Bunbury Hospital Biological Surveys 2024

Fauna, Flora and Vegetation Surveys - Bunbury Hospital Complex

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WEPL will not be liable to update or revise this report to take into account any events or circumstances or facts becoming apparent after the date of this report.

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Executive Summary

Western Environmental Approvals Pty Ltd (WEPL) was commissioned by Multiplex to undertake biological surveys over six portions of Bunbury Hospital at the Southwest Health Campus. The purpose of the surveys was to provide information to support approvals processes for potential clearing required as part of the expansion of Bunbury Hospital.

The Survey Area comprises of six portions surrounding the Bunbury Hospital at Southwest Health Campus, covering 3.654 ha.

The biological surveys consisted of a detailed flora and vegetation survey, targeted Priority and Threatened flora searches, basic fauna survey and targeted black cockatoo and western ringtail possum assessments. Field surveys were conducted between August and October 2024 with a total of six person days survey effort applied.

Flora and Vegetation

A total of 89 vascular flora species were recorded within the Survey Area from five quadrats and three relevés. Thirty-five of these species were weeds. Historical clearing has resulted in much of the Survey Area comprising a regrowth community with reduced native species diversity

No Threatened and Priority flora were recorded, and no species of other conservation significance were identified. No Threatened and Priority flora species identified by the desktop assessment are considered likely to occur under the post survey assessment.

Eight vegetation types were identified, with the majority of the Survey Area in Degraded condition. Five vegetation types are considered to represent native vegetation, ranging from Good to Completely Degraded Condition. Three vegetation types which are not classified as native vegetation comprise native landscaping type plantings, cleared areas or non-endemic planted species.

Of the four TECs identified by the desktop assessment as having a high or medium likelihood of occurrence one was identified as present. This was:

- Banksia Woodlands of the Swan Coastal Plain ecological community (Banksia Woodland TEC)- State listed as Priority 3 and listed by the Commonwealth as Endangered. Within the Survey Area there is 0.748 ha of Banksia TEC present.

Fauna

Five species of conservation significance were recorded in the Survey Area. These are:

- *Pseudocheirus occidentalis* (western ringtail possum)-CE
- *Isoodon fusciventer* (quenda)-P4
- *Calyptorhynchus banksia naso* (forest red-tailed black cockatoo) – VU.

- *Calyptorhynchus baudinii* (Baudin's black cockatoo) – EN.
- *Calyptorhynchus latirostris* (Carnaby's black cockatoo)-EN

One species was assessed as having a high likelihood of occurrence:

- *Phascogale tapoatafa wambenger* (southwestern brush-tailed phascogale)-CD

Black Cockatoos

The Survey Area falls within the modelled distribution and breeding range for Baudin's black cockatoo, Carnaby's black cockatoo and the forest red-tailed black cockatoo (DCCEEW, 2022). No known breeding sites are present within or immediately adjacent to the Survey Area. One buffered roosting site intersects with the Survey Area.

A total of 74 potential/ future potential breeding trees were recorded. One tree, a large marri was assessed from ground observation as potentially being a Suitable Nesting Trees (Class 3). The tree is located in the north of the Survey Area near Robertson Drive. The tree has a 30cm diameter upwards facing hollow entry. The hollow is currently filled with a large bees nest making it currently unsuitable for use. No evidence of current or previous nesting behaviour such as chew marks at hollow entrance attributed to black cockatoos, or flushed individuals were recorded

The native vegetation of FHT-01 is characterised by foraging species for all three black cockatoo species including marri, jarrah, banksia, sheoak and small fruited eucalyptus species. Within FHT-02 (non-native vegetation) there are very few high value foraging species with the majority comprised of cleared areas, scattered/planted low foraging value eucalypts and other areas of non-native vegetation.

- Carnaby's Black Cockatoo: 1.146 ha (9/10), 0.545 ha (6/10) and 1.963 ha (Low 2 to None 0).
- Baudin's Black Cockatoo: 1.146 ha (9/10), 0.545 ha (6/10) and 1.963 ha (Low 2 to None 0).
- Forest Red-tailed Black Cockatoo: 0.392 ha (9/10), 0.749 ha (8/10), 0.545 ha (7/10) and 1.963 ha (Low 2 to None 0).

No evidence of scat marking, branch clipping or feather dropping was recorded suggesting that the location is not a highly frequented roosting location. Throughout the Survey Area, isolated stands of tall (> 10 m) eucalypts are scattered which may provide suitable roosting habitat. Access to permanent water is present from the lake within the Survey Area.

Western Ringtail Possum

Targeted searches recorded 12 individuals on the first night and ten individuals on the second night. Twelve dreys (nests of leaves and sticks) and one daytime observation were also recorded.

Combined there is 2.277 ha of core habitat (excluding areas with no vegetation and/or suitable habitat) present within the Survey Area. The calculated population is an average of 5.05 individuals per ha (average 11.5 individuals across two sampling events over 2.277 ha of habitat).

FHT-01 (Native Vegetation) was assessed as comprising core habitat with 2.277 ha present. The Commonwealth unpublished guideline, the Habitat Scoring System for Western Ringtail Possum was applied to determine habitat quality scores out for 10 for individual polygons of habitat within the Survey Area. This assessment identified as present within the Survey Area:

- 1.163 - (9.5/10)
- 1.097- (9/10)
- 0.174 - (0.5/10)
- 1.219 - (0/10)

Note that habitat with a score of 0.5 or 0 is unlikely to be considered as suitable habitat (DCCEEW, n.d.).

At a regional (10km) scale the combined 2.277 ha of core habitat which broadly aligns with the Shedley and Williams 2014 mapping as Class C (medium) represent 0.04% of the combined Class A (very high), Class B (high) and Class C (medium) habitat mapped within 10 km.

The habitat within the Survey Area is contiguous with extensive areas of habitat within the Manea Park and Edith Cowan University precinct. The habitat within the Survey Area does not play an important role as a connective corridor with a break in habitat present to the west and north from the existing hospital footprint and Robertson Drive.

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

1. Introduction

1.1 Project Background

Western Environmental Approvals Pty Ltd (WEPL) was commissioned by Multiplex to undertake biological surveys over six portions of Bunbury Hospital at the Southwest Health Campus. The purpose of the surveys was to provide information to support approvals processes for potential clearing required as part of the expansion of Bunbury Hospital.

1.2 Location

The Survey Area comprises of six portions surrounding the Bunbury Hospital at Southwest Health Campus, covering 3.654 ha. See Figure 1 for location.

1.3 Objectives and Scope of Work

The objective of the surveys was to delineate key flora, vegetation and fauna habitat values within the Survey Area and identify potential environmental values that may occur.

The scope of works included:

- A desktop assessment of relevant databases and previous surveys.
- A detailed level flora and vegetation survey in accordance with the Technical Guidance for Flora and Vegetation Surveys for Environmental Impact Assessment (EPA,2016), including:
    - Targeted surveys for Threatened and Priority flora.
    - Targeted surveys for Threatened Ecological Communities (TECs) and Priority Ecological Communities (PECs)
    - Vegetation condition and vegetation type mapping.
    - A flora inventory of common and key/ dominant species
- A basic fauna survey and likelihood of occurrence for Threatened or Priority fauna in accordance with the Technical Guidance for Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment (EPA 2020).
- Targeted black cockatoo habitat assessment as per Department of Climate Change, Energy, the Environment and Water (DCCEEW) Referral Guideline for 3 WA Threatened Black Cockatoo Species (2022) to identify potential breeding, foraging or roosting habitat.

- Targeted western ringtail possum habitat assessment considering Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC) 2011 Survey guidelines for Australia's threatened mammals and comprising daytime drey (nest) and scat searches and night-time spotlighting.
- Provision of spatial data in a format suitable format for an IBSA submission.
- Technical report including the results of the desktop assessment and field surveys.

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

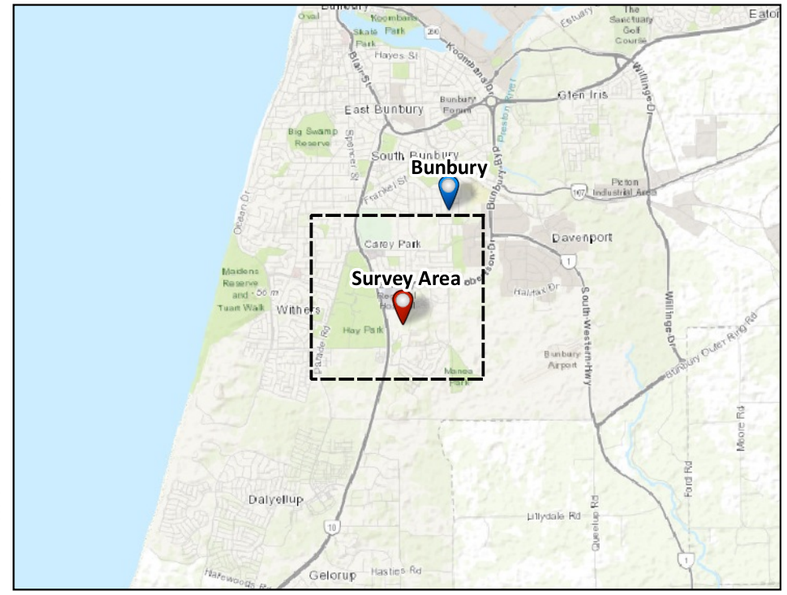

Figure 1: Survey Area

N

0 37 74 111 148 m

PROJECT/REPORT NAME: Bunbury Hospital Biological Survey Bunbury Hospital, Southwest Health Campus		
SCALE: 1:2,474	SHEET SIZE: A3 COLOUR	CLIENT: Multiplex
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	PROJECT NUMBER: P24.096	VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY Summer 2023	DRAWN BY / REVIEWED BY: JP/TC	DATE: 11/10/2024

Legend

Survey Area

No	Description	Drawn	Approved	Date
A	Original issue	JP	TC	11/10/2024

NOTES:

Cadastral boundary (LGATE-002). Base map ESRI Topo. Townsites (LGATE-248).

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1.4 Relevant Legislation and Guidance

This environmental assessment was conducted in accordance with Commonwealth and State legislation and guidelines:

- Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).
- Western Australian Environmental Protection Act 1986 (EP Act).
- Western Australian Biodiversity Conservation Act 2016 (BC Act).
- Western Australian Biodiversity Conservation Regulations 2018.
- Department of the Environment (DotE). (2013). Matters of National Environmental Significance. Significant Impact Guidelines 1.1 - Environment Protection and Biodiversity Conservation Act 1999.
- Department of the Environment Water Heritage and the Arts (DEWHA). (2010). Survey Guidelines for Australia's Threatened Birds.
- Department of Climate Change, Energy, Environment and Water (DCCEEW). (2022). Referral Guidelines for 3 WA threatened black cockatoo species: Carnaby's Cockatoo, Baudin's Cockatoo and the Forest Red-tailed Black-cockatoo.
- Department of Biodiversity Conservation and Attractions (DBCA) (2023a) Draft: Methods for survey and identification of Western Australian Threatened Ecological Communities. Communities and Communities Program, DBCA.

As well as those listed above, the assessment complied with Environmental Protection Authority (EPA) requirements for environmental survey and reporting in Western Australia, as outlined in:

- EPA. (2020). Technical Guidance – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment. Known herein as the 'Fauna Technical Guidance'.
- EPA. (2016). Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment. Known herein as the 'Flora and Vegetation Technical Guidance.'

A short description of key legislation is provided in Appendix A. Other definitions, including species and ecological community conservation categories, are provided in Appendix B.

1.5 Survey Limitations and Constraints

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

Table 1: Limitations and Constraints of the 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, targeted Threatened or Priority flora survey, Basic fauna survey and targeted assessment of black cockatoo and western ringtail possum habitat 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 the development of the infrastructure footprint and support approvals and referrals.
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. Department of Biodiversity Conservation and Attractions (DBCA) data was requested as part of the desktop assessment.
Site Access	Negligible	The Survey Area was readily accessed by vehicle and on foot.
Survey Intensity and Extent	Negligible	Suitable survey effort by an experienced ecologist was applied. Survey effort is shown in Figure 2 and included: • 2 person days sampling flora and vegetation with 5 quadrats and 3 relevés sampled. • 1 person days (one winter one mid spring) targeted search effort for Threatened and Priority flora. • 1 person days sampling fauna and undertaking daytime black cockatoo and western ringtail possum assessment. • 2 evening (non-concurrent nights) of western ringtail possum spotlighting transects. All planned Survey Areas were adequately sampled in line with the project scope of works.
Experience	Negligible	The ecologist leading the field survey (Andrew Fry) has been conducting flora and vegetation surveys and fauna habitat assessments in Western Australia for over 10 years, with over 10 years experience in the southwest bioregion.
Timing, weather, season	Negligible	Flora and Vegetation 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 October. The seasonal timing was considered appropriate considering the objectives of the survey. Fauna Spring is also the optimal survey period for the main faunal groups sampled (birds and mammals) as per EPA Technical Guidance. Primary survey was undertaken in October.

Possible Limitation	Degree of Limitation (Significant, Moderate or Negligible)	Potential Constraints on Survey Outcomes
		The survey was undertaken within the recommended timing for both foraging and breeding habitat for forest red-tailed black cockatoo (year round) and Carnaby's black cockatoo (year-round foraging, July to December breeding) and close to optimal for Baudin's cockatoo (foraging March to September, breeding all year) (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. Western ringtail possum spotlighting searches were undertaken in optimal condition in still and clear conditions on cool nights. Seasonal timing (October) coincides with September to November breeding peak for coastal populations and was considered optimal for establishing population estimates (DPaW, 2017). 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.
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 Basic fauna 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 agricultural and public purposes and weeds were recorded but were not a constraint on the results of the survey.

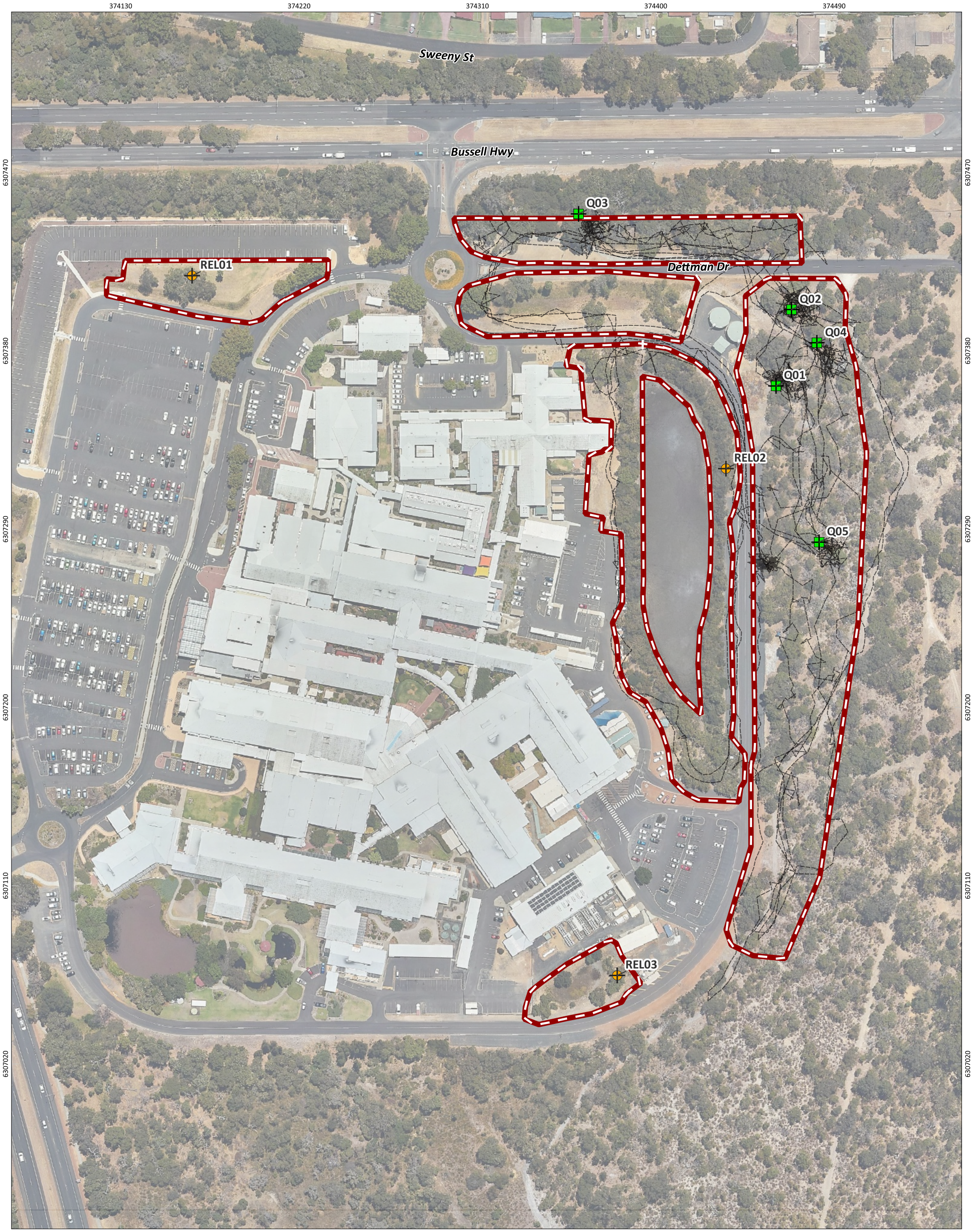

Figure 2: Survey Effort

0 10 20 30 40 m

N

PROJECT/REPORT NAME: Bunbury Hospital Biological Survey Bunbury Hospital, Southwest Health Campus			
SCALE: 1:1,805	SHEET SIZE: A3 COLOUR	CLIENT: Multiplex	
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50		PROJECT NUMBER: P24.096	VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY Summer 2023		DRAWN BY / REVIEWED BY: JP/TC	DATE: 11/10/2024

Legend

- Survey Area
- Tracklog
- Quadrat
- Releve

No	Description	Drawn	Approved	Date
A	Original issue	JP	TC	11/10/2024

NOTES:

Cadastral boundary (LGATE-002). Label corresponds to the vegetation association number.

