms part of an important migratory link for international migratory bird species protected under international bird conservation agreements (DCCEEEW 2019). A total of 352 Geomorphic Wetlands of the Swan Coastal Plain are located within the City, including 123 Conservation Category wetlands. Much of the City's area on the Swan Coastal Plain is mapped as wetlands.

River, Watercourses and Tributaries

Five key natural watercourses and tributaries (Canning River, Wungong River/Brook, Neerigen Brook, Carradine Brook and Wright Brook) occur within the City, with most of the rivers, watercourses and tributaries occurring in the scarp and hills, and those on the Swan Coastal Plain, generally having been significantly altered.

Cultural Heritage

72 Aboriginal Cultural Heritage sites occur within the City of Armadale, a majority of these sites occur in the development zone and the reservation zones.

THREATS TO BIODIVERSITY

Threats to biodiversity within the City include: invasive and feral species; fragmentation from clearing; changing land use and development; altered hydrology and erosion; pathogens; degradation of natural areas, inappropriate fire regimes, and global and regional threats (e.g., climate change), and social threats.

RISK AND RESPONSE

The City has conducted risk workshops with subject matter experts to develop a risk matrix for this strategy. Further stakeholder consultation has also been used to inform and finalise the risk assessment. The process identified six biodiversity asset categories and five risk categories. A total of 31 risks to biodiversity within the City were identified as part of this risk assessment.

OUTCOMES

The City already has in place numerous policies, plans, mechanisms and actions to protect and enhance biodiversity, with significant achievements to celebrate. As part of the development of this strategy, nineteen outcomes that will reduce the impact of risks to biodiversity values have been identified. A number of actions are recommended to achieve the outcomes.

CONTEXT AND IMPLEMENTATION

The City will implement this strategy to meet relevant objectives within the Strategic Environment Commitment.

The strategy has been developed in accordance with the intents and objectives of the City's key corporate integrated planning documents, informing strategies, planning policies and other plans, including the City of Armadale Strategic Community Plan 2020-2023 and the City of Armadale Corporate Business Plan 2023-2027, in addition to State and Commonwealth environmental legislation.

Place hold – diagram in development

1 INTRODUCTION

The City of Armadale (the City) has prepared this Biodiversity Strategy (strategy) as part of protecting, managing and retaining its Local Natural Areas (LNAs) and to achieve the biodiversity objectives of the City's Strategic Environment Commitment:

> *'To preserve and enhance the City's natural areas and ensure development outcomes are sensitive to pre-existing environmental values*.'

1.1 DEFINITION AND DESCRIPTION OF BIODIVERSITY

'Biodiversity' – short for 'biological diversity' – describes the variety and complexity of all living things on Earth and is considered to include three levels – genetic, species and ecosystem diversity. However, as in this strategy, it can also be used to describe the particular biological assemblage in a specific region, area or ecosystem.

Biodiversity is fundamentally important to all levels of life. Having biological diversity within a system gives it resilience in the face of change, helping it to maintain a constant state or recover from natural disasters. Systems where the natural biodiversity has been significantly compromised can change in state quickly and may never recover.

Humans rely on biodiversity for survival and wellbeing. Biodiversity loss can cause a loss in ecosystem functions that provide clean air and water; affect the production of crops; allow the introduction of pests and disease or affect a person's cultural, spiritual or recreational services.

1.2 VISION

The vision for the strategy is to contribute to the achievement of outcome 2.1 (*conservation and restoration of the natural environment*) of the City of Armadale Strategic Community Plan 2020 – 2030, specifically:

- Manage biodiversity to preserve and improve ecosystem health.
- Facilitate the creation of partnerships and support strategies for the maintenance and enrichment of the natural environment.
- Ensure that the health of the City's natural environment is regularly monitored, and the effectiveness of environmental programs are periodically assessed.

1.3 BIODIVERSITY STRATEGY OBJECTIVES

This strategy intends on achieving the following ten objectives.

1. Corporate activities are undertaken in a manner that protects and enhances the natural environment.
2. Biodiversity assets are protected during the land use change process.
3. Ecological condition of biodiversity assets is enhanced as part of the land use change process.
4. The condition of biodiversity assets in natural areas managed by the City of Armadale are enhanced.
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6. The condition of biodiversity assets infected with dieback in City managed natural areas is enhanced.
7. The ecological health of fauna populations in the City is enhanced.
8. The impact on feral animals on City of Armadale biodiversity values is reduced.
9. Private landowners are supported in the identification, management, and improvement of condition of biodiversity assets on private land.
10. Best practice biodiversity management is reviewed on an ongoing basis and the strategy adapt actions accordingly.

2 BIODIVERSITY STRATEGY FRAMEWORK

2.1 ENVIRONMENTAL MANAGEMENT FRAMEWORK

The City's approach to environmental management is guided by an Environmental Management Framework (**Figure 1**). This strategy is one of five documents that inform the five-year operational plan in accordance with the Environmental Management Framework.

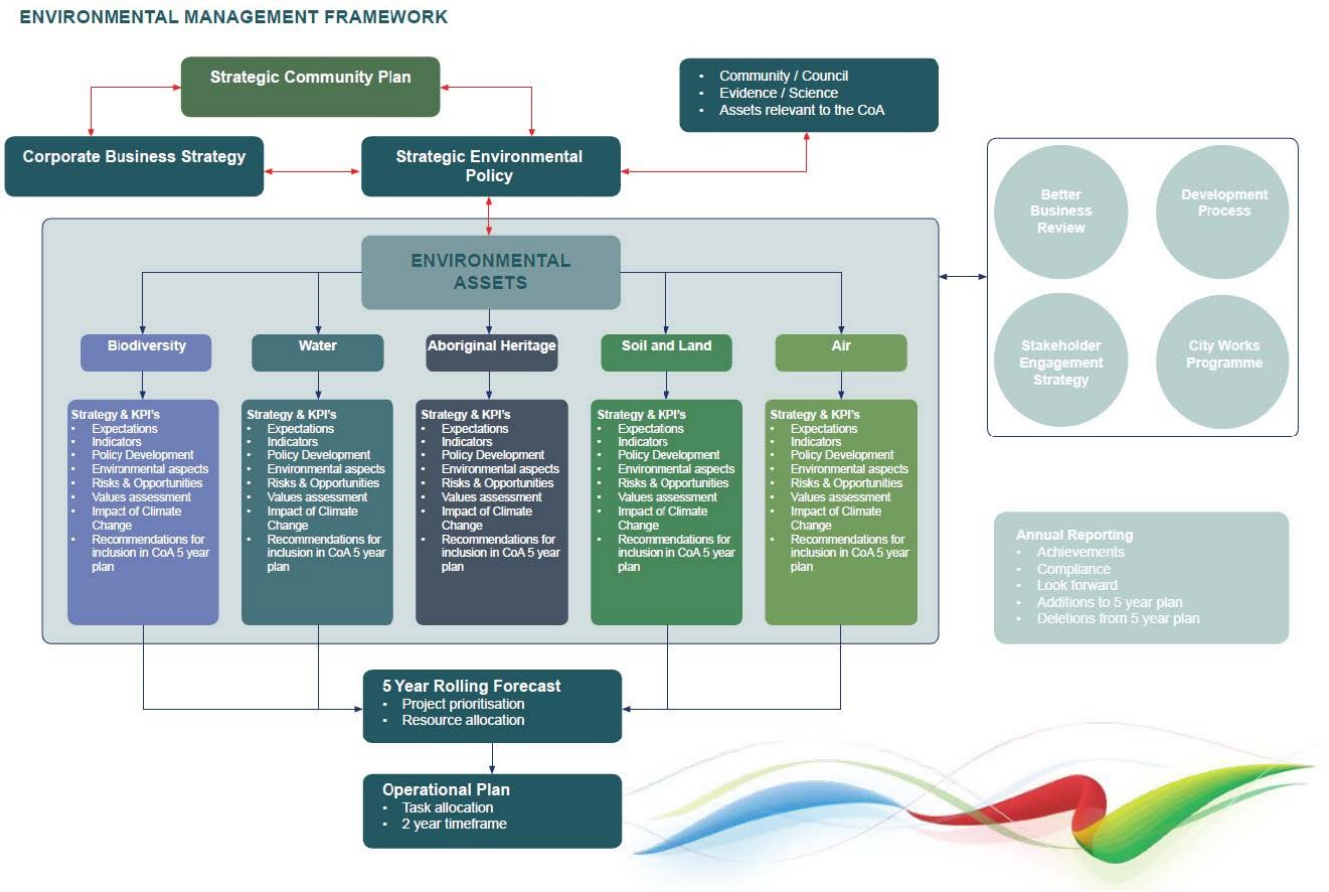


Figure 1 – City of Armadale Environmental Management Framework

2.2 STRATEGIC ENVIRONMENTAL COMMITMENT

The City has a Strategic Environmental Commitment (Policy – ENG 21- Strategic Environmental Commitment) that intends to clearly define the key environmental objectives to be pursued in order to achieve the City's environmental goal of having a natural environment that is valued and conserved. The strategy is anticipated to achieve the City of Armadale's biodiversity objectives of the Strategic Environment Commitment.

2.3 CITY OF ARMADALE STRATEGIC COMMUNITY PLAN AND CORPORATE BUSINESS PLAN OBJECTIVES

The City's Strategic Community Plan 2020-2030 (2020) is the guiding document for the City over the decade 2020 to 2030. It identifies the community's expectations for the future and defines the types of services that the City will need to deliver. It is built around four aspirations – Community, Environment, Economy and Leadership – and outlines the objectives, strategies, outcomes and measures for the success of the plan.

The City's Strategic Community Plan 2020-2030 and Corporate Business Plan 2023-2027 (2023) are intrinsically linked. The Corporate Business Plan recognises the Strategic Community Plan as a key informing plan. It links the Strategic Community Plan to key actions, projects and strategies. The Biodiversity strategy and Strategic Environmental Commitment are identified as influencing plans and strategies within the Corporate Business Plan.

The Corporate Business Plan 2023/2027 identifies, in action 2.1.5.1, the requirement to develop and implement a revised Local Biodiversity Strategy by mid-2024. This document achieves this action. A review of the implementation of the 2009 LBS is presented in **Appendix A**.

The City has prepared this strategy to build on the outcomes from the earlier *Local Biodiversity Strategy* (2009) and to provide a snapshot view of biodiversity assets in the City with the aim of updating and replacing the City's existing *State of the Environment Report*.

2.4 STATE AND COMMONWEALTH LEGISLATION AND POLICIES

This strategy will complement existing State and Commonwealth laws and policies. In Western Australia, biodiversity conservation and protection of the natural environment is achieved through a hierarchy of legislation, policy, and planning frameworks. Both statutory and non-statutory planning processes and tools address matters in relation to the retention of remnant vegetation, protection of flora and fauna species, and management of their habitats. This strategy draws upon existing legislative and government policies across National, State and Local levels that are summarised below (**Table 1**).

Table 1 – Summary of Legislative, Policy, and Planning Frameworks

Government Jurisdiction	Statutory Mechanisms / Legislation	Key Strategic, Policy, and Planning Documents
Commonwealth	• *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)	• Nature Positive Plan: better for the environment, better for business (DCCEEW 2022a) • Australia's Strategy for Nature 2019-2030 (Commonwealth of Australia 2019)
State	• *Environmental Protection Act 1986* (EP Act) • *Conservation and Land Management Act 1984* (CALM Act) • *Planning and Development Act 2005* (PD Act) • *Biodiversity Conservation Act 2016* (BC Act) • *Soil and Land Conservation Act 1945* (SLC Act) • *Biosecurity and Agriculture Management Act 2007* (BAM Act) • *Aboriginal Heritage Act 1972* (AH Act)	• State Planning Strategy 2050 (Government of Western Australia 2014a) • Native Vegetation Policy for Western Australia (Government of Western Australia 2022) • WA Environmental Offsets Policy and Guidelines (Government of Western Australia 2011, 2014b) • State Planning Policy 2.0 – Environment and Natural Resources Policy • State Planning Policy 2.4 – Basic Raw Materials • State Planning Policy 2.7 – Public Drinking Water Source • State Planning Policy 2.8 – Bushland Policy for the Perth Metropolitan Region • State Planning Policy 2.9 – Water Resources • State Planning Policy 3.0 – Urban Growth and Settlement • State Planning Policy 3.7 – Planning in Bushfire Prone Areas • State Planning Policy 4.1 – State Industrial Interface • Liveable Neighbourhoods • Water Sensitive Urban Design

Local	• Local Government bylaws	• Strategic Community Plan 2020-2030
		• Corporate Business Plan 2023-2027
		• Reconciliation Action Plan 2023-2025
		• City of Armadale Local Planning Policies for environment and natural resources including:
		  ○ PLN 2.1 Development Envelopes
		  ○ PLN 2.4 Landscape Feature and Tree Preservation
		  ○ PLN 2.5 Erosion Prevention and Sediment Control
		  ○ PLN 2.6 Water Sensitive Design
		  ○ PLN 2.7 Environmental Management
		  ○ PLN 2.8 Subdivision
		  ○ PLN 2.9 Landscaping
		  ○ PLN 2.10 Environmentally Sustainable Design
		  ○ Local Government Guidelines for Subdivisional Development
		  ○ City of Armadale Subdivision and Development Guidelines

2.5 CURRENT APPROACH TO BIODIVERSITY MANAGEMENT AND CONTROL OF THREATS

The current approach to biodiversity management and the control of threats to biodiversity within the City incorporates strategic actions from the Corporate Business Plan, supporting strategies and service delivery (business as usual activities). The existing strategic and service delivery actions are listed below.

Current Strategic Actions including Corporate Business Plan and Supporting Strategies (SS):

- Through planning and engineering policies and processes, advocate for the environmental offsets to be located within City boundaries
- Delivery of Wungong River Detailed Design Project
- Implement the feral animal control program
- Implement the Dieback control program
- Preparation and implementation of Natural Area management plans (strategic) and supporting works programs
- Fauna (Management Plan) Project Implementation
- Recognise the connection that members of the Aboriginal community share with City managed land through the implementation of on-ground initiatives
- Delivery of the Habitat Links Program
- Implementation of the Armadale Settlers Common Recreational and Signage Strategy
- Develop and implement a program for the upgrade and maintenance of waterways within the City's reserves
- Deliver the Armadale Gosnells Landcare Group Business Plan in accordance with the MOU

Current business as usual activities:

- Environment personnel participating in the review of the Local Planning Strategy and Town Planning Scheme
- Implement, update and review of environmental Local Planning Polices
- Develop Assessment and Review Guidelines to support a consistent approach to land use change applications and technical report review and comment
- Provide comment on land use change applications
- Provision of comment on matters relating to Bushfire Mitigation activities
- Black Cockatoo Habitat Supplementation Program
- City representation on the Darling Range Regional Park Advisory Committee, Jandakot Regional Park Advisory Committee, Middle Canning Stakeholder Group, Southern East Regional Centre for Urban Landcare and Wetlands Coordinating Committee
- Delivery of the Plants for Residents Program, National Tree Day and the Bushcare and Environmental Working Group (BEWG) Plenary sessions
- Support bushland volunteers through BEWG and though the Friends Group Manual process
- Review corporate proposals and provide advice on environmental legislative framework
- Coordinate environmental approvals where required
- Natural Area management in accordance with a works program (weed, dieback, feral animals)

2.6 LOCAL NATURAL AREAS

LNAs are defined as natural areas excluding the DBCA Managed Estate, Regional Parks and Bush Forever sites (Del Marco *et al.* 2004). LNAs are natural areas under the management and control of the Local Government Authority within which they occur. This strategy will therefore focus on LNAs under the management and control of the City.

These are natural areas that are outside of the State Government's conservation estate, State Forests, Bush Forever areas or Development WA lands. LNAs are areas of bushland, wetlands, watercourses or rock outcrops on private lands, in Local Reserves and on other Government land which is not vested for conservation, water catchment or State Forest. LNAs include wetlands without remnant vegetation because these areas also have important biodiversity values. Bush Forever sites are excluded from the definition of LNA, except where the land is directly managed by the City.

3 STAKEHOLDERS

The City is committed to assisting and supporting environmental stakeholders in conserving and restoring LNAs throughout the City. The City identifies the stakeholders listed below as being involved in the conservation of biodiversity in the City:

- Community Groups:
  - First Nations Australians
  - The Armadale Community Environmental Centre
  - Armadale Gosnells Landcare Group
  - Armadale Settlers Common Working Group
  - Bushcare Environmental Working Group
  - Friends of Banyowla Regional Park Clifton Hills
  - Friends of Fletcher Park
  - Friends of Forrestdale
  - Friends of Goolamrup
  - Friends of Lloyd Hughes Park
  - Friends of Roley Pools
  - Palomino Reserve Catchment Group
  - Friends of Wright Brook
  - Roleybushcare
  - Wildflower Society – Armadale Branch

- Key internal stakeholders:
  - Elected Members of the City of Armadale
  - Executive level officers of the City of Armadale
  - Environment and Sustainability
  - Service Delivery (Parks Operation)
  - Design (Parks Design)
  - Development Services
  - Community Development
  - Economic Development
  - Rangers and Emergency Services

- Key external stakeholders Business Partners:
  - Department of Biodiversity, Conservation and Attractions
  - Department of Water and Environmental Regulation
  - Department of Planning, Lands and Heritage
  - Western Australian Planning Commission
  - Water Corporation
  - South East Regional Centre for Urban Landcare

4 INDICATORS OF STATE

Data analysis was undertaken to describe (indicate) the state of biodiversity assets in the City. Indicators of state have been developed for the following six key categories of biodiversity assets:

1. Native Vegetation Communities
2. Ecological Corridors and Key Habitat Areas
3. Native Fauna (Aquatic and Terrestrial) and Key Habitat
4. Native Flora (Aquatic and Terrestrial)
5. Wetlands
6. River, Watercourses and Tributaries

Indicators of the state of biodiversity assets within the City are summarised in the following sections, following an analysis of available data and information. Tables summarising each dataset relevant to each indicator are presented in **Appendices A** to **D**.

4.1 LAND-USE ZONES

Although not an indicator of state for biodiversity within the City, land-use zoning group categories (herein referred to as 'land-use zones' or 'zones' provide context for the distribution of biodiversity assets. The City supports eight land-use zones), as shown in **Table 2** and **Figure 2**. All biodiversity and related values across the City have been analysed in the context of each of these zones, in order to report on the indicators of state in relevant context.

Land-use zones within the City have varying levels of protection for native vegetation under the Town Planning Scheme. Certain zones are predominantly for different type of development, including residential, industrial and commercial, and have limited protection for native vegetation under the Town Planning Scheme. Areas in the 'Development zone' are only a temporary transitional classification that require a structure plan to be prepared and approved prior to any development intensification. This prevents more intensive development until the structure plan is in place, which includes, as part of the structure plan, the identification and setting aside of land areas containing high environmental/biodiversity value such as conservation wetlands, significant vegetation or protected fauna habitat, for public management for conservation and recreation in accordance with the required management plan, before significant ground-breaking or land clearing activity occurs. Development zones are specified where (usually) rural land is identified as suitable for future urban residential, industrial or commercial development.

Whilst, all rural zones are categorised as a single category (**Table 2**), it is important to note, that 13% of the rural zone (general rural) does not have specific remnant vegetation protection provisions under the Town Planning Scheme. Within the remaining 87% of the rural land-use zone (**Table 2**), clearing of remnant native vegetation, or the destruction or damage of native trees is not permitted, unless the City has granted an exemption under a planning, building or similar approval.

Part 4B7.3 of the Town Planning Scheme, only provides protection for particular trees or areas of native vegetation, within the general rural zone, that have been specifically identified for Tree Preservation under Schedule A - clause 80A or are located on a site for which a Development Envelope has been required under the provisions of clause 4.7. Despite this, State clearing regulations still apply within the general rural zone, unless clearing permit exemptions apply.

Table 2 – Area of land in each Land-Use Zone within the City of Armadale

Land-Use Zone	Area (ha)
Development including Urban Development	2,200.44
Industrial including District Centre, General Industry, Industrial Business, Mixed Business, Strategic Regional Centres	363.23
Infrastructure including Primary and Other roads, Railway	2,173.10
Public Purpose	1,352.41
Reservation including Park and Recreation, State Forest	40,209.01
Residential	3,097.24
Rural including General Rural, Special Rural	6,067.00
Waterways includes rivers, dams, reservoirs	487.49
TOTAL	**55,949.92**

The vast majority of native the City (71.86%) occurs within the reservation zone, with 10.84% falling within the rural zone. All other zones individually comprise of less than 5% of the City.

Figure 2 - Land-Use Zones

CITY OF Armadale

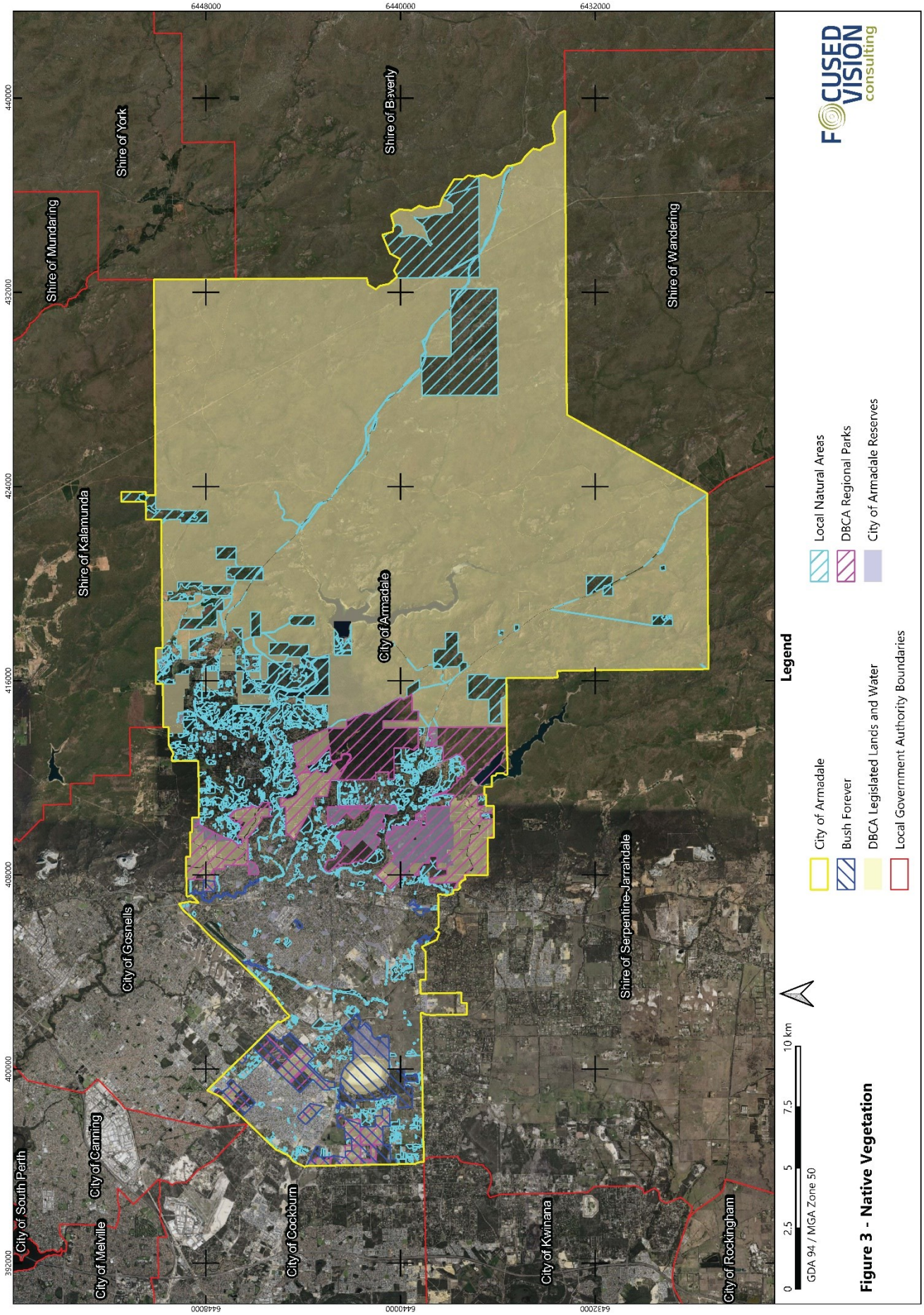
Native Vegetation

The City of Armadale comprises a total municipal land area of 55,949.92 hectares (ha). Of this, 42,766.90 ha (76.44%) of the pre-European extent of vegetation currently remains. A summary of the remaining extent of vegetation, according the custodian categories for discussion purposes, is presented in **Table 3** and spatially presented in **Figure 3**.

Table 3 – Summary of Remaining Remnant Vegetation in the City of Armadale

Administrative Planning Category	Area (ha)	% of Total
Total City Area	55,949.92	100
Urban/non-vegetated area	13,147.54	23.50
2020 native vegetation extent	42,766.90	76.44
Bush Forever	1,654.74	2.96
Regional Parks	4,671.92	8.35
Regional Parks managed by the City	861.52	1.54
Regional Parks managed by others (excluding DBCA)	370.05	0.66
DBCA Managed Lands	35,519.77	63.48
Local Natural Areas (LNAs)	5,677.16	10.15
All Reserves across the City	31,109.95	55.60
City of Armadale vested Reserves	1,569.65	2.81
State Forest	27,974.26	50.00
Water catchment areas	36,430.55	65.11
Freehold land	7,374.79	13.18

Note - Not all areas are exclusive and some support more than one classification of Administrative Planning Category

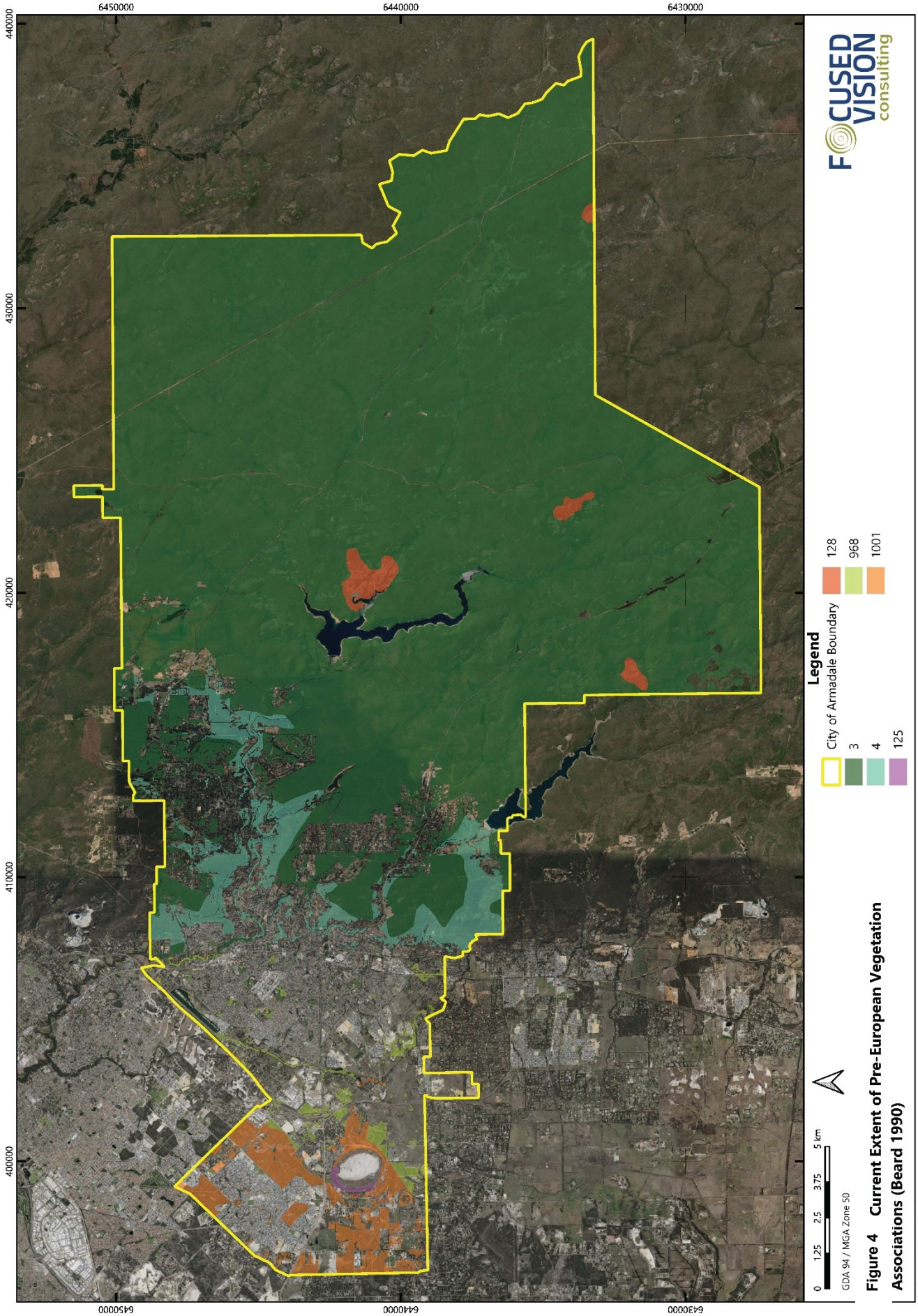

Shire of York
Shire of Beverly
Shire of Mundaring
Shire of Wandering
Shire of Kalamunda
City of Armadale
City of Gosnells
Shire of Serpentine-Jarrahdale
City of South Perth
City of Canning
City of Melville
City of Cockburn
City of Kwinana
City of Rockingham
Legend
City of Armadale
Bush Forever
DBCA Legislated Lands and Water
Local Government Authority Boundaries
Local Natural Areas
DBCA Regional Parks
City of Armadale Reserves
0
2.5
5
7.5
10 km
GDA 94 / MGA Zone 50
Figure 3 - Native Vegetation
COA2300 3 September 2023

Pre-European Vegetation

The six Beard (1990) vegetation associations supported within the City of Armadale, and the remaining extent across a range of contexts, are presented in **Table 4** and **Table 5** and spatially in **Figure 4**.

The objective of the Environmental Protection Authority (EPA) in relation to flora and vegetation is 'to protect flora and vegetation so that biological diversity and ecological integrity are maintained' (EPA 2016). The EPA considers it is important that ecological communities are maintained above a threshold level of 30% of the original pre-clearing extent of the community in unconstrained areas and 10% within 'constrained' areas for example the Perth Metropolitan Region (EPA 2008).

The City of Armadale is one of 30 Local Governments located within the Perth Metropolitan Region. The collective 10% retention target for the original pre-European extents for specific ecological communities applies to these Local Governments, since the Metropolitan Region is considered 'constrained'. As per 2020 extents, one of the vegetation associations, association 968, was documented to be represented by less than 10% (6.97%) of its pre-European extent within the City of Armadale. Within the City, vegetation association 968 (Medium woodland, Jarrah, Marri and Wandoo) occurs on the Swan Coastal Plain, adjacent to areas that have been heavily cleared and modified for residential development or agriculture.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City of Armadale Boundary
128
968
1001
3
4
125
0
1.25
2.5
3.75
5 km
GDA 94 / MGA Zone 50
FOCUSED VISION consulting
Figure 4 Current Extent of Pre-European Vegetation Associations (Beard 1990)
COA23001 15 August 2023

Table 4 - Pre-European Vegetation Extent within the City of Armadale (Beard 1990, Government of Western Australia 2019)

Context	Veg. Association No.	Broad Vegetation Description	Pre–European Extent (ha)	Current Extent (ha)	% Pre-European Extent Remaining
Western Australia	3	Medium forest; jarrah-marri	2,661,404.62	1,803,437.48	67.76
	4	Medium woodland; marri & wandoo	1,054,279.89	284,102.41	26.95
	125	Bare areas; salt lakes	3,485,785.49	3,146,487.22	90.27
	128	Bare areas; rock outcrops	329,836.19	288,813.54	87.56
	968	Medium woodland; jarrah, marri & wandoo	296,877.84	95,048.82	32.02
	1001	Medium very sparse woodland; jarrah, with low woodland; banksia & casuarina	57,410.23	12,660.76	22.05
City of Armadale	3	Medium forest; jarrah-marri	42,944.33	38,844.50	90.45
	4	Medium woodland; marri & wandoo	4,007.13	1,997.38	49.85
	125	Bare areas; salt lakes	218.88	34.26	15.65
	128	Bare areas; rock outcrops	390.17	370.86	95.05
	968	Medium woodland; jarrah, marri & wandoo	5,056.18	352.33	6.97
	1001	Medium very sparse woodland; jarrah, with low woodland; banksia & casuarina	3,332.90	1,167.57	35.03

Red shaded row/s indicate current representation is less than 10% of pre-European extent in the City of Armadale.
Yellow shaded row/s indicate current representation is greater than 10% but less than 30% of pre-European extent in the City of Armadale.

Table 5 - Pre-European Vegetation Association (Beard 1990) Extent within the City of Armadale by Zone

Veg. Association No.	Zone															
	Development		Industrial		Infrastructure		Public Purpose		Reservation		Residential		Rural		Waterways	
	Extent Remaining (ha)	Extent Remaining (%)	Extent Remaining (ha)	Extent Remaining (%)	Extent remaining (ha)	Extent Remaining (%)	Extent Remaining (ha)	Extent Remaining (%)	Extent Remaining (ha)	Extent Remaining (%)	Extent Remaining (ha)	Extent Remaining (%)	Extent Remaining (ha)	Extent Remaining (%)	Extent Remaining (ha)	Extent Remaining (%)
3	0.21	0.0005	0.94	0.002	337.72	0.87	1,109.35	2.86	35,573.19	91.58	123.89	0.32	1,683.09	4.33	16.11	0.04
4	-	-	0.01	0.0005	31.09	1.56	8.64	0.43	1,341.55	67.17	44.04	2.20	552.82	27.68	19.23	0.96
125	-	-	-	-	2.40	7.01	-	-	30.27	88.38	-	-	1.58	4.61	-	-
128	-	-	-	-	-	-	-	-	367.79	99.17	-	-	-	-	3.07	0.83
968	120.99	34.34	1.00	0.29	19.75	5.61	1.01	0.29	150.59	42.74	3.75	1.06	48.35	13.72	6.88	1.95
1001	53.98	4.62	-	-	15.64	1.34	3.52	0.30	881.96	75.54	0.41	0.04	212.06	18.16	-	-
TOTAL	**179.42**		**1.95**		**406.60**		**1122.52**		**38,341.11**		**172.09**		**2,497.90**		**45.29**	

4.1.1 Vegetation Complexes

Vegetation complexes mapped by Heddle *et al.* (1980) are categorised based on vegetation in association with landforms and underlying geology. There are 18 vegetation complexes within the City of Armadale and the remaining extents of each across a range of contexts is presented in **Table 6** and **Table 7** and spatially in **Figure 5** and **6**.

As per 2020 extents, three of the vegetation complexes, Beermullah, Forrestfield and Guildford, are represented by 6.59%, 4.97% and 2.17%, respectively, which is less than 10% of their pre-European extent within the City.

