



Attachment 8 Rose Shanks Reserve Biological Surveys 2024

Lot 11 and 74 Beenyup Road, Banjup

Response to Submissions

EPA Assessment Number: 2255

Aigle Royal Developments

SLR Project No.: 675.072616.00001

23 July 2025



WESTERN
ENVIRONMENTAL

Rose Shanks Reserve Biological Surveys 2024

Detailed Flora and Vegetation Survey, Black
Cockatoo Habitat Assessment

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Rose Shanks Reserve Biological Surveys 2024

Detailed Flora and Vegetation Survey,
Black Cockatoo Habitat Assessment

Report No:

A24.213_RPT-FVSR_1_DRAFT

Issue Date:

5-Mar-2025

Status

<DRAFT>

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20-Feb-2025	20-Feb-2025	3-Mar-2025

Distribution Record

Copies	Document ID / Version	Date	Received by
1	A24.213_RPT-FVSR_1_DRAFT	6-Mar-2025	Kris Kennedy

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Executive Summary

Aigle Royal commissioned Western Environmental Approvals Pty Ltd (WEPL) to undertake a flora, vegetation, and black cockatoo habitat assessment across Rose Shanks Reserve to inform the development of an Offset Strategy and Offset Management Plan for approved development within Lot 11 and Lot 74 Beenyup Road, Banjup (EPBC 2017/7923). The biological surveys included a high intensity survey effort over the 'Survey Area' and the surrounding 'Context Area'. The Survey Area covers 16.158 ha, the Context Area covers 25.524 ha.

Flora and Vegetation

A total of 104 vascular flora species were recorded from within the Survey Area from four quadrats and opportunistic observations.

Although a targeted search was not completed, the following conservation significant species was recorded.

- *Poranthera moorokatta* (P2) - Fifty-nine plants were recorded in RVQ01. Comprising a single population.

Eight vegetation types were identified within the Survey Area and Context Area. Majority of vegetation in the Survey Area is in Degraded condition, while majority of the Context Area is in Excellent condition.

Vegetation type VT-05 (Revegetation zone) is identified as most concordant with the Low-lying *Banksia attenuata* woodlands or shrublands ('floristic community type 21c') community listed as Priority 3. There is 12.239 ha of this vegetation type present within the Survey Area.

Carnaby's Black Cockatoos

The Survey Area contains species which comprise suitable foraging habitat for black cockatoo. The banksia woodlands are characterised by foraging species for Carnaby's black cockatoo species including jarrah, *Banksia attenuata*, *Banksia menziesii*, the remainder of the Survey Area comprised cleared areas, scattered/planted eucalypts in degraded areas which have low to no foraging habitat value.

23 locations of foraging evidence (*Banksia* cones) were recorded for Carnaby's black cockatoo.

Foraging habitat quality was rated using the Commonwealth Habitat Quality Scoring Tool (DCCEEW, n.d.). Foraging habitat quality extents within the Survey Area out of ten are:

- Carnaby's Black Cockatoo: 1.793 ha (10/10), 0.045 ha (9/10), 0.833 ha (8/10), 2.21 ha (7/10), 0.228 ha (6/10), 11.05 (Low 2 to None 0).

Acronyms and Abbreviations

Abbreviation	Full Title
BAM Act	Biosecurity and Agriculture Management Act 2007
BC Act	Biodiversity Conservation Act 2016
°C	Degree Celsius
CR	Critically Endangered
DBCA	Department of Biodiversity, Conservation and Attractions
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DEWHA	Department of the Environment Water Heritage and the Arts
DPIRD	Department of Primary Industries and Regional Development
DRF	Declared Rare Flora
DWER	Department of Water and Environmental Regulation
DWER	Department of Water and Environmental Regulation
EIA	Environmental Impact Assessment
EN	Endangered
EP Act	Environmental Protection Act 1986
EPA	Environmental Protection Authority
EPBC Act	Environment Protection Biodiversity and Conservation Act 1999
ESA	Environmentally Sensitive Area
FCT	Floristic Community Type
GDE	Groundwater Dependent Ecosystem
GIS	Geographic Information System
GPS	Global Positioning System
ha	Hectare
IBRA	Interim Biogeographic Regionalisation for Australia
IBSA	Index of Biodiversity Surveys for Assessments
km	Kilometres
m	Metres
MA	Marine
MI	Migratory
MNES	Matters of National Environmental Significance
NVIS	National Vegetation Information System
OS	Other Specially Protected
P	Priority
PEC	Priority Ecological Community

Abbreviation	Full Title
PF	Priority Flora
PMST	Protected Matters Search Tool
RAAF	Royal Australian Air Force
T	Threatened
TEC	Threatened Ecological Community
TPFL	Threatened and Priority Flora Database
TPFRF	Threatened and Priority Flora Report Forms
VU	Vulnerable
WA	Western Australia
WAH	Western Australian Herbarium
WC Act	Wildlife Conservation Act 1950
WEPL	Western Environmental Pty Ltd
WoNS	Weeds of National Significance

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1. Introduction

1.1 Project Background

Aigle Royal commissioned Western Environmental Approvals Pty Ltd (WEPL) to undertake a flora, vegetation, and black cockatoo habitat assessment across Rose Shanks Reserve to inform the development of an Offset Strategy and Offset Management for approved development within Lot 11 and Lot 74 Beenyup Road, Banjup (EPBC 2017/7923).

1.2 Location

The Survey Area comprises a portion of Rose Shanks Reserve, Warton Road, Treeby, located approximately 20 km from Perth CBD.

The biological surveys included a high intensity survey effort over the 'Survey Area' and the surrounding 'Context Area'. The Survey Area covers 16.158 ha, the Context Area covers 25.524 ha.

1.3 Objectives and Scope of Work

The objective of this assessment was to undertake detailed flora and vegetation survey and black cockatoo habitat assessment within Rose Shanks Reserve to determine the suitability of the Survey Area as a potential restoration offset site.

The field survey comprised of the following:

- A survey which identified and described vegetation units and condition throughout the Survey Area, supported by quadrat sampling.
- A targeted assessment of Banksia TEC which included assessment of habitat quality under a scoring tool endorsed by DCCEEW.
- An assessment of black cockatoo foraging value under a scoring tool endorsed by DCCEEW.
- An assessment of the heavily degraded and partially revegetated portion of the reserve in the west, and the establishment of permanent quadrants for ongoing revegetation monitoring.

This report presents the results of the field survey undertaken to support the above objective.

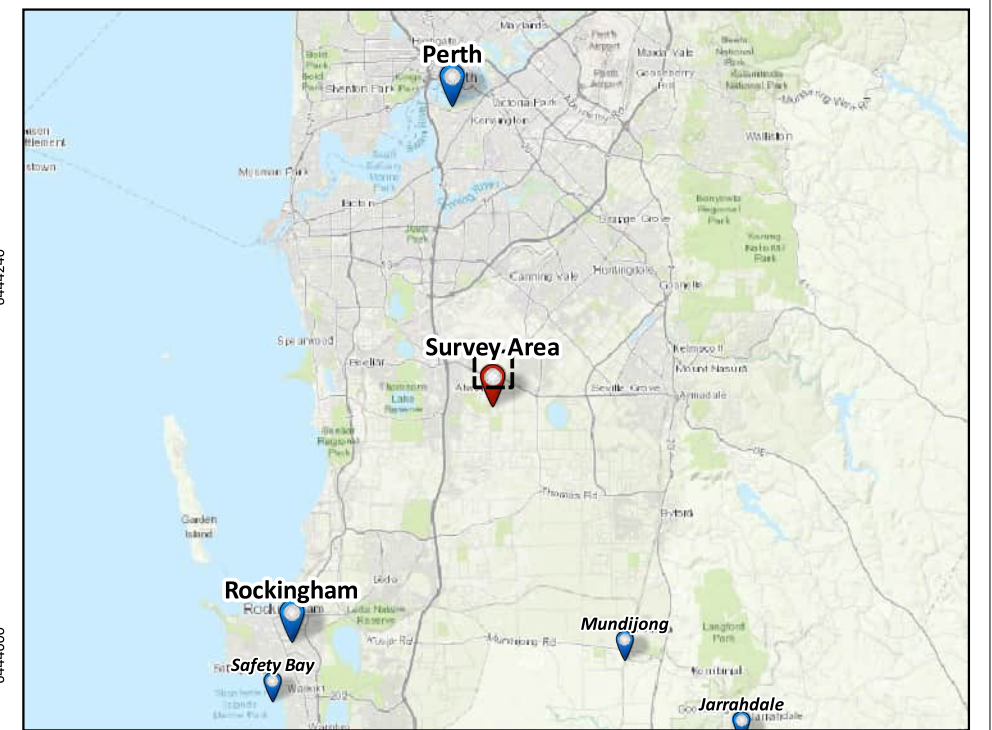
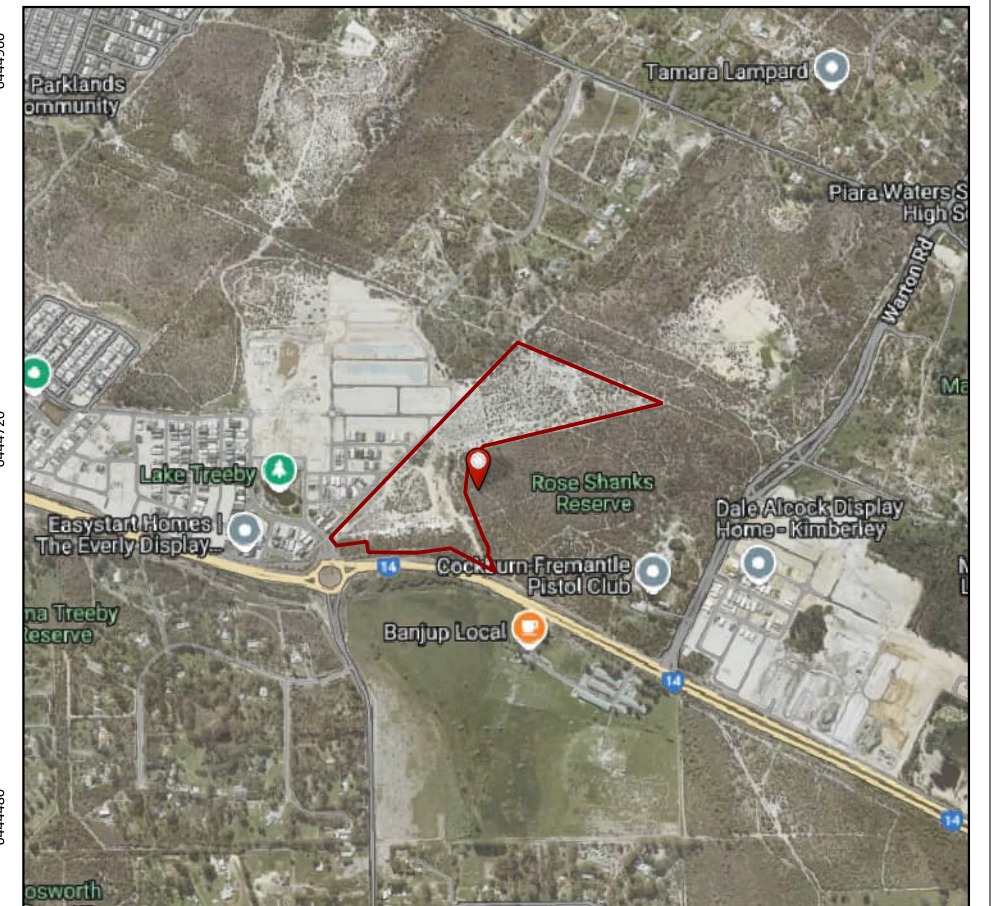
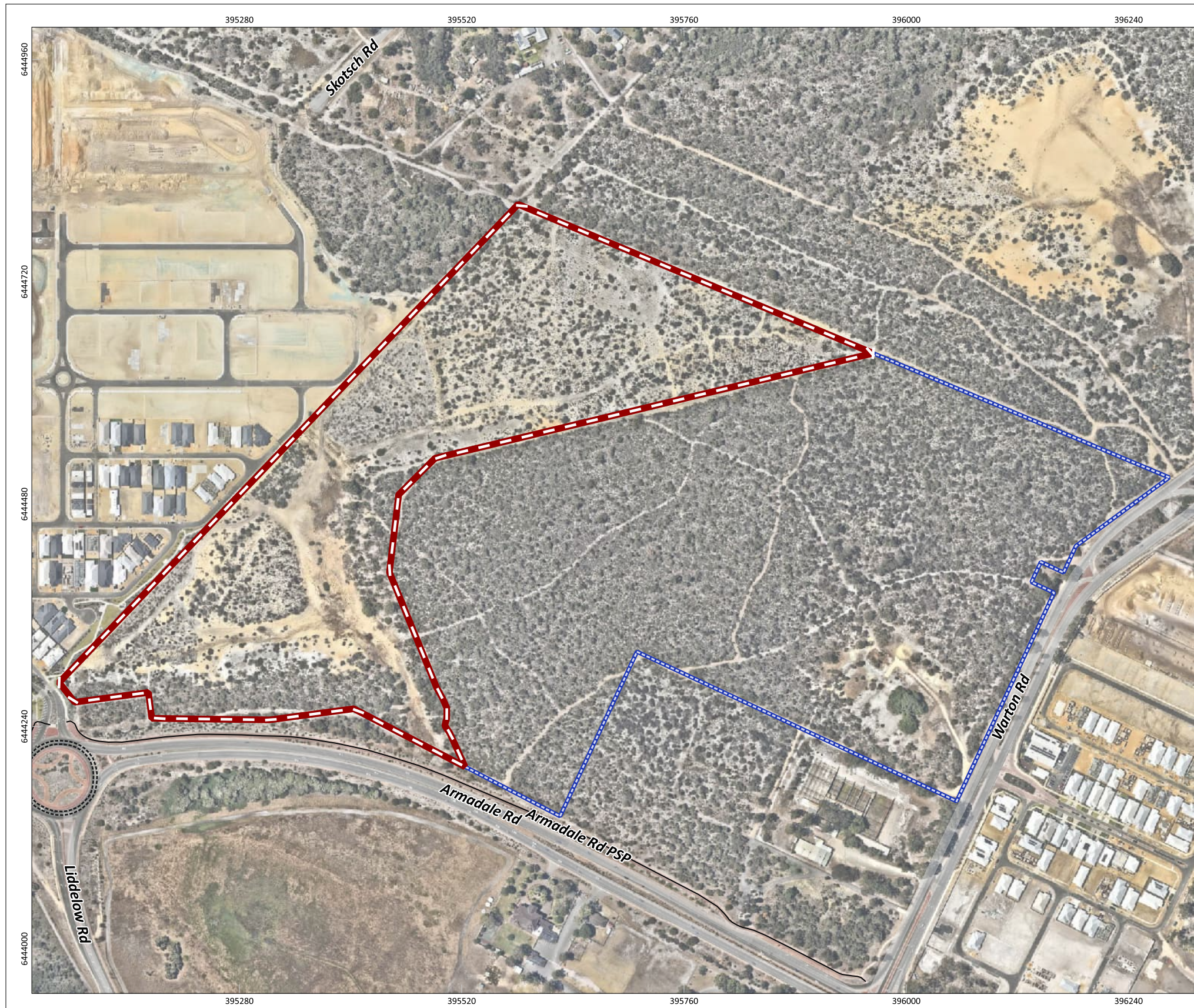






Figure 1: Survey Area and Context Area

 	PROJECT/REPORT NAME Biological Surveys Rose Shanks Reserve		Legend  Survey Area  Context Area	<table border="1"> <thead> <tr> <th>No</th> <th>Description</th> <th>Drawn</th> <th>Approved</th> <th>Date</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>Original issue</td> <td>JP</td> <td>TC</td> <td>5/2/2025</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	No	Description	Drawn	Approved	Date	A	Original issue	JP	TC	5/2/2025															
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DATA SOURCE Nearmap Imagery (7th December, 2024)		NOTES: Cadastral boundary (LGATE-002), Base map ESRI Topo, Townsites (LGATE-248).																											



1.4 Survey Limitations and Constraints

Limitations and constraints of the fauna, flora and vegetation survey as outlined in the Flora and Vegetation and Fauna Survey Technical Guidance are detailed below in Table 1.

Table 1: Limitations and Constraints of the Fauna, Flora and Vegetation Survey

Possible Limitation	Degree of Limitation (Significant, Moderate or Negligible)	Potential Constraints on Survey Outcomes
Survey Level/ Scope	Negligible	The Detailed flora and vegetation survey and targeted foraging habitat assessment of Carnaby's black cockatoo is considered suitable based on species expected to be present and the extent and condition of vegetation/habitat present within the Survey Area. The level of information collect is suitable to provide information required to inform an offset assessment.
Availability of contextual information at a regional and local scale	Negligible	All data required to complete the scope of works including regional and local contextual information was available.
Site Access	Negligible	The Survey Area was readily accessed by vehicle and on foot.
Survey Intensity and Extent	Negligible	<p>Suitable survey effort by an experienced ecologist was applied. Survey effort is shown in Figure 2 and included:</p> <ul style="list-style-type: none"> • 4 person days sampling flora and vegetation with 14 quadrats and 3 relevés sampled. • 1 person day undertaking daytime black cockatoo foraging assessment. <p>All planned Survey Areas were adequately sampled in line with the project scope of works.</p>
Experience	Negligible	<p>The botanist leading the field survey (Beth Loudon) has been conducting flora and vegetation surveys in Western Australia for over 10 years, with over 10 years' experience in the Swan Coastal plain bioregion.</p> <p>Flora and Vegetation</p> <p>In the three months prior to survey rainfall was 22.15 mm above average (276.6 mm) of long-term average. The seasonal conditions were considered to be optimal.</p> <p>The recommended primary survey period for flora and vegetation surveys for the region as per the EPA Technical Guidance occurs in spring (September-November). The primary survey was completed in early November. The seasonal timing was considered appropriate considering the objectives of the survey.</p> <p>Carnaby's Black Cockatoo</p>

Possible Limitation	Degree of Limitation (Significant, Moderate or Negligible)	Potential Constraints on Survey Outcomes
		<p>The survey was undertaken within the recommended timing for foraging habitat for Carnaby's black cockatoo (year-round foraging) (DCCEEW, 2022). Targeted searches were undertaken for secondary evidence of the species presence (i.e. foraging evidence which can be done at any time of year) and to evaluate the potential suitability of the habitat. The primary survey was completed in January.</p> <p>The temperatures and weather experienced during both field surveys were not considered a limitation to the survey and did not affect the ability to record fauna or habitats.</p>
Proportion of the flora and fauna recorded and/or collected, and any identification issues	Negligible	Species sampling was in line with the technical guidance for Detailed flora and vegetation and targeted black cockatoo surveys.
Mapping Reliability	Negligible	The majority of the Survey Areas was traversed by foot and mapping reliability is considered high.
Disturbances (fire, flood etc.)	Negligible	Areas of disturbance associated with historic clearing for tracks, land development and weeds were recorded but were not a constraint on the results of the survey.

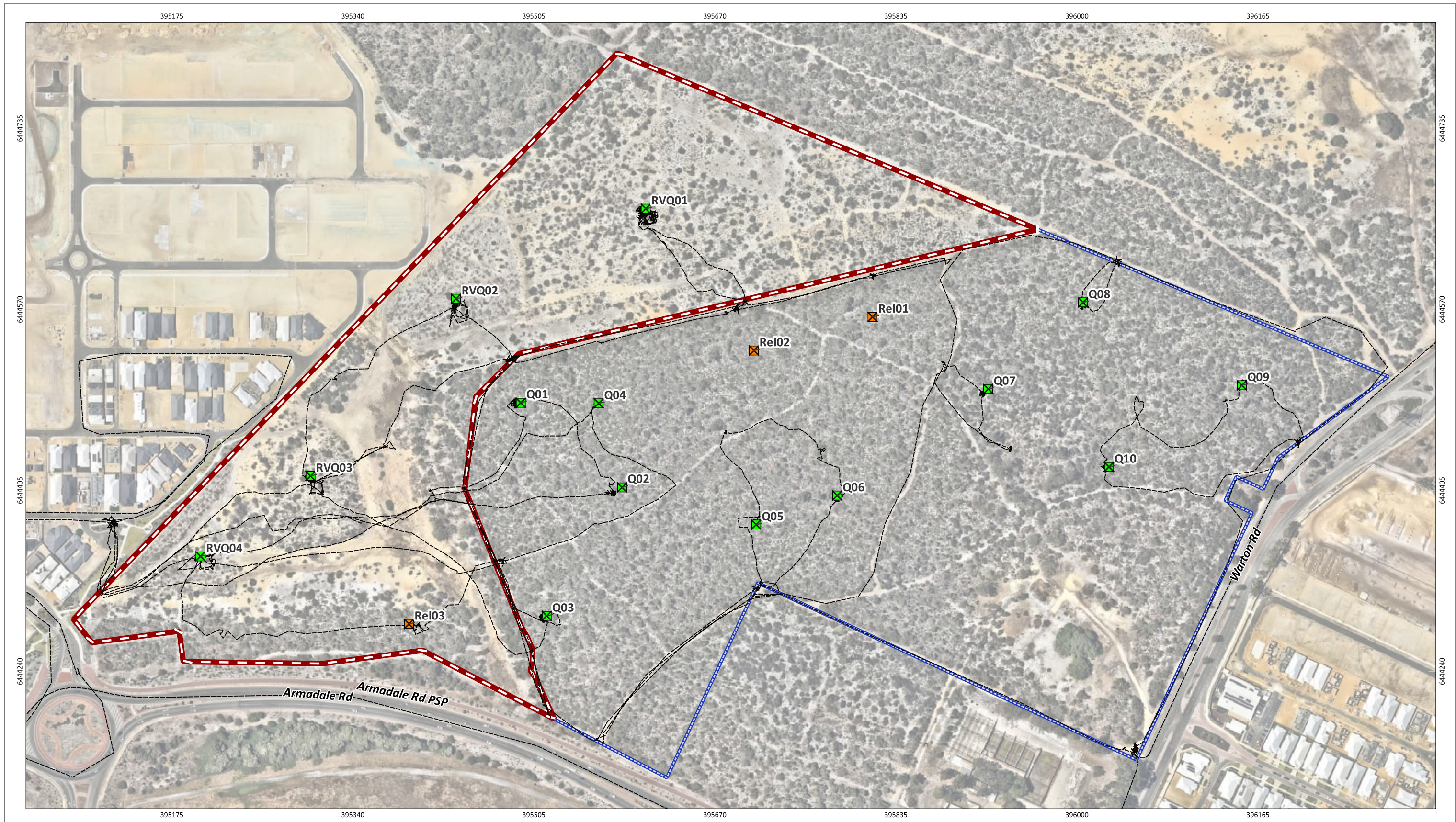


Figure 2: Survey Effort

		PROJECT/REPORT NAME Biological Surveys Rose Shanks Reserve		Legend Survey Area Context Area Tracklog Quadrat Releve		<table border="1"> <thead> <tr> <th>No</th> <th>Description</th> <th>Drawn</th> <th>Approved</th> <th>Date</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>Original issue</td> <td>JP</td> <td>TC</td> <td>5/2/2025</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		No	Description	Drawn	Approved	Date	A	Original issue	JP	TC	5/2/2025															
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2. Existing Environment

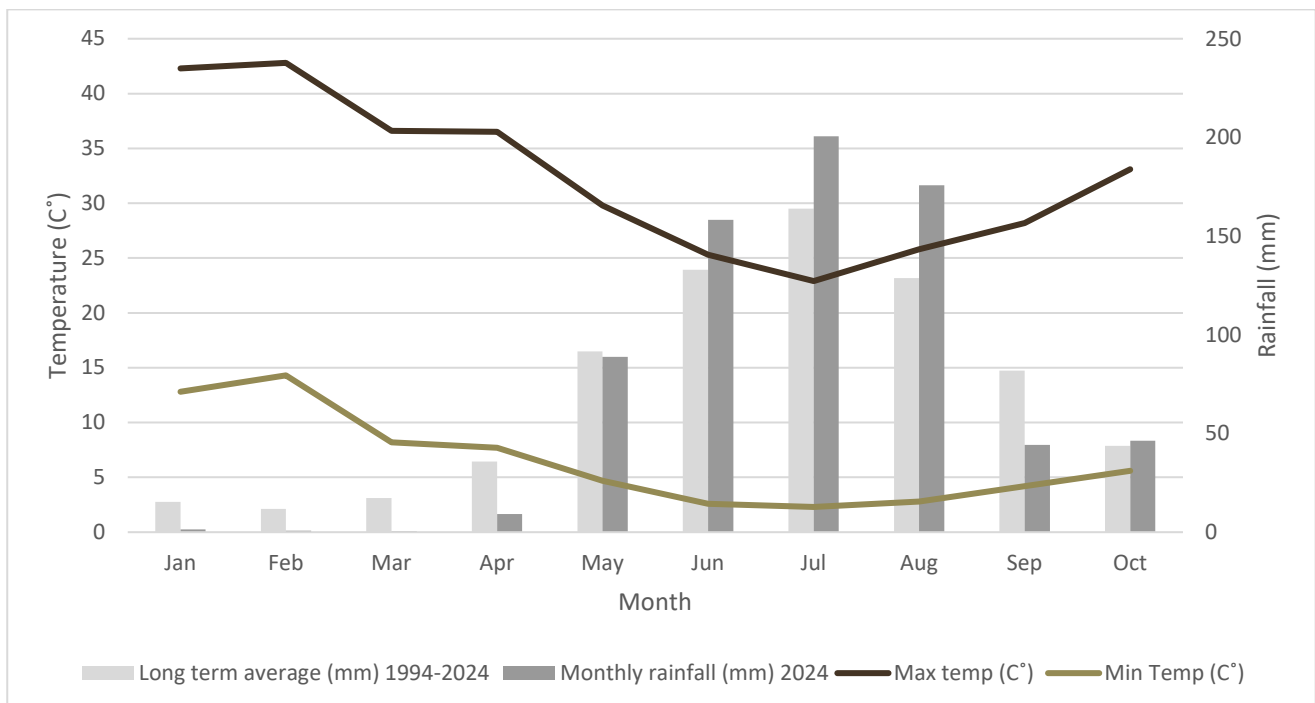
2.1 Climate and Pre-Survey Rainfall

The closest long-term Bureau of Meteorology (BoM) weather station with a complete dataset is Jandakot Aero WA (Station 009172), located approximately 4 km north-west of the Survey Area.

Climate statistics were calculated utilising data from the most current climate normal, which is defined as a 30-year interval (BoM, 2007), where possible. A climate normal is a period long enough to include year-to-year variations while avoiding the influence of longer-term changes in climate.

The long-term mean minimum temperature for Jandakot ranges from 7.2°C (July) to 17.2°C (February) (1994 to 2024) and the long-term mean maximum temperature ranges from 18.1°C (July) to 31.7°C (February) (Graph 1) (BoM, 2024).

Jandakot Aero weather station recorded 736 mm of rain in the nine months prior to the survey (Jan 2024 – Oct 2024), which is 89.55mm above the long-term average of 715.79 mm in the same period (BoM, 2024). Conditions during winter 2024 showed above average rainfall in June (158.2 mm in 2024 compared to 132.99 mm), July (200.6 mm in 2024 compared to 162.63 mm), and August (175.8 mm in 2024 compared to 127.23 mm) (BoM 2024). In the three months prior to the survey (July to Oct 2024), 276.6 mm of rainfall was recorded, which is 22.15 mm above the long-term average at 254.45 mm (BoM, 2024).



Graph 1: Long Term and Monthly Total Rainfall, Maximum and Minimum Temperatures for Jandakot Aero (009172) (BoM, 2025).

2.2 Interim Biogeographic Regionalisation for Australia

The Interim Biogeographic Regionalisation of Australia (IBRA) divides Australia into 89 bioregions based on major biological, geographical, and geological attributes. These bioregions are subdivided into 419 subregions as part of a refinement of the IBRA framework (Commonwealth of Australia, 2012). The Survey Area is situated within the Swan Coastal Plain bioregion and the Perth (SWA02) subregion.

2.3 Geology and Soil

The Survey Area is located within the Bassendean Soil Landscape Mapping System (DPIRD-064). The system is described as "Sand dunes and sandplains with pale deep sand, semi-wet and wet soil. Banksia-paperbark woodlands and mixed heaths".

2.4 Pre-European Vegetation

2.4.1 Vegetation Association Mapping

During the 1970s, John Beard and associates conducted a systematic survey of native vegetation, describing the vegetation systems in Western Australia at a scale of 1:250 000 in the south-west and at a scale of 1:1,000,000 in less developed areas (Beard, 1976).

Beard's mapping attempted to depict the native vegetation as it was presumed to be at the time of settlement and is known as the pre-European vegetation type and extent. Beard's vegetation maps are maintained in digital form by DPIRD (2019). Extents are updated periodically by Department of Biodiversity, Conservation and Attractions (DBCA) (GoWA, 2018). This mapping indicates that the Survey Area intersects one pre-European vegetation association:

- Bassendean_1001: Low forest, woodland or low woodland with scattered trees

The pre-European vegetation association identified from the Survey Area (DPIRD-006) and its pre-European and current extents are listed in Table 2 (GoWA, 2018) and shown in Figure 3.

Table 2: Pre-European Vegetation Association Representation

Vegetation Association	Original Extent (ha)	Current Extent (ha)	% Remaining	% Managed for Conservation
Bassendean_1001	53,283.54	11,394.19	21.38	3.01

2.4.2 Vegetation Complex Mapping

Regional vegetation for the Swan Coastal Plain (at vegetation complex level) was mapped by Heddle et al. (1980) and are maintained in digital form by DBCA (2018). The Survey Area intersects two vegetation complexes:

- Bassendean Complex-Central and South (44) - 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.
- Southern River Complex (42) - Open woodland of *Corymbia calophylla* (Marri) - *Eucalyptus marginata* (Jarrah) - *Banksia* species with fringing woodland of *Eucalyptus rudis* (Flooded Gum) - *Melaleuca raphiophylla* (Swamp Paperbark) along creek beds.

The vegetation complexes identified from the Survey Area (Heddle et al, 1980) and the pre-European and current extents are listed in Table 3 (DBCA, 2018) and shown in Figure 4.

Table 3: Pre-European Regional Vegetation Complexes

Vegetation Complex Name	System 6 Mapping Unit Number	Original Extent (ha)	Current Extent (ha)	% Remaining	% Managed for Conservation
Bassendean Complex-Central and South	44	87,476.26	23,508.66	26.87	1.86
Southern River Complex	42	58,781.48	10,832.18	18.43	1.18

2.5 Environmentally Sensitive Areas and Conservation Estate

Environmentally Sensitive Areas (ESAs) are declared by the Department of Water and Environmental Regulation (DWER) to prevent the degradation of important environmental values such as Threatened Flora, Threatened Ecological Communities (TECs) or significant wetlands.