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2. Existing Environment

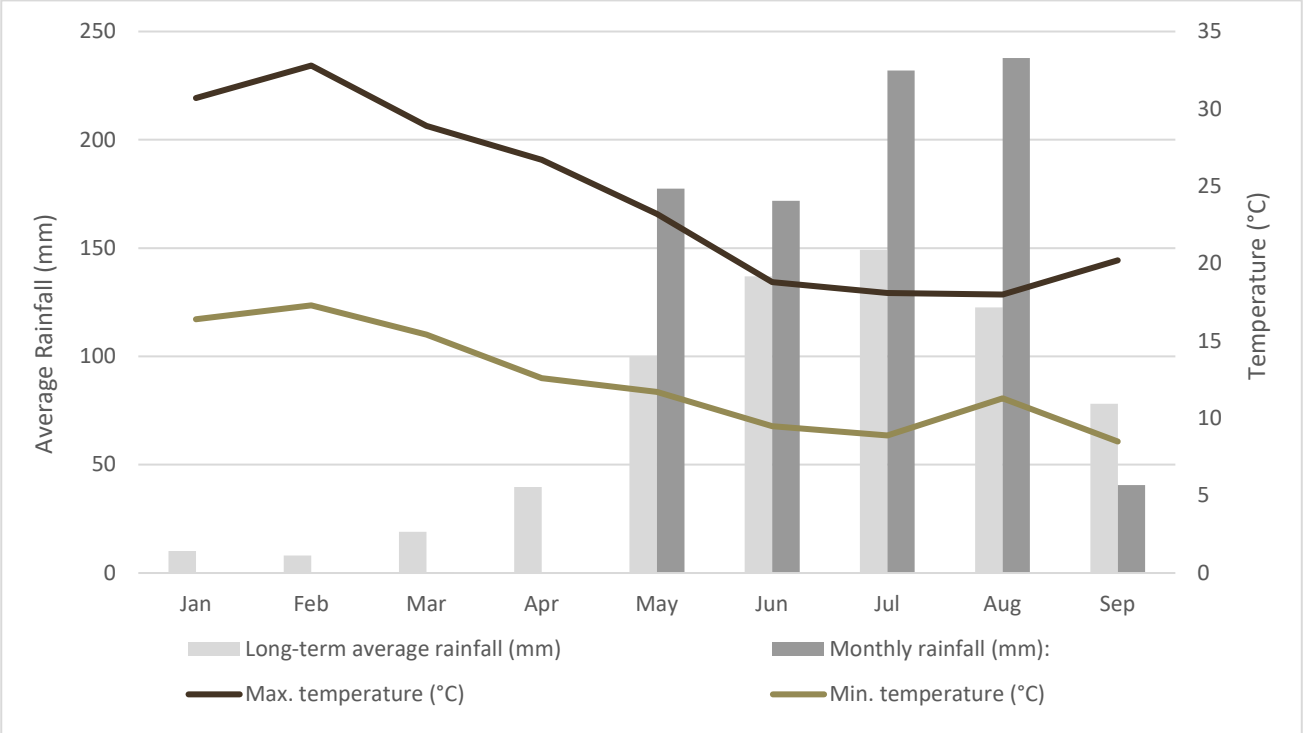
2.1 Climate and Pre-Survey Rainfall

The closest long-term Bureau of Meteorology (BoM) weather station with a complete dataset is Bunbury WA (Station 009965), located approximately 1 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 Bunbury ranges from 4.1˚C (August) to 18.6˚C (February) (1994 to 2024) and the long-term mean maximum temperature ranges from 16.3˚C (July) to 32.9˚C (February) (Graph 1) (BoM, 2024).

Bunbury weather station recorded 860 mm of rain in the nine months prior to the survey (Jan 2024 – Sept 2024), which is 196 mm above the long-term average of 664 mm in the same period (BoM, 2024). In the three months prior to the survey (June to September 2024), 682.2 mm of rainfall was recorded, which is 195.19 mm above the long-term average at 487.01 mm (BoM, 2024).



Graph 1: Long Term and Monthly Total Rainfall, Maximum and Minimum Temperatures for Bunbury WA (009965) (BoM, 2024)

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 Soils

The Survey Area is located within the Spearwood Soil Landscape Mapping System (DPIRD-064). The system is described as "Sand dunes and plains. Yellow deep sands, pale deep sands and yellow/brown shallow sands".

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 two pre-European vegetation associations:

- Spearwood_6: Medium woodland; tuart & jarrah
- Bassendean_998: Medium woodland; tuart

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
Spearwood_6	54,427.13	13,287.64	24.41	3.42
Bassendean_998	1,051.26	140.98	13.41	na

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 intersect two vegetation complexes:

- Karrakatta Complex-Central and South (49)- Predominantly open forest of *Eucalyptus gomphocephala* (Tuart) - *Eucalyptus marginata* (Jarrah) - *Corymbia calophylla* (Marri) and woodland of *Eucalyptus marginata* (Jarrah) - *Banksia* species. *Agonis flexuosa* (Peppermint) is co-dominant south of the Capel River.

- Yoongarillup Complex (56)- *Eucalyptus marginata* (Jarrah) - *Corymbia calophylla* (Marri). South of Bunbury is characterized by *Eucalyptus rudis* (Flooded Gum)-*Melaleuca* species open forests.

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
Karrakatta Complex-Central and South	49	53,080.99	12,465.24	23.48	3.87
Yoongarillup Complex	56	27,977.93	10,018.14	35.81	13.95

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.

Majority of the Survey Area intersects with an ESA (ObjectID-9943) associated with a Threatened Ecological Community (DWER-046). The southern portion of the Survey Area intersects with another ESA (ObjectID-17038) associated with a Threatened Ecological Community (DWER-046). As shown in Figure 5.

The Survey Area is not identified as intersecting a Conservation Area (DBCA-011), as shown in Figure 5. The nearest conservation or DBCA managed areas are:

- Kalgulup Regional Park located approximately 2.3 km west from the Survey Area.

- Crown Land, 2.5 km northeast of the Survey Area zoned as Section 5(1)(h) Reserve under the CALM Act and managed by DBCA.

2.6 Wetlands and Hydrology

The Survey Area intersects with two features mapped as geomorphic wetlands of the Swan Coastal Plain (DBCA-19). See Table 4 below and Figure 6.

Table 4: Geomorphic Wetlands

Unique Feature ID	Wetland Name	Wetland Type	Management Category
15492	Unknown	Palusplain	Multiple Use
916	Unknown	Palusplain	Conservation Class

The Survey Area does not intersect any wetlands listed under the Directory of Important Wetlands in Australia (DBCA-045) or any drainage lines (DWER-031).

Figure 3: Pre-European Vegetation Types

0 10 20 30 40 m N		PROJECT/REPORT NAME Bunbury Hospital Biological Survey Bunbury Hospital, Southwest Health Campus	
SCALE 1:1,805	SHEET SIZE A3 COLOUR	CLIENT Multiplex	
COORDINATE REFERENCE SYSTEM GDA2020 / MGA zone 50		PROJECT NUMBER P24.096	VERSION 0
DATA SOURCE LANDGATE AERIAL IMAGERY Summer 2023		DRAWN BY / REVIEWED BY JP/TC	DATE 11/10/2024

Legend

- Survey Area

Pre-European Vegetation (DPIRD-006)

- BASSENDEAN_998
- SPEARWOOD_6

No	Description	Drawn	Approved	Date
A	Original issue	JP	TC	11/10/2024

NOTES:

Cadastral boundary (LGATE-002). Label corresponds to the vegetation association number.

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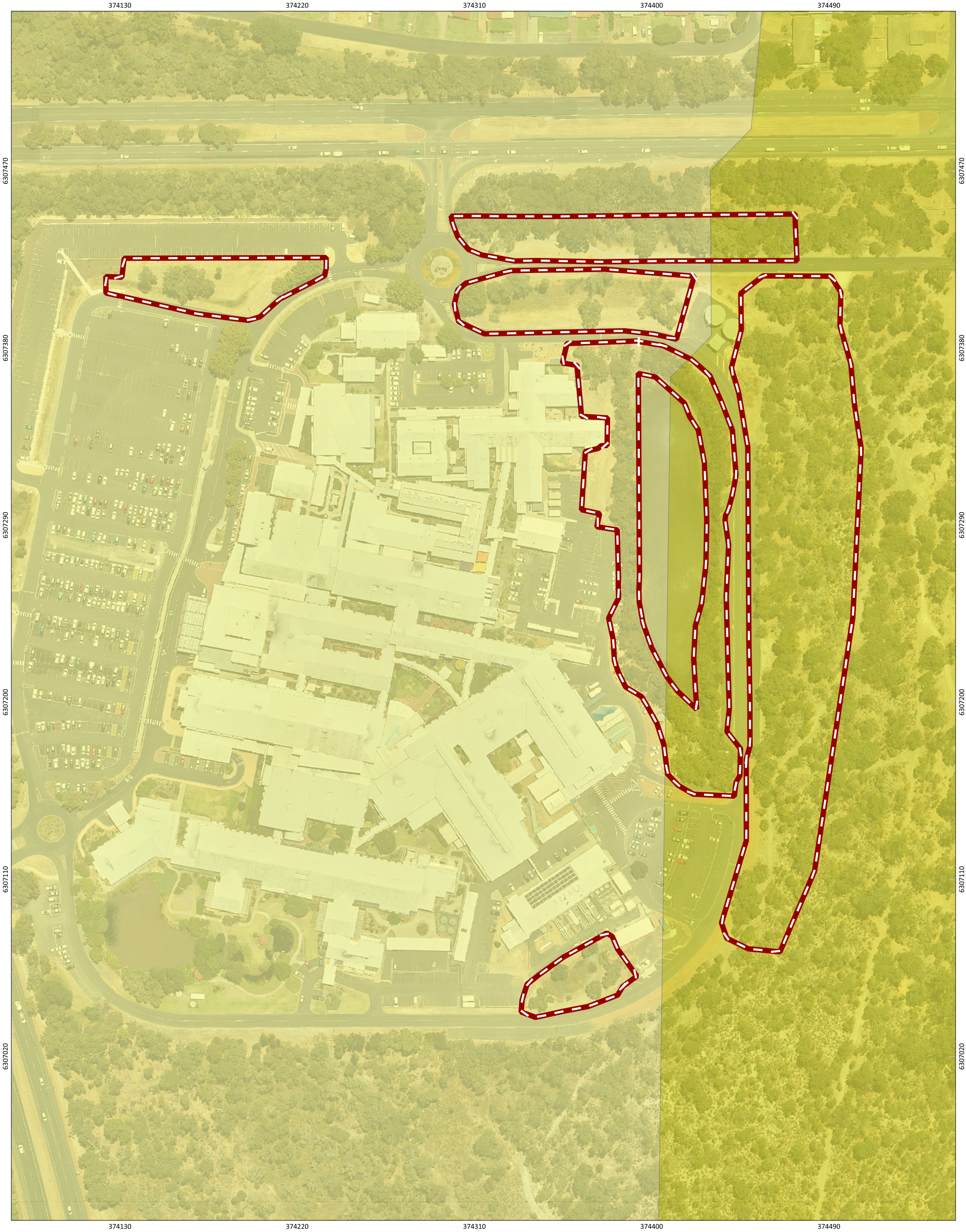

Figure 4: Vegetation Complexes

0 10 20 30 40 m

N

PROJECT/REPORT NAME: Bunbury Hospital Biological Survey Bunbury Hospital, Southwest Health Campus		
SCALE: 1:1,805	SHEET SIZE: A3 COLOUR	CLIENT: Multiplex
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	PROJECT NUMBER: P24.096	VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY Summer 2023	DRAWN BY / REVIEWED BY: JP/TC	DATE: 14/10/2024

Legend

- Survey Area

Vegetation Complexes - Swan Coastal Plain (DBCA-046)

- Karrakatta Complex-Central and South
- Yoongarillup Complex

No	Description	Drawn	Approved	Date
A	Original issue	JP	TC	14/10/2024

NOTES:

Cadastral boundary (LGATE-002). Label corresponds to the vegetation association number.

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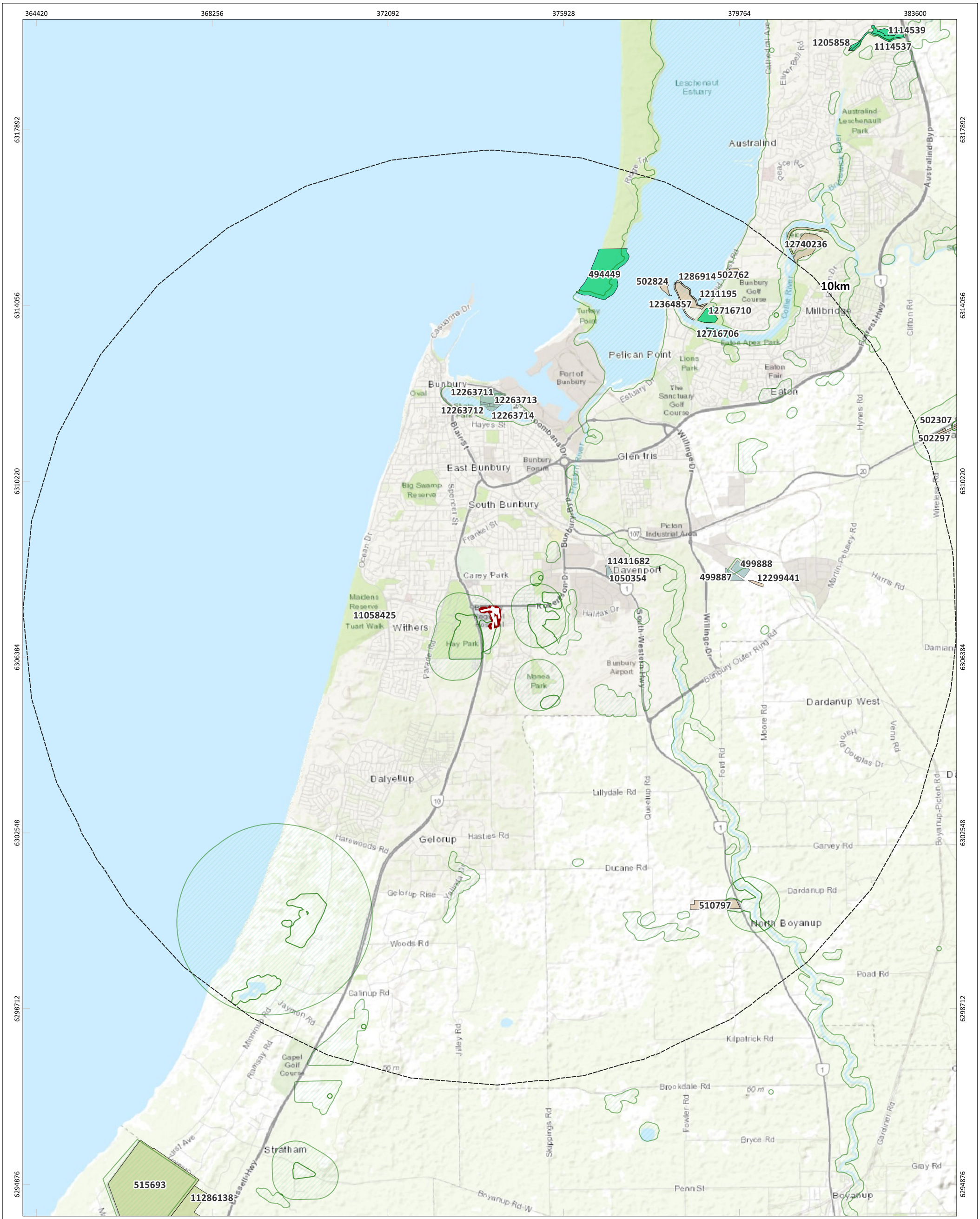

Figure 5: Environmentally Sensitive Areas, Conservation Estate and Bush Forever

N 0 1 2 km		PROJECT/REPORT NAME: Bunbury Hospital Biological Survey Bunbury Hospital, Southwest Health Campus	
SCALE: 1:76,728	SHEET SIZE: A3 COLOUR	CLIENT: Multiplex	
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50		PROJECT NUMBER: P24.096	VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY Summer 2023		DRAWN BY / REVIEWED BY: JP/TC	DATE: 17/10/2024

Legend

- Survey Area
- Clearing Regulations - Environmentally Sensitive Areas (DWER-046)

DBCA - Legislated Lands and Waters (DBCA-011)

- National Park
- Nature Reserve
- Conservation Park
- Section 5(1)(h) Reserve

No	Description	Drawn	Approved	Date
A	Original issue	JP	TC	17/10/2024

NOTES:

Cadastral boundary (LGATE-002). Label corresponds to the vegetation association number.

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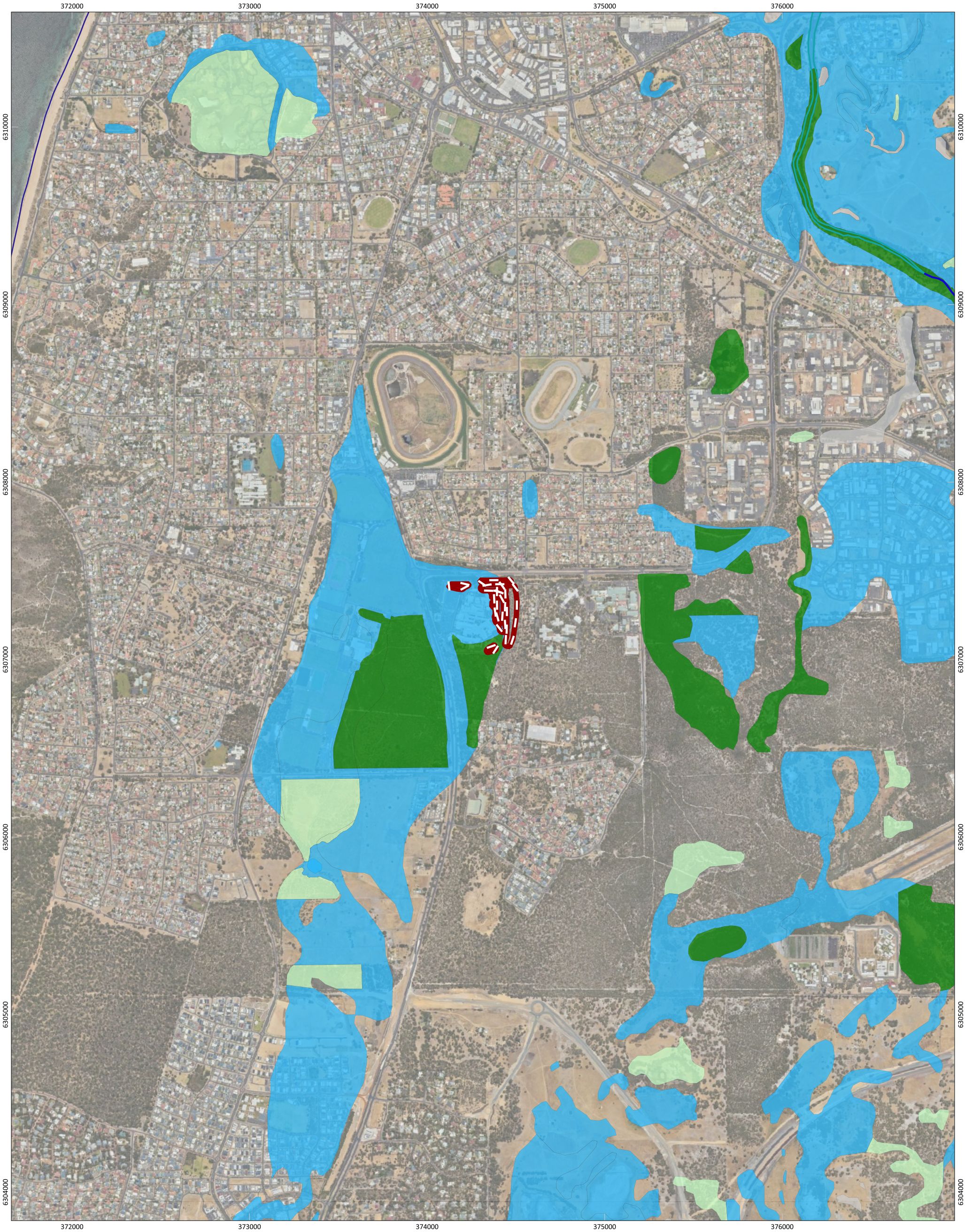

Figure 6: Surface Water Features and Geomorphic Wetlands

N

0 100 200 300 400 m

PROJECT/REPORT NAME: Bunbury Hospital Biological Survey Bunbury Hospital, Southwest Health Campus		
SCALE: 1:20,000	SHEET SIZE: A3 COLOUR	CLIENT: Multiplex
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	PROJECT NUMBER: P24.096	VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY Summer 2023	DRAWN BY / REVIEWED BY: JP/TC	DATE: 14/10/2024

Legend

- Survey Area
- Hydrography Linear (Hierarchy) (DWER-031)
  - Coastal Waterline
  - Estuarine
  - Mainstream
- Geomorphic Wetlands, Swan Coastal Plain (DBCA-019)
  - Conservation
  - Multiple Use
  - Not Assessed
  - Resource Enhancement

No	Description	Drawn	Approved	Date
A	Original issue	JP	TC	14/10/2024

NOTES:

Cadastral boundary (LGATE-002). Label corresponds to the vegetation association number.