Table 6 - Vegetation Complex (Heddle *et al.* 1980) Extent within the City of Armadale

Vegetation Complex	Vegetation Description	Pre–European Extent (ha) within the City	Current Extent (ha) within the City*	% Pre-European Extent Remaining
Bassendean Complex-Central and South	Vegetation ranges from woodland of *Eucalyptus marginata* (Jarrah) - *Allocasuarina fraseriana* (Sheoak) - *Banksia* species to low woodland of *Melaleuca* species, and sedgelands on the moister sites. This area includes the transition of *Eucalyptus marginata* (Jarrah) to *Eucalyptus todtiana* (Pricklybark) in the vicinity of Perth.	879.62	348.54	39.62
Beermullah Complex	Mixture of low open forest of *Casuarina obesa* (Swamp Sheoak) and open woodland of *Corymbia calophylla* (Marri) - *Eucalyptus wandoo* (Wandoo) - *Eucalyptus marginata* (Jarrah). Minor components include closed scrub of *Melaleuca* species and occurrence of *Actinostrobus pyramidalis* (Swamp Cypress).	682.82	45.03	6.59
Cooke (Ce)	Mosaic of open forest of *Eucalyptus marginata* subsp. *marginata-Corymbia calophylla* (subhumid zone) and open forest of *Eucalyptus marginata* subsp. *thalassica-Corymbia calophylla* (semiarid and arid zones) and on deeper soils adjacent to outcrops, closed heath of Myrtaceae-Proteaceae species and lithic complex on granite rocks and associated soils in all climate zones, with some *Eucalyptus laeliae* (semiarid), and *Allocasuarina huegeliana* and *Eucalyptus wandoo* (mainly semiarid to perarid zones).	789.99	776.76	98.33
Darling Scarp (DS2)	Mosaic of open forest of *Eucalyptus marginata* subsp. *marginata-Corymbia calophylla*, with some admixtures with *Eucalyptus laeliae* in the north (subhumid zone), with occasional *Eucalyptus marginata* subsp. *elegantella* (mainly in subhumid zone) and *Corymbia haematoxylon* in the south (humid zone) on deeper soils adjacent to outcrops, woodland of *Eucalyptus wandoo* (subhumid and semiarid zones), low woodland of *Allocasuarina huegeliana* on shallow soils over granite outcrops, closed heath of Myrtaceae-Proteaceae species and lithic complex on or near granite outcrops in all climate zones.	1,757.12	874.41	49.76
Dwellingup (D1)	Open forest of *Eucalyptus marginata* subsp. *marginata-Corymbia calophylla* on lateritic uplands in mainly humid and subhumid zones.	376.46	263.93	70.11
Dwellingup (D2)	Open forest of *Eucalyptus marginata* subsp. *marginata-Corymbia calophylla* on lateritic uplands in subhumid and semiarid zones.	19,222.42	17,506.74	91.07
Dwellingup (D4)	Open forest to woodland of *Eucalyptus marginata* subsp. *thalassica-Corymbia calophylla* on lateritic uplands in semiarid and arid zones.	1,416.26	1,392.43	98.32
Forrestfield Complex	Vegetation ranges from open forest of *Corymbia calophylla* (Marri) - *Eucalyptus wandoo* (Wandoo) - *Eucalyptus marginata* (Jarrah) to open forest of *Eucalyptus marginata* (Jarrah) - *Corymbia calophylla* (Marri) - *Allocasuarina fraseriana* (Sheoak) - Banksia species. Fringing woodland of *Eucalyptus rudis* (Flooded Gum) in the gullies that dissect this landform.	1,937.44	96.27	4.97

Vegetation Complex	Vegetation Description	Pre–European Extent (ha) within the City	Current Extent (ha) within the City*	% Pre-European Extent Remaining
Goonaping (G)	Mosaic of open forest of *Eucalyptus marginata* subsp. *marginata* (humid zones) and *Eucalyptus marginata* subsp. *thalassica* (semiarid to perarid zones) on the sandy-gravels, low woodland of *Banksia attenuata* on the drier sandier sites (humid to perarid zones) with some *Banksia menziesii* (northern arid and perarid zones) and low open woodland of *Melaleuca preissiana-Banksia littoralis* on the moister sandy soils (humid to perarid zones).	719.18	712.65	99.09
Guildford Complex	A mixture of open forest to tall open forest of *Corymbia calophylla* (Marri) - *Eucalyptus wandoo* (Wandoo) - *Eucalyptus marginata* (Jarrah) and woodland of *Eucalyptus wandoo* (Wandoo) (with rare occurrences of *Eucalyptus lane-poolei* (Salmon White Gum)). Minor components include Eucalyptus rudis (Flooded Gum) - *Melaleuca rhaphiophylla* (Swamp Paperbark).	1,436.92	31.21	2.17
Helena 1 (He1)	Mosaic of open forest of *Corymbia calophylla-Eucalyptus patens-Eucalyptus marginata* subsp. *marginata* with some *Eucalyptus rudis* on the deeper soils ranging to closed heath and lithic complex on shallow soils associated with granite on steep slopes of valleys in humid and subhumid zones.	2,342.93	1,657.02	70.72
Murray 1 (My1)	Open forest of *Eucalyptus marginata* subsp. *marginata-Corymbia calophylla-Eucalyptus patens* on valley slopes to woodland of *Eucalyptus rudis-Melaleuca rhaphiophylla* on the valley floors in humid and subhumid zones.	8,188.92	7,284.47	88.96
Murray 2 (My2)	Open forest of *Eucalyptus marginata* subsp. *thalassica-Corymbia calophylla-Eucalyptus patens* and woodland of *Eucalyptus wandoo* with some *Eucalyptus accedens* on valley slopes to woodland of *Eucalyptus rudis-Melaleuca rhaphiophylla* on the valley floors in semiarid and arid zones.	54.43	54.43	100
Southern River Complex	Open woodland of *Corymbia calophylla* (Marri) - *Eucalyptus marginata* (Jarrah) - Banksia species with fringing woodland of *Eucalyptus rudis* (Flooded Gum) - *Melaleuca rhaphiophylla* (Swamp Paperbark) along creek beds.	4,110.12	1,084.73	26.39
Swamp (S)	Mosaic of low open woodland of *Melaleuca preissiana-Banksia littoralis*, closed scrub of Myrtaceae spp., closed heath of Myrtaceae spp. and sedgelands of *Baumea* and *Leptocarpus* spp. on seasonally wet or moist sand, peat and clay soils on valley floors in all climatic zones.	1,914.21	1,873.48	97.87
Swan Complex	Fringing woodland of *Eucalyptus rudis* (Flooded Gum) - *Melaleuca rhaphiophylla* (Swamp Paperbark) with localised occurrence of low open forest of *Casuarina obesa* (Swamp Sheoak) and *Melaleuca cuticularis* (Saltwater Paperbark).	160.67	23.30	14.50
Yarragil 1 (Yg1)	Open forest of *Eucalyptus marginata* subsp. *marginata-Corymbia calophylla* on slopes with mixtures of *Eucalyptus patens* and *Eucalyptus megacarpa* on the valley floors in humid and subhumid zones.	4,031.95	2,993.30	74.24
Yarragil 2 (Yg2)	Open forest of *Eucalyptus marginata* subsp. *thalassica-Corymbia calophylla* on slopes, woodland of *Eucalyptus patens-Eucalyptus rudis* with *Hakea prostrata* and *Melaleuca viminea* on valley floors in subhumid and semiarid zones.	5,928.47	5,748.19	96.96

*Remaining extent areas current as of 2020
Red shaded row/s indicate current representation is less than 10% of pre-European extent within the City of Armadale.
Yellow shaded row/s indicate current representation is greater than 10% but less than 30% of pre-European extent within the City of Armadale.

The remaining extents of the various vegetation complexes across the land-use zones in the City, as presented in **Table 7** illustrates that:

- a high proportion of the remaining extents of the Beermullah Complex (98.16%) and the Guildford Complex (78.50%) occur in the development zone (**Figure 6**).
- a high proportion of the remaining extents of the Forrestfield Complex (61.83%) and the Southern River Complex (77.75%) occur in the reservation zone.
- 40.73% of the remaining extent of the Swan Complex occurs in the Rural zone.

It is important to note that representation of complexes in each land use zone category does not necessarily mean the area will be subject to land use change of that nature.

The results indicate that 42,767 hectares (76%) of the City supports remnant vegetation and approximately 85% of this is east of Albany Highway (on the Darling Scarp).

There is one vegetation association and three vegetation complexes that are represented by less than 10% of their pre-European extent.

Vegetation represented by less than 10% of pre-European (pre-clearing) extent is considered at risk.

Table 7 - Vegetation Complex Extent within the City of Armadale by Zone (Heddle *et al.* 1980)

Vegetation Complex	Zone															
	Development		Industrial		Infrastructure		Public Purpose		Reservation		Residential		Rural		Waterways	
	Extent Remaining (ha)	Extent Remaining (%)	Extent Remaining (ha)	Extent Remaining (%)	Extent Remaining (ha)	Extent Remaining (%)	Extent Remaining (ha)	Extent Remaining (%)	Extent Remaining (ha)	Extent Remaining (%)	Extent Remaining (ha)	Extent Remaining (%)	Extent Remaining (ha)	Extent Remaining (%)	Extent Remaining (ha)	Extent Remaining (%)
Bassendean Complex-Central & South	0.04	0.01	-	-	4.17	1.20	-	-	196.06	56.25	-	-	148.27	42.54	-	-
Beermullah Complex	44.20	98.16	-	-	0.82	1.82	-	-	-	-	-	-	0.01	0.02	-	-
Cooke (Ce)	-	-	-	-	7.22	0.93	-	-	766.83	98.72	-	-	2.71	0.35	-	-
Darling Scarp (DS2)	-			-	10.94	1.25	6.24	0.71	665.77	76.14	14.14	1.62	173.70	19.86	3.62	0.41
Dwellingup (D1)	-	-	-	-	-	-	-6.24		263.92	99.99	-	-	0.01	0.004	-	-
Dwellingup (D2)	-		0.05	0.001	148.87	0.85	219.02	1.25	16,299.80	93.11	73.58	0.42	765.42	4.37	-	-
Dwellingup (D4)	-	-	-	-	13.98	1.00	-	-	1,378.45	98.99	-	-	-	-	-	-
Forrestfield Complex	6.45	6.70	0.89	0.92	7.50	7.79	4.18	4.334	59.52	61.83	4.49	4.66	6.87	7.14	6.38	6.63
Goonaping (G)	-	-	-	-	4.39	0.62	181.56	25.49	526.70	73.91	-	-	-	-	-	-
Guildford Complex	24.50	78.50	-	-	0.41	1.31	-	-	4.27	13.68	0.04	0.13	0.53	1.70	1.46	4.68
Helena 1 (He1)	-	-	0.008	0.01	27.35	1.65	0.23	0.01	1,174.91	70.91	62.25	3.76	377.95	22.81	14.32	0.86
Murray 1 (My1)	-	-	-	-	48.63	0.67	-	-	6,889.65	94.58	0.002	0.001	334.23	4.59	11.96	0.16
Murray 2 (My2)	-	-	-	-	6.04	11.10	-	-	48.39	88.90	-	-	-	-	-	-
Southern River Complex	99.35	9.16	0.98	0.09	26.39	2.43	3.52	0.32	843.40	77.75	0.42	0.4	108.84	10.03	1.82	0.17
Swamp (S)	-	-	-	-	14.28	0.76	196.08	10.48	1,626.61	86.82	-	-	36.51	1.95	-	-
Swan Complex	0.64	2.75	0.02	0.09	1.03	4.42	0.09	0.39	6.04	25.92	0.27	1.16	9.49	40.73	5.72	24.55
Yarragil 1 (Yg1)	-	-	-	-	30.31	1.01	23.87	0.80	2,502.39	83.60	16.91	0.56	419.82	14.03	-	-
Yarragil 2 (Yg2)	-	-	-	-	54.29	0.94	487.87	88.48	5,092.62	88.60	-	-	113.55	1.97	-	-
TOTAL	**175.18**		**1.95**		**406.62**		**1,122.51**		**38,341.09**		**172.10**		**2,497.91**		**45.28**	

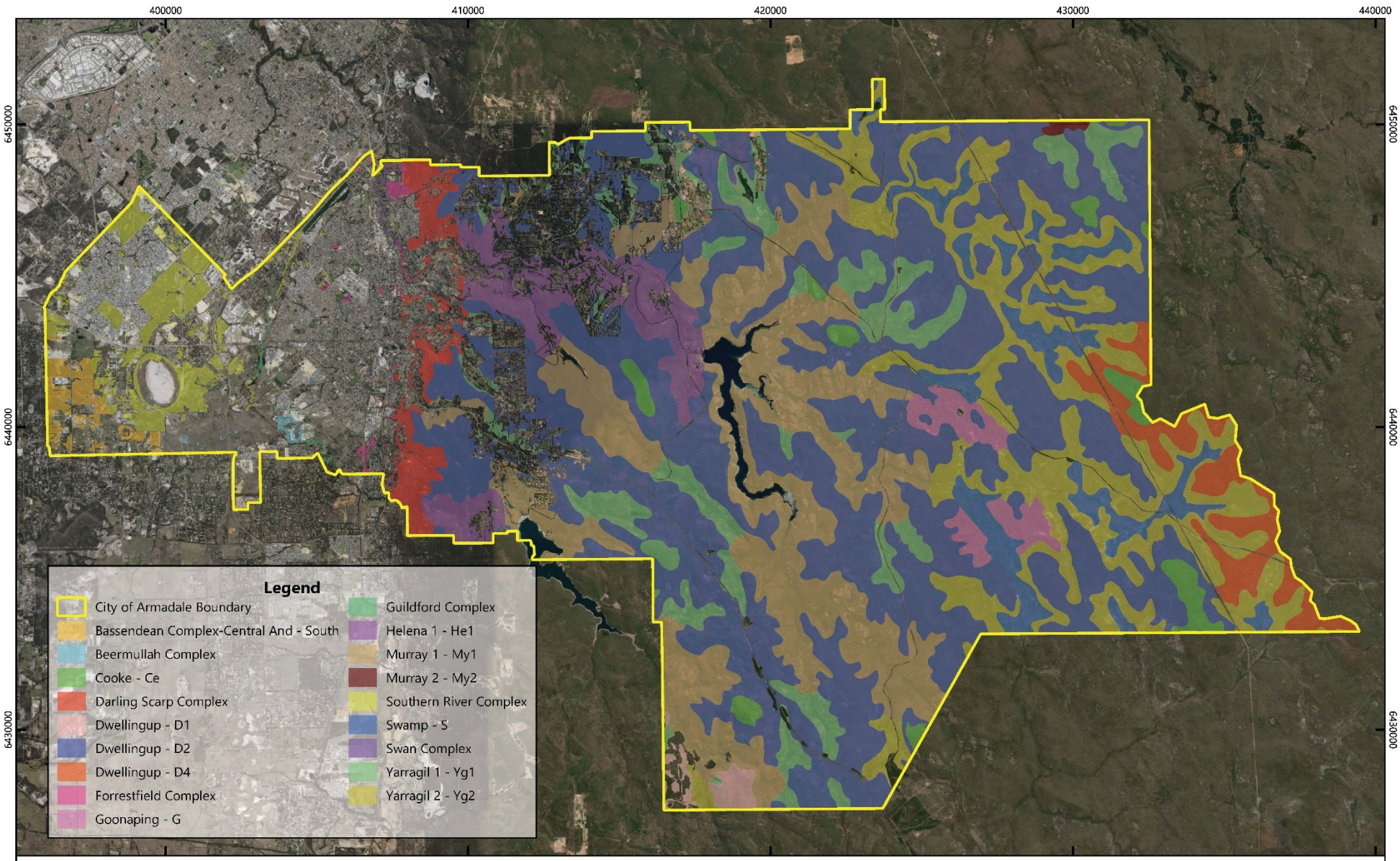

Figure 5 - Current Extent of Vegetation Complexes (Heddle *et al.* 1980)

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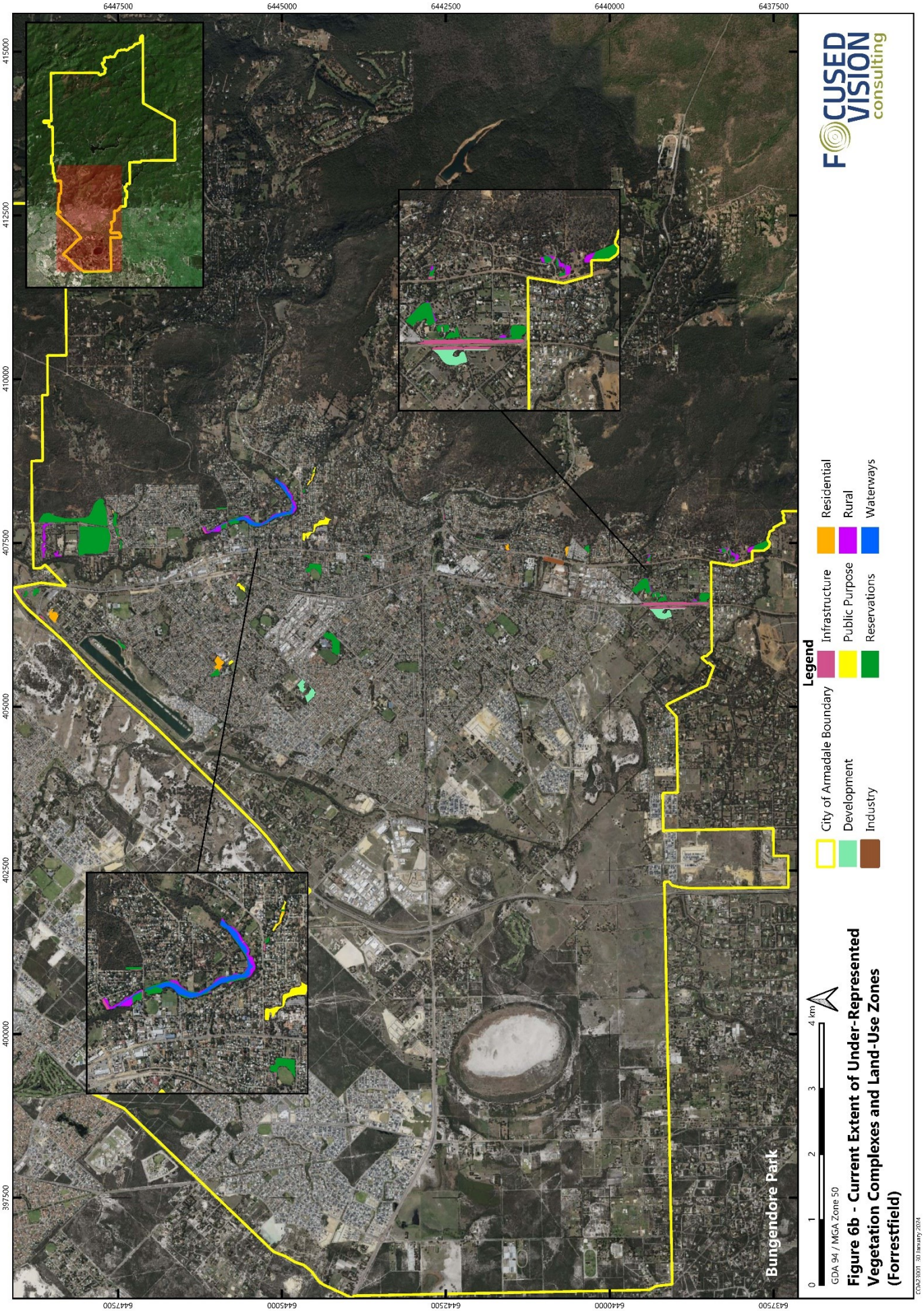
CITY OF Armadale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402500
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397500
Bungendore Park
Legend
City of Armadale Boundary
Development
Industry
Infrastructure
Public Purpose
Reservations
Residential
Rural
Waterways
0
1
2
3
4 km
GDA 94 / MGA Zone 50
Figure 6b - Current Extent of Under-Represented Vegetation Complexes and Land-Use Zones (Forrestfield)
FOCUSED VISION consulting

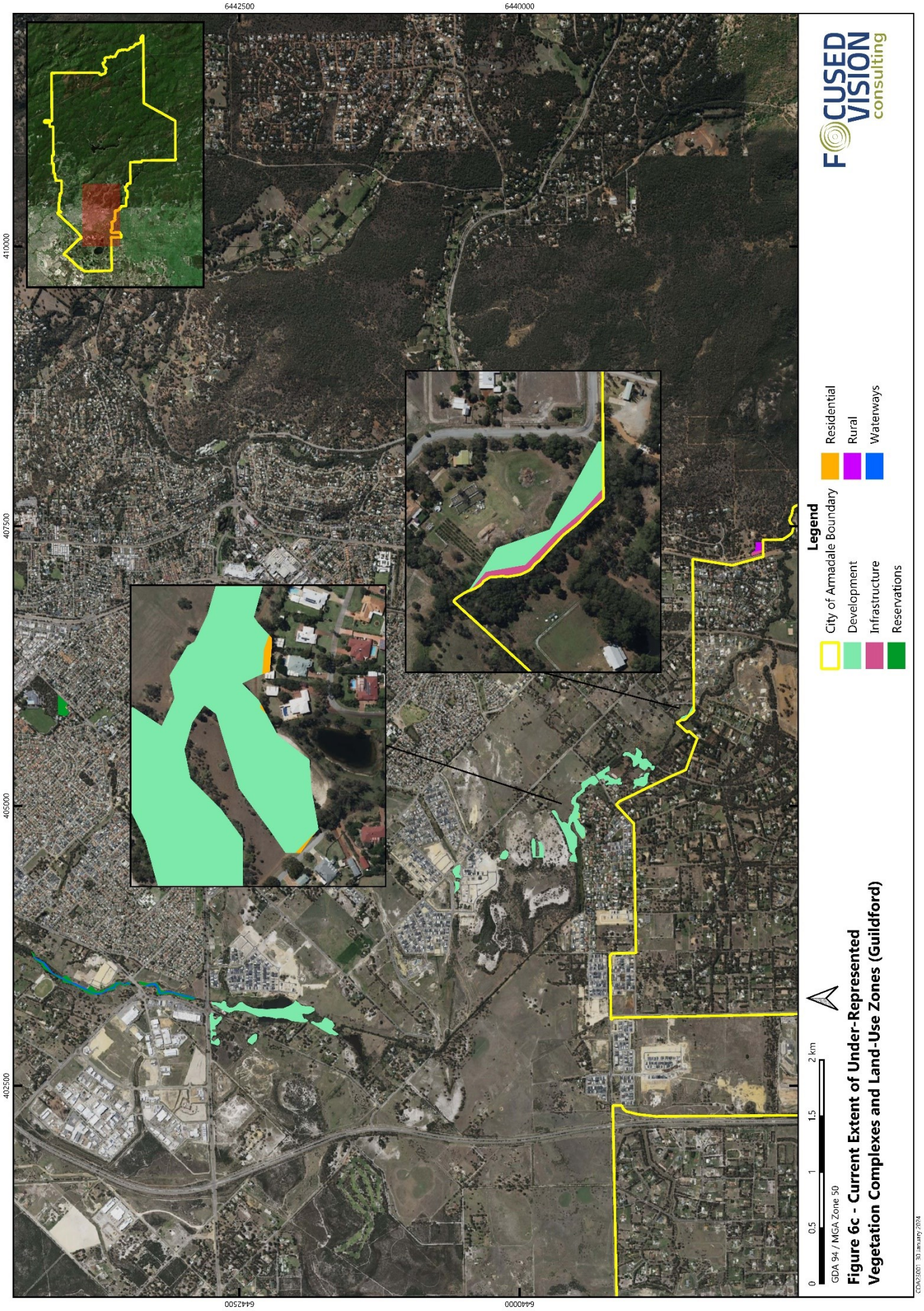

Figure 6c - Current Extent of Under-Represented Vegetation Complexes and Land-Use Zones (Guildford)

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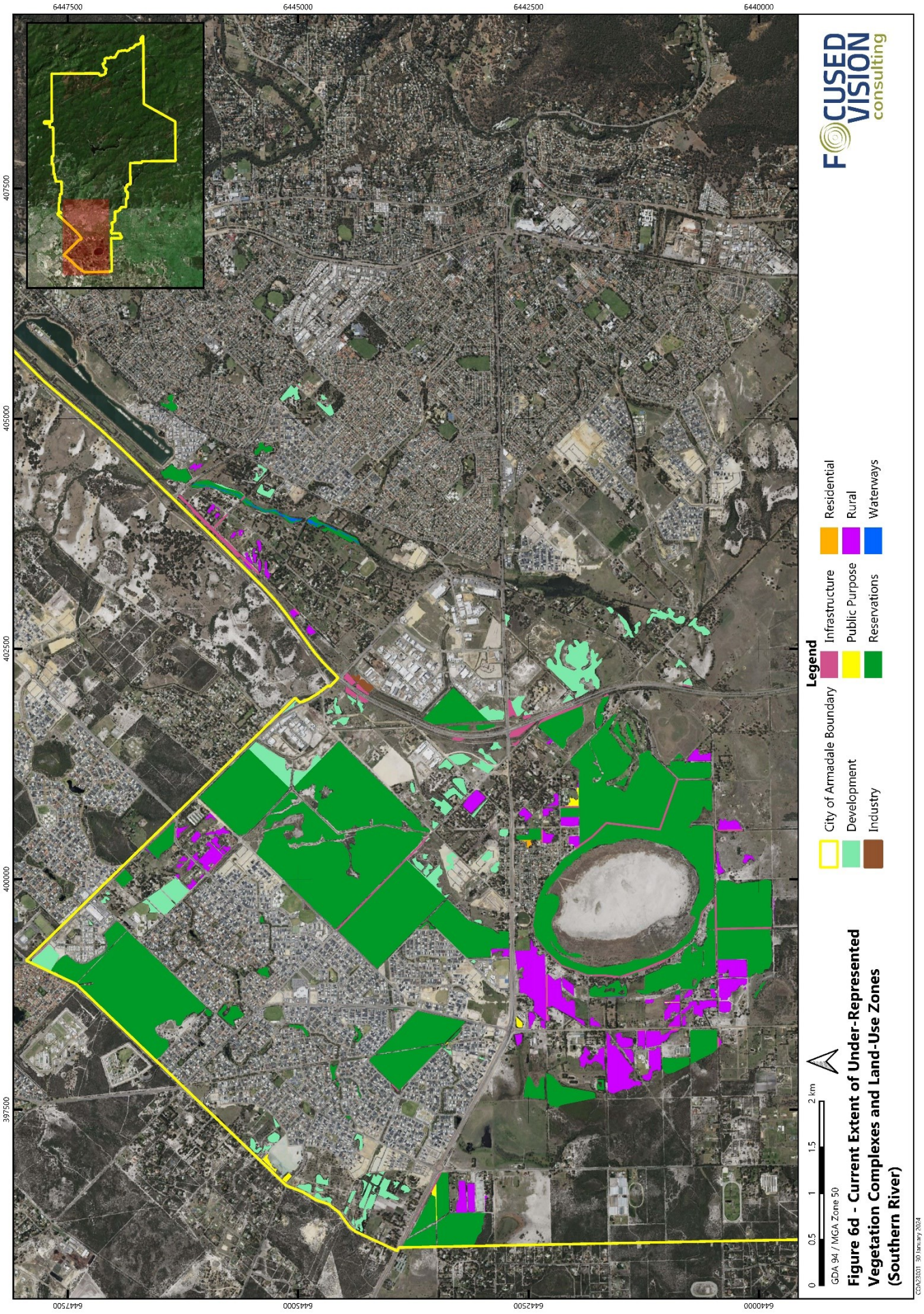

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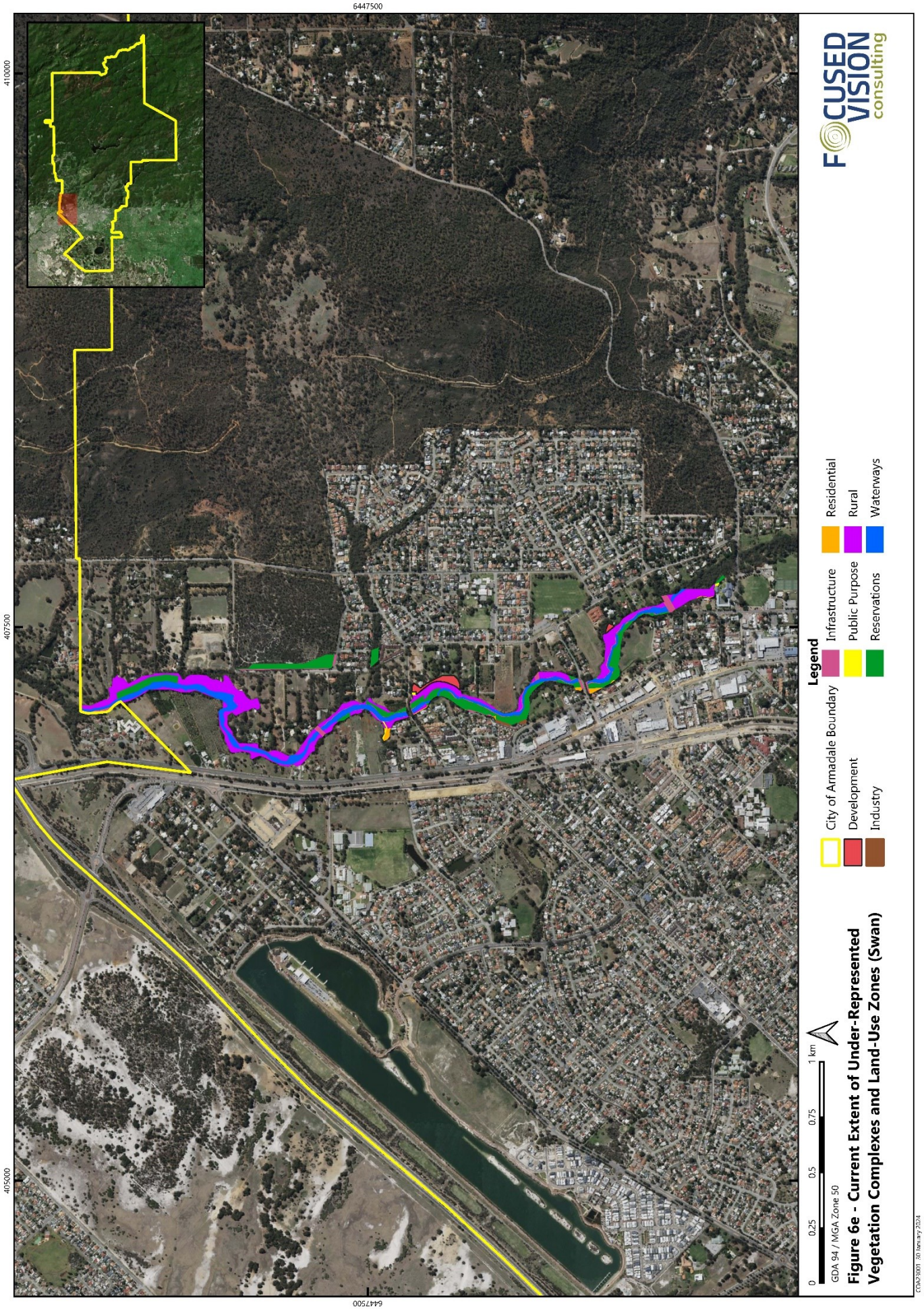


CITY OF Armadale

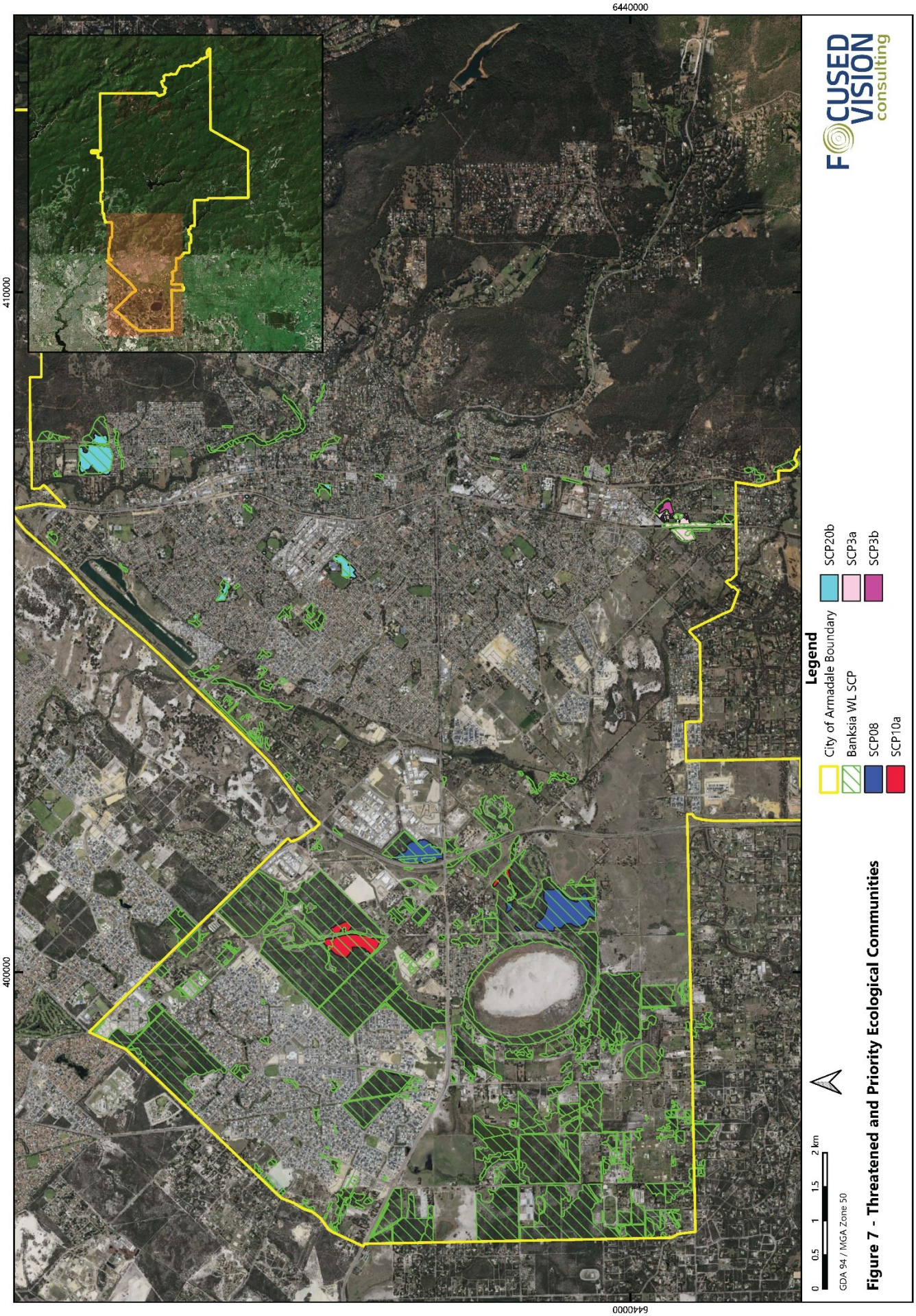
4.1.2 Threatened and Priority Ecological Communities

Threatened Ecological Communities (TECs) are listed for protection under either the BC Act, the Commonwealth EPBC Act, or both. Priority Ecological Communities (PECs) are afforded some protection by the Department of Biodiversity, Conservation and Attractions (DBCA).

A review of the DBCA TEC and PEC database and the EPBC Act Protected Matters Search Tool (PMST) (DCCEEW 2023) identified seven Commonwealth-listed TECs and one State-listed TEC as occurring, or potentially occurring, within the City (**Table 8**). The TECs and PECs known to occur in the City (in accordance with the current DBCA database) are presented spatially in **Figures 7** and **8**. A summary of the extent of each TEC within the City is summarised in **Table 9**.

Table 8 - Threatened and Priority Ecological Communities Occurring within the City of Armadale

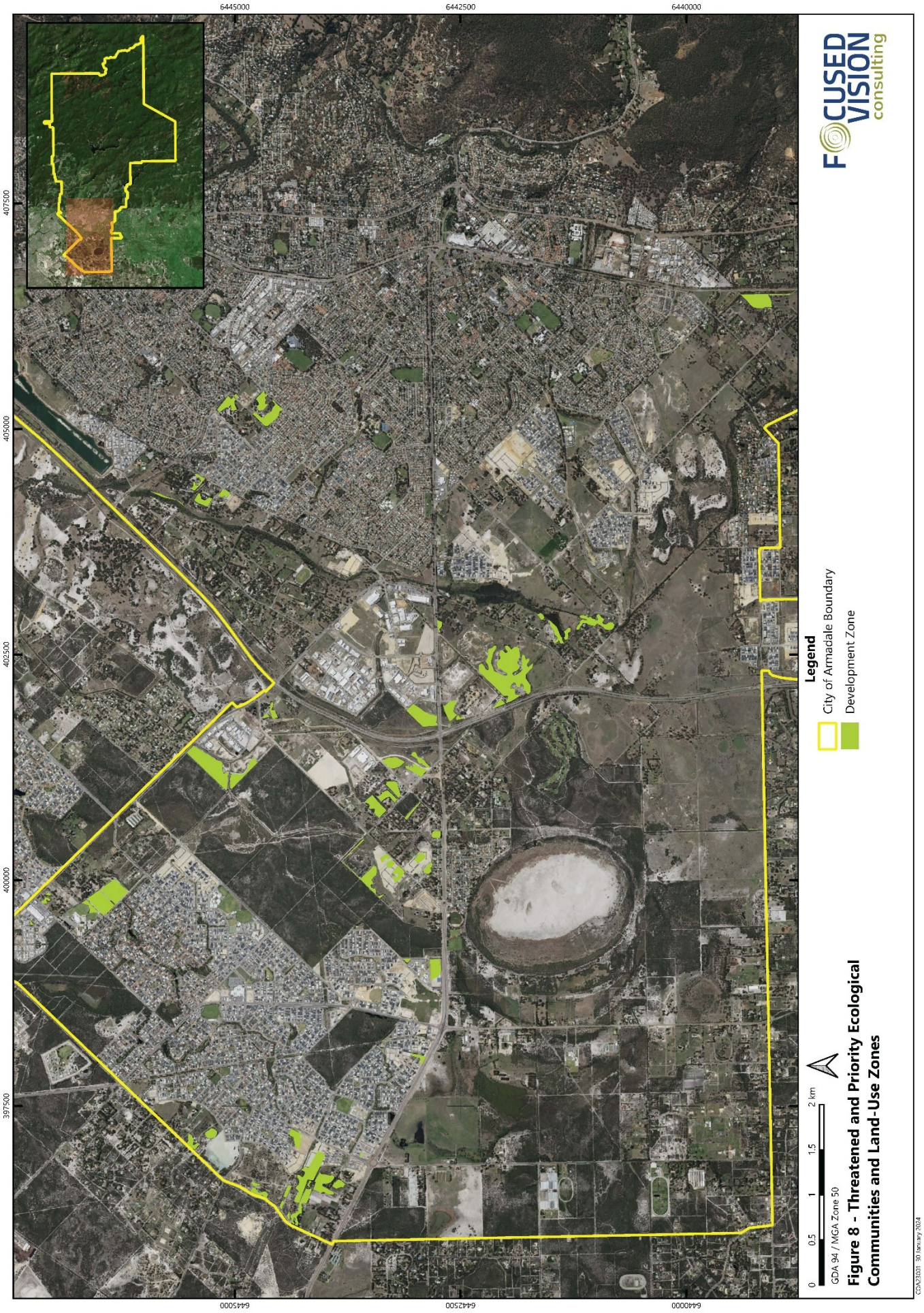
Abbreviated Identifier	Community Name	Commonwealth Category	State Category	Presence within the City	Source
Clay Pans of the SCP	Clay Pans of the Swan Coastal Plain	Critically Endangered	-	Part SCP08/10a	EPBC PMST
SCP 08	Herb rich shrublands in clay pans (Floristic Community Type 8 as originally described in Gibson *et al*. (1994))	Critically Endangered	Vulnerable	Yes	DBCA
SCP 10a	Shrublands on dry clay flats (floristic community type 10a as originally described in Gibson *et al*. (1994))	Critically Endangered	Endangered	Yes	DBCA
Banksia WL SCP	Banksia Woodlands of the Swan Coastal Plain Ecological Community	Endangered	Priority 3	Yes	EPBC PMST DBCA
SCP 20b	*Banksia attenuata* and/or *Eucalyptus marginata* woodlands of the eastern side of the Swan Coastal Plain (floristic community type 20b as originally described in Gibson *et al.* (1994))	Endangered	Endangered	Yes	DBCA
SCP 3a	*Corymbia calophylla – Kingia australis* woodlands on heavy soils of the Swan Coastal Plain	Endangered	Critically Endangered	Yes	EPBC PMST DBCA
SCP 3b	*Corymbia calophylla - Eucalyptus marginata* woodlands on sandy clay soils of the southern Swan Coastal Plain (Floristic Community Type 3b as originally described in Gibson *et al.* (1994))	-	Vulnerable	Yes	EPBC PMST DBCA



CITY OF Armadale

Table 9 – Summary of Threatened and Priority Ecological Communities Extent within the City

TEC/PEC	Extent (ha) within Zone								
	Development	Industrial	Infrastructure	Public Purpose	Reservation	Residential	Rural	Waterway	TOTAL
Clay Pans of the SCP (EPBC)	4.02	0.09	1.82	-	68.34	-	-	-	74.27
Banksia WL SCP (EPBC)	100.99	0.99	37.28	8.11	1,064.15	6.72	218.32	7.55	1444.11
SCP 08	4.02	0.09	1.82	-	44.74	-	-	-	50.67
SCP 10a	-	-	-	-	23.60			-	23.6
SCP 20b	-	0.12	0.60	-	27.47	1.19	0.11	-	29.49
SCP 3a	3.65	0.002	6.03	-	5.42	-	0.003	-	15.105
SCP 3b	-	-	-	-	2.26	-	0.002	-	2.262


6445000
6442500
6440000
407500
405000
402500
400000
397500
Legend
City of Armadale Boundary
Development Zone
0
0.5
1
1.5
2 km
GDA 94 / MGA Zone 50
Figure 8 - Threatened and Priority Ecological Communities and Land-Use Zones
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4.1.2.1 Clay Pans of the Swan Coastal Plain

The Commonwealth-listed 'Clay pans of the Swan Coastal Plain' TEC, comprises the following four State-listed TECs and one State-listed PEC:

- SCP 07 – Herb rich saline shrublands in clay pans (Vulnerable)
- SCP 08 – Herb rich shrublands in clay pans (Vulnerable)
- SCP 09 – Dense shrublands on clay flats (Vulnerable)
- SCP 10a – Shrublands on dry clay flats (Endangered)
- Clay pans with mid dense shrublands of *Melaleuca lateritia* over herbs (Priority 1)

Of the four communities that comprise the Clay pans of the Swan Coastal Plain ecological community, two, SCP 08 and SCP 10a are known to be present within the City.