The Survey Area and Context Area intersect with an ESA (ObjectID-214) associated with Bush Forever Site 390: Fraser Road Bushland (DPLH-019).

Lands <600 m from Survey Area zoned section 34A freehold land under the CALM Act and managed by DBCA.

2.6 Wetlands and Hydrology

The Survey Area and Context Area do not intersect any mapped wetlands of the Swan Coastal Plain (DBCA-19), wetlands listed under the Directory of Important Wetlands in Australia (DBCA-045) or a drainage line (DWER-031). See Figure 6.

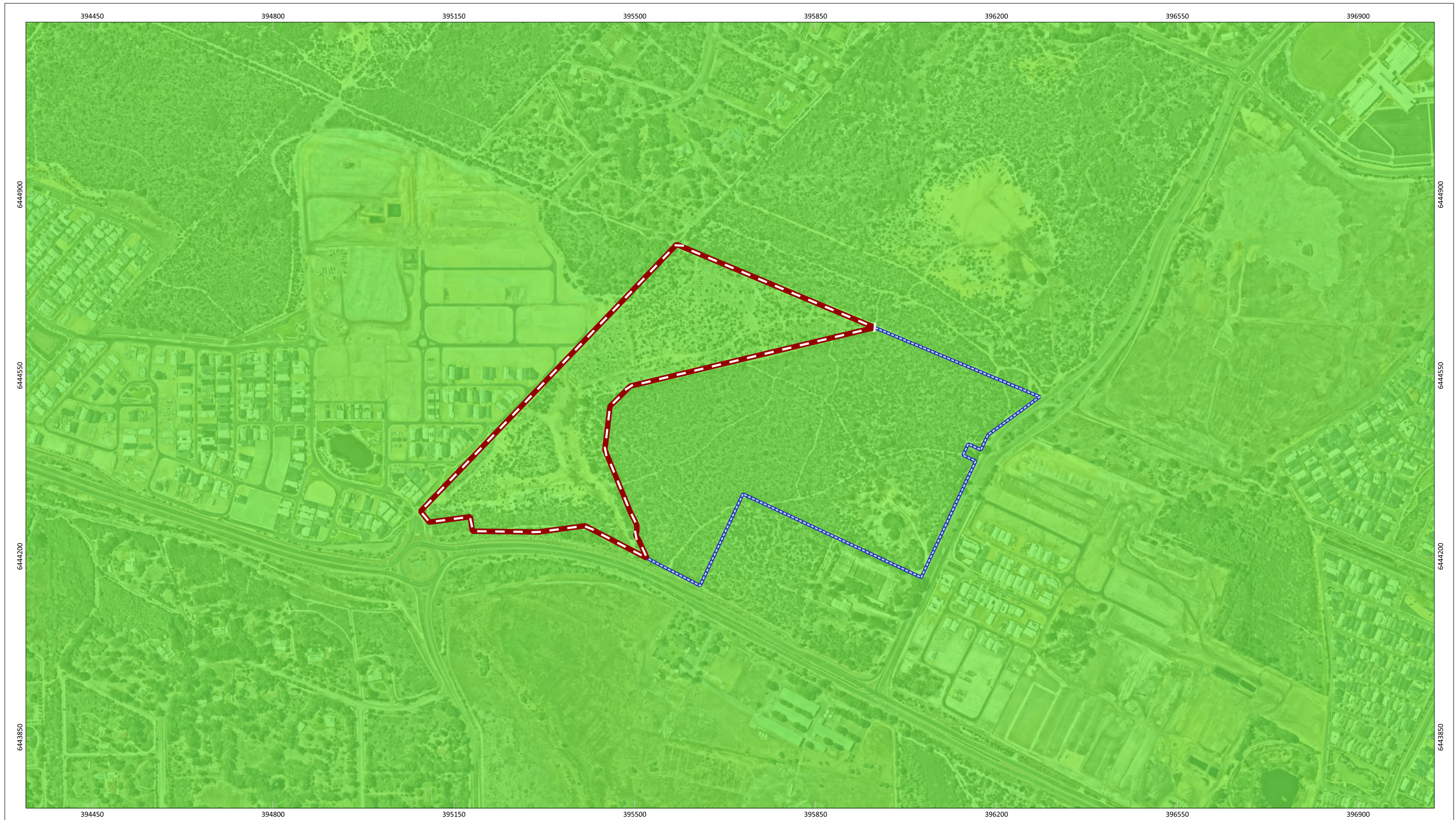








Figure 3: Pre-European Vegetation Type

 	PROJECT/REPORT NAME Biological Surveys Rose Shanks Reserve		Legend  Survey Area  Context Area  Pre-European Vegetation (DPIRD-006)  BASSENDEAN_1001	<table border="1"> <thead> <tr> <th>No</th> <th>Description</th> <th>Drawn</th> <th>Approved</th> <th>Date</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>Original issue</td> <td>JP</td> <td>TC</td> <td>5/2/2025</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	No	Description	Drawn	Approved	Date	A	Original issue	JP	TC	5/2/2025															
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SCALE 1:7,000	SHEET SIZE A3 COLOUR	CLIENT Aigle Royal Developments	<table border="1"> <tr> <td colspan="2"> NOTES: Cadastral boundary from LANDGATE 2022. Label corresponds to the vegetation association number. </td> </tr> </table>	NOTES: Cadastral boundary from LANDGATE 2022. Label corresponds to the vegetation association number.																									
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DATA SOURCE Nearmap Imagery (7th December, 2024)		DRAWN BY / REVIEWED BY JP/TC	DATE 5/2/2025																										



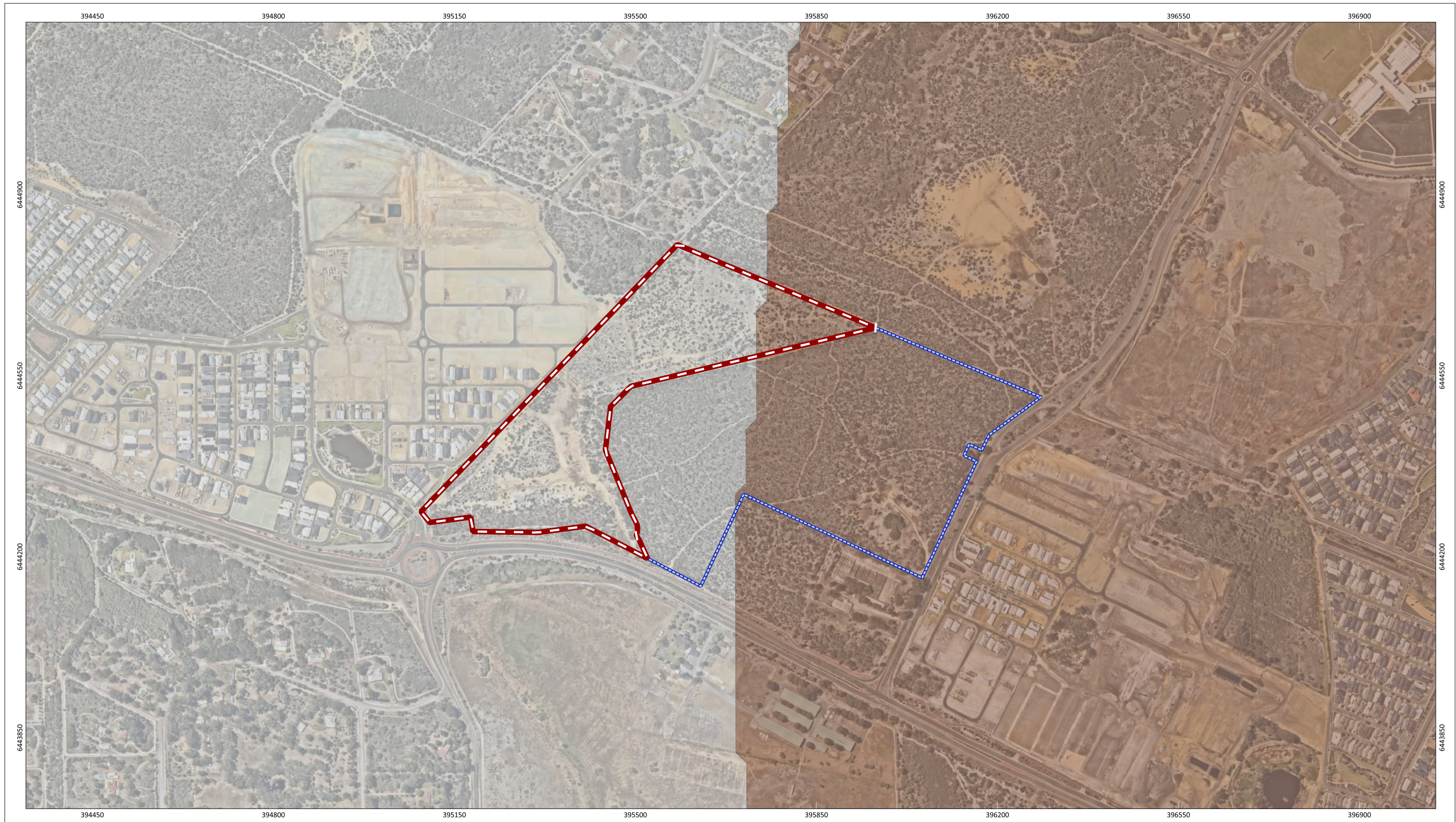


Figure 4: Vegetation Complexes

		PROJECT/REPORT NAME Biological Surveys Rose Shanks Reserve	Legend Survey Area Context Area	Vegetation Complexes - Swan Coastal Plain (DBCA-046) Southern River Complex Bassendean Complex-Central and South
SCALE 1:7,000	SHEET SIZE A3 COLOUR	CLIENT Aigle Royal Developments		
COORDINATE REFERENCE SYSTEM GDA2020 / MGA zone 50		PROJECT NUMBER A24.213	VERSION 0	
DATA SOURCE Nearmap Imagery (7th December, 2024)		DRAWN BY / REVIEWED BY JP/TC	DATE 5/2/2025	

No	Description	Drawn	Approved	Date
A	Original issue	JP	TC	5/2/2025

NOTES:

Cadastral boundary from LANDGATE 2022. Label corresponds to the vegetation association number.

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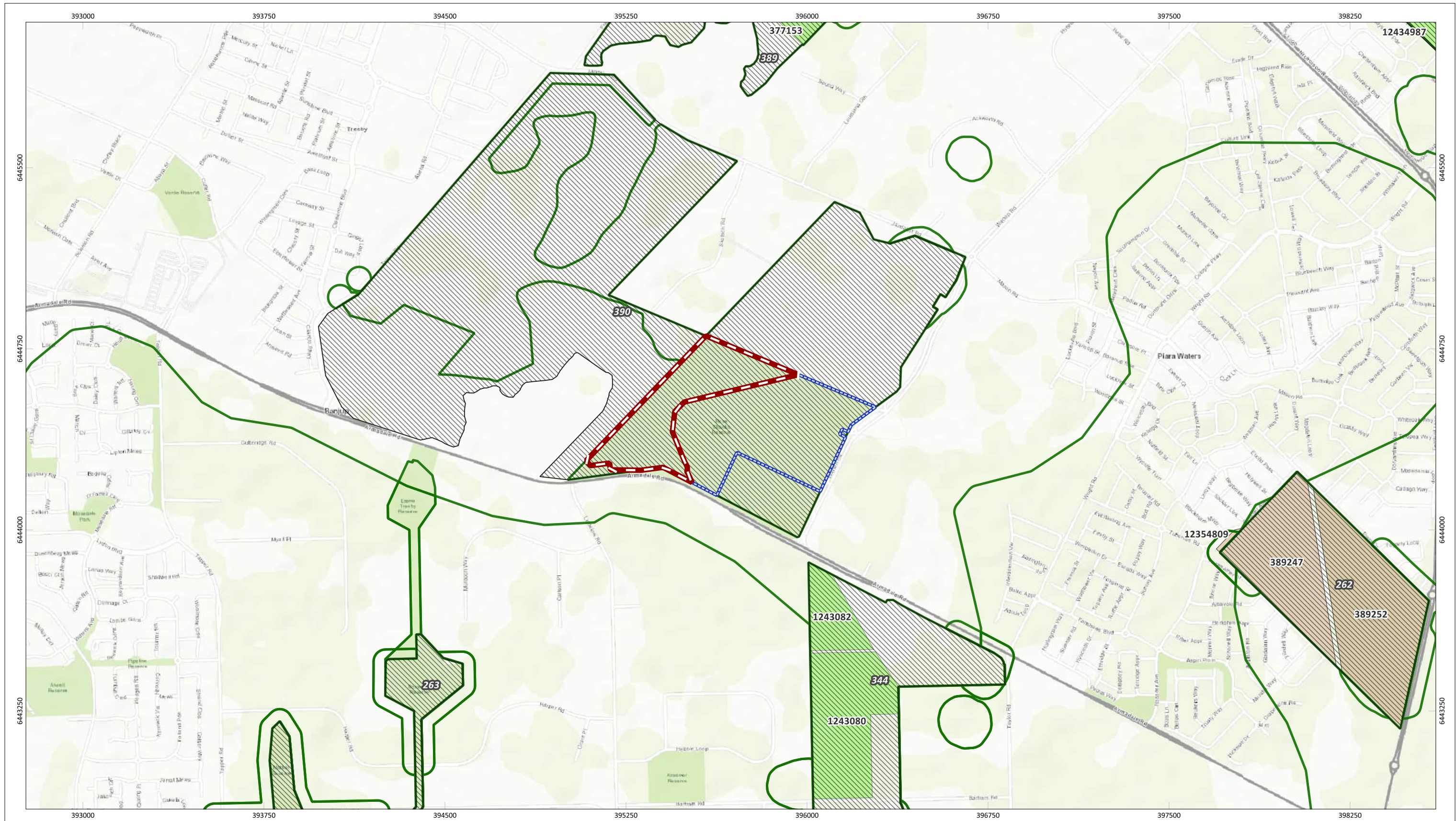


Figure 5: Environmentally Sensitive Areas, Conservation Estate and Bush Forever

	PROJECT/REPORT NAME Biological Surveys Rose Shanks Reserve		Legend Survey Area Context Area Bush Forever Areas - 2000 (DPLH-019) Clearing Regulations - Environmentally Sensitive Areas (DWER-046) DBCA - Legislated Lands and Waters (DBCA-011) Nature Reserve Crown Freehold - Dept Managed	<table border="1"> <thead> <tr> <th>No</th> <th>Description</th> <th>Drawn</th> <th>Approved</th> <th>Date</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>Original issue</td> <td>JP</td> <td>TC</td> <td>5/2/2025</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	No	Description	Drawn	Approved	Date	A	Original issue	JP	TC	5/2/2025															
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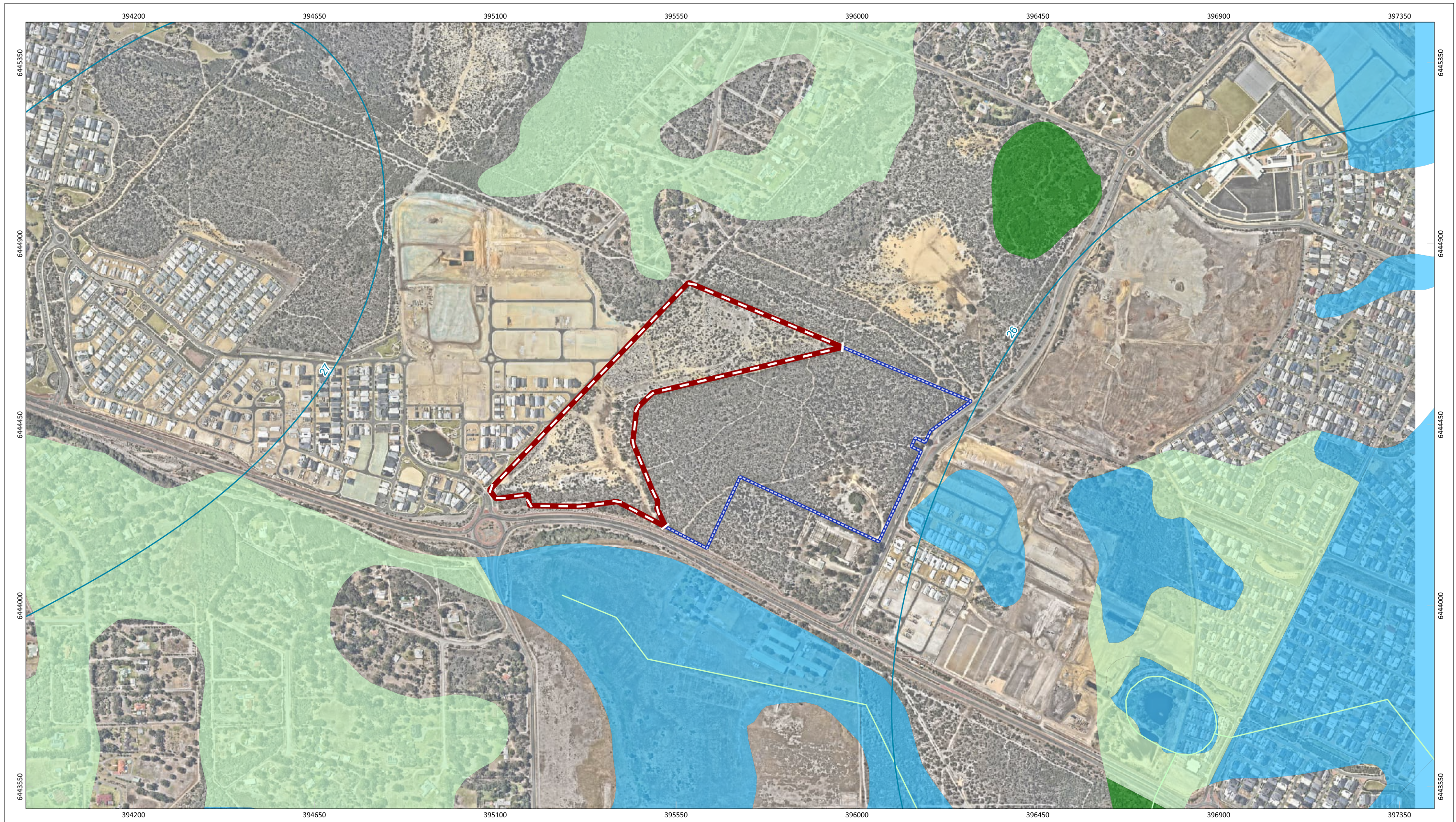


Figure 6: Surface Water Features and Geomorphic Wetlands

<p>↑ N</p> <p>0 130 260 390 520 m</p>	<p>PROJECT/REPORT NAME Biological Surveys Rose Shanks Reserve</p>	<p>Legend</p> <p> Survey Area</p> <p> Context Area</p> <p> Gngalara Jandakot Water Table Elevation (Contours) – 2019 Max (DWER-100)</p> <p> Hydrography Linear (Hierarchy) (DWER-031)</p> <p> Insignificant Tributary</p>	<p>Geomorphic Wetlands, Swan Coastal Plain (DBCA-019)</p> <p> Conservation</p> <p> Multiple Use</p> <p> Resource Enhancement</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>No</th> <th>Description</th> <th>Drawn</th> <th>Approved</th> <th>Date</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>Original Issue</td> <td>JP</td> <td>TC</td> <td>5/2/2025</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table> <p>NOTES: Cadastral boundary from LANDGATE 2022. Label corresponds to the vegetation association number.</p>	No	Description	Drawn	Approved	Date	A	Original Issue	JP	TC	5/2/2025															
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2.7 Land Use History

The Survey Area was previously cleared for sand mine development in 1994. Analysis of historical aerial imagery indicated that the vegetation of the Survey Area had been partially cleared for road access prior to 1981. This is attributed to historical land use of clearing for further development and sand mining, evident in the aerial from 2004. Following clearing for the sand mine, vegetation cover increases from 2004 to 2024 due to revegetation efforts.

The Context Area was cleared prior to 1981, for roads and urban development. It has since remained mostly unchanged with the addition of access tracks in 1994.



Image 1: 1981 aerial



Image 2: 1994 aerial



Image 3: 2004 aerial



Image 4: 2010 aerial

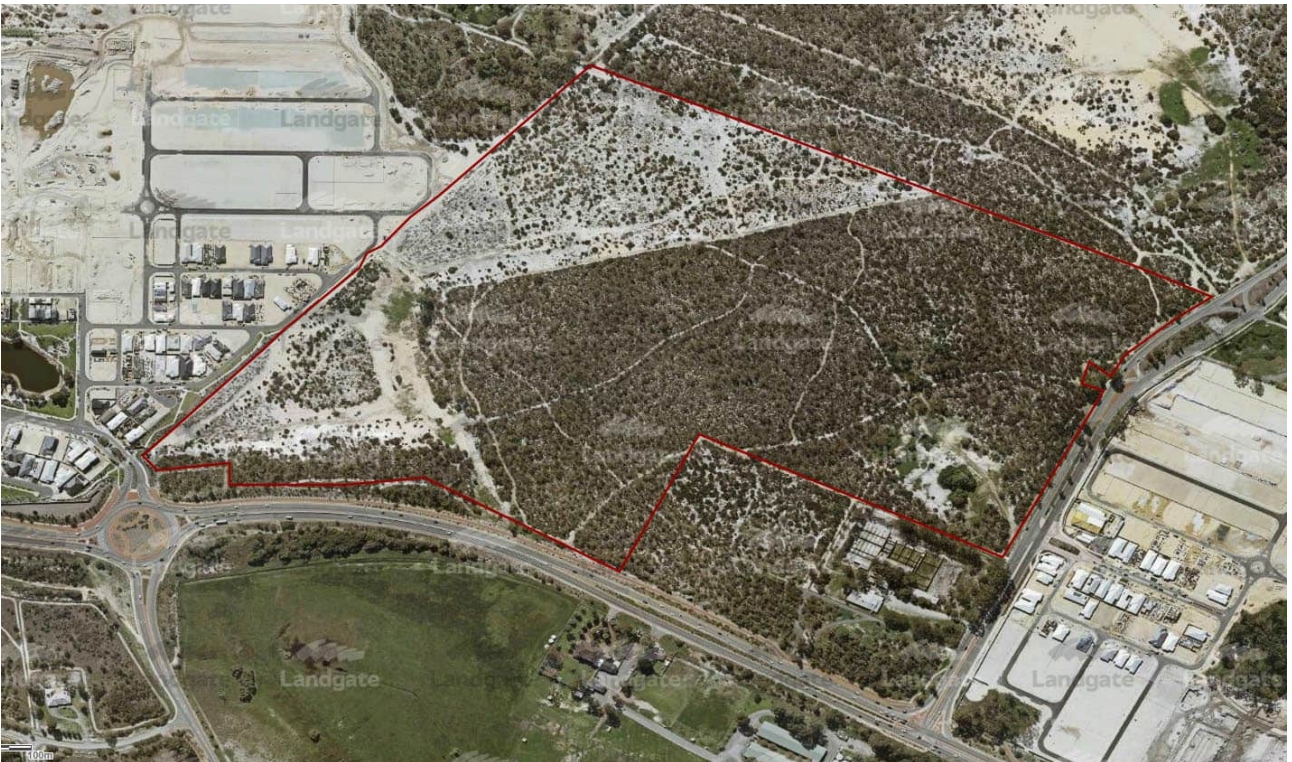


Image 5: 2024 aerial

3. Methodology

3.1 Flora and Vegetation Survey

3.1.1 Field Survey Timing and Survey Team

Biological surveys were undertaken by the survey team listed in Table 4 as per the below schedule.

- Four person days sampling flora and vegetation in November 2024 with 14 quadrats and three relevés sampled.
- One person day undertaking daytime black cockatoo foraging habitat, January 2025.

Table 4: Survey Team

Name	Position and Years of Experience	DBCA Licence No.
Beth Loudon	Independent Environmental Scientist - 16 years	FB62000049-2; TFL 140-2122
Taya Cherry	Graduate Environmental Scientist - 1 year	FB62000675

3.1.2 Floristic Sampling

Four quadrats and one relevé were sampled in the Survey Area. Ten quadrats and two relevés were sampled in the Context Area. The following information was collected from within the quadrat (approximately 10 x 10 m).:

- Observer.
- Date.
- Quadrat/site number.
- Global Position System (GPS) location (GDA2020) of the north-west corner.
- Digital photograph (spatially referenced with a reference number), taken from the north-west corner, looking diagonally across the quadrat.
- Broad soil type and colour.
- Topography.
- List of flora species recorded with total foliar cover within the quadrat for each species.
- National Vegetation Information System (NVIS) Vegetation description (as per below).
- Vegetation condition.

Of the 14 quadrats, four permanent quadrats were set up and sampled in the Survey Area to provide future monitoring sites. A typical 10 m x 10 m quadrat was established and recorded as previously described. Digital photograph (spatially referenced with a reference number), taken from each corner, looking diagonally across the quadrat. The following information was collected from within a sub-quadrat set up in the northwest corner (approximately 2.5 x 2.5 m):

- Count of flora species individuals including annuals.

Relevés and mapping notes were also used to record changes in vegetation and condition.

Data collected from quadrats and relevés is provided in Appendix D. Survey effort, including the location of the relevé and track logs, is presented in Figure 2.

3.1.3 Vegetation Condition Assessment

Vegetation condition was assessed at each quadrat and during traverses of the Survey Area using the Vegetation Condition Scale for the appropriate bioregion as per the Flora and Vegetation Technical Guidance (EPA, 2016). As quadrats were deliberately located in the best condition parts of a vegetation type, the condition rating of the quadrat may not match that of the broader vegetation type due to the scale of mapping.

3.1.4 Vegetation Description and Classification

Vegetation was described from the quadrats, relevés, and mapping notes, using the height and estimated cover of dominant and characteristic species of each stratum based on NVIS, recorded at Level V (NVIS Technical Working Group, 2017). Up to three species per stratum from each stratum (upper, mid and ground) were used to formulate vegetation descriptions for each quadrat and each vegetation type. Vegetation types were defined by observation of species dominance and structural composition by the field survey team.

Vegetation, statistical analysis was undertaken including PATN© software dendrogram interpretation to assist in defining floristic groups and MVA analysis defining associations with Floristic Community Types, as per Gibson et al. (1994). See Appendix F for detailed statistical methodology.

3.1.5 Flora Taxonomy and Lodgement of Specimens

Where field identification of plant taxa was not possible, specimens were collected for identification using resources of the Western Australian Herbarium (WAH). Identification of flora collections, including confirmation of Priority flora, was completed by consultant taxonomist Beth Lowden.

The finalised species list was checked against FloraBase (Western Australian Herbarium, 2024) to determine the conservation status and known distribution of each taxon. Introduced species were compared against the current Biosecurity and Agriculture Management Act 2007 (BAM Act) Declared Pest list to determine their control status (Department of Agriculture, Water and the Environment 2022b; Department of Primary Industries and Regional Development, 2022).

Threatened and Priority Flora Report Forms (TPFRFs) were submitted to DBCA for new populations of conservation listed flora.

3.2 Carnaby's Black Cockatoo Habitat Assessment

The Swan Coastal Plain is used by black cockatoos primarily for foraging resources, with some small patches of breeding habitat. Vegetation used by black cockatoos is dominated by *Banksia* spp. and tuart (*Eucalyptus gomphocephala*) woodlands, as well as marri (*Corymbia calophylla*) and jarrah (*E. marginata*) (DCCEEW, 2022).

On the Swan Coastal Plain, Carnaby's black cockatoo are most commonly present from February through to September. The timing of the survey in January 2025 provided good opportunity to record foraging individuals and nesting for Carnaby's Black cockatoo. If no individuals are present, searching for foraging evidence is a reliable alternative as it will generally persist in the landscape (particularly marri nut chews) for up to two years (DCCEEW, 2022).

The Black cockatoo habitat field survey followed the Commonwealth referral guidelines for Threatened Black cockatoos (DCCEEW, 2022) for identifying breeding, foraging and roosting habitat.

Foraging Habitat Assessment

The Commonwealth defines foraging habitat as areas including plants of species known to support foraging within the range of each black cockatoo species. Marri (*Corymbia calophylla*) and jarrah (*Eucalyptus marginata*) woodlands are particularly important to Baudin's and the forest red-tailed black cockatoo, while proteaceous heaths (shrublands dominated by *Banksia*, *Hakea* and *Grevillea* species) are also utilised by Carnaby's black cockatoo (DCCEEW, 2022).

The potential of the habitat within the Survey Area to support foraging was described, and any evidence was recorded, along with opportunistic sightings of any black cockatoo individuals.

Habitat mapping of the Survey Area was used in conjunction with the site assessment to determine the foraging quality using the Foraging Habitat Scoring Tool (DCCEEW, 2022). The Foraging Habitat Scoring Tool (DCCEEW, 2022) is applied once only for an entire site. A secondary assessment was undertaken using the 'Habitat Scoring System for WA black cockatoo foraging habitat' (the Habitat Quality Scoring Tool) provided by DCCEEW in 2023 as an unpublished source. The Habitat Quality Scoring Tool produces a score of 0-7 for site condition and may be applied to each identified fauna habitat type. An overall site context score of 0-3 is then added. See Appendix G for detailed scoring tool methodologies.

Information collected for the Survey Area was also contextualised with consideration to the wider availability of foraging habitat for black cockatoos in the surrounding area (12 km radius). This buffer is selected as recommended in the Commonwealth referral guidelines due to black cockatoos mainly foraging within 12 km of their nest site during the breeding season and their reliance on this proximity of foraging resources to successfully raise chicks (DCCEEW, 2022). Analysis utilises Remnant Native Vegetation Extent mapping

(DPIRD-005) and Vegetation Complexes- Swan Coastal Plain and South West forest region (DBCA-046 and DBCA-047) mapping to define extent and type of remnant vegetation.

4. Results

4.1 Flora and Vegetation Field Survey

4.1.1 Flora

A total of 104 vascular flora species were recorded from within the Survey Area from four quadrats and opportunistic observations. Within the Context Area, a total of 151 vascular flora species were recorded from ten quadrats, three relevés and opportunistic observations. The timing of the field survey, in late spring following significant rainfall, was optimal for identifying most species with many flowering or in fruit.

Within the Survey Area, 21 (20.19%) of the recorded species represented introduced taxa. A comprehensive inventory of introduced species was not collected from cleared Completely Degraded areas, paddocks and parklands.