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2.7 Land Use History

Analysis of historical imagery displayed historic land use of agricultural grazing. Construction of Bunbury Hospital was started and completed between 2000 to 2001. Development of the hospital has continued since with expansions to carparks and additional buildings.

Table 5: Land Use History

Image	Date/Year	Description and Land Use
	11/02/1970	Agricultural use, cleared land, water points and access road present.
	19/10/1992	Agricultural use, cleared land, water points and access road present.

Image	Date/Year	Description and Land Use
	2000/2001	Development of Bunbury Hospital, with man made lake/water points.
	20/01/2024	Further development of Bunbury hospital, expansion of car park and buildings.

3. Methodology

3.1 Desktop Assessment

A previous desktop assessment was completed by Statutory Planning and Asset Policy, Department of Finance in 2022. The desktop assessment was reviewed and is provided as Appendix F.

3.1.1 Database Searches

Database searches were undertaken to compile a list of potential conservation significant flora and ecological communities within or surrounding the Survey Area (see Table 6). In addition, an EPBC Protected Matters Search Tool (PMST) was undertaken to identify the potential for Matters of National Environmental Significance (MNES) to occur within or surrounding the Survey Area (DEECCW, 2023).

Table 6: Database Searches of the Survey Area

Database Name	Date Received and Reference Number	Search Type	Search Area
Threatened and Priority Ecological Communities database search (Department of Biodiversity Conservation and Attractions)	01/07/2024 41-0624EC	TECs and PECs	20 km buffer around the Survey Area
Threatened and Priority Flora (TPFL) database search (Department of Biodiversity Conservation and Attractions)	02/07/2024 07-0724FL	Threatened and Priority Flora	20 km buffer around the Survey Area
Western Australian Herbarium (WAHerb) flora database search (Department of Biodiversity Conservation and Attractions)	02/07/2024 07-0724FL	Threatened and Priority Flora	20 km buffer around the Survey Area
DBCA Threatened and Priority Fauna database search (Department of Biodiversity Conservation and Attractions)	03/07/2024 46-0624FA	Threatened and Priority Fauna	30 km buffer around the Survey Area
Protected Matters Search Tool Department of Agriculture Water and the Environment, 2022a)	07/05/2024	Commonwealth listed Threatened Flora and fauna and TECs	10 km buffer around the Survey Area

3.1.2 Likelihood of Occurrence

Conservation listed flora communities identified from the desktop assessment were assessed to determine the likelihood of their occurrence within the Survey Area, both prior to and post field survey. The assessment was completed based on the likelihood of occurrence criteria presented in Table 7.

Only species either recorded within the Survey Area or considered as having a high-medium likelihood of occurrence in post field survey assessment will be discussed in detail. Species classified as having a low likelihood of occurrence will not be discussed unless a justification for this classification is required.

Table 7: Likelihood of Occurrence Criteria

Likelihood	Criteria
Recorded	Recorded in the Survey Area from database searches, previous survey by others or by current survey.
High	Records of flora species <1 km from the Survey Area. With record <20 years old. Records of fauna species <5 km from the Survey Area. With record <20 years old; or For species with well understood and specific habitat preference/ requirements, when specific habitat is present in the Survey Area, and records present <10 km from the Survey Area. Species with general habitat preference, which is present in the Survey Area, and records present <5 km from the Survey Area.
Medium	There are records <10 km from the Survey Area, however: The species is strongly linked to a specific habitat, which is marginally suitable or small in extent in the Survey Area; or Species has a general habitat preference, but small extent of suitable habitat is present. There is suitable habitat in the Survey Area, but records are >10 km from Survey Area.
Low	Records are historical only, or are pre mapping procedures (e.g. records assigned to towns or place names). The species has a well understood and specific habitat preference/ requirements, which is absent from the Survey Area; or Suitable habitat is present, however there are no existing records of the species from the region despite reasonable previous search effort; or There is some suitable habitat in the Survey Area, however the species is very infrequently recorded in the locality (e.g. migratory bird species).

3.2 Flora and Vegetation Survey

3.2.1 Field Survey Timing and Survey Team

Biological surveys were undertaken by the survey team listed in Table 8 as per the below schedule.

- Two person days sampling flora and vegetation in October 2024 with five quadrats and three relevés sampled.
- One person days (October 2024) targeted search effort for Threatened and Priority flora.
- One person days sampling fauna and undertaking daytime black cockatoo and western ringtail possum assessment, October 2024.
- Two evening (non-concurrent nights) of western ringtail possum spotlighting transects, September 2024.

Table 8: Survey Team

Name	Position and Years of Experience	DBCA Licence No.
Andrew Fry	Associate Environmental Scientist-12 years	FB62000002-2; TFL 2223-0086
Taya Cherry	Graduate Environmental Consultant - 1 year	FB62000675

3.2.2 Floristic Sampling

Five quadrats and three relevés were sampled within the Survey Area boundaries. 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.

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.

3.2.3 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.

3.2.4 Targeted Threatened and Priority Flora Survey

Searches were undertaken prioritising survey effort on areas of most suitable habitat for species identified as potentially present by the desktop assessment. Targeted searches comprised of regularly spaced transects being walked at spacings of 10 metres through the most likely habitat. Any identified Threatened and Priority Flora was recorded by GPS, with population details and photographed.

3.2.5 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.

3.3 Fauna Survey

The basic fauna survey incorporated a number of survey techniques as per the Terrestrial Fauna Technical Guidance (EPA, 2020). A basic survey is a low-intensity survey, conducted at the local scale to gather broad fauna and habitat information. The primary objectives are to verify the overall adequacy of the desktop study, and to map and describe habitats, with a focus on habitat for conservation listed fauna.

Fauna species were identified by active searches, secondary evidence such as scats, tracks, calls, remains, diggings and other signs. A fauna inventory was not compiled as part of this survey (not required under basic level survey) however observations are used to inform the fauna habitat type assessment.

Potential habitats for conservation listed species were identified and evaluated.

3.3.1 Fauna Habitat Type Assessment

The fauna habitat types present within the Survey Area were defined considering landform, vegetation, structure such as rockpiles and logs and fauna assemblage occupying the area.

The following information was used to define and map all fauna habitat types within the Survey Area at specific fauna habitat assessment points and during traverses of the Survey Area:

- Land systems and landform.
- Vegetation type and condition mapping.
- Soil characteristics.
- Structure such as rockpiles and logs.
- Fauna assemblage information from desktop assessment and field observations.
- Aerial imagery and historic imagery.

Each fauna habitat type is described considering suitability for various fauna species groups or conservation-listed species. In addition, fauna habitat types likelihood to harbour specialised fauna species which are not found in adjacent areas was taken into consideration. Habitat types were delineated in the field and digitised upon return from the field survey.

3.3.2 Fauna Taxonomy

Terrestrial vertebrate fauna taxa were identified in the field by an experienced ecologist.

Taxonomy and nomenclature follow the WA Museum checklist 2022 (Western Australian Museum, 2022). Conservation status follows the DBCA Threatened and Priority fauna list (DBCA, 2022b). Where required verification of identification of secondary evidence (tracks, scats, diggings) may be undertaken by a relevant species group expert.

3.3.3 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, Baudin's black cockatoo and Carnaby's black cockatoo are most commonly present from February through to September, with forest red-tailed black cockatoo presence being flexible across the year. The timing of the survey in October 2024 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.

Breeding Habitat Assessment

The Commonwealth defines breeding habitat as trees species, 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) (1.3 m from the ground) to develop a hollow, including:

- Potential future nesting trees -eucalypts 300-500mm DBH
- Potential nesting trees Greater than 500 mm DBH for most Eucalypts (jarrah, marri or tuart); or
- 300 mm in the case of wandoo and salmon gum (DCCEEW, 2022).

All trees of species with the potential to form hollows (typically jarrah, marri and tuart) and with sufficient diameter (i.e. DBH >300 mm) were recorded using a mobile GIS field data collector platform. The following was recorded for each such tree:

- Species
- DBH (approximately 1.3 m from the ground)

- Coordinates and
- Presence of hollows (as observable form the ground).

In addition to Commonwealth guidelines for assessing potential breeding trees, a scoring system based on that developed by Dr Mike Bamford was applied to class potential breeding trees.

Table 9: Black cockatoo Potential Breeding Tree Class

Class	Description of Tree and Hollows/Activity
1	Active nest observed; adult (or immature) bird seen entering or emerging from hollow, eggs present.
2	Hollow of suitable size and angle visible with chew marks around entrance.
3	Potentially suitable hollow visible but no chew marks present; or potentially suitable hollow present (as suggested by structure of tree, such as large, vertical trunk broken off at a height of >10m).
4	Tree with hollows or broken branches that might contain hollows, but hollows or potential hollows are not of a suitable size, or are aligned or obstructed so as to prevent access
5	Tree lacking large hollows or broken branches that might have large hollows; a tree with more or less intact branches and a spreading crown.

Trees identified as having potentially suitable hollows present was inspected using a pole camera or small drone to inspect hollow internal dimensions. Hollow information that was recorded included:

- Size of entry.
- Estimated depth.
- Hollow type (knot, fissure, spout, vertical/chimney.
- Suitability for use.
- Evidence of use.
- Presence of other birds or bees.

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 Survey Area 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 E 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.

Roosting Habitat Assessment

Roosting habitat was assessed based on observation of roosting or roosting evidence recorded during survey and based on habitat suitability (generally tall trees in the landscape in proximity to a water source). During the field survey, searches were conducted for evidence of roosting (e.g. piles of scats, feeding debris or chewed trees).

3.3.4 Targeted Western Ringtail Possum Habitat Assessment

Searching was carried out for presence or signs of occurrence of western ringtail possum and for suitable habitat. This involved searching potentially suitable habitat for scats and dreys (possum nests). A nocturnal survey of identified habitat was also undertaken on two separate nights through approximate 20-50m spaced spotlighting traverses following suitable habitat.

An assessment of habitat quality was undertaken utilising the Habitat Scoring System for Western Ringtail Possum (DCCEEW, n.d.) methodology. See Appendix E for method details.

4. Results

4.1 Previous Desktop Assessment

In 2022, the Government of Western Australia Department of Finance (Statutory Planning and Asset Policy) prepared a Desktop Site Investigation Report (GoWA, 2022). The report is provided as Appendix F with relevant information on environmental values found in section 5.2.

The desktop assessment identified that the vegetation present within the Survey Areas had been completely cleared during the construction of the hospital, and that the majority of vegetation present had been planted or had regrown since.

The Desktop Site Investigation Report (GoWA, 2022) identified the following of relevance to the Survey Areas:

- The Survey Area was heavily developed and historically cleared. The Survey Area intersects with an Environmental Sensitive Area
- The Lake and northern portion of the Survey Area intersects with a Multiple Use wetland, while the southern portion of the Survey Area intersects with a Conservation Category wetland.

All of the remnant vegetation was identified as Category C (medium) Suitability for Western Ringtail Possum Habitat, as well as requiring investigation for Carnaby's Cockatoo feeding habitat area. The Desktop Site Investigation Report is provided as Appendix F (see section 5.2).

4.2 Flora and Vegetation Desktop Assessment

Conservation Significant Flora

The DBCA database and Commonwealth PMST searches identified 66 conservation listed flora species as occurring within 20 km of the Survey Area or with suitable habitat potentially occurring in the region. No previous records are present within the Survey Area.

See Appendix C for database search results and likelihood of occurrence assessment table.

Conservation Significant Communities

The desktop assessment identified that 17 Threatened Ecological Communities (TECs) and Priority Ecological Communities (PECs) occur within 10 km of the Survey Area. The desktop assessment identified that the Survey Area intersects with the mapped potential occurrence or the buffer zone of an occurrence for four of the communities. These are discussed in more detail in Table 10.

Table 10: TECs and PECs Potentially Intersecting Survey Area

Floristic Community Type	Community name	Conservation Status		Discussion
		State	Federal	
SCP08/ Claypans of the Swan Coastal Plain	Herb rich shrublands in clay pans (floristic community type 8 as originally described in Gibson et al. (1994))	VU	CE	Occurrence is within the Hay Park sporting complex. Occurs on the west side of Bussel Hwy- Survey Area is on east side of Bussel Hwy. Survey Area intersects buffer zone only.
SCP18	Shrublands on calcareous silts of the Swan Coastal Plain (floristic community type 18 as originally described in in Gibson et al. (1994))	VU	-	Occurrence is within the Hay Park sporting complex. Occurs on the west side of Bussel Hwy- Survey Area is on east side of Bussel Hwy. Survey Area intersects buffer zone only.
Banksia WL SCP	Banksia Woodlands of the Swan Coastal Plain ecological community	P3	EN	Survey Area intersects with mapped potential occurrence.
Tuart woodlands	Tuart (Eucalyptus gomphocephala) woodlands and forests of the Swan Coastal Plain	P3	CR	Survey Area intersects with mapped potential occurrence.

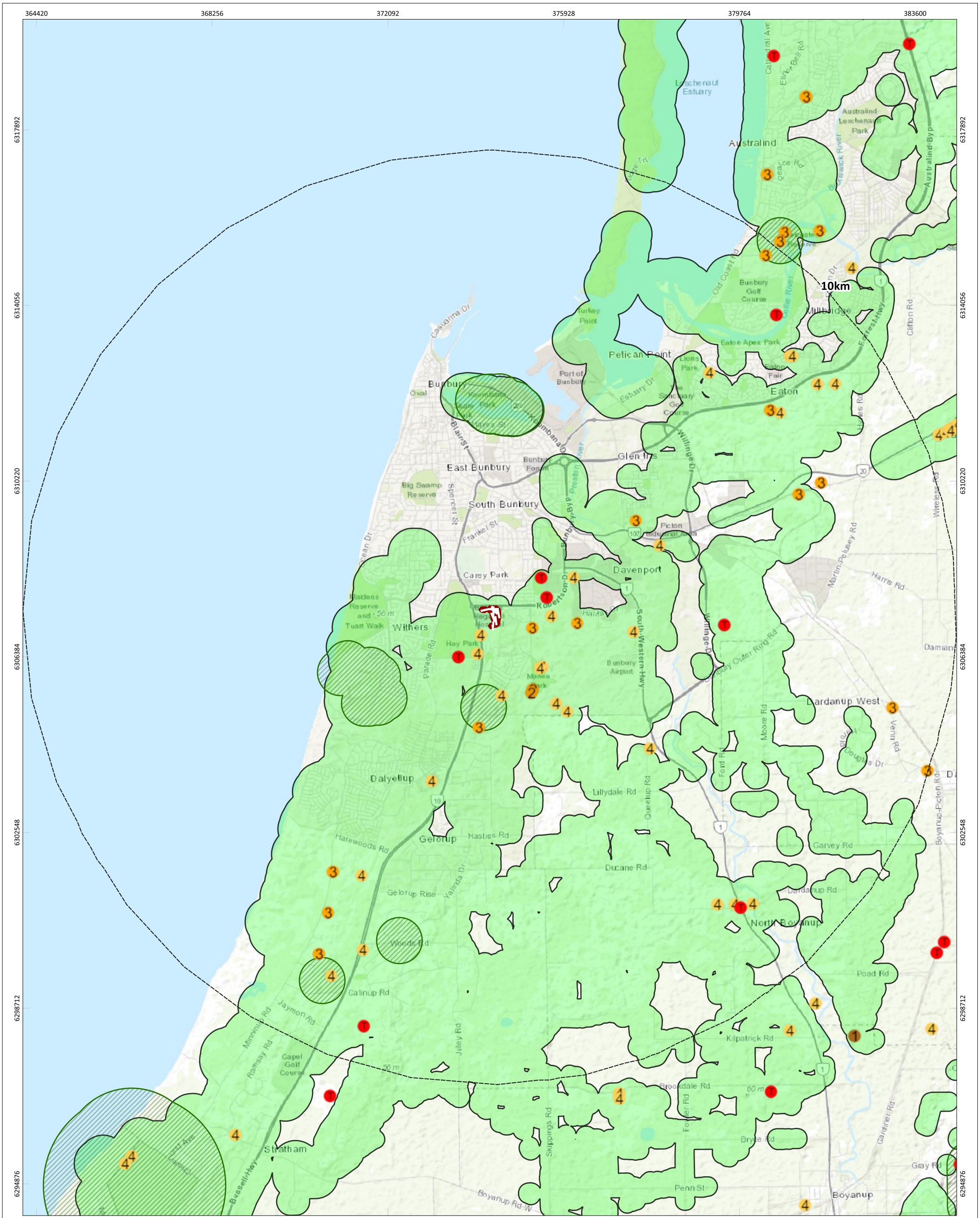

Figure 7: Database Search Results Flora and Communities

0 1 2 km

N

PROJECT/REPORT NAME	Bunbury Hospital Biological Survey Bunbury Hospital, Southwest Health Campus
SCALE	1:76,728
SHEET SIZE	A3 COLOUR
CLIENT	Multiplex
COORDINATE REFERENCE SYSTEM	GDA2020 / MGA zone 50
PROJECT NUMBER	P24.096
VERSION	0
DATA SOURCE	LANDGATE AERIAL IMAGERY Summer 2023
DRAWN BY / REVIEWED BY	JP/TC
DATE	17/10/2024

Legend

- Survey Area
- Threatened Ecological Communities (DBCA-038)
  - Priority
  - Threatened
- Threatened and Priority Flora (DBCA-036)
  - 1 Priority 1
  - 2 Priority 2
  - 3 Priority 3
  - 4 Priority 4
  - 1 Threatened

No	Description	Drawn	Approved	Date
A	Original issue	JP	TC	17/10/2024

NOTES:

Cadastral boundary (LGATE-002). Label corresponds to the vegetation association number.

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4.3 Flora and Vegetation Field Survey

4.3.1 Flora

A total of 89 vascular flora species were recorded within the Survey Area from five quadrats and three relevés. Thirty-five of these species were weeds. Historical clearing has resulted in much of the Survey Area comprising a regrowth community with reduced native species diversity.

4.3.2 Threatened and Priority Flora

No Threatened and Priority flora were recorded, and no species of other conservation significance were identified. No Threatened and Priority flora species identified by the desktop assessment are considered likely to occur under the post survey assessment.

4.3.3 Vegetation

Vegetation Types

Eight vegetation types were identified at the Survey Area. Five vegetation types are considered to represent native vegetation, ranging from Good to Completely Degraded Condition. Three vegetation types which are not classified as native vegetation comprise native landscaping type plantings, cleared areas or non-endemic planted species. Due to the primarily degraded condition of the Survey Area, low species diversity and the majority of vegetation being influenced by replanting or historical clearing a formal Floristic Community Type (FCT) associations assessment was not undertaken.

The vegetation types are described below in Table 11 and shown in Figure 8.