The species-diverse clay plan communities of the SCP occur where clay substrates are low in the landscape and form an impermeable layer close to the surface (DBCA 2019). There are no specific suites of flora that characterise all the clay pans, but they share general characteristics of substrate, landform, hydrology and vegetation structure (DBCA 2019).

4.1.2.2 SCP 08 - Herb Rich Shrublands in Clay Pans

This vegetation community type occurs in low lying flats with a clay impeding layer allowing seasonal inundation. While aquatic annuals are common, the pools are probably not inundated to the same depth or for the same length of time as in ecological community type SCP 07 (DSEWPAC 2012). This community forms part of the EPBC listed Clay Pans of the Swan Coastal Plain TEC.

This vegetation community type is dominated by one or more of the shrubs: *Viminaria juncea*, *Melaleuca viminea*, *Melaleuca lateritia*, *Kunzea micrantha* or *Kunzea recurva,* with occasional emergence of *Eucalyptus wandoo* (wandoo). Species such as *Hypocalymma angustifolium*, *Acacia lasiocarpa* var. *bracteolata* and *Verticordia huegelii* occur at moderate frequencies. This vegetation community type has a high percentage of weeds and appears to be the clay pan vegetation community type that has the greatest disturbance (DSEWPAC 2012), such as presence of aggressive weeds, clearing, or grazing.

4.1.2.3 SCP 10a – Shrublands on Dry Clay Flats

This is the most rapidly drying of the clay flats vegetation community types. The microtopography is generally shallower and has thin skeletal soils. This vegetation community type has a high species richness and includes the aquatic annuals and geophytes typical of other clay pan and clay flat vegetation community types (e.g., *Schoenus natans* (floating bog-rush), *Crassula natans*, *Eryngium pinnatifidum* subsp. *palustre*, *Wurmbea dioica* subsp. *alba* (Early Nancy) and *Amphibromus nervosus*). There are many species of herbs represented in this vegetation community type in spring. The shrub layer is dominated by *Hakea varia* and *Hakea sulcata,* which along with *Pericalymma ellipticum* (swamp teatree), is indicative of a short inundation period (DBCA 2020a, DSEWPaC 2012).

This community forms part of the EPBC listed Clay Pans of the Swan Coastal Plain TEC.

4.1.2.4 Banksia Woodlands TEC

The *Banksia Woodlands of the Swan Coastal Plain Ecological Community* (Banksia woodlands TEC) was approved for inclusion as an Endangered TEC under the EPBC Act on 16 September 2016. This ecological community is woodland associated with some soils of the Swan Coastal Plain with a prominent tree layer of Banksia with scattered Eucalypts and other tree species among or emerging above the canopy. The understorey is comprised of a species rich mix of sclerophyllous shrubs, graminoids and forbs (TSSC 2016).

The Banksia woodlands TEC is largely restricted to the Swan Coastal Plain IBRA bioregion, within the Perth (SWA02) and Dandaragan (SWA01) sub-regions. It extends into the adjacent Jarrah Forrest IBRA region (JA01 and JA02 sub-regions) and areas of the Whicher and Darling escarpments where pockets of Banksia woodland may occur. This TEC mainly occurs on deep Bassendean and Spearwood sands or occasionally on Quindalup sands at the eastern edge (Threatened Species Scientific Committee (TSSC) 2016).

4.1.2.5 SCP 20b – Eastern Banksia attenuata and/or Eucalyptus marginata woodlands of the eastern side of the Swan Coastal Plain (part of Banksia woodlands TEC)

This community occurs on sands at the base of the Darling Scarp primarily on Pinjarra Plain and Ridge Hill Shelf soils. The community comprises woodlands of *Banksia attenuata* often with *Eucalyptus marginata*. The presence of *Hakea stenocarpa, Conostylis setosa* and *Johnsonia pubescens* subsp. *cygnorum* is considered an indicator of this community (DBCA 2023).

4.1.2.6 SCP 3a - Corymbia calophylla – Kingia australis woodlands on heavy soils, Swan Coastal Plain (TEC)

The *Corymbia calophylla – Kingia australis* woodlands on heavy soils of the Swan Coastal Plain ecological community is a woodland community located on heavy soils of the eastern side of the Swan Coastal Plain between Ruabon and Guildford (DEE 2017). This TEC occurs on sites wetter than those of FCT 3b or 3c and is associated with the median species richness, and lowest level of weed invasion and disturbance (DPaW 2011).

This TEC is typically dominated by; *Corymbia calophylla* (Marri); *Banksia dallanneyi, Philotheca spicata, Kingia australis* and *Xanthorrhoea preissii;* over herbs, rushes and sedges of *Cyathochaeta avenacea, Dampiera linearis, Haemodorum laxum, Desmocladus fasciculatus, Mesomelaena tetragona* and *Tetraria* (now *Morelotia*) *octandra* (DEE 2017).

4.1.2.7 SCP 3b - Corymbia calophylla – Eucalyptus marginata woodlands on sandy clay soils of the southern Swan Coastal Plain (TEC)

The *Corymbia calophylla - Eucalyptus marginata* woodlands on sandy clay soils of the southern Swan Coastal Plain ecological community (SCP 3b) is characterised by an overstorey of dominated by both *Corymbia calophylla* (Marri) and *Eucalyptus marginata* (Jarrah) (DBCA 2020b). Other typical species include: *Bossiaea eriocarpa*, *Conostylis juncea, Hibbertia hypericoides, Tetraria* (now *Morelotia*) *octandra, Chamaescilla corymbosa, Desmocladus fasciculatus, Banksia dallanneyi, Mesomelaena tetragona, Babingtonia camphorosmae, Lepidosperma squamatum, Neurachne alopecuroidea, Philotheca spicata, Burchardia congesta, Caesia micrantha, Kingia australis, Drosera erythrorhiza, Lomandra hermaphrodita* and *Caladenia flava* (DBCA 2020b). This community is distributed between Wattle Grove and Harvey.

4.1.3 Matters of National Environmental Significance

The results of the interrogation of the EPBC Act PMST (**Appendix B**) were used to identify potential Matters of National Environmental Significance (MNES) within the City of Armadale. MNES within the City of Armadale are summarised in **Table 10**.

Table 10 – MNES Within the City of Armadale (DCCEEW 2023)

MNES	Existing Environment
World Heritage Properties	None
National Heritage Places	None
Wetlands of International Importance (Ramsar Wetlands)	One Ramsar wetland occurs within the City. Forrestdale Lake (Ramsar Ref 35) occurs approximately 200 m south of Armadale Road in Forrestdale
Great Barrier Reef Marine Park	None
Commonwealth Marine Area	None
Listed Threatened Ecological Communities	The EPBC PMST identified the following five listed TECs within the City (**Table 6**): • *Banksia* Woodland of the Swan Coastal Plain ecological community • Clay Pans of the Swan Coastal Plain • *Corymbia calophylla – Kingia australis* Woodlands of heavy soils of the Swan Coastal Plain • *Corymbia calophylla – Xanthorrhoea preissii* Woodlands and Shrublands of the Swan Coastal Plain • Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain ecological community
Listed Threatened Species	A total of 45 Threatened species are known or have the potential to occur within the City, which comprises of: • 11 birds • two insects • five mammals • 26 plant taxa
Listed Migratory Species	A total of 20 migratory species are known or have the potential to occur within the City, which comprises of: • one Migratory marine bird • one Migratory terrestrial bird • 18 Migratory wetland fauna

4.1.4 Aboriginal Heritage

Aboriginal heritage sites are defined in the AH Act. DPLH maintains the register of Aboriginal heritage sites and provides a publicly available Aboriginal Heritage Inquiry System (AHIS). A search the AHIS identified a total of 72 Aboriginal Cultural Heritage sites that occur within the City of Armadale (**Appendix C, Figure 9**). This comprises of 58 Registered heritage sites and 14 Lodged sites. An additional 77 'Stored Data/Not a Site' records also occur. The number of Aboriginal heritage sites occurring within each land-use zone is presented in **Table 11**.

Table 11 – Summary of Aboriginal Heritage Sites within Land-Use Zones

Status	Number of Aboriginal Heritage Sites in Land-Use Zones							
	Development	Industrial	Infrastructure	Public Purpose	Reservation	Residential	Rural	Waterways
Registered Site	31	6	16	3	28	3	6	7
Lodged	5	-	11	-	6	3	-	-
Stored Data/Not a Site	52	5	24	1	19	3	7	3
TOTAL	**88**	**11**	**51**	**4**	**53**	**9**	**13**	**10**

*Aboriginal Heritage Sites may traverse multiple land-use zones

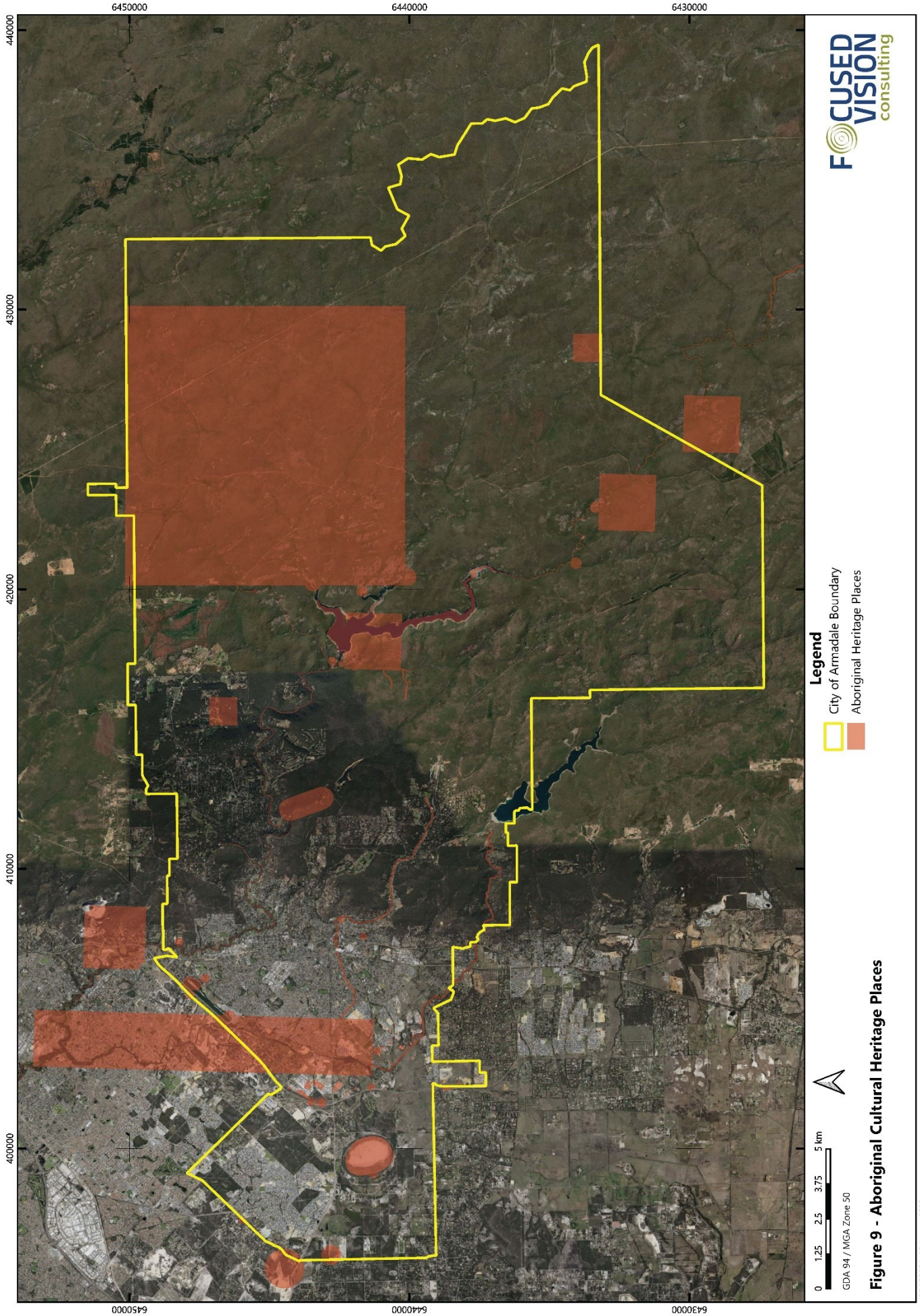


Figure 9 - Aboriginal Cultural Heritage Places

CITY OF Armadale

4.2 ECOLOGICAL CORRIDORS AND KEY HABITAT AREAS

Land clearing is a fundamental pressure on the environment and causes the loss, fragmentation and degradation of native vegetation (Jackson *et al*. 2017). The viability of any natural area depends on its size, proximity to other LNAs, and the quality of linkages or barriers in the landscape between them (Del Marco *et al.* 2004, Davis and Brooker 2008, Molloy *et al.* 2009). Ecological corridors and linkages are important for the connection of biodiversity and movement between natural areas, particularly key habitat areas.

Perth Biodiversity Project regional linkages that were identified within the City generally run east to west, and to a lesser extent, north to southeast to west (**Figure 8**). In addition, numerous riparian corridors occur throughout the City. Riparian corridors are the corridors that are formed by rivers and creeks and range from relatively major water courses, such as the Wungong River, through to minor creeks (City of Armadale 2009). A summary of regional ecological linkages and riparian corridors, as well as other key habitats within the City is presented in **Tables 12** and **13**.

A total of 14 Regional Ecological Linkages occur within the City and a large number traverse the infrastructure, reservation and rural zones.

A total of six existing Green Links occur within the City, with five links traversing infrastructure, reservation, rural and waterways zones.

A total of five proposed Green Links, newly identified as part of this strategy preparation, occur within the City, with five links traversing the infrastructure zone.

Table 12 - Summary of Ecological Linkages and Key Habitat Areas in the City of Armadale

Corridor	Comments
Regional Ecological Linkages	LBS ID: 34, 37, 38, 47, 48, 52, 54, 55, 56, 57, 61, 141, 142, 143
Streams	Water lines make up 633.98 km
Lakes	41 Lakes in dataset, of which 33 are man-made and eight are natural Most are small and insignificant except Wright Lake (man-made, incorporating Champion Lakes Regatta Centre) and Forrestdale Lake (natural)
Reservoirs	Churchmans Brook Dam, Wungong Dam, Canning Reservoir
Canning River Deep Pool Mapping	Canning River (downstream of Dam) is 22.71 km
Riparian Corridors	Comprise an area of 1,926.80 ha within the City This area encompasses naturally vegetated waterlines broadly including a 15 m buffer
City of Armadale Green links	Six existing green links Five proposed green links

Table 13 – Summary of Regional Ecological Corridors and Green Links within Land-Use Zones

Context	Number of Corridors or Linkages in Land-Use Zones							
	Development	Industrial	Infrastructure	Public Purpose	Reservation	Residential	Rural	Waterways
Regional Ecological Corridors	9	5	14	10	13	8	11	8
Existing Green Links	1	-	5	2	5	2	5	5
Proposed Additional Green Links	-	-	5	2	4	3	4	-

*Regional Ecological Corridors and Green Links may traverse multiple land-use zones

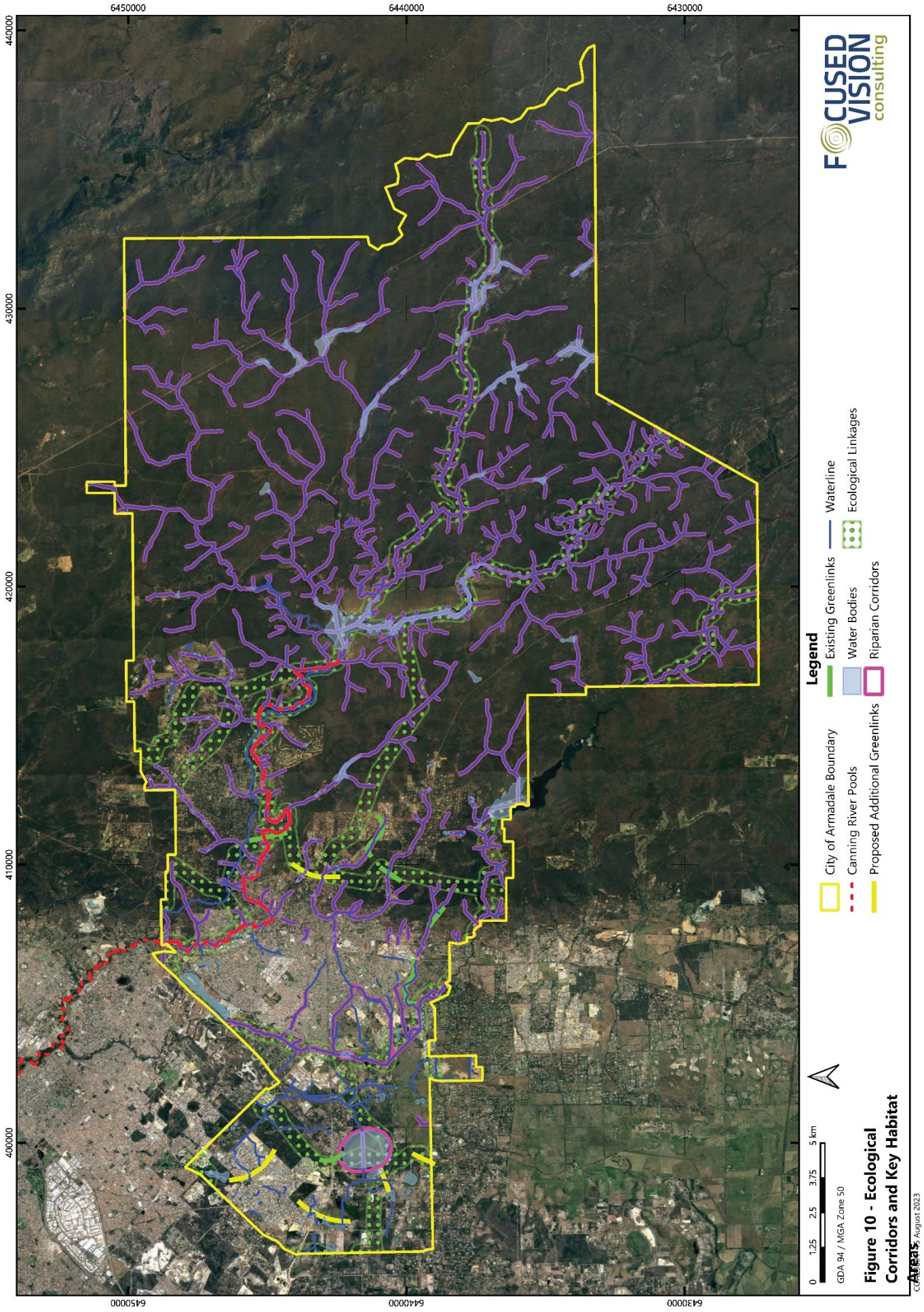


Figure 10 - Ecological Corridors and Key Habitat Areas

4.3 NATIVE FAUNA

Threatened fauna species are listed for protection under the State BC Act, the Commonwealth EPBC Act or both, whilst Priority fauna species are afforded some protection by DBCA.

The EPBC PMST identified 19 Commonwealth-listed fauna species, which comprises of 11 birds, two insects, five mammals and one invertebrate (**Appendix B**).

The DBCA database search results identified the presence of 46 significant fauna species, comprising of

- Twenty-six birds (23 listed under the EBPC Act, eight listed as Threatened under the BC Act)
- One fish (listed as Priority under the BC Act)
- Seven invertebrates (three listed as Threatened under the EBPC and BC Acts, four listed as Priority under the BC Act)
- Eight mammals (three listed as Threatened under the EBPC and BC Acts, one listed as conservation-dependent under the BC Act and four listed as Priority under the BC Act)
- Four reptiles (listed as Priority under the BC Act).

Of the 46 significant fauna species, five reside in or near water: Pouched Lamprey, Carters Fresh Water Mussel, McMillan's biting midge, Jarrah Forest Freshwater Snail and the Water-Rat (Rakali).

The DBCA database search results for significant fauna are summarised in **Table 14** and spatially presented in **Figure 11**.

All land-use zones have conservation significant fauna associated with them. The results show that 47.93% of the records occur in the Reservation land-use category. This is expected, given that many reserves are created specifically to retain the natural vegetation and habitats in public reserves. These areas are protected from land use change by the Town Planning Scheme in a Parks and Recreation reservation. Town Planning and land development processes for land-use change specifically creates and protects such land under public management, in order for protect areas of high environmental value including land values such as wetlands, foreshores and significant vegetation and fauna communities. Reserves, by virtue of the habitat they support, are also often the sites of environmental sampling and research projects.

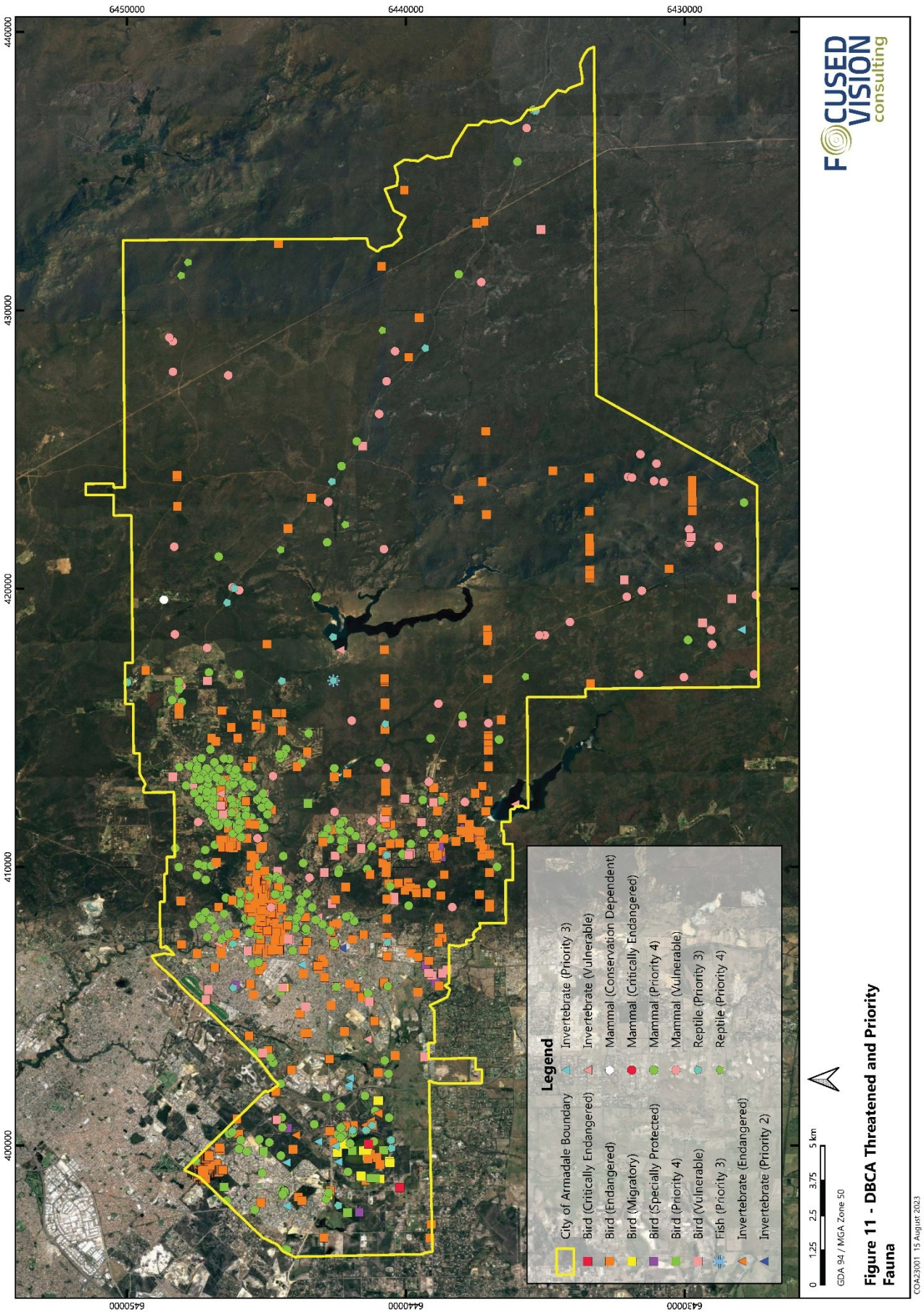
Records for three species of Black-Cockatoo are the most abundant in the significant fauna datasets. There is also a high number of records associated with Quenda.

Table 14 – DBCA Conservation Fauna Previously Recorded within the City

Name	Common Name	EPBC Act Cons. Code	WA Cons. Code	Number of Records								
				Development	Industrial	Infrastructure	Public Purpose	Reservation	Residential	Rural	Waterways	TOTAL
Calidris ferruginea	Curlew Sandpiper	Critically Endangered	Critically Endangered	-	-	1	-	26	-	4	-	**31**
Leioproctus douglasiellus	short-tongued bee	Critically Endangered	Endangered	-	-	-	-	2	-	-	-	**2**
Neopasiphae simplicior	short-tongued bee	Critically Endangered	Endangered	-	-	-	-	6	-	-	-	**6**
Bettongia penicillata ogilbyi	Woylie, Brush-tailed Bettong	Endangered	Critically Endangered	-	-	1	-	-	-	-	-	**1**
Botaurus poiciloptilus	Australasian Bittern	Endangered	Endangered	-	-	-	-	4	-	-	-	**4**
Calyptorhynchus baudinii	Baudin's Black-Cockatoo	Endangered	Endangered	4	1	41	11	55	50	66	7	**235**
Calyptorhynchus latirostris	Carnaby's Black-Cockatoo	Endangered	Endangered	74	31	-	7	646	422	7	3	**1,382**
Thalassarche chrysostoma	Grey-headed Albatross	Endangered	Vulnerable	-	-	-	-	-	1	-	-	**1**
Calyptorhynchus banksii naso	Forest Red-tailed Black-Cockatoo	Vulnerable	Vulnerable	6	4	10	1	17	9	19	-	**66**
Dasyurus geoffroii	Chuditch, Western Quoll	Vulnerable	Vulnerable	-	-	7	1	30	4	6	-	**48**
Leipoa ocellata	Malleefowl	Vulnerable	Vulnerable	-	-	-	-	1	-	-	-	**1**
Setonix brachyurus	Quokka	Vulnerable	Vulnerable	-	-	1	1	20	1	15	-	**38**
Westralunio carteri	Carter's Freshwater Mussel	Vulnerable	Vulnerable	1	-	2	-	6	-	-	4	**13**
Calyptorhynchus sp. 'white-tailed black cockatoo'	White-tailed Black-Cockatoo	Endangered	Endangered	-	-	-	-	3	1	1	-	**12**
Charadrius leschenaultii	Greater Sand Plover, Large Sand Plover	Migratory	Vulnerable	-	-	-	-	2	-	-	-	**2**
Apus pacificus	Fork-tailed Swift	Migratory	Migratory	-	-	-	-	1	-	-	-	**1**
Arenaria interpres	Ruddy Turnstone	Migratory	Migratory	-	-	-	-	2	-	-	-	**2**
Calidris acuminata	Sharp-tailed Sandpiper	Migratory	Migratory	-	-	-	-	45	3	1	-	**49**
Calidris melanotos	Pectoral Sandpiper	Migratory	Migratory	-	-	-	-	4	-	-	-	**4**
Calidris ruficollis	Red-necked Stint	Migratory	Migratory	-	-	1	-	57	-	3	-	**61**
Calidris subminuta	Long-toed Stint	Migratory	Migratory	-	-	-	-	15	-	-	-	**15**
Limosa limosa	Black-tailed Godwit	Migratory	Migratory	-	-	-	-	2	-	-	-	**2**

Name	Common Name	EPBC Act Cons. Code	WA Cons. Code	Number of Records								
				Development	Industrial	Infrastructure	Public Purpose	Reservation	Residential	Rural	Waterways	TOTAL
Pandion cristatus	Osprey, Eastern Osprey	Migratory	Migratory	-	-	1	-	-	-	-	-	**1**
Plegadis falcinellus	Glossy Ibis	Migratory	Migratory	-	-	-	-	16	1	2	-	**19**
Pluvialis fulva	Pacific Golden Plover	Migratory	Migratory	-	-	-	-	2	-	-	-	**2**
Pluvialis squatarola	Grey Plover	Migratory	Migratory	-	-	-	-	2	-	-	-	**2**
Stercorarius longicaudus	Long-tailed Jaeger, Long-tailed Skua	Migratory	Migratory	-	-	-	-	1	-	-	-	**1**
Tringa glareola	Wood Sandpiper	Migratory	Migratory	-	-	-	-	12	-	-	-	**12**
Tringa nebularia	Common Greenshank, Greenshank	Migratory	Migratory	-	-	-	-	55		2	-	**57**
Tringa stagnatilis	Marsh Sandpiper, Little Greenshank	Migratory	Migratory	-	-	-	-	2	-	-	-	**2**
Falco peregrinus	Peregrine Falcon		Other Specially Protected Fauna	2	-	1	1	31	1	1	-	**37**
Phascogale tapoatafa wambenger	South-western Brush-tailed Phascogale, Wambenger		Conservation Dependent	-	1	-	-	4	3	1	-	**9**
Austroconops mcmillani	McMillan's Biting Midge (Swan Coastal Plain)		Priority 2	-	-	-	1	-	-	-	-	**1**
Acanthophis antarcticus	Southern Death Adder		Priority 3	-	2	7	-	35	4	-	6	**54**
Geotria australis	Pouched Lamprey		Priority 3	-	-	-	-	1	-	-	-	**1**
Glacidorbis occidentalis	Jarrah Forest Freshwater Snail		Priority 3	-	-	-	-	1	-	-	-	**1**
Idiosoma sigillatum	Swan Coastal Plain Shield-backed Trapdoor Spider		Priority 3	4	-	2	-	1	4	-	-	**11**
Leioproctus contrarius	short-tongued bee		Priority 3	1	-	-	1	-	-	-	-	**2**
Lerista lineata	Perth Slider, Lined Skink		Priority 3	-	-	-	-	23	-	-	-	**23**
Neelaps calonotos	Black-striped Snake, Black-striped Burrowing Snake		Priority 3	-	-	-	-	1	-	-	-	**1**
Ctenotus delli	Dell's Skink, Darling Range Southwest Ctenotus		Priority 4	-	-	-	-	7	-	-	-	**7**
Falsistrellus mackenziei	Western False Pipistrelle, Western Falsistrelle		Priority 4	-	-	-	-	1	-	-	-	**1**
Hydromys chrysogaster	Water-rat, Rakali		Priority 4	-	-	2	1	3	2	-	-	**8**

Name	Common Name	EPBC Act Cons. Code	WA Cons. Code	Number of Records								
				Development	Industrial	Infrastructure	Public Purpose	Reservation	Residential	Rural	Waterways	TOTAL
Isoodon fusciventer	Quenda, Southwestern Brown Bandicoot		Priority 4	10	5	49	1	75	209	55	-	**404**
Notamacropus irma	Western Brush Wallaby		Priority 4	-	-	1	-	13	2	1	-	**17**
Oxyura australis	Blue-billed Duck		Priority 4	-	-	3	-	81	-	2	-	**86**
			TOTAL	**102**	**44**	**331**	**24**	**1,311**	**673**	**230**	**20**	**2,735**



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4.3.1 Black-Cockatoo Habitat

The City of Armadale lies within the modelled distribution of all three Black-Cockatoo species; Baudin's Black-Cockatoo, Carnaby's Black-Cockatoo and Forest Red-tailed Black-Cockatoo (DAWE 2022). DBCA Black-Cockatoo datasets indicate that confirmed and unconfirmed Black-Cockatoo breeding and roosting sites occur throughout the City and are summarised in **Table 15** and spatially presented in the **Figure 12** series. All three species have been observed within Bungendore Park, through visual observations, foraging evidence or from calls (Kirkby 2022).

Table 15 – DBCA Database Records of Black-Cockatoo Breeding and Roosting Habitat within the City

DBCA Black-Cockatoo Database	Closest Occurrence from LGA Boundary	Number (including buffer) Within the City
Black-Cockatoo breeding sites buffer (DBCA_063)	19 km north of City	0
Black-Cockatoo roosting site buffer (DBCA_064)	Occurs within the City	19
Carnaby's Black-Cockatoo confirmed roost (DBCA_050)	Occurs within the City	8
Carnaby's Black-Cockatoo confirmed roost 6 km buffer (DBCA_053)	Occurs within the City	1
Carnaby's Black-Cockatoo unconfirmed roost (DBCA_051)	Occurs within the City	3
Carnaby's Black-Cockatoo unconfirmed roost 6 km buffer (DBCA_053)	Occurs within the City	1
Carnaby's Black-Cockatoo Confirmed Breeding Areas within the Swan Coastal Plain and Jarrah Forest IBRA Regions (DBCA_054)	Occurs within the City	1

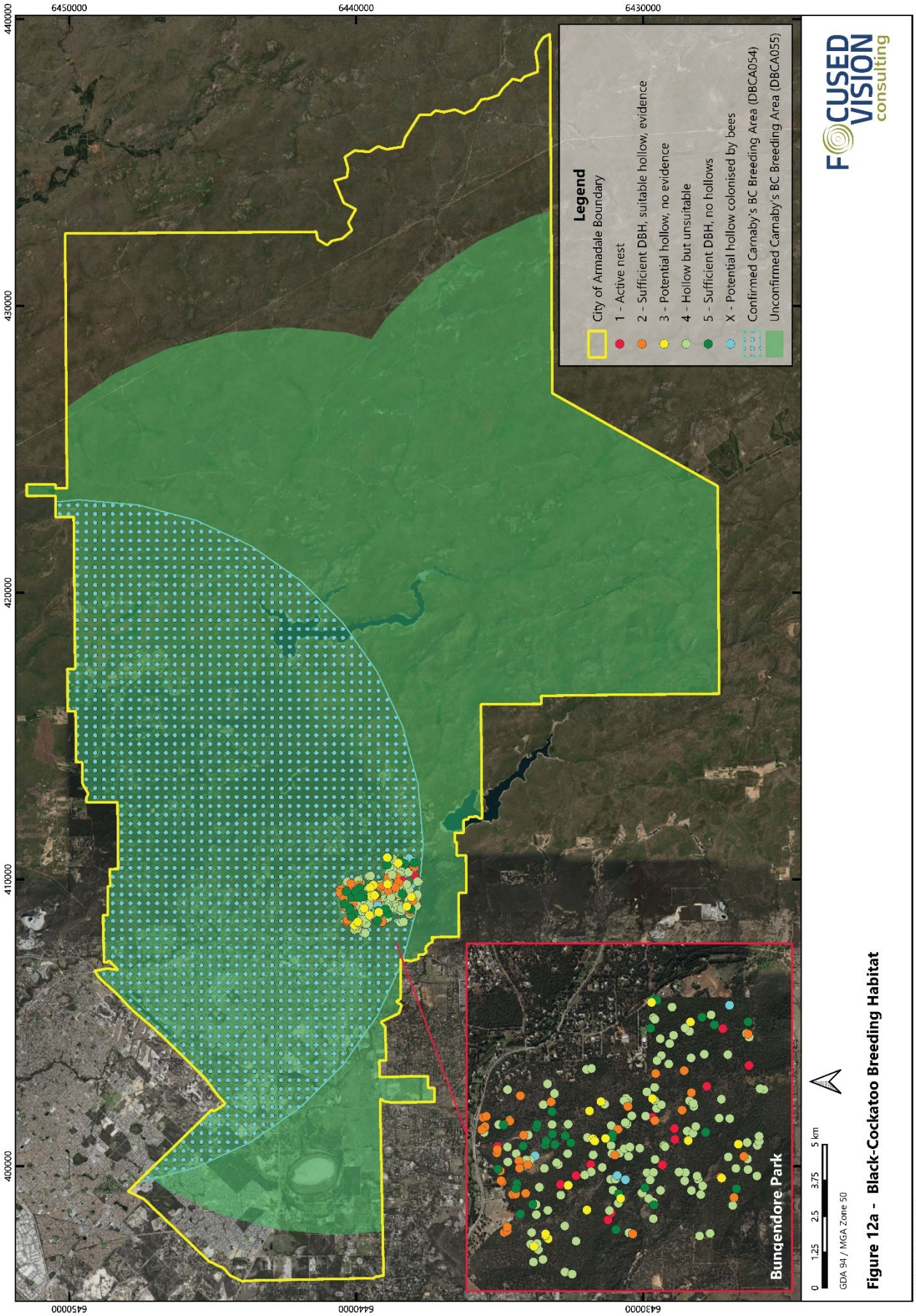
A Black-Cockatoo breeding habitat assessment was conducted within Bungendore Park and Armadale Settlers Common (Kirkby 2022), both of which form part of Wungong Regional Park. A total of 1,382 trees potentially suitable for Black-Cockatoo breeding (Diameter at Breast Height (DBH) >500 mm) were recorded within Bungendore Park and Armadale Settlers Common. Tree species recorded included: *Corymbia calophylla, Eucalyptus marginata*, *Eucalyptus patens, Eucalyptus rudis, Eucalyptus wandoo* or stags (i.e., a dead tree with no live branches, leaving branch stubs and trunk only). The rankings of the trees in accordance with the Bamford Consulting Ecologist's methodology (BCE 2018) is summarised in **Table 16**, and spatially presented in the **Figure 12** series.