The families with the highest number of taxa within the Survey Area, were Fabaceae (14 taxa), Asteraceae (11 taxa), Poaceae (10 taxa) and Myrtaceae (10 taxa). The most commonly recorded genera were *Acacia* (seven taxa), *Hibbertia* and *Stylidium* (three taxa each). These families and genera are typical and common for the locality.

The flora inventory, presented as a site by species table, is provided in the Flora Inventory and Appendix C. Floristic quadrat sheets are provided in Appendix D. A species accumulation curve assessing survey effort adequacy is provided in Appendix F. The species accumulation curve indicates that the curve is approaching asymptote, however additional survey effort is likely to identify more flora species. With 104 species recorded (including opportunistic observations) it is considered that the survey is adequate to describe the flora of the Survey Area taking account of degrading factors present.

4.1.2 Threatened and Priority Flora

One flora species of conservation significance was recorded within the Survey Area and Context Area. Records for the species are summarised in Table 5 and pictured in Image 6 below. Locations of occurrence in the Survey Area and Context Area are presented in Figure 7 and data provided in Appendix E. A targeted Threatened and Priority flora survey was not included in the scope of the survey; therefore, locations of occurrence are not considered an accurate representation of the population.

Table 5: Flora of Conservation Significance Recorded from the Survey Area

Species	Conservation Code		Records Within the Survey Area
	Federal	State	
<i>Poranthera moorokatta</i>	Not listed	Priority 2	One-hundred and thirty plants were recorded between the Survey Area and Context Area. Comprising multiple populations.

***Poranthera moorokatta* (P2)**



Image 6: *Poranthera moorokatta* (P2) in situ (Photo credit Beth Loudon)

4.1.3 Introduced Flora

A total of 21 introduced taxa were recorded within the Survey Area see Table 6.

No Weed of National Significance (WoNS) or Declared Pest Plant species were recorded.

Table 6: Introduced Species Recorded in the Survey Area

Family	Species	Common Name	Status Under BAM Act and WONS List
Aizoaceae	<i>Carpobrotus edulis</i>	Slender Thistle	
Asphodelaceae	<i>Asphodelus fistulosus</i>	onionweed	
Asteraceae	<i>Arctotheca calendula</i>	Cape Weed	
Asteraceae	<i>Hypochaeris glabra</i>	Cats Ear	
Asteraceae	<i>Leontodon rhagadioloides</i>	Cretan Weed	
Asteraceae	<i>Sonchus oleraceus</i>	Sow thistle	
Asteraceae	<i>Ursinia anthemoides</i>	Ursinia	
Brassicaceae	<i>Brassica tournefortii</i>	African mustard	
Campanulaceae	<i>Wahlenbergia capensis</i>	Cape Bluebell	

Family	Species	Common Name	Status Under BAM Act and WONS List
Caryophyllaceae	<i>Silene gallica</i>	French Catchfly	
Cyperaceae	<i>Ficinia marginata</i>	Coarse Club Rush	
Euphorbiaceae	<i>Ricinus communis</i>	castor oil plant	
Geraniaceae	<i>Pelargonium capitatum</i>	Rose Pelargonium	
Iridaceae	<i>Gladiolus caryophyllaceus</i>	Wild Gladiolus	
Poaceae	<i>Aira cupaniana</i>	Silver Hairgrass	
Poaceae	<i>Avena barbata</i>	Bearded Oat	
Poaceae	<i>Briza maxima</i>	Blowfly Grass	
Poaceae	<i>Cynodon dactylon</i>	Scutch grass	
Poaceae	<i>Ehrharta calycina</i>	Perennial Veldt Grass	
Poaceae	<i>Vulpia bromoides</i>	Squirrel Tail Fescue	
Poaceae	<i>Vulpia muralis</i>	Wall Fescue	

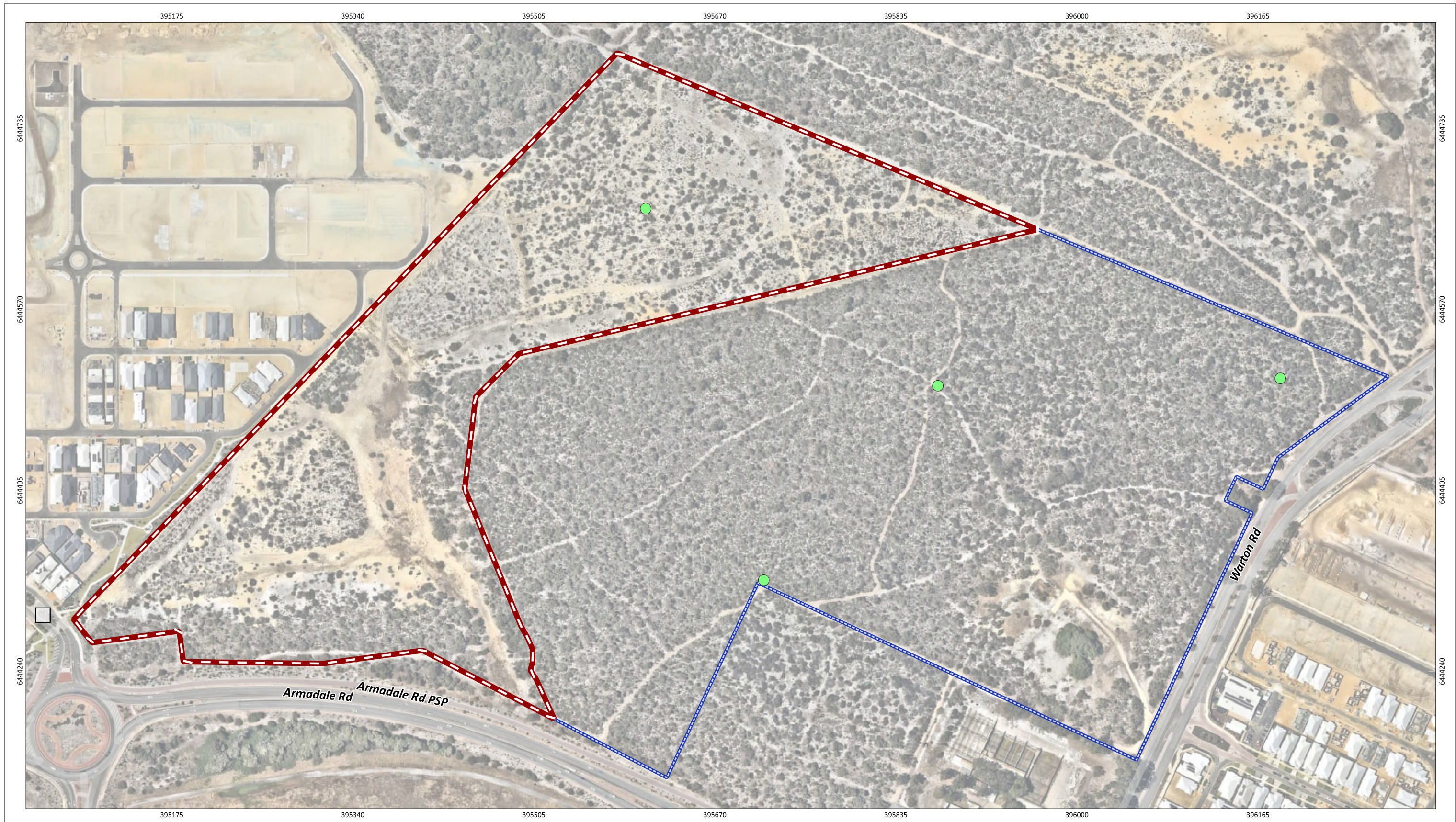


Figure 7: Conservation Significant Flora Locations

		PROJECT/REPORT NAME Biological Surveys Rose Shanks Reserve		Legend Survey Area Context Area Poranthera moorokatta - P2	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>No</th> <th>Description</th> <th>Drawn</th> <th>Approved</th> <th>Date</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>Original issue</td> <td>JP</td> <td>TC</td> <td>5/2/2025</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	No	Description	Drawn	Approved	Date	A	Original issue	JP	TC	5/2/2025																<p style="font-size: small; margin: 0;"> WESTERN ENVIRONMENTAL Western Environmental Pty Ltd 08 6244 2310 enquiries@western.com.au Level 3/25 Prowse St, West Perth WA 6005 western.com.au </p>
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4.1.4 Vegetation

Vegetation Types

Eight vegetation types were identified within the Survey Area and Context Area. Four vegetation types comprise intact native vegetation, and four types comprise highly modified, planted non-native or Completely Degraded areas. The vegetation types are described below in Table 7 and shown in Figure 8. Due to historical clearing, and other degrading factors, vegetation in the Survey Area has low native species diversity (range 17-47 species per quadrat). Although quadrats were located in the best condition patches of vegetation present, the majority of the Survey Area is in Degraded condition, limiting sampling opportunities. Vegetation in the Context Area is in better condition and has higher native species diversity (range 38-60 species per quadrat). The majority of the Context Area is in Excellent condition.


Vegetation statistical analysis used to assist in defining vegetation types is presented in Appendix F. For the vegetation in the Survey Area Floristic Community Type (FCT) Analysis was undertaken with quadrat presence absence data compared against the Keighery et al (2012) Swan Coastal Plain dataset and the Gibson et al (1994) dataset. The Summary of Statistical Analyses to Determine Relationship of Quadrats to Floristic Community Types is also shown in Appendix F.


Because of the history of disturbance (sand mining) and consequent changes in species composition in the Survey Area quadrat grouping in the dendrograms was generally not reliable in correctly assigning the most likely FCT.


Percentage similarity between the revegetation quadrats and the comparison dataset sites was generally relatively low (46.9% - 64%) which reflects the relatively low species richness and high weed numbers (Weeds accounted for 26.22% of the total species numbers for the four quadrats). The closest FCT associations for quadrats occurring in each vegetation type are described in Table 7.


Table 7: Vegetation Types Present in Survey Area and Context Area

Vegetation Unit Description	Total Area, Proportion (%) of the Survey Area	Sites	Vegetation Condition	Photograph
<p>VT01 <i>Banksia attenuata</i>, <i>Banksia menziesii</i> low woodland over <i>Eremaea pauciflora</i> var. <i>pauciflora</i> and <i>Hibbertia hypericoides</i> subsp. <i>hypericoides</i> mid open shrubland over <i>Lyginia barbata</i>, <i>Scholtzia involucrata</i> and <i>Phlebocarya ciliata</i> low sparse shrubland/mid sparse sedgeland.</p> <p>In Context Area and Survey Area</p>	<p>6.134 ha 14.72%</p>	<p>Q02 Q03 REL03</p>	<p>CD to VG</p>	
<p>VT02 <i>Banksia attenuata</i>, <i>Banksia menziesii</i> low woodland over <i>Eremaea pauciflora</i> var. <i>pauciflora</i>, <i>Hibbertia hypericoides</i> subsp. <i>hypericoides</i> and <i>Allocasuarina humilis</i> mid open shrubland over, <i>Lyginia imberbis</i>, <i>Lyginia barbata</i> and <i>Scholtzia involucrata</i> low sparse shrubland/mid sparse sedgeland.</p> <p>In Context Area and Survey Area</p>	<p>3.933 ha 9.44 %</p>	<p>Q01 Q04 Q05</p>	<p>D to VG</p>	

Vegetation Unit Description	Total Area, Proportion (%) of the Survey Area	Sites	Vegetation Condition	Photograph
<p>VT03 <i>Banksia attenuata</i>, <i>Banksia menziesii</i> low open woodland over <i>Eremaea pauciflora</i> var. <i>pauciflora</i>, <i>Hibbertia hypericoides</i> subsp. <i>hypericoides</i> and <i>Allocasuarina humilis</i> mid shrubland over, <i>Scholtzia involucrata</i>, <i>Ursinia anthemoides</i>*, <i>Lyginia barbata</i> low sparse shrubland/mid sparse sedgeland.</p> <p>In Context Area</p>	<p>10.982 ha 26.35 %</p>	<p>Q07 Q08 Q09 Q10</p>	<p>CD to VG</p>	
<p>VT04 <i>Banksia attenuata</i>, <i>Banksia menziesii</i> low open woodland over <i>Allocasuarina humilis</i>, <i>Eremaea pauciflora</i> var. <i>pauciflora</i>, <i>Hibbertia hypericoides</i> subsp. <i>hypericoides</i> tall shrubland over <i>Lyginia barbata</i>, <i>Scholtzia involucrata</i> and <i>Stirlingia latifolia</i>, low sparse shrubland/mid sparse sedgeland, with yellow sand at depth. Patches of <i>Eucalyptus marginata</i> present.</p> <p>In Context Area</p>	<p>4.389 ha 10.53 %</p>	<p>Q06 REL01 REL02</p>	<p>D to E</p>	

Vegetation Unit Description	Total Area, Proportion (%) of the Survey Area	Sites	Vegetation Condition	Photograph
<p>VT05 - Revegetation Zone - <i>Banksia</i> woodland with regeneration from topsoil</p> <p><i>Banksia attenuata</i>, <i>Eucalyptus todtiana</i>, <i>Allocasuarina fraseriana</i> low open woodland over <i>Adenanthos cygnorum</i> subsp. <i>cygnorum</i>, <i>Kunzea glabrescens</i> tall shrubland over <i>Eremaea pauciflora</i> var. <i>pauciflora</i>, mid open shrub land over <i>Styphelia xerophylla</i>, <i>Daviesia triflora</i> low isolated clumps shrubs over <i>Lyginia imberbis</i> and <i>L. barbata</i> low isolated rushes.</p> <p>Vegetation type is most concordant with FCT unit FCT 21c 'Low-lying <i>Banksia attenuata</i> woodlands and shrublands'. FCT 21c is listed as a Priority 3 Ecological Community.</p> <p>In Survey Area</p>	<p>12.239 ha 29.36 %</p>	<p>RVQ01 RVQ02 RVQ03 RVQ04</p>	<p>CD to VG</p>	

Vegetation Unit Description	Total Area, Proportion (%) of the Survey Area	Sites	Vegetation Condition	Photograph
<p>Planted 01 - <i>Eucalyptus gomphocephala</i> and <i>Eucalyptus platypus</i> <i>Eucalyptus gomphocephala</i>, <i>Eucalyptus platypus</i>, low open woodland over <i>Acacia rostellifera</i> <i>Banksia attenuata</i>, tall, isolated clumps of shrubs over <i>Conostylis aculeata</i>, <i>Gompholobium tomentosum</i> low isolated shrubs <i>Briza maxima</i> low sparse grassland. (planted trees, shrubs with some minor regrowth).</p> <p>In Survey Area</p>	<p>0.599 ha 1.44 %</p>		<p>CD</p>	
<p>Planted 02 - Planted with a mix of native species but not locally endemic and not <i>Banksia</i> woodland composition.</p> <p>Dumped limestone, bitumen that has been ripped and revegetated. Plants or seeded, likely planted; including <i>Banksia grandis</i>, <i>Banksia menziesii</i>, <i>Jacksonia furcellata</i>, <i>Regelia ciliata</i>, and <i>Acacia pulchella</i> var. <i>glaberrima</i>.</p> <p>In Survey Area</p>	<p>1.128 ha 2.71%</p>		<p>CD</p>	

Vegetation Unit Description	Total Area, Proportion (%) of the Survey Area	Sites	Vegetation Condition	Photograph
<p>Planted 03 - Planted with a mix of native locally endemic species including <i>Banksia spp.</i></p> <p>In Survey Area</p>	<p>0.265 ha 0.64 %</p>		<p>CD</p>	
<p>Cleared areas and roads</p>	<p>2.013 ha 4.83 %</p>			
<p>Total</p>	<p>41.682 ha</p>			

Vegetation Condition

The vegetation of the Survey Area ranged from Excellent to Completely Degraded with the majority in Degraded condition. See Table 8 and Figure 9. The condition of the Context Area is better than the Survey Area and ranges from Excellent to Degraded with the majority in Excellent condition.

Table 8: Vegetation Condition Extents of the Survey Area (as per EPA, 2016 condition scale)

Vegetation Condition	Extent (ha)	Extent (%)
Excellent	0.235	1.45%
Very Good	1.303	8.06%
Good	1.732	10.72%
Degraded	7.293	45.13%
Completely Degraded	5.14	31.81%
Cleared/Road	0.456	2.82%
Total	16.159	100

The vegetation of the Survey Area has been degraded as a result of historical clearing and use for sand mining and access tracks. Assessment of historical aerial imagery shows that as of 1994 vegetation in the Survey Area was previously cleared for sand mining. From 2010 to 2024 vegetation cover appears to have increased (Landgate, 2022). Likely due to revegetation from replaced topsoil. Most of the vegetation in the Context Area does not appear to have been historically cleared, some clearing for access road and urban development in the southwest portion is evident.

4.1.5 Threatened and Priority Ecological Communities

Threatened and Priority communities' presence was assessed as per guidance in *Methods for survey and identification of Western Australian threatened ecological communities* by DBCA, (2023a) and as per listing in *the Priority Ecological Communities for Western Australia version 35* by DBCA, (2023b). Where applicable Commonwealth Approved Conservation Advice including Listing Advice is also applied for EPBC Act listed communities.

FCT21C Low Lying *Banksia attenuata* Woodlands Assessment (P3)

Vegetation type VT-05 (Revegetation zone) is identified as most concordant with the Low-lying *Banksia attenuata* woodlands or shrublands ('floristic community type 21c') community listed as Priority 3. There is 12.239 ha of this vegetation type present within the Survey Area.

This community type occurs sporadically between Gingin and Bunbury, and is largely restricted to the Bassendean system. The type tends to occupy lower lying wetter sites and is variously dominated by *Melaleuca preissiana*, *Banksia attenuata*, *B. menziesii*, *Regelia ciliata*, *Eucalyptus marginata* or *Corymbia calophylla*. Structurally, this community type may be either a woodland or occasionally shrubland.

The FCT may form a component of the Endangered Banksia Woodlands of the Swan Coastal Plain EPBC listed TEC. The extent of VT-05 is not currently consistent with the vegetation structure and composition of the TEC, as it is mostly in Degraded condition.

4.1.6 Banksia Woodlands TEC Patch Assessment

The field survey confirmed that areas of vegetation within VT01, VT02, VT03 and VT04 *Banksia attenuata* Woodland were consistent with the vegetation structure and composition of the community and that patches of the Banksia TEC were present.

The Conservation Advice describes a four-step process for identifying presence of the community. The steps are:

1. Key diagnostic characteristics (location and physical environment, soils and landform, structure, and composition).
2. Vegetation condition thresholds.
3. Minimum patch size.
4. Further information to assist in determining the presence of the ecological community and significant impacts.

The Conservation Advice defines a patch as "a discrete and mostly continuous area of the ecological community. A patch may include small-scale (<30 m) variations, gaps and disturbances, such as tracks, paths or breaks" (DotEE, 2016). Where breaks are present (e.g. cleared gaps of >30m or area of non-Banksia Woodland vegetation types) several patches within a Survey Area may be defined and assessed against the criteria separately. The assessment is also tenure blind and requires consideration of vegetation outside of the Survey Area. Within the Survey Area and Context Area five separate patches of potential Banksia Woodland TEC were identified. The assessment of these patches against the criteria are presented in Table 9. The extents are shown in Figure 10.

Table 9: Banksia Woodland TEC Assessment (As per Conservation Advice)

Characteristic	Key Diagnostic Criteria	Survey Area	Context Area
Step 01			
Location and physical environment	Occurs in the Swan Coastal Plain IBRA bioregion. Occurs on well drained, low nutrient soils on sandplain landforms, particularly deep Bassendean and Spearwood sands; occasionally on Quindalup sands or eolian sands of the Ridge Hill Shelf, Whicher Scarp and Dandaragan Plateau.	Meets criterion: Survey Area occurs on the Swan Coastal Plain Occurs on deep, leached sands of the Bassendean Soil-Landscape Zone or mildly calcareous sand of the Spearwood Soil-Landscape Zone. Patch meets criterion	Meets criterion: Context Area occurs on the Swan Coastal Plain Occurs on deep, leached sands of the Bassendean Soil-Landscape Zone or mildly calcareous sand of the Spearwood Soil-Landscape Zone. Patch meets criterion
Structure	<ul style="list-style-type: none"> • Low woodland to forest structure • Distinctive upper tree layer or tall shrub layer of Banksia species at >2% cover. • May have emergent trees of <i>Eucalyptus</i> or <i>Allocasuarina</i> • An often highly species-rich understorey that consists of sclerophyllous shrubs of various heights and a herbaceous ground layer of cord rushes, sedges and perennial and ephemeral forbs 	Meets criterion: Patch within VT01 and VT02 comprised a woodland structure with a canopy layer dominated by <i>Banksia attenuata</i> , <i>B. menziesii</i> at >2% cover with emergent <i>Eucalyptus marginata</i> or <i>E. todtiana</i>	Meets criterion: Patch within VT01, VT02, VT03 and VT04 comprised a woodland structure with a canopy layer dominated by <i>Banksia attenuata</i> , <i>B. menziesii</i> at >2% cover with emergent <i>Eucalyptus marginata</i> or <i>E. todtiana</i>
Species composition	<ul style="list-style-type: none"> • Canopy is most commonly dominated or co-dominated by and must include at least one of the following species: • <i>Banksia attenuata</i> • <i>Banksia menziesii</i> • <i>Banksia prionotes</i> • <i>Banksia ilicifolia</i> 	Meets criterion: Patch within VT01 and VT02 are dominated or co dominated by <i>Banksia attenuata</i> , <i>B. menziesii</i> with emergent <i>Eucalyptus marginata</i> or <i>E. todtiana</i>	Meets criterion: Patch within VT01, VT02, VT03 and VT04 are dominated or co dominated by <i>Banksia attenuata</i> , <i>B. menziesii</i> with emergent <i>Eucalyptus marginata</i> or <i>E. todtiana</i>
Step 02			

Characteristic	Key Diagnostic Criteria	Survey Area	Context Area
Condition thresholds	<ul style="list-style-type: none"> To be considered as a part of the ecological community a patch should meet at least the Good Condition category. 	<p>Excellent to Good condition. Majority of the patch is in Very Good Condition.</p> <p>See Step 4 for further assessment</p>	<p>Excellent to Degraded condition. Majority of the patch is in Excellent Condition.</p> <p>See Step 4 for further assessment</p>
Step 03			
Size and condition thresholds	<ul style="list-style-type: none"> ‘Pristine’ – no minimum patch size applies ‘Excellent’ – 0.5 ha or 5,000 m² ‘Very Good’ – 1 ha or 10,000 m² (e.g. 100 m x 100 m) ‘Good’ – 2 ha or 20,000 m² (e.g. 200 m x 100 m) Degraded- does not meet criteria A patch is a discrete and mostly continuous area of the ecological community. A patch may continue into vegetation outside of the Survey Area so long as the patch meets key diagnostic criteria. A patch may include small scale (<30m) gaps such as tracks, breaks or disturbed vegetation 	<p>Meets criterion.</p> <p>Patch covers at least 1.84 ha combined in Survey Area, with at least 1.06 ha in Very Good Condition.</p> <p>Patch is a part of a continuous community outside of the Survey Area.</p>	<p>Meets criterion.</p> <p>Patch covers at least 23.02 ha in the Context Area with at least 17 ha of Excellent condition.</p>
Step 04			
Assessing variation in canopy cover, quality or condition.	<p>As per the Conservation advice "Patches can be spatially variable and are often characterised by one or more areas within a patch that meet the key diagnostic characteristics and condition threshold criteria, amongst areas of lower condition. Average canopy cover and quality across the broadest area that meets the general description of the community should be used".</p> <p>Hence for patches with a mixture of vegetation condition present, the patch should be assessed considering the "average" condition of the patch across the broadest area potentially comprising a patch.</p>	<p>Meets criterion.</p> <p>Patch contains:</p> <ul style="list-style-type: none"> 0.54 ha Good 1.06 ha Very Good 0.24 ha Excellent <p>Average patch condition is Very Good.</p>	<p>Meets criterion.</p> <p>Patch contains:</p> <ul style="list-style-type: none"> 0.34 ha Degraded 3.14 ha Good 1.86 ha Very Good 17.68 ha Excellent <p>Average patch condition is Excellent</p>

Characteristic	Key Diagnostic Criteria	Survey Area	Context Area
Landscape position and influence on broader landscape	The landscape position of the patch, including its position relative to surrounding vegetation influences how important it is in the broader landscape. For example, if it enables movement of native fauna or plant material or supports other ecological processes.	The patch is large and provides connectivity for the TEC in the broader landscape.	The patch is large and provides connectivity for the TEC in the broader landscape. Degraded areas of the patch within of the Survey Area provides connectivity between multiple Good condition areas.
Conclusion		Meets Criterion 1.84 ha patch	Meets Criterion 23.02 ha patch

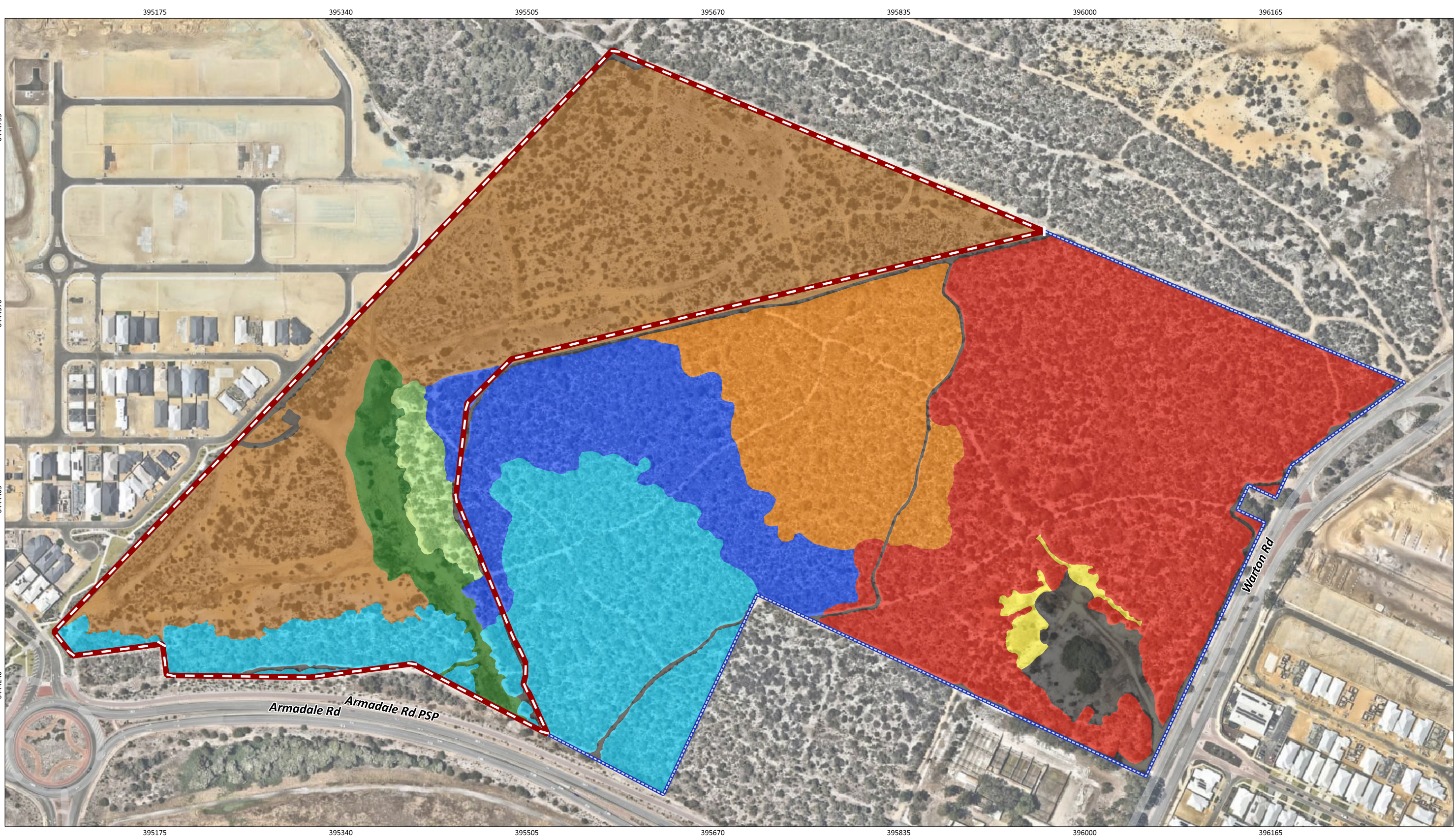


Figure 8: Vegetation Types

	PROJECT/REPORT NAME Biological Surveys Rose Shanks Reserve		Legend <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <ul style="list-style-type: none"> Survey Area Context Area </div> <div style="width: 45%;"> <p>Vegetation Type</p> <ul style="list-style-type: none"> Cleared Reveg Planted01 Planted02 Planted03 </div> </div>																									
	CLIENT Aigle Royal Developments	PROJECT NUMBER A24.213	VERSION 0	DATE 5/2/2025																								
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COORDINATE REFERENCE SYSTEM GDA2020 / MGA zone 50		NOTES: Cadastral boundary from LANDGATE 2022. Label corresponds to the vegetation association number.																										
DATA SOURCE Nearmap Imagery (7th December, 2024)		<div style="text-align: center;"> <p>Western Environmental Pty Ltd 08 6244 2310 enquiries@western.com.au Level 3/25 Prowse St, West Perth WA 6005 western.com.au</p> </div>																										