Table 11: Vegetation Types Present in the Survey Area

Vegetation Unit Description	Total Area, Proportion (%) of the Survey Area	Quadrats/Releve Numbers	Vegetation Condition	Photograph
VT01 – Banksia woodland (native vegetation) (Representative of Banksia woodland TEC) *Banksia attenuata, Eucalyptus marginata, Corymbia calophylla* mid open forest over *Acacia pulchella* and *Macrozamia riedlei* mid sparse shrubland over *Hibbertia hypericoides, Stirlingia latifolia*, **Ehrharta longiflora* low shrubland/mid sparse tussock grassland. An area of remnant native vegetation that has not previously been cleared.	0.749 ha 20.49 %	Q02 Q04 Q05	Degraded or Good	
VT02 – Planted red gum and peppermint trees woodland (native vegetation) *Agonis flexuosa* low woodland over **Oxalis pes-caprae*, **Chasmanthe floribunda* and **Fumaria capreolata* mid forbland. This vegetation was previously cleared as of 2001. Vegetation now present is a combination of planted *Eucalyptus camaldulensis* and potentially planted *Agonis flexuosa* with some native regrowth.	0.618 ha 16.90 %	Q01	Degraded	

Vegetation Unit Description	Total Area, Proportion (%) of the Survey Area	Quadrats/Releve Numbers	Vegetation Condition	Photograph
VT03 – Marri woodland over mixed weeds and scattered *Machaerina juncea* (native vegetation) *Corymbia calophylla* mid open forest over *Kunzea glabrescens* tall sparse shrubland over **Ehrharta longiflora*, **Briza maxima*, **Fumaria capreolata* mid forbland/tussock grassland. An area of remnant *Corymbia calophylla* trees. Mid and understory has been previously cleared.	0.318 ha 8.72 %	Q03	Degraded	
VT04 – Fringing wetland (native vegetation) **Eucalyptus camaldulensis*, *Casuarina obesa* and *Agonis flexuosa* low woodland over *Melaleuca teretifolia*, *Kunzea glabrescens* and **Acacia longifolia* tall shrubland over *Machaerina juncea*, **Briza maxima*, **Fumaria capreolata* mid open sedgeland/open tussock grassland/open forbland. This vegetation was previously cleared as of 2001. Now an area of mixed plantings of non-endemic West Australian native species and Bunbury region endemic species. A significant portion of	0.518 ha 14.19 %	REL02	Degraded	

Vegetation Unit Description	Total Area, Proportion (%) of the Survey Area	Quadrats/Releve Numbers	Vegetation Condition	Photograph
vegetation present is natural regeneration by endemic species that have established from adjacent bushland (likely from drainage inflows).				
VT05 – Isolated marri trees (native vegetation) An area of remnant *Corymbia calophylla* trees. Mid and understory has been cleared.	0.073 ha 2.01 %	REL01	Completely Degraded	

Vegetation Unit Description	Total Area, Proportion (%) of the Survey Area	Quadrats/Releve Numbers	Vegetation Condition	Photograph
VT06 – Planted Eucalypts and shrubs (non-native) Non endemic or non-native planted species.	0.116 ha 3.19 %	REL03	Completely Degraded to Degraded	
VT07 – Cleared land and non-native vegetation (non-native)	1.256 ha 34.37 %	REL01 REL03	Completely Degraded	-
VT08 – Pine trees (non-native)	0.005 ha 0.14 %	REL01	Completely Degraded	-
Total	**3.654 ha**			

Vegetation Condition

The vegetation of the Survey Area ranged from Good to Completely Degraded with the majority in Degraded condition. See Table 12 and Figure 9.

Table 12: Vegetation Condition Extents of the Survey Area (as per EPA, 2016 condition scale)

Vegetation Condition	Extent (ha)	Extent (%)
Excellent	-	-
Very Good	-	-
Good	0.749 ha	20.49 %
Degraded	1.482 ha	40.55 %
Completely Degraded	1.424 ha	38.97 %
Total	**3.654 ha**	**100** %

The degraded condition of the vegetation with the Survey Area is a result of historical clearing, grazing and construction of the Bunbury Hospital, as seen in section 2.7 Land use history.

4.3.4 Threatened and Priority Ecological Communities

Of the four TECs and PECs identified by the pre survey desktop assessment as having a mapped potential occurrence or the buffer zone of an occurrence intersecting the Survey Area one was identified as present. Results of a presence/absence assessment are provided below in Table 13. 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.

Table 13: Assessment of TEC PEC Presence or Absence

Floristic Community Type	Community name	Conservation Status		Occurrence and Justification
		State	Federal	
SCP08/ Claypans of the Swan Coastal Plain	Herb rich shrublands in clay pans (floristic community type 8 as originally described in Gibson et al. (1994)) Aligns with the EPBC listed Claypans of the Swan Coastal Plain Ecological Community	VU	CE	**Does not occur** No claypan landforms or soils are present. The wetlands present are constructed drainage basins with a sandy substrate. The nearby mapped occurrence is within the Hay Park sporting complex. Occurs on the west side of Bussel Hwy- Survey Area

Floristic Community Type	Community name	Conservation Status		Occurrence and Justification
		State	Federal	
				is on east side of Bussel Hwy. Survey Area intersects buffer zone only.
SCP18	Shrublands on calcareous silts of the Swan Coastal Plain (floristic community type 18 as originally described in in Gibson et al. (1994))	VU	-	**Does not occur** No calcareous silt flat landforms are present. The wetlands present are constructed drainage basins with a sandy substrate The nearby mapped occurrence is within the Hay Park sporting complex. Occurs on the west side of Bussel Hwy- Survey Area is on east side of Bussel Hwy. Survey Area intersects buffer zone only.
Banksia WL SCP	Banksia Woodlands of the Swan Coastal Plain ecological community	P3	EN	**Occurs** See detailed assessment below.
Tuart woodlands	Tuart (Eucalyptus gomphocephala) woodlands and forests of the Swan Coastal Plain	P3	CR	**Does not occur** Definitive species *Eucalyptus gomphocephala* does not occur within Survey Area.

Banksia Woodlands of the Swan Coastal Plain TEC Assessment

The pre survey desktop assessment identified that DBCA database mapping indicates the potential presence of the Banksia Woodlands of the Swan Coastal Plain TEC (The Banksia Woodland TEC). The field survey confirmed that areas of vegetation within VT01 Banksia 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. Minium 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 potential Banksia Woodland TEC was identified. The assessment of these patches against the criteria are presented in Table 14 and displayed in Figure 10.

Table 14: Banksia Woodland TEC Assessment (As per Conservation Advice)

Characteristic	Key Diagnostic Criteria	Patch 01
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 the deep yellow sands, pale deep sands and yellow/brown shallow sands of the Spearwood Soil Landscape Mapping System (DPIRD-064). All patches meet criterion
Structure	• Low woodland to forest structure • Distinctive upper tree layer or tall shrub layer of Banksia species at >2% cover. • May have emergent trees of *Eucalyptus* or *Allocasuarina* • 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:** All patches within VT01 comprised a woodland structure with a canopy layer dominated by *Banksia attenuata* at >2% cover with emergent *Eucalyptus marginata.*

Species composition	• Canopy is most commonly dominated or co-dominated by and must include at least one of the following species:
	  • *Banksia attenuata*
	  • *Banksia menziesii*
	  • *Banksia prionotes*
	  • *Banksia ilicifolia*
		Meets criterion:
		All patches within VT01 are dominated or co dominated by *Banksia attenuata*, with emergent *Eucalyptus marginata.*

Step 02		
Condition thresholds	• To be considered as a part of the ecological community a patch should meet at least the Good Condition category.	Good to Degraded condition. Majority of the patch is in Good Condition. See Step 4 for further assessment

Characteristic	Key Diagnostic Criteria	Patch 01
Step 03		
Size and condition thresholds	• '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	Meets criterion. Patch covers 0.748 ha of Good condition within Survey Area. Patch continues outside the Survey Area which appears to meet Banksia TEC criterion and comprises at least 5 ha of Good condition. Likely forms part of a large extent of Banksia TEC.
Step 04		
Assessing variation in canopy cover, quality or condition.	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". 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.	Meets criterion. Patch within Survey Area contains: • 0.748 ha Good Average patch condition is Good.
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.
Conclusion		**Meets Criterion** 0.748 ha patch

Figure 8: Vegetation Types

0 10 20 30 40 m

N

PROJECT/REPORT NAME: Bunbury Hospital Biological Survey Bunbury Hospital, Southwest Health Campus		
SCALE: 1:1,519	SHEET SIZE: A3 COLOUR	CLIENT: Multiplex
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	PROJECT NUMBER: P24.096	VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY Summer 2023	DRAWN BY / REVIEWED BY: JP/TC	DATE: 14/11/2024

Legend

- Survey Area
- Releve
- Quadrat

Vegetation Type

- VT01 - Banksia woodland
- VT02 - Planted red gum and peppermint trees woodland
- VT03 - Marri woodland over mixed weeds and scattered Machaerina juncea
- VT04 - Fringing wetland
- VT05 - Isolated marri trees
- VT06 - Planted Eucalypts and shrubs
- VT07 - Cleared land and non-native vegetation
- VT08 - Pine tree

No	Description	Drawn	Approved	Date
A	Original issue	JP	TC	14/11/2024

NOTES:

Cadastral boundary (LGATE-002). Label corresponds to the vegetation association number.

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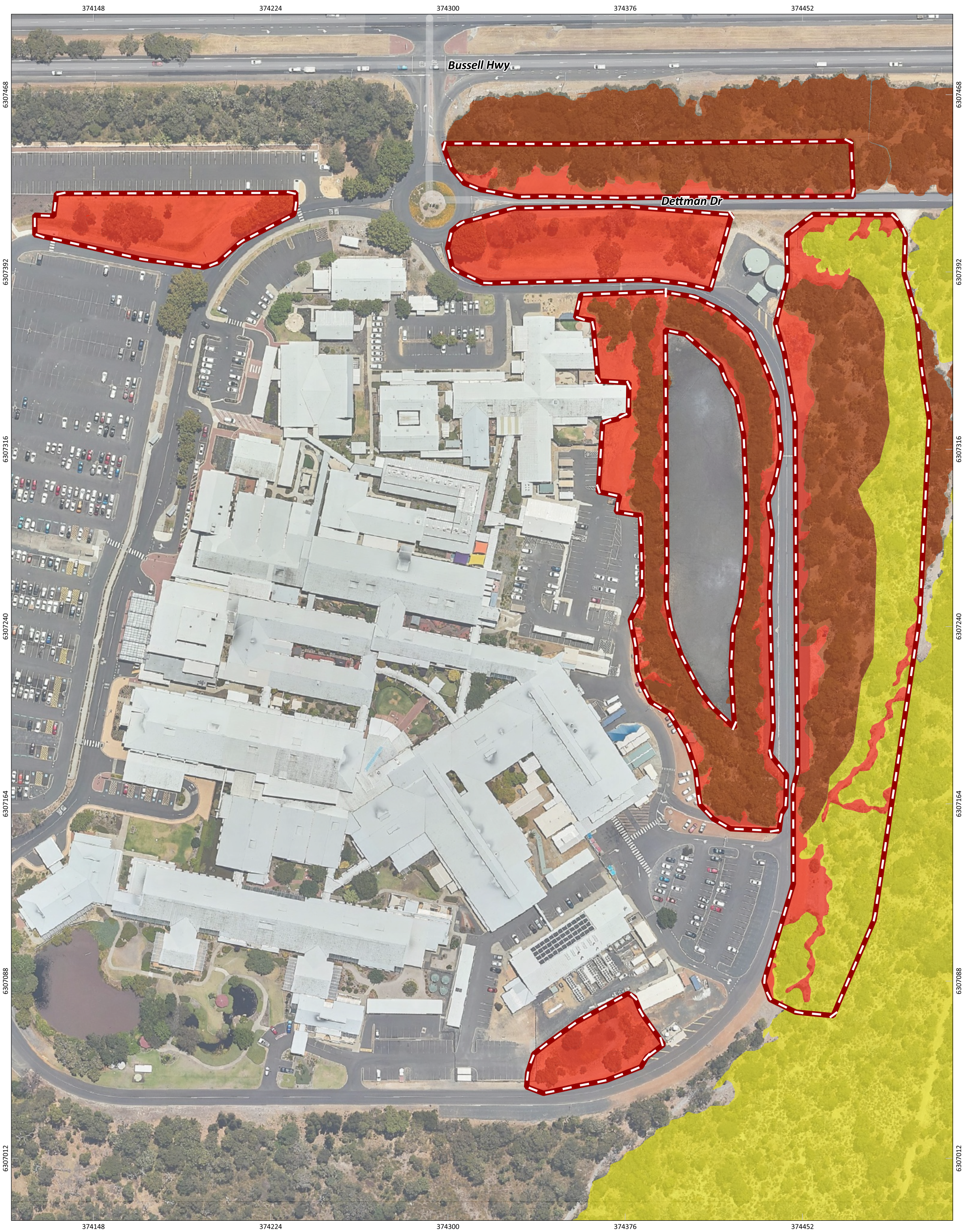

Figure 9: Vegetation Condition

N

0 10 20 30 40 m

PROJECT/REPORT NAME: Bunbury Hospital Biological Survey Bunbury Hospital, Southwest Health Campus		
SCALE: 1:1,519	SHEET SIZE: A3 COLOUR	CLIENT: Multiplex
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	PROJECT NUMBER: P24.096	VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY Summer 2023	DRAWN BY / REVIEWED BY: JP/TC	DATE: 29/11/2024

Legend

- SurveyArea

Vegetation Condition

- Completely Degraded
- Degraded
- Good

No	Description	Drawn	Approved	Date
A	Original issue	JP	TC	29/11/2024

NOTES:

Cadastral boundary (LGATE-002). Label corresponds to the vegetation association number.

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Figure 10: Banksia Woodland TEC Extent

N

0 10 20 30 40 m

PROJECT/REPORT NAME: Bunbury Hospital Biological Survey Bunbury Hospital, Southwest Health Campus		
SCALE: 1:1,519	SHEET SIZE: A3 COLOUR	CLIENT: Multiplex
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	PROJECT NUMBER: P24.096	VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY Summer 2023	DRAWN BY / REVIEWED BY: JP/TC	DATE: 16/10/2024

Legend

- Survey Area
- Banksia woodland

No	Description	Drawn	Approved	Date
A	Original issue	JP	TC	16/10/2024

NOTES:

Cadastral boundary (LGATE-002). Label corresponds to the vegetation association number.

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4.4 Fauna Desktop Assessment

A Commonwealth PMST search along with an assessment by an experienced ecologist was undertaken to inform potential presence of conservation significant fauna within the Survey Area. Thirty-eight conservation listed fauna species were identified as having suitable habitat potentially occurring in the region.

- Thirty-two bird species.
- Four mammal species
- Two fish or other species.

The results of the DBCA publicly available information search are shown in Figure 11.

Fauna Likelihood of Occurrence

Species listed as Marine only under the EPBC Act (e.g. sharks, whales, turtles) have been excluded from the likelihood of occurrence list as there is no marine habitat present.

The likelihood of occurrence for conservation listed fauna species found that:

Five species were recorded as present or having been present in last year (from foraging evidence):

- *Pseudocheirus occidentalis* (western ringtail possum)-CE
- *Isoodon fusciventer (*quenda)-P4
- *Calyptorhynchus banksia naso* (forest red-tailed black cockatoo) – VU.
- *Calyptorhynchus baudinii* (Baudin's black cockatoo) – EN.
- *Calyptorhynchus latirostris* (Carnaby's black cockatoo)-EN

One species had a high likelihood of occurrence:

- *Phascogale tapoatafa wambenger* (southwestern brush-tailed phascogale)-CD

The species assessed as low likelihood of occurrence are species that are locally extinct, have no recent records or for which no suitable habitat is present (e.g. wading birds).

4.5 Fauna Field Survey

4.5.1 Fauna Assemblage

As per the scope of a basic fauna survey under the Technical Guidance the primary objectives are to verify the overall adequacy of the desktop study, and to map and describe habitats, with a focus on habitat for conservation listed fauna.

4.5.2 Fauna Habitat Types

Two habitat types were described which aligned with mapped vegetation boundaries.

For possibly occurring conservation listed fauna species, habitat types are assessed as either core, supporting or non-significant habitat. As per Commonwealth Matters of National Environmental Significance – Significant Impact Guidelines 1.1 "core" habitat is defined as that critical to the survival of the species and considered to contain denning/ breeding sites, primary foraging areas and refuge from drought, fire and other stresses (DotE, 2013). "Supporting" habitat is defined as that which is likely used for foraging and dispersing/ connective purposes but is not essential habitat for the continuation of a local population. "Non-significant" habitat is that which would be used only very infrequently for foraging or dispersing.

Native Vegetation (FHT-01)

This fauna habitat type comprises of the extents of VT01, VT02, VT03, VT04 and VT05. Total area is 2.277 ha

Habitat consists of good to completely degraded native vegetation. Varying from woodland structure to isolated trees. Ground structure is variable in patches, most areas consisting of mixed weed understorey to shrubland/sedgeland dependent on condition.

Areas of connective vegetation provide core habitat for western ringtail possum and supporting habitat for quenda, southwestern brush-tailed phascogale and foraging habitat for black cockatoo species.

Non-native Vegetation (FHT-02)

Habitat consists of completely degraded areas and non-native vegetation, including park lands, cleared areas and planted non-endemic trees and shrubs. Total area is 1.377 ha. Mature trees may provide some habitat value for bird species. However, there is absence of sufficient connectivity between canopy for arboreal mammals to effectively utilise the habitat. The open ground layer provides low to no value for ground dwelling species. No significant habitat for all conservation fauna species is present.

4.5.3 Threatened and Priority Fauna

Five species of conservation significance were recorded in the Survey Area. These are:

- *Pseudocheirus occidentalis* (western ringtail possum)-CE
- *Isoodon fusciventer* (quenda)-P4
- *Calyptorhynchus banksia naso* (forest red-tailed black cockatoo) – VU.
- *Calyptorhynchus baudinii* (Baudin's black cockatoo) – EN.
- *Calyptorhynchus latirostris* (Carnaby's black cockatoo)-EN

Specific targeted assessments for black cockatoo species and western ringtail possum were undertaken and are presented in Sections 4.6 and 4.7.

Other fauna species of conservation significance which were recorded or assessed as having a high or medium likelihood of occurrence are discussed in detail below:

Isoodon fusciventer (quenda, southwestern brown bandicoot) – P4

One observation of distinctive foraging digging marks was recorded in VT01. The single observation of foraging suggests the species is present at times but not abundant within the Survey Area.

Quendas are widely distributed in southwest WA and are associated with wetlands and fringing areas with dense cover of shrubs and sedges adjoining areas of woodland and grassland. Quenda will forage in grasslands or paddocks when adjacent to dense cover. Quenda are commonly recorded in bushland of Manea Park surrounding the Survey Area.

Native vegetation (FHT-01) provides supporting habitat for quenda.

Phascogale tapoatafa wambenger (southwestern brush-tailed phascogale)-CD

Found in dry forests and woodlands with connective canopy of large mature trees containing hollows and denning opportunities. An arboreal species foraging is undertaken on trees and large logs and dead trees.

Recent records are present within 5km of the Survey Area and the species is commonly recorded in bushland in the Bunbury region. Habitat type FHT01 is supporting habitat, with the species likely being occasionally present foraging or dispersing across the area.