Based on the presence of 13 'Rank 1' trees (trees containing active nests) and 37 'Rank 2' trees (trees of sufficient DBH, suitable hollow/s and evidence of use), Bungendore Park is considered to support important Black-Cockatoo breeding habitat.

Table 16 - Summary Black-Cockatoo Breeding Habitat (Kirkby 2022) in Bungendore Park and Armadale Settlers Common

Species	Total No. Trees	Total Number in Tree Rank Category					
		5 - Sufficient DBH, no hollows	4 – Hollow but unsuitable	3 - Potential hollow, no evidence	2 - Sufficient DBH, suitable hollow, evidence	1 – Active nest	X – Potential hollow colonised by bees
Corymbia calophylla	448	263	127	15	33	8	2
Eucalyptus marginata	877	865	1	3	3	5	-
Eucalyptus patens	1	-	-	-	1	-	-
Eucalyptus rudis	16	16	-	-	-	-	-
Eucalyptus wandoo	6	-	3	-	-	-	3
Stag	34	34	34	-	-	-	-
TOTAL	**1,382**	**1,178**	**131**	**18**	**37**	**13**	**5**

NB: Assumes that all trees for which no rank or relevant data was recorded, are Rank 5



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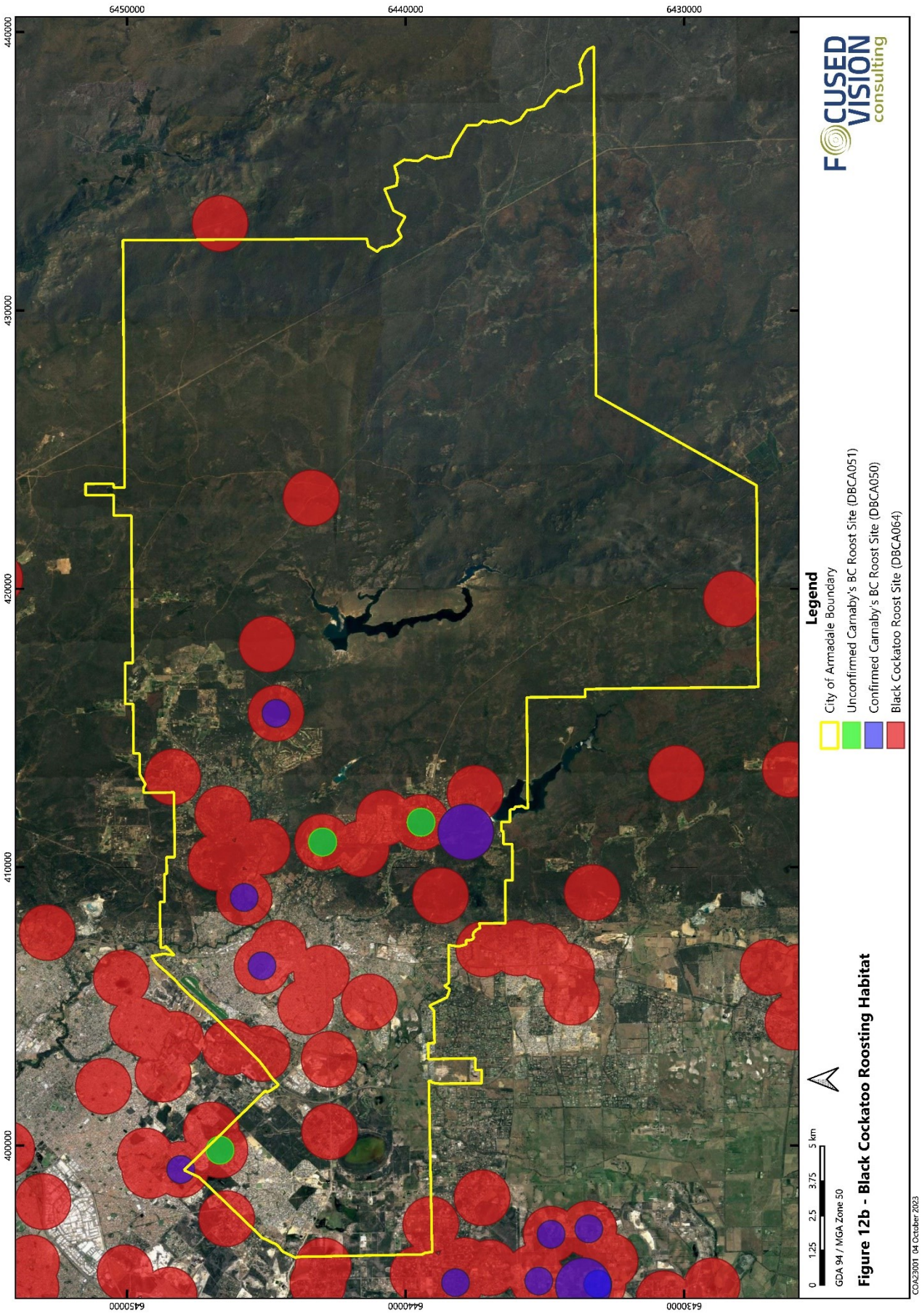

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Native Flora

Any natural area that supports Threatened and/or Priority flora and/or fauna species is considered to have conservation value and is considered a significant LNA. Threatened flora species are protected under the State BC Act, the Commonwealth EPBC Act or both, whilst Priority flora species are afforded some protection by DBCA.

The EPBC PMST identified 26 Commonwealth-listed Threatened flora, which comprises of three Critically Endangered, 15 Endangered and eight Vulnerable species.

The DBCA database search results identified the presence of significant flora as summarised in **Table 17** and spatially presented in **Figure 13**.

Table 17 – DBCA Listed Conservation Significant Flora Previously Recorded within the City

WA Cons. Code	Number of Individual Records								
	Develop-ment	Industrial	Infrastruct-ure	Public Purpose	Reservation	Residential	Rural	Waterways	TOTAL
Threatened	5	1	2	-	28	2	1	1	**40**
Priority 1	1	-	-	12	10	6	1	1	**31**
Priority 2	1	-	-	-	18	2	6	-	**27**
Priority 3	1	-	6	17	43	4	1	-	**72**
Priority 4	4	-	4	-	40	-	2	-	**50**
TOTAL	**12**	**1**	**12**	**29**	**139**	**14**	**11**	**2**	**-**

All land-use zones have conservation significant flora associated with them. The results show that 63.18% of the records occur in the Reservation land-use zone. This is expected, due to the creation of reserves specifically to retain the native vegetation and flora in public reserves, protected by the Town Planning Scheme in a Parks and Recreation reservation. Town Planning and land development processes for land-use change specifically creates and protects such land under public management, in order for protect areas of high environmental value including land values such as wetlands, foreshores and significant vegetation and fauna communities. By virtue of the habitat they support, reserves, are also often the sites of environmental sampling and research projects.

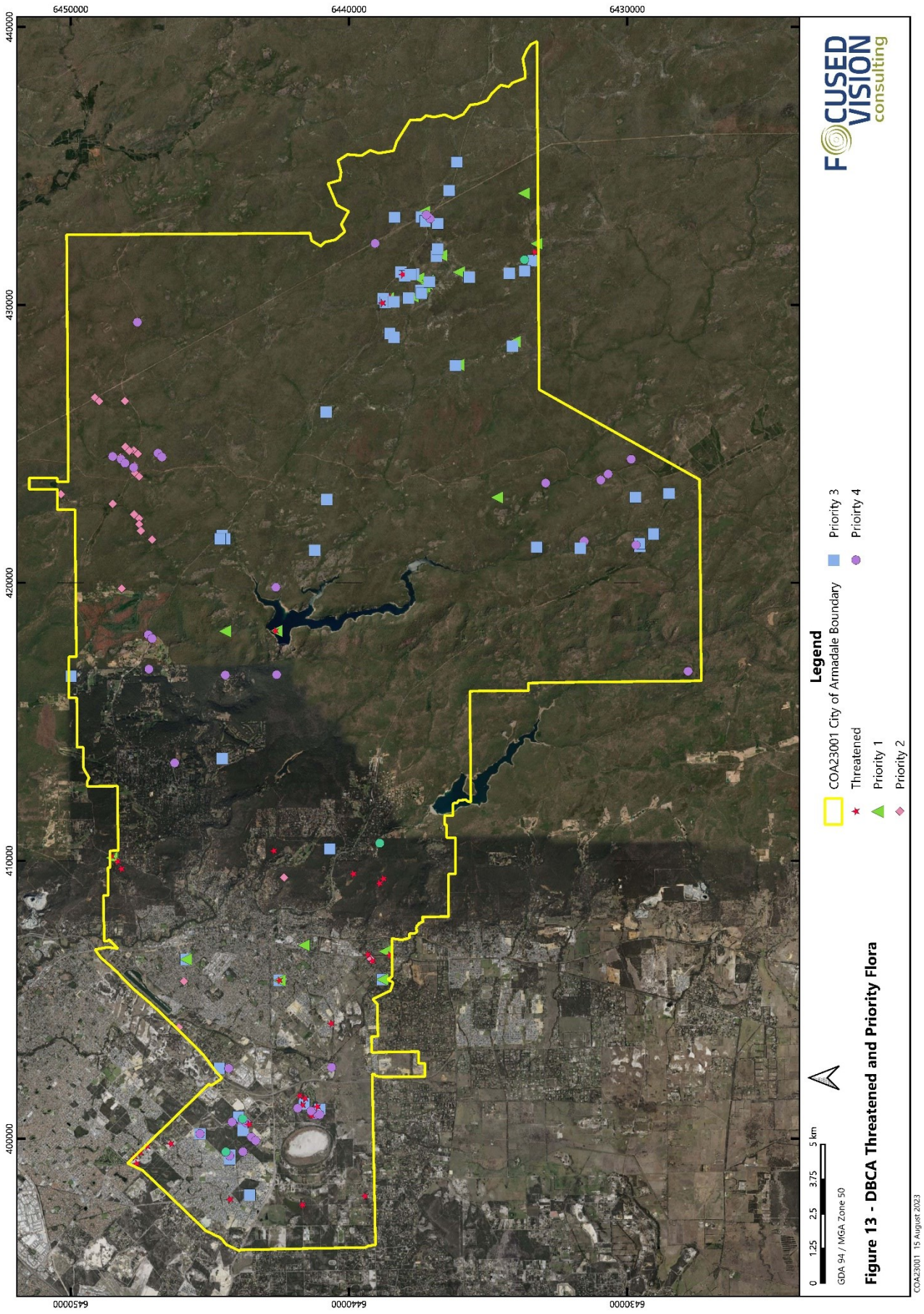

Figure 13 - DBCA Threatened and Priority Flora

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Wetlands

4.3.2 Ramsar Wetlands

Ramsar wetlands listed under the Ramsar Convention are considered to be of international importance. These internationally important (Ramsar) wetlands are those that are representative, rare or unique wetlands, or are importance for conserving biological diversity (DCCEEW 2022b).

One Ramsar wetland, Forrestdale Lake (Ramsar Ref. 35), occurs within the City, located approximately 200 m south of Armadale Road in Forrestdale (**Figure 14**). Forrestdale Lake occupies an area of 246 ha and provides important habitat for waterbirds on the Swan Coastal Plain (DCCEEW 2019).

4.3.3 Geomorphic Wetlands of the Swan Coastal Plain

The Geomorphic Wetlands of the Swan Coastal Plain dataset displays the location, boundary, geomorphic classification (wetland type) and management category of wetlands. Wetland management categories are based on their ecological, hydrological and geomorphological significance, and the degree of disturbance that has occurred. The three Wetland Management Categories on the Swan Coastal Plain can be summarised as follows:

- Conservation Category (CC) – wetlands that support a high level of ecological attributes and functions (generally having intact vegetation and natural hydrological processes), or that have a reasonable level of functionality and are representative of wetland types that are rare or poorly protected.
- Resource Enhancement (RE) – wetlands that have been modified (degraded) but still support substantial ecological attributes (wetland dependant vegetation covering more than 10%) and functions (hydrological properties that support wetland dependent vegetation and associated fauna) and have some potential to be restored to CC quality. Typically, such wetlands still support some elements of the original native vegetation, and hydrological function.
- Multiple Use (MU) – wetlands that are assessed as possessing few remaining ecological attributes and functions. While such wetlands can still play an important role in regional or landscape ecosystem management, including water management, they are considered to have low intrinsic ecological value. Typically, they have very little or no native vegetation remaining (less than 10%).

Conservation Category and Resource Enhancement wetlands are of ecological value, and are often identified and afforded protection through the planning and development process, where land is undergoing land-use change for urban development. Conservation Category and Resource Enhancement wetlands are generally secured in Crown reserves and protected by a Parks and Recreation Reservation under the Town Planning Scheme. They are then managed by the City for conservation and passive recreation.

A total of 352 Geomorphic Wetlands of the Swan Coastal Plain are located within the City, including 123 Conservation Category wetlands (**Appendix D**, **Figure 14**), 86 Resource Enhancement wetlands, 120 Multiple Use wetlands, 19 ‘Not Applicable’ wetlands and four ‘Not Assessed’. The number Geomorphic Wetlands occurring within the City of Armadale and the Town Planning zones in which they occur is summarised in **Table 18**. The Geomorphic Wetlands occurring within City managed reserves are summarised in **Table 19**.

Wetlands occur across all zones within similar representations in the reservation and rural zones. There is a high proportion of watercourses (69.047%) within the reservation zone.

Individual wetlands may traverse a number of land-use zones. The high representation of wetlands in the infrastructure and development zones can be attributed to wetland boundaries extending across roads and lower lying areas.

Table 18 – Geomorphic Wetlands within the City of Armadale

Evaluation	Classification	Wetlands within Land-Use Zone*							
		Development	Industrial	Infrastructure	Public Purpose	Reservation	Residential	Rural	Waterways
Conservation Category	Creek	-	-	-	-	2	-	-	-
	Dampland	6	-	30	3	39	-	25	1
	Dryland	-	-	-	-	-	-	1	-
	Lake	-	-	1	-	1	-	1	-
	Palusplain	7	1	20	4	19	3	20	9
	River	1	-	2	-	1		1	2
	Sumpland	3	-	15	2	15		19	-
	Not Assessed	-	-	3	-	3	-	-	-
Resource Enhancement	Artificial Channel	1	-	-	-	1	-	-	-
	Artificial Lake	1	-	-	-	-	-	-	-
	Dampland	13	3	23	3	16	5	14	-
	Dryland	-	-	1	-	-	-	2	-
	Floodplain	2	1	2	-	1	-	1	1
	Palusplain	9	-	7	-	4	-	4	-
	Sumpland	5	-	17	3	10	1	15	-
	Not Assessed	2	-		-	-	-	-	-
Multiple Use	Artificial Lake	-	-	1	-	1	-	-	-
	Creek	-	-	2	-	2	2	4	-
	Dampland	21	3	42	11	29	18	21	1
	Dryland	-	-	1	-	-	-	2	-
	Palusplain	14	2	12	3	7	3	12	7
	River	-	-	1	-	-	-	1	1
	Sumpland	13	-	18	2	14	3	23	-
	Not Assessed	1	-	-	-	-	-	-	-
Not Applicable	Dryland	1	-	2	-	-	-	1	-
	No longer a wetland	6	2	11	3	8	5	5	-
Not Assessed	Dampland	-	-	1	-	-	-	1	-
	Palusplain	1	-	1	1	1	1	1	-
	Not Assessed	-	-		-	2	-	-	2
TOTAL		**107**	**12**	**213**	**35**	**176**	**41**	**174**	**24**

*Wetlands may traverse multiple land-use zones

Table 19 – Geomorphic Wetlands within the City of Armadale Reserves

Suburb	Reserve Name	Wetland Category	Other Values
Bedfordale	Armadale Settlers Common	Multiple Use	
Brookdale	Bronzewing Reserve	Resource Enhancement	
	Don Simmons Reserve	Multiple Use	
Camillo	Eva and Bill Moore Reserve	Resource Enhancement	
	Kuhl Park	Resource Enhancement	
	Westfield Herron Reserve	Multiple Use Wetland	
Champion Lakes	Corfield Street Wetland	Multiple Use	
Harrisdale	Greenshank Park	Multiple Use	
	Heronwood Reserve	Conservation Category Multiple Use	Commonwealth Endangered TEC
	Jim and Alma Baker Reserve	Conservation Category	
	Sandstone Park	Multiple Use	
Hilbert	Allwood Park	Resource Enhancement Multiple Use	
Piara Waters	Berkshire Park	Multiple Use	
	Boardway Park	Multiple Use	
	Novelli Reserve	Multiple Use	
	Robot Park	Multiple Use	Commonwealth Endangered TEC
	Rosette Park	Multiple Use	
Seville Grove	Barry Poad Reserve	Not Assessed	
	Cam Clay Reserve	Multiple Use	
	Matthew Stott Reserve	Multiple Use	
	Seminole Reserve	Multiple Use	
	Ticklie Park	Not Assessed	
	Verdant Reserve	Conservation Category Multiple Use	Commonwealth Endangered TEC
Wungong	Fletcher Park	Conservation Category Resource Enhancement Multiple Use	Commonwealth Endangered TEC
	Wungong Road	Conservation Category	

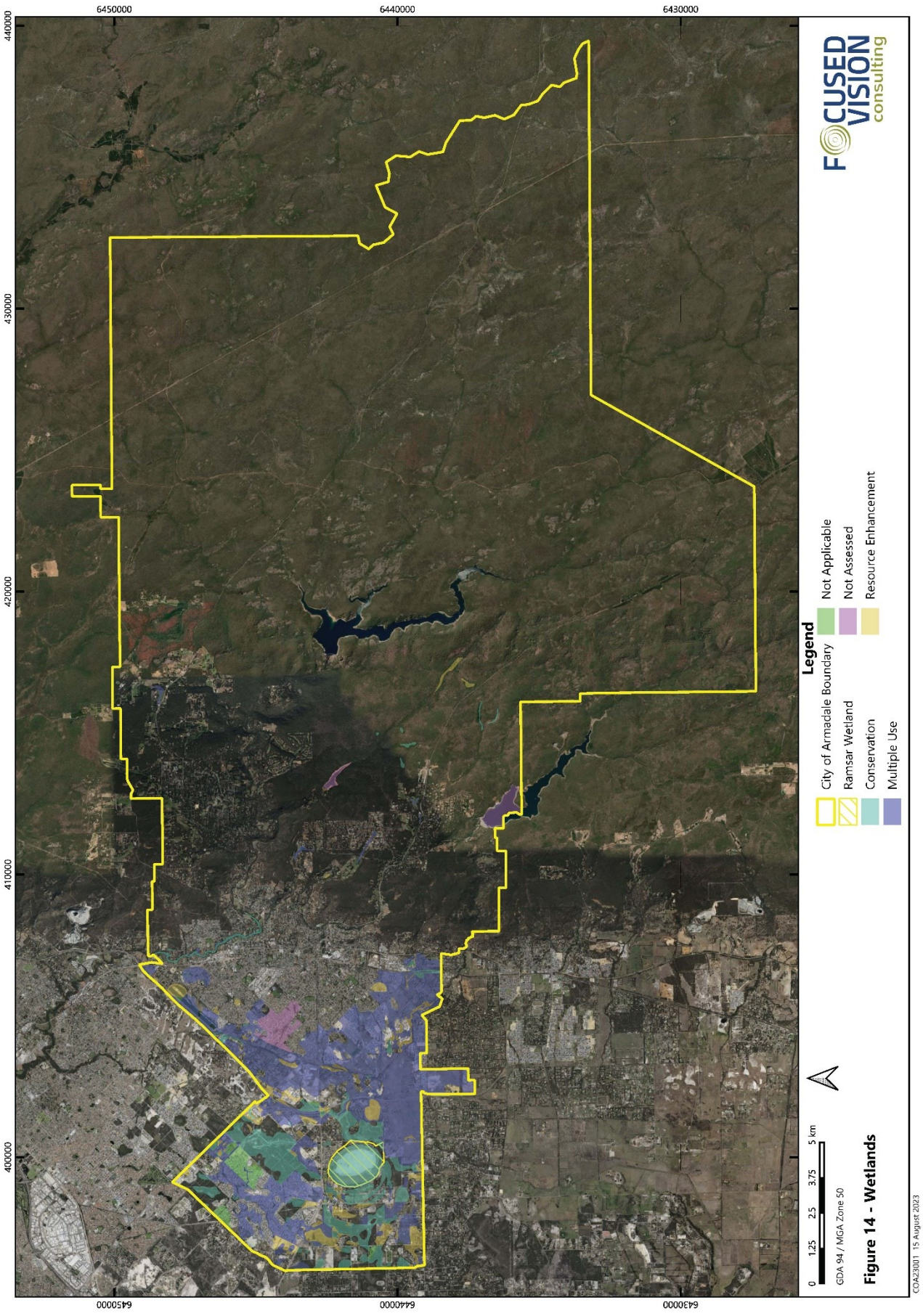


Figure 14 - Wetlands

Rivers, Watercourses and Tributaries

Numerous minor and major watercourses and tributaries occur within the City (**Figure 15**) which includes five key natural watercourses and tributaries (Canning River, Wungong Brook, Neerigen Brook, Carradine Brook and Wright Brook). In order to determine the proportion of watercourses and tributaries occurring within the City, a 15 m buffer was applied to all watercourses, with the exception two major waterways, the Canning and Wungong Rivers, where a 30 m buffer was applied.

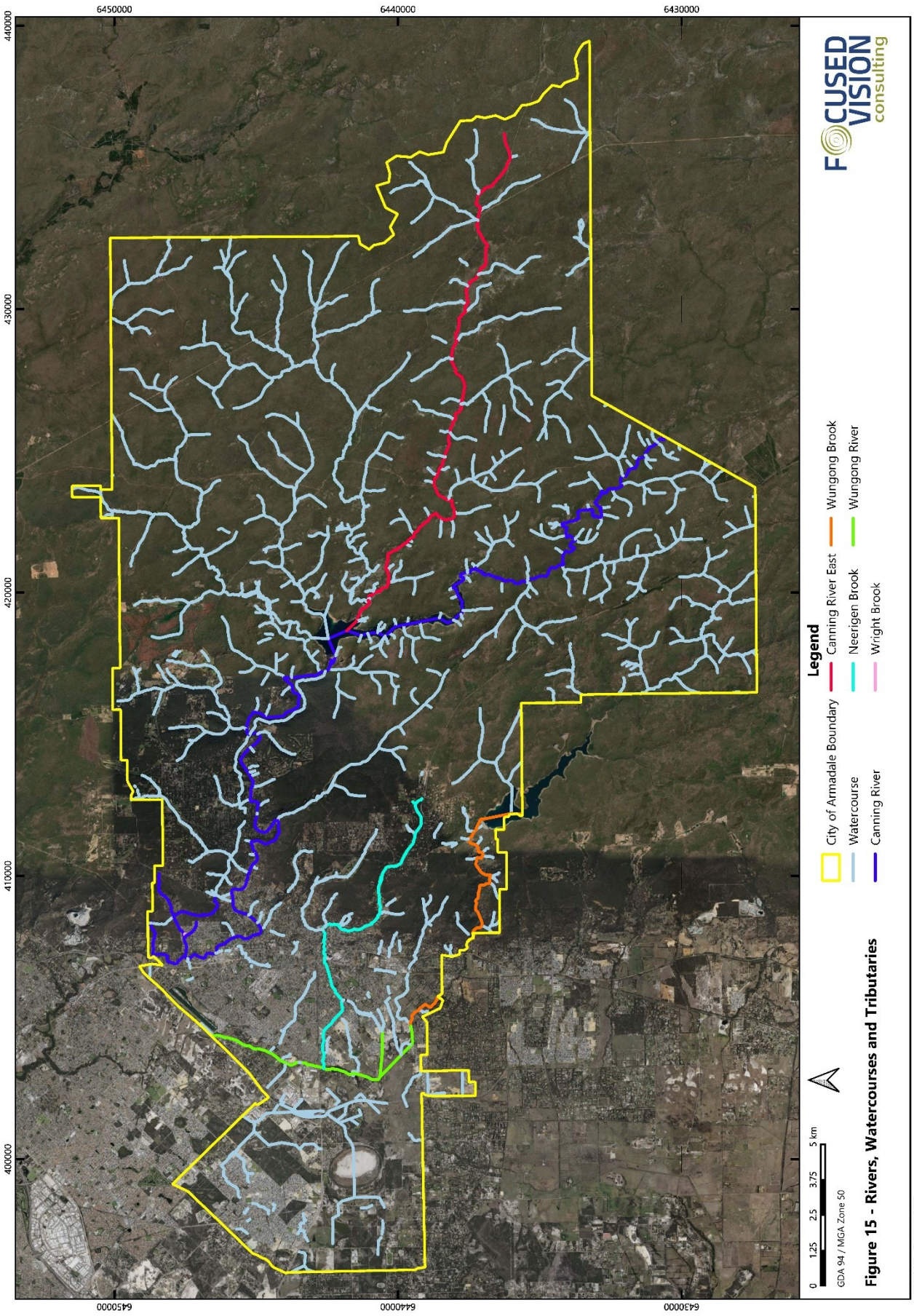
Waterways typically support unique biodiversity values and are important feature for retention, movement and connectivity of these. The data shows that whilst the majority of watercourses and tributaries are within the reservation zone category, 12.69% of waterways in the City occur within the rural zone

The City of Armadale manages approximately 12 km of rivers, with 100.02 ha of riparian vegetation. The proportion of naturally occurring watercourses and tributaries within the City is presented in **Table 20**.

A living stream is a constructed or retrofitted waterway exhibiting an ecosystem that mimics the characteristics of a natural stream (SERUCUL 2023). Areas classified as 'Living Stream' within the Wungong Development Area account for 31.71 ha or 0.06% of the City. Delineation of future potential 'Living Streams' within the City will be carried out at a later date, which is captured in the action plan for this strategy.

Table 20 – Proportion of Watercourses and Tributaries within the City

Zone	Area (ha) of Watercourses within the City	% of Watercourses within the City
Development	75.66	3.75
Industrial	0.22	0.01
Infrastructure	47.05	2.33
Public Purpose	58.04	2.88
Reservation	1,392.00	69.07
Residential	24.92	1.24
Rural	255.67	12.69
Waterways	161.74	8.03
TOTAL	**2,015.29**	**100**


6450000
6440000
6430000
440000
430000
420000
410000
400000
Legend
City of Armadale Boundary
Watercourse
Canning River
Canning River East
Neerigen Brook
Wright Brook
Wungong Brook
Wungong River
0 1.25 2.5 3.75 5 km
GDA 94 / MGA Zone 50
FOCUSED VISION consulting
Figure 15 - Rivers, Watercourses and Tributaries
COA23001 15 August 2023

The condition of the riparian vegetation for the Canning River Reserves is known for those reserves that have been subject to detailed vegetation mapping (the Roley Pools Heritage Walk Trail and Wungong River Reserve), are summarised in **Table 21**.

Table 21 – Watercourses within City Managed Reserves

River/ Watercourse	Reserve	Reserve Size (ha)
Canning River	Augustino Reserve	2.61
Canning River	Fancote Park	0.79
Canning Reserve	Goolmarup Reserve	1.68
Canning River	Pries Parks	13.12
Canning River	Roley Pools Heritage Walk Trail	23.25
Canning River	Rushton Park	4.52
Canning River	R 33647	0.72
Canning River	R 53736	0.47
Wungong River	Wungong River Reserves; Champion Drive to Ranford Road	37.24

Roley Pools Reserve on the Canning River was mapped with regards to riparian vegetation structure and condition in 2016 (Ecoscape 2018). This study found only 24% of the reserve is in 'Good' or better vegetation condition.

Table 22 – Vegetation Condition within Roley Pools Reserve

Vegetation Condition	Area (ha)	% of Total
Very Good	1.49	6.44
Good	4.12	17.68
Degraded	8.17	35.14
Completely Degraded	9.47	40.75
TOTAL	**23.25**	**100**

In addition, the following tributaries occur within City of Armadale vested reserves:

- Carradine Brook
- Neerigen Brook
- Wungong Brook
- Wright Brook.

The City of Armadale also manages a number of man-made tributaries and Water Sensitive Urban Design drainage features, including:

- Balannup Drain through Forrestdale Industrial Area, Piara Waters and Harrisdale
- James Drain through Piara Waters.

5 THREATS TO BIODIVERSITY AND EXISTING ACTIONS

5.1 INVASIVE AND FERAL SPECIES

Weeds are flora that occur outside of their natural range. They have the ability to displace native plants and can disrupt ecosystem function through smothering vegetation, altering habitat and fire regime. To help focus national efforts to address weed problems in Australia, a list of Weeds of National Significance (WoNS) was compiled. In Western Australia many WoNS are also Declared Pest (DP) plants under the *Biosecurity and Agriculture Management Act 2007.*

The City of Armadale manages weeds in natural areas in accordance with natural area maintenance programs and Reserve Management Plans.

More information regarding priority environmental weeds in the City of Armadale can be found in the following:

- Bungendore Park Strategic Directions Document
- Roley Pools Heritage Walk Trail Management Plan
- Wungong River Management Plan
- Armadale Settlers Common Strategic Direction Document
- Armadale Settlers Common Weed and Vegetation Condition Analysis (unpublished)
- Fletcher Park Bushland Management Plan
- Lloyd Hughes Management Plan
- Forrestfield Complex Bushland Management Pan (unpublished)
- Natural Area Management Plans specifying conditions of subdivision including:
    - Harrisdale North Bushland Management Plan
    - Hilbert Road Wetland Management Plan
    - Harrisdale Green Bushland Management Plan
    - Wildflower Estate Wetland Management Plan
    - Birrgea Living Stream Foreshore Management Plan
    - Springtime Estate Foreshore Management Plan.

Feral/introduced animals are an example of invasive species, where they displace and outcompete local fauna for resources, reducing native population numbers through limiting reproduction opportunities and predation (Mooney and Cleland 2001).

Collectively, roaming pet cats kill 546 million animals per year in Australia. The fox has played a major role in the decline of ground-nesting birds, small to medium sized mammals (Biodiversity Council, 2023). Predation by the European red fox and cats are listed as a key threatening process under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (the EPBC Act). Competition and land degradation by Feral Goats' is currently listed as a key threatening process under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999. Predation, habitat degradation, competition and disease transmission by feral pigs is currently nominated as a Key Threatening Process under the Environment Protection and Biodiversity Conservation Act 1999 (Department of Sustainability, Environment, Water, Population and Communities, 2010).

Pest parrots and cockatoos compete with native bird species and can cause substantial damage to crops and infrastructure. Several species of parrots and cockatoos are declared pests under the Biosecurity and Agriculture Management Act 2007 (BAM Act) and are subject to control measures.

The Department of Primary Industries and Regional Development (DPIRD) is developing a Pest Parrot and Cockatoo Management Strategy for Western Australia, to help guide stakeholders in the effective management of pest birds (Department of Primary Industries and Regional Development, 2023).

Managing Weeds in Natural Areas

The City of Armadale employs a specialist team of ecological technicians for the ongoing maintenance and abatement of threats such as weeds in sixty-five natural areas within the City.

Threat abatement planning involves strategic management and eradication of weed species that are categorised as weeds of national significance (WONS) and are of high threat to remnant bushlands of high ecological value.

In delivering a high standard of natural area management within the local natural areas, the City actively seeks out partnerships with stakeholders including community, landcare groups, First Nations Australians, Research institutes and other government agencies.

The Roley Pools - Heritage Walk Trail is a 2.6 km stretch of Canning (Dyarlgarro) River with high ecological and cultural heritage values. The City managed an areas of 20 hectares in these reserves.

In 2018, 67 weed species were comprehensively mapped and used to develop a management plan. One of the priority weed species identified was the highly invasive, aggressive *Rubus anglocandicans* (Blackberry), occupying 75% of the 9.1 Ha Roley Pools Reserve site. Through targeted and careful weed control programs in the last three years, coupled with replanting of native species, this weed has reduced to less than 40% occurrence.

Image left shows the presence of Rubus anglocandicans before weed management with approximately 85% cover. Image right shows the successful removal of the weed from the river foreshore and revegetation of the area with native endemic species.

Research Partnerships

Quenda are a Priority 4 species in WA, meaning their ongoing survival is dependent on conservation and close monitoring. In 2022, in response to increasing reports of quenda health decline in Roleystone, a dedicated research team from Murdoch University, the Department of Biodiversity Conservation and Attractions and City staff set traps for quendas in nature reserves in Roleystone.

Throughout the night, the research team progressively collected quenda in soft bags, before being carefully transported to a mobile vet clinic in Roleystone where they were closely monitored, sampled for mange and other parasites then transported back to the capture location.

Outcomes from this research will provide valuable insights into the extent and severity of the occurrence of mange in the Roleystone quenda population.

Research into Quenda health in Roleystone in consideration of reports of Sarcoptic mange in the population.

5.2 FRAGMENTATION FROM CLEARING

Loss and degradation of native vegetation continues to negatively impact biodiversity in WA. Nearly 900 ha of native vegetation was cleared each year in the Perth metropolitan region (equivalent to more than 1 football oval per day) between 1998 and 2004 (Government of Western Australia, 2007).

Genetic dispersal in the form of seeds and pollen for flora becomes restricted while smaller fragmented habitats are more susceptible to degradation. Movement across the landscape for local fauna is also made more difficult. Further clearing and increased habitat fragmentation poses an ongoing threat to native species (Molloy *et al.* 2009).

Within the City, 42,767 ha (76.44%) of remnant vegetation remains. A large proportion of the vegetation on the Swan Coastal Plain has been cleared, with 85% of the remnant vegetation occurring east of Albany Highway.

The extent of the impact on fragmentation is different for different species, depending on their mode of reproduction and dispersal, habitat range and exposure to other threats.

Habitat Links

The City of Armadale Habitat Links program (formally StreamCare) has, for over 20 years, provided residents with assistance to improve biodiversity and the health of the biodiversity assets on private lands.

One of the objectives of Habitat Links is to provide connectivity of natural areas across the landscape in private land tenure. Over 225 properties have been engaged with the Stream Care and Habitat Links Program since their inception.

Habitat Links targets larger properties that contain, or are next to, significant areas of bushland, wetlands and waterways. Participants of the program receive native seedlings and technical advice to help with revegetation, wildlife habitat creation, weed and feral animal management, erosion control and environmental monitoring. Participants are also able to loan monitoring cameras to capture images of fauna on their properties.

Participants of the program receive technical advice to help with native plant species selection, planting techniques to give seedlings a greater chance of survival management, feral animal management, creating wildlife habitat, erosion management and environmental management.

In 2023, 7,125 plants were distributed through the Habitat Links Program, with 65 participants receiving native seedlings to plant on their properties.

habitat LINKS
connecting landscapes for wildlife

Returning Native Species to Urban Areas

The enhancement of the natural environment in a more urban landscape is supported through the Plants for Residents Program. The program has successfully been implemented for seven years. The Plants for Residents event is a collaboration providing an immersive, environmental, culture and sustainability experience. Approximately 800 residents receive approximately 10 plants each annually as part of the program.

Identifying and Managing Ecological Corridors

Habitat loss is one of the largest concerns of extinction, often due to the reduction in quality habitat and delayed extinction debts (time lag between and environmental event i.e. habitat loss and climate change, and the subsequent loss of species).

As a result of the recommendations endorsed by Council in 2019, seven reserves with vegetated linkages between Armadale Settlers Common and State Forest were modified under the *Land Administration Act 1997,* recognising conservation in purpose. This enabled formalisation of their values and inclusion into environmental programs (such as weed control and dieback treatment).

Three ecological links across the residential landscape in Bedfordale. A series of City managed reserves linking the Armadale Settlers Common to Regional Parks that are managed by others.

Understanding and Managing Black-Cockatoo Habitat

Habitat loss is the main threat to the decline of three species of Black Cockatoo in WA.

Since 2016, the City has installed, monitored and maintained over 100 habitat boxes for three Threatened species of Black-Cockatoo and over 50 habitat boxes for other species such as bats and possums. This program has been enhanced with partnerships with local schools who build habitat boxes as part of their educational programs.

These habitat boxes have been successful in the breeding of Red-tailed Black-Cockatoos, a Vulnerable species, protected under the Commonwealth EPBC and WA Biodiversity Conservation Acts. The City in partnership with the WA Museum volunteers, monitor the chicks (DNA, banding and health assessment) to contribute to the conservation science for these species

Scientific research of a Red-tailed Black Cockatoo chick that successfully fledged from a habitat box in a City natural area.

Researching Fauna to Inform Management

In 2016, the City commenced a project to enhance fauna research and management in the City's bushland reserves. The project:

- established a research based approach to natural area management
- provided evidence of stable and increasing native fauna populations in high priority City reserves
- successfully identified changes in fauna trends, to inform the City's management approach. For example, success in feral animal control programs targeting pigs, goats and foxes are successful in conserving native fauna
- demonstrated conservation and preservation of local biodiversity including the protection of endemic fauna and their habitat
- was endorsed by Council (December 2023) to continue for an additional 5 years.

Chuditch (left) and Mardo with pouch young (right) that were trapped, marked and released in Bungendore Park in 2022

Quenda that was trapped, marked and released during the survey in Bungendore Park in 2022 (left) and camera recording of an Echidna in Bungendore Park in 2022 (right)

5.3 CHANGING LAND-USE AND DEVELOPMENT

Subdivision and development of the landscape can result in reduced functional natural areas and ecological linkages, decreased remnant vegetation communities, and altered wetlands and watercourses (Molloy *et al.* 2009).