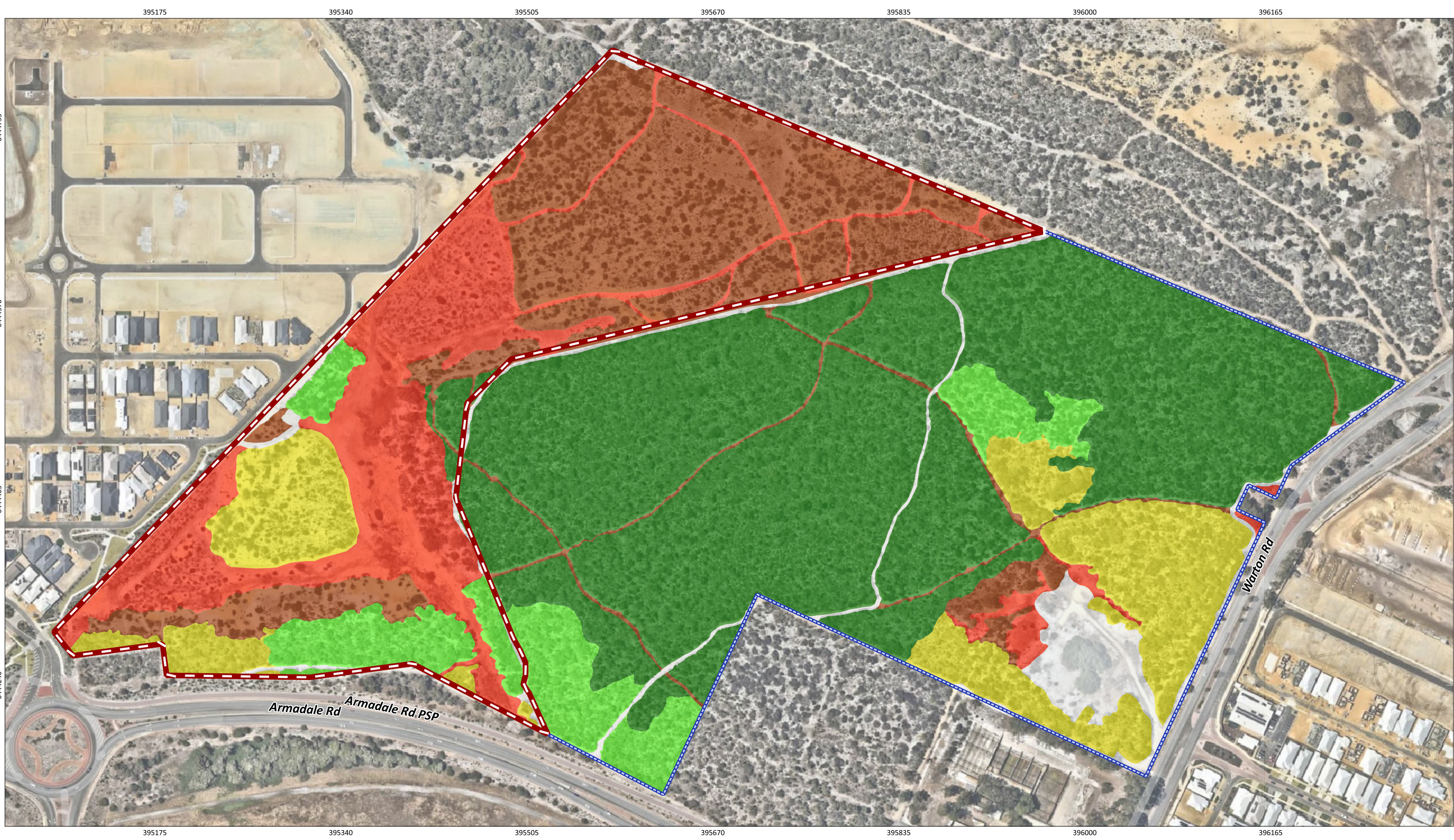


Figure 9: Vegetation Condition

		PROJECT/REPORT NAME Biological Surveys Rose Shanks Reserve	Legend Survey Area Context Area	Vegetation Condition Cleared Completely Degraded Degraded Good Very Good Excellent	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>No</th> <th>Description</th> <th>Drawn</th> <th>Approved</th> <th>Date</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>Original issue</td> <td>JP</td> <td>TC</td> <td>5/2/2025</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	No	Description	Drawn	Approved	Date	A	Original issue	JP	TC	5/2/2025															
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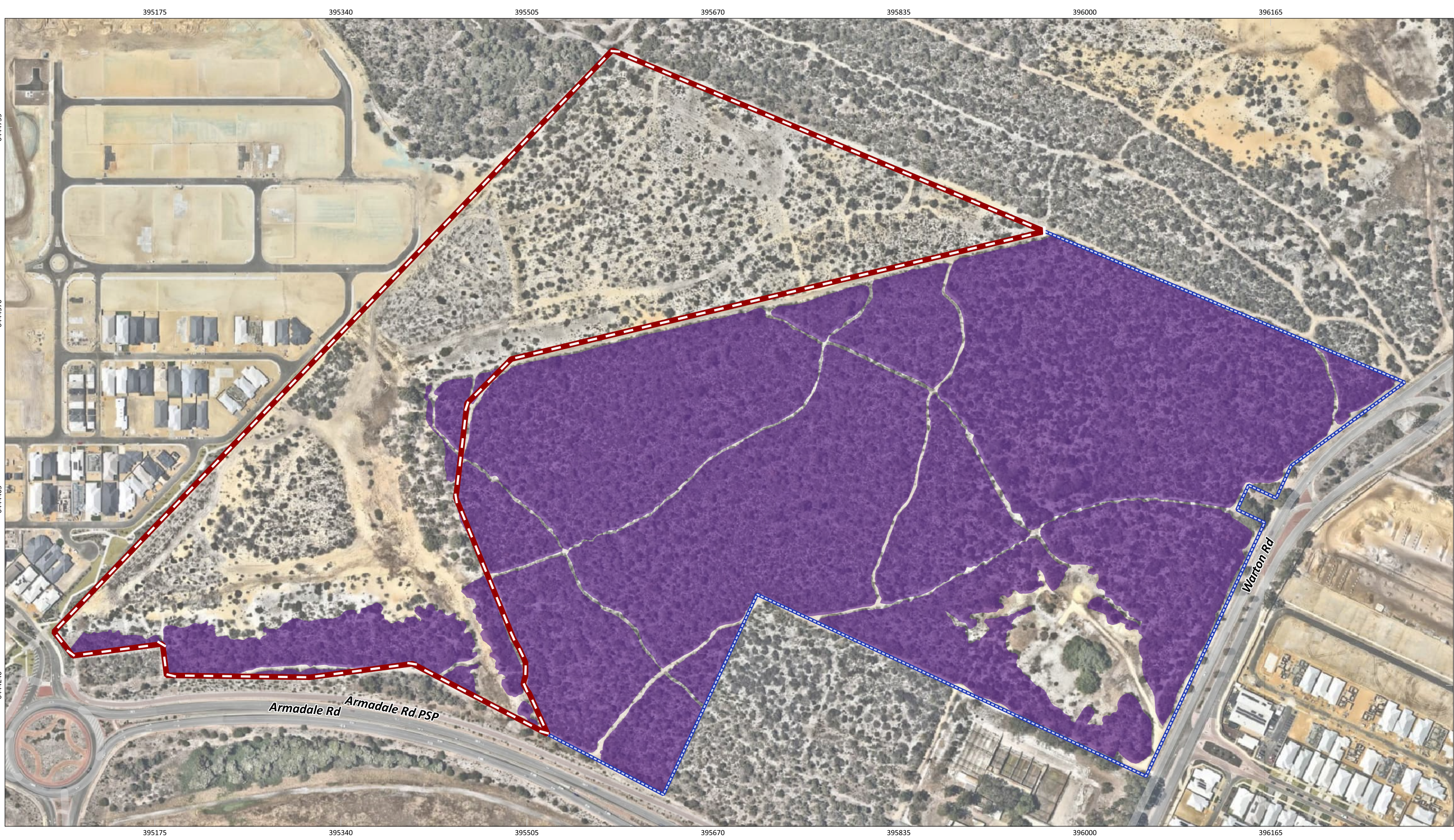


Figure 10: Banksia TEC Extent

		PROJECT/REPORT NAME Biological Surveys Rose Shanks Reserve		Legend Survey Area Context Area Banksia TEC - Patch 1	<table border="1" style="font-size: 8px;"> <thead> <tr> <th>No</th> <th>Description</th> <th>Drawn</th> <th>Approved</th> <th>Date</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>Original issue</td> <td>JP</td> <td>TC</td> <td>5/2/2025</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	No	Description	Drawn	Approved	Date	A	Original issue	JP	TC	5/2/2025															
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4.2 Carnaby's Black Cockatoo Foraging Habitat

Observations and Previous Records

The Survey Area falls within the modelled distribution and breeding range for Carnaby's black cockatoo (DCCEEW, 2022).

A confirmed Carnaby's black cockatoo breeding location is present approximately 15 km northeast of the Survey Area in the Korung Nation Park area (DBCA-054). The Survey Area does not overlap with the (12 km) key foraging area buffer of this confirmed breeding location. Eighteen mapped confirmed Carnaby's black cockatoo roost sites are present within 12 km of the Survey Area (DBCA-50). See Figure 11.

Foraging evidence (chewed *Banksia* cones) for the species were recorded during the field survey. Foraging evidence or observation of individuals were recorded at 23 locations. The Survey Area is confirmed as being frequently foraged by Carnaby's black cockatoo. See Figure 12 for locations.

Foraging Habitat Assessment

The Survey Area contains species which comprise suitable foraging habitat for black cockatoo. The banksia woodlands are characterised by foraging species for Carnaby's black cockatoo species including jarrah, *Banksia attenuata*, *Banksia marginata*. The remainder of the Survey Area comprised cleared areas, scattered/planted eucalypts in degraded areas which have low to no foraging habitat value.

The Commonwealth referral guideline provides a foraging quality scoring tool to guide referral information (DCCEEW, 2022). The tool advises that if the Survey Area contains native vegetation used for foraging at any time by a black cockatoo species and is >1 ha in size, that it is considered at face value to be of very high quality and assigned a starting score of 10. The tool then allows for subtractions if attributes are present which reduce the functionality of the foraging habitat. The Commonwealth referral guidelines specify that the tool is to be applied once to the entire impact area even if there is more than one type of foraging habitat present. The calculated foraging habitat quality score is shown below in Table 10. Scores of 5-10 are identified as representing high value foraging habitat.

Table 10: Foraging Quality Scoring Tool (DCCEEW, 2022)

Attribute	Carnaby's Black cockatoo
Starting score	10 - eucalypt woodland/ paddock trees with marri and wandoo
Foraging potential (-2 if no foraging evidence)	No change, foraging evidence present
Connectivity (-2 if no other foraging habitat in 12km)	No change, other foraging habitat <12 km away
Proximity to breeding habitat (-2 if no breeding habitat in 12km)	No change, recorded breeding habitat within 12 km
Proximity to roosting	No change, known roosting site <20 km distant

Attribute	Carnaby's Black cockatoo
(-1 if >20km from known night roost)	
Impact from significant plant disease (-1 if >50% impact)	No change, impact from plant disease affecting <50% of foraging plants
Total score	10

The Commonwealth referral guidance allows for the inclusion of additional information for foraging habitat which may be considered during an assessment, such as the extent and density of recognised foraging plants within a Survey Area. As an additional source of information, WEPL provides an assessment of foraging habitat quality using a more detailed scoring tool developed by DCCEEW (n.d.) referred to as the Habitat Quality Scoring Tool to produce a numerical foraging habitat score. The Habitat Quality Scoring Tool allows for a score of 0 (none) to 7 (very high) for Site Condition. This is assessed based on density of known foraging species and health of vegetation. The 0-7 Site Condition score is applied to each mapped polygon of fauna habitat. The Habitat Quality Scoring Tool then applies a Site Context score out of three, this is applied only once to the whole Survey Area.

The Site Condition habitat quality score for each species, and the total area of that score present within the Survey Area are listed in Table 11 below and shown in Figure 13. The score was calculated as per the criteria listed in Appendix G.

Table 11: Habitat Quality Scoring Tool- Site Condition Extent

Site Condition	Carnaby's Black Cockatoo (ha)
7- Very High	1.793
6- High	0.045
5-Moderate-High	0.833
4-Moderate	2.21
3-Low-Moderate	0.228
2-Low	5.806
1-Negligable to Low	2.594
0-None	2.65
Total	16.159 ha

The Habitat Quality Scoring Tool then requires the application of a Site Context score out of three (see Table 12) which is added to the Site Condition score for a final x/10 score. See Table 13 for final Habitat Quality Scoring Tool score. Note that habitat with a Site Condition starting score of 2 or less are extremely unlikely to be suitable habitat and do not have a Site Context score added.

Table 12: Habitat Quality Scoring Tool-Site Context

Site Context					
Proximity of the site in relation to other habitat	3	Site is within 6 km of known breeding site.	or	Site is within 12 km of other foraging resources with site condition of at least 3.	3
	2	Site is within 12 km of known breeding site.		Site is within 15 km of other foraging resources with site condition of at least 4.	
	1	Site is within 15 km of known breeding site.		Site is between 15 km and 20 km of other foraging resources with site condition of at least 5.	
	0	Site is further than 15 km from known breeding site.		Site is further than 20 km from other foraging resources.	
Totals					3

Table 13: Final Habitat Quality Scoring Tool Score

Site Condition	Carnaby's Black Cockatoo (ha)
10	1.793
9	0.045
8	0.833
7	2.21
6	0.228
5	-
4	-
3	-
2	5.806
1	2.594
0	2.65
Total	16.159 ha

Regional Foraging Habitat Assessment

Analysis of estimated foraging habitat extent within the local area was also undertaken to provide further context. The estimated extent of foraging habitat is calculated for a buffer of 12 km around and including the Survey Area. This buffer is selected as recommended in the Commonwealth referral guidelines due to black cockatoos mainly foraging within 12 km of their nest site during the breeding season and their reliance on this proximity of foraging resources to successfully raise chicks (DCCEEW, 2022).

Analysis considers Remnant Native Vegetation Extent mapping (DPIRD-005) and Vegetation Complexes-Swan Coastal Plain and Southwest Forest region (DBCA-046 and DBCA-047). See summary of regional vegetation complexes and extents in Table 14 and displayed in Figure 13.

Analysis indicates there is 9705.89 ha of remnant native vegetation mapped within a 12 km buffer of the Survey Area. It is expected that the majority of this vegetation would contain suitable foraging species at the same or greater rate than that present within the Survey Area and Context Area. Much of this regional remnant native vegetation occurs within the Thomsons Lake Nature Reserve and the Forrestdale Lake Nature Reserve.

Within the Survey Area there is 16.15 ha of foraging habitat scoring between 1 (negligible to low) and 6 (high) on the Habitat Quality Scoring Tool -Site Condition scale. This represents 0.17 % of the estimated regional habitat extent. The habitat quality within the Survey Area is considered likely to be of similar quality than much of the regional foraging habitat, which includes high quality banksia woodlands of the Bassendean Complex sandplains and the jarrah and marri forests of the Darling Scarp.

Table 14: Regional Foraging Habitat Extent

Vegetation Complex	Remnant Extent (ha)
Bassendean Complex-Central and South	4752.94
Beermullah Complex	69.55
Cottesloe Complex-Central and South	1243.48
Darling Scarp, DS2	6.23
Forrestfield Complex	111.67
Guildford Complex	43.47
Herdsmen Complex	782.25
Karrakatta Complex-Central and South	600.02
Quindalup Complex	38.53
Southern River Complex	1873.91
Swan Complex	167.70
Grand Total	9705.89

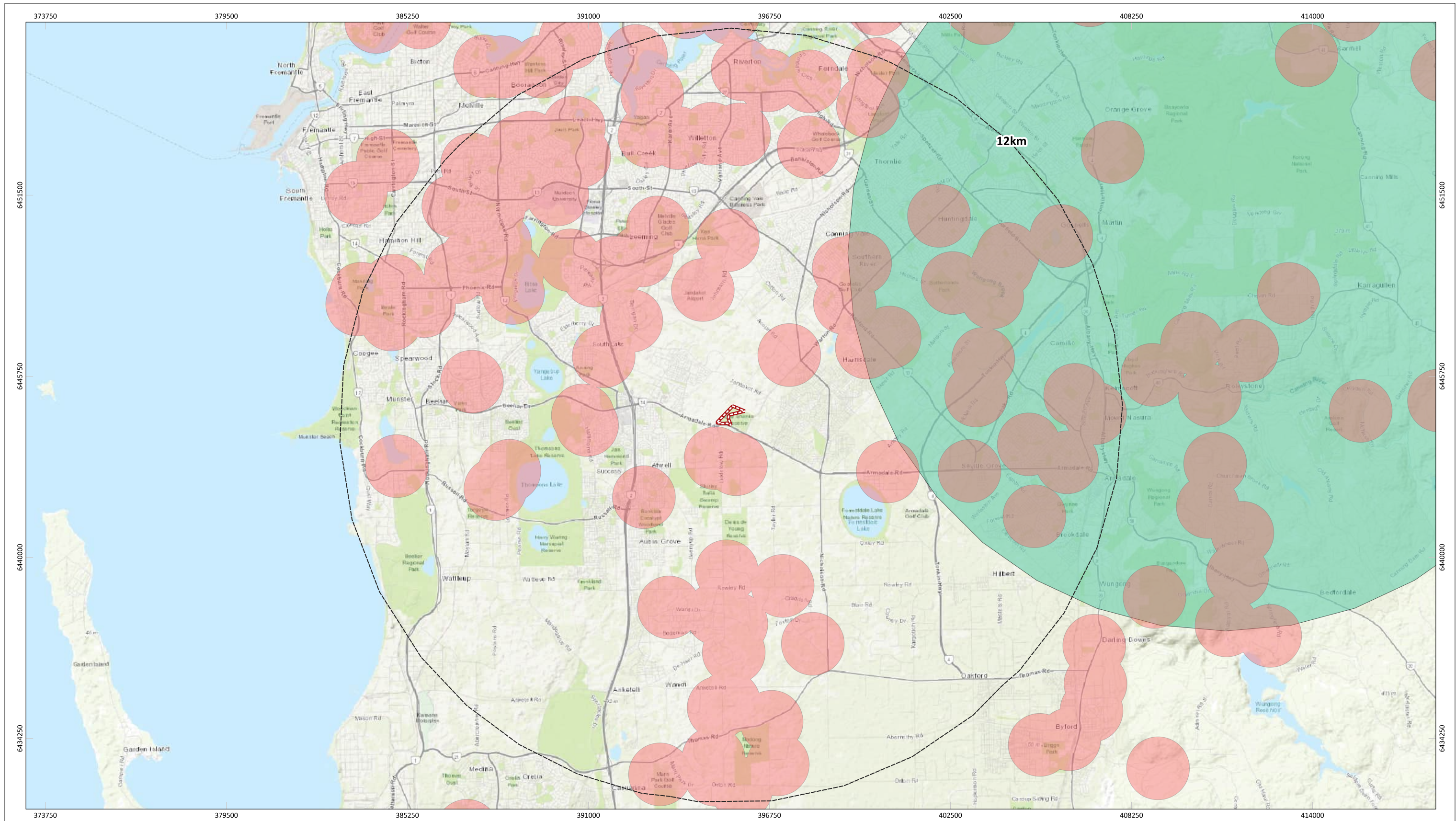

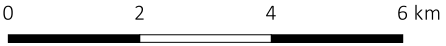






Figure 11: Known Black Cockatoo Roosting and Breeding Sites within 12 km Buffer

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SCALE 1:115,000	SHEET SIZE A3 COLOUR	CLIENT Aigle Royal Developments		Legend  Survey Area  Black Cockatoo Roosting Sites - Buffered (DBCA-064)  Carnabys Cockatoo Confirmed Breeding Areas within the Swan Coastal Plain and Jarrah Forest IBRA Regions (DBCA-054)																									
COORDINATE REFERENCE SYSTEM GDA2020 / MGA zone 50		PROJECT NUMBER A24.213	VERSION 0																										
DATA SOURCE Nearmap Imagery (7th December, 2024)		DRAWN BY / REVIEWED BY JP/TC	DATE 5/2/2025																										
NOTES: Cadastral boundary from LANDGATE 2022. Label corresponds to the vegetation association number.		 WESTERN ENVIRONMENTAL Western Environmental Pty Ltd 08 6244 2310 enquiries@western.com.au Level 3/25 Prowse St, West Perth WA 6005 western.com.au																											

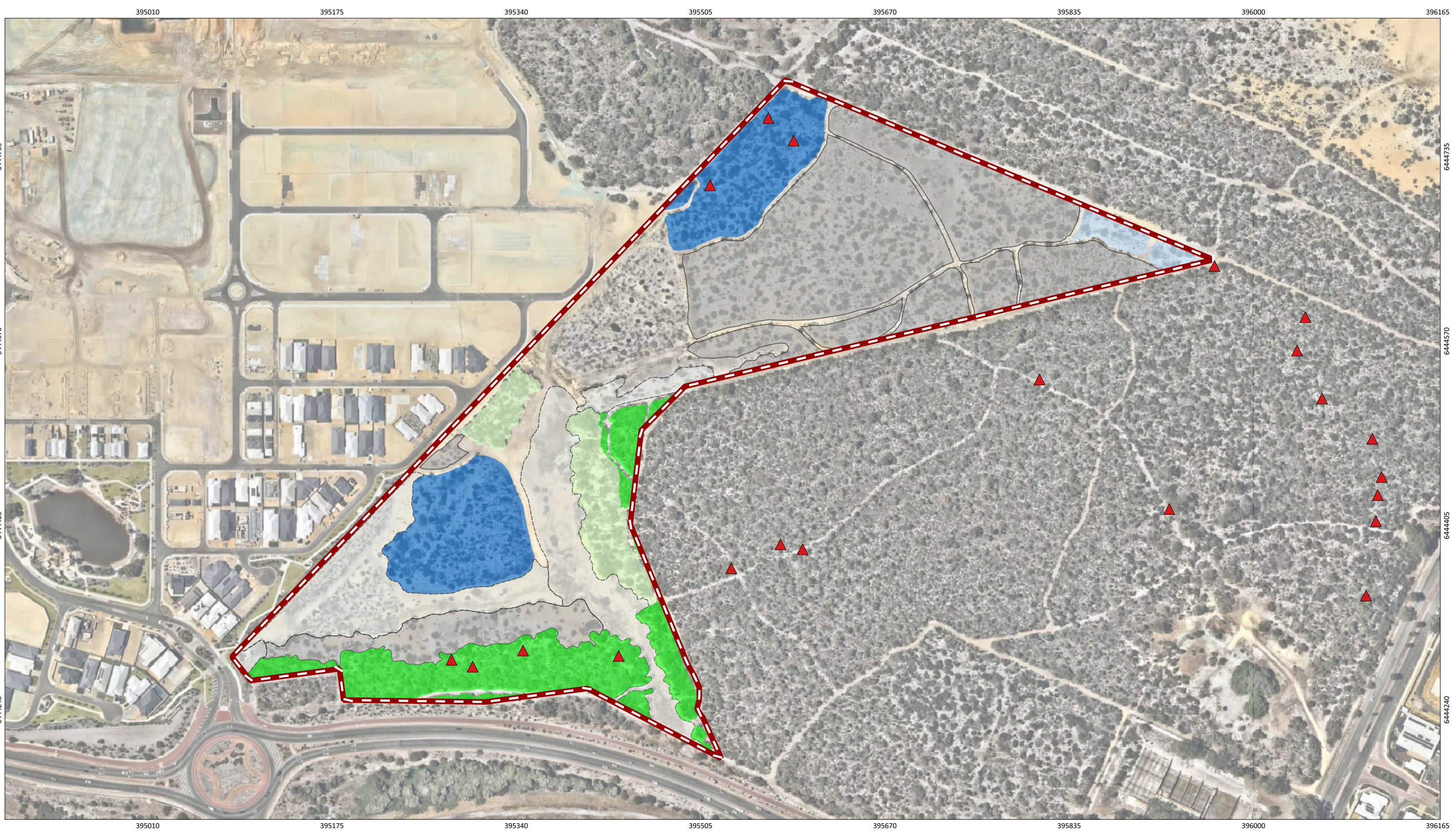


Figure 12: Carnaby's Black Cockatoo Foraging Habitat Quality and Foraging Evidence

		PROJECT/REPORT NAME Biological Surveys Rose Shanks Reserve		Legend Survey Area Fauna Species and Observation Type ▲ Carnaby's Black Cockatoo foraging evidence	Foraging Habitat Score (DCCEEW, n.d.) 0 - None 1 - Negligible 2 - Low 3 - Low to Moderate 4 - Moderate 5 - Moderate to High 6 to 7 - High	<table border="1" style="font-size: 8px;"> <thead> <tr> <th>No</th> <th>Description</th> <th>Drawn</th> <th>Approved</th> <th>Date</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>Original issue</td> <td>JP</td> <td>TC</td> <td>5/2/2025</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	No	Description	Drawn	Approved	Date	A	Original issue	JP	TC	5/2/2025															
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SCALE 1:3,300	SHEET SIZE A3 COLOUR	CLIENT Aigle Royal Developments	PROJECT NUMBER A24.213	VERSION 0	NOTES: Cadastral boundary from LANDGATE 2022. Label corresponds to the vegetation association number.	WESTERN ENVIRONMENTAL <small>Western Environmental Pty Ltd 08 6244 2310 enquiries@western.com.au Level 3/25 Prowse St, West Perth WA 6005 western.com.au</small>																									
COORDINATE REFERENCE SYSTEM GDA2020 / MGA zone 50		DRAWN BY / REVIEWED BY JP/TC	DATE 5/2/2025	DATA SOURCE Nearmap Imagery (7th December, 2024)																											

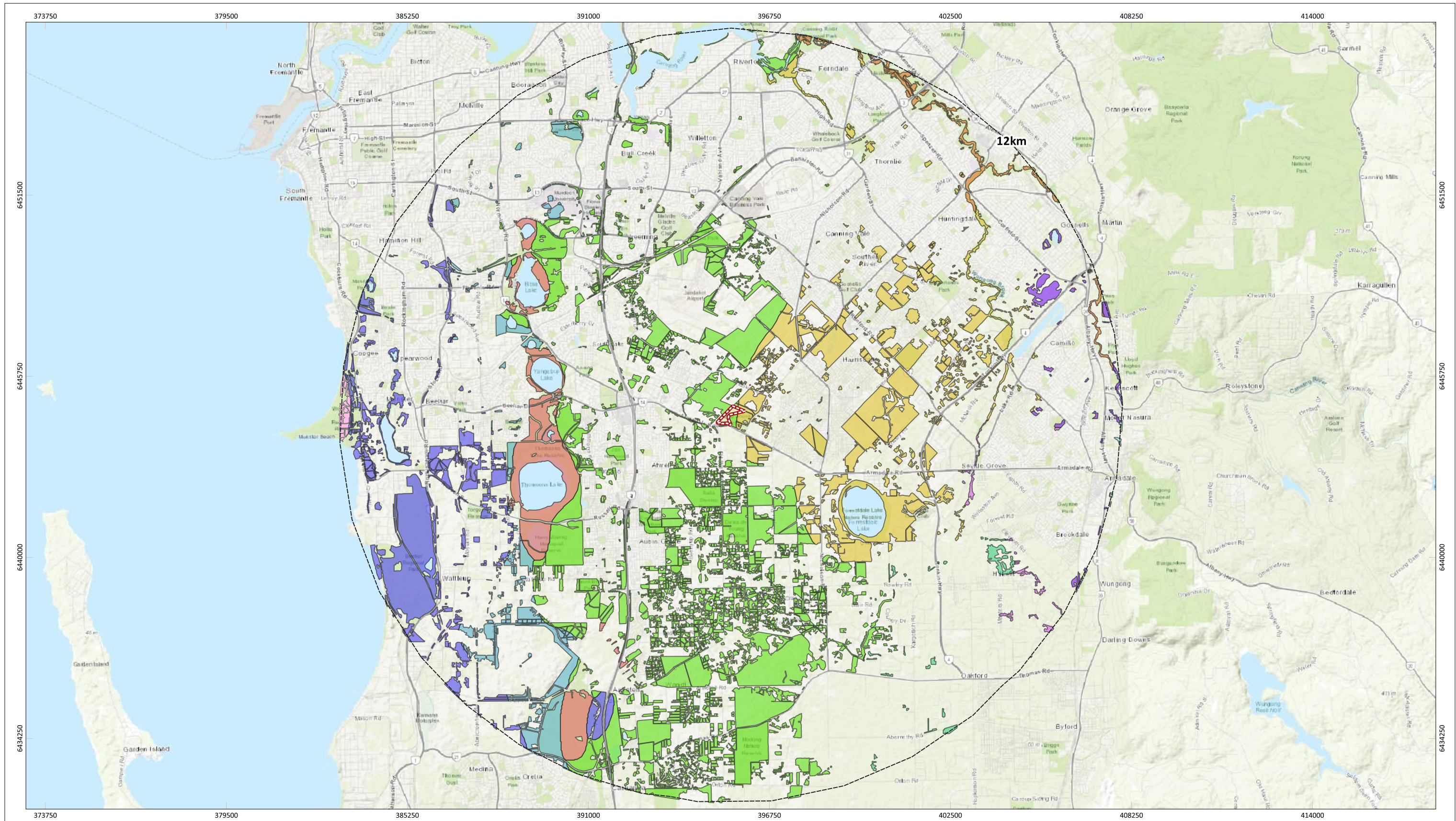


Figure 13: Black Cockatoo Foraging Habitat Extent 12 km Buffer

		PROJECT/REPORT NAME Biological Surveys Rose Shanks Reserve		Legend Survey Area Native Vegetation (DPIRD-005) Interset with Vegetation Complexes (DBCA-046 and DBCA 047) Bassendean Complex-Central and South Beermullah Complex Cottesloe Complex-Central and South Darling Scarp, DS2 Forrestfield Complex Guildford Complex Herdsman Complex Karrakatta Complex-Central and South Quindalup Complex Southern River Complex Swan Complex	<table border="1"> <thead> <tr> <th>No</th> <th>Description</th> <th>Drawn</th> <th>Approved</th> <th>Date</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>Original issue</td> <td>JP</td> <td>TC</td> <td>5/2/2025</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	No	Description	Drawn	Approved	Date	A	Original issue	JP	TC	5/2/2025															
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A	Original issue	JP	TC	5/2/2025																										
SCALE 1:115,000	SHEET SIZE A3 COLOUR	CLIENT Aigle Royal Developments		 Western Environmental Pty Ltd 08 6244 2310 enquiries@western.com.au Level 3/25 Prowse St, West Perth WA 6005 western.com.au																										
COORDINATE REFERENCE SYSTEM GDA2020 / MGA zone 50		PROJECT NUMBER A24.213	VERSION 0																											
DATA SOURCE Nearmap Imagery (7th December, 2024)		DRAWN BY / REVIEWED BY JP/TC	DATE 5/2/2025																											

5. Discussion

5.1 Flora of Conservation Significance

Although a targeted search was not completed, the following species was recorded.

- *Poranthera moorokatta* (P2) - Fifty-nine plants were recorded in RVQ01. Comprising a single population.

5.2 Vegetation Significance

A total of eight vegetation types were identified within the Survey Area and Context Area.

Survey Area

Majority of vegetation in the Survey Area is in Degraded condition

Vegetation type VT-05 (Revegetation zone) is identified as most concordant with the Low-lying *Banksia attenuata* woodlands or shrublands ('floristic community type 21c') community listed as Priority 3. There is 12.239 ha of this vegetation type present within the Survey Area.

Because of the history of disturbance (sand mining) and consequent changes in species composition in the Survey Area quadrat grouping in the dendrograms was generally not reliable in correctly assigning the most likely FCT.