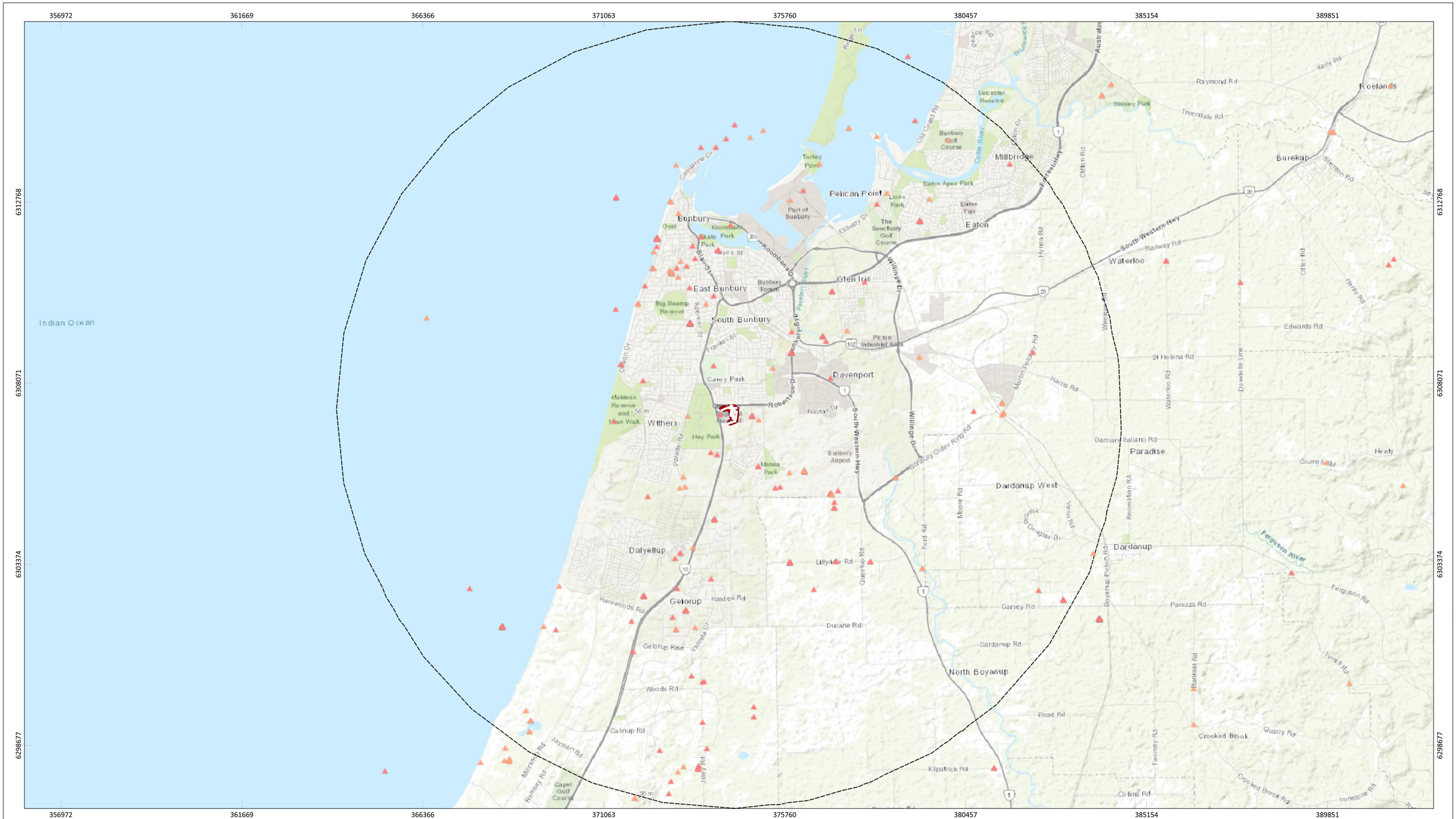

Figure 11: DBCA Database Search Results Fauna

N

0 2.8 5.6 km

PROJECT/REPORT NAME: Bunbury Hospital Biological Survey Bunbury Hospital, Southwest Health Campus		
SCALE: 1:93,932	SHEET SIZE: A3 COLOUR	CLIENT: Multiplex
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	PROJECT NUMBER: P24.096	VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY Summer 2023	DRAWN BY / REVIEWED BY: JP/TC	DATE: 31/10/2024

Legend

- Survey Area

Threatened and Priority Fauna (DBCA-037)

- Threatened - Endangered
- Threatened - Vulnerable

No	Description	Drawn	Approved	Date
A	Original issue	JP	TC	31/10/2024

NOTES:

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

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4.6 Black Cockatoo

Observations and Previous Records

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

A confirmed Carnaby's black cockatoo breeding location is present approximately 28 km southwest of the Survey Area (DBCA-054) in the Ludlow Tuart Forest. The Survey Area does not overlap with the (12 km) key foraging area buffer of this confirmed breeding location. Nine mapped black cockatoo roosting sites are present within 6 km, with one buffer zone intersecting the Survey Area, five to the south and three to the northeast of the Survey Area (DBCA-64). All are confirmed Carnaby's black cockatoo roost sites (no specific ID code supplied) (DBCA-64). See Figure 12.

Foraging evidence (chewed marri nuts) for all three species was recorded during the field survey. Foraging evidence or observation of individuals were recorded at two locations for Baudin's black cockatoo, four locations for Carnaby's and one location for forest red-tailed. See Figure 13 for locations.

Breeding Habitat Assessment

Potential black cockatoo breeding trees are defined as those which either have a suitable nest hollow or are of a suitable DBH (> 500 mm for most species, >300mm for wandoo and salmon gum) to develop a hollow (DEECCW, 2022). Potential future breeding trees, being eucalypts with DBH of 300-500mm are also recorded. Breeding typically occurs in native eucalypt species particularly marri, jarrah, wandoo and tuart however many species of eucalypt including non-endemic species may develop suitable hollows for breeding (DEECCW, 2022). A summary of understood suitable nesting hollow characteristics for the three species is provided below in Table 15.

Table 15: Black Cockatoo Nesting Hollow Characteristics

Species	Baudin's Black cockatoo	Carnaby's Black cockatoo	Forest Red-tailed Black cockatoo
Tree species and hollow characteristic	Nesting mainly in karri, marri, jarrah, wandoo, bullich, and tuart Preferred hollow dimensions have not been specifically studies but are considered likely to be similar to that of the Carnaby's Black cockatoo	Nesting mainly in salmon gum, wandoo, tuart, jarrah, flooded gum, karri and marri. Utilise hollows from 10-65 cm diameter (average 26 cm) and >1 m deep	Nesting mainly in jarrah, marri, karri, wandoo, bullich, blackbutt and tuart Utilise hollow from 12-150 cm diameter (average 34 cm) and >1 m depth
Sources	DCCEEW, 2022.	DCCEEW, 2022, Saunders et al., 2014a, Saunders et al., 2014b.	DCCEEW, 2022, Johnstone et al., 2013.

A total of 74 potential/ future potential breeding trees were recorded. See Figure 13 for tree locations and Appendix G for summary of tree locations, species, DBH and tree health. No evidence of current or previous nesting behaviour such as chew marks at hollow entrance attributed to black cockatoos, or flushed individuals were recorded. A breakdown of potential nesting trees by Bamford Class and DAWE, 2022 terminology is shown below in Table 16.

Table 16 Summary of Potential Nesting Trees

Bamford Class	Class 1	Class 2	Class 3	Class 4	Class 5	No Class	Totals (Trees)
DAWE, 2022 Terminology	Known Nesting Tree		Suitable Nesting Tree	Potential Nesting Tree	Potential Nesting Tree	Potential Future Nesting Tree	
Tree Species							
Dead (Species not confirmed)				3			**3**
Jarrah				3	4	10	**17**
Marri			1	3	20	20	**44**
River Red gum					4	6	**10**
Total (Bamford Class			**1**	9	**28**	**36**	**74**

The large majority of marked trees (64 trees) did not show signs of potential nesting hollow development (Class 5 or No Class trees). Nine trees were assessed as possessing small hollows which are of an insufficient size to support nesting (<10cm entrance); or which have an entrance of >10cm but the internal dimensions are not suitable, or the hollow is not accessible (Class 4 trees). These Class 4 trees are however of sufficient age and growth form to be developing hollows. One tree was assessed from ground observation as potentially being a Suitable Nesting Trees (Class 3). The tree which is located in the north of the Survey Area near Robertson Drive is a large marri with a 30cm diameter upwards facing hollow entry. The hollow is currently filled with a large bee nest making it currently unsuitable for use. No Known Nesting Trees (Class 1 or 2) were recorded.

Foraging Habitat Assessment

Habitats within the Survey Area contain species which comprise suitable foraging habitat. The native vegetation of FHT-01 is characterised by foraging species for all three black cockatoo species including marri, jarrah, banksia, sheoak and small fruited eucalyptus species. Within FHT-02 (non-native vegetation) there are very few high value foraging species with the majority comprised of cleared areas, scattered/planted low foraging value eucalypts and other areas of non-native vegetation.

The Commonwealth referral guidelines 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 17. Scores of 5-10 are identified as representing high value foraging habitat.

Table 17: Foraging Quality Scoring Tool (DCCEEW, 2022)

Attribute	Baudin's Black cockatoo	Carnaby's Black cockatoo	Forest Red-tailed Black cockatoo
Starting score	10- contains native eucalypt woodland with marri	10- eucalypt woodland/ paddock trees with marri and wandoo	10- eucalypt woodland/ paddock trees with marri and wandoo
Foraging potential (-2 if no foraging evidence)	No change, foraging evidence present	No change, foraging evidence present	No change, foraging evidence present
Connectivity (-2 if no other foraging habitat in 12km)	No change, other foraging habitat <12 km away	No change, other foraging habitat <12 km away	No change, other foraging habitat <12 km away
Proximity to breeding habitat (-2 if no breeding habitat in 12km)	-2, No recorded breeding habitat within 12 km	-2, No recorded breeding habitat within 12 km	-2, No recorded breeding habitat within 12 km
Proximity to roosting (-1 if >20km from known night roost)	No change, known roosting site <20 km distant	No change, known roosting site <20 km distant	No change, known roosting site <20 km distant
Impact from significant plant disease (-1 if >50% impact)	No change, impact from plant disease affecting <50% of foraging plants	No change, impact from plant disease affecting <50% of foraging plants	No change, impact from plant disease affecting <50% of foraging plants
Total score	8	8	8

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 18 below and shown in Figure 14. The score was calculated as per the criteria listed in Appendix E.

Table 18: Habitat Quality Scoring Tool- Site Condition Extent

Site Condition	Carnaby's Black Cockatoo (ha)	Baudin's Black Cockatoo (ha)	Forest Red-tailed Black Cockatoo (ha)
7- Very High	-	-	-
6- High	1.146	1.146	0.392
5-Moderate-High	-	-	0.749
4-Moderate	-	-	0.545
3-Low-Moderate	0.545	0.545	-
2-Low	0.707	0.707	0.707
1-Negligable to Low	1.137	1.137	1.142
0-None	0.119	0.119	0.119
Total	**3.654**	**3.654**	**3.654**

The Habitat Quality Scoring Tool then requires the application of a Site Context score out of three (see Table 19) which is added to the Site Condition score for a final x/10 score. See Table 20 for final Habitat Quality Scoring Tool score. Note that habitat with a Site Condition starting score of 2 or less are unlikely to be suitable habitat and do not have a Site Context score added.

Table 19: 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 20: Final Habitat Quality Scoring Tool Score

Site Condition	Carnaby's Black Cockatoo (ha)	Baudin's Black Cockatoo (ha)	Forest Red-tailed Black Cockatoo (ha)
10	-	-	-
9	1.146	1.146	0.392
8	-	-	0.749
7	-	-	0.545
6	0.545	0.545	-
5	-	-	-
4	-	-	-
3	-	-	-
2	0.707	0.707	0.707
1	1.137	1.137	1.142
0	0.119	0.119	0.119
Total	3.654	3.654	3.654

Roosting Habitat Assessment

Known roost sites are present <6km from the Survey Areas, with one buffer zone intersecting with the Survey Area. (DBCA-064). No evidence of scat marking, branch clipping or feather dropping was recorded suggesting that the location is not a highly frequented roosting location.

Night roosting locations are typically in proximity to foraging habitat (Black cockatoos mainly foraging within 20km of night roosts) and with access to water points <2km from roosting location (DCCEEW, 2022). Any groups of tall trees, particularly large native eucalypts in proximity to water sources may provide night roosting habitat (DCCEEW, 2022). Throughout the Survey Area, isolated stands of tall (> 10 m) eucalypts are scattered which may provide suitable roosting habitat. Access to permanent water is present from the lake within the Survey Area.

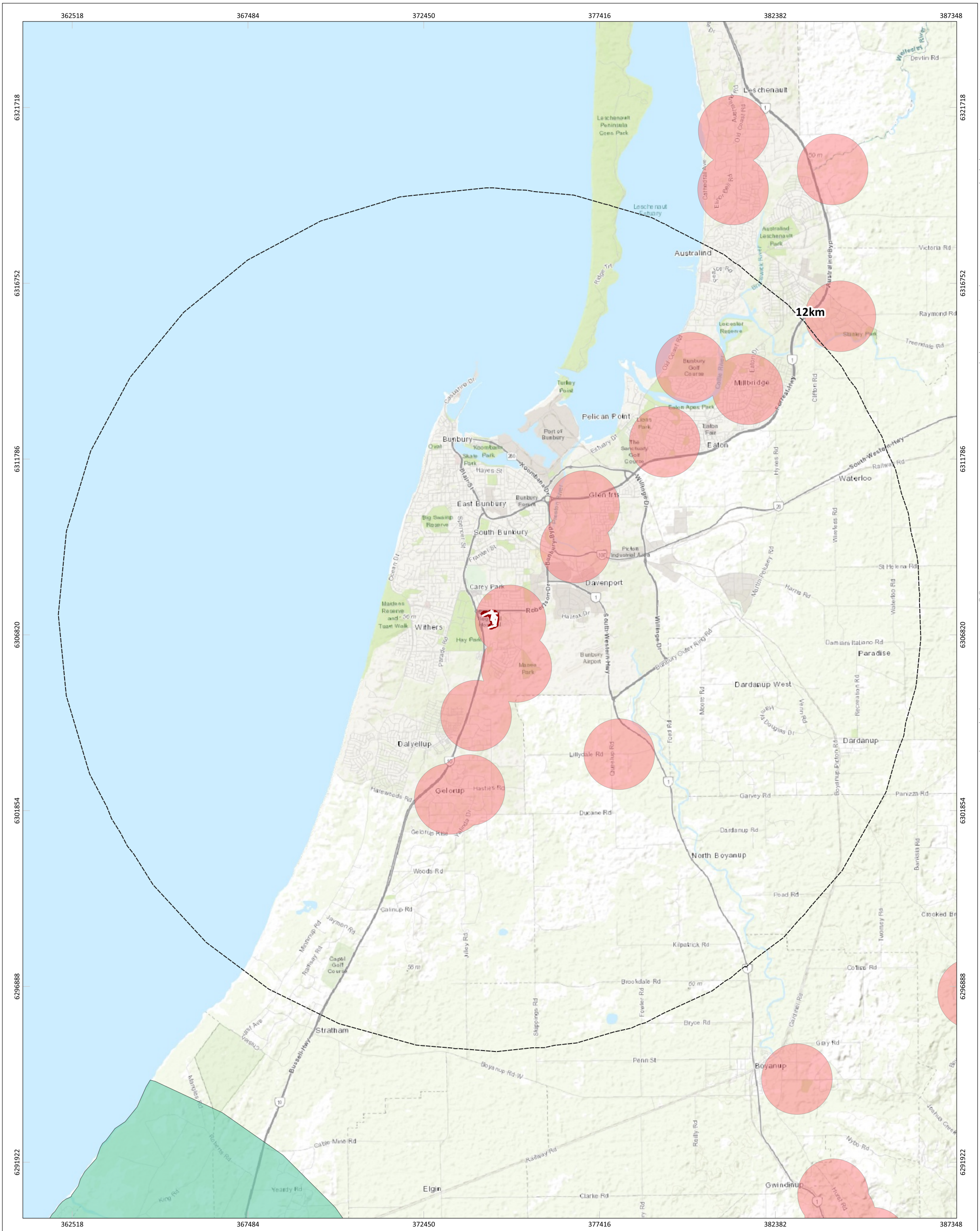

Figure 12: Known Black Cockatoo Roosting and Breeding Sites within 12 km Buffer

N

0 1 2 3 km

PROJECT/REPORT NAME: Bunbury Hospital Biological Survey Bunbury Hospital, Southwest Health Campus			
SCALE: 1:99,313	SHEET SIZE: A3 COLOUR	CLIENT: Multiplex	
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50		PROJECT NUMBER: P24.096	VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY Summer 2023		DRAWN BY / REVIEWED BY: JP/TC	DATE: 15/10/2024

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)

No	Description	Drawn	Approved	Date
A	Original issue	JP	TC	15/10/2024

NOTES:

Cadastral boundary (LGATE-002). Label corresponds to the vegetation association number.

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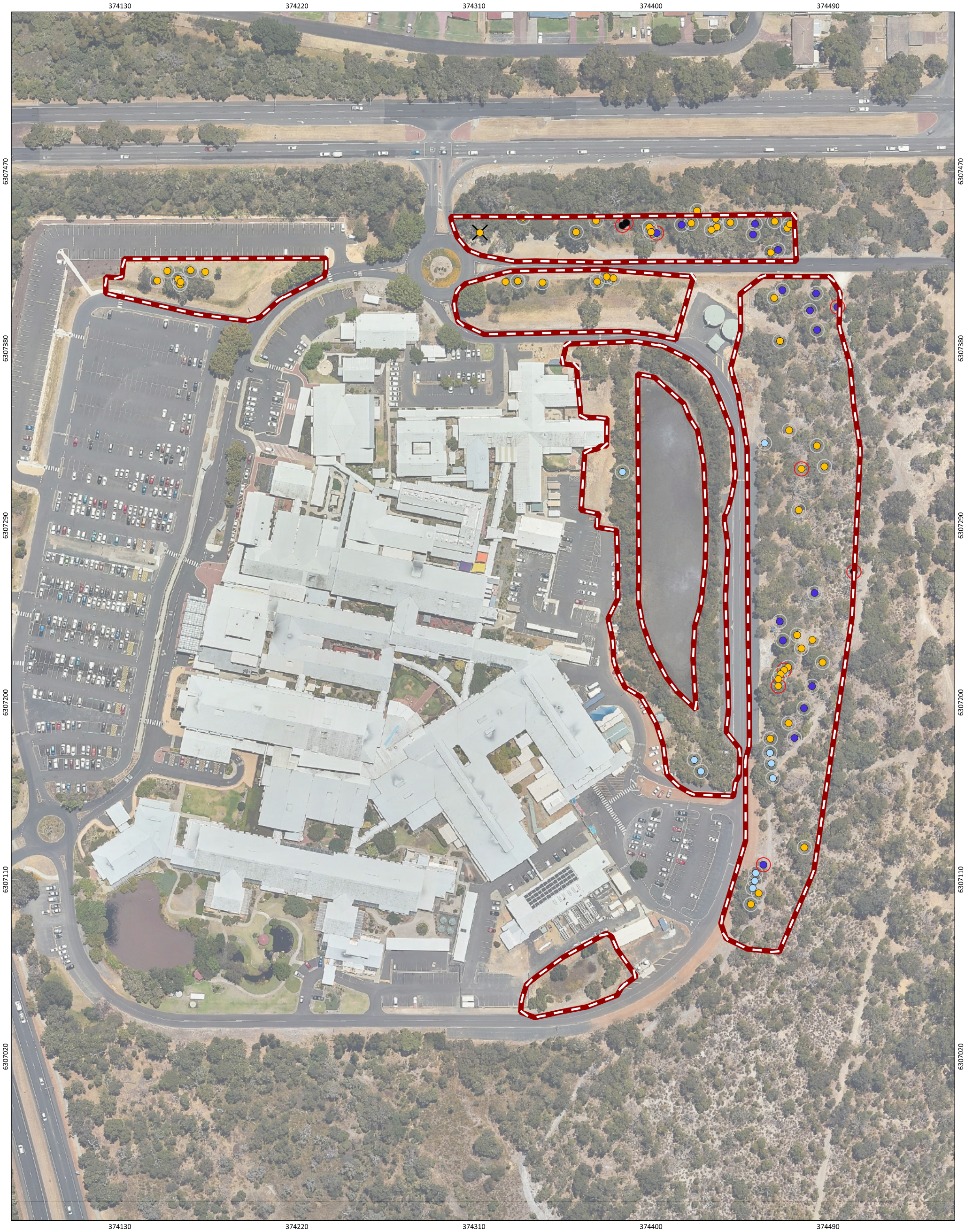

Figure 13: Black Cockatoo Potential Breeding Habitat

0 10 20 30 40 m
N

PROJECT/REPORT NAME: Bunbury Hospital Biological Survey Bunbury Hospital, Southwest Health Campus		
SCALE: 1:1,805	SHEET SIZE: A3 COLOUR	CLIENT: Multiplex
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	PROJECT NUMBER: P24.096	VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY Summer 2023	DRAWN BY / REVIEWED BY: JP/TC	DATE: 5/12/2024

Legend

- Survey Area

Tree Species

- Dead
- Jarrah
- Marri
- River Red Gum

Bamford Tree Class

- 3
- 4
- 5

No	Description	Drawn	Approved	Date
A	Original issue	JP	TC	5/12/2024

NOTES:

Cadastral boundary (LGATE-002). Label corresponds to the vegetation association number.