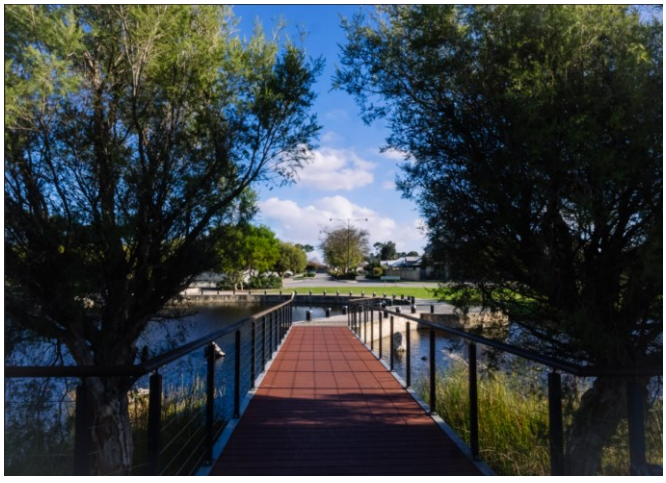
The City of Armadale is currently preparing a new land use planning strategy that will guide future planning, development and land use change over the next 20 years and beyond. It will also set out the City's approach to managing its environmental land resources to cater for the sixty thousand new residents expected to live in the City of Armadale over the next 29 years.

The new Local Planning Strategy (LPS 2024) will set out the City's strategies, objectives and actions and guide its future planning directions. By 2051 the State Government's planning frameworks and policies are expected to see the City's population swell from the current 98,000 to over 151,000 residents. The new LPS 2024 is also the first step towards zoning the land for new business and industrial opportunities that will provide employment for the City's residents, in addition to the new residential areas, recreation facilities and local parks where residents will enjoy the benefits of everything the City of Armadale has to offer.

Enhancing Watercourses During Land Use Change

During land-use change processes, the City utilises a number of Town Planning Scheme mechanisms to seek protection enhancement of biodiversity assets. In areas adjacent to the Wungong and Canning Rivers, Structure Plan provisions require the preparation of Foreshore Management Plans to see the betterment of the reserves.

The implementation of these management plans usually involves a three year program of works including weed control, revegetation with native species and provision of infrastructure such as pathways and interpretive signs to facilitate the enjoyment of natural areas by the community.



Protecting and Enhancing Vegetation During Land Use Change

The Beermullah, Forrestfield and Southern River vegetation complexes are poorly represented in the City, with less than 10% of their original extent on the Swan Coastal Plain remaining. The Southern River and Swan complexes are also poorly represented, with less than 30% of their original extent remaining.

Areas of Southern River Complex vegetation community have been protected in Harrisdale through the retention of bushland remnants in newly created public open space.

Integration of remnant Banksia woodland (Threatened Ecological Community) in community parks in Harrisdale.

Protecting and Enhancing Wetlands During Land Use Change

Approximately 98% (or 44.2 ha) of the remaining Beermullah vegetation complex in the City is within the development zone. Using Town Planning Mechanisms and Developer Contribution Planning, 12.41 ha of Conservation Category wetland and wetland buffer in the Beermullah Vegetation Complex in Hilbert (Hilbert Road Wetland) was protected in reservation and is being enhanced through the implementation of a wetland management plan. This wetland will be ceded to the Crown as part of land use change and be managed for its biodiversity values.

The Wungong Cell F Structure Plan (left) shows the protection of areas of Banksia woodland Threatened Ecological Communities (right) and Melaleuca forest wetland areas in public open space ceded to the Crown as a condition of subdivision.

Similarly, through Structure Planning process 7.35 ha of wetland, in the Southern River vegetation complex in Piara Waters will be ceded to the Crown, enhanced through developer contribution schemes, and be managed for its biodiversity values.

5.4 ALTERED HYDROLOGY AND EROSION

Changes to land use can alter natural wetlands and watercourses. Changes in water availability influence species assemblages and habitat suitability. Following the construction of the Canning and Wungong Dams in the 1940s, release points were established along the Canning River and Southern-Wungong River system to provide water to licensed users and landholders with riparian rights. There were six release points along the Canning River; Araluen, Hill 60, Bernard Road and Orlando Street. Two release points were established on the Southern-Wungong River, one in the City of Armadale at South-West Highway (DoW 2007).

Environmental water releases are made from surface water storages and water mains along the Canning River during the drier months, between November and May. These releases make up most of the river's summer baseflow. The maintenance of environmental flows is administered by the Department of Water and Environmental Regulation. Detail on water allocation in the lower and middle Canning River is available in the Middle Canning River Surface Water Allocation Plan (DoW 2012).

Increased nutrient run-off and pollutants from developments can cause eutrophication (algal blooms), increase in weeds, and death of aquatic life in wetlands.

Stormwater-borne sediment creates challenges for receiving waters, such as the deposition of the sediment itself, as well as the transport of sediment-bound. The presence of suspended sediment in aquatic ecosystems has significant effects on the community structure, diversity, density, biomass, growth, rates of reproduction, and mortality of biota. A high concentration of total suspended solids (TSS) can negatively impact periphyton and reduces light available for phytoplankton photosynthesis. These effects on the primary trophic levels of aquatic ecosystems mean that the entire food web is affected both directly and indirectly. Furthermore, as TSS settles on the remaining macrophytes, the sediment forms a physical barrier preventing higher order consumers from consuming them.

Understanding the Impact of Sediment on Hydrology of Watercourses

Permanent water pools provide important habitat for aquatic fauna such as fish and invertebrate species, including Carter's Freshwater Mussel (*Westralunio carteri*) and the Water Rat (*Hydromys chrysogaster*) (Ecoscape 2018). In 2022, a study was undertaken to determine the changes in sediment volume/bathymetry of a number of key deep river pools on the Canning River. Of particular significance was the Roley Pool and Child's Wall, where the data could be compared to data collected in 2015/16. The results indicated that there has been a minimum of 79 m^3 of sediment accumulated in the Childs Wall Pool (Coggins 2022), whilst the volume of sediment within Roley Pool has not changed in volume significantly.

Whilst the monitoring of Roley Pools suggests sediment is stable, managing the risk of sediment pollution entering waterways in rapidly developing areas is an ongoing challenge.

In a research project commissioned by the Sediment Task Force in Heron Park in the City of Armadale, the measured sediment discharge rate amounted to a total of 290 m^3 in 2017, and 190 m^3 in 2019. The costs borne by for high-growth local councils can Governments is reported at reaching over $600,000 per year, for managing water-borne sediment discharge from new subdivisions. From the Heron Park study, it is noted that (the sediment discharged along the Heron Park drain in 2017 and 2019 (estimated at 766 tonnes) whereas released to waterways, and it would cost $12,000 – $60,000 to remove or /dredge this sediment. This calculation does not consider the often irreversible environmental and biodiversity impacts.

River Pools on the Canning River, Roleystone.

5.5 PATHOGENS

Phytophthora dieback occurs throughout the south west of WA under varying climatic, vegetation, and soil conditions. Pathogens such as *Phytophthora* Dieback and Marri Canker (*Quambalaria coyrecup*) pose a threat to biodiversity by causing death to endemic flora and altering vegetation structure. In WA's south-west bioregion, more than 40 per cent of native plant species are considered susceptible to dieback.

Ongoing spread of pathogens occurs through soil or plant material movement from infested to non-infested areas (Peterson *et al.* 2014).

Managing Dieback

Phytophthora Dieback is primarily spread through the movement of infected soil, often on vehicles and shoes. The best strategy to control Dieback is to prevent the spread of contaminated soil, water and plant material.

City and City contractor operations are guided by a *Phytophthora* Policy and Management Practice.

Many City vested bushland reserves have been mapped for Dieback and are subject to a three year rotational treatment program. In accordance with this program a 15 metre buffer of native vegetation surrounding the dieback infection is treated with Phosphite on a three-yearly rotational basis. In addition, susceptible habitat trees for Black-Cockatoo that occur in wider Dieback infected areas are also treated with Phosphite on a three-year rotational basis.

The City of Armadale provides Dieback Hygiene foot cleaning stations in natural areas where there is a risk of introduction or spread of dieback disease.

Roleybushcare is a volunteer based environmental group that is focused on maintaining and protecting the Jarrah bushland around the Roleystone and Karragullen areas. Roleysbuchare (formally Roleystone Dieback Action Group) was founded in 1999 by the Late Dr Ian Colquhoun and were global leaders in the treatment of dieback. The City of Armadale supports the Roleybushcare through the administration of the Bushcare and Environment Working Group.

Jarrah/ Marri dominated bushland community typical of the Perth hills.

5.6 DEGRADATION OF NATURAL AREAS

Natural areas can be impacted by human activities such as off-road driving activities, rubbish dumping and arson. Offroad driving often results in damage to vegetation and ongoing erosion, as well as the introduction of weeds and potentially contaminants from hydrocarbon spills. Illegal dumping can include various waste, stolen or abandoned vehicles and garden waste. Dumped garden waste can pose a threat to biodiversity through the introduction of weeds which will compete with native species for nutrients, water and space. Other rubbish dumped illegally could potentially also contain other environmental contaminants harmful to biodiversity, such as hydrocarbons.

Resorting Watercourses – Roley Pools – Heritage Walk Trail Reserve

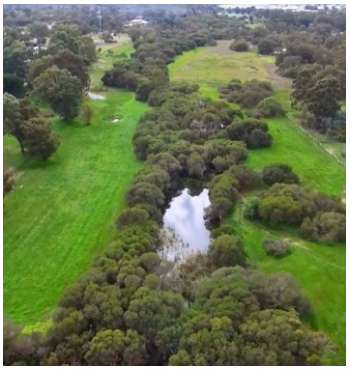
Management of LNAs vested in or owned by the City, is guided by six Reserve Management Plans and natural area management schedules.

In 2019, the City endorsed the Roley Pools Heritage Walk Trail Management Plan. The implementation of this project has resulted in the control of weeds and revegetation of a 2.1 km stretch of the Canning River in Roleystone. 30,000 native plants having been planted in the last 18 months.

Volunteers planting native seedlings at Roley Pools heritage Walk Trail in 2023.

Resorting Watercourses – Wungong River Reserve

In partnership with DBCA, SERCUL and AGLG and community volunteers, a 3 km stretch of Wungong River Reserve is currently undergoing intensive river restoration including instream works, weed control, revegetation, feral animal control and habitat supplementation. These works will be completed in 2025 and funded from municipal funds and various grant funding bodies. The value of investment exceeds $500,000 and contributes to the achievement of objectives of the City of Armadale Wungong River Management Plan.



The Wungong River Concept Plan and Detailed Design (in development) provides a special design for foreshore improvement in consideration of cultural, environmental and recreational values to the community.

Strategic Enhancement of Bushland Areas – Armadale Settlers Common

In 2023, the City and the Western Australian Planning Commission finalised an agreement, involving the vesting of 105 ha of land in the City of Armadale. The formal addition of this area of land and consolidation with the Armadale Settlers Common Reserve provides the City with the opportunity to manage a connected landscape in a strategic manner for its conservation and recreation values. The area contains Threatened and Priority flora and fauna. The agreement included a grant for the implementation of environmental and passive recreational improvements in the reserve including the improvement of a network of trails.

The eastern section near Observation Circle (the Jeeriji trail) is wheelchair and pram friendly. The area is highly important for flora conservation, with a total of 318 plant species found in the Common, along with two 'Declared Rare and Priority Flora Species'.

Strategic Enhancement of Wetland Areas – Corfield Street Wetland

In 2021, the City accepted a management order for 6.7 ha of Regional Parks and Recreation reserve in Champion Lakes. The City commenced implementation of a Bushland and Wetland Management Plan with the view to protect and enhance the sites environmental values which include Wetlands and vegetation of the Forrestfield vegetation complex.

Through the implementation of this plan, all Weeds of National Significance and rubbish has been removed, perimeter fencing has been installed and a large number of native plants, specifically selected in consideration of future habitat requirements for Black Cockatoos.

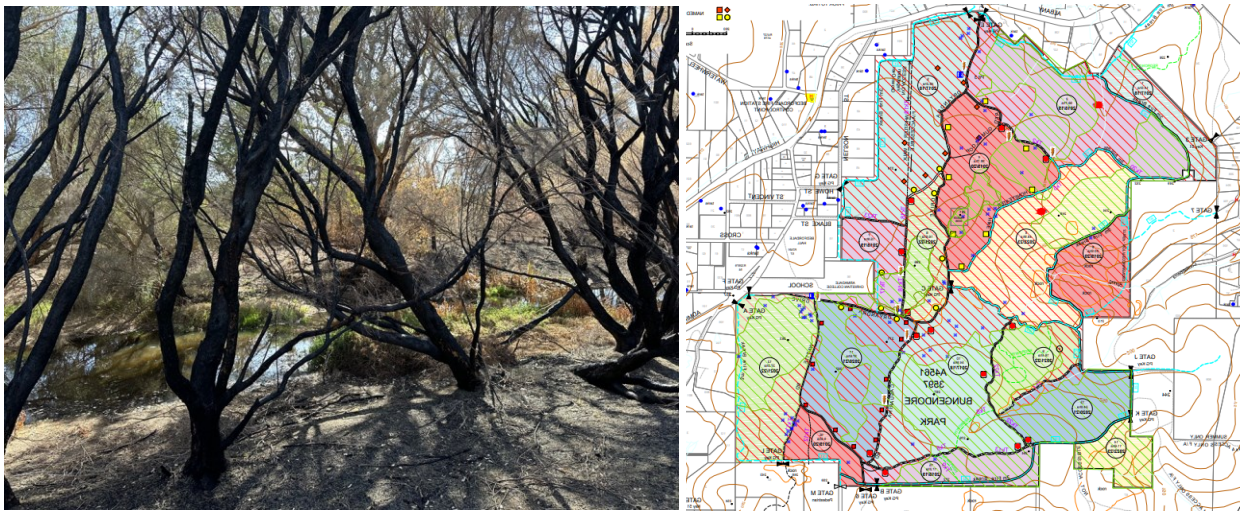
Corfield Street Wetland is being revegetated with species suitable for Black Cockatoo foraging. Photography right courtesy of: Tony Kirkby.

5.7 UNDESIRABLE FIRE REGIMES

Undesirable fire regimes can cause a decline in biodiversity (DCCEEW 2022c). Declines in biodiversity and ecosystem function occur when fire regimes have direct effects on biotic and abiotic factors through heat or by-products such as smoke, particulates and noxious gases such as carbon monoxide (DCCEEW 2022c). Changes to ecosystems may occur through the loss of critical habitat, food sources, shelter and keystone species. Arson events can impact on fauna habitat and natural cycles of regeneration of species by resprouting or seeding.

Balancing Fire and Biodiversity

The City of Armadale manages bushfire risk in a manner that also considers the biodiversity of natural areas. This is achieved through implementation of non-burning mitigation techniques, planning of mosaic burn patterns, seasonal burning to achieve low temperatures, on-ground protection of habitat trees, liaison with community and through post fire management such as weed control. Environmental management programs are adapted after arson events in natural areas, to encourage healthy ecosystem recovery.



Left: Post fire monitoring, Wungong River arson incident Jan 2024. Right: Mosaic style bushfire mitigation planning (under review) for Bungendore Park

5.8 GLOBAL AND REGIONAL THREATS

Climate change predictions pose an ongoing threat to local biodiversity. Rises in sea level will affect coastal biodiversity while a warmer and drier climate can result in an increase in droughts, storms and bushfires leading to loss of habitat and species extinctions over time (DCCEEW 2013). The urban heat island effect can impact on biodiversity at a regional scale, by direct effects on local vegetation health and condition, increases in fire hazards and by allowing fauna (both native and feral) to colonise outside their natural ranges, displacing locally endemic species or by allowing insect populations to be more abundant in urban areas (Parris and Hazell 2005).

Retaining Trees in Urban Landscapes

Armadale is one of the fastest growing areas in Perth and with this rapid urban sprawl comes a loss of tree canopy, rising local temperatures, and a greater need to plant and maintain trees in our neighbourhoods, creating what is known as 'urban forest' which has a cooling effect. Further to this combative action on local heat-island effects, the vision of the City of Armadale Urban Forest Strategy is to strengthen a diverse landscape character through allocating suitable tree diversity. The strategy is also proactive against inappropriate landscape planning, while showcasing the City's botanic heritage, and to distinguish an expanding 'tree-change' destination from the existing Perth vernacular. During the past five years, the Urban Forest Strategy has seen 4,792 new street trees planted on residential verges throughout the City.

The City may request Construction and Environmental Management Plans (CEMPs) as conditions of development approval, and these plans are required to accompany civil works or bulk earthworks applications. CEMPs are used as a tool for the identification of environmental conditions, and assets such as trees that can be protected during site works, resulting in site-level environmental controls.

Natural area management end environmental restoration in the City is undertaken in consideration of forecasted changes to climate through the selection of species, cumulative stress to natural systems and increasing needs for shade and water in the landscape.

Urban Forest planting program (left), tree protection plan implementation as part of the Byford Rail Extension works.

5.9 SOCIAL THREATS

Social threats to biodiversity are the impacts caused by the attitudes and actions of individuals or a group of individuals. These can be examples of anti-social or illegal behaviour, for example, illegal collection of firewood, illegal dumping of rubbish or garden waste, or off-road driving in an unauthorised area. These sorts of activities can originate from a lack of understanding of the significance of the natural environment, the fragility of ecosystems and the consequence of such actions.

Supporting Community Partnerships & Environmental Education

The City works in close partnership with the Armadale Gosnell's Landcare Group (AGLG) and supports community environmental volunteering through the Bushcare and Environmental Working Group (BEWG). In partnership, community engagement initiatives include planting events, training opportunities, information sessions and plant giveaways.

The AGLG has been working in partnership with the Cities of Armadale and Gosnells since 1998, when both Councils resolved to provide matching funds to support the Community Landcare Coordinator position. In 2013/14, both Councils provided funding to give security to the employment of the Community Landcare Officer position. This decision addressed the position's unsustainable reliance on external grants for funding staff.

In 2022/2023, environmental volunteers supported through BEWG contributed of $392,900 to City LNAs, undertaking activities such as weeding, rubbish clean-ups and hosting events.

In 2022/2023, the City contributed $170,302 to the AGLG to support their operations that resulted in the installation of 38,810 native plants across 14 restoration sites, 17 school Landcare planting events, 13 community Landcare planting events, and a biodiversity-focused community workshop. Over $164,370 was invested into environmental improvement works on the banks of the Canning River. A total of 918 volunteers contributed 1,910 volunteer hours within the City of Armadale across 2022-2023.

Environmental volunteers annual breakfast – Armadale Settlers Common.

Heritage Values in Natural Areas

Heritage is important in understanding the story of our local area, and for providing a link to past and present culture and history. Heritage refers to both Aboriginal and non-Aboriginal values, and incorporates both the tangible and intangible. Heritage values can include landmarks, places, artefacts, buildings and contents, spaces, and views, and the stories associated with them. There are hundreds of known heritage sites within the City of Armadale. As a community, we share the responsibility to identify and respect heritage values, and preserve them to pass on to future generations.

In 2002 the City undertook an Ethnographic and Archaeological Survey of the Roley Pools Heritage Walk Trail. Derbal Yerrigan was identified and recorded as being mythologically linked to Dyarlgarro.

An output of the survey was a request by Traditional Owners that the interpretative signage and digital content include their Whadjuk Noongar contributions. This was achieved in 2022 with the completion of passive recreational facility upgrades with interpretive experiences providing an indigenous cultural experience through signage, videography and spoken Noongar language.

In 2023 the City commenced a similar project in the Armadale Settlers Common Reserve, which includes the undertaking of the first Aboriginal Heritage Survey in the reserve.

Watch a Sand Ceremony
being performed at Roley Pools.

6 RISK AND RESPONSE

As part of preparing this document, an analysis of the Indicators of State has been undertaken for each asset category according to occurrences in each land-use zone. Land-use zoning categories (land-use zones) were used as the primary field for review because many of the protection mechanisms for biodiversity protection are specific to particular tenures of land. This analysis is provided as **Appendix E**.

The City has conducted risk workshops with stakeholders and subject matter experts to develop a risk matrix as a basis for this strategy. These processes have identified six biodiversity asset categories and five risk categories.

This risk assessment has identified the highest risks in relation to impacts to biodiversity within the City and identified potential actions to be implemented to reduce those risks.

6.1 RISK ASSESSMENT

6.1.1 Methodology

Risk management is defined in *AS/NZS ISO 31000:2018 Risk Management – Principles and Guidelines* (ISO 31000) as 'Coordinated activities to direct and control an organisation with regard to risk'. The risk assessment and management process is iterative. For this strategy, the risk assessment was developed through engagement with key relevant stakeholders, and will require regular monitoring and review throughout the implementation of the strategy, to ensure continual improvement.

As per ISO 31000, the risk assessment has followed (and will continue to follow) the process and steps outlined below:

1. Establish the context (identifying hazards and risks)
2. Risk treatment (applying controls)
    a. Risk identification
    b. Risk analysis
    c. Risk evaluation
3. Monitor and review.

The purpose of the risk assessment was to prepare this strategy. Workshops were undertaken, firstly to identify and analyse risks and existing controls. Risks were then evaluated to determine the level of risk without controls and with existing controls. Only risks where a response is within the organisations potential influence were included.

Risk ratings were based on the standard combinations of likelihood and consequence of the risk eventuating. Additional controls to further manage the risks were then determined and added, and the risks were then analysed again, in the aim of minimising the risk ratings to as low as reasonably practicable.

Whilst it would be ideal to address all risks and implement all actions identified within the risk assessment, this is not practical nor realistic. The purpose of conducting a risk assessment is to prioritise actions to respond to the greatest risks, in order to optimise allocated resources.

6.1.2 Risk Results

A total of 31 risks to biodiversity within the City were identified from the risk assessment. Risk ratings were applied in consideration of the conceptual descriptions provided in Appendix F, Table 4.

One risk has an initial risk rating of ‘extreme’, ten risks had an initial risk rating of ’high’, nine ’medium’ and 11 ’low’.

Table 23 contains a list of risks with an initial rating of ‘extreme’ or ’high’ as an outcome of the risk assessment process. The full risk matrix is presented in **Appendix F**, and contains all risks identified in subject matter expert workshops.

The risk assessment identified risks within the following two key risk categories with initial risk ratings of ‘high’:

1. Biodiversity loss associated with land-use change (ten risks, one ‘extreme’, two ‘high’)
2. Biodiversity loss associated with poor management of on ground threats (dieback, weeds, edge effects, fire regime) across multiple tenures (15 risks, eight ‘high’).

Three risks remain in the matrix with a residual risk rating of ‘high’ following the implementation of existing and additional controls. These are:

- *Biodiversity loss associated with clearing of native vegetation (further loss of the Swan vegetation complex in the rural zone category and loss of native vegetation of the Beermullah and Guildford vegetation complexes and of Banksia WL SCP in the development land-use zone).*
- *Loss of Black-Cockatoo and Quenda habitat during land-use change processes.*
- *Feral animal control, applicable only to priority conservation reserves.*

This is due to the asset category including a matter that is a regionally or nationally significant environmental asset.

Table 23 – Summary of High Risks to Biodiversity and Potential Controls

Risk Category	Risk Description	Likelihood	Consequence	Initial Risk Rating	Actions (existing and proposed)	Likelihood	Consequence	Residual Risk Rating
1. Biodiversity loss associated with land-use change	Biodiversity loss associated with clearing of native vegetation • Further loss of the Swan Vegetation Complex in the rural zone • Further loss of native vegetation of the Beermullah and Guildford Complex Vegetation Complexes and of Banksia WL SCP in the development zone."	Almost Certain	Moderate	EXTREME	Existing: • Engagement with State Government (Planning and Environment Regulators) on the identification areas marked for urban intensification in Regional Land-Use Strategies. • Structure Planning of Development Areas for urban development to assess and identify areas for protection/environmental repair as part of Public Open Space (POS). • Environmental professional participation in Planning and Development Assessments & recommendations and participation in review of the Local Planning Policy, Local Planning Strategy and Town Planning Scheme. Proposed: • Consider inclusion of additional mechanisms to support of Biodiversity conservation into the Town Planning Scheme and Local Planning Strategy (Action 1). Specifically, • Review Tree Preservation Order provisions in the scheme to capture ecologically or culturally significant trees. • Consider opportunities: ○ to include protection mechanisms under the Town Planning Scheme for rural properties with Banksia WL SCP (EPBC). ○ to include a 'conservation zone' in the Town Planning Scheme to provide an opportunity for the protection of native remnant vegetation of local significance on private land. ○ to support protection of biodiversity assets in the public purpose zones. ○ to identify wetlands and Banksia WL SCP (EPBC) in rural properties as potential future offset areas. ○ for watercourse improvements in the rural zone. ○ to develop a package of incentives for landowners to enhance biodiversity on private property. ○ for the use of conservation covenants to protect areas of high biodiversity on private land. • For future Structure Plans, subdivisions and developments, particular in planned open space areas and road reserves: ○ prepare a policy to guide protection of the highest quality biodiversity assets during structure plan preparation. ○ require the identification of trees to be protected. ○ provide guidelines to support requirements for environmental information to be provided as part of development envelope modification applications.	Moderate	Moderate	HIGH
1. Biodiversity loss associated with land-use change	Potential loss of Black-Cockatoo and Quenda habitat during land-use change processes.	Likely	Moderate	HIGH	Existing: • Identification and protection of natural areas in POS at Structure Plan stage of development. • Environmental professional participation in land use change process (Planning and Development Assessments) and participation in review of the Local Planning Policy, Local Planning Strategy and Town Planning Scheme. • Facilitate the Development Contribution Scheme supporting protection and enhancement of biodiversity assets • Administrator of land use change works processes – construction environmental management • Support community education regarding native fauna, particularly as relates to Quenda and Black Cockatoo habitat. Proposed:. • Prepare, for adoption by Council, an Environmental Protection Policy (Action 11). • Seek inclusion of mechanisms for the protection of Biodiversity into the Town Planning Scheme, Local Planning Strategy and Local Planning Policies (Action 1). • Develop, for Council endorsement, a consolidated Fauna Management Plan (Action 4) • Develop, for Council endorsement, a proposal to expand the feral animal treatment program (Action 5) • Prepare external guidance for achievement of environmental conditions associated with the land use change process (Action 7)	Moderate	Moderate	HIGH
1. Biodiversity loss associated with land-use change	Opportunities to protect LNAs not currently protected in conservation estate through the provision of offsets are not realised	Moderate	Moderate	HIGH	Existing: • Through planning and engineering policies and processes, advocacy for the environmental offsets to be located within City boundaries (CBP) Proposed: • Prepare a Policy and Procedure for Avoidance, Mitigation and Offset of impacts on biodiversity assets (Action 8)	Unlikely	Moderate	MEDIUM

Risk Category	Risk Description	Likelihood	Consequence	Initial Risk Rating	Actions (existing and proposed)	Likelihood	Consequence	Residual Risk Rating
2. Biodiversity Loss associated with poor management of on ground threats (dieback, weeds, edge effects, fire regime) across multiple tenures	Limited application of the Feral animal control program (target species and reserves).	Likely	Moderate	HIGH	Existing: • Provide departmental comment on cat local laws (in draft by others) • Implement the feral animal control program Proposed: • Develop, for Council endorsement, a consolidated Fauna Management Plan (Action 4)	Moderate	Moderate	HIGH
2. Biodiversity Loss associated with poor management of on ground threats (dieback, weeds, edge effects, fire regime) across multiple tenures	• Tracking of rate of spread of *Phytophthora* Dieback across the municipality unknown. • No regular maintenance of phytofighters. • No monitoring of phytofighter use by community.	Moderate	Moderate	HIGH	Existing: • Implement the Dieback control program Proposed: • Develop, for Council endorsement, a consolidated Natural Area Management Plan for City LNAs (Action 2) • Develop, for Council endorsement, a proposal to expand the dieback treatment program (Action 3)	Rare	Moderate	MEDIUM
2. Biodiversity Loss associated with poor management of on ground threats (dieback, weeds, edge effects, fire regime) across multiple tenures	• Natural area management planning approach may not incorporate the full complement of reserves & spread of responsibilities between operational and strategic departments. • Opportunities for bushfire mitigation to be strategically planned to achieve biodiversity objectives & incident management response not fully realised. • Limited strategic response to Climate Change adaptation in Natural Reserve Management approaches. • Operational management of the ecosystem services provided by urban living streams in the absence of Strategy. • No process of mapping habitat tree change (loss) over time across the municipality (cross tenure)."	Likely	Minor	HIGH	Existing: • Preparation and implementation of Natural Area management plans (strategic) and supporting works programs. Proposed: • Develop, for Council endorsement, a consolidated Natural Area Management Plan for City LNAs (Action 2)	Moderate	Minor	MEDIUM
2. Biodiversity Loss associated with poor management of on ground threats (dieback, weeds, edge effects, fire regime) across multiple tenures	No strategic approach to small mammal conservation within the City.	Likely	Minor	HIGH	Existing: • Preparation and implementation of Natural Area management plans (strategic) and supporting works programs Proposed: • Develop, for Council endorsement, a consolidated Fauna Management Plan (Action 4)	Moderate	Minor	MEDIUM

Risk Category	Risk Description	Likelihood	Consequence	Initial Risk Rating	Actions (existing and proposed)	Likelihood	Consequence	Residual Risk Rating
2. Biodiversity Loss associated with poor management of on ground threats (dieback, weeds, edge effects, fire regime) across multiple tenures	• No consistent and strategic approach to recreation strategy development and implementation for natural areas. • Limited integration with other business unit supporting strategies (e.g. Tourist Strategy). • Ad-hoc delivery with funding reliance often on grants. • Lack of supporting Aboriginal heritage surveys in natural areas to support meaningful development of indigenous storytelling for natural areas.	Moderate	Moderate	HIGH	Existing: • Preparation and implementation of Natural Area management plans (strategic) and supporting works • Tourism Strategy • Trails Network Plan Proposed: • Develop, for Council endorsement, a consolidated Natural Area Management Plan for City LNAs (Action 2).	Unlikely	Moderate	MEDIUM
2. Biodiversity Loss associated with poor management of on ground threats (dieback, weeds, edge effects, fire regime) across multiple tenures	No formal engagement approach for integration of indigenous land management practices into natural area management	Moderate	Moderate	HIGH	Existing: • Recognise the connection that members of the Aboriginal community share with City-managed land through the implementation of on-ground initiatives Proposed: • Develop, for Council endorsement, a consolidated Natural Area Management Plan for City LNAs (Action 2). This includes subsidiary programs to support plan implementation including the incorporation of traditional land practices from engagement and recognition of the connection that First Nations Australians share with City managed land through the implementation of on ground initiatives.	Unlikely	Moderate	MEDIUM
2. Biodiversity Loss associated with poor management of on ground threats (dieback, weeds, edge effects, fire regime) across multiple tenures	Value of Living Streams as urban fauna corridors not realised	Likely	Minor	HIGH	Existing: • Develop and implement a program for the upgrade and maintenance of waterways within the City's reserves Proposed: • Develop, for Council endorsement, a consolidated Natural Area Management Plan for City LNAs (Action 2). This includes an approach for the management and enhancement of urban living streams and wildlife corridors and ecosystem services they provide incorporation of responsibilities associated with threatened and priority species	Moderate	Minor	MEDIUM
2. Biodiversity Loss associated with poor management of on ground threats (dieback, weeds, edge effects, fire regime) across multiple tenures	Slow delivery of individual reserve management plans	Moderate	Moderate	HIGH	Existing: • City representation on the Darling Range Regional Park Advisory Committee, Jandakot Regional Park Advisory Committee, Middle Canning Stakeholder Group and Southern East Regional Centre for Urban Landcare (SD) Proposed: • Develop, for Council endorsement, a consolidated Natural Area Management Plan for City LNAs (Action 2)	Unlikely	Moderate	MEDIUM

6.2 PROPOSED ACTION PLAN

Table 24 below contains 19 outcomes that respond to risks (not just those with an initial risk assessment of 'extreme' or 'high'). All risks identified in Appendix F and proposed controls are presented (without exclusion) in the Action Plan. The intention of the action plan is to inform business unit plans.

Table 24 – Outcomes and actions.

Outcome No.	Outcome	Action	Priority	Associated business unit(s)
1	Additional mechanisms for the protection of Biodiversity are included into the Town Planning Scheme, Local Planning Strategy and Local Planning Policies.	1. Consider feasibility and seek to include additional mechanisms for biodiversity conservation into the land use change processes as follows. • A presumption against clearing of significant native vegetation in the Town Planning Scheme • Requirements for an assessment of environmental values to support applications, with a presumption against clearing of native vegetation unless the conservation value is determined as low in liaison with Stage Government agencies • Policy provisions that reference environmental assets mapped in the Constraints Map Intramaps GIS layer. In addition: o expand mapping of Greenlinks with Remnant vegetation (outside of reservation zone) for inclusion in Constraints Map Intramaps GIS layer, recognise in Local Planning Policy, seek to protect in Local Planning Scheme amendments, structure plans and through subdivisional processes o Include remnant vegetation in the Beermullah, Forrestfield, Guildford, Southern River and Swan Complex in the Constraints Map Intramaps GIS layer. • Revised Tree Preservation Order provisions in the scheme to capture ecologically or culturally significant trees. • Protection mechanisms under the Town Planning Scheme for rural properties with Banksia WL SCP (EPBC) • A Conservation zone in the Town Planning Scheme to provide an opportunity for the protection of native remnant vegetation of local significance on private land. • Mechanisms to support protection of biodiversity assets in the public purpose zones • Mechanism to identify wetlands and Banksia WL SCP (EPBC) in rural properties as potential future offset areas • Mechanisms to support watercourse improvements in the rural zone • Opportunities to develop a package of incentives for landowners to enhance biodiversity on private property • Opportunities for the use of conservation covenants to protect areas of high biodiversity on private land • For future Structure Plans, subdivisions and developments, particularly in planned open space areas and road reserves: o prepare a policy to guide protection of the highest quality biodiversity assets during structure plan preparation o require the identification of trees to be protected. o provide guidelines to support requirements for environmental information to be provided as part of development envelope modification applications. • Prepare guidelines that assist in achievement of natural area management plans that are required as a condition of land use change • Establish and maintain a dataset for recording presence of, or changes to, the occurrence of Black Cockatoo habitat trees as a result of design survey, submissions associated with land-use change and environmental research. • Establish a process for recording Black Cockatoo habitat as a part of asset capture when new lands are ceded to the City of Armadale as a part of the land use change process • Establish a schedule for ongoing review of policy application effectiveness (objective and outcome analysis). Schedule Policy review based on review outcomes. • Develop a guideline to salvage large habitat trees or logs from development, or other sites, for use as habitat logs in natural areas, where there is no disease risk associated with the works • Advocate for the WAPC to amend the Metropolitan Region Scheme to include appropriate areas worthy of environmental protection into the MRS Parks and Recreation Reservation.	HIGH	Environment and Sustainability/ Development Services
2	A consolidated Natural Area Management Plan for City LNAs is developed and endorsed by Council.	2. Develop a consolidated Natural Area Management Plan for City reserves that includes the following. • Provides objectives, describes approach, incorporates KPIs, roles and responsibilities, monitoring and review • Identifies biodiversity assets – o Including bushland reserves, wetland reserves, river reserves and living stream corridors o Consolidates and maintains all available City data on biodiversity assets • Incorporates a standard Natural Area Management Strategy, that provides objectives and standards with supporting programs (including rehabilitation using local provenance species) as a simplified approach • Identifies where subsidiary programs to support the plan implementation are required, including: o management of assets and threats traditionally addressed in a Reserve Management Plan including but not limited to dieback, weeds, fire, climate change, feral animals, pests o incorporation of traditional land management practices from formal engagement and recognition of the connection that First Nations Australians share with City managed land through the implementation of on-ground initiatives o an approach for the management and enhancement of urban living streams and wildlife corridors and ecosystem services they provide o incorporation of responsibilities associated with threatened and priority species o a review and data monitoring process for habitat tree registration and loss that may be associated with works, fire etc. o vegetation condition and weed mapping across the City o expands the dieback treatment program (see Action 3) • Integrates natural area management with recreation and tourism • Includes key (priority) actions from management plans that are challenged by slow delivery into the consolidated Natural Area Management Plan for City reserves • Considers opportunities for collaboration and research • Includes ongoing implementation of the habitat supplementation program including maintenance and monitoring of existing habitat boxes. • Includes revegetation programs to increase habitat cover for small mammal assemblages • Implementation of actions in the plan should be costed and funding sought in annual and longer-term City budgets, plus also identify other potential funding sources • Integrates priorities for natural area improvement into the forward planning for Landcare activities	HIGH	Environment and Sustainability/ Service Delivery
3	A proposal to expand the dieback treatment program is develop, for Council endorsement & subsequently integrated into a Natural Area Plan.	3a. Prepare for Councils endorsement, a proposal to expand the dieback treatment program that includes the following. • An investment option for monitoring and reporting of dieback progression as KPI of success • Maintenance, monitoring and review schedule for phytofighters • Expansion of the dieback treatment program to include: o mapped susceptible habitat trees in Bungendore Park, that are outside of the current dieback treatment program and are in dieback infected areas o City reserves susceptible to dieback as recommended for inclusion by the Dieback Contractor, and include dieback mapping of identified habitat corridors o Significant susceptible street trees • Prepare and adopt a procedure to protect mapped habitat trees during fire management practices.	HIGH	Environment and Sustainability