Vegetation within VT01 and VT02 were assessed as being consistent vegetation structure and composition of the community and that patches of the *Banksia* Woodland TEC were present. This community is also a State listed Priority 3 PEC which shares the same name and description, area/condition thresholds and determination criteria. One patch of *Banksia* Woodland TEC was identified as present within the Survey Area. The Survey Area contains 1.84 ha of *Banksia* Woodland TEC.

The patch extents are likely larger than currently mapped with *Banksia* dominate vegetation extending past the Context area into adjacent landholdings.

Context Area

Majority of the Context Area is in Excellent condition.

Vegetation within VT01, VT02, VT03 and VT04 were assessed as being consistent vegetation structure and composition of the community and that patches of the *Banksia* Woodland TEC were present. This community is also a State listed Priority 3 PEC which shares the same name and description, area/condition thresholds and determination criteria. One patch of *Banksia* Woodland TEC was identified as present within the Context Area. Within the Context Area there is 23.08 ha of *Banksia* TEC present.

The Survey Area and Context Area combined, contain at least 24.86 ha of *Banksia* Woodland TEC present.

5.3 Carnaby's Black Cockatoos

The Survey Area contains species which comprise suitable foraging habitat for black cockatoo. The banksia woodlands are characterised by foraging species for Carnaby's black cockatoo species including jarrah, *Banksia attenuata*, *Banksia marginata*. The remainder of the Survey Area comprised cleared areas, scattered/planted eucalypts in degraded areas which have low to no foraging habitat value.

Foraging habitat quality was rated using the Commonwealth Habitat Quality Scoring Tool (DCCEEW, n.d.). Foraging habitat quality extents within the Survey Area out of ten are:

- Carnaby's Black Cockatoo: 1.793 ha (10/10), 0.045 ha (9/10), 0.833 ha (8/10), 2.21 ha (7/10), 0.228 ha (6/10), 11.05 (Low 2 to None 0).

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Appendix A

Legislation

Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act aims to protect matters of national environmental significance (MNES). Under the EPBC Act, the Commonwealth Department of Climate Change, Energy and the Environment lists Threatened species and communities in categories determined by criteria set out in the EPBC Act.

Projects likely to cause a significant impact on MNES should be referred to the DCCEEW for assessment under the EPBC Act.

Biodiversity Conservation Act 2016

The Biodiversity Conservation Act 2016 aims to conserve and protect biodiversity and biodiversity components within the State and to promote ecologically sustainable use of biodiversity components in the State.

Environmental Protection Act 1986

Declared Rare Flora (DRF) and Threatened Ecological Communities (TECs) are given special consideration in environmental impact assessments and have special status as Environmentally Sensitive Areas (ESAs) under the EP Act and the Environmental Protection (Clearing of Native Vegetation) Regulations 2004. Exemptions for a clearing permit do not apply in an ESA. In addition, habitat necessary for the maintenance of indigenous fauna is considered in the clearing principles and assessed during consideration of applications for a clearing permit.

Biosecurity and Agricultural Management Act 2007

Plants may be 'Declared' by the Minister for Agriculture and Food under the BAM Act. The Western Australian Organism List contains information on the area(s) in which a plant is declared and the control and keeping categories to which it has been assigned in Western Australia. A declaration may apply to the whole State, to districts, individual properties or even to single paddocks. If a plant is 'Declared', landholders are obliged to control that plant on their properties.

Weeds of National Significance

The Australian Government along with the State and Territory governments has endorsed 32 WoNS. Four major criteria were used in determining WoNS:

- The invasiveness of a weed species.
- A weed's impacts.
- The potential for spread of a weed.
- Socio-economic and environmental values.

Each WoNS has a national strategy and a national coordinator, responsible for implementing the strategy. WoNS are regarded as the worst weeds in Australia because of their invasiveness, potential for spread, and economic and environmental impacts.

Department of Biodiversity, Conservation and Attractions Priority Lists

DBCA lists 'Priority' flora and fauna that have not been assigned statutory protection as "Threatened" under the BC Act and are under consideration for declaration as Threatened. Flora and fauna assessed as Priority 1-3 are considered to be in urgent need of further survey. Priority 4 flora requires monitoring every 5 -10 years.

DBCA maintains a list of Priority Ecological Communities (PECs) which identifies plant communities that require further investigation before possible nomination for TEC status. Once listed, a community becomes a PEC and, when endorsed by the WA Minister for Environment, becomes a TEC and protected as an ESA under Environmental Protection (Clearing of Native Vegetation) Regulations 2004.

Informal Recognition of Flora and Fauna

Certain populations or communities of flora and/or fauna may be of local significance or interest because of their patterns of distribution and abundance. For example, specific locations of flora and may be locally significant because they are range extensions to the previously known distribution, or are newly discovered taxa (and have the potential to be of more than local significance). In addition, many species are in decline as a result of threatening processes (land clearing, grazing, and changed fire regimes) and relict populations of such species assume local importance for DBCA. It is not uncommon for DBCA to make comment on these species of interest.

Appendix B

Definitions and Criteria

EPBC Act Categories for Flora, Fauna and Ecological Communities

Category	Threatened Species	Threatened Ecological Communities
Extinct	A native species is eligible to be included in the extinct category at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.	N/A.
Extinct in the wild	<p>A native species is eligible to be included in the extinct in the wild category at a particular time if, at that time:</p> <p>(a) it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or</p> <p>(b) it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.</p>	N/A.
Critically Endangered (CE)	A native species is eligible to be included in the critically endangered category at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.	An ecological community is eligible to be included in the critically endangered category at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
Endangered (EN)	<p>A native species is eligible to be included in the endangered category at a particular time if, at that time:</p> <p>(a) it is not critically endangered; and</p> <p>(b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.</p>	<p>An ecological community is eligible to be included in the endangered category at a particular time if, at that time:</p> <p>(a) it is not critically endangered; and</p> <p>(b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.</p>
Vulnerable (VU)	<p>A native species is eligible to be included in the vulnerable category at a particular time if, at that time:</p> <p>(a) it is not critically endangered or endangered; and</p> <p>(b) it is facing a high risk of extinction in the wild in the medium term future, as determined in accordance with the prescribed criteria.</p>	<p>An ecological community is eligible to be included in the vulnerable category at a particular time if, at that time:</p> <p>(a) it is not critically endangered or endangered; and (b) it is facing a high risk of extinction in the wild in the medium term future, as determined in accordance with the prescribed criteria.</p>
Conservation Dependent	<p>A native species is eligible to be included in the conservation dependent category at a particular time if, at that time:</p> <p>(a) the species is the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered; or</p> <p>(b) the following subparagraphs are satisfied:</p> <p>(i) the species is a species of fish.</p> <p>(ii) the species is the focus of a plan of management that provides for</p>	N/A.

Category	Threatened Species	Threatened Ecological Communities
	<p>management actions necessary to stop the decline of, and support the recovery of, the species so that its chances of long-term survival in nature are maximised.</p> <p>(iii) the plan of management is in force under a law of the Commonwealth or of a State or Territory.</p> <p>(iv) cessation of the plan of management would adversely affect the conservation status of the species.</p>	

Conservation Codes for Western Australian Flora and Fauna (DBCA)

Conservation Codes for Western Australian Flora and Fauna	
	<p>Threatened, Extinct and Specially Protected fauna or flora¹ are species² which have been adequately searched for and are deemed to be, in the wild, Threatened, extinct or in need of special protection, and have been gazetted as such.</p> <p>The Wildlife Conservation (Specially Protected Fauna) Notice 2018 and the Wildlife Conservation (Rare Flora) Notice 2018 have been transitioned under regulations 170, 171 and 172 of the Biodiversity Conservation Regulations 2018 to be the lists of Threatened, Extinct and Specially Protected species under Part 2 of the Biodiversity Conservation Act 2016.</p> <p>Categories of Threatened, Extinct and Specially Protected fauna and flora are:</p>
	<p>Threatened species</p> <p>Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as Threatened species under section 26(2) of the Biodiversity Conservation Act 2016 (BC Act).</p> <p>Threatened fauna is that subset of 'Specially Protected Fauna' listed under schedules 1 to 3 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for Threatened Fauna.</p> <p>Threatened flora is that subset of 'Rare Flora' listed under schedules 1 to 3 of the Wildlife Conservation (Rare Flora) Notice 2018 for Threatened Flora.</p> <p>The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using International Union for Conservation of Nature (IUCN) Red List categories and criteria as detailed below.</p>
T	
CR	<p>Critically endangered species</p> <p>Threatened species considered to be "facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines".</p> <p>Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for critically endangered fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for critically endangered flora.</p>
EN	<p>Endangered species</p> <p>Threatened species considered to be "facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines".</p> <p>Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines. Published under schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for endangered fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for endangered flora.</p>
VU	<p>Vulnerable species</p>

Conservation Codes for Western Australian Flora and Fauna

Threatened species considered to be “facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines”.

Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for vulnerable fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for vulnerable flora.

Extinct species

Listed by order of the Minister as extinct under section 23(1) of the BC Act as extinct or extinct in the wild.

EX Extinct species
Species where “there is no reasonable doubt that the last member of the species has died”, and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act).
Published as presumed extinct under schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for extinct fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for extinct flora.

EW Extinct in the wild species
Species that “is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form”, and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act).
Currently there are no Threatened fauna or Threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.

Specially protected species

Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection.

Species that are listed as Threatened species (critically endangered, endangered or vulnerable) or extinct species under the BC Act cannot also be listed as Specially Protected species.

MI Migratory species
Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act).
Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.
Published as migratory birds protected under an international agreement under schedule 5 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.

CD Species of special conservation interest (conservation dependent fauna)
Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as Threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act).
Published as conservation dependent fauna under schedule 6 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.

Conservation Codes for Western Australian Flora and Fauna

OS	<p>Other specially protected species</p> <p>Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act).</p> <p>Published as other specially protected fauna under schedule 7 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.</p>
P	<p>Priority species</p> <p>Possibly Threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of Priority for survey and evaluation of conservation status so that consideration can be given to their declaration as Threatened fauna or flora.</p> <p>Species that are adequately known, are rare but not Threatened, or meet criteria for near Threatened, or that have been recently removed from the Threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.</p> <p>Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.</p>
1	<p>Priority 1: Poorly-known species</p> <p>Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.</p>
2	<p>Priority 2: Poorly-known species</p> <p>Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.</p>
3	<p>Priority 3: Poorly-known species</p> <p>Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.</p>
4	<p>Priority 4: Rare, Near Threatened and other species in need of monitoring</p> <p>(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently Threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands.</p> <p>(b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent.</p> <p>(c) Species that have been removed from the list of Threatened species during the past five years for reasons other than taxonomy.</p>

1 The definition of flora includes algae, fungi and lichens.

DBCA Definitions and Criteria for TECs and PECs

Criteria	Definition
Threatened Ecological Communities	
Presumed Totally Destroyed (PD)	<p>An ecological community that has been adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure in the foreseeable future.</p> <p>An ecological community will be listed as presumed totally destroyed if there are no recent records of the community being extant and either of the following applies (A or B):</p> <p>A. Records within the last 50 years have not been confirmed despite thorough searches of known or likely habitats or</p> <p>B. All occurrences recorded within the last 50 years have since been destroyed.</p>
Critically Endangered (CR)	<p>An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated.</p> <p>An ecological community will be listed as Critically Endangered when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future. This will be determined on the basis of the best available information, by it meeting any one or more of the following criteria (A, B or C):</p> <p>A. The estimated geographic range, and/or total area occupied, and/or number of discrete occurrences since European settlement have been reduced by at least 90% and either or both of the following apply (i or ii):</p> <ul style="list-style-type: none"> i. geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is imminent (within approximately 10 years). ii. modification throughout its range is continuing such that in the immediate future (within approximately 10 years) the community is unlikely to be capable of being substantially rehabilitated. <p>B. Current distribution is limited, and one or more of the following apply (i, ii or iii):</p> <ul style="list-style-type: none"> i. geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the immediate future (within approximately 10 years). ii. there are very few occurrences, each of which is small and/or isolated and extremely vulnerable to known threatening processes. iii. there may be many occurrences but total area is very small and each occurrence is small and/or isolated and extremely vulnerable to known threatening processes. <p>C. The ecological community exists only as highly modified occurrences that may be capable of being rehabilitated if such work begins in the immediate future (within approximately 10 years).</p>
Endangered (EN)	<p>An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future.</p>

Criteria	Definition
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An ecological community will be listed as Endangered when it has been adequately surveyed and is not Critically Endangered but is facing a very high risk of total destruction in the near future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria (A, B, or C):

A. The geographic range, and/or total area occupied, and/or number of discrete occurrences have been reduced by at least 70% since European settlement and either or both of the following apply (i or ii):

i. the estimated geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is likely in the short term future (within approximately 20 years).

ii. modification throughout its range is continuing such that in the short term future (within approximately 20 years) the community is unlikely to be capable of being substantially restored or rehabilitated.

B. Current distribution is limited, and one or more of the following apply (i, ii or iii):

i. geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the short term future (within approximately 20 years).

ii. there are few occurrences, each of which is small and/or isolated and all or most occurrences are very vulnerable to known threatening processes.

iii. there may be many occurrences but total area is small and all or most occurrences are small and/or isolated and very vulnerable to known threatening processes.

The ecological community exists only as very modified occurrences that may be capable of being substantially restored or rehabilitated if such work begins in the short-term future (within approximately 20 years).

Vulnerable (VU)	<p>An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range.</p> <p>An ecological community will be listed as Vulnerable when it has been adequately surveyed and is not Critically Endangered or Endangered but is facing a high risk of total destruction or significant modification in the medium to long-term future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria (A, B or C):</p> <p>A. The ecological community exists largely as modified occurrences that are likely to be capable of being substantially restored or rehabilitated.</p> <p>B. The ecological community may already be modified and would be vulnerable to threatening processes, is restricted in area and/or range and/or is only found at a few locations.</p> <p>C. The ecological community may be still widespread but is believed likely to move into a category of higher threat in the medium to long term future because of existing or impending threatening processes.</p>
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Priority Ecological Communities

Priority One	<p>Poorly known ecological communities</p> <p>Ecological communities with apparently few, small occurrences, all or most not actively managed for conservation (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) and for which current threats exist. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of</p>
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Criteria	Definition
	survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.
Priority Two	<p>Poorly known ecological communities</p> <p>Communities that are known from few small occurrences, all or most of which are actively managed for conservation (e.g. within national parks, conservation parks, nature reserves, state forest, unallocated Crown land, water reserves, etc.) and not under imminent threat of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities, but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.</p>
Priority Three	<p>Poorly known ecological communities</p> <ul style="list-style-type: none"> i. Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or. ii. Communities known from a few widespread occurrences, which are either large or within significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat, or. iii. Communities made up of large, and/or widespread occurrences, that may or may not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, and inappropriate fire regimes. <p>Communities may be included if they are comparatively well known from several localities, but do not meet adequacy of survey requirements and / or are not well defined, and known threatening processes exist that could affect them.</p>
Priority Four	<p>Ecological communities that are adequately known, rare but not Threatened or meet criteria for Near Threatened, or that have been recently removed from the Threatened list. These communities require regular monitoring.</p> <ul style="list-style-type: none"> i. Rare. Ecological communities known from few occurrences that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently Threatened or in need of special protection, but could be if present circumstances change These communities are usually represented on conservation lands. ii. Near Threatened. Ecological communities that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable. iii. Ecological communities that have been removed from the list of Threatened communities during the past five years.
Priority Five	<p>Conservation Dependent Ecological Communities</p> <p>Ecological Communities that are not Threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming Threatened within five years.</p>

Appendix C

Flora Inventory and Site x Species

Flora Inventory

Family	Species	Naturalised	Conservation Code
Aizoaceae	<i>Carpobrotus edulis</i>	*	
Anarthriaceae	<i>Lyginia imberbis</i>	0	
Anarthriaceae	<i>Lyginia barbata</i>	0	
Apiaceae	<i>Xanthosia huegelii</i>	0	
Apiaceae	<i>Homalosciadium homalocarpum</i>	0	
Araceae	<i>Zantedeschia aethiopica</i>	*	
Araliaceae	<i>Trachymene pilosa</i>	0	
Asparagaceae	<i>Thysanotus patersonii</i>	0	
Asparagaceae	<i>Laxmannia ramosa</i>	0	
Asparagaceae	<i>Lomandra caespitosa</i>	0	
Asparagaceae	<i>Lomandra hermaphrodita</i>	0	
Asparagaceae	<i>Laxmannia squarrosa</i>	0	
Asparagaceae	<i>Lomandra suaveolens</i>	0	
Asparagaceae	<i>Thysanotus multiflorus</i>	0	
Asparagaceae	<i>Agave sisalana</i>	*	
Asparagaceae	<i>Thysanotus sp. Coastal plain (N.H. Brittan 66/63)</i>	0	
Asphodelaceae	<i>Trachyandra divaricata</i>	*	
Asphodelaceae	<i>Asphodelus fistulosus</i>	*	
Asteraceae	<i>Ursinia anthemoides</i>	*	
Asteraceae	<i>Hypochaeris glabra</i>	*	
Asteraceae	<i>Sonchus oleraceus</i>	*	
Asteraceae	<i>Podotheca angustifolia</i>	0	
Asteraceae	<i>Hyalosperma cotula</i>	0	
Asteraceae	<i>Siloxerus humifusus</i>	0	
Asteraceae	<i>Millotia tenuifolia var. tenuifolia</i>	0	
Asteraceae	<i>Leontodon rhagadioloides</i>	*	
Asteraceae	<i>Quinetia urvillei</i>	0	
Asteraceae	<i>Urospermum picroides</i>	*	
Asteraceae	<i>Podotheca gnaphalioides</i>	0	
Asteraceae	<i>Rhodanthe citrina</i>	0	
Asteraceae	<i>Arctotheca calendula</i>	*	
Asteraceae	<i>Asteridea pulverulenta</i>	0	
Brassicaceae	<i>Brassica tournefortii</i>	*	

Family	Species	Naturalised	Conservation Code
Campanulaceae	<i>Wahlenbergia capensis</i>	*	
Campanulaceae	<i>Wahlenbergia gracilentia</i>	0	
Campanulaceae	<i>Lobelia rhytidosperma</i>	0	
Caryophyllaceae	<i>Silene gallica</i>	*	
Casuarinaceae	<i>Allocasuarina humilis</i>	0	
Casuarinaceae	<i>Allocasuarina fraseriana</i>	0	
Celastraceae	<i>Tripterococcus brunonis</i>	0	
Centrolepidaceae	<i>Centrolepis drummondiana</i>	0	
Centrolepidaceae	<i>Centrolepis inconspicua</i>	0	
Centrolepidaceae	<i>Centrolepis polygyna</i>	0	
Colchicaceae	<i>Burchardia congesta</i>	0	
Crassulaceae	<i>Crassula colorata</i>	0	
Crassulaceae	<i>Crassula colorata var. colorata</i>	0	
Cyperaceae	<i>Mesomelaena pseudostygia</i>	0	
Cyperaceae	<i>Schoenus clandestinus</i>	0	
Cyperaceae	<i>Lepidosperma pubisquameum</i>	0	
Cyperaceae	<i>Ficinia marginata</i>	*	
Cyperaceae	<i>Lepidosperma leptostachyum</i>	0	
Cyperaceae	<i>Chaetospora curvifolia</i>	0	
Cyperaceae	<i>Lepidosperma leptophyllum</i>	0	
Cyperaceae	<i>Schoenus brevisetis</i>	0	
Dasypogonaceae	<i>Dasypogon bromeliifolius</i>	0	
Dilleniaceae	<i>Hibbertia hypericoides</i> subsp. <i>hypericoides</i>	0	
Dilleniaceae	<i>Hibbertia striata</i>	0	
Dilleniaceae	<i>Hibbertia subvaginata</i>	0	
Dilleniaceae	<i>Hibbertia sericosepala</i>	0	
Droseraceae	<i>Drosera pallida</i>	0	
Droseraceae	<i>Drosera menziesii</i>	0	
Droseraceae	<i>Drosera micrantha</i>	0	
Droseraceae	<i>Drosera erythrorhiza</i>	0	
Ericaceae	<i>Styphelia conostephioides</i>	0	
Ericaceae	<i>Conostephium pendulum</i>	0	
Ericaceae	<i>Styphelia xerophylla</i>	0	
Euphorbiaceae	<i>Euphorbia peplus</i>	*	

Family	Species	Naturalised	Conservation Code
Euphorbiaceae	<i>Ricinus communis</i>	*	
Fabaceae	<i>Bossiaea eriocarpa</i>	0	
Fabaceae	<i>Gompholobium tomentosum</i>	0	
Fabaceae	<i>Acacia pulchella</i> var. <i>glaberrima</i>	0	
Fabaceae	<i>Daviesia triflora</i>	0	
Fabaceae	<i>Jacksonia furcellata</i>	0	
Fabaceae	<i>Acacia stenoptera</i>	0	
Fabaceae	<i>Trifolium campestre</i>	*	
Fabaceae	<i>Gastrolobium linearifolium</i>	0	
Fabaceae	<i>Acacia huegelii</i>	0	
Fabaceae	<i>Chamaecytisus palmensis</i>	*	
Fabaceae	<i>Trifolium arvense</i>	*	
Fabaceae	<i>Acacia willdenowiana</i>	0	
Fabaceae	<i>Hardenbergia comptoniana</i>	0	
Fabaceae	<i>Acacia longifolia</i>	0	
Fabaceae	<i>Acacia rostellifera</i>	0	
Fabaceae	<i>Acacia signata</i>	0	
Fabaceae	<i>Acacia cyclops</i>	0	
Fabaceae	<i>Hovea trisperma</i>	0	
Fabaceae	<i>Hovea pungens</i>	0	
Fabaceae	<i>Acacia sessiliceps</i>	0	
Geraniaceae	<i>Pelargonium capitatum</i>	*	
Goodeniaceae	<i>Dampiera linearis</i>	0	
Goodeniaceae	<i>Lechenaultia floribunda</i>	0	
Haemodoraceae	<i>Conostylis aurea</i>	0	
Haemodoraceae	<i>Phlebocarya ciliata</i>	0	
Haemodoraceae	<i>Anigozanthos humilis</i> subsp. <i>humilis</i>	0	
Haemodoraceae	<i>Conostylis aculeata</i> subsp. <i>aculeata</i>	0	
Haemodoraceae	<i>Anigozanthos manglesii</i>	0	
Hemerocallidaceae	<i>Tricoryne elatior</i>	0	
Hemerocallidaceae	<i>Hensmania turbinata</i>	0	
Hemerocallidaceae	<i>Chamaescilla corymbosa</i>	0	
Hemerocallidaceae	<i>Arnocrinum preissii</i>	0	
Hemerocallidaceae	<i>Dianella revoluta</i> var. <i>divaricata</i>	0	
Hemerocallidaceae	<i>Corynotheca micrantha</i>	0	

Family	Species	Naturalised	Conservation Code
Iridaceae	<i>Gladiolus caryophyllaceus</i>	*	
Iridaceae	<i>Patersonia occidentalis</i> var. <i>occidentalis</i>	0	
Iridaceae	<i>Freesia alba x leichtlinii</i>	*	
Lamiaceae	<i>Hemiandra pungens</i>	0	
Lauraceae	<i>Cassytha flava</i>	0	
Loganiaceae	<i>Phyllangium divergens</i>	0	
Loranthaceae	<i>Nuytsia floribunda</i>	0	
Macarthuriaceae	<i>Macarthuria australis</i>	0	
Montiaceae	<i>Calandrinia granulifera</i>	0	
Montiaceae	<i>Calandrinia corrigioloides</i>	0	
Moraceae	<i>Ficus rubiginosa</i>	*	
Myrtaceae	<i>Eremaea pauciflora</i> var. <i>pauciflora</i>	0	
Myrtaceae	<i>Scholtzia involucrata</i>	0	
Myrtaceae	<i>Hypocalymma robustum</i>	0	
Myrtaceae	<i>Calytrix flavescens</i>	0	
Myrtaceae	<i>Eucalyptus marginata</i> subsp. <i>marginata</i>	0	
Myrtaceae	<i>Eucalyptus todtiana</i>	0	
Myrtaceae	<i>Melaleuca thymoides</i>	0	
Myrtaceae	<i>Calytrix angulata</i>	0	
Myrtaceae	<i>Melaleuca trichophylla</i>	0	
Myrtaceae	<i>Aptospermum spinescens</i>	0	
Myrtaceae	<i>Kunzea glabrescens</i>	0	
Myrtaceae	<i>Melaleuca seriata</i>	0	
Myrtaceae	<i>Calytrix fraseri</i>	0	
Myrtaceae	<i>Eucalyptus marginata</i>	0	
Myrtaceae	<i>Chamelaucium uncinatum</i>	M	
Myrtaceae	<i>Regelia inops</i>	0	
Myrtaceae	<i>Melaleuca leuropoma</i>	0	
Myrtaceae	<i>Beaufortia elegans</i>	0	
Myrtaceae	<i>Kunzea micrantha</i> subsp. <i>micrantha</i>	0	
Orchidaceae	<i>Microtis media</i> subsp. <i>media</i>	0	
Orchidaceae	<i>Leporella fimbriata</i>	0	
Orchidaceae	<i>Caladenia flava</i> subsp. <i>flava</i>	0	

Family	Species	Naturalised	Conservation Code
Orchidaceae	<i>Caladenia flava</i>	0	
Phyllanthaceae	<i>Poranthera moorokatta</i>	0	2
Phyllanthaceae	<i>Poranthera microphylla</i>	0	
Pinaceae	<i>Pinus pinaster</i>	*	
Poaceae	<i>Austrostipa compressa</i>	0	
Poaceae	<i>Briza maxima</i>	*	
Poaceae	<i>Amphipogon turbinatus</i>	0	
Poaceae	<i>Neurachne alopecuroidea</i>	0	
Poaceae	<i>Ehrharta calycina</i>	*	
Poaceae	<i>Aira cupaniana</i>	*	
Poaceae	<i>Vulpia muralis</i>	*	
Poaceae	<i>Ehrharta longiflora</i>	*	
Poaceae	<i>Brachypodium distachyon</i>	*	
Poaceae	<i>Vulpia bromoides</i>	*	
Poaceae	<i>Aira caryophyllea</i>	*	
Poaceae	<i>Rytidosperma setaceum</i>	0	
Poaceae	<i>Rytidosperma occidentale</i>	0	
Poaceae	<i>Bromus diandrus</i>	*	
Poaceae	<i>Cynodon dactylon</i>	*	
Poaceae	<i>Avena barbata</i>	*	
Primulaceae	<i>Lysimachia arvensis</i>	*	
Proteaceae	<i>Banksia attenuata</i>	0	
Proteaceae	<i>Banksia menziesii</i>	0	
Proteaceae	<i>Adenanthos cygnorum</i> subsp. <i>cygnorum</i>	0	
Proteaceae	<i>Stirlingia latifolia</i>	0	
Proteaceae	<i>Petrophile linearis</i>	0	
Proteaceae	<i>Persoonia saccata</i>	0	
Proteaceae	<i>Banksia ilicifolia</i>	0	
Proteaceae	<i>Xylomelum occidentale</i>	0	
Proteaceae	<i>Conospermum acerosum</i>	0	
Proteaceae	<i>Synaphea spinulosa</i> subsp. <i>spinulosa</i>	0	
Proteaceae	<i>Adenanthos cygnorum</i> subsp. <i>chamaephyton</i>	0	3
Restionaceae	<i>Desmocladius flexuosus</i>	0	

Family	Species	Naturalised	Conservation Code
Restionaceae	<i>Hypolaena exsulca</i>	0	
Restionaceae	<i>Hypolaena robusta</i>	0	4
Rubiaceae	<i>Opercularia vaginata</i>	0	
Rutaceae	<i>Cyanothamnus ramosus</i> subsp. <i>anethifolius</i>	0	
Rutaceae	<i>Philothea spicata</i>	0	
Stylidiaceae	<i>Levenhookia stipitata</i>	0	
Stylidiaceae	<i>Stylidium repens</i>	0	
Stylidiaceae	<i>Stylidium piliferum</i>	0	
Stylidiaceae	<i>Stylidium brunonianum</i>	0	
Xanthorrhoeaceae	<i>Xanthorrhoea preissii</i>	0	
Zamiaceae	<i>Macrozamia riedlei</i>	0	

Site by Species Matrix for Survey Area

Family	Full Taxon	Naturalised	Conservation code	RVQ01	RVQ02	RVQ03	RVQ04	OPPS
Fabaceae	<i>Acacia cyclops</i>	0						*
Fabaceae	<i>Acacia huegelii</i>	0					*	
Fabaceae	<i>Acacia pulchella</i> var. <i>glaberrima</i>	0		*	*	*	*	
Fabaceae	<i>Acacia rostellifera</i>	0						*
Fabaceae	<i>Acacia sessiliceps</i>	0						*
Fabaceae	<i>Acacia signata</i>	0						*
Fabaceae	<i>Acacia stenoptera</i>	0			*		*	
Proteaceae	<i>Adenanthos cygnorum</i> subsp. <i>cygnorum</i>	0		*	*	*	*	
Poaceae	<i>Aira cupaniana</i>	*			*			
Casuarinaceae	<i>Allocasuarina fraseriana</i>	0						*
Casuarinaceae	<i>Allocasuarina humilis</i>	0				*		
Poaceae	<i>Amphipogon turbinatus</i>	0				*		
Haemodoraceae	<i>Anigozanthos humilis</i> subsp. <i>humilis</i>	0		*		*		
Haemodoraceae	<i>Anigozanthos manglesii</i>	0					*	
Asteraceae	<i>Arctotheca calendula</i>	*			*			
Hemerocallidaceae	<i>Arnocrinum preissii</i>	0			*			

Family	Full Taxon	Naturalised	Conservation code	RVQ01	RVQ02	RVQ03	RVQ04	OPPS
Asphodelaceae	<i>Asphodelus fistulosus</i>	*						*
Asteraceae	<i>Asteridea pulverulenta</i>	0					*	
Poaceae	<i>Austrostipa compressa</i>	0		*	*	*	*	
Poaceae	<i>Avena barbata</i>	*			*			
Proteaceae	<i>Banksia attenuata</i>	0				*	*	*
Proteaceae	<i>Banksia menziesii</i>	0		*				*
Myrtaceae	<i>Beaufortia elegans</i>	0				*		
Fabaceae	<i>Bossiaea eriocarpa</i>	0			*	*	*	*
Brassicaceae	<i>Brassica tournefortii</i>	*			*			
Poaceae	<i>Briza maxima</i>	*		*	*		*	
Montiaceae	<i>Calandrinia corrigioloides</i>	0					*	
Aizoaceae	<i>Carpobrotus edulis</i>	*			*		*	
Centrolepidaceae	<i>Centrolepis drummondiana</i>	0		*		*	*	
Centrolepidaceae	<i>Centrolepis polygyna</i>	0					*	
Cyperaceae	<i>Chaetospora curvifolia</i>	0				*		
Proteaceae	<i>Conospermum acerosum</i>	0			*			
Haemodoraceae	<i>Conostylis aculeata</i> subsp. <i>aculeata</i>	0				*		*
Haemodoraceae	<i>Conostylis aurea</i>	0				*		