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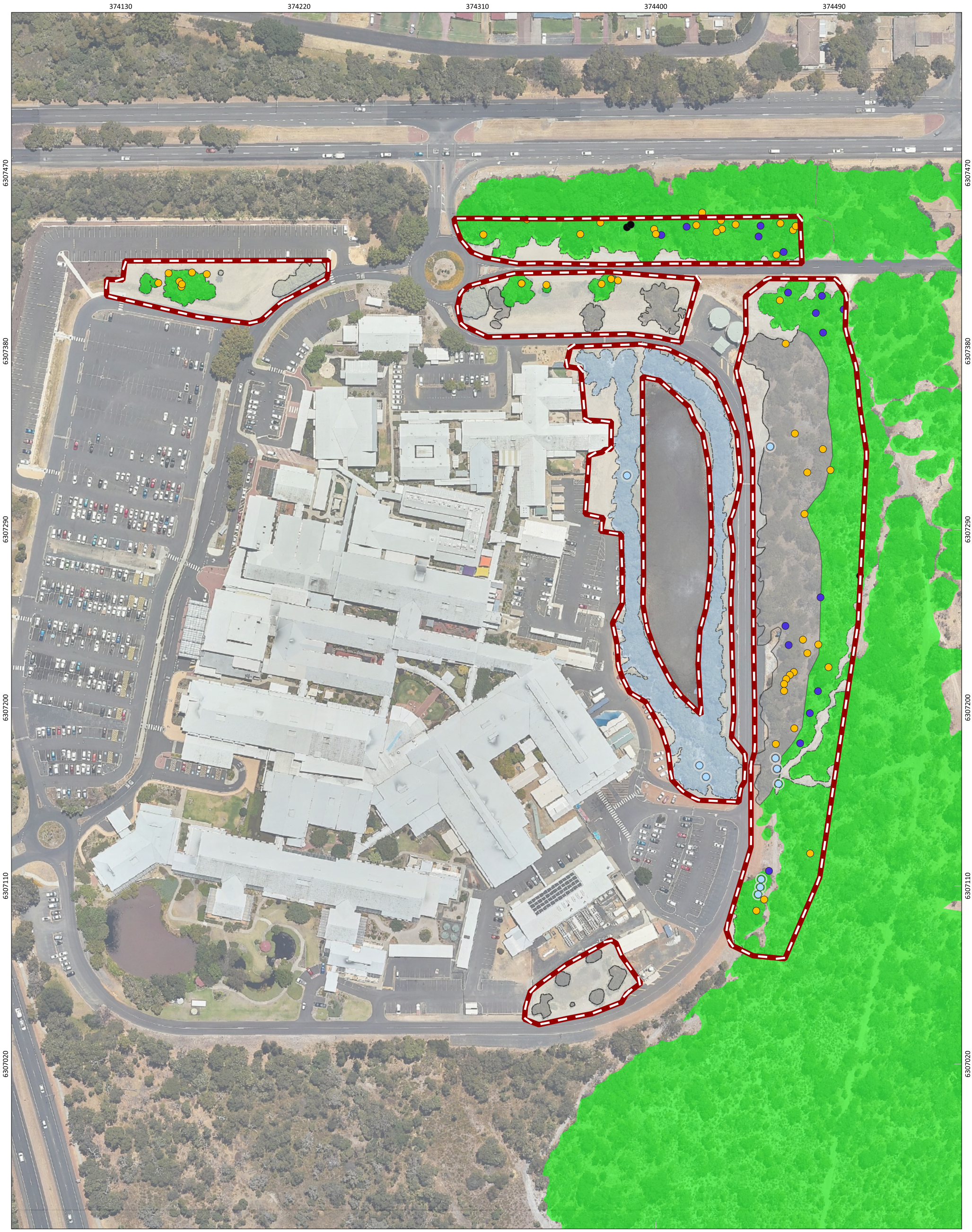

Figure 14a: Black Cockatoo Foraging Habitat- Carnaby's and Baudins Black Cockatoo

PROJECT/REPORT NAME: Bunbury Hospital Biological Survey Bunbury Hospital, Southwest Health Campus			
SCALE: 1:1,805	SHEET SIZE: A3 COLOUR	CLIENT: Multiplex	
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50		PROJECT NUMBER: P24.096	VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY Summer 2023		DRAWN BY / REVIEWED BY: JP/TC	DATE: 5/12/2024

Legend

- Survey Area

Tree Species
- Dead
- Jarrah
- Marri
- River Red Gum

Species Foraging Value
- Low

Foraging Habitat Score (Bamford, 2018 Scale)
- 1-Negligible
- 2-Low
- 3-Low to Moderate
- 6-High

No	Description	Drawn	Approved	Date
A	Original issue	JP	TC	5/12/2024

NOTES:

Cadastral boundary (LGATE-002). Label corresponds to the vegetation association number.

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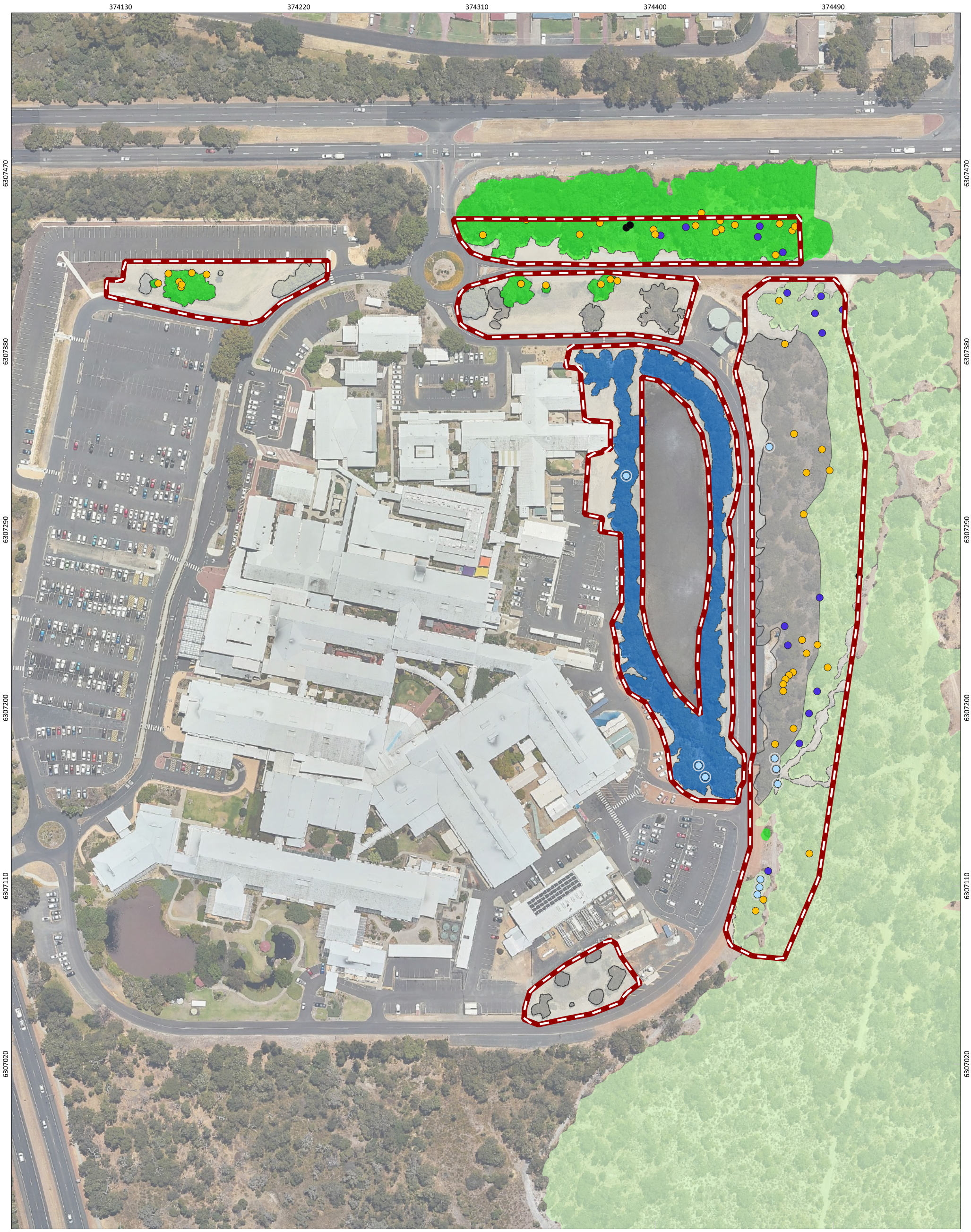

Figure 14b: Black Cockatoo Foraging Habitat- Forest Red-tailed Black Cockatoo

N

0 10 20 30 40 m

PROJECT/REPORT NAME	Bunbury Hospital Biological Survey Bunbury Hospital, Southwest Health Campus
SCALE	1:1,805
SHEET SIZE	A3 COLOUR
CLIENT	Multiplex
COORDINATE REFERENCE SYSTEM	GDA2020 / MGA zone 50
PROJECT NUMBER	P24.096
VERSION	0
DATA SOURCE	LANDGATE AERIAL IMAGERY Summer 2023
DRAWN BY / REVIEWED BY	JP/TC
DATE	5/12/2024

Legend

Survey Area

Tree Species
- Dead
- Jarrah
- Marri
- River Red Gum

Species Foraging Value
- Low

Foraging Habitat Score (Bamford, 2018 Scale)
- 1-Negligible
- 2-Low
- 4-Moderate
- 5-Moderate to High
- 6-High

No	Description	Drawn	Approved	Date
A	Original issue	JP	TC	5/12/2024

NOTES:

Cadastral boundary (LGATE-002). Label corresponds to the vegetation association number.

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4.7 Western Ringtail Possum

The western ringtail possum *(Pseudocheirus occidentalis)* is listed as Critically Endangered under the EPBC Act and BC Act. On the Swan Coastal Plain the species is present from north of Bunbury to Augusta, with greatest populations around Busselton (DPaW, 2017). Targeted searches were undertaken due to the expected presence of the species.

Observations and Previous Records

Targeted spotlighting searches were undertaken over two separate nights. The searches covered all suitable habitat at approximately 20-50 m spacing. The spotlighting surveys recorded thirteen individuals on the first night and ten individuals on the second night.

Twelve dreys (nests of leaves and sticks) were recorded during daytime habitat assessment and one western ringtail possum was observed in its drey during daytime surveys. See Figure 15 for locations.

Habitat Assessment

The western ringtail possum is an arboreal species whose diet comprises almost exclusively myrtaceous plants primarily peppermint, melaleuca, kunzea, marri and jarrah (DPaW, 2017). In the Bunbury region, western ringtail possum habitat typically has a dominant or co-dominant upper or mid stratum of peppermint trees, though may be found in areas of melaleuca, kunzea or marri/jarrah. In other regions the species also utilises, coastal heath, riparian vegetation and thickets of myrtaceous species (DPAW, 2017). The western ringtail possum recovery plan identifies that habitat critical for survival of the species is not well understood and as such habitat where western ringtail possums are commonly recorded may be considered critical and worthy of protection (DPAW, 2017).

FHT-01 (Native vegetation) was assessed as comprising core habitat, with individuals recorded in these habitat types.

Habitat quality was assessed using the Commonwealth unpublished guidelines, Habitat Scoring System for Western Ringtail Possum (the Habitat Scoring System), see Appendix E (DCCEEW, n.d). The Habitat Scoring System comprises three components:

1. Site Condition - score of canopy and mid story connectivity, fire age and evidence of dreys.
2. Site Context- connectivity of vegetation within Survey Area with other areas of suitable habitat
3. Species Stocking Rate- frequency of current or historical observations

Step 1- Site Condition allows for scores to be applied to individual polygons. The Site Condition score, which rates habitat from 0 (Absent) to 3 (Very High) is shown in Figure 15 and extent within the Survey Area summarised below in Table 22.

Table 21: Habitat Scoring System for Western Ringtail Possum- Site Condition

Score	Detail	Scores Extent (ha)	Scores % of Survey Area
3	Very High – High canopy (90-100%) continuity	-	-
2.5	High – High canopy (70-89%) continuity	1.163	31.83 %
2	Medium – High canopy (70-89%) continuity	1.097	30.03 %
1.5	Low – Some canopy (50-69%) continuity	-	-
1.0	Very Low – Little canopy (30-49%)	-	-
0.5	Marginal – Less than 30% canopy continuity	0.174	4.77 %
0	Absent, no vegetation and/or suitable habitat on site	1.219	33.37 %
Total		**3.654**	**100 %**

The Habitat Scoring System then applies a Site Context Score as per Table 22. As vegetation in the Survey Area is contiguous the Site Context score may be applied once for the entire Survey Area.

Table 22: Habitat Scoring System for Western Ringtail Possum- Site Context

Score	Detail	Score
3	Site is connected by vegetation, including continuous canopy cover, to more than one area of contiguous suitable habitat. Site is within a key management zone.	**3**
2.5	Site is connected by vegetation, including high level of canopy cover (70-89%), to at least one area of contiguous suitable habitat. Site is within a key management zone.	
2	Site is connected by vegetation, including some level of canopy cover (50-69%), to more than one patch4 of suitable habitat. Site is within a key management zone.	
1.5	Site is connected by vegetation, including limited canopy cover (30-49%), to at least one patch of suitable habitat. Records on or immediately adjacent (within 500 m) to site within last 2 years. Site is located within known species distribution.	
1.0	Site is separated from other known suitable habitat by cleared areas or linear barrier of up to 25 m. Records on site or immediately adjacent (within 500 m) within last 3 years. Site is located within known distribution of species.	

Finally, a Species Stocking Rate out of four is applied as per Table 23. The Stacking Rate score is applied once to the entire Survey Area.

Table 23: Habitat Scoring System for Western Ringtail Possum- Species Stocking Rate

Score	Detail	Score
4	Record of species presence on site in last 12 months (WRP observed on site in last 12 months and scats; evidence of nests/dreys/hollows being used; evidence of breeding); site is within 50-100 m of verified/published records in last 12 months.	**4**
3	Record of species presence on site in last 2 years (WRP observed on site in last 2 years and scats; evidence of nests/dreys/hollows being used); site is within 100-150 m of verified/published records in last 12 months	
2	Record of species presence on site in last 2 years (WRP observed on site in last 2 years and scats; evidence of nests/dreys/hollows being used); site is within 150-200 m of verified/published records in last 2 years	
1	Record of species presence on site in previous 3 years (WRP observed on site in last 5 years and scats; evidence of nests/dreys/hollows being used); site is within 500 m of verified/published records in last 3 years (minimum required to be considered a suitable offset site for WRP).	
0	No record of species presence on site, or within 500 m in last 3 years	

See Table 24 or final Habitat Scoring System scores and extents present within the Survey Area. Note that habitat with a Site Condition starting score of 0.5 or 0 is unlikely to be suitable habitat and does not have a Site Context or Stocking Rate score added.

Table 24: Habitat Scoring System for Western Ringtail Possum- Final Scores

Final Score	Site Condition Starting Score Detail	Extent (ha)	% of Survey Area
9.5	High – High canopy (70-89%) continuity	1.163	31.83 %
9	Medium – High canopy (70-89%) continuity	1.097	30.03 %
0.5	Marginal – Less than 30% canopy continuity	0.174	4.77 %
0	Absent, no vegetation and/or suitable habitat on site	1.219	33.37 %
Total		**3.654 ha**	**100 %**

Population Estimate

Combined there is 2.277 ha of core habitat (excluding areas with no vegetation and/or suitable habitat) present within the Survey Area. The targeted survey effort was considered suitable to allow for an accurate sample of number of individuals present. The calculated population is an average of 5.05 individuals per ha (average 11.5 individuals across two sampling events over 2.277 ha of habitat). Population is subject to variation following yearly seasonal cycles and longer-term weather events such as drought and heatwaves. Typically breeding peaks occur in April to July and September to November (DPAW, 2017). The survey period in October following an above average season of rainfall was considered optimal for estimating population.

An assessment of habitat for western ringtail possum was undertaken by the then Department of Parks and Wildlife (DPaW) for the region in 2014. This mapping excludes the majority of the Survey Area however identifies adjacent vegetation as representing Class B (high) and Class C (medium) habitat suitability with an estimated western ringtail possum density of 5-10 and 2-5 individuals per ha respectively (Shedley and Williams 2014).

Regional Context

In order to provide further context, an analysis of habitat extent within the local area (defined as a 10 km buffer of the Survey Area) as per Shedley and Williams (2014) mapping was undertaken. This analysis identifies that a combined 5580.48 ha of Class A (very high), Class B (high) and Class C (medium) habitat is mapped within 10 km. The majority of this is Class C (medium) with 4868 ha. The combined 2.277 ha of core habitat which broadly aligns with the Shedley and Williams 2014 mapping as Class C (medium) represent 0.04% of the combined Class A (very high), Class B (high) and Class C (medium) habitat mapped within 10 km.

The habitat within the Survey Area is contiguous with extensive areas of habitat within the Manea Park and Edith Cowan University precinct. The habitat within the Survey Area does not play an important role as a connective corridor with a break in habitat present to the west and north from the existing hospital footprint and Robertson Drive.