Outcome No.	Outcome	Action	Priority	Associated business unit(s)
		3b. Incorporate an updated Dieback control program into the Natural Area Management Plan for LNAs.		
4	A consolidated Fauna Management Plan is prepared and endorsed by Council.	4.Prepare a cross tenure, City wide fauna management plan, that includes the following. • Establishment of objectives and KPIs as measure of change • Fauna Research Program including (items endorsed by Council December 2023): o habitat tree mapping on 10-15 year rotation, o fauna survey works for reptiles, bats, small mammal, feral animal assemblage and avian fauna on a five yearly rotation (last undertaken Spring 2022 due Spring 2027) in Armadale Settlers Common, o Re-monitoring of the small mammal assemblage in Bungendore Park using Mark-Release-Recapture methods and camera trapping. o Researching the extent of Pest Parrots in Bungendore Park using ecological survey techniques, o Repeat the 2023 fauna survey works in Roley Pools to provide a dataset to measure change over time. o Investigate genetic sampling of target species to ascertain private allele frequencies as an indicator of population health and/or source populations. • Review of the feral animal control program including target reserves and species (Action 5) • Ongoing recommendations of the feral animal program (including expansion across other reserves, tenures and species) • Identification of opportunities to integrate a feral and native animal fauna monitoring program and data collection through Habitat Links Program (Action 6) • Monitoring and review of impact on habitat of priority species such as Black-Cockatoos in Bungendore Park. • Review of Species Recovery Plans relevant to the City • Further consideration of opportunities for mammal habitat supplementation • Review of success of fauna supplementation program and consider opportunities for continuation and expansion, • Identification of cross program synergies and partnerships (Quenda health, Habitat Links, WA Museum research, offset projects) • Identification of priority locations for crossings (fauna bridges or underpasses) • Appropriate management of corridors in City LNAs • Identification of opportunities for wildlife safety initiatives in transport corridors • A procedure for injured or sick fauna first aid and response.	HIGH	Environment and Sustainability
5	A proposal to expand the feral animal control program is developed and endorsed by Council.	5.Prepare a feral animal control program that includes the following. • Encouragement of responsible cat ownership through the Habitat Links Program • Introduction and enforce cat local laws • Modification to the feral animal control program to reflect the following changes: o Expansion of the Feral Animal Control Program to include Roley Pools Reserve o Increase the effort in fox control in Armadale Settlers Common o Removal of beehives from mapped habitat trees in Armadale Settlers Common and Bungendore Park when identified • Preparation of a case study (for Councils consideration) relating to potential expansion of the feral animal control program to include Pest Rabbits • Methods of integration passive management and dispersal tactics into City operations as relates to pest parrots	HIGH	Environment and Sustainability/ Ranger and Emergency Services
6	A 5-year program delivery proposal for Habitat Links Program is developed and referred for Council endorsement if required.	6. Prepare a five-year delivery plan for Habitat Links Program that include the following. • Opportunities to support rural land conservation efforts for Banksia WL SCP (EPBC) and wetlands • Establishment of a processes for data collection relating to fauna monitoring for feral and native fauna. • Providing information to support options for low impact of bushfire mitigation activities. • Implementation of a trial rabbit control program. • Establishment of systems for data collection and review. • Consideration of the integration of grant funding opportunities. • Develops resources to support private landowner bushfire mitigation in an environmentally sensitive manner • Development of strategies to encourage private land feral animal control, especially in properties that are located in: • Armadale Settlers Common and Bungendore Park where fox movement is recorded • On private lands south west of Bungendore Park where pigs are concentrated. • Considers opportunities to expand the package of incentives for land owners to enhance biodiversity on private property, considering the following possibilities: funding grants; supply of native plants; rate rebates; education and local government labour support	HIGH	Environment and Sustainability
7	External guidance for achievement of environmental conditions associated with the land use change process is developed.	7. Prepare a Guidance Note that stipulates the required content of subdivisional Environmental Management Plans or achievement of conditions associated with environmental management during land use change. This includes: • KPIs and completion criteria • threat management requirements (dieback, feral animals etc.) • fauna relocations • compliance monitoring and reporting (for data management and review) • landscaping/revegetation with local native species • habitat tree mapping and avoidance • bond arrangement for requests to clear conditions ahead of works completion.	HIGH	Environment and Sustainability
8	A Policy and Procedure for Avoidance, Mitigation and Offset of impacts on biodiversity assets is prepared and endorsed by Council.	8. Prepare a policy statement for avoidance, mitigation and offset of impacts on vegetation to: • support advocacy of provision of offsets within the City of Armadale • prioritise LNAs based on biodiversity assets (vegetation complexes, fauna, wetlands, watercourses, corridors) and risks associated with current protection mechanisms. • offset City operational impacts, provides a procedure for the offset provision. • Prioritises rural properties or wetland areas with Banksia WL SCP (EPBC) as potential offsets	HIGH	Environment and Sustainability

Outcome No.	Outcome	Action	Priority	Associated business unit(s)
9	A Review of best practice procedures for the management of local biodiversity in other jurisdictions is completed.	9. Undertake a review of best practice procedures for the management of local biodiversity in other jurisdictions. Where applicable and practical, apply those practices within the City	MEDIUM	Environment and Sustainability
10	A process for ongoing review of progress and success of the Wungong River Management Plan and Detailed Design is developed and implemented.	10. Establish a project delivery team to review success in implementation including planning control integration and City of Armadale land management	MEDIUM	Development Services/Environment and Sustainability/Design/Service Delivery
11	An Environmental Protection Policy is prepared and adopted by Council.	11. Prepare an Environmental Protection Policy, applicable to corporate operations that addresses avoidance, mitigation and offset principles including the following. • Provide a framework for internal review of environmental impacts associated with operations or projects that provides recommendations of controls. • Integrate requirements for Construction Environmental Management Plans (CEMPs) or environmental management processes, as standard assessment criteria during tenders for construction contracts awarded by the City • Include Policy support documents including revised internal templates for referral, information sheets for environmental management during works, templates for CEMPs and standard conditions for environmental management documents to be provided as part of tender or quote commissioning as assessment criteria during construction tender process • Formalise the Bushfire Mitigation Proposal review process for environmental impacts • Formalise internal environmental and heritage impact review process including update of Environmental Review Template and Guidance Document	MEDIUM	Environment and Sustainability
12	A new AGLG Business Plan is prepared and adopted by Council.	12. Participate in (facilitate and drive) the development of the new Armadale Gosnells Landcare Group (AGLG) and Business Plan post 30 June 2024.	MEDIUM	Environment and Sustainability
13	A procedure & schedule for review of policy effectiveness is established & implemented.	13. Establish procedure and schedule for ongoing the review of policy application effectiveness (objective and outcome analysis) and schedule Policy reviews based on review outcomes	LOW	Environment and Sustainability/ Development Services
14	Environment and Sustainability internal guidance documents are reviewed and updated on an ongoing basis.	14. Regular review and update of Environment and Sustainability internal guidance documents for the application of policy and provision of comment as part of the land-use change process	LOW	Environment and Sustainability
15	Environment and Sustainability internal guidance documents are reviewed and updated on an ongoing basis.	15.Prepare Guidance Note for the required content of Environmental Management Plans, such as; KPIs with completion criteria, threat management requirements (dieback, feral animals etc.), fauna relocations, compliance monitoring and reporting (for data management and review), landscaping/revegetation with local native species and bond arrangement for requests to clear conditions ahead of works completion	LOW	Environment and Sustainability
16	A Natural Area Legal Agreement Template associated with bonds is developed and continuously improved.	16. Formalise a Natural Area Legal Agreement Template associated with bonds and an associated internal procedure for compliance reviews including a schedule	LOW	Environment and Sustainability
17	PLN 2.7. Environmental Management and Improvement Policy for Development of Constrained Land is reviewed.	17. Undertake a review of PLN 2.7 (Environmental Management and Improvement Policy for Development of Constrained Land), as it relates to the rural living zones, to enable these areas to be prioritised for environmental impact mitigation associated with development	LOW	Environment and Sustainability/Development Services
18	An integrated Environment and Sustainability Community Engagement and Education Plan is prepared and endorsed by Council.	18. prepare an Environment and Sustainability Community Engagement and Education Plan that includes the following. • Review the BEWG and Friends Group support structure, budget allocation and community engagement approach • Review the volunteer and community engagement approach to address opportunities to integrate youth and First Nations Australians. • Include budget, explore other funding opportunities and include programs for events etc. including Plants for Residents and National Tree Day	LOW	Environment and Sustainability
19	Risk assessment and control measures of the Biodiversity Strategy are reviewed annually	19.Conduct an annual review of the Biodiversity Strategy risk assessment and control measures throughout the lifespan of this strategy in accordance with he Environmental Management Framework.	LOW	Environment and Sustainability

7 CONCLUSION

The City of Armadale is proud of its natural environment and the significance of its many bushland areas, wetland and waterways. The City recognises that action is required in order to protect, preserve and enhance these assets for current and future generations.

The City will implement this strategy as part of the City's objective within the Strategic Environment Commitment "*To preserve and enhance the City's natural areas and ensure development outcomes are sensitive to pre-existing environmental values*.'

The City's approach to environmental management is guided by an Environmental Management Framework (EMF). The strategy is one of five strategic documents that informs the five-year operational plan in accordance with the EMF.

This Biodiversity Strategy:

- replaces the Local Biodiversity Strategy 2009
- develops a written vision (**Section 1.3**) and objectives (**Section 1.4**) for biodiversity conservation in the municipality
- provides a snapshot view of biodiversity assets in the City (**Section 4**)
- uses a risk response-based approach to identify key risks, describing the current management response and recommends additional controls in the Action Plan (**Sections 6.1** and **6.2**)
- has been developed in consultation with key stakeholders including various City of Armadale business units, Council and environmental volunteers
- will be reviewed internally on a five-year rolling basis

This strategy identifies 10 objectives. Using risk-based approach, 19 outcomes were identified and prioritised. A summary of the objectives and outcomes is provided in Table 25.

The outcomes and associated actions recommended in this strategy will inform the five-year rolling forecast of the *Environmental and Sustainability* business unit and operational planning.

Reporting of implementation of actions will be achieved through the annual reporting commitment of the Environmental Management Framework.

Table 25: Alignment of Biodiversity Strategy objectives and outcomes.

Objective	Outcome
1.Corporate activities are undertaken in a manner that protects and enhances the natural environment.	Outcome 8: A Policy and Procedure for Avoidance, Mitigation and Offset of impacts on biodiversity assets is prepared and endorsed by Council. Outcome 11: An Environmental Protection Policy is prepared and adopted by Council.
2.Biodiversity assets are protected during the land use change process.	Outcome 1: Additional mechanisms for the protection of Biodiversity are included into the Town Planning Scheme, Local Planning Strategy and Local Planning Policies. Outcome 10: A process for ongoing review of progress and success of the Wungong River Management Plan and Detailed Design is developed and implemented. Outcome 13: A procedure & schedule for review of policy effectiveness is established & implemented. Outcome 14 & 15 : Environment and Sustainability internal guidance documents are reviewed and updated on an ongoing basis. Outcome 16: A Natural Area Legal Agreement Template associated with bonds is developed and continuously improved. Outcome 17: PLN 2.7. Environmental Management and Improvement Policy for Development of Constrained Land is reviewed.

Objective	Outcome
3.Ecological condition of biodiversity assets are enhanced as part of the land use change process.	Outcome 7: External guidance for achievement of environmental conditions associated with the land use change process is developed.
4.The condition of biodiversity assets in natural areas managed by the City of Armadale is enhanced.	Outcome 2: A consolidated Natural Area Management Plan for City LNAs is developed and endorsed by Council. Outcome 10.
5.Strong partnerships are fostered for the maintenance and enrichment of the natural environment across all tenures of land	Outcome 12: A new AGLG Business Plan is prepared and adopted by Council. Outcome 18: An integrated Environment and Sustainability Community Engagement and Education Plan is prepared and endorsed by Council.
6. The condition of biodiversity assets infected with dieback in City managed natural areas is enhanced.	Outcome 3: A proposal to expand the dieback treatment program is develop, for Council endorsement & subsequently integrated into a Natural Area Plan.
7.The ecological health of fauna populations in the City is enhanced.	Outcome 4: A consolidated Fauna Management Plan is prepared and endorsed by Council.
8.The impact on feral animals on City of Armadale biodiversity values is reduced.	Outcome 5: A proposal to expand the feral animal control program is developed and endorsed by Council.
9.Private landowners are supported in the identification, management, and improvement of condition of biodiversity assets on private land.	Outcome 6: A 5-year program delivery proposal for Habitat Links Program is developed and referred for Council endorsement if required.
10.Best practice biodiversity management is reviewed on an ongoing basis and the strategy adapts actions accordingly.	Outcome 9: A Review of best practice procedures for the management of local biodiversity in other jurisdictions is completed. Outcome 19: Risk assessment and control measures of the Biodiversity Strategy are reviewed annually

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APPENDIX A – PREVIOUS LOCAL BIODIVERSITY STRATEGY (2009) IMPLEMENTATION REVIEW

LBS Action	Implementation Status
1. Inclusion of the vision for biodiversity conservation in Section 5.2 of the City's Local Planning Strategy (LBS) (Aims and Objectives).	The City's current Local Planning Strategy incorporates a *Biodiversity Strategy* reflecting the LBS vision for biodiversity in the LPS context. The LPS was endorsed by Council on 27 September and by WAPC on 23 December 2016. Consideration of biodiversity has also been included in TPS No. 4, 1.6 Aims of the Scheme: *(j) To conserve and enhance the natural environmental and biodiversity attributes of the district by incorporating environmental principles into public and private decision-making;* *(m) To prioritise the protection of life and property from bushfire attack where areas with an elevated bushfire risk are being planned for new development having regard to the objectives of retaining native vegetation and biodiversity.*
2. Amend Section 5.4.7 of the LPS to recognise the need for a strategy or district structure plan to guide future subdivision of rural living lands on the coastal plain, in conjunction with a review of PLN 2.7, to achieve, among other objectives, the protection of natural areas	The structure plan to guide future subdivision of rural living lands on the coastal plain called for by Action 2 was implemented by the Perth and Peel at 3.5 million - South Metropolitan Peel Sub-Regional Planning Framework (March 2018). The 2018 Sub-regional Planning Framework reset the planning structure for the coastal plain portion of Armadale and these areas are identified in the proposed new LPS 2024. No additional subdivision of Rural Living land is proposed other than that indicated by the planning structure in the Perth and Peel at 3.5 million - South Metropolitan Peel Sub-Regional Planning Framework (March 2018). The WAPC does not support further fragmentation of rural areas by further subdivision.
3. Consider an environmental review and strategy to guide assessment of development applications and subdivision applications over rural living lands on the coastal plain. One of the primary objectives of the review is to implement State level environmental and planning policy, assess environmental values and make recommendations on the protection of these values. This should also lead to a review of PLN 2.7. *Environmental Management and Improvement Policy for Development of Constrained Land*.	See Action 2 above. Propose to assess and where appropriate protect areas of high environmental value as part of planning assessments and determinations. This is ongoing in accordance with both State and National level environmental policy and City local planning policies.
4. Consider amending Section 5.4.8 of the City's Local Planning Strategy with the Local Biodiversity Protection Plan	The LPS was endorsed by Council on 27 September and by WAPC on 23 December 2016. The Local Planning Strategy has been fully updated The Local Biodiversity Protection Plan forms part of the current LPS together with a major Biodiversity Strategy section.
5. Consider adding the targets for natural area protection in Precinct Categories 1 and 3 into the City's LPS.	The aspirational targets for natural area protection in Precinct Categories 1 and 3 are included in the LPS - Local Biodiversity Protection Plan in the LPS in 2016. Quantum targets, pre-emptively set for conservation of land to be implemented through local planning processes, has little support from State and Regional development approval policies and procedures, particularly where comprehensive land-use planning assessments including assessment of environmental values, has not been undertaken prior to setting of the conservation quantum.

LBS Action	Implementation Status
6. Consider amending the City's Intramaps to include all vegetated Local Natural Areas and all additional ecological linkages proposed in this Strategy and shown in Figure 4 of the LBS.	The LBS mapping was implemented in the City's Intramaps Planning or "Environment" module in July 2012. It allows Officers in Planning and Environment services to interpret and assessing land-use/development proposals in relation to the various map overlays of environmental features.
7. Consider amending the City's Intramaps to include all vegetated Resource Enhancement Wetlands mapped by the Department of Environment and Conservation.	Completed. Wetlands are regularly reclassified between Resource Enhancement, Conservation or Multiple use categories as part of detailed assessments undertaken by DPAW (now DBCA).
8. Consider an amendment to the scheme to introduce a zone that can formally protect LNAs where required on new developments/subdivisions (e.g. conservation zone). Alternatively, this mechanism could be the recognition in the Scheme of conservation covenants that are the result of a planning decision.	Conservation Covenants have been used to protect local natural areas within special rural or rural living zoned land undergoing land-use change, or where a Structure Plan guides future subdivision. The LPS gives recognition to the Conservation Covenants tool and this can applied where relevant in future developments under the new LPS and TPS.
9. Consider introduction of a LPP for natural areas in accordance with guidance contained in Section 5.2.1 of the City's full LBS report.	Incomplete review of PLN 2.1 and PLN 2.6
10. Consider a review of Local Planning Policy PLN 2.7 to facilitate protection of natural areas in future possible scheme amendments on Rural Living lands on the coastal plain. Also consider amending PLN 2.7 to require applicants collecting ecological information to use the PBP Natural Area Initial Assessment templates.	EPA Guidance statements for the collection of biological information are utilised as an alternative, more appropriate mechanism.
11. In the longer term, consider the creation of an offsetting policy to offset the unavoidable loss of LNAs as part of development approvals.	Propose that the City of Armadale's prepare a work-practice guideline to guide the operational works it carries out on land described as "local natural area" where the vegetation has biodiversity value that may be at risk so that the City has an opportunity to apply an offset policy or exercise avoidance or mitigation. To apply an offset policy through statutory approvals under Planning and Development legislation and procedure would require prior formal confirmation of environmental values of the land through land-use planning and environmental assessments.
12. That the City considers the achievement of Target 11 for Category 1 precincts as part of the assessment of structure plans for precincts 11, 22, 26 and 35. Where possible, provisions should be attached to endorsed structure plans to ensure commitments are met as part of future developments.	Ongoing - the planning/environmental assessments of Scheme Amendments and Structure Plans, is an ongoing part of the planning processes as each precinct/stage unfolds over time. Quantum targets, pre-emptively set for conservation of land to be implemented through local planning processes, has little support from State and Regional development approval policies and procedures, particularly where comprehensive land-use planning assessments including assessment of environmental values, has not been undertaken prior to setting of the conservation quantum.
13. That the City maximises the protection of natural areas (and the achievement of Targets 1 to 10 and 12) through their inclusion in proposed POS areas, the detailed design of POS areas and the vesting of new reserves. This action applies to Category 1 and 2 precincts, and may be achieved through subdivision conditions recommended to the WA Planning Commission.	Ongoing - the planning/environmental assessments of Scheme Amendments and Structure Plans, is an ongoing part of the planning processes as each precinct/stage unfolds over time. Management Plans are put in place to maximize the protection of natural areas through Scheme provisions, Structure Plans and conditions of subdivision and development.
14. That the City considers recommending conditions on subdivisions to restore or regenerate foreshore vegetation to achieve Target 7B, where appropriate.	Ongoing - the planning/environmental assessments of Scheme Amendments and Structure Plans, is an ongoing part of the planning processes as each precinct/stage unfolds over time. In accordance with State environmental and planning policy the protection and restoration of foreshore vegetation is considered and applied through standard planning assessments, Scheme provisions, Structure Plans and subdivision recommendations and conditions. Propose that the City of

LBS Action	Implementation Status
	Armadale prepare a work-practice guideline for the standards associated with avoidance, mitigation, and revegetation to restore or regenerate foreshore vegetation to achieve Target 7B, where appropriate.
15. That the City consider recommending conditions on subdivisions to revegetate areas, or restore natural areas on the Green links shown in Figure 4, to achieve Target 10.	Ongoing - the planning/environmental assessments of Scheme Amendments and Structure Plans, is an ongoing part of the planning processes as each precinct/stage unfolds over time. Subdivision conditions to revegetate or restore natural areas identified as Green links are provided.
16. Further investigate the need for a stewardship program at a local level (this Strategy) 17. Based on findings of above, carry out further consultation with potential providers (see Options 1, 2 and 3. 18. Establish the program, as a result of Actions 16 and 17. 19. In the event that a Stewardship program is not able to be established, consider short-term projects to assist natural area landowners with management. A similar project could focus on landowners on designated Greenlinks 20. Continue to fund and support the StreamCare Program	Completed. Implemented as part of modified “Streamcare Program” – now Habitat Links Program
21. Establish a BushCare Crew to undertake bushland maintenance works consistent with priorities through the natural area survey program and with works undertaken by friends groups.	Completed.
22. Ensure developers conduct adequate mapping of vegetation structural communities, vegetation condition, weeds and dieback over reserves which are being transferred to the City to manage.	Ongoing.
23. Include budget proposals to introduce a 3-person BushCare Crew in the 20010/11 budget.	Completed.
24. Include budget proposals to provide stewardship support to private landowners with high conservation natural areas.	Completed.
25. Ensure time and resource allocations are made to monitor and report on achievement of LBS targets and the implementation of the LBS Action Plan.	Completed.
26. Collect existing ecological information on Stirling Swamp, including surveys of waterbird usage, to more accurately determine its conservation significance. Should these assessments confirm a high level of ecological significance, then further surveys may be required and protection of the wetland should be discussed with the Department of Planning with a view towards MRS reservation. The assessment should also include the linkage of vegetation between Stirling Swamp and the Forrestdale Lake Nature Reserve.	Completed.
27. Promote the Local Biodiversity Strategy to residents, once it has been adopted by Council.	Completed.
28. Refer development proponents (who are required to do initial ecological assessments of their land) to the PBP Natural Area Initial Assessment templates to ensure information is collected and presented to the standard set across the Perth	EPA & DBCA Technical Guidance notes are now used.

LBS Action	Implementation Status
Metropolitan Region. Develop a set of guidelines for those required to collect ecological information, focusing on any specific survey requirements	
29. Ensure mapping of native vegetation in the City is updated at regular intervals (e.g annually) to track achievement of LBS targets, and loss of vegetation	Mapping completed. Reporting against targets incomplete.
30. Ensure progress towards implementing the LBS Actions and achievement of targets is reported to the public every year as part of the annual State of the Environment report.	Completed as part of State of the Environment Review 2017.
31. Consider the preparation of a separate policy to address the clearing of native vegetation on road verges and road reserves	Council adopted PLN 2.4, the Local Planning Policy for Landscape Feature and Tree Preservation in February 2021. This policy includes mechanisms that protect or that can be used to achieve preservation of trees, groups of trees or features of the City's landscape through various processes. The environmental features that can be considered for protection includes shrubs and other perennial plants which the Armadale community deems are significant to the site location or context, or by virtue of their species, heritage or landmark significance.

APPENDIX B - EPBC PROTECTED MATTERS SEARCH REPORT

Australian Government

Department of Climate Change, Energy, the Environment and Water

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 25-Jul-2023

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	2
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	5
Listed Threatened Species:	45
Listed Migratory Species:	20

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	14
Commonwealth Heritage Places:	None
Listed Marine Species:	28
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	13
Regional Forest Agreements:	1
Nationally Important Wetlands:	2
EPBC Act Referrals:	31
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands) [Resource Information]

Ramsar Site Name	Proximity
Forrestdale and thomsons lakes	Within Ramsar site
Peel-yalgorup system	40 - 50km upstream from Ramsar site

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text
Banksia Woodlands of the Swan Coastal Plain ecological community	Endangered	Community likely to occur within area
Clay Pans of the Swan Coastal Plain	Critically Endangered	Community likely to occur within area
Corymbia calophylla - Kingia australis woodlands on heavy soils of the Swan Coastal Plain	Endangered	Community known to occur within area
Corymbia calophylla - Xanthorrhoea preissii woodlands and shrublands of the Swan Coastal Plain	Endangered	Community known to occur within area
Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain ecological community	Critically Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text
BIRD		
Aphelocephala leucopsis		
Southern Whiteface [529]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat known to occur within area
Zanda baudinii listed as Calyptorhynchus baudinii Baudin's Cockatoo, Baudin's Black-Cockatoo, Long-billed Black-cockatoo [87736]	Endangered	Breeding known to occur within area
Zanda latirostris listed as Calyptorhynchus latirostris Carnaby's Black Cockatoo, Short-billed Black-cockatoo [87737]	Endangered	Breeding known to occur within area
INSECT		
Leioproctus douglasiellus a short-tongued bee [66756]	Critically Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Neopasiphae simplicior A native bee [66821]	Critically Endangered	Species or species habitat known to occur within area
MAMMAL		
Bettongia penicillata ogilbyi Woylie [66844]	Endangered	Species or species habitat known to occur within area
Dasyurus geoffroii Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat known to occur within area
Myrmecobius fasciatus Numbat [294]	Endangered	Species or species habitat known to occur within area
Pseudocheirus occidentalis Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911]	Critically Endangered	Species or species habitat may occur within area
Setonix brachyurus Quokka [229]	Vulnerable	Species or species habitat known to occur within area
OTHER		
Westralunio carteri Carter's Freshwater Mussel, Freshwater Mussel [86266]	Vulnerable	Species or species habitat known to occur within area
PLANT		
Acacia aphylla Leafless Rock Wattle [13553]	Vulnerable	Species or species habitat may occur within area
Andersonia gracilis Slender Andersonia [14470]	Endangered	Species or species habitat likely to occur within area
Anthocercis gracilis Slender Tailflower [11103]	Vulnerable	Species or species habitat may occur within area
Austrostipa jacobsiana [87809]	Critically Endangered	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Banksia mimica Summer Honeypot [82765]	Endangered	Species or species habitat may occur within area
Caladenia huegelii King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid [7309]	Endangered	Species or species habitat known to occur within area
Calytrix breviseta subsp. breviseta Swamp Starflower [23879]	Endangered	Species or species habitat may occur within area
Conospermum undulatum Wavy-leaved Smokebush [24435]	Vulnerable	Species or species habitat may occur within area
Diplolaena andrewsii [6601]	Endangered	Species or species habitat may occur within area
Diuris drummondii Tall Donkey Orchid [4365]	Vulnerable	Species or species habitat likely to occur within area
Diuris micrantha Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat known to occur within area
Diuris purdiei Purdie's Donkey-orchid [12950]	Endangered	Species or species habitat known to occur within area
Drakaea elastica Glossy-leafed Hammer Orchid, Glossy-leaved Hammer Orchid, Warty Hammer Orchid [16753]	Endangered	Species or species habitat known to occur within area
Drakaea micrantha Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat known to occur within area
Eleocharis keigheryi Keighery's Eleocharis [64893]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Eucalyptus x balanites Cadda Road Mallee, Cadda Mallee [87816]	Endangered	Species or species habitat known to occur within area
Goodenia arthrotricha [12448]	Endangered	Species or species habitat likely to occur within area
Grevillea curviloba subsp. incurva Narrow curved-leaf Grevillea [64909]	Endangered	Species or species habitat may occur within area
Lasiopetalum pterocarpum Wing-fruited Lasiopetalum [64922]	Endangered	Species or species habitat may occur within area
Lepidosperma rostratum Beaked Lepidosperma [14152]	Endangered	Species or species habitat known to occur within area
Synaphea sp. Fairbridge Farm (D.Papenfus 696) Selena's Synaphea [82881]	Critically Endangered	Species or species habitat likely to occur within area
Synaphea sp. Pinjarra Plain (A.S.George 17182) [86878]	Endangered	Species or species habitat likely to occur within area
Synaphea sp. Serpentine (G.R.Brand 103) [86879]	Critically Endangered	Species or species habitat known to occur within area
Thelymitra stellata Star Sun-orchid [7060]	Endangered	Species or species habitat known to occur within area
Tribonanthes purpurea Granite Pink [16244]	Vulnerable	Species or species habitat likely to occur within area
Verticordia fimbrilepis subsp. fimbrilepis Shy Featherflower [24631]	Endangered	Species or species habitat known to occur within area

Listed Migratory Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text

Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Roosting known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area
Calidris subminuta Long-toed Stint [861]		Roosting known to occur within area
Charadrius dubius Little Ringed Plover [896]		Roosting known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area

Scientific Name	Threatened Category	Presence Text
Limosa limosa Black-tailed Godwit [845]		Roosting known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Philomachus pugnax Ruff (Reeve) [850]		Roosting known to occur within area
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State
Unknown	
Commonwealth Land - [51387]	WA
Commonwealth Land - [51382]	WA
Commonwealth Land - [50883]	WA
Commonwealth Land - [50881]	WA
Commonwealth Land - [51975]	WA

Commonwealth Land Name	State
Commonwealth Land - [51514]	WA
Commonwealth Land - [50865]	WA
Commonwealth Land - [50272]	WA
Commonwealth Land - [51518]	WA
Commonwealth Land - [50953]	WA
Commonwealth Land - [50832]	WA
Commonwealth Land - [50864]	WA
Commonwealth Land - [50882]	WA
Commonwealth Land - [51376]	WA

Listed Marine Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area
Calidris acuminata Sharp-tailed Sandpiper [874]		Roosting known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area overfly marine area
Calidris subminuta Long-toed Stint [861]		Roosting known to occur within area overfly marine area
Charadrius dubius Little Ringed Plover [896]		Roosting known to occur within area overfly marine area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius ruficapillus Red-capped Plover [881]		Roosting known to occur within area overfly marine area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area overfly marine area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area overfly marine area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area overfly marine area
Limosa limosa Black-tailed Godwit [845]		Roosting known to occur within area overfly marine area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area overfly marine area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Philomachus pugnax Ruff (Reeve) [850]		Roosting known to occur within area overfly marine area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Roosting known to occur within area overfly marine area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area
Thinornis cucullatus as Thinornis rubricollis Hooded Plover, Hooded Dotterel [87735]		Species or species habitat may occur within area overfly marine area
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area overfly marine area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area overfly marine area

Extra Information

State and Territory Reserves		[Resource Information]
Protected Area Name	Reserve Type	State
Balannup Lake	Nature Reserve	WA
Canning River	Management Area	WA
Forrestdale Lake	Nature Reserve	WA
Gibbs Road	Nature Reserve	WA
Helena	National Park	WA
Korung	National Park	WA
Midgegooroo	National Park	WA
Monadnocks	5(1)(g) Reserve	WA
Piara	Nature Reserve	WA
Stinton Cascades	Nature Reserve	WA
Unnamed WA21569	5(1)(g) Reserve	WA
Unnamed WA42044	Nature Reserve	WA
Unnamed WA53649	Nature Reserve	WA

Regional Forest Agreements	[Resource Information]

Note that all areas with completed RFAs have been included. Please see the associated resource information for specific caveats and use limitations associated with RFA boundary information.

RFA Name	State
South West WA RFA	Western Australia

Nationally Important Wetlands	[Resource Information]
Wetland Name	State
Forrestdale Lake	WA

Wetland Name	State
Gibbs Road Swamp System	WA

EPBC Act Referrals			[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status
Fruit Orchard Expansion Project	2022/09315		Completed
Tree removal for Nerrigen Brook culvert repair, Armadale.	2023/09464		Completed
Vinci Quarry, Gravel Quarry Expansion	2022/9142		Assessment
Controlled action			
Byford Rail Extension, Byford, WA	2020/8764	Controlled Action	Post-Approval
Efficiency and Growth Increase of Alumina Production	2004/1566	Controlled Action	Post-Approval
Keane Road Strategic Link, proposed construction central portion of Keane Road	2009/5035	Controlled Action	Completed
Natural Gas Pipeline Expansion	2006/2813	Controlled Action	Post-Approval
Nava-1 Cable System	2001/510	Controlled Action	Completed
Residential development and bushfire protection within part Lot 9006 Reilly Road, Harrisdale, WA	2016/7846	Controlled Action	Post-Approval
Not controlled action			
Armadale Road Duplication - Tapper to Anstey Road	2017/7972	Not Controlled Action	Completed
Canning Mills Road Improvement Project, Martin, WA	2015/7426	Not Controlled Action	Completed
Commercial development of Lot 106 Wright Road, Forrestdale WA	2003/1255	Not Controlled Action	Completed
Construction of international rowing course and commercial/residential areas	2003/1034	Not Controlled Action	Completed
Denny Avenue Level Crossing Removal, Kelmscott WA	2018/8377	Not Controlled Action	Completed
Eighth Road and Forrest Road Upgrade, Armadale, WA	2019/8538	Not Controlled Action	Completed
Eradication of the European House Borer, Perth metropolitan area, WA	2009/5027	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Grazing of stock and associated works on Lot 1790 Passmore Street, Southern River Western Australia	2018/8176	Not Controlled Action	Completed
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed
Lot 2 Nicholson Road, Forrestdale	2012/6561	Not Controlled Action	Completed
Perth Seawater Desalination Project: Thomsons Lake to Kogolup Pipeline	2005/1971	Not Controlled Action	Completed
Residential Development, Hilbert	2020/8675	Not Controlled Action	Completed
Road widening - Eighth Road Armadale between Gribble Avenue and Armadale Road	2021/8964	Not Controlled Action	Completed
Southern River Mixed Business Precinct F, City of Gosnells, WA	2013/6813	Not Controlled Action	Completed
Tonkin Highway Extension	2001/470	Not Controlled Action	Completed
Urban developmnet & associated infrastructure, Lot 4 Armadale Road, Banjup WA	2013/7049	Not Controlled Action	Completed
Wungong Transfer Mains Project	2007/3532	Not Controlled Action	Completed
Not controlled action (particular manner)			
City of Cockburn Sporting Facilties	2005/2139	Not Controlled Action (Particular Manner)	Post-Approval
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval
South West Metropolitan Railway Project	2003/1175	Not Controlled Action (Particular Manner)	Post-Approval
Referral decision			
AIC Forrestdale Campus, Educational Establishment	2021/9134	Referral Decision	Referral Publication

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

APPENDIX C – ABORIGINAL CULTURAL HERITAGE INQUIRY SYSTEM REPORT

Aboriginal Cultural Heritage Inquiry System

List of Aboriginal Cultural Heritage (ACH) Directory

Search Criteria

72 Aboriginal Cultural Heritage (ACH) Directory in Shapefile - City of Armadale boundary/COA23001 City of Armadale Boundary

Disclaimer

The *Aboriginal Cultural Heritage Act 2021 (Act)* recognises, protects, conserves, and preserves Aboriginal cultural heritage (ACH), and recognises the fundamental importance of ACH to Aboriginal people and its role in Aboriginal communities past, present and future. The Act recognises the value of ACH to Aboriginal people as well as to the wider Western Australian community.

Aboriginal cultural heritage in Western Australia is protected, whether or not the ACH has been reported to the ACH Council or exists on the Directory.

The information provided is made available in good faith and is predominately based on the information provided to the Department of Planning, Lands and Heritage by third parties. The information is provided solely on the basis that readers will be responsible for making their own assessment as to the accuracy of the information. If you find any errors or omissions in our records, including our maps, it would be appreciated if you email the details to the Department at AboriginalHeritage@dplh.wa.gov.au and we will make every effort to rectify it as soon as possible.

South West Settlement ILUA Disclaimer

Your heritage enquiry is on land **within or adjacent to** the following Indigenous Land Use Agreement(s): Gnaala Karla Booja Indigenous Land Use Agreement, Whadjuk People Indigenous Land Use Agreement.

On 8 June 2015, six identical Indigenous Land Use Agreements (ILUAs) were executed across the South West by the Western Australian Government and, respectively, the Yued, Whadjuk People, Gnaala Karla Booja, Ballardong People, South West Boojarah #2 and Wagyl Kaip & Southern Noongar groups, and the South West Aboriginal Land and Sea Council (SWALSC).

The ILUAs bind the parties (including 'the State', which encompasses all State Government Departments and certain State Government agencies) to enter into a Noongar Standard Heritage Agreement (NSHA) when conducting Aboriginal Heritage Surveys in the ILUA areas, unless they have an existing heritage agreement. It is also intended that other State agencies and instrumentalities enter into the NSHA when conducting Aboriginal Heritage Surveys in the ILUA areas. It is recommended a NSHA is entered into, and an 'Activity Notice' issued under the NSHA, if there is a risk that an activity will 'impact' (i.e. by excavating, damaging, destroying or altering in any way) an Aboriginal heritage site. The Aboriginal Heritage Due Diligence Guidelines, which are referenced by the NSHA, provide guidance on how to assess the potential risk to Aboriginal heritage.

Likewise, from 8 June 2015 the Department of Mines, Industry Regulation and Safety (DMIRS) in granting Mineral, Petroleum and related Access Authority tenures within the South West Settlement ILUA areas, will place a condition on these tenures requiring a heritage agreement or a NSHA before any rights can be exercised.

If you are a State Government Department, Agency or Instrumentality, or have a heritage condition placed on your mineral or petroleum title by DMIRS, you should seek advice as to the requirement to use the NSHA for your proposed activity. The full ILUA documents, maps of the ILUA areas and the NSHA template can be found at https://www.wa.gov.au/organisation/department-of-the-premier-and-cabinet/south-west-native-title-settlement.

Further advice can also be sought from the Department of Planning, Lands and Heritage at AboriginalHeritage@dplh.wa.gov.au.

Copyright

Terminology

ID: Reported ACH is assigned a unique ID by the Department of Planning, Lands and Heritage using the format: ACH-00000001. For ACH places on the former Register the ID numbers remain unchanged and use the new format. For example the ACH ID of the place Swan River was previously '3536' and is now 'ACH-00003536'.

Access and Restrictions:

- **Boundary Reliable (Yes/No):** Indicates whether the location and extent of the ACH boundary is considered reliable.
- **Boundary Restricted = No:** ACH location is shown as accurately as the information submitted allows.
- **Boundary Restricted = Yes:** To preserve confidentiality the exact location and extent of the place is not displayed on the map. However, the shaded region (generally with an area of at least 4km²) provides a general indication of where the ACH is located. If you are a landowner and wish to find out more about the exact location of the place, please contact the Department of Planning, Lands and Heritage.
- **Culturally Sensitive = No:** Availability of information that the Department of Planning, Lands and Heritage holds in relation to the ACH is not restricted in any way.
- **Culturally Sensitive = Yes:** Some of the information that the Department of Planning, Lands and Heritage holds in relation to the ACH is restricted if it is considered culturally sensitive information. This information will only be made available if the Department of Planning, Lands and Heritage receives written approval from the people who provided the information. To request access please contact AboriginalHeritage@dplh.wa.gov.au.
- **Culturally Sensitive Nature:**
  - **No Gender / Initiation Restrictions:** *Anyone* can view the information.
  - **Men only:** Only *males* can view restricted information.
  - **Women only:** Only *females* can view restricted information.