Family	Full Taxon	Naturalised	Conservation code	RVQ01	RVQ02	RVQ03	RVQ04	OPPS
Asteraceae	<i>Conyza sp.</i>			*				
Hemerocallidaceae	<i>Corynotheca micrantha</i>	0		*				
Crassulaceae	<i>Crassula colorata var. colorata</i>	0		*	*	*	*	
Poaceae	<i>Cynodon dactylon</i>	*						*
Fabaceae	<i>Daviesia triflora</i>	0				*		*
Restionaceae	<i>Desmocladius flexuosus</i>	0				*		
Droseraceae	<i>Drosera erythrorhiza</i>	0				*		
Droseraceae	<i>Drosera micrantha</i>	0						*
Poaceae	<i>Ehrharta calycina</i>	*		*	*	*	*	
Myrtaceae	<i>Eremaea pauciflora var. pauciflora</i>	0				*		
Myrtaceae	<i>Eucalyptus todtiana</i>	0				*		*
Cyperaceae	<i>Ficinia marginata</i>	*		*	*	*	*	
Fabaceae	<i>Gastrolobium linearifolium</i>	0				*		
Iridaceae	<i>Gladiolus caryophyllaceus</i>	*		*	*	*	*	
Fabaceae	<i>Gompholobium tomentosum</i>	0		*	*	*	*	
Lamiaceae	<i>Hemiandra pungens</i>	0		*	*		*	
Dilleniaceae	<i>Hibbertia hypericoides subsp. hypericoides</i>	0				*		

Family	Full Taxon	Naturalised	Conservation code	RVQ01	RVQ02	RVQ03	RVQ04	OPPS
Dilleniaceae	<i>Hibbertia sericosepala</i>	0				*		
Dilleniaceae	<i>Hibbertia subvaginata</i>	0		*	*	*	*	
Fabaceae	<i>Hovea pungens</i>	0					*	
Fabaceae	<i>Hovea trisperma</i>	0				*		
Myrtaceae	<i>Hypocalymma robustum</i>	0				*		
Asteraceae	<i>Hypochaeris glabra</i>	*		*	*	*	*	
Fabaceae	<i>Jacksonia furcellata</i>	0			*	*	*	*
Myrtaceae	<i>Kunzea glabrescens</i>	0		*			*	*
Myrtaceae	<i>Kunzea micrantha</i> subsp. <i>micrantha</i>	0						*
Asparagaceae	<i>Laxmannia ramosa</i>	0					*	
Asparagaceae	<i>Laxmannia squarrosa</i>	0		*		*	*	
Goodeniaceae	<i>Lechenaultia floribunda</i>	0					*	*
Asteraceae	<i>Leontodon rhagadioloides</i>	*				*		
Cyperaceae	<i>Lepidosperma leptophyllum</i>	0				*		
Cyperaceae	<i>Lepidosperma pubisquameum</i>	0					*	
Stylidiaceae	<i>Levenhookia stipitata</i>	0		*		*	*	
Asparagaceae	<i>Lomandra suaveolens</i>	0				*		
Anarthriaceae	<i>Lyginia barbata</i>	0		*		*		

Family	Full Taxon	Naturalised	Conservation code	RVQ01	RVQ02	RVQ03	RVQ04	OPPS
Anarthriaceae	<i>Lyginia imberbis</i>	0				*		
Macarthuriaceae	<i>Macarthuria australis</i>	0			*		*	
Myrtaceae	<i>Melaleuca leuropoma</i>	0						*
Myrtaceae	<i>Melaleuca trichophylla</i>	0				*		
Cyperaceae	<i>Mesomelaena pseudostygia</i>	0						*
Onagraceae	<i>Oenotera sp.</i>				*			
Geraniaceae	<i>Pelargonium capitatum</i>	*			*	*	*	
Proteaceae	<i>Petrophile linearis</i>	0				*		
Loganiaceae	<i>Phyllangium divergens</i>	0		*		*	*	
Asteraceae	<i>Podotheca angustifolia</i>	0			*			
Asteraceae	<i>Podotheca gnaphalioides</i>	0			*		*	
Phyllanthaceae	<i>Poranthera moorokatta</i>	0	2	*				
Myrtaceae	<i>Regelia inops</i>	0		*				
Euphorbiaceae	<i>Ricinus communis</i>	*						*
Poaceae	<i>Rytidosperma setaceum</i>	0				*		
Cyperaceae	<i>Schoenus brevisetis</i>	0					*	
Myrtaceae	<i>Scholtzia involucrata</i>	0		*		*		
Asteraceae	<i>Senecio sp.</i>			*				

Family	Full Taxon	Naturalised	Conservation code	RVQ01	RVQ02	RVQ03	RVQ04	OPPS
Caryophyllaceae	<i>Silene gallica</i>	*				*		
Asteraceae	<i>Siloxerus humifusus</i>	0		*		*	*	
Asteraceae	<i>Sonchus oleraceus</i>	*			*	*		
Proteaceae	<i>Stirlingia latifolia</i>	0		*		*		
Stylidiaceae	<i>Stylidium brunonianum</i>	0				*		
Stylidiaceae	<i>Stylidium piliferum</i>	0				*		
Stylidiaceae	<i>Stylidium repens</i>	0		*		*		
Ericaceae	<i>Styphelia conostephioides</i>	0		*		*		
Ericaceae	<i>Styphelia xerophylla</i>	0		*		*		
Proteaceae	<i>Synaphea spinulosa subsp. spinulosa</i>	0				*		*
Asparagaceae	<i>Thysanotus sp. Coastal plain (N.H. Brittan 66/63)</i>	0						*
Araliaceae	<i>Trachymene pilosa</i>	0		*	*	*	*	
Asteraceae	<i>Ursinia anthemoides</i>	*		*	*	*	*	
Poaceae	<i>Vulpia bromoides</i>	*				*		
Poaceae	<i>Vulpia muralis</i>	*			*	*		
Campanulaceae	<i>Wahlenbergia capensis</i>	*		*	*	*	*	
Apiaceae	<i>Xanthosia huegelii</i>	0						*

Appendix D

Floristic Quadrat and Releve Data Sheets

Quadrat or Releve Number: Q01
Date: 5/11/2024
Project Number: A24.213
Collector: BL/TC
Photo Number:
Slope Gentle

Aspect NW

Position Crest

Soil Texture Sand

Soil Colour Pale grey

Rock Type null

Rock Cover null

Bare Ground 1-5%

Litter 25-50%

Surface Water null

Vegetation Condition Excellent

Weed Cover 4

Disturbance Weeds

Fire Age Years >10

NVIS

Species	Naturalised	Conservation code	Height	% Cover
<i>Banksia attenuata</i>	0		6	20
<i>Banksia menziesii</i>	0		6	5
<i>Nuytsia floribunda</i>	0		6	2
<i>Eremaea pauciflora</i> var. <i>pauciflora</i>	0		1.1	20
<i>Allocasuarina humilis</i>	0		1.2	2
<i>Lyginia imberbis</i>	0		0.5-1	7
<i>Mesomelaena pseudostygia</i>	0		0.5-1	2
<i>Hibbertia hypericoides</i> subsp. <i>hypericoides</i>	0		0.5-1	4
<i>Scholtzia involucrata</i>	0		<0.5	<1
<i>Bossiaea eriocarpa</i>	0		<0.5	<1
<i>Lyginia barbata</i>	0		<0.5	<1
<i>Ursinia anthemoides</i>	*		<0.5	<1
<i>Austrostipa compressa</i>	0		<0.5	<1
<i>Wahlenbergia capensis</i>	*		<0.5	<1
<i>Gladiolus caryophyllaceus</i>	*		<0.5	<1

Quadrat or Releve Number: Q01				
<i>Levenhookia stipitata</i>	0		<0.5	<1
<i>Gompholobium tomentosum</i>	0		<0.5	<1
<i>Trachymene pilosa</i>	0		<0.5	<1
<i>Briza maxima</i>	*		<0.5	<1
<i>Hypochaeris glabra</i>	*		<0.5	<1
<i>Amphipogon turbinatus</i>	0		<0.5	<1
<i>Schoenus clandestinus</i>	0		<0.5	1
<i>Hibbertia striata</i>	0		<0.5	<1
<i>Sonchus oleraceus</i>	*		<0.5	<1
<i>Lepidosperma pubisquameum</i>	0		<0.5	<1
<i>Burchardia congesta</i>	0		<0.5	<1
<i>Neurachne alopecuroidea</i>	0		<0.5	<1
<i>Ehrharta calycina</i>	*		<0.5	<1
<i>Desmocladius flexuosus</i>	0		<0.5	1
<i>Lysimachia arvensis</i>	*		<0.5	<1
<i>Pelargonium capitatum</i>	*		<0.5	<1
<i>Styphelia conostephioides</i>	0		<0.5	<1
<i>Thysanotus patersonii</i>	0		<0.5	<1
<i>Adenanthos cygnorum subsp. cygnorum</i>	0		0.5-1	<1
<i>Tricoryne elatior</i>	0		<0.5	<1
<i>Conostephium pendulum</i>	0		<0.5	<1
<i>Acacia pulchella var. glaberrima</i>	0		0.5-1	<1
<i>Stirlingia latifolia</i>	0		<0.5	<1
<i>Dasypogon bromeliifolius</i>	0		<0.5	<1
<i>Daviesia triflora</i>	0		<0.5	<1
<i>Aira cupaniana</i>	*		<0.5	<1
<i>Vulpia muralis</i>	*		<0.5	<1
<i>Centrolepis drummondiana</i>	0		<0.5	<1
<i>Crassula colorata</i>	0		<0.5	<1
<i>Phyllangium divergens</i>	0		<0.5	<1
<i>Podotrochea angustifolia</i>	0		<0.5	<1
<i>Stylidium repens</i>	0		<0.5	<1
<i>Drosera sp.</i>			<0.5	<1
<i>Hyalosperma cotula</i>	0		<0.5	<1
<i>Hypocalymma robustum</i>	0		<0.5	<1

Quadrat or Releve Number: Q01				
<i>Conostylis aurea</i>	0		<0.5	<1
<i>Petrophile linearis</i>	0		<0.5	<1
<i>Carpobrotus edulis</i>	*		<0.5	<1
<i>Laxmannia ramosa</i>	0		<0.5	<1
<i>Phlebocarya ciliata</i>	0		<0.5	<1
<i>Microtis media subsp. media</i>	0		<0.5	<1
<i>Wahlenbergia gracilentia</i>	0		<0.5	<1
<i>Cassytha flava</i>	0		<0.5	<1
<i>Siloxerus humifusus</i>	0		<0.5	<1
<i>Centrolepis drummondiana</i>	0		<0.5	<1
<i>Millotia tenuifolia var. tenuifolia</i>	0		<0.5	<1
<i>Lomandra caespitosa</i>	0		<0.5	<1
<i>Calytrix flavescens</i>	0		<0.5	<1
<i>Styphelia xerophylla</i>	0		<0.5	<1

Quadrat or Relevé Number: Q02

Date: 5/11/2024

Project Number: A24.213

Collector: BL/TC

Photo Number:

Slope Gentle

Aspect NE

Position Lower slope

Soil Texture Sand

Soil Colour Pale grey

Rock Type null

Rock Cover null

Bare Ground 5-10%

Litter 25-50%

Surface Water null

Vegetation Condition Excellent

Weed Cover 8

Disturbance Weeds

Fire Age Years >10



NVIS

Species	Naturalised	Conservation code	Height	% Cover
<i>Banksia menziesii</i>	0		6	15
<i>Banksia attenuata</i>	0		5	8
<i>Eremaea pauciflora</i> var. <i>pauciflora</i>	0		1.1	15
<i>Hibbertia hypericoides</i> subsp. <i>hypericoides</i>	0		1.1	3
<i>Styphelia conostephioides</i>	0		0.6	6
<i>Lyginia barbata</i>	0		0.5	7
<i>Phlebocarya ciliata</i>	0		0.5	2
<i>Eucalyptus todtiana</i>	0		7	2
<i>Melaleuca thymoides</i>	0		1	1
<i>Ursinia anthemoides</i>	*		0.4	2
<i>Hibbertia subvaginata</i>	0		<0.5	<1
<i>Trachymene pilosa</i>	0		<0.5	<1
<i>Gladiolus caryophyllaceus</i>	*		<0.5	<1

Quadrat or Releve Number: Q02				
<i>Patersonia occidentalis</i> var. <i>occidentalis</i>	0		<0.5	<1
<i>Bossiaea eriocarpa</i>	0		<0.5	<1
<i>Briza maxima</i>	*		<0.5	<1
<i>Ehrharta calycina</i>	*		<0.5	<1
<i>Hypochaeris glabra</i>	*		<0.5	<1
<i>Stylidium repens</i>	0		<0.5	<1
<i>Desmocladius flexuosus</i>	0		<0.5	<1
<i>Burchardia congesta</i>	0		<0.5	<1
<i>Conostephium pendulum</i>	0		<0.5	<1
<i>Amphipogon turbinatus</i>	0		<0.5	<1
<i>Gompholobium tomentosum</i>	0		<0.5	<1
<i>Drosera</i> sp.			<0.5	<1
<i>Austrostipa compressa</i>	0		<0.5	<1
<i>Ficinia marginata</i>	*		<0.5	<1
<i>Lyginia imberbis</i>	0		<0.5	<1
<i>Adenanthos cygnorum</i> subsp. <i>cygnorum</i>	0		<0.5	<1
<i>Lomandra hermaphrodita</i>	0		<0.5	<1
<i>Petrophile linearis</i>	0		<0.5	<1
<i>Leporella fimbriata</i>	0		<0.5	<1
<i>Scholtzia involucrata</i>	0		<0.5	1
<i>Hypolaena exsulca</i>	0		<0.5	<1
<i>Sonchus oleraceus</i>	*		<0.5	<1
<i>Lepidosperma pubisquameum</i>	0		<0.5	<1
<i>Vulpia muralis</i>	*		<0.5	<1
<i>Acacia pulchella</i> var. <i>glaberrima</i>	0		<0.5	<1
<i>Podotheca angustifolia</i>	0		<0.5	<1
<i>Quinetia urvillei</i>	0		<0.5	<1
<i>Anigozanthos humilis</i> subsp. <i>humilis</i>	0		<0.5	<1
<i>Hemiandra pungens</i>	0		<0.5	<1
<i>Stirlingia latifolia</i>	0		<0.5	<1
<i>Phyllangium divergens</i>	0		<0.5	<1
<i>Hyalosperma cotula</i>	0		<0.5	<1
<i>Freesia alba</i> x <i>leichtlinii</i>	*		<0.5	<1
<i>Dasypogon bromeliifolius</i>	0		<0.5	<1
<i>Hensmania turbinata</i>	0		<0.5	<1

Quadrat or Releve Number: Q02				
<i>Levenhookia stipitata</i>	0		<0.5	<1
<i>Drosera pallida</i>	0		<0.5	<1
<i>Caladenia flava subsp. flava</i>	0		<0.5	<1
<i>Jacksonia furcellata</i>	0		<0.5	<1
<i>Thysanotus patersonii</i>	0		<0.5	<1
<i>Calytrix angulata</i>	0		<0.5	<1
<i>Melaleuca trichophylla</i>	0		<0.5	<1
<i>Calytrix flavescens</i>	0		<0.5	<1
<i>Styphelia xerophylla</i>	0		<0.5	<1
<i>Cassytha flava</i>	0		<0.5	<1
<i>Siloxerus humifusus</i>	0		<0.5	<1
<i>Millotia tenuifolia var. tenuifolia</i>	0		<0.5	<1
<i>Laxmannia squarrosa</i>	0		<0.5	<1

Quadrat or Releve Number: Q03

Date: 5/11/2024

Project Number: A24.213

Collector: BL/TC

Photo Number:

Slope Gentle

Aspect SE

Position Crest

Soil Texture Sand

Soil Colour Pale grey

Rock Type null

Rock Cover null

Bare Ground 5-10%

Litter 25-50%

Surface Water null

 Vegetation
 Condition Very Good

Weed Cover 5

Disturbance Weeds

Fire Age Years >10


NVIS

Species	Naturalised	Conservation code	Height	% Cover
<i>Banksia attenuata</i>	0		6	20
<i>Eucalyptus todtiana</i>	0		6	5
<i>Eremaea pauciflora</i> var. <i>pauciflora</i>	0		1.1	25
<i>Hibbertia hypericoides</i> subsp. <i>hypericoides</i>	0		1.1	5
<i>Lyginia barbata</i>	0		0.5	4
<i>Scholtzia involucreta</i>	0		0.6	2
<i>Ursinia anthemoides</i>	*		0.4	2
<i>Stylidium piliferum</i>	0		<0.5	<1
<i>Stirlingia latifolia</i>	0		<0.5	<1
<i>Briza maxima</i>	*		<0.5	1
<i>Freesia alba</i> x <i>leichtlinii</i>	*		<0.5	1
<i>Trachymene pilosa</i>	0		<0.5	<1
<i>Adenanthos cygnorum</i> subsp. <i>cygnorum</i>	0		1	1
<i>Vulpia muralis</i>	*		<0.5	<1
<i>Ehrharta calycina</i>	*		<0.5	<1

Quadrat or Revele Number: Q03				
<i>Gladiolus caryophyllaceus</i>	*		<0.5	<1
<i>Lyginia imberbis</i>	0		<0.5	<1
<i>Amhipogon turbinatus</i>	0		<0.5	<1
<i>Austrostipa compressa</i>	0		<0.5	<1
<i>Bossiaea eriocarpa</i>	0		<0.5	<1
<i>Hypochaeris glabra</i>	*		<0.5	<1
<i>Aira cupaniana</i>	*		<0.5	<1
<i>Desmocladius flexuosus</i>	0		<0.5	<1
<i>Sonchus oleraceus</i>	*		<0.5	<1
<i>Lomandra hermaphrodita</i>	0		<0.5	<1
<i>Phlebocarya ciliata</i>	0		<0.5	<1
<i>Ehrharta longiflora</i>	*		<0.5	<1
<i>Chamaescilla corymbosa</i>	0		<0.5	<1
<i>Drosera pallida</i>	0		<0.5	<1
<i>Lysimachia arvensis</i>	*		<0.5	<1
<i>Brachypodium distachyon</i>	*		<0.5	<1
<i>Acacia pulchella var. glaberrima</i>	0		<0.5	<1
<i>Gompholobium tomentosum</i>	0		<0.5	<1
<i>Drosera sp.</i>			<0.5	<1
<i>Levenhookia stipitata</i>	0		<0.5	<1
<i>Burchardia congesta</i>	0		<0.5	<1
<i>Jacksonia furcellata</i>	0		<0.5	<1
<i>Stylidium repens</i>	0		<0.5	<1
<i>Petrophile linearis</i>	0		<0.5	<1
<i>Styphelia conostephioides</i>	0		<0.5	<1
<i>Thysanotus patersonii</i>	0		<0.5	<1
<i>Ficinia marginata</i>	*		<0.5	<1
<i>Conostephium pendulum</i>	0		<0.5	<1
<i>Wahlenbergia capensis</i>	*		<0.5	<1
<i>Hibbertia subvaginata</i>	0		<0.5	<1
<i>Urospermum picroides</i>	*		<0.5	<1
<i>Cyanothamnus ramosus subsp. anethifolius</i>	0		<0.5	<1
<i>Dasypogon bromeliifolius</i>	0		<0.5	<1
<i>Opercularia vaginata</i>	0		<0.5	<1
<i>Hibbertia striata</i>	0		<0.5	<1

Quadrat or Releve Number: Q03				
<i>Quinetia urvillei</i>	0		<0.5	<1
<i>Centrolepis drummondiana</i>	0		<0.5	<1
<i>Calandrinia granulifera</i>	0		<0.5	<1
<i>Phyllangium divergens</i>	0		<0.5	<1
<i>Hyalosperma cotula</i>	0		<0.5	<1
<i>Crassula colorata</i>	0		<0.5	<1
<i>Euphorbia peplus</i>	*		<0.5	<1
<i>Hypolaena exsulca</i>	0		<0.5	<1
<i>Calytrix flavescens</i>	0		<0.5	<1
<i>Lomandra suaveolens</i>	0		<0.5	<1
<i>Millotia tenuifolia var. tenuifolia</i>	0		<0.5	<1
<i>Lomandra caespitosa</i>	0		<0.5	<1
<i>Conostylis aculeata subsp. aculeata</i>	0		<0.5	<1
<i>Poranthera moorokatta</i>	0	2	<0.5	<1

Quadrat or Relevé Number: Q04

Date: 5/11/2024

Project Number: A24.213

Collector: BL/TC

Photo Number:

Slope Gentle

Aspect NE

Position Crest

Soil Texture Sand

Soil Colour Pale grey

Rock Type null

Rock Cover null

Bare Ground 10-25%

Litter 10-25%

Surface Water null

Vegetation Condition Excellent

Weed Cover 3

Disturbance Weeds

Fire Age Years >10


NVIS

Species	Naturalised	Conservation code	Height	% Cover
<i>Banksia menziesii</i>	0		5	5
<i>Banksia attenuata</i>	0		4	4
<i>Melaleuca seriata</i>	0		1.3	6
<i>Allocasuarina humilis</i>	0		1.7	3
<i>Eremaea pauciflora</i> var. <i>pauciflora</i>	0		1.1	2
<i>Hibbertia hypericoides</i> subsp. <i>hypericoides</i>	0		0.8	5
<i>Scholtzia involucrata</i>	0		0.5	3
<i>Lyginia barbata</i>	0		0.6	20
<i>Lyginia imberbis</i>	0		<0.5	1
<i>Stirlingia latifolia</i>	0		<0.5	2
<i>Austrostipa compressa</i>	0		<0.5	<1
<i>Hibbertia subvaginata</i>	0		<0.5	<1
<i>Ursinia anthemoides</i>	*		<0.5	1

Quadrat or Revele Number: Q04				
<i>Briza maxima</i>	*		<0.5	<1
<i>Conostephium pendulum</i>	0		<0.5	<1
<i>Calytrix fraseri</i>	0		<0.5	<1
<i>Amphipogon turbinatus</i>	0		<0.5	<1
<i>Gladiolus caryophyllaceus</i>	*		<0.5	<1
<i>Stylidium repens</i>	0		<0.5	<1
<i>Hyalosperma cotula</i>	0		<0.5	<1
<i>Crassula colorata</i>	0		<0.5	<1
<i>Phyllangium divergens</i>	0		<0.5	<1
<i>Ficinia marginata</i>	*		<0.5	<1
<i>Hypochaeris glabra</i>	*		<0.5	<1
<i>Acacia pulchella var. glaberrima</i>	0		<0.5	<1
<i>Gompholobium tomentosum</i>	0		<0.5	<1
<i>Hibbertia striata</i>	0		<0.5	<1
<i>Schoenus clandestinus</i>	0		<0.5	<1
<i>Styphelia conostephioides</i>	0		<0.5	<1
<i>Trachymene pilosa</i>	0		<0.5	<1
<i>Levenhookia stipitata</i>	0		<0.5	<1
<i>Petrophile linearis</i>	0		<0.5	<1
<i>Tricoryne elatior</i>	0		<0.5	<1
<i>Trifolium campestre</i>	*		<0.5	<1
<i>Phlebocarya ciliata</i>	0		<0.5	<1
<i>Drosera sp.</i>			<0.5	<1
<i>Vulpia muralis</i>	*		<0.5	<1
<i>Thysanotus patersonii</i>	0		<0.5	<1
<i>Lepidosperma pubisquameum</i>	0		<0.5	<1
<i>Aira cupaniana</i>	*		<0.5	<1
<i>Anigozanthos humilis subsp. humilis</i>	0		<0.5	<1
<i>Drosera menziesii</i>	0		<0.5	<1
<i>Rhodanthe citrina</i>	0		<0.5	<1
<i>Ehrharta calycina</i>	*		<0.5	<1
<i>Sonchus oleraceus</i>	*		<0.5	<1
<i>Bossiaea eriocarpa</i>	0		<0.5	<1
<i>Adenanthos cygnorum subsp. cygnorum</i>	0		<0.5	<1
<i>Philothea spicata</i>	0		<0.5	<1

Quadrat or Releve Number: Q04				
<i>Lepidosperma leptostachyum</i>	0		<0.5	<1
<i>Arnocrinum preissii</i>	0		<0.5	<1
<i>Podotheca angustifolia</i>	0		<0.5	<1
<i>Desmocladius flexuosus</i>	0		<0.5	<1
<i>Lomandra hermaphrodita</i>	0		<0.5	<1
<i>Carpobrotus edulis</i>	*		<0.5	<1
<i>Acacia stenoptera</i>	0		<0.5	<1
<i>Burchardia congesta</i>	0		<0.5	<1
<i>Daviesia triflora</i>	0		<0.5	<1
<i>Calandrinia granulifera</i>	0		<0.5	<1
<i>Styphelia xerophylla</i>	0		<0.5	<1
<i>Dasyogon bromeliifolius</i>	0		<0.5	<1
<i>Cassytha flava</i>	0		<0.5	<1
<i>Lobelia rhytidosperra</i>	0		<0.5	<1
<i>Wahlenbergia gracilenta</i>	0		<0.5	<1
<i>Siloxerus humifusus</i>	0		<0.5	<1
<i>Centrolepis drummondiana</i>	0		<0.5	<1
<i>Millotia tenuifolia var. tenuifolia</i>	0		<0.5	<1
<i>Conostylis aculeata subsp. aculeata</i>	0		<0.5	<1
<i>Calytrix flavescens</i>	0		<0.5	<1
<i>Lomandra suaveolens</i>	0		<0.5	<1
<i>Laxmannia squarrosa</i>	0		<0.5	<1
<i>Poranthera moorokatta</i>	0	2	<0.5	<1

Quadrat or Relevé Number: Q05

Date: 7/11/2024

Project Number: A24.213

Collector: BL/TC

Photo Number:

Slope Gentle

Aspect N

Position Mid slope

Soil Texture Sand

Soil Colour Pale grey

Rock Type null

Rock Cover null

Bare Ground 10-25%

Litter 10-25%

Surface Water null

Vegetation Condition Excellent

Weed Cover 2

Disturbance Weeds

Fire Age Years >10



NVIS

Species	Naturalised	Conservation code	Height	% Cover
<i>Banksia attenuata</i>	0		6	9
<i>Banksia menziesii</i>	0		5	5
<i>Allocasuarina humilis</i>	0		1.2	5
<i>Eremaea pauciflora</i> var. <i>pauciflora</i>	0		1.1	8
<i>Hibbertia hypericoides</i> subsp. <i>hypericoides</i>	0		0.7	8
<i>Scholtzia involuocrata</i>	0		0.5	5
<i>Lyginia barbata</i>	0		0.5	11
<i>Stirlingia latifolia</i>	0		<0.5	2
<i>Hibbertia subvaginata</i>	0		<0.5	<1
<i>Ursinia anthemoides</i>	*		<0.5	2
<i>Lyginia imberbis</i>	0		<0.5	1
<i>Hypochoeris glabra</i>	*		<0.5	<1
<i>Desmocladius flexuosus</i>	0		<0.5	<1

Quadrat or Revele Number: Q05				
<i>Bossiaea eriocarpa</i>	0		<0.5	<1
<i>Gompholobium tomentosum</i>	0		<0.5	<1
<i>Austrostipa compressa</i>	0		<0.5	<1
<i>Petrophile linearis</i>	0		<0.5	<1
<i>Melaleuca thymoides</i>	0		<0.5	1
<i>Briza maxima</i>	*		<0.5	<1
<i>Trachymene pilosa</i>	0		<0.5	<1
<i>Vulpia bromoides</i>	*		<0.5	<1
<i>Aira cupaniana</i>	*		<0.5	<1
<i>Crassula colorata</i>	0		<0.5	<1
<i>Quinetia urvillei</i>	0		<0.5	<1
<i>Stylidium repens</i>	0		<0.5	<1
<i>Centrolepis drummondiana</i>	0		<0.5	<1
<i>Ficinia marginata</i>	*		<0.5	<1
<i>Wahlenbergia capensis</i>	*		<0.5	<1
<i>Carpobrotus edulis</i>	*		<0.5	<1
<i>Lomandra hermaphrodita</i>	0		<0.5	<1
<i>Chamaescilla corymbosa</i>	0		<0.5	<1
<i>Hyalosperma cotula</i>	0		<0.5	<1
<i>Phlebocarya ciliata</i>	0		<0.5	<1
<i>Hypolaena exsulca</i>	0		<0.5	<1
<i>Dampiera linearis</i>	0		<0.5	<1
<i>Gladiolus caryophyllaceus</i>	*		<0.5	<1
<i>Ehrharta calycina</i>	*		<0.5	<1
<i>Burchardia congesta</i>	0		<0.5	<1
<i>Hibbertia striata</i>	0		<0.5	<1
<i>Thysanotus multiflorus</i>	0		<0.5	<1
<i>Acacia stenoptera</i>	0		<0.5	<1
<i>Drosera sp.</i>			<0.5	<1
<i>Sonchus oleraceus</i>	*		<0.5	<1
<i>Lepidosperma pubisquameum</i>	0		<0.5	<1
<i>Amphipogon turbinatus</i>	0		<0.5	<1
<i>Acacia pulchella var. glaberrima</i>	0		<0.5	<1
<i>Styphelia conostephioides</i>	0		<0.5	<1
<i>Phyllangium divergens</i>	0		<0.5	<1

Quadrat or Releve Number: Q05				
<i>Gastrolobium linearifolium</i>	0		<0.5	<1
<i>Persoonia saccata</i>	0		<0.5	<1
<i>Conostephium pendulum</i>	0		<0.5	<1
<i>Drosera pallida</i>	0		<0.5	<1
<i>Acacia huegelii</i>	0		<0.5	<1
<i>Wahlenbergia gracilentia</i>	0		<0.5	<1
<i>Cassytha flava</i>	0		<0.5	<1
<i>Millotia tenuifolia var. tenuifolia</i>	0		<0.5	<1
<i>Calytrix angulata</i>	0		<0.5	2
<i>Conostylis aculeata subsp. aculeata</i>	0		<0.5	<1
<i>Calytrix flavescens</i>	0		<0.5	<1
<i>Lomandra suaveolens</i>	0		<0.5	<1
<i>Poranthera moorokatta</i>	0	2	<0.5	<1