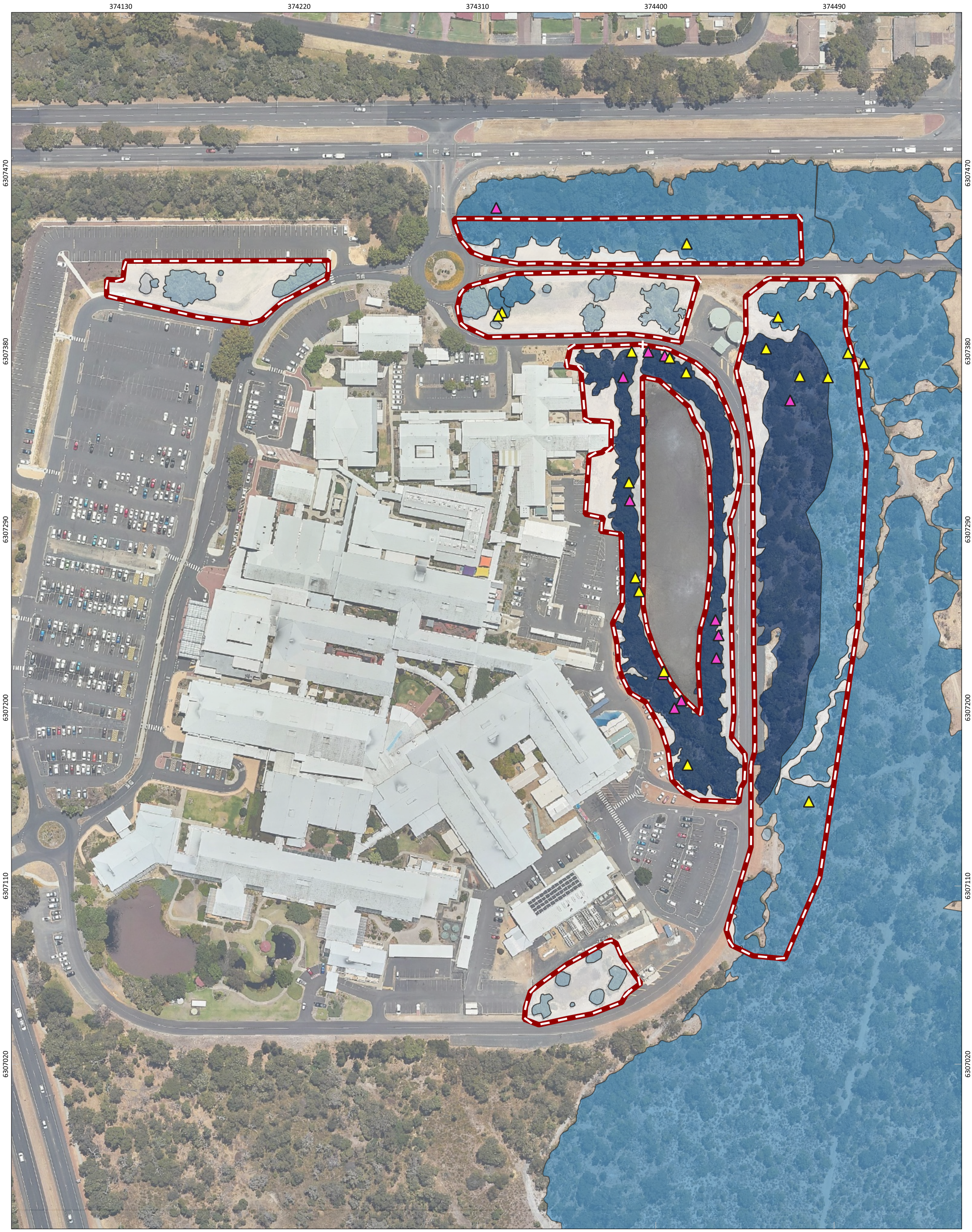

Figure 15: Western Ringtail Possum Habitat

0 10 20 30 40 m
N

PROJECT/REPORT NAME: Bunbury Hospital Biological Survey Bunbury Hospital, Southwest Health Campus		
SCALE: 1:1,805	SHEET SIZE: A3 COLOUR	CLIENT: Multiplex
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	PROJECT NUMBER: P24.096	VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY Summer 2023	DRAWN BY / REVIEWED BY: JP/TC	DATE: 19/11/2024

Legend

- Survey Area
- WRP Observations: Drey/Nest; Spotlight
- WRP Habitat Score: 0; 0.5; 2; 2.5

No	Description	Drawn	Approved	Date
A	Original issue	JP	TC	19/11/2024

NOTES:

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5. Discussion

5.1 Flora of Conservation Significance

No Threatened and Priority flora were recorded, and no species of other conservation significance were identified. No Threatened and Priority flora species identified by the desktop assessment are considered likely to occur under the post survey assessment.

5.2 Vegetation Significance

Eight vegetation types were identified, with the majority of the Survey Area in Degraded condition and being planted vegetation or regrowth following clearing for hospital development in the early 2000's.

Of the four TECs and PECs identified by the pre survey desktop assessment as having a mapped potential occurrence or the buffer zone of an occurrence intersecting the Survey Area one was identified as present.

Vegetation within VT01 Banksia Woodland was assessed as being the Banksia Woodland TEC. This community is also a State listed Priority 3 PEC which shares the same name and description, area/condition thresholds and determination criteria. Within the Survey Area there is 0.749 ha of Banksia TEC present. The patch extends at least 5 ha outside of the Survey Area, likely forming part of a larger patch extending into Manea Park.

5.3 Fauna Habitat Significance

Five species of conservation significance were recorded in the Survey Area. These are:

- *Pseudocheirus occidentalis* (western ringtail possum)-CE
- *Isoodon fusciventer* (quenda)-P4
- *Calyptorhynchus banksia naso* (forest red-tailed black cockatoo) – VU.
- *Calyptorhynchus baudinii* (Baudin's black cockatoo) – EN.
- *Calyptorhynchus latirostris* (Carnaby's black cockatoo)-EN

One species was assessed as having a high likelihood of occurrence:

- *Phascogale tapoatafa wambenger* (southwestern brush-tailed phascogale)-CD

Extent of core and supporting habitat present within the Survey Area by species is summarised in Table 25.

Table 25: Summary of Habitat Values

Species	Extent Core Habitat (ha)	Extent Supporting Habitat (ha)
Isoodon fusciventer **(quenda)**	-	2.277
Phascogale tapoatafa wambenger **(southwestern brush-tailed phascogale)**	-	2.277
Pseudocheirus occidentalis **(western ringtail possum)**	2.277	-
Calyptorhynchus banksia naso **(forest red-tailed black cockatoo)**		2.277
Calyptorhynchus baudinii **(Baudin's black cockatoo)**		2.277
Calyptorhynchus latirostris **(Carnaby's black cockatoo)**		2.277

5.4 Black Cockatoos

The Survey Area falls within the modelled distribution and breeding range for Baudin's black cockatoo, Carnaby's black cockatoo and the forest red-tailed black cockatoo (DCCEEW, 2022). No known breeding sites are present within or immediately adjacent to the Survey Area. One buffered roosting site intersects with the Survey Area.

A total of 74 potential/ future potential breeding trees were recorded. One tree, a large marri was assessed from ground observation as potentially being a Suitable Nesting Trees (Class 3). The tree is located in the north of the Survey Area near Robertson Drive. The tree has a 30cm diameter upwards facing hollow entry. The hollow is currently filled with a large bees nest making it currently unsuitable for use. No evidence of current or previous nesting behaviour such as chew marks at hollow entrance attributed to black cockatoos, or flushed individuals were recorded

The native vegetation of FHT-01 is characterised by foraging species for all three black cockatoo species including marri, jarrah, banksia, sheoak and small fruited eucalyptus species. Within FHT-02 (non-native vegetation) there are very few high value foraging species with the majority comprised of cleared areas, scattered/planted low foraging value eucalypts and other areas of non-native vegetation.

- Carnaby's Black Cockatoo: 1.146 ha (9/10), 0.545 ha (6/10) and 1.963 ha (Low 2 to None 0).
- Baudin's Black Cockatoo: 1.146 ha (9/10), 0.545 ha (6/10) and 1.963 ha (Low 2 to None 0).
- Forest Red-tailed Black Cockatoo: 0.392 ha (9/10), 0.749 ha (8/10), 0.545 ha (7/10) and 1.963 ha (Low 2 to None 0).

No evidence of scat marking, branch clipping or feather dropping was recorded suggesting that the location is not a highly frequented roosting location. Throughout the Survey Area, isolated stands of tall (> 10 m) eucalypts are scattered which may provide suitable roosting habitat. Access to permanent water is present from the lake within the Survey Area.

5.5 Western Ringtail Possum

Targeted searches recorded 12 individuals on the first night and ten individuals on the second night. Twelve dreys (nests of leaves and sticks) and one daytime observation were also recorded.

Combined there is 2.277 ha of core habitat (excluding areas with no vegetation and/or suitable habitat) present within the Survey Area. The calculated population is an average of 5.05 individuals per ha (average 11.5 individuals across two sampling events over 2.277 ha of habitat).

FHT-01 (Native Vegetation) was assessed as comprising core habitat with 2.277 ha present. The Commonwealth unpublished guideline, the Habitat Scoring System for Western Ringtail Possum was applied to determine habitat quality scores out for 10 for individual polygons of habitat within the Survey Area. This assessment identified as present within the Survey Area:

- 1.163 - (9.5/10)
- 1.097- (9/10)
- 0.174 - (0.5/10)
- 1.219 - (0/10)

Note that habitat with a score of 0.5 or 0 is unlikely to be considered as suitable habitat (DCCEEW, n.d.).

At a regional (10km) scale the combined 2.277 ha of core habitat which broadly aligns with the Shedley and Williams 2014 mapping as Class C (medium) represent 0.04% of the combined Class A (very high), Class B (high) and Class C (medium) habitat mapped within 10 km.

The habitat within the Survey Area is contiguous with extensive areas of habitat within the Manea Park and Edith Cowan University precinct. The habitat within the Survey Area does not play an important role as a connective corridor with a break in habitat present to the west and north from the existing hospital footprint and Robertson Drive.

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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	A native species is eligible to be included in the extinct in the wild category at a particular time if, at that time: (a) it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or (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.	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)	A native species is eligible to be included in the endangered category at a particular time if, at that time: (a) it is not critically endangered; and (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.	An ecological community is eligible to be included in the endangered category at a particular time if, at that time: (a) it is not critically endangered; and (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.
Vulnerable (VU)	A native species is eligible to be included in the vulnerable category at a particular time if, at that time: (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.	An ecological community is eligible to be included in the vulnerable category at a particular time if, at that time: (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.
Conservation Dependent	A native species is eligible to be included in the conservation dependent category at a particular time if, at that time: (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 (b) the following subparagraphs are satisfied: (i) the species is a species of fish. (ii) the species is the focus of a plan of management that provides for	N/A.

Category	Threatened Species	Threatened Ecological Communities
	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. (iii) the plan of management is in force under a law of the Commonwealth or of a State or Territory. (iv) cessation of the plan of management would adversely affect the conservation status of the species.	

Conservation Codes for Western Australian Flora and Fauna (DBCA)

Conservation Codes for Western Australian Flora and Fauna	
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. **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.** **Categories of Threatened, Extinct and Specially Protected fauna and flora are:**	
T	Threatened species 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). 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. 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. 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.
CR	Critically endangered species 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". Listed as critically endangered undersection 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.
EN	Endangered species 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". 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.
VU	Vulnerable species

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 undersection 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	Other specially protected species 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). Published as other specially protected fauna under schedule 7 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.
P	Priority species 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. 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. 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.
1	Priority 1: Poorly-known species 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.
2	Priority 2: Poorly-known species 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.
3	Priority 3: Poorly-known species 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.
4	Priority 4: Rare, Near Threatened and other species in need of monitoring (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. (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. (c) Species that have been removed from the list of Threatened species during the past five years for reasons other than taxonomy.

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)	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. 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): A. Records within the last 50 years have not been confirmed despite thorough searches of known or likely habitats or B. All occurrences recorded within the last 50 years have since been destroyed.
Critically Endangered (CR)	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. 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): 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): 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. 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 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. 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).
Endangered (EN)	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.

Criteria	Definition
	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)	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. 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): A. The ecological community exists largely as modified occurrences that are likely to be capable of being substantially restored or rehabilitated. 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. 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.
Priority Ecological Communities	
Priority One	Poorly known ecological communities 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

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	Poorly known ecological communities 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.
Priority Three	Poorly known ecological communities 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. 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.
Priority Four	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. 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	Conservation Dependent Ecological Communities 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.

Appendix C
Desktop Assessment Results and Likelihood of Occurrence Assessment

Flora Database Search Results (DBCA Database Search using 20 Km Buffer, PMST 10 km buffer), Likelihood and Flora Survey Records

Species	Conservation Status		Source		Flowering Period	Preferred Habitat	Habitat Occurs Within the Survey Area	Pre-Survey Likelihood of Occurrence	Post-Survey Likelihood of Occurrence
	DBCA	EPBC	PMST	DBCA					
Acacia flagelliformis	P4			x	May - Sep	Sandy soils. Winter-wet areas.	Yes	Medium	Low
Acacia semitrullata	P4			x	Mat - Oct	White/grey sand, sometimes over laterite, clay. Sandplains, swampy areas.	Yes	Medium	Low
Adelphacme minima	P3			x	-	White/grey sand, swampy areas	Yes	Low	Low
Andersonia gracilis		EN	x		Sep - Nov	White/grey sand, sandy clay, gravelly loam. Winter-wet areas, near swamps. In the Perth region	No	Low	Low
Angianthus drummondii	P3			x	Oct - Dec	Grey or brown clay soils, ironstone. Seasonally wet flats.	No	Low	Low
Aponogeton hexatepalus	P4			x	Jul - Oct	Mud. Freshwater: ponds, rivers, claypans.	Yes	Medium	Low
Austrostipa bronweniae	T	EN	x	x		Saline limestone claypans	No	Low	Low
Austrostipa jacobsiana	T	CR	x	x		Saline limestone claypans	No	Low	Low
Banksia nivea subsp. uliginosa		EN	x		Aug - Sep	Sandy clay, gravel.	No	Low	Low
Banksia squarrosa subsp. argillacea		VU	x		Jun - Nov	White/grey sand, gravelly clay or loam. Winter-wet flats, clay flats.	No	Low	Low
Bolboschoenus medianus	P1			x		Mud on riverbanks.	No	Low	Low
Boronia juncea subsp. juncea	P1			x	Apr	Sand. Low scrub.	Yes	Low	Low

Species	Conservation Status		Source		Flowering Period	Preferred Habitat	Habitat Occurs Within the Survey Area	Pre-Survey Likelihood of Occurrence	Post-Survey Likelihood of Occurrence
	DBCA	EPBC	PMST	DBCA					
Boronia tetragona	P3			x	Oct - Dec	Black/white sand, laterite, brown sandy loam. Winter-wet flats, swamps, open woodland.	Yes	Medium	Low
Brachyscias verecundus		CR	x			In a moss sward. On a granite outcrop.	No	Low	Low
Caladenia huegelii	T	EN	x	x	Sep - Oct	Grey or brown sand, clay loam.	Yes	Medium	Low
Caladenia procera	T			x	Sep - Oct	Rich clay loam. Alluvial loamy flats, jarrah/marri/peppermint woodland, dense heath, sedges.	No	Low	Low
Caladenia speciosa	P4			x	Sep - Oct	White, grey or black sand.	Yes	High	Low
Carex tereticaulis	P3			x	Sep - Oct	Black peaty sand.	Yes	Medium	Low
Caustis sp. Boyanup (G.S. McCutcheon 1706)	P3			x		White or grey sand at base of laterite hills.	No	Low	Low
Chamaescilla gibsonii	P3			x	Sep	Clay to sandy clay. Winter-wet flats, shallow water-filled claypans.	No	Low	Low
Chamelaucium erythrochlorum	P4			x		Clay to sandy clay	No	Low	Low
Chamelaucium sp. S coastal plain (R.D.Royce 4872)		VU	x		Nov - Dec	Royce's Waxflower is confined to swamp margins in open Banksia shrubland in winter-wet sandy clay sites on a coastal plain.	No	Low	Low
Craspedia sp. Waterloo (G.J. Keighery 13724)	P2			x	Aug – Sep or Oct	Growing in water on seasonally inundated heavy soils of the Pinjarra plain near Waterloo.	No	Low	Low
Darwinia whicherensis	T			x		Sand and laterite along scarp	No	Low	Low

Species	Conservation Status		Source		Flowering Period	Preferred Habitat	Habitat Occurs Within the Survey Area	Pre-Survey Likelihood of Occurrence	Post-Survey Likelihood of Occurrence
	DBCA	EPBC	PMST	DBCA					
Dillwynia dillwynioides	P3			x	Aug - Dec	Sandy soils. Winter-wet depressions.	Yes	Low	Low
Diuris drummondii	T	VU	x	x	Nov – Dec or Jan	Low-lying depressions, swamps.	Yes	Medium	Low
Diuris micrantha	T			x	Sep - Oct	Brown loamy clay. Winter-wet swamps, in shallow water.	Yes	Medium	Low
Diuris purdiei		EN	x		Sep - Oct	Grey-black sand, moist. Winter-wet swamps.	Yes	Low	Low
Drakaea elastica	T	EN	x	x	Oct - Nov	White or grey sand. With Kunzea. Low-lying situations adjoining winter-wet swamps.	Yes	Low	Low
Drakaea micrantha	T	VU	x	x	Sep - Oct	White-grey sand.	Yes	Low	Low
Eleocharis keigheryi	T	VU	x		Aug - Nov	Clay, sandy loam. Emergent in freshwater: creeks, claypans.	No	Low	Low
Eucalyptus rudis subsp. cratyantha	P4			x	Jul - Sep	Loam. Flats, hillsides. In the capes region	No	Low	Low
Franklandia triaristata	P4			x	Aug - Oct	White or grey sand.	Yes	Medium	Low
Gastrolobium sp. Yoongarillup (S.Dilkes s.n. 1/9/1969)	P1			x		In the Yoongarillup region	No	Low	Low
Gastrolobium whicherense	P2			x	Oct	Red-grey sandy clay over quartzite. Steep westerly slopes.	No	Low	Low
Grevillea rosieri	P2			x	Jul or Sep	Gravelly soil, or sand; sandplains; gravel pits.	No	Low	Low

Species	Conservation Status		Source		Flowering Period	Preferred Habitat	Habitat Occurs Within the Survey Area	Pre-Survey Likelihood of Occurrence	Post-Survey Likelihood of Occurrence
	DBCA	EPBC	PMST	DBCA					
Lambertia echinate subsp. occidentalis		EN	x		Feb or Apr or Dec	White sandy soils over laterite, orange/brown-red clay over ironstone. Flats to foothills, winter-wet sites.	No	Low	Low
Lasiopetalum laxiflorum	P3			x		Sandy soils over laterite	No	Low	Low
Lasiopetalum membranaceum	P3			x	Sep - Dec	Sand over limetsone.	Yes	medium	Low
Leptomeria furtiva	P2				Aug - Oct	Grey or black peaty sand. Winter-wet flats.	No	Low	Low
Leucopogon sp. Busselton (D. Cooper 243)	P2			x		No information- appears associated with clay areas	No	Low	Low
Lomandra whicherensis	P3			x		Laterite hills	No	Low	Low
Microtis quadrata	P4			x	December (following fire)	Coastal clay based swamps	No	Low	Low
Orianthera wendyae	P1			x		Laterite hills	No	Low	Low
Ornduffia submersa	P4			x		Floating aquatic plant of seasonal wetlands	Yes	Medium	Low
Platysace ramosissima	P3			x	Oct – Nov	Sandy soils	Yes	Low	Low
Pterostylis frenchii	P2			x		Calcareous sand with limestone, laterite. Flatlands and gentle slopes.	No	Low	Low
Puccinellia vassica	P1			x	Sep - Nov	Saline soils. On the outer margins of coastal saltmarshes.	No	Low	Low
Pultenaea skinneri	P4			x	Jul to Sep	Sandy or clayey soils. Winter-wet depressions.	Yes	Medium	Low

Species	Conservation Status		Source		Flowering Period	Preferred Habitat	Habitat Occurs Within the Survey Area	Pre-Survey Likelihood of Occurrence	Post-Survey Likelihood of Occurrence
	DBCA	EPBC	PMST	DBCA					
Rumex drummondii	P4			x		Winter-wet disturbed areas.	Yes	Medium	Low
Schoenus benthamii	P3			x	Oct - Nov	White, grey sand, sandy clay. Winter-wet flats, swamps.	Yes	High	Low
Schoenus capillifolius	P3			x	Oct - Nov	Brown mud. Claypans.	No	Low	Low
Schoenus loliaceus	P2			x	Aug - Nov	Sandy soils. Winter-wet depressions.	Yes	Medium	Low
Stylidium acuminatum subsp. acuminatum	P2			x		Laterite, Jarrah forest	No	Low	Low
Stylidium longitubum	P4			x	Oct - Dec	Sandy clay, clay. Seasonal wetlands.	Yes	Medium	Low
Stylidium paludicola	P3			x	Oct - Dec	Quartzite ridge. Brown sandy clay.	No	Low	Low
Stylidium perplexum	P1			x		Laterite, Jarrah forest	No	Low	Low
Synaphea hians	P3			x	Jul or Sep or Nov	Sandy soils. Rises. At base of laterite hills	No	Low	Low
Synaphea polypodioides	P3			x		Light brown loam, red-brown sandy loam, gravelly, brown sandy clay over laterite. In undulating areas.	No	Low	Low
Synaphea sp. Fairbridge Farm (D. Papenfus 696)	T	CR	x		Oct	Sandy with lateritic pebbles. Near winter-wet flats, in low woodland with weedy grasses.	No	Low	Low
Synaphea sp. Pinjarra Plain (A.S. George 17182)	T		x		Sep - Nov	Grey sandy loam or clay, grey-brown clayey sand, brown clayey loam, laterite. Flats, seasonally wet areas, railroad reserves often with wet depressions or drains.	No	Low	Low