Status:

- **ACH Directory**: Aboriginal cultural heritage place or cultural landscape.
- **Pending**: Aboriginal cultural heritage place or cultural landscape with information in a verification stage.
- **Historic**: Aboriginal heritage places determined to not meet the criteria of Section 5 of the Aboriginal Heritage Act 1972. Includes places that no longer exist as a result of land use activities with existing approvals.

ACH Type:

- **Cultural Landscape:** a group of areas interconnected through the tangible elements of Aboriginal culture heritage present.
- **Place**: an area in which tangible elements of Aboriginal cultural heritage are present.

Place Type: The type of Aboriginal cultural heritage place. For example an artefact scatter place or engravings place.

Legacy Place Status: A status determined under the previous *Aboriginal Heritage Act 1972*:

- **Registered Site:** the place was assessed as meeting Section 5 of the *Aboriginal Heritage Act 1972.*
- **Lodged:** Information was received in relation to the place, but an assessment was not completed to determine if it met section 5 of the *Aboriginal Heritage Act 1972.*
- **Stored Data/Not a Site:** The place was assessed as not meeting Section 5 of the *Aboriginal Heritage Act 1972.*

Legacy ID: This is the former unique number that the former Department of Aboriginal Sites assigned to the place.

Coordinates

Map coordinates are based on the GDA 94 Datum.

Basemap Copyright

Aboriginal Cultural Heritage Inquiry System

List of Aboriginal Cultural Heritage (ACH) Directory

ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	ACH Type	Place Type	Knowledge Holders	Legacy Place Status	Legacy ID
397	SOUTH-EAST CORRIDOR 08.	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Camp; Meeting Place	*Registered Knowledge Holder names available from DPLH	Lodged	S02960
398	SOUTH-EAST CORRIDOR 09	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter; Camp	*Registered Knowledge Holder names available from DPLH	Registered Site	S02961
3511	SOUTHERN RIVER	Yes	Yes	Yes	No Gender / Initiation Restrictions	ACH Directory	Place	Camp; Creation / Dreaming Narrative; Hunting Place	*Registered Knowledge Holder names available from DPLH	Registered Site	S02601
3512	WUNGONG BROOK	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Creation / Dreaming Narrative	*Registered Knowledge Holder names available from DPLH	Registered Site	S02602
3538	CANNING RIVER.	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Creation / Dreaming Narrative; Ochre; Water Source	*Registered Knowledge Holder names available from DPLH	Registered Site	S02550
3577	CANNING RIVER FOOTPRINTS	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place		*Registered Knowledge Holder names available from DPLH	Registered Site	S02402
3578	CANNING RESERVOIR ROCKS	Yes	Yes	Yes	No Gender / Initiation Restrictions	ACH Directory	Place		*Registered Knowledge Holder names available from DPLH	Registered Site	S02403
3579	TURTLE POOL.	Yes	Yes	Yes	No Gender / Initiation Restrictions	ACH Directory	Place	Creation / Dreaming Narrative; Water Source	*Registered Knowledge Holder names available from DPLH	Registered Site	S02404
3580	SOUTH CANNING POOLS.	Yes	Yes	Yes	No Gender / Initiation Restrictions	ACH Directory	Place	Creation / Dreaming Narrative; Water Source	*Registered Knowledge Holder names available from DPLH	Registered Site	S02405
3696	SOLDIERS ROAD, ROLEYSTONE.	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Massacre	*Registered Knowledge Holder names available from DPLH	Registered Site	S02258
3713	LAKE FORRESTDALE.	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Camp; Creation / Dreaming Narrative; Hunting Place	*Registered Knowledge Holder names available from DPLH	Registered Site	S02213
3715	NEERIGEN BROOK 2.	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Camp; Water Source	*Registered Knowledge Holder names available from DPLH	Registered Site	S02215

ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	ACH Type	Place Type	Knowledge Holders	Legacy Place Status	Legacy ID
3910	SOUTH CANNING 04	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	S01768
4149	NATGAS 128	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Lodged	S01267
4339	WARTON ROAD, BANJUP	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Lodged	S00749
4344	KELMSCOTT LAKE SE	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Lodged	S00754
15082	ONYX ROAD CAMP.	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Camp	*Registered Knowledge Holder names available from DPLH	Lodged	S02994
15119	CANNING RIVER SCATTER	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	S03035
15906	PROPOSED FORRESTDALE INDUSTRIAL ESTATE PFIE-1	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	
15908	PROPOSED FORRESTDALE INDUSTRIAL AREA SEC/A4	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	
15909	PROPOSED FORRESTDALE INDUSTRIAL AREA SEC/A5	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	
15975	TURTLE BROOK	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Creation / Dreaming Narrative; Other	*Registered Knowledge Holder names available from DPLH	Registered Site	
15978	CANNING DAM ROAD (Realignment)	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	

Aboriginal Cultural Heritage Inquiry System

List of Aboriginal Cultural Heritage (ACH) Directory

ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	ACH Type	Place Type	Knowledge Holders	Legacy Place Status	Legacy ID
16963	Men's Ceremonial Site (CDE2)	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Ritual / Ceremonial	*Registered Knowledge Holder names available from DPLH	Registered Site	
17197	Canning Reservoir 9	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	
17203	Canning Reservoir 7	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	
17204	Canning Reservoir 6	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	
17205	Canning Reservoir 5	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	
17206	Canning Reservoir 4	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	
17208	Canning Reservoir 2	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	
17209	Canning Reservoir 1	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Lodged	
17924	FI-2	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	
17925	SEC/1C-1	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	
17928	SEC/1C-5	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	
18605	SEC/1C-3	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	

ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	ACH Type	Place Type	Knowledge Holders	Legacy Place Status	Legacy ID
18792	Wright Lake	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Creation / Dreaming Narrative	*Registered Knowledge Holder names available from DPLH	Registered Site	
18954	Armadale Road Duplication Project - 01	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Lodged	
18955	Armadale Road Dupe Project - Isolated Artefacts	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Other	*Registered Knowledge Holder names available from DPLH	Lodged	
20929	KELMSCOTT SCARRED TREE	No	No	No	No Gender / Initiation Restrictions	ACH Directory	Place	Modified Tree	*Registered Knowledge Holder names available from DPLH	Lodged	
23025	Boulder Rock	Yes	Yes	Yes	Initiated men only	ACH Directory	Place	Ritual / Ceremonial; Landscape / Seascape Feature	*Registered Knowledge Holder names available from DPLH	Lodged	
23649	Forrestdale 01	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Sub surface cultural material; Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	
24754	TH 17-11-03/01	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Lodged	
24755	TH 19-04-04/01	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Lodged	
24757	TH 23-10-03/01	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Lodged	
24758	TH Isolated Finds	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Lodged	
25477	Brookdale Archaeological Site 12	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Sub surface cultural material; Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	
25481	Brookdale Archaeological Site 18	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	

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List of Aboriginal Cultural Heritage (ACH) Directory

ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	ACH Type	Place Type	Knowledge Holders	Legacy Place Status	Legacy ID
25482	Brookdale Archaeological Site 19	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	
25486	Brookdale Archaeological Site 23	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	
25488	Brookdale Archaeological Site 25	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	
25489	Brookdale Archaeological Site 26	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	
25521	Brookdale Archaeological Site 44	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	
25523	Brookdale Archaeological Site 46	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	
25524	Brookdale Archaeological Site 47	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	
25526	Brookdale Archaeological Site 50	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	
25527	Brookdale Archaeological Site 51	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	
25530	Brookdale Potentially Modified Tree 002	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Modified Tree	*Registered Knowledge Holder names available from DPLH	Registered Site	
26083	Brookdale Archaeological Site 001	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Sub surface cultural material; Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	
26084	Brookdale Archaeological Site 002	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Sub surface cultural material; Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	

ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	ACH Type	Place Type	Knowledge Holders	Legacy Place Status	Legacy ID
26086	Brookdale Archaeological Site 004	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	
26087	Brookdale Archaeological Site 005	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Sub surface cultural material; Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	
26090	Brookdale Archaeological Site 008	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	
26093	Brookdale Archaeological Site 011	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	
26094	Brookdale Archaeological Site 015	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Sub surface cultural material; Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	
26095	Brookdale Archaeological Site 016	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Sub surface cultural material; Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	
26096	Brookdale Archaeological Site 038	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	
26102	Brookdale Archaeological Site 055	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Sub surface cultural material; Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	
26104	Brookdale Archaeological Site 057	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	
26105	Brookdale Archaeological Site 058	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	
26106	Brookdale Archaeological Site 059	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Sub surface cultural material; Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	
26107	Brookdale Archaeological Site 060	No	Yes	No	No Gender / Initiation Restrictions	ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	

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List of Aboriginal Cultural Heritage (ACH) Directory

ID	Name	Boundary Restricted	Boundary Reliable	Culturally Sensitive	Culturally Sensitive Nature	Status	ACH Type	Place Type	Knowledge Holders	Legacy Place Status	Legacy ID
37106	Goolamrup Artefact Scatter	No	Yes	No		ACH Directory	Place	Artefacts / Scatter	*Registered Knowledge Holder names available from DPLH	Registered Site	

Department of Planning, Lands and Heritage

Aboriginal Cultural Heritage Inquiry System

Map of Aboriginal Cultural Heritage (ACH) Directory

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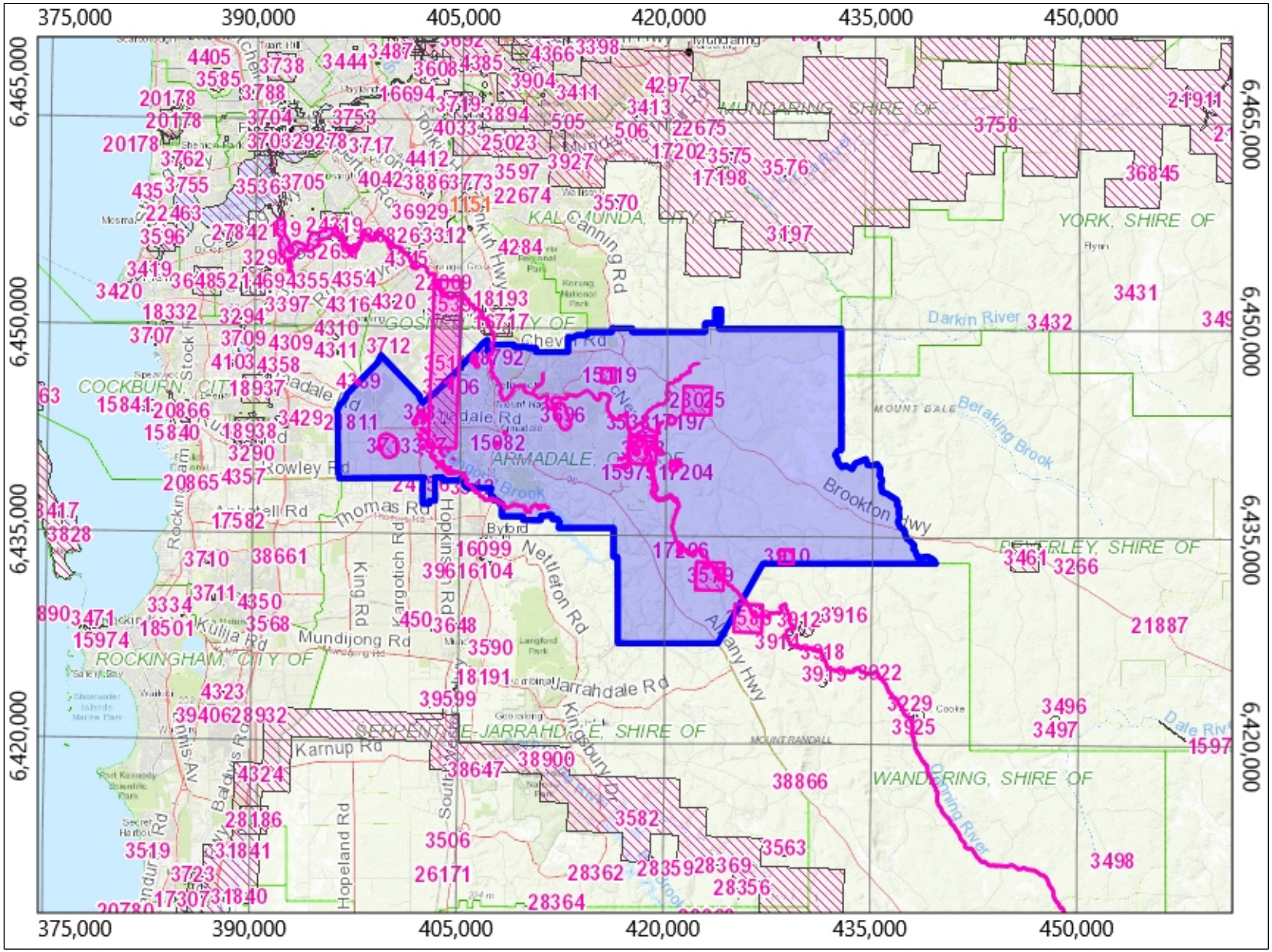

Legend

- Aboriginal Cultural Heritage (ACH) Directory
- Search Area
- Aboriginal Community
  - *Permanent*
  - *Seasonal*
  - *Town Based*
- Town
- Road
- River
- Local Government Authority

16.37 kilometres

Map Scale 1 : 496,000

MGA Zone 50 (GDA94)

APPENDIX D – GEOMORPHIC WETLANDS WITHIN THE CITY OF ARMADALE

UFI	Wetland Name	Wetland Classification	Management Category
6927	unknown	Sumpland	Conservation
7083	unknown	Dampland	Conservation
7090	unknown	Sumpland	Conservation
7143	unknown	Dampland	Conservation
7166	unknown	Sumpland	Conservation
7175	unknown	Sumpland	Conservation
7205	unknown	Dampland	Conservation
7206	unknown	Dampland	Conservation
7208	Harrisdale Swamp	Sumpland	Conservation
7209	unknown	Dampland	Conservation
7217	Forrestdale Sumpland	Sumpland	Conservation
7221	unknown	Dampland	Conservation
7223	Mason Road Swamp	Sumpland	Conservation
7233	Forrestdale Sumpland	Sumpland	Conservation
7235	Forrestdale Sumpland	Sumpland	Conservation
7237	unknown	Sumpland	Conservation
7381	Armadale Palusplain	Palusplain	Conservation
7382	Palusplain East Forrestdale	Palusplain	Conservation
7383	Armadale Palusplain	Palusplain	Conservation
7384	unknown	Dampland	Conservation
7442	unknown	Not Assessed	Conservation
7473	unknown	Dampland	Conservation
7479	Forresdale Lake	Lake	Conservation
7481	unknown	Dampland	Conservation
7482	unknown	Dampland	Conservation
7521	Balannup Lake	Sumpland	Conservation
7529	unknown	Sumpland	Conservation
7531	unknown	Dampland	Conservation
7627	unknown	Dampland	Conservation
7685	unknown	Palusplain	Conservation
7809	unknown	Dampland	Conservation
12139	unknown	Palusplain	Conservation
12140	unknown	Palusplain	Conservation
12141	unknown	Palusplain	Conservation
12142	unknown	Palusplain	Conservation
12154	unknown	Palusplain	Conservation
12179	unknown	Palusplain	Conservation
12184	unknown	Palusplain	Conservation
12365	unknown	Creek	Conservation
12366	unknown	Creek	Conservation
12367	unknown	Dampland	Conservation
12372	unknown	Dampland	Conservation
12380	unknown	Dampland	Conservation
12382	unknown	Dampland	Conservation
12993	unknown	Dampland	Conservation
13085	unknown	Palusplain	Conservation
13140	unknown	Palusplain	Conservation
13143	unknown	Dampland	Conservation
13536	unknown	Dampland	Conservation
13862	Armadale Dampland	Dampland	Conservation
13863	Armadale Dampland	Sumpland	Conservation
14165	unknown	Dampland	Conservation
14167	unknown	Dampland	Conservation
14170	unknown	Dampland	Conservation

UFI	Wetland Name	Wetland Classification	Management Category
14179	unknown	Palusplain	Conservation
14344	unknown	Not Assessed	Conservation
14345	unknown	Dampland	Conservation
14346	unknown	Not Assessed	Conservation
14349	unknown	Dampland	Conservation
14350	unknown	Dampland	Conservation
14403	Balannup Lake	Sumpland	Conservation
14475	Hilbert Road Wetland	Sumpland	Conservation
14774	unknown	Sumpland	Conservation
14835	unknown	Dampland	Conservation
14836	unknown	Dampland	Conservation
14874	unknown	Sumpland	Conservation
14875	unknown	Dampland	Conservation
14876	unknown	Dampland	Conservation
14880	Balannup Lake	Sumpland	Conservation
14882	Balannup Lake	Sumpland	Conservation
14890	Not Applicable	Dryland	Conservation
14891	unknown	Dampland	Conservation
14893	unknown	Dampland	Conservation
14937	unknown	Dampland	Conservation
14966	unknown	Dampland	Conservation
15120	unknown	Palusplain	Conservation
15182	unknown	Sumpland	Conservation
15197	Armadale Palusplain	Palusplain	Conservation
15198	Armadale Palusplain	Palusplain	Conservation
15304	unknown	Dampland	Conservation
15305	unknown	Dampland	Conservation
15306	unknown	Dampland	Conservation
15307	unknown	Dampland	Conservation
15308	unknown	Dampland	Conservation
15309	unknown	Dampland	Conservation
15311	unknown	Dampland	Conservation
15354	Forrestdale Sumpland	Sumpland	Conservation
15365	unknown	Dampland	Conservation
15366	unknown	Sumpland	Conservation
15367	unknown	Dampland	Conservation
15368	unknown	Sumpland	Conservation
15417	unknown	Dampland	Conservation
15427	unknown	Dampland	Conservation
15428	unknown	Dampland	Conservation
15430	unknown	Dampland	Conservation
15431	Armadale Palusplain	Palusplain	Conservation
15464	Lambert Lane Bushland	Palusplain	Conservation
15465	unknown	Sumpland	Conservation
15470	Fletcher Park	Palusplain	Conservation
15509	Balannup Lake	Sumpland	Conservation
15535	Forrestdale Sumpland	Sumpland	Conservation
15537	Forrestdale Sumpland	Sumpland	Conservation
15547	unknown	Dampland	Conservation
15549	unknown	Dampland	Conservation
15559	Forrestdale Sumpland	Sumpland	Conservation
15644	Canning River Floodplain	Palusplain	Conservation
15655	Canning River Floodplain	River	Conservation
15663	Canning River Floodplain	Palusplain	Conservation
15669	Canning River Floodplain	Palusplain	Conservation
15674	Canning River Floodplain	Palusplain	Conservation
15675	Canning River Floodplain	Palusplain	Conservation
15677	Canning River Floodplain	Palusplain	Conservation
15679	Canning River Floodplain	River	Conservation
15680	Canning River Floodplain	Palusplain	Conservation
15689	Canning River Floodplain	Palusplain	Conservation
15690	Canning River Floodplain	Palusplain	Conservation
15865	unknown	Dampland	Conservation
16166	unknown	Dampland	Conservation

UFI	Wetland Name	Wetland Classification	Management Category
16167	unknown	Dampland	Conservation
16169	unknown	Dampland	Conservation
16170	Balannup Lake	Sumpland	Conservation
16172	Balannup Lake	Sumpland	Conservation
16174	unknown	Dampland	Conservation
6923	unknown	Sumpland	Resource Enhancement
7087	unknown	Dampland	Resource Enhancement
7164	unknown	Sumpland	Resource Enhancement
7165	unknown	Sumpland	Resource Enhancement
7172	unknown	Dampland	Resource Enhancement
7210	unknown	Dampland	Resource Enhancement
7214	unknown	Sumpland	Resource Enhancement
7215	unknown	Sumpland	Resource Enhancement
7216	unknown	Dampland	Resource Enhancement
7224	unknown	Dampland	Resource Enhancement
7230	Not Applicable	Dryland	Resource Enhancement
7278	unknown	Sumpland	Resource Enhancement
7328	unknown	Sumpland	Resource Enhancement
7525	unknown	Dampland	Resource Enhancement
7530	unknown	Sumpland	Resource Enhancement
7536	Armadale Palusplain	Palusplain	Resource Enhancement
7537	unknown	Sumpland	Resource Enhancement
7667	unknown	Palusplain	Resource Enhancement
7673	unknown	Floodplain	Resource Enhancement
7674	unknown	Dampland	Resource Enhancement
7676	unknown	Floodplain	Resource Enhancement
7678	unknown	Artificial Lake	Resource Enhancement
7768	unknown	Floodplain	Resource Enhancement
7816	unknown	Palusplain	Resource Enhancement
7969	unknown	Dampland	Resource Enhancement
7971	Wright Lake	Sumpland	Resource Enhancement
7978	unknown	Artificial Channel	Resource Enhancement
12124	unknown	Dampland	Resource Enhancement
12151	unknown	Dampland	Resource Enhancement
12363	unknown	Dampland	Resource Enhancement
12370	unknown	Palusplain	Resource Enhancement
12379	unknown	Dampland	Resource Enhancement
13342	unknown	Dampland	Resource Enhancement
13580	unknown	Sumpland	Resource Enhancement
13822	Forrestdale Sumpland	Sumpland	Resource Enhancement
14002	Armadale Dampland	Dampland	Resource Enhancement
14342	unknown	Dampland	Resource Enhancement
14347	unknown	Sumpland	Resource Enhancement
14982	unknown	Dampland	Resource Enhancement
15117	unknown	Palusplain	Resource Enhancement
15118	unknown	Palusplain	Resource Enhancement
15183	unknown	Dampland	Resource Enhancement
15189	Forrestdale Sumpland	Sumpland	Resource Enhancement
15191	Not Applicable	Dryland	Resource Enhancement
15355	Forrestdale Sumpland	Sumpland	Resource Enhancement
15385	unknown	Dampland	Resource Enhancement
15432	unknown	Palusplain	Resource Enhancement
15434	unknown	Sumpland	Resource Enhancement
15435	Armadale Palusplain	Palusplain	Resource Enhancement
15436	Armadale Palusplain	Palusplain	Resource Enhancement
15438	unknown	Palusplain	Resource Enhancement
15466	unknown	Sumpland	Resource Enhancement
15530	unknown	Dampland	Resource Enhancement
15532	unknown	Sumpland	Resource Enhancement
15533	unknown	Dampland	Resource Enhancement
15534	unknown	Dampland	Resource Enhancement
15539	unknown	Sumpland	Resource Enhancement
15550	unknown	Dampland	Resource Enhancement
15552	unknown	Sumpland	Resource Enhancement

UFI	Wetland Name	Wetland Classification	Management Category
15558	unknown	Sumpland	Resource Enhancement
15564	unknown	Dampland	Resource Enhancement
15565	unknown	Dampland	Resource Enhancement
15566	unknown	Dampland	Resource Enhancement
15572	unknown	Dampland	Resource Enhancement
15573	unknown	Dampland	Resource Enhancement
15594	unknown	Dampland	Resource Enhancement
15695	unknown	Dampland	Resource Enhancement
15696	unknown	Dampland	Resource Enhancement
15793	unknown	Dampland	Resource Enhancement
15796	Armadale Palusplain	Palusplain	Resource Enhancement
15820	Forrestdale Sumpland	Sumpland	Resource Enhancement
15832	unknown	Not Assessed	Resource Enhancement
15833	unknown	Not Assessed	Resource Enhancement
15836	unknown	Dampland	Resource Enhancement
15838	unknown	Dampland	Resource Enhancement
15839	unknown	Dampland	Resource Enhancement
15943	unknown	Dampland	Resource Enhancement
15946	Balannup Lake	Sumpland	Resource Enhancement
15947	Balannup Lake	Sumpland	Resource Enhancement
16046	unknown	Palusplain	Resource Enhancement
16047	unknown	Palusplain	Resource Enhancement
16048	unknown	Palusplain	Resource Enhancement
16163	unknown	Dampland	Resource Enhancement
16164	unknown	Dampland	Resource Enhancement
16165	Balannup Lake	Sumpland	Resource Enhancement
16173	Balannup Lake	Sumpland	Resource Enhancement
6789	unknown	Sumpland	Multiple Use
6921	unknown	Sumpland	Multiple Use
6931	unknown	Dampland	Multiple Use
7069	unknown	Dampland	Multiple Use
7072	unknown	Sumpland	Multiple Use
7082	unknown	Dampland	Multiple Use
7088	unknown	Dampland	Multiple Use
7089	unknown	Dampland	Multiple Use
7091	unknown	Sumpland	Multiple Use
7176	unknown	Dampland	Multiple Use
7179	unknown	Sumpland	Multiple Use
7219	unknown	Dampland	Multiple Use
7222	unknown	Dampland	Multiple Use
7226	Mason Road Swamp	Sumpland	Multiple Use
7227	unknown	Dampland	Multiple Use
7228	unknown	Dampland	Multiple Use
7232	Forrestdale Sumpland	Sumpland	Multiple Use
7236	Forrestdale Sumpland	Sumpland	Multiple Use
7238	unknown	Sumpland	Multiple Use
7324	unknown	Sumpland	Multiple Use
7327	unknown	Sumpland	Multiple Use
7534	Armadale Palusplain	Sumpland	Multiple Use
7535	Armadale Palusplain	Sumpland	Multiple Use
7538	unknown	Dampland	Multiple Use
7539	Armadale Palusplain	Sumpland	Multiple Use
7666	unknown	Palusplain	Multiple Use
7669	unknown	Dampland	Multiple Use
7679	Armadale Palusplain	Palusplain	Multiple Use
7680	unknown	Palusplain	Multiple Use
7682	unknown	Dampland	Multiple Use
7684	unknown	Palusplain	Multiple Use
7686	Armadale Palusplain	Palusplain	Multiple Use
7814	unknown	Palusplain	Multiple Use
7825	unknown	Palusplain	Multiple Use
7867	unknown	Sumpland	Multiple Use
12122	unknown	Dampland	Multiple Use
12134	unknown	Dampland	Multiple Use

UFI	Wetland Name	Wetland Classification	Management Category
12138	unknown	Artificial Lake	Multiple Use
12143	unknown	Palusplain	Multiple Use
12355	unknown	Palusplain	Multiple Use
12364	unknown	Creek	Multiple Use
12368	unknown	Creek	Multiple Use
12369	unknown	Creek	Multiple Use
12371	unknown	Creek	Multiple Use
12992	unknown	Sumpland	Multiple Use
12995	unknown	Dampland	Multiple Use
13061	Not Applicable	Dryland	Multiple Use
13065	Not Applicable	Dryland	Multiple Use
13114	unknown	Dampland	Multiple Use
13371	unknown	Dampland	Multiple Use
13860	unknown	Sumpland	Multiple Use
13879	unknown	Dampland	Multiple Use
13927	unknown	Dampland	Multiple Use
13948	unknown	Dampland	Multiple Use
13949	unknown	Sumpland	Multiple Use
13950	unknown	Sumpland	Multiple Use
13991	unknown	Sumpland	Multiple Use
13994	unknown	Sumpland	Multiple Use
14155	unknown	Dampland	Multiple Use
14173	Armadale Palusplain	Palusplain	Multiple Use
14351	unknown	Sumpland	Multiple Use
14449	unknown	Dampland	Multiple Use
14844	unknown	Dampland	Multiple Use
14883	unknown	Dampland	Multiple Use
14884	unknown	Sumpland	Multiple Use
14897	unknown	Dampland	Multiple Use
14898	unknown	Dampland	Multiple Use
14902	unknown	Dampland	Multiple Use
14940	Southern River	Dampland	Multiple Use
14943	unknown	Dampland	Multiple Use
14944	unknown	Palusplain	Multiple Use
14965	unknown	Dampland	Multiple Use
14967	unknown	Palusplain	Multiple Use
15190	Forrestdale Sumpland	Sumpland	Multiple Use
15386	unknown	Dampland	Multiple Use
15405	unknown	Sumpland	Multiple Use
15421	unknown	Dampland	Multiple Use
15425	unknown	Dampland	Multiple Use
15429	unknown	Dampland	Multiple Use
15437	unknown	Palusplain	Multiple Use
15529	unknown	Dampland	Multiple Use
15531	unknown	Sumpland	Multiple Use
15536	Forrestdale Sumpland	Sumpland	Multiple Use
15538	Forrestdale Sumpland	Sumpland	Multiple Use
15548	unknown	Dampland	Multiple Use
15551	unknown	Sumpland	Multiple Use
15553	unknown	Dampland	Multiple Use
15557	unknown	Sumpland	Multiple Use
15560	Forrestdale Sumpland	Sumpland	Multiple Use
15577	unknown	Dampland	Multiple Use
15625	unknown	Dampland	Multiple Use
15626	unknown	Dampland	Multiple Use
15665	unknown	Palusplain	Multiple Use
15666	Canning River Floodplain	Palusplain	Multiple Use
15667	Canning River Floodplain	Palusplain	Multiple Use
15668	Canning River Floodplain	Palusplain	Multiple Use
15670	Canning River Floodplain	Palusplain	Multiple Use
15671	Canning River Floodplain	River	Multiple Use
15672	Canning River Floodplain	Palusplain	Multiple Use
15673	Canning River Floodplain	Palusplain	Multiple Use
15676	Canning River Floodplain	Palusplain	Multiple Use

UFI	Wetland Name	Wetland Classification	Management Category
15678	Canning River Floodplain	Palusplain	Multiple Use
15697	unknown	Dampland	Multiple Use
15698	unknown	Dampland	Multiple Use
15699	unknown	Dampland	Multiple Use
15797	Armadale Palusplain	Palusplain	Multiple Use
15831	unknown	Dampland	Multiple Use
15834	unknown	Not Assessed	Multiple Use
15837	unknown	Dampland	Multiple Use
15846	unknown	Palusplain	Multiple Use
15942	unknown	Dampland	Multiple Use
15948	Balannup Lake	Sumpland	Multiple Use
16025	unknown	Dampland	Multiple Use
16054	unknown	Sumpland	Multiple Use
16159	unknown	Dampland	Multiple Use
16160	unknown	Dampland	Multiple Use
16161	unknown	Dampland	Multiple Use
16168	Balannup Lake	Sumpland	Multiple Use
16171	Balannup Lake	Sumpland	Multiple Use
16175	unknown	Dampland	Multiple Use
7366	unknown	No Longer a Wetland	Not Applicable
7468	unknown	No Longer a Wetland	Not Applicable
7480	unknown	No Longer a Wetland	Not Applicable
12130	unknown	Dryland	Not Applicable
13599	unknown	No Longer a Wetland	Not Applicable
13866	Not Applicable	Dryland	Not Applicable
13888	unknown	No Longer a Wetland	Not Applicable
13928	unknown	No Longer a Wetland	Not Applicable
15310	unknown	No Longer a Wetland	Not Applicable
15540	unknown	No Longer a Wetland	Not Applicable
15546	unknown	No Longer a Wetland	Not Applicable
15599	unknown	No Longer a Wetland	Not Applicable
15681	Balannup Lake	No Longer a Wetland	Not Applicable
15855	unknown	No Longer a Wetland	Not Applicable
15887	unknown	Dryland	Not Applicable
16155	unknown	No Longer a Wetland	Not Applicable
16156	unknown	No Longer a Wetland	Not Applicable
16157	unknown	No Longer a Wetland	Not Applicable
16158	unknown	No Longer a Wetland	Not Applicable
7668	unknown	Palusplain	Not Assessed
12361	unknown	Dampland	Not Assessed
12362	unknown	Not Assessed	Not Assessed
12381	unknown	Not Assessed	Not Assessed

APPENDIX E – INDICATORS OF STATE & LAND-USE ZONE ANALYSIS

This appendix presents an analysis of indicators of state for each land-use zone grouping, and a gap and opportunity analysis of the procedures and/or control mechanisms that are or can be applied to protect environmental values in each of these zones.

When reading this gap analysis, it should be noted that:

- the land-use zoning categories (land-use zones) are generalisations for discussion purposes as described in the Biodiversity Strategy.
- This interpretation considers the recommendations of the City of Armadale Environmental Profile (Urbaqua 2023) that was prepared to provide advice to the consultant preparing the City of Armadale Local Planning Strategy 2024.
- Town Planning Scheme 4 includes provisions and mechanisms that assist in the protection of biodiversity in the use and development of freehold and reserved land in accordance with the legal requirements of environmental and planning legislation.

Table E1 – Gap Analysis of Procedures and/or Control Mechanisms for Protection of Biodiversity for <u>All</u> Zoning Category Groupings

Summary of Indicators of State	Cth and WA Protection Mechanism	City Protection Mechanism	Gap and Opportunity Analysis
All	NA	NA	- Include a presumption against clearing in the Scheme. - Include a 'conservation zone' in the scheme to provide an opportunity for the protection of native remannt vegetation of local signficance on private land. Support with references for conservation covernants. - Include scheme provisions that reference an environmenal assets map. - Expand mapping of greenlinks with Remanant vegetation (outside of reservation zone categories) for inclusion of Special Control Area Maps, recognsise in Local Planning Policy, Protect in Local Planning Scheme ammendments, structure plans and through subdivisional processes. - Review Tree preservation order provisions in the scheme to capture ecologically or culturally signficant trees.

Table E2 – Gap Analysis of Procedures and/or Control Mechanisms for Protection of Biodiversity in the Development Zone
(Includes urban development zone and industrial development zone of TPS 4; and DevelopmentWA Scheme development zone)

Summary of Indicators of State	Cth and WA Protection Mechanism	City Protection Mechanism	Gap and Opportunity Analysis
Native vegetation - 2,200.44 ha of native vegetation. **Poorly represented vegetation complexes** - 44.20 ha, or 98.16% of the total extent of the Beermullah Complex. - Nil representation of the Beermullah Complex in the reservation zone in the municipality. - 24.50 ha, or 78.50% of the total extent of the Guildford Complex occurs in this zone. **TECs (Cth & WA listed)** - 4.02 ha of SCP 08. - 3.6 ha of SCP 3a. - 101 ha of Banksia WL SCP. - 4.02 ha for Clay Pans of the SCP. **Recorded conservation significant flora & fauna** - 7 species, 102 formally mapped occurrences. - 12 records of conservation significant flora **Key habitat areas** - 107 geomorphic wetlands mapped in the zone 17 of conservation category. - 75 ha of watercourses in this zone (3.75% of the total extent of watercourses) **Aboriginal heritage** - 88 Aboriginal Heritage Sites (31 Registered Sites, five Lodged and 52 Stored Data/Not a Site records) **Protected fauna** - 8 listed species	- *Environment Protection and Biodiversity Conservation Act 1999 (Cth)* - *Environmental Protection Act 1986 (WA)* - *Biodiversity Conservation Act 2016 (WA)* - *Aboriginal Heritage Act 1972 (WA)*	- Structure Planning (both CoA and DWA led) to maximise environmental protection and require Foreshore Management Plans as a condition of development. - Development contribution scheme areas facilitate the protection of biodiversity assets. - Special Control Areas – wetland protection areas and groundwater environmental management areas & Catchment Protection Area - Peel Harvey Coastal Plain Catchment - Provide advice to WAPC or DWA on subdivisional or development conditions, guided by Local Planning Policy. - Administration of subdivision and development approvals process – construction environmental management. - Protection of vegetation and revegetation in the Local Planning Policy 2.7 – Water Sensitive Urban Design. - Management of land ceded as part of land-use change process and vested in the City of Armadale.	- Provide comment to Development Western Australia on Foreshore Management Plans that are required as conditions of development, noting the significance of protection of Beermullah and Guildford Complexes, Banksia WL SCP and wetlands. - Seek opportunities for the protection of native vegetation as part of Sienna Wood Structure Plan (Cell K). - Seek to condition the retention of Beermullah Complex vegetation accompanied by a Natural Area Management Plan for the public open space in the South Forestdale Industrial Area (Development area 46). - Investigate opportunities for lot level vegetation retention through civil and development approvals process for vegetation of the Beermullah Complex within the Development area 46 within the South Forestdale Industrial Area - Investigate mechanisms for the protection of Banksia WL SCP identified in Figure 6. - Include remnant vegetation in the Beermullah, Forrestfield, Guildford, Southern River and Swan Complex onto Special Control area maps of the Town Planning Scheme. Require an assessment of environmental values to support an application with a presumption against clearing of native vegetation unless the conservation value is deemed as low in liaisons with Stage Government agencies. - Monitor implementation of the Wildflower Wetland Management Plan in relation to Banksia WL SCP and protection. - Policy statement regarding vegetation avoidance in design. - Manage fauna populations in natural areas ceded to the City as part of land-use change. - Establish a database of fauna habitat trees when areas are ceded to the City as part of land-use change. - Require the identification of trees to be protected under future Structure Plans, subdivisions and developments, particular in planed open space areas and road reserves.

Table E3 – Gap Analysis of Procedures and/or Control Mechanisms for Protection of Biodiversity in the Industrial Zone
(Includes Industrial Business, General Industry, Strategic Regional Centre and District Centre of TPS 4)

Summary of Indicators of State	Cth and WA Protection Mechanism	City Protection Mechanism	Gap and Opportunity Analysis
Poorly represented vegetation - 3.23 ha of native vegetation (less than 2% of total vegetation remaining). - Low representation of at risk vegetation complexes in this zone. - Low representation of TEC in this zone. **Key habitat areas** - 12 mapped wetlands in the zone, 1 conservation category. **Aboriginal heritage** - 11 Aboriginal Heritage Sites (six Registered Sites and five Stored Data/Not a Site records) **Ecological linkages** - Drainage channels are the key ecological links **Protected fauna** - 6 species listed	- *Environment Protection and Biodiversity Conservation Act 1999 (Cth)* - *Environmental Protection Act 1986 (WA)* - *Biodiversity Conservation Act 2016 (WA)* - *Aboriginal Heritage Act 1972 (WA)*	- Structure Planning - Provide advice to WAPC or DWA on subdivisional or development conditions, guided by Local Planning Policy - Administration of subdivision and development approvals process – construction environmental management	- Policy statement regarding vegetation avoidance and protection in design. - Review of drainage asset maintenance in industrial areas to manage their value as ecological corridors for biodiversity. - Require the identification of trees to be protected under future Structure Plans, subdivisions and developments, particular in planed open space areas and road reserves.