Quadrat or Releve Number: Q06

Date: 7/11/2024

Project Number: A24.213

Collector: BL/TC

Photo Number:

Slope Gentle

Aspect SW

Position Lower slope

Soil Texture Sand

Soil Colour Pale grey

Rock Type null

Rock Cover null

Bare Ground 5-10%

Litter 10-25%

Surface Water null

Vegetation
Condition Excellent

Weed Cover 2

Disturbance Weeds

Fire Age Years >10



NVIS

Species	Naturalised	Conservation code	Height	% Cover
<i>Banksia attenuata</i>	0		6	11
<i>Banksia menziesii</i>	0		6	4
<i>Adenanthos cygnorum subsp. cygnorum</i>	0		4	25
<i>Eremaea pauciflora var. pauciflora</i>	0		1.1	8
<i>Hibbertia hypericoides subsp. hypericoides</i>	0		1.1	3
<i>Scholtzia involucreta</i>	0		0.7	3
<i>Levenhookia stipitata</i>	0		<0.5	<1
<i>Ursinia anthemoides</i>	*		<0.5	1
<i>Centrolepis drummondiana</i>	0		<0.5	<1
<i>Austrostipa compressa</i>	0		<0.5	<1
<i>Gladiolus caryophyllaceus</i>	*		<0.5	<1
<i>Hibbertia subvaginata</i>	0		<0.5	<1
<i>Hyalosperma cotula</i>	0		<0.5	<1
<i>Phyllangium divergens</i>	0		<0.5	<1
<i>Wahlenbergia capensis</i>	*		<0.5	<1

Quadrat or Releve Number: Q06				
<i>Ficinia marginata</i>	*		<0.5	<1
<i>Stylidium repens</i>	0		<0.5	<1
<i>Gompholobium tomentosum</i>	0		<0.5	<1
<i>Trachymene pilosa</i>	0		<0.5	<1
<i>Stirlingia latifolia</i>	0		<0.5	<1
<i>Crassula colorata</i>	0		<0.5	<1
<i>Acacia pulchella</i> var. <i>glaberrima</i>	0		<0.5	<1
<i>Phlebocarya ciliata</i>	0		<0.5	<1
<i>Carpobrotus edulis</i>	*		<0.5	<1
<i>Anigozanthos humilis</i> subsp. <i>humilis</i>	0		<0.5	<1
<i>Desmodcladus flexuosus</i>	0		<0.5	1
<i>Styphelia conostephioides</i>	0		<0.5	<1
<i>Briza maxima</i>	*		<0.5	2
<i>Patersonia occidentalis</i> var. <i>occidentalis</i>	0		<0.5	<1
<i>Arctotheca calendula</i>	*		<0.5	<1
<i>Hypochaeris glabra</i>	*		<0.5	<1
<i>Lyginia imberbis</i>	0		<0.5	<1
<i>Gastrolobium linearifolium</i>	0		<0.5	<1
<i>Styphelia xerophylla</i>	0		<0.5	<1
<i>Hemiandra pungens</i>	0		<0.5	<1
<i>Conostephium pendulum</i>	0		<0.5	<1
<i>Caladenia</i> sp.			<0.5	<1
<i>Aira caryophyllea</i>	*		<0.5	<1
<i>Vulpia bromoides</i>	*		<0.5	<1
<i>Lyginia barbata</i>	0		<0.5	<1
<i>Burchardia congesta</i>	0		<0.5	<1
<i>Xanthosia huegelii</i>	0		<0.5	<1
<i>Drosera pallida</i>	0		<0.5	<1
<i>Hibbertia sericosepala</i>	0		<0.5	<1
<i>Rytidosperma setaceum</i>	0		<0.5	<1
<i>Wahlenbergia gracilentia</i>	0		<0.5	<1
<i>Millotia tenuifolia</i> var. <i>tenuifolia</i>	0		<0.5	<1
<i>Lomandra caespitosa</i>	0		<0.5	<1
<i>Calytrix flavescens</i>	0		<0.5	<1
<i>Laxmannia squarrosa</i>	0		<0.5	<1

Quadrat or Releve Number: Q06

Poranthera moorokatta

0

2

<0.5

<1

Quadrat or Releve Number: Q07

Date: 7/11/2024

Project Number: A24.213

Collector: BL/TC

Photo Number:

Slope Gentle

Aspect N

Position Crest

Soil Texture Sand

Soil Colour Pale grey

Rock Type null

Rock Cover null

Bare Ground 10-25%

Litter 25-50%

Surface Water null

Vegetation Condition Very Good

Weed Cover 3

Disturbance Weeds, shrub death (Adenanthos)

Fire Age Years >10



NVIS

Species	Naturalised	Conservation code	Height	% Cover
<i>Banksia attenuata</i>	0		6	11
<i>Banksia menziesii</i>	0		6	4
<i>Adenanthos cygnorum subsp. cygnorum</i>	0		4	25
<i>Eremaea pauciflora var. pauciflora</i>	0		1.1	8
<i>Hibbertia hypericoides subsp. hypericoides</i>	0		1.1	3
<i>Scholtzia involucrata</i>	0		0.7	3
<i>Levenhookia stipitata</i>	0		<0.5	<1
<i>Ursinia anthemoides</i>	*		<0.5	1
<i>Centrolepis drummondiana</i>	0		<0.5	<1
<i>Austrostipa compressa</i>	0		<0.5	<1
<i>Gladiolus caryophyllaceus</i>	*		<0.5	<1
<i>Hibbertia subvaginata</i>	0		<0.5	<1
<i>Hyalosperma cotula</i>	0		<0.5	<1
<i>Phyllangium divergens</i>	0		<0.5	<1

Quadrat or Releve Number: Q07				
<i>Wahlenbergia capensis</i>	*		<0.5	<1
<i>Ficinia marginata</i>	*		<0.5	<1
<i>Stylidium repens</i>	0		<0.5	<1
<i>Gompholobium tomentosum</i>	0		<0.5	<1
<i>Trachymene pilosa</i>	0		<0.5	<1
<i>Stirlingia latifolia</i>	0		<0.5	<1
<i>Crassula colorata</i>	0		<0.5	<1
<i>Acacia pulchella</i> var. <i>glaberrima</i>	0		<0.5	<1
<i>Phlebocarya ciliata</i>	0		<0.5	<1
<i>Carpobrotus edulis</i>	*		<0.5	<1
<i>Anigozanthos humilis</i> subsp. <i>humilis</i>	0		<0.5	<1
<i>Desmocladus flexuosus</i>	0		<0.5	1
<i>Styphelia conostephioides</i>	0		<0.5	<1
<i>Briza maxima</i>	*		<0.5	2
<i>Patersonia occidentalis</i> var. <i>occidentalis</i>	0		<0.5	<1
<i>Arctotheca calendula</i>	*		<0.5	<1
<i>Hypochaeris glabra</i>	*		<0.5	<1
<i>Lyginia imberbis</i>	0		<0.5	<1
<i>Gastrolobium linearifolium</i>	0		<0.5	<1
<i>Styphelia xerophylla</i>	0		<0.5	<1
<i>Hemiandra pungens</i>	0		<0.5	<1
<i>Conostephium pendulum</i>	0		<0.5	<1
<i>Caladenia</i> sp.			<0.5	<1
<i>Aira caryophyllea</i>	*		<0.5	<1
<i>Vulpia bromoides</i>	*		<0.5	<1
<i>Lyginia barbata</i>	0		<0.5	<1
<i>Burchardia congesta</i>	0		<0.5	<1
<i>Xanthosia huegelii</i>	0		<0.5	<1
<i>Drosera pallida</i>	0		<0.5	<1
<i>Hibbertia sericosepala</i>	0		<0.5	<1
<i>Rytidosperma setaceum</i>	0		<0.5	<1
<i>Wahlenbergia gracilentia</i>	0		<0.5	<1
<i>Millotia tenuifolia</i> var. <i>tenuifolia</i>	0		<0.5	<1
<i>Lomandra caespitosa</i>	0		<0.5	<1
<i>Calytrix flavescens</i>	0		<0.5	<1

Quadrat or Releve Number: Q07

<i>Laxmannia squarrosa</i>	0		<0.5	<1
<i>Poranthera moorokatta</i>	0	2	<0.5	<1

Quadrat or Releve Number: Q08

Date: 7/11/2024

Project Number: A24.213

Collector: BL/TC

Photo Number:

Slope Gentle

Aspect SW

Position Crest

Soil Texture Sand

Soil Colour Pale-Yelow

Rock Type null

Rock Cover null

Bare Ground 25-50%

Litter 25-50%

Surface Water null

Vegetation
Condition Excellent

Weed Cover 1

Disturbance Weeds

Fire Age Years >10



NVIS

Species	Naturalised	Conservation code	Height	% Cover
<i>Banksia menziesii</i>	0		5	5
<i>Banksia attenuata</i>	0		4	4
<i>Adenanthos cygnorum subsp. cygnorum</i>	0		3	20
<i>Eremaea pauciflora var. pauciflora</i>	0		1.5	15
<i>Hibbertia hypericoides subsp. hypericoides</i>	0		1.1	6
<i>Styphelia xerophylla</i>	0		<0.5	2
<i>Ursinia anthemoides</i>	*		<0.5	1
<i>Gladiolus caryophyllaceus</i>	*		<0.5	<1
<i>Austrostipa compressa</i>	0		<0.5	<1
<i>Scholtzia involucreta</i>	0		<0.5	4
<i>Briza maxima</i>	*		<0.5	<1
<i>Conostephium pendulum</i>	0		<0.5	<1
<i>Aira cupaniana</i>	*		<0.5	<1
<i>Hyalosperma cotula</i>	0		<0.5	<1
<i>Amphipogon turbinatus</i>	0		<0.5	<1

Quadrat or Releve Number: Q08				
<i>Acacia pulchella</i> var. <i>glaberrima</i>	0		<0.5	<1
<i>Trachymene pilosa</i>	0		<0.5	<1
<i>Vulpia bromoides</i>	*		<0.5	<1
<i>Ehrharta calycina</i>	*		<0.5	<1
<i>Schoenus clandestinus</i>	0		<0.5	<1
<i>Phyllangium divergens</i>	0		<0.5	<1
<i>Quinetia urvillei</i>	0		<0.5	<1
<i>Levenhookia stipitata</i>	0		<0.5	<1
<i>Crassula colorata</i> var. <i>colorata</i>	0		<0.5	<1
<i>Gompholobium tomentosum</i>	0		<0.5	<1
<i>Ficinia marginata</i>	*		<0.5	<1
<i>Stylidium repens</i>	0		<0.5	<1
<i>Stirlingia latifolia</i>	0		<0.5	<1
<i>Hypolaena robusta</i>	0	4	<0.5	<1
<i>Lyginia imberbis</i>	0		<0.5	<1
<i>Conostylis aurea</i>	0		<0.5	<1
<i>Hibbertia striata</i>	0		<0.5	<1
<i>Lepidosperma pubisquameum</i>	0		<0.5	<1
<i>Styphelia conostephioides</i>	0		<0.5	<1
<i>Allocasuarina humilis</i>	0		>2	1
<i>Burchardia congesta</i>	0		<0.5	<1
<i>Leontodon rhagadioloides</i>	*		<0.5	<1
<i>Lyginia barbata</i>	0		<0.5	<1
<i>Hemiandra pungens</i>	0		<0.5	<1
<i>Acacia stenoptera</i>	0		<0.5	<1
<i>Rytidosperma occidentale</i>	0		<0.5	<1
<i>Wahlenbergia gracilentia</i>	0		<0.5	<1
<i>Siloxerus humifusus</i>	0		<0.5	<1
<i>Centrolepis drummondiana</i>	0		<0.5	<1
<i>Millotia tenuifolia</i> var. <i>tenuifolia</i>	0		<0.5	<1
<i>Lomandra caespitosa</i>	0		<0.5	<1
<i>Calytrix angulata</i>	0		<0.5	1
<i>Calytrix flavescens</i>	0		<0.5	<1
<i>Lomandra suaveolens</i>	0		<0.5	<1
<i>Laxmannia squarrosa</i>	0		<0.5	<1

Quadrat or Releve Number: Q08

<i>Rytidosperma setaceum</i>	0		<0.5	<1
<i>Lobelia rhytidosperma</i>	0		<0.5	<1

Quadrat or Releve Number: Q09

Date: 7/11/2024

Project Number: A24.213

Collector: BL/TC

Photo Number:

Slope Steep

Aspect SW

Position Crest

Soil Texture Sand

Soil Colour Pale-Yellow

Rock Type null

Rock Cover null

Bare Ground 5-10%

Litter 25-50%

Surface Water null

Vegetation Condition Excellent

Weed Cover 2

Disturbance Weeds, shrub death and drought evidence.

Fire Age Years >10



NVIS

Species	Naturalised	Conservation code	Height	% Cover
<i>Banksia menziesii</i>	0		6	4
<i>Banksia attenuata</i>	0		5	8
<i>Adenanthos cygnorum subsp. cygnorum</i>	0		3	20
<i>Hibbertia hypericoides subsp. hypericoides</i>	0		0.8	25
<i>Allocasuarina humilis</i>	0		1.5	4
<i>Briza maxima</i>	*		0.2	2
<i>Macrozamia riedlei</i>	0		0.5-1	<1
<i>Drosera pallida</i>	0		<0.5	<1
<i>Austrostipa compressa</i>	0		<0.5	<1
<i>Ursinia anthemoides</i>	*		<0.5	<1
<i>Hypolaena robusta</i>	0	4	<0.5	<1
<i>Levenhookia stipitata</i>	0		<0.5	<1
<i>Gladiolus caryophyllaceus</i>	*		<0.5	<1

Quadrat or Releve Number: Q09				
<i>Phyllangium divergens</i>	0		<0.5	<1
<i>Podotheca angustifolia</i>	0		<0.5	<1
<i>Acacia pulchella</i> var. <i>glaberrima</i>	0		<0.5	<1
<i>Jacksonia furcellata</i>	0		<0.5	<1
<i>Melaleuca thymoides</i>	0		<0.5	<1
<i>Stylidium repens</i>	0		<0.5	<1
<i>Aira cupaniana</i>	*		<0.5	<1
<i>Pelargonium capitatum</i>	*		<0.5	<1
<i>Burchardia congesta</i>	0		<0.5	<1
<i>Wahlenbergia capensis</i>	*		<0.5	<1
<i>Ehrharta calycina</i>	*		<0.5	<1
<i>Trachymene pilosa</i>	0		<0.5	<1
<i>Caladenia flava</i>	0		<0.5	<1
<i>Lyginia barbata</i>	0		<0.5	<1
<i>Anigozanthos humilis</i> subsp. <i>humilis</i>	0		<0.5	<1
<i>Desmodcladus flexuosus</i>	0		<0.5	<1
<i>Amphipogon turbinatus</i>	0		<0.5	<1
<i>Hypochaeris glabra</i>	*		<0.5	<1
<i>Stirlingia latifolia</i>	0		<0.5	<1
<i>Sonchus oleraceus</i>	*		<0.5	<1
<i>Styphelia xerophylla</i>	0		<0.5	<1
<i>Laxmannia ramosa</i>	0		<0.5	<1
<i>Hyalosperma cotula</i>	0		<0.5	<1
<i>Ficinia marginata</i>	*		<0.5	<1
<i>Centrolepis drummondiana</i>	0		<0.5	<1
<i>Schoenus clandestinus</i>	0		<0.5	<1
<i>Carpobrotus edulis</i>	*		<0.5	<1
<i>Hibbertia subvaginata</i>	0		<0.5	<1
<i>Gastrolobium linearifolium</i>	0		<0.5	<1
<i>Scholtzia involucrata</i>	0		<0.5	<1
<i>Vulpia bromoides</i>	*		<0.5	<1
<i>Daviesia triflora</i>	0		<0.5	<1
<i>Arnocrinum preissii</i>	0		<0.5	<1
<i>Chamaescilla corymbosa</i>	0		<0.5	<1
<i>Xanthosia huegelii</i>	0		<0.5	<1

Quadrat or Releve Number: Q09

<i>Conyza sp.</i>			<0.5	<1
<i>Drosera sp.</i>			<0.5	<1
<i>Styphelia conostephioides</i>	0		<0.5	<1
<i>Wahlenbergia gracilentia</i>	0		<0.5	<1
<i>Siloxerus humifusus</i>	0		<0.5	<1
<i>Millotia tenuifolia var. tenuifolia</i>	0		<0.5	<1
<i>Lomandra caespitosa</i>	0		<0.5	<1
<i>Calytrix flavescens</i>	0		<0.5	<1
<i>Lomandra suaveolens</i>	0		<0.5	<1
<i>Laxmannia squarrosa</i>	0		<0.5	<1
<i>Poranthera moorokatta</i>	0	2	<0.5	<1

Quadrat or Revele Number: Q10

Date: 7/11/2024

Project Number: A24.213

Collector: BL/TC

Photo Number:

Slope Gentle

Aspect S

Position Mid slope

Soil Texture Sand

Soil Colour Grey

Rock Type null

Rock Cover null

Bare Ground 1-5%

Litter 25-50%

Surface Water null

Vegetation
Condition Excellent

Weed Cover 3

Disturbance Weeds

Fire Age Years >10



NVIS

Species	Naturalised	Conservation code	Height	% Cover
<i>Banksia menziesii</i>	0		5	20
<i>Banksia attenuata</i>	0		4	5
<i>Adenanthos cygnorum subsp. cygnorum</i>	0		>2	8
<i>Xanthorrhoea preissii</i>	0		1.3	5
<i>Hibbertia hypericoides subsp. hypericoides</i>	0		0.9	6
<i>Lyginia barbata</i>	0		0.4	3
<i>Persoonia saccata</i>	0		<0.5	<1
<i>Melaleuca thymoides</i>	0		<0.5	2
<i>Ursinia anthemoides</i>	*		<0.5	1
<i>Briza maxima</i>	*		<0.5	2
<i>Hypochaeris glabra</i>	*		<0.5	<1
<i>Desmocladius flexuosus</i>	0		<0.5	<1
<i>Trachymene pilosa</i>	0		<0.5	<1
<i>Sonchus oleraceus</i>	*		<0.5	<1
<i>Petrophile linearis</i>	0		<0.5	<1

Quadrat or Revele Number: Q10				
<i>Austrostipa compressa</i>	0		<0.5	<1
<i>Aira cupaniana</i>	*		<0.5	<1
<i>Chamaescilla corymbosa</i>	0		<0.5	<1
<i>Burchardia congesta</i>	0		<0.5	<1
<i>Gompholobium tomentosum</i>	0		<0.5	<1
<i>Styphelia conostephioides</i>	0		<0.5	<1
<i>Poranthera microphylla</i>	0		<0.5	<1
<i>Arctotheca calendula</i>	*		<0.5	<1
<i>Gladiolus caryophyllaceus</i>	*		<0.5	<1
<i>Daviesia triflora</i>	0		<0.5	1
<i>Ehrharta calycina</i>	*		<0.5	<1
<i>Hibbertia subvaginata</i>	0		<0.5	<1
<i>Leontodon rhagadioloides</i>	*		<0.5	<1
<i>Homalosciadium homalocarpum</i>	0		<0.5	<1
<i>Ehrharta longiflora</i>	*		<0.5	<1
<i>Trifolium campestre</i>	*		<0.5	<1
<i>Thylam sp.</i>			<0.5	<1
<i>Conostephium pendulum</i>	0		<0.5	<1
<i>Acacia pulchella var. glaberrima</i>	0		<0.5	<1
<i>Scholtzia involucrata</i>	0		<0.5	1
<i>Centrolepis drummondiana</i>	0		<0.5	<1
<i>Quinetia urvillei</i>	0		<0.5	<1
<i>Vulpia bromoides</i>	*		<0.5	<1
<i>Amphipogon turbinatus</i>	0		<0.5	<1
<i>Stylidium repens</i>	0		<0.5	<1
<i>Bossiaea eriocarpa</i>	0		<0.5	<1
<i>Hypolaena robusta</i>	0	4	<0.5	<1
<i>Philothea spicata</i>	0		<0.5	<1
<i>Lyginia imberbis</i>	0		<0.5	<1
<i>Wahlenbergia gracilentia</i>	0		<0.5	<1
<i>Millotia tenuifolia var. tenuifolia</i>	0		<0.5	<1
<i>Lomandra caespitosa</i>	0		<0.5	<1
<i>Conostylis aculeata subsp. aculeata</i>	0		<0.5	<1
<i>Calytrix flavescens</i>	0		<0.5	<1
<i>Lomandra suaveolens</i>	0		<0.5	<1

Quadrat or Releve Number: Q10

Quadrat or Releve Number: REL01

Date: 8/11/2024 Project Number: A24.213

Collector: BL/TC Photo Number:

Slope Gentle

Aspect S

Position Crest

Soil Texture Sand

Soil Colour Pale grey

Rock Type null

Rock Cover null

Bare Ground 5-10%

Litter 25-50%

Surface Water null

Vegetation
Condition Excellent

Weed Cover 2

Disturbance Weeds

Fire Age Years >10



NVIS

Species	Naturalised	Conservation code	Height	% Cover
<i>Banksia menziesii</i>	0		5	8
<i>Banksia attenuata</i>	0		4	4
<i>Eucalyptus marginata subsp. marginata</i>	0		5	2
<i>Allocasuarina humilis</i>	0		1.8	8
<i>Hibbertia hypericoides subsp. hypericoides</i>	0		1.2	6
<i>Eremaea pauciflora var. pauciflora</i>	0		1.1	4
<i>Daviesia triflora</i>	0		0.6	2
<i>Stirlingia latifolia</i>	0		0.7	2
<i>Lyginia barbata</i>	0		0.5	3
<i>Melaleuca thymoides</i>	0		<0.5	<1
<i>Scholtzia involucrata</i>	0		<0.5	<1
<i>Ursinia anthemoides</i>	*		<0.5	<1
<i>Hyalosperma cotula</i>	0		<0.5	<1

Quadrat or Releve Number: Q10				
<i>Austrostipa compressa</i>	0		<0.5	<1
<i>Acacia pulchella</i> var. <i>glaberrima</i>	0		<0.5	<1
<i>Styphelia xerophylla</i>	0		<0.5	<1
<i>Patersonia occidentalis</i> var. <i>occidentalis</i>	0		<0.5	<1
<i>Hibbertia striata</i>	0		<0.5	<1
<i>Bossiaea eriocarpa</i>	0		<0.5	<1
<i>Desmocladius flexuosus</i>	0		<0.5	<1
<i>Stylidium repens</i>	0		<0.5	<1
<i>Amphipogon turbinatus</i>	0		<0.5	<1
<i>Hibbertia subvaginata</i>	0		<0.5	<1
<i>Podotheca angustifolia</i>	0		<0.5	<1
<i>Briza maxima</i>	*		<0.5	<1
<i>Drosera micrantha</i>	0		<0.5	<1
<i>Conostylis aculeata</i> subsp. <i>aculeata</i>	0		<0.5	<1
<i>Poranthera moorokatta</i>	0	2	<0.5	<1

Quadrat or Releve Number: REL02

Date: 8/11/2024

Project Number: A24.213

Collector: BL/TC

Photo Number:

Slope Gentle

Aspect W

Position Lower slope

Soil Texture Sand

Soil Colour Pale grey

Rock Type null

Rock Cover null

Bare Ground 1-5%

Litter 25-50%

Surface Water null

Vegetation
Condition Excellent

Weed Cover 1

Disturbance Weeds

Fire Age Years >10



NVIS

Species	Naturalised	Conservation code	Height	% Cover
<i>Banksia menziesii</i>	0		5	10
<i>Banksia attenuata</i>	0		5	5
<i>Eremaea pauciflora</i> var. <i>pauciflora</i>	0		1.1	15
<i>Calytrix angulata</i>	0		1.3	2
<i>Hibbertia hypericoides</i> subsp. <i>hypericoides</i>	0		0.6	4
<i>Scholtzia involucreta</i>	0		0.5	4
<i>Lyginia barbata</i>	0		0.5	15
<i>Stirlingia latifolia</i>	0		<0.5	<1
<i>Allocasuarina humilis</i>	0		<0.5	<1
<i>Nuytsia floribunda</i>	0		<0.5	<1
<i>Acacia pulchella</i> var. <i>glaberrima</i>	0		<0.5	<1
<i>Lyginia imberbis</i>	0		<0.5	<1
<i>Daviesia triflora</i>	0		<0.5	<1
<i>Acacia stenoptera</i>	0		<0.5	<1
<i>Ursinia anthemoides</i>	*		<0.5	<1

Quadrat or Releve Number: REL02				
<i>Briza maxima</i>	*		<0.5	<1
<i>Austrostipa compressa</i>	0		<0.5	<1
<i>Stylidium repens</i>	0		<0.5	<1
<i>Ehrharta calycina</i>	*		<0.5	<1
<i>Lomandra hermaphrodita</i>	0		<0.5	<1
<i>Gompholobium tomentosum</i>	0		<0.5	<1
<i>Phlebocarya ciliata</i>	0		<0.5	<1
<i>Melaleuca thymoides</i>	0		<0.5	<1
<i>Conostylis aculeata subsp. aculeata</i>	0		<0.5	<1
<i>Calytrix flavescens</i>	0		<0.5	<1

Quadrat or Releve Number: REL03

Date: 8/11/2024

Project Number: A24.213

Collector: BL/TC

Photo Number:

Slope Steep

Aspect S

Position Crest

Soil Texture Sand

Soil Colour Pale-Yellow

Rock Type null

Rock Cover null

Bare Ground 10-25%

Litter 10-25%

Surface Water null

 Vegetation
 Condition Very Good

Weed Cover 6

Disturbance Weeds

Fire Age Years >10


NVIS

Species	Naturalised	Conservation code	Height	% Cover
<i>Banksia menziesii</i>	0		6	11
<i>Banksia attenuata</i>	0		5	8
<i>Eremaea pauciflora</i> var. <i>pauciflora</i>	0		1.2	20
<i>Allocasuarina humilis</i>	0		1.3	3
<i>Hibbertia hypericoides</i> subsp. <i>hypericoides</i>	0		1.2	4
<i>Lyginia barbata</i>	0		0.5	2
<i>Ursinia anthemoides</i>	*		0.3	4
<i>Scholtzia involucreta</i>	0		<0.5	<1
<i>Briza maxima</i>	*		<0.5	<1
<i>Gladiolus caryophyllaceus</i>	*		<0.5	<1
<i>Stirlingia latifolia</i>	0		<0.5	<1
<i>Dianella revoluta</i> var. <i>divaricata</i>	0		<0.5	<1
<i>Austrostipa compressa</i>	0		<0.5	<1
<i>Petrophile linearis</i>	0		<0.5	<1
<i>Macrozamia riedlei</i>	0		<0.5	<1

Quadrat or Releve Number: REL03				
<i>Amphipogon turbinatus</i>	0		<0.5	<1
<i>Daviesia triflora</i>	0		<0.5	<1
<i>Chamaescilla corymbosa</i>	0		<0.5	<1
<i>Ehrharta calycina</i>	*		<0.5	<1
<i>Anigozanthos humilis subsp. humilis</i>	0		<0.5	<1
<i>Aira cupaniana</i>	*		<0.5	<1
<i>Lomandra hermaphrodita</i>	0		<0.5	<1
<i>Conostephium pendulum</i>	0		<0.5	<1
<i>Desmocladius flexuosus</i>	0		<0.5	<1
<i>Freesia alba x leichtlinii</i>	*		<0.5	<1
<i>Siloxerus humifusus</i>	0		<0.5	<1
<i>Laxmannia squarrosa</i>	0		<0.5	<1

Quadrat or Releve Number: RV-Q01

Date: 8/11/2024

Project Number: A24.213

Collector: BL/TC

Photo Number:

Slope Flat

Aspect null

Position Plain

Soil Texture Sand

Soil Colour Pale-Yellow

Rock Type null

Rock Cover null

Bare Ground 25-50%

Litter 25-50%

Surface Water null

Vegetation Condition Degraded

Weed Cover 2

Disturbance Cleared, mined and topsoil added back, lost most of structure. weeds present



Fire Age Years >10

NVIS

Species	Naturalised	Conservation code	Height	% Cover
<i>Banksia menziesii</i>	0		<3	4
<i>Kunzea glabrescens</i>	0		>2	2
<i>Adenanthos cygnorum</i> subsp. <i>cygnorum</i>	0		>2	8
<i>Styphelia conostephioides</i>	0		0.8	2
<i>Ehrharta calycina</i>	*		1.3	1
<i>Ursinia anthemoides</i>	*		0.4	1
<i>Levenhookia stipitata</i>	0		<0.5	0.5
<i>Hibbertia subvaginata</i>	0		<0.5	<1
<i>Gladiolus caryophyllaceus</i>	*		<0.5	<1
<i>Styphelia xerophylla</i>	0		<0.5	0.5

Quadrat or Releve Number: RV-Q01				
Anigozanthos humilis subsp. humilis	0		<0.5	<1
Austrostipa compressa	0		<0.5	<1
Lyginia barbata	0		<0.5	<1
Wahlenbergia capensis	*		<0.5	<1
Crassula colorata var. colorata	0		<0.5	<1
Corynotheca micrantha	0		<0.5	<1
Phyllangium divergens	0		<0.5	<1
Stirlingia latifolia	0		<0.5	<1
Centrolepis drummondiana	0		<0.5	<1
Hemiandra pungens	0		<0.5	<1
Acacia pulchella var. glaberrima	0		<0.5	<1
Gompholobium tomentosum	0		<0.5	<1
Briza maxima	*		<0.5	<1
Hypochaeris glabra	*		<0.5	<1
Trachymene pilosa	0		<0.5	<1
Ficinia marginata	*		<0.5	<1
Senecio sp.	0		<0.5	<1
Stylidium repens	0		<0.5	<1
Conyza sp.	0		<0.5	<1
Scholtzia involucrata	0		<0.5	<1
Regelia inops	0		<0.5	<1
Laxmannia squarrosa	0		<0.5	<1
Poranthera moorokatta	0	2	<0.5	<1
Siloxerus humifusus	0		<0.5	<1

Quadrat or Releve Number: RV-Q02

Date: 8/11/2024

Project Number: A24.213

Collector: BL/TC

Photo Number:

Slope	Flat
Aspect	null
Position	Plain
Soil Texture	Sand
Soil Colour	Pale grey
Rock Type	null
Rock Cover	null
Bare Ground	50-75%
Litter	10-25%
Surface Water	null
Vegetation Condition	Completely Degraded
Weed Cover	25
Disturbance	Weeds, clearing, mining/excavation, rubbish.
Fire Age Years	>10



NVIS

Species	Naturalised	Conservation code	Height	% Cover
<i>Adenanthos cygnorum</i> subsp. <i>cygnorum</i>	0		>2	8
<i>Vulpia muralis</i>	*		0.3	15
<i>Ehrharta calycina</i>	*		1.2	2
<i>Podotheca gnaphalioides</i>	0		0.3	4
<i>Jacksonia furcellata</i>	0		0.1	<1
<i>Pelargonium capitatum</i>	*		0.1	<1
<i>Avena barbata</i>	*		0.1	<1
<i>Acacia pulchella</i> var. <i>glaberrima</i>	0		0.1	<1
<i>Ursinia anthemoides</i>	*		0.1	<1
<i>Wahlenbergia capensis</i>	*		0.1	<1
<i>Hypochaeris glabra</i>	*		0.1	<1
<i>Austrostipa compressa</i>	0		0.1	<1
<i>Gladiolus caryophyllaceus</i>	*		0.1	<1

Quadrat or Releve Number: RV-Q02				
<i>Carpobrotus edulis</i>	*		0.1	<1
<i>Acacia stenoptera</i>	0		0.1	<1
<i>Sonchus oleraceus</i>	*		0.1	<1
<i>Arnocrinum preissii</i>	0		0.1	<1
<i>Bossiaea eriocarpa</i>	0		0.1	<1
<i>Podotheca angustifolia</i>	0		0.1	<1
<i>Conospermum acerosum</i>	0		0.1	<1
<i>Hemiandra pungens</i>	0		0.1	<1
<i>Arctotheca calendula</i>	*		0.1	<1
<i>Macarthuria australis</i>	0		0.1	<1
<i>Gompholobium tomentosum</i>	0		0.1	<1
<i>Briza maxima</i>	*		0.1	<1
<i>Oenotera sp.</i>			0.1	<1
<i>Trachymene pilosa</i>	0		0.1	<1
<i>Ficinia marginata</i>	*		0.1	<1
<i>Hibbertia subvaginata</i>	0		0.1	<1
<i>Crassula colorata var. colorata</i>	0		0.1	<1
<i>Aira cupaniana</i>	*		0.1	<1
<i>Brassica tournefortii</i>	*		0.1	<1

Quadrat or Releve Number: RV-Q03

Date: 8/11/2024

Project Number: A24.213

Collector: BL/TC

Photo Number:

Slope Flat

Aspect null

Position Plain

Soil Texture Sand

Soil Colour Pale grey

Rock Type null

Rock Cover null

Bare Ground 50-75%

Litter 10-25%

Surface Water null

Vegetation
Condition Good

Weed Cover <1

Disturbance Weeds, clearing,
mine/excavation,
rubbish and
previous
disturbance

Fire Age Years >10



NVIS

Species	Naturalised	Conservation code	Height	% Cover
<i>Banksia attenuata</i>	0		<3	1
<i>Eucalyptus tottiana</i>	0		1.6	0.5
<i>Adenanthos cygnorum</i> subsp. <i>cygnorum</i>	0		>2	15
<i>Beaufortia elegans</i>	0		1.2	6
<i>Acacia pulchella</i> var. <i>glaberrima</i>	0		1	2
<i>Wahlenbergia capensis</i>	*		<0.5	<1
<i>Stirlingia latifolia</i>	0		<0.5	1
<i>Desmocladius flexuosus</i>	0		<0.5	<1
<i>Hibbertia subvaginata</i>	0		<0.5	<1
<i>Lyginia imberbis</i>	0		<0.5	<1
<i>Hibbertia hypericoides</i> subsp. <i>hypericoides</i>	0		<0.5	1
<i>Silene gallica</i>	*		<0.5	<1

Quadrat or Releve Number: RV-Q03				
<i>Ficinia marginata</i>	*		<0.5	<1
<i>Vulpia muralis</i>	*		<0.5	<1
<i>Petrophile linearis</i>	0		<0.5	<1
<i>Amphipogon turbinatus</i>	0		<0.5	<1
<i>Daviesia triflora</i>	0		<0.5	<1
<i>Gastrolobium linearifolium</i>	0		<0.5	<1
<i>Eremaea pauciflora</i> var. <i>pauciflora</i>	0		<0.5	<1
<i>Stylidium brunonianum</i>	0		<0.5	<1
<i>Styphelia xerophylla</i>	0		<0.5	<1
<i>Pelargonium capitatum</i>	*		<0.5	<1
<i>Chaetospora curvifolia</i>	0		<0.5	<1
<i>Vulpia bromoides</i>	*		<0.5	<1
<i>Scholtzia involucrata</i>	0		<0.5	<1
<i>Leontodon rhagadioloides</i>	*		<0.5	<1
<i>Lyginia barbata</i>	0		<0.5	<1
<i>Sonchus oleraceus</i>	*		<0.5	<1
<i>Hypochaeris glabra</i>	*		<0.5	<1
<i>Conostylis aurea</i>	0		<0.5	<1
<i>Hovea trisperma</i>	0		<0.5	<1
<i>Allocasuarina humilis</i>	0		<0.5	<1
<i>Drosera erythrorhiza</i>	0		<0.5	<1
<i>Lepidosperma leptophyllum</i>	0		<0.5	<1
<i>Hypolaena robusta</i>	0	4	<0.5	<1
<i>Melaleuca trichophylla</i>	0		<0.5	<1
<i>Lomandra suaveolens</i>	0		<0.5	<1
<i>Siloxerus humifusus</i>	0		<0.5	<1
<i>Centrolepis drummondiana</i>	0		<0.5	<1
<i>Styphelia conostephioides</i>	0		<0.5	<1
<i>Rytidosperma setaceum</i>	0		<0.5	<1
<i>Stylidium piliferum</i>	0		<0.5	<1
<i>Jacksonia furcellata</i>	0		<0.5	<1
<i>Bossiaea eriocarpa</i>	0		<0.5	<1
<i>Gompholobium tomentosum</i>	0		<0.5	<1
<i>Stylidium repens</i>	0		<0.5	<1
<i>Conostylis aculeata</i> subsp. <i>aculeata</i>	0		<0.5	<1

Quadrat or Releve Number: RV-Q03				
Laxmannia squarrosa	0		<0.5	<1
Anigozanthos humilis subsp. humilis	0		<0.5	<1
Ursinia anthemoides	*		<0.5	<1
Hibbertia sericosepala	0		<0.5	<1
Trachymene pilosa	0		<0.5	<1
Synaphea spinulosa subsp. spinulosa	0		<0.5	<1
Levenhookia stipitata	0		<0.5	<1
Phyllangium divergens	0		<0.5	<1
Austrostipa compressa	0		<0.5	<1
Ehrharta calycina	*		<0.5	<1
Gladiolus caryophyllaceus	*		<0.5	<1
Crassula colorata var. colorata	0		<0.5	<1

Quadrat or Releve Number: RV-Q04

Date: 8/11/2024

Project Number: A24.213

Collector: BL/TC

Photo Number:

Slope	Flat
Aspect	null
Position	Plain
Soil Texture	Sand
Soil Colour	Pale grey
Rock Type	null
Rock Cover	null
Bare Ground	50-75%
Litter	10-25%
Surface Water	null
Vegetation Condition	Completely Degraded
Weed Cover	10
Disturbance	Weeds, clearing, excavation, rubbish dumped
Fire Age Years	>10



NVIS

Species	Naturalised	Conservation code	Height	% Cover
<i>Adenanthos cygnorum</i> subsp. <i>chamaephyton</i>	0	3	2	11
<i>Ehrharta calycina</i>	*		1.3	5
<i>Anigozanthos manglesii</i>	0		<0.5	<1
<i>Bossiaea eriocarpa</i>	0		<0.5	<1
<i>Hemiandra pungens</i>	0		<0.5	<1
<i>Lepidosperma pubisquameum</i>	0		<0.5	<1
<i>Acacia pulchella</i> var. <i>glaberrima</i>	0		<0.5	<1
<i>Acacia stenoptera</i>	0		<0.5	<1
<i>Kunzea glabrescens</i>	0		<0.5	<1
<i>Banksia attenuata</i>	0		4	<1
<i>Jacksonia furcellata</i>	0		<0.5	<1
<i>Phyllangium divergens</i>	0		<0.5	<1
<i>Hovea pungens</i>	0		<0.5	<1
<i>Crassula colorata</i> var. <i>colorata</i>	0		<0.5	<1

Quadrat or Releve Number: RV-Q04				
<i>Asteridea pulverulenta</i>	0		<0.5	<1
<i>Siloxerus humifusus</i>	0		<0.5	<1
<i>Centrolepis drummondiana</i>	0		<0.5	<1
<i>Acacia huegelii</i>	0		<0.5	<1
<i>Schoenus brevisetis</i>	0		<0.5	<1
<i>Lechenaultia floribunda</i>	0		<0.5	<1
<i>Gompholobium tomentosum</i>	0		<0.5	<1
<i>Carpobrotus edulis</i>	*		<0.5	<1
<i>Macarthuria australis</i>	0		<0.5	<1
<i>Hibbertia subvaginata</i>	0		<0.5	<1
<i>Ursinia anthemoides</i>	*		<0.5	<1
<i>Podotheca gnaphalioides</i>	0		<0.5	<1
<i>Wahlenbergia capensis</i>	*		<0.5	<1
<i>Pelargonium capitatum</i>	*		<0.5	<1
<i>Trachymene pilosa</i>	0		<0.5	<1
<i>Austrostipa compressa</i>	0		<0.5	<1
<i>Hypochaeris glabra</i>	*		<0.5	<1
<i>Ficinia marginata</i>	*		<0.5	<1
<i>Gladiolus caryophyllaceus</i>	*		<0.5	<1
<i>Calandrinia corrigioloides</i>	0		<0.5	<1
<i>Laxmannia ramosa</i>	0		<0.5	<1
<i>Briza maxima</i>	*		<0.5	<1
<i>Levenhookia stipitata</i>	0		<0.5	<1
<i>Centrolepis polygyna</i>	0		<0.5	<1
<i>Laxmannia squarrosa</i>	0		<0.5	<1

Revegetation Quadrat Data

Species	Conservation Code	Number of Individuals Counted			
		RVQ01	RVQ02	RVQ03	RVQ04
<i>Acacia pulchella</i> var. <i>glaberrima</i>				1	
<i>Adenanthos cygnorum</i> subsp. <i>cygnorum</i>				5	
<i>Aira cupaniana</i> *			1		
<i>Angianthus humifusus</i>		4			
<i>Anigozanthos humilis</i> subsp. <i>humilis</i>				14	
<i>Austrostipa compressa</i>		31	5	28	220
<i>Avena barbata</i> *		12			
<i>Beaufortia elegans</i>				27	
<i>Bossiaea eriocarpa</i>				3	
<i>Brassica tournefortii</i> *			4		
<i>Briza maxima</i> *			1		1
<i>Calandrinia corrigioloides</i>			8		
<i>Carpobrotus edulis</i> *			2		26
<i>Centrolepis drummondiana</i>		12		3	4
<i>Centrolepis polygyna</i>					6
<i>Conostylis aculeata</i> subsp. <i>aculeata</i>				11	
<i>Crassula colorata</i> var. <i>colorata</i>		5	1	1	
<i>Ehrharta calycina</i> *		4	225	1	65
<i>Ficinia marginata</i> *			8		8
<i>Gladiolus caryophyllaceus</i> *		9	3	2	8
<i>Gompholobium tomentosum</i>			2	1	3
<i>Hibbertia sericosepala</i>				6	
<i>Hibbertia subvaginata</i>		10	2		4
<i>Hypochaeris glabra</i> *		12	70	2	12
<i>Jacksonia furcellata</i>			1	1	
<i>Kunzea glabrescens</i>		305			
<i>Laxmannia ramosa</i>					1
<i>Laxmannia squarrosa</i>		393		105	1
<i>Lechenaultia floribunda</i>					20
<i>Levenhookia stipitata</i>		118		2	1
<i>Macarthuria australis</i>					3
<i>Oenotera</i> sp.			2		
<i>Pelargonium capitatum</i> *			42		26

Species	Conservation Code	Number of Individuals Counted			
		RVQ01	RVQ02	RVQ03	RVQ04
<i>Phyllangium divergens</i>				1	
<i>Podotheca gnaphalioides</i>			36		1
<i>Poranthera moorokatta</i>	P2	59			
<i>Siloxerus humifusus</i>				3	
<i>Sonchus oleraceus*</i>			1		
<i>Stirlingia latifolia</i>				1	
<i>Stylidium repens</i>				28	
<i>Styphelia conostephioides</i>		18			
<i>Synaphea spinulosa subsp. spinulosa</i>				1	
<i>Trachymene pilosa</i>			15	1	87
<i>Ursinia anthemoides*</i>		99	3	11	84
<i>Vulpia muralis*</i>			451		
<i>Wahlenbergia capensis*</i>		57	74		95

Appendix E Conservation Significant Flora Data

Species	Conservation Status/ Weed listing	Abundance	Location (GDA2020 MGA Zone 50)	
			Easting	Northing
<i>Poranthera moorokatta</i>	P2	57	395714.5	6444323
<i>Poranthera moorokatta</i>	P2	5	395873.2	6444500
<i>Poranthera moorokatta</i>	P2	9	396185.3	6444507
<i>Poranthera moorokatta</i>	P2	59	395606.9	6444662

Appendix F

Vegetation Statistical Analysis

Floristic Analysis

PATN© software was used to undertake statistical analysis to assess validity of field interpreted vegetation types. PATN is a multivariate analysis tool that generates estimates of association (resemblance, affinity, distance) between sets of objects described by a suite of variables (attributes) and classifies the objects into groups and condenses the information and displays the patterns in the data graphically. Floristic groups, identified using a dendrogram output of the analysis, are used as a tool to inform vegetation type groups at various levels and scales.

Interpretation of these floristic groups into recognisable and mappable on-ground units is a tool used to identify vegetation types. Generally, quadrats that are closely floristically related on the dendrogram form identifiable vegetation units, however, interpretation is frequently required for imperfect results. Vegetation types are therefore determined as a combination of floristic analysis and on-ground interpretation using dominant and characteristic species.

Floristic analysis was conducted using quadrat data applying Bray Curtis analysis with non-native species removed from the dataset. The resulting hierarchical clustering (dendrogram) and (dis)similarity calculation was used to assist in determining floristic groups. The analysis identified one broad floristic group corresponding with the mapped vegetation type (in Degraded or better condition) these were.

- Revegetation-VT - FCT 21c 'Low-lying Banksia attenuata woodlands and shrublands' (RVQ01, RVQ02, RVQ03, RVQ04)

Overall, the floristic vegetation types were a good match for the observed structural vegetation types of the survey area.

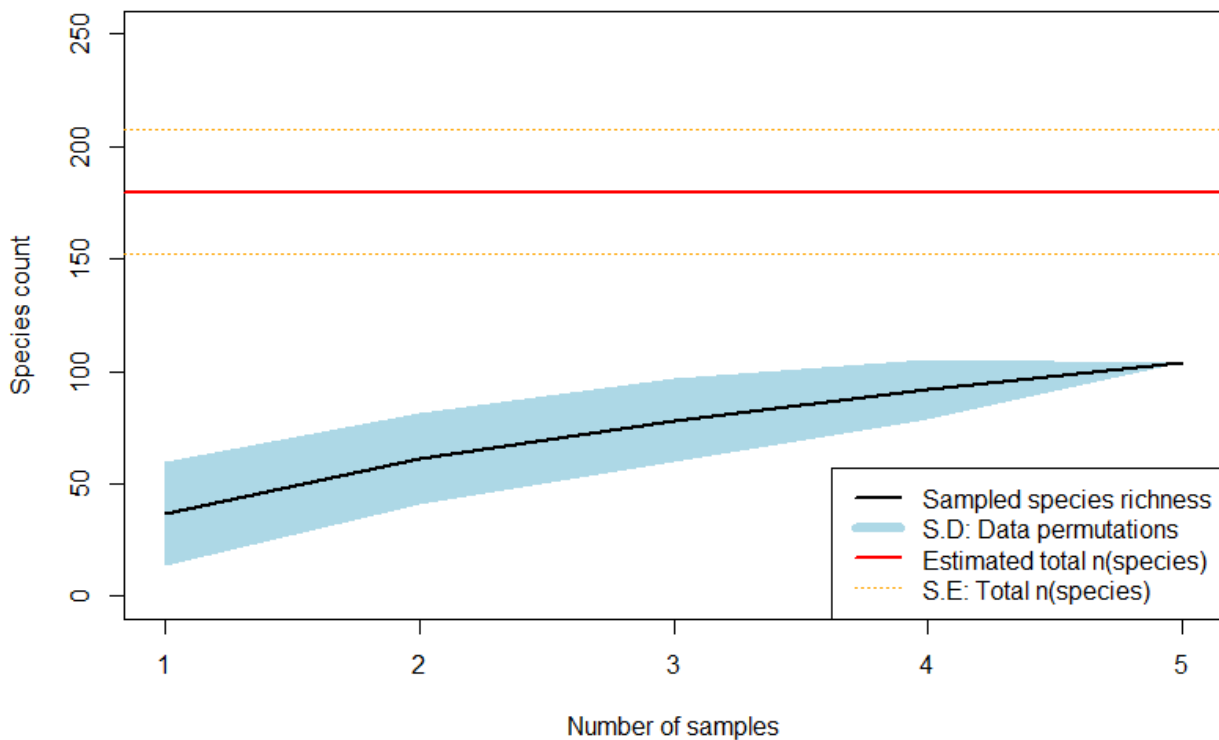
Species Accumulation Curve

Survey adequacy can be interpreted using a species accumulation curve, with the curve reaching or nearing asymptote an indication that most species present have likely been recorded. Consideration also needs to be given to the addition of species through opportunistic records not used in calculating a curve.

A species accumulation curve was generated using quadrat data utilising the Jackknife1 non-parametric estimator in the R suite Vegan package. The species accumulation curve indicates that the curve is

approaching asymptote however additional survey would likely have identified more flora species. With 104 species recorded (including opportunistic observations) it is considered that survey is adequate to describe the flora of the Survey Area considering the historical disturbance and degradation of vegetation.

Species Accumulation Curve (SAC)



MVA Analysis

The DBCA have developed draft guidelines on the use of statistical analysis to determine FCTs on the SCP (DBCA, 2023a), which largely follows the methodology presented in Gibson et al. (1994). Floristic analysis conducted for this assessment was consistent with these methods.

Floristic analyses were undertaken to determine relationships between quadrats from the Survey Area and SCP FCTs defined by Gibson et al. (1994). The original assessment of SCP quadrats by Gibson et al. (1994) established the FCTs that later defined TECs and PECs for the State. Thus, aligning quadrats with the SCP FCTs identifies relationships between the Survey Area vegetation and the broader SCP, and determines the presence of TECs and PECs.

Classification analysis of floristic data was conducted using the following datasets:

- Quadrats conducted during the current survey ('Rose Shanks quadrats'): 4 quadrats.

- Gibson et al. (1994) dataset: 509 quadrats.
- Keighery et al. (2012) dataset: 1,098 quadrats and relevés, including quadrats assessed by Gibson et al. (1994).

Consistent with DBCA (2023a) taxonomy and treatments were reconciled between the Rose Shanks quadrats and the Gibson et al. (1994) and Keighery et al. (2012) datasets, including:

- Alignment of current and historic taxon names; a large number of taxonomic changes that have occurred since the Gibson et al. (1994) survey.
- Removal of singletons; any taxon occurring only once in the quadrat dataset were removed from the dataset prior to analysis (as per Gibson et al., (1994)).
- Taxa were removed from the analysis where the identification was unclear (e.g. *Thysanotus* sp.); as per Gibson et al., (1994).
- Amalgamation of some infra-taxa (i.e. subspecies or variants of a taxon) where taxonomy was unclear or where taxa were likely to represent the same taxon.
- Introduced taxa were included in the analysis; as per Gibson et al., (1994).

Presence/absence species data were used; this is the only format that Gibson et al. (1994) and Keighery et al. (2012) datasets are available in.

Following the data matching process quadrat data was then combined with each of the regional data sets and subject to multivariate analysis (MVA) using the software PATN (Belbin 2003). The MVA used two-way classification (Agglomerative Hierarchical Fusion) of the presence/absence data for each quadrat. The flexible UPGMA (unweighted pair group method with arithmetic mean) classification strategy was used ($\beta = -0.1$), together with the Bray-Curtis site similarity measure. The default settings for the number of groups to be produced by the classification (i.e., the “cut-off level”) was accepted in each case. The primary output of the classification was dendrograms and a two-way table of taxa and quadrats. The assigned FCT code was affixed to the quadrat name to facilitate an understanding of the MVA outputs.

The initial grouped analysis often did not provide a straightforward match with the reference site data so a single site insertion analysis was undertaken to try to elucidate a better and clearer match of the Survey Area quadrats with the reference set FCTs. In doing this data from individual quadrats was analysed individually to minimise disruption of the original data set (referred to as single site insertion). The resultant analysis dendrograms were then reviewed to determine the position of Rose Shanks quadrats in relation to SCP quadrats (Gibson et al., (1994) and Keighery et al. (2012)) and FCT relationships were inferred where possible.

The similarity scores of the four quadrats with closest affinity to the Rose Shanks survey data produced in the Bray Curtis resemblance matrices were also identified and included to assist in elucidating a logical FCT assignment.

It is important to note that this approach does not produce dendrograms which maintain the original quadrat groupings of Gibson et al. (1994) (i.e. the original FCT groupings are not maintained with the inclusion of additional data). As a result, there is inherent ambiguity in inferences and alignments made from examination of the dendrograms alone.

Consistent with DBCA (2023a), and in order to provide further confidence in alignments, the statistical results were critically reviewed against other parameters, including:

- The typical species lists for SCP FCTs, species richness, descriptions of FCTs and the species groupings tables presented in Gibson et al. (1994) and DBCA (2023a).
- Other information such as vegetation structure, soils, topography and geographical distribution data as presented in presented in Gibson et al. (1994).

Bray Curtis dissimilarity values for Rose Shanks Reserve and the closest Swan Coastal Plain plots

Swan Coastal Plain Plot (FCT)	RVQ01	RVQ02	RVQ03	RVQ04
ELE17-23b			0.551	
gosn12-23a	0.619			
hurst01-23a		0.649		0.600
hurst04-23a				0.634
jand02-23a		0.649	0.536	0.638
jand07-23a	0.630	0.692	0.546	
jand08-23a	0.604	0.700	0.469	0.648
Light01-23a	0.631		0.523	
WHITE-1-23a	0.533	0.640	0.521	0.629
wire02-28		0.700		
YULE-1-23a	0.596			0.646
Minimum dissimilarity	0.533	0.640	0.469	0.600

Floristic Community Type assignment summary.

Plot	Assignment to Gibson et al. (1994)	Assignment to Keighery et al. (2012)	Nearest Neighbour	Probable FCT
RVQ01	21c	6/23c	23a	21c
RVQ02	21c	23c/28	23a	21c
RVQ03	21c	23a/23b/20a	23a	21c
RVQ04	21c	21c/23a	23a	21c

Appendix G

Black Cockatoo Habitat Quality Scoring Tool (DCCEEW, n.d)

Habitat Scoring System for WA black cockatoo foraging habitat

This habitat scoring system describes elements indicative of suitable foraging habitat¹ for the three WA black cockatoo species (Carnaby’s Black Cockatoo, Baudin’s Black Cockatoo and the Forest Red-tailed Black Cockatoo) in WA. Its use must be supported by survey information and reporting, undertaken by suitably qualified and experienced ecologists.

Appropriate scores will best fit a description. Where all components of the ‘detail’ column description are not met, this must be specified, and justification provided for that score to be accepted by the Department.

For an offset site to be considered by the Department, the offset site must have a start score of 1 for each indicator (e.g., there must be a species stocking rate score of at least 1).

Indicator	Score	Detail		Impact site	Offset start quality	Without offset	With offset	
Site Condition								
		Foraging value	Details					
Vegetation condition and structure. Habitat features	7	Very High	Carnaby’s Black Cockatoo					
			Native kwongan heath and shrubland (>30% projected foliage cover), banksia and eucalypt woodlands with >50% projected foliage cover. Low percentage (< 5%) of tree deaths ² .					
			Baudin’s Black Cockatoo					
			Marri-Jarrah Forest and woodlands with >50% projected foliage cover. Low percentage (< 5%) of tree deaths.					
			Forest Red-tailed Black Cockatoo					
		6	High	Marri-Jarrah-Karri Forest, other eucalypt woodlands, or allocasuarina woodlands, with >50% projected foliage cover. Low percentage (< 5%) of tree deaths.				
	Carnaby’s Black Cockatoo							
	Native kwongan heath and shrubland (>25% projected foliage cover), banksia and eucalypt woodlands with >40% projected foliage cover. Low percentage (< 10%) of tree deaths.							
	Baudin’s Black Cockatoo							
	Marri-Jarrah Forest and woodlands with >40% projected foliage cover. Low percentage (< 10%) of tree deaths.							
			Forest Red-tailed Black Cockatoo					
			Marri-Jarrah-Karri Forest, other eucalypt woodlands, or allocasuarina woodlands, with >40% projected foliage cover. Low percentage (< 10%) of tree deaths.					

¹ In some cases, an impact or offset site may contain or require both foraging and breeding habitat for one or more black cockatoos. Breeding habitat is species of trees known to support breeding within the range of the species which either have a suitable nest hollow or are of a suitable diameter at breast height (DBH) to develop a nest hollow. For most species of trees, suitable DBH is 500 mm. For salmon gum and wandoo, suitable DBH is 300 mm.

²No tree deaths indicate robustness of habitat, unlikely for the habitat to decline in the medium-term. Tree deaths may be owing to disease, water stress, fire, etc.

Vegetation condition and structure. Habitat features	5	Moderate to high	Carnaby's Black Cockatoo				
			Native kwongan heath and shrubland (>20% projected foliage cover), banksia and eucalypt woodlands with 30-40% projected foliage cover; OR > 60% projected foliage cover but veg. condition reduced due to tree deaths (up to 20%).				
			Baudin's Black Cockatoo				
			Marri-Jarrah Forest or woodlands with 30-40% projected foliage cover; OR > 60% projected foliage cover but veg. condition reduced due to tree deaths (up to 20%).				
			Forest Red-tailed Black Cockatoo				
			Marri-Jarrah-Karri Forest, other eucalypt woodlands, or allocasuarina woodlands, with 30-40% projected foliage cover; OR > 60% projected foliage cover but veg. condition reduced due to tree deaths (up to 20%).				
	4	Moderate	Carnaby's Black Cockatoo				
			Native kwongan heath and shrubland, banksia or eucalypt woodlands with 20-30% projected foliage cover. Moderate percentage of tree deaths (30-40%).				
			Baudin's Black Cockatoo				
			Marri-Jarrah Forest or woodlands with 20-30% projected foliage cover; OR Marri-Jarrah Forest with 40-60% projected foliage cover but vegetation condition reduced due to tree deaths (up to 30-40%).				
			Forest Red-tailed Black Cockatoo				
			Marri-Jarrah-Karri Forest, other eucalypt woodlands, or allocasuarina woodlands with: 20-30% projected foliage cover; OR 40-60% projected foliage cover but veg. condition reduced due to tree deaths (up to 30-40%).				
	3	Low to moderate	Carnaby's Black Cockatoo				
			Native kwongan heath and shrubland, banksia or eucalypt woodlands with 10-20% projected foliage cover.				
			Baudin's Black Cockatoo				
			Marri-Jarrah Forest or woodlands with 5-20% projected foliage cover.				
			Forest Red-tailed Black Cockatoo				
			Marri-Jarrah-Karri Forest, other eucalypt woodlands, or allocasuarina woodlands with 5-20% projected foliage cover.				
2	Low	Carnaby's Black Cockatoo					
		Native kwongan heath and shrubland, banksia and eucalypt woodlands with <10% projected foliage cover; OR Paddocks and/or urban areas with scattered foraging trees such as banksias, marri.					
		Baudin's Black Cockatoo					
		Marri-Jarrah Forest or woodlands with 1-5% projected foliage cover; OR Paddocks and/or urban areas with scattered foraging trees such as banksia, hakea, dryandra.					

Vegetation condition and structure.	1	Negligible to low	Forest Red-tailed Black Cockatoo				
			Marri-Jarrah-Karri Forest, other eucalypt woodlands, or allocasuarina woodlands with 1-5% projected foliage cover; OR Paddocks and/or urban areas with scattered food plants such as Cape Lilac, <i>Eucalyptus caesia</i> and <i>E. erythrocorys</i> .				
Habitat features	0	None	All species				
			No Proteaceae, eucalypts or other potential sources of food. May include bare ground or developed sites devoid of vegetation (e.g. infrastructure, roads, gravel pits).				
Totals							

Site Context							
Proximity of the site in relation to other habitat.	3	Site is within 6km of known breeding site.	or	Site is within 12km of other foraging resources with site condition of at least 3.			
	2	Site is within 12km of known breeding site.	or	Site is within 15km of other foraging resources with site condition of at least 4.			
	1	Site is within 15km of known breeding site.	or	Site is between 15km and 20km of other foraging resources with site condition of at least 5.			
	0	Site is further than 15km from known breeding site.	or	Site is further than 20km from other foraging resources.			
Totals							

Final Totals								
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Indicator	Species Stocking Rate ³		Impact Site			Offset Site		
	Yes	No	CBC	BBC	FRT	CBC	BBC	FRT
Confirm presence/absence of species.	Yes	Species is seen or reported regularly and/or there is abundant foraging evidence, e.g. chewed nuts can be identified as this species. Regularly is when the species is seen at intervals of every few days or weeks for at least several months of the year.						
	No	Species is recorded or reported very infrequently and there is little or no foraging evidence.						

³ Species stocking rate is indicated by yes or no to confirm if any of the species is frequently present or not. If yes, the presence must be for the species being impacted by the proposal, not for a species that will not be impacted.

Legend

If the site scores between 0-2 (low to no value) for site condition, 0 for the site context score, or is **No** for species stocking rate, it is extremely unlikely to be considered as suitable habitat. This would not be appropriate to use as an offset site.

The metrics used to determine Site Condition, Site Context, and Species Stocking Rate were developed by the Department of Climate Change, Energy, the Environment, and Water in consultation with species experts in WA.

A standard habitat quality scoring system for a species allocates scores out of 3 for both site condition and site context, and out of 4 for species stocking rate. However, as black cockatoos are very mobile, this HQS uses a score out of 7 for site condition and a score out of 3 for site context. Site condition is considered the key factor in determining the quality of habitat for these black cockatoo species. Species stocking rate is considered only in terms of presence or absence of the species and does not add to the total score. Note that the species, or strong indicators of the species, must be present, consistent with the presence/usage description above, for an offset to be considered suitable.