Table E4 – Gap Analysis of Procedures and/or Control Mechanisms for Protection of Biodiversity in the Infrastructure Zone
(Includes roads, railway, power easements and other infrastructure of TPS 4)

Summary of Indicators of State	Cth and WA Protection Mechanism	City Protection Mechanism	Gap and Opportunity Analysis
Native vegetation - 2,173.10 ha of native vegetation. **Poorly represented vegetation complexes** - 7.5 ha of Forrestfield Complex (7% of extent). - Low representation of TEC in this zone. **Conservation significant Fauna** - 14 species listed. **Key habitat areas** - 213 mapped wetlands in the zone, 80 are conservation category. **Aboriginal heritage** - 51 Aboriginal Heritage Sites (16 Registered Sites, 11 Lodged and 24 Stored Data/Not a Site records)	- *Environment Protection and Biodiversity Conservation Act 1999 (Cth).* - *Environmental Protection Act 1986 (WA)* - *Biodiversity Conservation Act 2016 (WA)* - *Aboriginal Heritage Act 1972 (WA)* - *Biosecurity and Agriculture Management Act 2007 (WA)*	- Design – local authority - Development approval, utility provision. - Advocacy. - Construction management process for protection of trees during operational works.	- Policy statement for avoidance, mitigation and offset of impacts on vegetation. - Dataset establishment and management for recording of habitat trees resulting from design survey. - Of the 7.5 ha of remaining Forrestfield complex, 5.34 ha occurs within railway corridors and 2.16 ha occurs within Primary Regional Road corridors - Require the identification of trees to be protected under future Structure Plans, subdivisions and developments, particular in planned open space areas and road reserves.

Table E5 – Gap Analysis of Procedures and/or Control Mechanisms for Protection of Biodiversity in the Public Purpose Zone

(Includes the landfill facility, DWER vested land (water catchment), Water Corporation and Department of Education lands)

Summary of Indicators of State	Cth and WA Protection Mechanism	City Protection Mechanism	Gap and Opportunity Analysis
Native vegetation - 1,352.41 ha of native vegetation **Poorly represented vegetation complexes** - Low representation of TEC in this zone. - Low representation of poorly protected vegetation complexes in this zone **Threatened and Priority Ecological Communities** - 8 ha of Banksia WL SCP (EPBC) **Key habitat areas** - What is the intersection of public purpose with corridors? **Aboriginal heritage** - Four Aboriginal Heritage Sites (three Registered Sites and one Stored Data/Not a Site records) **Conservation significant fauna:** - 9 species listed	- *Environment Protection and Biodiversity Conservation Act 1999 (Cth).* - *Environmental Protection Act 1986 (WA)* - *Biodiversity Conservation Act 2016 (WA)* - *Aboriginal Heritage Act 1972 (WA)*	- Advocacy - Land management - Support of private land conservation - Provide advice to WAPC or DWA on subdivisional or development conditions, guided by Local Planning Policy - Administration of subdivision and development approvals process – construction environmental management.	- Investigate opportunities to support primary school and hospital lands in the protection of native vegetation of Banksia WL SCP TEC (EPBC) on their properties. - Require the identification of trees to be protected under future Structure Plans, subdivisions and developments, particularly in planned open space areas and road reserves.

Table E6 – Gap Analysis of Procedures and/or Control Mechanisms for Protection of Biodiversity in the Reservation Zone
(Includes Regional and Local Parks and Recreation areas under Town Planning Scheme 4)

Summary of Indicators of State	Cth and WA Protection Mechanism	City Protection Mechanism	Gap and Opportunity Analysis
Native vegetation - 40,209.01 ha of native vegetation **Poorly represented vegetation complexes** - 59.52 ha, or 61.83% of the remaining extent occurs of the Forrestfield Complex occurs in this zone. - 4.27 ha, or 13.7% of the extent remaining Guildford Complex occur in this zone. - 843.40 ha, or 77.75% of the extent remaining of the Southern River Complex occurs in this zone. - 6.04 ha, or 26% of the extent of remaining Swan Complex occurs in this zone. **Threatened and Priority Ecological Communities** - Seven Threatened and Priority Ecological Communities in the municipality occur in the reservation zone. For all PEC, TEC, the reservation zone is the most significant land tenure representing their occurrence. **Key habitat areas** - 176 mapped wetlands in the zone, 80 are conservation category. - 70% of watercourses are within reservation **Aboriginal heritage** - 53 Aboriginal Heritage Sites (28 Registered Sites, six Lodged and 19 Stored Data/Not a Site records) **Conservation significant flora and fauna** - 139 recordings of conservation significant flora including 28 locations of Threatened flora. - 1,311 records of Conservation fauna with 41 species represented in this zone.	- *Environment Protection of Biodiversity Conservation Act 1999 (Cth)* - *Environmental Protection Act 1986 (WA)* - *Biodiversity Conservation Act 2016 (WA)* - *Aboriginal Heritage Act 1972 (WA)* - *Biosecurity and Agriculture Management Act 2007 (WA)*	- Natural area management in vested reserves - Advocacy for management of natural areas in reserve system that is not managed by CoA	- Natural Area Management Plans for City reserves including service level review and matters protected under Aboriginal Heritage Act 1972 review. - Consider Threatened and Endangered Species Recovery Plans and implications for natural area management in the municipality.

Table E7 – Gap Analysis of Procedures and/or Control Mechanisms for Protection of Biodiversity for Residential Zone
(Includes residential and special residential TPS 4 zones)

Summary of Indicators of State	Cth and WA Protection Mechanism	City Protection Mechanism	Gap and Opportunity Analysis
Native vegetation - 3,097.24 ha of native vegetation **Poorly represented vegetation communities** - 6.72 ha of Banksia WL SCP TEC (EPBC) in the residential zone **Conservation significant flora and fauna** - 16 conservation significant fauna with 673 records. - High frequency of Black Cockatoo and Quenda in records **Key habitat areas** - Living streams are ecological corridors **Aboriginal heritage** - Nine Aboriginal Heritage Sites (three Registered Sites, three Lodged and three Stored Data/Not a Site records)	- *Environment Protection and Biodiversity Conservation Act 1999 (Cth).* - *Environmental Protection Act 1986 (WA)* - *Biodiversity Conservation Act 2016 (WA)* - *Aboriginal Heritage Act 1972 (WA)* - *Biosecurity and Agriculture Management Act 2007 (WA)*	- Identification and Protection of Natural areas in POS at Structure Plan stage of development. - Developer Contribution Schemes in some areas; Harrisdale, Piara Waters and Forestdale (north of Armadale Rd). - Environmental management of areas ceded to the City as part of land-use change. - Development envelopes and scheme clauses in the special residential zone. - Lot-level tree protection.	- Policy to guide protection of biodiversity assets during structure plan preparation. - Provide Black Cockatoo foraging and Quenda habitat in the urban landscape. - Require the identification of trees to be protected under future Structure Plans, subdivisions and developments. particular in planned open space areas and road reserves. - Environmental management planning for living streams including provision of suitable habitat for Quenda. - Guidelines for development envelope modifications.

Table E8 – Gap Analysis of Procedures and/or Control Mechanisms for Protection of Biodiversity for Rural Zone
(Includes rural zones under TPS 4; general rural, rural living, special rural)

Summary of Indicators of State	Cth and WA Protection Mechanism	City Protection Mechanism	Gap and Opportunity Analysis
Native vegetation - 6,067.00 ha of native vegetation **Poorly represented vegetation communities** - 8.49 ha, or 40.73% of the Swan Complex occurs in this zone. **Threatened and Priority Ecological Communities** - 218 ha of Banksia WL SCP (EPBC) occurs on rural lands. **Aboriginal heritage** - 13 Aboriginal Heritage Sites (six Registered Sites and seven Stored Data/Not a Site records) **Key habitat areas** - 174 mapped wetlands in the zone, 67 that are conservation category. - 12.9% of watercourses are within reservation. **Conservation significant flora and fauna** - 11 records of conservation significant flora. - 230 records of conservation significant fauna with 15 species represented in this zone.	- *Environment Protection and Biodiversity Conservation Act 1999 (Cth).* - *Environmental Protection Act 1986 (WA)* - *Biodiversity Conservation Act 2016 (WA)* - *Aboriginal Heritage Act 1972 (WA)*	- 20 year "Stream Care" program supporting river revegetation – now "Habitat Links". - Development envelopes in some rural areas (focus on Roleystone and Karragullen). - Section 4B.7 of the TPS combined with other scheme provisions provide protection for remnant native vegetation over 87% (71 km^2) of the City's Rural land-use zone and does not permit the clearing of remnant native vegetation or the destruction or damage of native trees, unless the City has granted exemption under a planning, building or similar approval. The remaining 13% (9 km^2) reflects the general rural zone and a small area of special residential zone. - The general rural zone purpose being for agricultural land-uses. 4B.7 also provides similar protection for particular trees or areas of native vegetation that have been specifically identified for Tree Preservation under Schedule A - clause 80A or are located on a site for which a Development Envelope has been required under the provisions of clause 4.7.	- Prioritise opportunities to support rural land conservation efforts for Banksia WL SCP TEC (EPBC) and wetlands through Habitat Links Program lands. - Consider opportunities for rural properties with Banksia WL SCP (EPBC) with regards to protection mechanisms under the Town Planning Scheme. - Consider opportunities for rural properties with Banksia WL SCP TEC (EPBC) to be protected as formal offsets. - Require the identification of trees to be protected under future Structure Plans, subdivisions and developments, particular in planed open space areas and road reserves. - Provide guidelines for environmental information required to support development envelope modification. - Include remnant vegetation in the Beermullah, Forrestfield, Guildford, Southern River and Swan Complex onto Special Control area maps of the Town Planning Scheme. Require an assessment of environmental values to support an application with a presumption against clearing of native vegetation unless the conservation value is deemed as low in liaisons with Stage Government agencies. - Opportunity to identify wetlands in rural as potential future offset areas. - Consider opportunity for watercourse improvement in the rural zone.

Table E9– Gap Analysis of Procedures and/or Control Mechanisms for Protection of Biodiversity for Waterways Zone
(Includes the areas zoned waterways in TPS 4)

Summary of Indicators of State	Cth and WA Protection Mechanism	City Protection Mechanism	Gap and Opportunity Analysis
Native vegetation - 487.49 ha of native vegetation **Poorly represented vegetation complexes** - 5.72 ha, or 24.55% of the Swan Complex occurs in this zone. **Threatened and Priority Ecological Communities** - 7.55 ha of Banksia WL SCP TEC (EPBC) occurs in this zone. **Aboriginal heritage** - Ten Aboriginal Heritage Sites (seven Registered Sites and three Stored Data/Not a Site records) **Key habitat areas** - Only 8% of waterways are classified in this zone - 24 wetlands intersect the waterways zone - Key ecological corridors **Conservation significant flora and fauna** - Only 2 conservation significant flora species occur in this zone - 20 records of conservation significant fauna	- *Environment Protection and Biodiversity Conservation Act 1999 (Cth)* - *Environmental Protection Act 1986 (WA)* - *Biodiversity Conservation Act 2016 (WA)* - *Aboriginal Heritage Act 1972 (WA)* - *Swan Canning River Management Regulations 2007 (WA)*	- Development WA Redevelopment Area Wungong Uban Water – Requires foreshore management plans and environmental enhancements as a condition of land-use change approval. - SP provision for the Wungong River area through Champion Lakes requires foreshore revegetation plans. - Requirements for Structure Plan and Foreshore Management Plan for areas adjacent to Canning River in Kelmscott. - Natural area management programs. - Support of Armadale Gosnells Landcare Group in river restoration.	- Consolidated Environmental Management Plan for Canning River areas vested in City of Armadale. - Further investigate presence of Carter's Freshwater Mussel in City managed natural areas.

APPENDIX F – RISK ASSESSMENT AND RISK MATRIX

Table F1 - Risk Assessment Matrix

Likelihood	Consequence				
	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain	HIGH	HIGH	EXTREME	EXTREME	EXTREME
Likely	MEDIUM	HIGH	HIGH	EXTREME	EXTREME
Moderate	LOW	MEDIUM	HIGH	EXTREME	EXTREME
Unlikely	LOW	LOW	MEDIUM	HIGH	EXTREME
Rare	LOW	LOW	MEDIUM	HIGH	HIGH

Table F2 - Biodiversity Risk Categories

No.	Risk Category
1	Biodiversity loss associated with land-use change
2	Biodiversity Loss associated with poor management of on ground threats (dieback, weeds, edge effects, fire regime) across multiple tenures
3	Lack of knowledge to inform biodiversity management
4	Loss of community connection and engagement with the environment and natural areas
5	Biodiversity loss associated with corporate practices and business activities (excluding natural area management)

Table F3 - Biodiversity Asset Categories

No.	Asset Categories
1	Native Vegetation Communities
2	Ecological Corridors & key habitat areas
3	Native Fauna (Aquatic and Terrestrial) & Key Habitat
4	Native Flora (Aquatic and terrestrial)
5	Wetlands
6	Rivers, watercourses and tributaries

Table F4 – Conceptual description of risk ratings as relates to impact on the Natural Environment

Risk Rating	Conceptual description
Insignificant	Isolated example of damage to an environmental asset that is neither locally, regionally or environmentally significant.
Minor	Larger scale cumulative impact to a locally significant environmental asset that is not regionally or nationally significant.
Moderate	Decimation of locally significant environmental asset, or minor isolated examples of damage to a regionally or nationally significant environmental asset
Major	Larger scale community impact to a regionally or nationally significant environmental asset
Catastrophic	Decimation of regionally or nationally significant environmental asset

Table F5 - Risk Matrix

Risk Assessment		Identified Risks					Existing Risk Controls				Additional Controls			
Risk Category	**Asset Category**	**Risk Refer-once Number**	**Risk Description**	**Likely-hood**	**Consequence**	**RISK RATING (no controls in place)**	**Current Actions**	**Likely-hood**	**Consequence**	**Residual Risk (after current action)**	**Additional Response Action Name**	**Likely-hood**	**Consequence**	**Residual Risk Rating**
1. Biodiversity loss associated with land use change	All	1	Biodiversity loss associated with clearing of native vegetation • Further loss of the Swan Vegetation Complex in the rural zone • Further loss of native vegetation of the Beermullah and Guildford Complex Vegetation Complexes and of Banksia WL SCP in the development zones in the Development zone category.	Almost Certain	Moderate	EXTREME	• Engagement with State Government (Planning and Environment Regulators) on the identification areas marked for urban intensification in Regional Land-Use Strategies. • Structure Planning of Development Areas for urban development to assess and identify areas for protection/environmental enhancement as part of Public Open Space (POS). • Environmental professional participation in Planning and Development Assessments, Local Planning Policy, Local Planning Strategy and Town Planning Scheme.	Likely	Moderate	HIGH	• Consider inclusion of additional mechanisms to support of Biodiversity conservation into the Town Planning Scheme and Local Planning Strategy (Action 1). Specifically, • Review Tree Preservation Order provisions in the scheme to capture ecologically or culturally significant trees. • Consider opportunities: - to include protection mechanisms under the Town Planning Scheme for rural properties with Banksia WL SCP (EPBC). - to include a 'conservation zone' in the Town Planning Scheme to provide an opportunity for the protection of native remnant vegetation of local significance on private land. -to support protection of biodiversity assets in the public purpose zones. -to identify wetlands and Banksia WL SCP (EPBC) in rural properties as potential future offset areas. -for watercourse improvements in the rural zone. -to develop a package of incentives for landowners to enhance biodiversity on private property. -for the use of conservation covenants to protect areas of high biodiversity on private land. • For future Structure Plans, subdivisions and developments, particular in planned open space areas and road reserves: -prepare a policy to guide protection of the highest quality biodiversity assets during structure plan preparation. -require the identification of trees to be protected. -provide guidelines to support requirements for environmental information to be provided as part of development envelope modification applications.	Moderate	Moderate	MEDIUM

Risk Assessment		Identified Risks					Existing Risk Controls				Additional Controls			
Risk Category	Asset Category	Risk Refer-once Number	Risk Description	Likely-hood	Consequence	RISK RATING (no controls in place)	Current Actions	Likely-hood	Consequence	Residual Risk (after current action)	Additional Response Action Name	Likely-hood	Consequence	Residual Risk Rating
1. Biodiversity loss associated with land use change	All	2	Potential loss of Black-Cockatoo and Quenda habitat because of land-use change processes.	Likely	Moderate	HIGH	• Identification and protection of natural areas in POS at Structure Plan stage of development. • Environmental professional participation in land use change process (Planning and Development Assessments) and participation in review of the Local Planning Policy, Local Planning Strategy and Town Planning Scheme. • Facilitate the Development Contribution Scheme supporting protection and enhancement of biodiversity assets • Administrator of land use change works processes – construction environmental management • Support community education regarding native fauna, particularly as relates to Quenda and Black Cockatoo habitat.	Likely	Moderate	HIGH	• Prepare, for adoption by Council, an Environmental Protection Policy (Action 11). • Seek inclusion of mechanisms for the protection of Biodiversity into the Town Planning Scheme, Local Planning Strategy and Local Planning Policies (Action 1). • Develop, for Council endorsement, a consolidated Fauna Management Plan (Action 4) • Develop, for Council endorsement, a proposal to expand the feral animal treatment program (Action 5) • Prepare external guidance for achievement of environmental conditions associated with the land use change process (Action 7)	Moderate	Moderate	HIGH
1. Biodiversity loss associated with land use change	All	3	Loss of biodiversity assets resulting from development envelope modifications	Unlikely	Minor	LOW	• City of Armadale provide advice to WAPC or DWA on subdivisional or development conditions, guided by Local Planning Policy. • Administrator of subdivision and development approvals process – construction environmental management.	Unlikely	Minor	LOW	• Seek inclusion of mechanisms for the protection of Biodiversity into the Town Planning Scheme, Local Planning Strategy and Local Planning Policies (Action 1). Specifically, for future Structure Plans, subdivisions and developments, particular in planned open space areas and road reserves, provide guidelines to support requirements for environmental information to be provided as part of development envelope modification applications. • Prepare, for adoption by Council, an Environmental Protection Policy (Action 11)	Unlikely	Minor	LOW
1. Biodiversity loss associated with land use change	All	4	Loss of Black Cockatoo habitat because of poor oversight of habitat location and management needs.	Unlikely	Moderate	MEDIUM	• City of Armadale provide advice to WAPC or DWA on subdivisional or development conditions, guided by Local Planning Policy. • Administrator of subdivision and development approvals process – construction environmental management.	Unlikely	Moderate	MEDIUM	Seek inclusion of mechanisms for the protection of Biodiversity into the Town Planning Scheme, Local Planning Strategy and Local Planning Policies (Action 1). Specifically: • Establish and maintain a dataset for recording presence of, or changes to, the occurrence of Black Cockatoo habitat trees as a result of design survey, submissions associated with land-use change and environmental research; • Establish a process for recording Black Cockatoo habitat as a part of asset capture when new lands are ceded to the City of Armadale as a part of the land use change process	Unlikely	Minor	LOW

Risk Assessment		Identified Risks					Existing Risk Controls				Additional Controls			
Risk Category	Asset Category	Risk Refer-once Number	Risk Description	Likely-hood	Consequence	RISK RATING (no controls in place)	Current Actions	Likely-hood	Consequence	Residual Risk (after current action)	Additional Response Action Name	Likely-hood	Consequence	Residual Risk Rating
1. Biodiversity loss associated with land use change	All	5	Biodiversity conservation objectives being realised due to Local Planning Policy objectives not being evaluated for success	Unlikely	Minor	LOW	• City of Armadale provide advice to WAPC or DWA on subdivisional or development conditions, guided by Local Planning Policy. • Implement, update and review of environmental Local Planning Polices.	Unlikely	Minor	LOW	Establish procedure & schedule for ongoing the review of environmental policy application effectiveness (objective and outcome analysis) (Action 13)	Unlikely	Minor	LOW
1. Biodiversity loss associated with land use change	All	6	Biodiversity protection and enhancement during land use change not maximised because there is no formal review process to support continuous improvement in the application of conditions in the land use change process, as guided by Local Planning Policies.	Unlikely	Minor	LOW	• City of Armadale provide advice to WAPC or DWA on subdivisional or development conditions, guided by Local Planning Policy.• Implement, update and review of environmental Local Planning Polices.	Unlikely	Minor	LOW	Regular review and update of Environment and Sustainability internal guidance documents for the application of policy and provision of comment as part of the land use change process (Action 14).	Unlikely	Minor	LOW
1. Biodiversity loss associated with land use change	All	7	Biodiversity protection and enhancement during land use change not maximised because Environmental Management Plans that are required as an output of the land use change process (guided by Local Planning Polices) have no clear content requirements.	Unlikely	Minor	LOW	• City of Armadale provide advice to WAPC or DWA on subdivisional or development conditions, guided by Local Planning Policy. • Administrator of subdivision and development approvals process – construction environmental management. • Comment on requests to clear conditions	Unlikely	Minor	LOW	Prepare external guidance for achievement of environmental conditions associated with the land use change process (Action 7)	Unlikely	Minor	LOW
1. Biodiversity loss associated with land use change	All	8	Poor management of remaining Banksia WL SCP (EPBC), watercourses and wetlands in the Rural zone land category, where they are highly represented.	Unlikely	Minor	LOW	• Perth and Peel at 3.5 million - South Metropolitan Peel Sub-regional Planning Framework (March 2018) and integration into new City of Armadale Local Planning Strategy 2024. • No additional subdivision of Rural Living land is proposed other than that indicated by the planning structure in the Perth and Peel at 3.5 million - South Metropolitan Peel Sub-regional Planning Framework (March 2018). The WAPC does not support further fragmentation of rural areas by further subdivision.	Unlikely	Minor	LOW	• Consider opportunities to include protection mechanisms under the Town Planning Scheme for rural properties with Banksia WL SCP (Action 1). • Consider opportunities for rural properties with Banksia WL SCP (EPBC) or wetland areas to be protected as formal offsets. (Action 8) • Prioritise opportunities to support rural land conservation efforts for Banksia WL SCP (EPBC) and wetlands through Habitat Links Program lands (Action 6)	Unlikely	Minor	LOW
1. Biodiversity loss associated with land use change	All	9	Loss of opportunities to protect local natural areas (that are not currently protected in conservation estate) as formal offsets.	Moderate	Moderate	HIGH	Through Planning and engineering policies and processes, advocate for the environmental offsets to be located within City boundaries.	Unlikely	Moderate	MEDIUM	Prepare a Policy and Procedure for Avoidance, Mitigation and Offset of impacts on biodiversity assets (Action 8)	Unlikely	Moderate	MEDIUM

Risk Assessment		Identified Risks					Existing Risk Controls				Additional Controls			
Risk Category	**Asset Category**	**Risk Refer-once Number**	**Risk Description**	**Likely-hood**	**Consequence**	**RISK RATING (no controls in place)**	**Current Actions**	**Likely-hood**	**Consequence**	**Residual Risk (after current action)**	**Additional Response Action Name**	**Likely-hood**	**Consequence**	**Residual Risk Rating**
1. Biodiversity loss associated with land use change	All	10	Lack of protection and enhancement of biodiversity values of the Wungong River.	Moderate	Minor	MEDIUM	Delivery of Wungong River Detailed Design Project. Provide advice to WAPC or DWA on subdivisional or development conditions, guided by Local Planning Policy.(2) Administration of subdivision and development approvals process – construction environmental management.	Unlikely	Minor	LOW	Establish project delivery team to review success in implementation including planning control integration and City of Armadale land management (Action 10)	Unlikely	Minor	LOW
2. Biodiversity Loss associated with poor management of on ground threats (dieback, weeds, edge effects, fire regime) across multiple tenures	Fauna	11	Decline of native fauna populations because the feral animal control program is limited to target species and reserves.	Likely	Moderate	HIGH	Implement the feral animal control program Provide departmental comment on cat local laws	Likely	Moderate	HIGH	• Develop, for Council endorsement, a proposal to expand the feral animal treatment program including (Action 5) • Develop, for Council endorsement, a consolidated Fauna Management Plan (Action 4). Specifically, Modify feral animal control program to reflect the following changes; Expansion of the Feral Animal Control Program to include Roley Pools Reserve, Increase the effort in fox control in Armadale Settlers Common, Removal of beehives from mapped habitat trees in Armadale Settlers Common and Bungendore Park when identified; Prepare a case study (for Councils consideration) relating to potential expansion of the feral animal control program to include Pest Rabbits; and Integrate passive management and dispersal tactics into City operations as relates to pest parrots • Prepare a five year delivery plan for Habitat Links Program that includes the development of strategies to encourage private land feral animal control, especially in properties that are located in Armadale Settlers Common and Bungendore Park where fox movement is recorded and on private lands south west of Bungendore Park where pigs are concentrated (Action 6)	Moderate	Moderate	HIGH
2. Biodiversity Loss associated with poor management of on ground threats (dieback, weeds, edge effects, fire regime) across multiple tenures		12	Benefits of strategic approach to native fauna management not realised, resulting in species decline.	Moderate	Minor	MEDIUM	Implement the feral animal control program Implement Fauna management actions as designated in Environmental Management Plans	Moderate	Minor	MEDIUM	Develop, for Council endorsement, a consolidated Fauna Management Plan (Action 4)	Unlikely	Minor	LOW

Risk Assessment		Identified Risks					Existing Risk Controls				Additional Controls			
Risk Category	Asset Category	Risk Refer-once Number	Risk Description	Likely-hood	Consequence	RISK RATING (no controls in place)	Current Actions	Likely-hood	Consequence	Residual Risk (after current action)	Additional Response Action Name	Likely-hood	Consequence	Residual Risk Rating
2. Biodiversity Loss associated with poor management of on ground threats (dieback, weeds, edge effects, fire regime) across multiple tenures		13	Loss of habitat due to Phytophthora dieback. Specifically, because there is no tracking of rate of spread of Phytophthora Dieback across the municipality, limited maintenance of phytofighters and no monitoring of phytofighters use by community.	Moderate	Moderate	HIGH	• Implement the Dieback control program• Operational activities guided by Policy ENG9• Habitat Tree mapping program (change) – Armadale Settlers Common and Bungendore Park• Operational phytofighters maintenance	Unlikely	Moderate	MEDIUM	Develop, for Council endorsement, a proposal to expand the dieback treatment program (Action 3). Specifically, incorporate an updated Dieback control program into the Natural Area Management Plan for LNAs that includes:• An investment option for monitoring and reporting of dieback progression as KPI of success• Maintenance, monitoring and review schedule for phytofighters• Expansion of the dieback treatment program to include:o mapped susceptible habitat trees in Bungendore Park, that are outside of the current dieback treatment program and are in dieback infected areas.o City reserves susceptible to dieback as recommended for inclusion by the Dieback Contractor, and include dieback mapping of identified habitat corridorso Significant susceptible street trees• Prepare and adopt a procedure to protect mapped habitat trees during fire management practices. • Mechanisms to support for dieback treatment on lands not managed by the City.	Rare	Moderate	MEDIUM
2. Biodiversity Loss associated with poor management of on ground threats (dieback, weeds, edge effects, fire regime) across multiple tenures	All	14	Decline in condition of natural areas as a result of: • Extended timeframe since strategic review of Local Area Management Approach Natural area management approach. • Opportunities for biodiversity to be considered in bushfire mitigation planning not be fully realised. • Opportunities for strategic response to Climate Change adaptation in Natural Reserve Management approaches may not be realised. • Limited strategic approach to understanding and managing the ecosystem services provided by urban living streams. • No process of mapping habitat tree change (loss) over time across the municipality (cross tenure).	Likely	Minor	HIGH	Preparation and implementation of Natural Area management plans and supporting works programs	Likely	Minor	HIGH	Develop, for Council endorsement, a consolidated Natural Area Management Plan for City LNAs (Action 2)	Moderate	Minor	MEDIUM

Risk Assessment		Identified Risks					Existing Risk Controls				Additional Controls			
Risk Category	Asset Category	Risk Refer-once Number	Risk Description	Likely-hood	Consequence	RISK RATING (no controls in place)	Current Actions	Likely-hood	Consequence	Residual Risk (after current action)	Additional Response Action Name	Likely-hood	Consequence	Residual Risk Rating
2. Biodiversity Loss associated with poor management of on ground threats (dieback, weeds, edge effects, fire regime) across multiple tenures	All	15	Decline in occurrence of specially protected species due to lack of strategic identification in Natural Area Management planning	Moderate	Minor	MEDIUM	Preparation and implementation of Natural Area management plans and supporting works programs	Moderate	Minor	MEDIUM	Develop, for Council endorsement, a consolidated Natural Area Management Plan for City LNAs (Action 2)	Unlikely	Minor	LOW
2. Biodiversity Loss associated with poor management of on ground threats (dieback, weeds, edge effects, fire regime) across multiple tenures	Native Fauna (Aquatic and terrestrial) & Key Habitat	16	Decline in native fauna because of: • Limited baseline dataset for aquatic fauna in City natural areas • Occurrence of specially protected species on City lands not mapped or reported as measure of management success. • Feral animal program is applicable to limited reserves • Feral animal control program does not address pest bird species & rabbits	Moderate	Minor	MEDIUM	Preparation and implementation of Natural Area management plans and supporting works programs.	Moderate	Minor	MEDIUM	Develop, for Council endorsement, a consolidated Natural Area Management Plan for City LNAs (Action 2)	Unlikely	Minor	LOW
2. Biodiversity Loss associated with poor management of on ground threats (dieback, weeds, edge effects, fire regime) across multiple tenures	All	17	Loss of biodiversity associated with bushfire mitigation activities	Unlikely	Minor	LOW	Provision of comment on matters relating to Bushfire Mitigation activities	Unlikely	Minor	LOW	Prepare a five year delivery plan for Habitat Links Program that includes resources to support private landowner bushfire mitigation in an environmentally sensitive manner (Action 6)	Unlikely	Minor	LOW
2. Biodiversity Loss associated with poor management of on ground threats (dieback, weeds, edge effects, fire regime) across multiple tenures	Native Fauna (Aquatic and terrestrial) & Key Habitat	18	Decline in native fauna populations due to lack of strategic, targeted and programmed approach.	Unlikely	Minor	LOW	Fauna Project Implementation Black Cockatoo Habitat Supplementation Program	Unlikely	Minor	LOW	Develop, for Council endorsement, a consolidated Fauna Management Plan (Action 4)	Unlikely	Minor	LOW
2. Biodiversity Loss associated with poor management of on ground threats (dieback, weeds, edge effects, fire regime) across multiple tenures	Native Fauna (Aquatic and terrestrial) & Key Habitat	19	Decline in native fauna populations due to vehicle strikes and loss of natural areas	Likely	Minor	HIGH	Preparation and implementation of Natural Area management plans and supporting works programs	Likely	Minor	HIGH	Develop, for Council endorsement, a consolidated Fauna Management Plan (Action 4)	Moderate	Minor	MEDIUM

Risk Assessment		Identified Risks					Existing Risk Controls				Additional Controls			
Risk Category	Asset Category	Risk Refer-once Number	Risk Description	Likely-hood	Consequence	RISK RATING (no controls in place)	Current Actions	Likely-hood	Consequence	Residual Risk (after current action)	Additional Response Action Name	Likely-hood	Consequence	Residual Risk Rating
2. Biodiversity Loss associated with poor management of on ground threats (dieback, weeds, edge effects, fire regime) across multiple tenures	All	20	Opportunities to enhance the condition biodiversity in natural areas is not fully realised because: • lack of strategic approach to recreation strategy development and implementation for natural areas • Limited integration with other business unit supporting strategies • Ad-hoc delivery with funding reliance often on grants. • Low number of Aboriginal heritage surveys in natural areas to support meaningful development of indigenous storytelling for natural areas	Moderate	Moderate	HIGH	• Preparation and implement Natural Area management plans and supporting works programs • Environmental assets prioritised in Tourism Strategy. • Environmental assets prioritised in Trails Network Plan	Moderate	Moderate	HIGH	Develop, for Council endorsement, a consolidated Natural Area Management Plan for City LNAs (Action 2)	Unlikely	Moderate	MEDIUM
2. Biodiversity Loss associated with poor management of on ground threats (dieback, weeds, edge effects, fire regime) across multiple tenures	All	21	Biodiversity loss associated with poor land management practices, specifically the lack of formal approach to applying First Nations Australians land management practices into natural area management	Moderate	Moderate	HIGH	Recognise the connection that members of the Aboriginal community share with City managed land through he implementation of on-ground initiatives	Moderate	Moderate	HIGH	Develop, for Council endorsement, a consolidated Natural Area Management Plan for City LNAs (Action 2)	Unlikely	Moderate	MEDIUM
2. Biodiversity Loss associated with poor management of on ground threats (dieback, weeds, edge effects, fire regime) across multiple tenures	All	22	Loss of genetic integrity of local populations of flora and fauna due to the lack of a clear structure or policy for the use of local provenance species for revegetation	Moderate	Minor	MEDIUM	Natural Area management in accordance with a works program (weed, dieback, feral Animal)	Moderate	Minor	MEDIUM	Develop, for Council endorsement, a consolidated Natural Area Management Plan for City LNAs (Action 2)	Unlikely	Minor	LOW
2. Biodiversity Loss associated with poor management of on ground threats (dieback, weeds, edge effects, fire regime) across multiple tenures	All	23	Biodiversity decline on private lands because: • Lack of Habitat Links Program strategic direction • Lack of review of opportunities to support rural land conservation efforts for Banksia WL SCP (EPBC) and wetlands through Habitat Links Program lands.	Unlikely	Minor	LOW	Delivery of the Habitat Links Program	Unlikely	Minor	LOW	Prepare a 5 year program delivery proposal for Habitat Links (Action 6)	Unlikely	Minor	LOW
2. Biodiversity Loss associated with poor management of on ground threats (dieback, weeds, edge effects, fire regime) across multiple tenures	Ecological Corridors	24	Decline in the condition and value of ecological corridors because of lack of intentional management of these values.	Likely	Minor	HIGH	Develop and implement a program for the upgrade and maintenance of waterways within the City's reserves	Likely	Minor	HIGH	Develop, for Council endorsement, a consolidated Natural Area Management Plan for City LNAs (Action 2)	Moderate	Minor	MEDIUM

Risk Assessment		Identified Risks					Existing Risk Controls				Additional Controls			
Risk Category	Asset Category	Risk Refer-once Number	Risk Description	Likely-hood	Consequence	RISK RATING (no controls in place)	Current Actions	Likely-hood	Consequence	Residual Risk (after current action)	Additional Response Action Name	Likely-hood	Consequence	Residual Risk Rating
2. Biodiversity Loss associated with poor management of on ground threats (dieback, weeds, edge effects, fire regime) across multiple tenures	All	25	Delayed deliver of reserve management plans for Regional Parks resulting in poor on ground management of biodiversity assets	Moderate	Moderate	HIGH	City representation on the Darling Range Regional Park Advisory Committee, Jandakot Regional Park Advisory Committee, Middle Canning Stakeholder Group and Southern East Regional Centre for Urban Landcare.	Moderate	Moderate	HIGH	Develop, for Council endorsement, a consolidated Natural Area Management Plan for City LNAs (Action 2)	Unlikely	Moderate	MEDIUM
4. Loss of community connection and engagement with the environment and natural areas	All	26	Opportunity to enhance local natural areas not fully realised due to lack of strategic investment in restoration	Unlikely	Minor	LOW	Delivery of, and preparation of new, Armadale Gosnells Landcare Group Business Plan and MOU.	Unlikely	Minor	LOW	Participate in the preparation a new AGLG and Business Plan & integrate priorities for natural area improvement into the forward planning as part of the delivery (Action 12).	Unlikely	Minor	LOW
4. Loss of community connection and engagement with the environment and natural areas	All	27	Poor recognition of biodiversity values associated with community education. Specifically, benefits of community environmental and engagement programs integrating to achieve the objectives of a wide range of business units may not be fully realised.	Unlikely	Minor	LOW	Delivery of the Plants for Residents Program, National Tree Day and the BEWG Plenary sessions.	Unlikely	Minor	LOW	Prepare an integrated Environment and Sustainability Community Engagement and Education Plan (Action 18)	Unlikely	Minor	LOW
4. Loss of community connection and engagement with the environment and natural areas	All	28	Poor management of cultural heritage values of natural areas as the BEWG and environmental volunteer support process does not specifically seek youth or traditional owner engagement	Unlikely	Minor	LOW	Support bushland volunteers through the Bush care and Environmental Working Group, Friends Group support and through the delivery of the AGLG Business Plan and MOU.	Unlikely	Minor	LOW	Prepare an integrated Environment and Sustainability Community Engagement and Education Plan (Action 18)	Unlikely	Minor	LOW
5. Biodiversity loss associated with corporate practices and business activities (excluding natural area management)	All	29	Decline in Biodiversity associated with corporate activity management. Specifically, The internal process for review of corporate activities focuses on native vegetation removal, with the response guided by the Federal and State Legislative Framework without City-specific policy direction.	Moderate	Minor	MEDIUM	Review corporate proposals and provide advice on environmental legislative framework. Coordinate environmental approvals where required and review Construction and Environmental Management Plans.	Moderate	Minor	MEDIUM	• Prepare a Policy and Procedure for Avoidance, Mitigation and Offset of impacts on biodiversity assets (Action 8)• Prepare, for adoption by Council, an Environmental Protection Policy (Action 11)	Unlikely	Minor	LOW
5. Biodiversity loss associated with corporate practices and business activities (excluding natural area management)	All	30	Loss of biodiversity due to lack of incentive for landowners to enhance biodiversity on private property	Moderate	Minor	MEDIUM	No existing controls	Moderate	Minor	MEDIUM	Prepare a five year delivery plan for Habitat Links Program that considers opportunities to expand the package of incentives for land owners to enhance biodiversity on private property, considering the following possibilities: funding grants; supply of native plants; rate rebates; education and local government labour support (Action 6)	Unlikely	Minor	LOW

Risk Assessment		Identified Risks					Existing Risk Controls				Additional Controls			
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5. Biodiversity loss associated with corporate practices and business activities (excluding natural area management)	All	31	Loss of biodiversity due to failure to implement best practice in local biodiversity conservation.	Moderate	Minor	MEDIUM	No existing controls	Moderate	Minor	MEDIUM	Review of best practice procedures for the management of local biodiversity in other jurisdictions (Action 9)	Unlikely	Minor	LOW

APPENDIX G –ENDORSEMENT OF STRATEGY

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