Species	Conservation Status		Source		Flowering Period	Preferred Habitat	Habitat Occurs Within the Survey Area	Pre-Survey Likelihood of Occurrence	Post-Survey Likelihood of Occurrence
	DBCA	EPBC	PMST	DBCA					
Synaphea sp. Serpentine (G.R. Brand 103)	T	CR	x		Sep - Oct	Shrublands and woodlands on loamy soils	No	Low	Low
Synaphea stenoloba	T	EN	x		Aug- Oct	Sandy or sandy clay soils. Winter-wet flats, granite.	No	Low	Low
Thelymitra variegata	P2			x	Jun - Sep	Sandy clay, sand, laterite.	Yes	Medium	Low
Trithuria australis	P4			x		Emergent from shallow claypan wetlands	No	Low	Low
Verticordia attenuata	P3			x	Dec or Jan - May	White or grey sand. Winter-wet depressions.	Yes	Medium	Low

Threatened Ecological Communities Database Search Results (DBCA Database Search using 10 Km Buffer, PMST 10 km buffer), Likelihood and Flora Survey Records

Floristic Community Type	Community name	Conservation Status		Database		Likelihood of Occurrence	Justification
		State	Federal	PMST	DBCA		
SCP08	Herb rich shrublands in clay pans (floristic community type 8 as originally described in Gibson et al. (1994))	VU			x	Low	Unsuitable geology and soils
SCP3c	Corymbia calophylla - Xanthorrhoea preissii woodlands and shrublands, Swan Coastal Plain (floristic community type 3c as originally described in in Gibson et al. (1994))	CR			x	Low	Unsuitable geology and soils
SCP09	Dense shrublands on clay flats (floristic community type 9 as originally described in Gibson et al. (1994))	CR			x	Low	Unsuitable geology and soils
SCP18	Shrublands on calcareous silts of the Swan Coastal Plain (floristic community type 18 as originally described in in Gibson et al. (1994))	VU			x	Low	Unsuitable geology and soils
SCP07	Herb rich saline shrublands in clay pans (floristic community type 7 as originally described in Gibson et al. (1994))	VU			x	Low	Unsuitable geology and soils
Relictual White Mangrove Community	Relictual White Mangrove Community (Leschenault Inlet)	P1			x	Low	Not marine influenced system
Coastal Saltmarsh	Subtropical and Temperate Coastal Saltmarsh	P3	VU	x	x	Low	Not marine influenced system
Banksia WL SCP	Banksia Woodlands of the Swan Coastal Plain ecological community	P3	EN	x	x	High	Suitable land system and present within 1 km of Survey Area
SCP19a	Sedgelands in Holocene dune swales of the southern Swan Coastal Plain (floristic	CR			x	Low	Not suitable land system

Floristic Community Type	Community name	Conservation Status		Database		Likelihood of Occurrence	Justification
		State	Federal	PMST	DBCA		
	community type 19 as originally described in in Gibson et al. (1994))						
Tuart woodlands	Tuart (Eucalyptus gomphocephala) woodlands and forests of the Swan Coastal Plain	P3	CR	x	x	Low	No Eucalyptus gomphocephala present
SCP10a	Shrublands on dry clay flats (floristic community type 10a as originally described in Gibson et al. (1994))	EN			x	Low	Unsuitable geology and soils
SCP1b	Corymbia calophylla woodlands on heavy soils of the southern Swan Coastal Plain (floristic community type 1b as originally described in Gibson et al. (1994))	VU			x	Low	Unsuitable geology and soils
SCP29a	Coastal shrublands on shallow sands	P3			x	Low	Unsuitable geology and soils
SCP25	Southern Eucalyptus gomphocephala-Agonis flexuosa woodlands	P3			x	Low	No Eucalyptus gomphocephala present
SCP21b	Southern Banksia attenuata woodlands	P3			x	High	Suitable land system and present within 5 km of Survey Area
Claypans with shrubs over herbs	Claypans with mid dense shrublands of Melaleuca lateritia over herbs	P1	CR	x	x	Low	Unsuitable geology and soils
SCP30b	Quindalup Eucalyptus gomphocephala and/or Agonis flexuosa woodlands	P3				Low	Unsuitable geology and soils

Appendix D Quadrat and Releve Sheets

Flora Site Sheet					
Project Number	P24.096	**Site Number**		REL01	
Location	33.3650777	115.6474156			
Date	07/08/2024	**Collector**		AF/TC	
Slope	Flat				
Aspect	n/a				
Position	n/a				
Soil Texture	n/a				
Soil Colour	n/a				
Rock Cover	n/a				
Bare Ground	75+				
Litter	<10				
Surface water	5-10				
Vegetation	Planted pine, palm and London plane with native marri on cleared parkland				
Condition	Completely Degraded				
Weed Cover	50-75				
Fire Age	n/a	**Disturbance**		Weeds, Constructed drain, maintenance and people.	

SPECIES LIST

Taxon	Naturalised	Conservation Status	Notes/Observations	Height	% Cover
Corymbia calophylla	N			5-10 m	<1
Plantago lanceolata	N		Planted	5-10 m	<1
Pinus pinea	*		Planted	10 m	<1
Kennedia prostrata	N			<0.1 m	<1
Machaerina juncea				<1 m	<1

Flora Site Sheet					
Project Number	P24.096	**Site Number**		REL02	
Location					
Date	07/08/2024	**Collector**		AF/TC	
Slope	Flat				
Aspect	n/a				
Position	wetland, creek/river				
Soil Texture	n/a				
Soil Colour	n/a				
Rock Cover	n/a				
Bare Ground	25-50				
Litter	25-50				
Surface water	50-75				
Vegetation	Lake with planted and native vegetation surrounding.				
Condition	Good				
Weed Cover	25				
Fire Age	n/a	**Disturbance**		Weeds, Constructed drain, maintenance and people.	
SPECIES LIST					
Taxon	**Naturalised**	**Conservation Status**	**Notes/Observations**	**Height**	**% Cover**
Eucalyptus camaldulensis	M			<10 m	20
Casuarina obesa	N			2-3 m	10
Acacia longifolia	*			2 m	15
Kunzea glabrescens	N		Planted	<1 m	10
Machaerina juncea				1-2 m	40
Melaleuca preissiana	N		Recruit	<1 m	<1
Melaleuca teretifolia	N		Planted	<1 m	<1
Acacia pulchella	M		Recruit	2-3 m	<1
Cortaderia selloana subsp. jubata	*			<1 m	<1
Oxalis pes-caprae	*			<0.1 m	<1

Flora Site Sheet					
Hardenbergia comptoniana	N		Recruit	<1 m	<1
Spyridium globulosum	N		Planted	<1 m	<1
Calothamnus quadrifidus	M		Planted	<1 m	<1
Acacia cyclops	N		Planted	2-3 m	<1
Hibbertia cuneiformis	M		Planted	<1 m	<1
Ferraria crispa	*			<1 m	<1
Eragrostis curvula	*			<1 m	<1
Ehrharta calycina	*			<1 m	5
Ehrharta longiflora	*			<1 m	5
Taraxacum khatoonae	*			<1 m	<1
Corymbia calophylla	N			<10 m	<1
Cotula turbinata	*			<1 m	<1
Fumaria capreolata	*			<1 m	<1
Hypochaeris glabra	A			<1 m	<1
Agonis flexuosa	M			<1 m	<1
Schinus terebinthifolius	*			<1 m	<1
Acacia cochlearis	N			<1 m	<1
Melaleuca sp.				<1 m	<1
Conyza bonariensis	*			<1 m	<1
Asparagus asparagoides	*			<1 m	<1
Dipogon lignosus	*			<1 m	<1
Ricinus communis	*			<1 m	<1

Flora Site Sheet					
Project Number	P24.096	Site Number		REL03	
Location	33.3650777	115.6474156			
Date	07/08/2024	Collector		AF/TC	
Slope	Flat				
Aspect	n/a				
Position	n/a				
Soil Texture	n/a				
Soil Colour	n/a				
Rock Cover	n/a				
Bare Ground	75+				
Litter	<10				
Surface water	50-75				
Vegetation					
Condition	Degraded				
Weed Cover	95 %				
Fire Age	n/a	**Disturbance**		Weeds, clearance, maintenance and people.	

SPECIES LIST

Taxon	Naturalised	Conservation Status	Notes/Observations	Height	% Cover
Eucalyptus camaldulensis	N		Planted	<10 m	15
Casuarina obesa	N		Planted	<10 m	5
Kunzea glabrescens	N		Recruit	1-2 m	<1
Melaleuca teretifolia	N			1-2 m	<1
Machaerina juncea	N		Recruit	<1 m	<1
Baumea articulata	N		Recruit	1 m	5
Conyza bonariensis	*			<1 m	<1
Asparagus asparagoides	*			<1 m	<1
Dipogon lignosus	*			<1 m	<1
Ricinus communis	*			<1 m	<1

Flora Site Sheet					
Project Number	P24.096	Site Number		Q01	
Location	NW	Point (374460.69901732046855614, 6307362.27577970270067453)			
Date	01/10/2024	Collector		AF/TC	
Slope	Gentle				
Aspect	W				
Position	Lower slope				
Soil Texture	Sand				
Soil Colour	Grey				
Rock Cover	<1%				
Bare Ground	10-25%				
Litter	10-25%				
Surface water	NULL				
Vegetation Condition	Degraded				
Disturbance	Weeds and previously cleared				
Weed Cover	70 %				
Fire Age	>10				
SPECIES LIST					
Taxon	Naturalised	Conservation Status	Notes/Observations	Height	% Cover
Agonis flexuosa	M				40
Eucalyptus marginata	N				1
Oxalis pes-caprae	A				20
Chasmanthe floribunda	A				10
Fumaria capreolata	A				10
Euphorbia peplus	A				1
Briza maxima	A				1
Ehrharta longiflora	A				5
Cotula turbinata	A				1
Cytisus proliferus	A				1
Arctotheca calendula	A				1
Hypochaeris glabra	A				1
Petrorhagia dubia	A				<1
Lysimachia arvensis	A				<1

Flora Site Sheet					
Xanthorrhoea gracilis	N				<1
Hardenbergia comptoniana	N				<1
Hypolaena exsulca	N				<1
Erodium botrys	A				<1

Flora Site Sheet					
Project Number	P24.096	Site Number		Q02	
Location	NW	Point (374468.49960335553623736 6307400.86282475665211678)			
Date	01/10/2024	Collector		AF/TC	
Slope	Gentle				
Aspect	W				
Position	Lower slope				
Soil Texture	Sand				
Soil Colour	Grey				
Rock Cover					
Bare Ground	10-25%				
Litter	25-50%				
Surface water					
Vegetation Condition	Good				
Disturbance	Weeds, partial clearing				
Weed Cover	25 %				
Fire Age	>10				
SPECIES LIST					
Taxon	Naturalised	Conservation Status	Notes/Observations	Height	% Cover
Banksia attenuata	N				25
Eucalyptus marginata	N				5
Corymbia calophylla	N				5
Dodonaea aptera	N	Dodonaea wide	Q2-01		1
Acacia pulchella	M				1
Hibbertia hypericoides	N				15
Stirlingia latifolia	N				15
Macrozamia riedlei	N				10
Xanthorrhoea brunonis	N				5
Adenanthos meisneri	N				2
Ehrharta longiflora	A				10
Oxalis pes-caprae	A				5
Briza maxima	A				3
Fumaria capreolata	A				2

Flora Site Sheet					
Lysimachia arvensis	A				<1
Trachymene pilosa	N				<1
Hypochaeris glabra	A				<1
Hardenbergia comptoniana	N				<1
Ehrharta calycina	A				<1
Pyrorchis nigricans	N				<1
Ursinia anthemoides	A				<1
Euphorbia peplus	A				<1
Arctotheca calendula	A				<1
Asparagus asparagoides	A				<1
Burchardia congesta	N				<1
Sowerbaea laxiflora	N				<1
Bromus diandrus	A				<1
Cotula turbinata	A				<1
Erodium botrys	A				<1
Avena barbata	A				<1
Romulea rosea	A				<1
Ammothryon grandiflorum	N				<1
Ficinia marginata	A				<1
Lepidosperma squamatum	N	Lepisperma - pib	Q2-02		<1
Acacia longifolia	A				<1
Sonchus oleraceus	A				<1
Dichopogon capillipes	N				<1
Agrostocrinum hirsutum	N	Tricho - purple	Q2-03		<1

Flora Site Sheet					
Project Number	P24.096	Site Number		Q03	
Location	NW				
Date	1/10/2024	Collector		AF/TC	
Slope	Flat				
Aspect					
Position	Open depression				
Soil Texture	Sand				
Soil Colour	Grey				
Rock Cover					
Bare Ground	1-5%				
Litter	25-50%				
Surface water					
Vegetation Condition	Degraded				
Disturbance	Weeds and clearing				
Weed Cover	60%				
Fire Age	>10				
SPECIES LIST					
Taxon	Naturalised	Conservation Status	Notes/Observations	Height	% Cover
Corymbia calophylla	N				50
Kunzea glabrescens	N				1
Oxalis pes-caprae	A				30
Ehrharta longiflora	A				15
Fumaria capreolata	A				10
Briza maxima	A				10
Machaerina juncea	N				2
Xanthorrhoea brunonis	N				1
Hibbertia cuneiformis	M				<1
Caladenia latifolia	N				<1

Flora Site Sheet					
Sonchus oleraceus	A				<1
Microtis media	N				<1
Ferraria crispa	A				<1
Hypochaeris glabra	A				<1
Vicia sativa	A				<1
Dianella revoluta	N				<1
Burchardia congesta	N				<1

Flora Site Sheet					
Project Number	P24.096	Site Number		Q04	
Location	NW	Point (374481.30813374160788953 6307384.10072106122970581)			
Date	01/10/2024	Collector		AF/TC	
Slope	Gentle				
Aspect	W				
Position	Mid slope				
Soil Texture	Sand				
Soil Colour	Grey				
Rock Cover					
Bare Ground	10-25%				
Litter	10-25%				
Surface water					
Vegetation Condition	Good				
Disturbance	Weeds, clearing				
Weed Cover	30%				
Fire Age	>10				
SPECIES LIST					
Taxon	Naturalised	Conservation Status	Notes/Observations	Height	% Cover
Banksia attenuata	N				15
Agonis flexuosa	M				1
Nuytsia floribunda	N				2
Hibbertia hypericoides	N				20
Stirlingia latifolia	N				10
Chasmanthe floribunda	A				5
Ehrharta longiflora	A				5
Briza maxima	A				2
Hypochaeris glabra	A				5
Ursinia anthemoides	A				<1
Arctotheca calendula	A				<1
Trachymene pilosa	N				<1
Crassula colorata	N				<1
Lysimachia arvensis	A				<1

Flora Site Sheet					
Aira caryophyllea	A				<1
Ficinia marginata	A				<1
Cotula turbinata	A				<1
Trifolium campestre	A				<1
Sowerbaea laxiflora	N				<1
Xanthorrhoea brunonis	N				1
Dasypogon bromeliifolius	N				<1
Burchardia congesta	N				<1
Dichopogon capillipes	N				<1
Drosera pallida	N				<1
Vicia sativa	A				<1
Xylomelum occidentale	N				<1
Styphalia sp.					<1
Acacia pulchella	M				<1
Pyrorchis nigricans	N				<1
Melaleuca thymoides	N				<1
Acacia longiflora	A				<1

Flora Site Sheet					
Project Number	P24.096	Site Number		Q05	
Location	NW	Point (374482.43463170522591099 6307283.3915049284696579)			
Date	01/10/2024	Collector		AF/TC	
Slope	Gentle				
Aspect	W				
Position	Mid slope				
Soil Texture	Sand				
Soil Colour	Grey				
Rock Cover					
Bare Ground	10-25%				
Litter	25-50%				
Surface water					
Vegetation Condition	Good				
Disturbance	Weeds. Dieback.				
Weed Cover	10 %				
Fire Age	>10				
SPECIES LIST					
Taxon	Naturalised	Conservation Status	Notes/Observations	Height	% Cover
Banksia attenuata	N				25
Xylomelum occidentale	N				2
Eucalyptus marginata	N				2
Hibbertia hypericoides	N				20
Xanthorrhoea brunonis	N				12
Macrozamia riedlei	N				4
Briza maxima	A				5
Ehrharta longiflora	A				5
Ehrharta calycina	A				<1
Ursinia anthemoides	A				<1
Dichopogon capillipes	N				<1
Lysimachia arvensis	A				1
Phyllanthus maderaspatensis	N				<1
Stirlingia latifolia	N				<1

Flora Site Sheet					
Hypochaeris glabra	A				2
Aenictophyton reconditum	N		Aen prost		<1
Trachymene pilosa	N				<1
Ehrharta calycina	A				<1
Romulea rosea	A				<1
Sowerbaea laxiflora	N				<1
Dianella revoluta	N				<1
Crassula colorata	N				<1
Caladenia flava	N				<1
Arctotheca calendula	A				<1
Agrostocrinum hirsutum	N		Tricho - purple	Q2-03	<1
Acacia pulchella	M				<1
Verticordia carinata	N	T			<1
Acacia iteaphylla	A				<1
Styphalia sp.					<1
Drosera pallida	N				<1
Pyrorchis nigricans	N				<1
Drosera macrantha	N				<1
Austrostipa compressa	N				<1

Appendix E
DCCEEW Scoring Tools

Habitat Scoring System for WA black cockatoo foraging habitat

This habitat scoring system describes elements indicative of suitable foraging habitat[1] 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				
			Marri-Jarrah-Karri Forest, other eucalypt woodlands, or allocasuarina woodlands, with >50% projected foliage cover. Low percentage (< 5%) of tree deaths.				
	6	High	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.

[2] No 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. Habitat features			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, *Eucalyptus caesia* and *E. erythrocorys*.				
	1	Negligible to low	All species				
			Scattered specimens of known food plants but projected foliage cover of these is <2%. May include: paddocks or urban areas with scattered foraging trees.				
	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				

Indicator		**Species Stocking Rate**[3]	**Impact Site**			**Offset Site**		
			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.

Appendix F : Desktop Site Investigation Report (GoWA, 2022)

Government of **Western Australia**
Department of **Finance**

South West Health Campus

Desktop Site Investigation Report

Prepared by Statutory Planning and Asset Policy, Department of Finance

24 January 2022

Disclaimer

This report is a preliminary desktop assessment that has been compiled from information available on existing systems including Landgate, Shared Land Information Platform, agency websites and internal Department of Finance records. There has been no collaboration with the current owners or occupiers of the site.

Contents

List of Figures & Tables

1. Introduction

This Desktop Site Investigation Report of the South West Health Campus and surrounding lots has been prepared to inform the consideration of redevelopment options for the Bunbury Hospital.

2. Location

The subject area is located within the City of Bunbury (the City) and is bounded by Robertson Drive to the north, Bussell Highway to the west, bushland to the south and the Bunbury Edith Cowan University (ECU) Campus to the East. The South West Sports Centre is on the western side of Bussell Highway. The site is approximately 3.5km from the centre of Bunbury

Figure 1 on the following page provide the spatial context for the subject site.

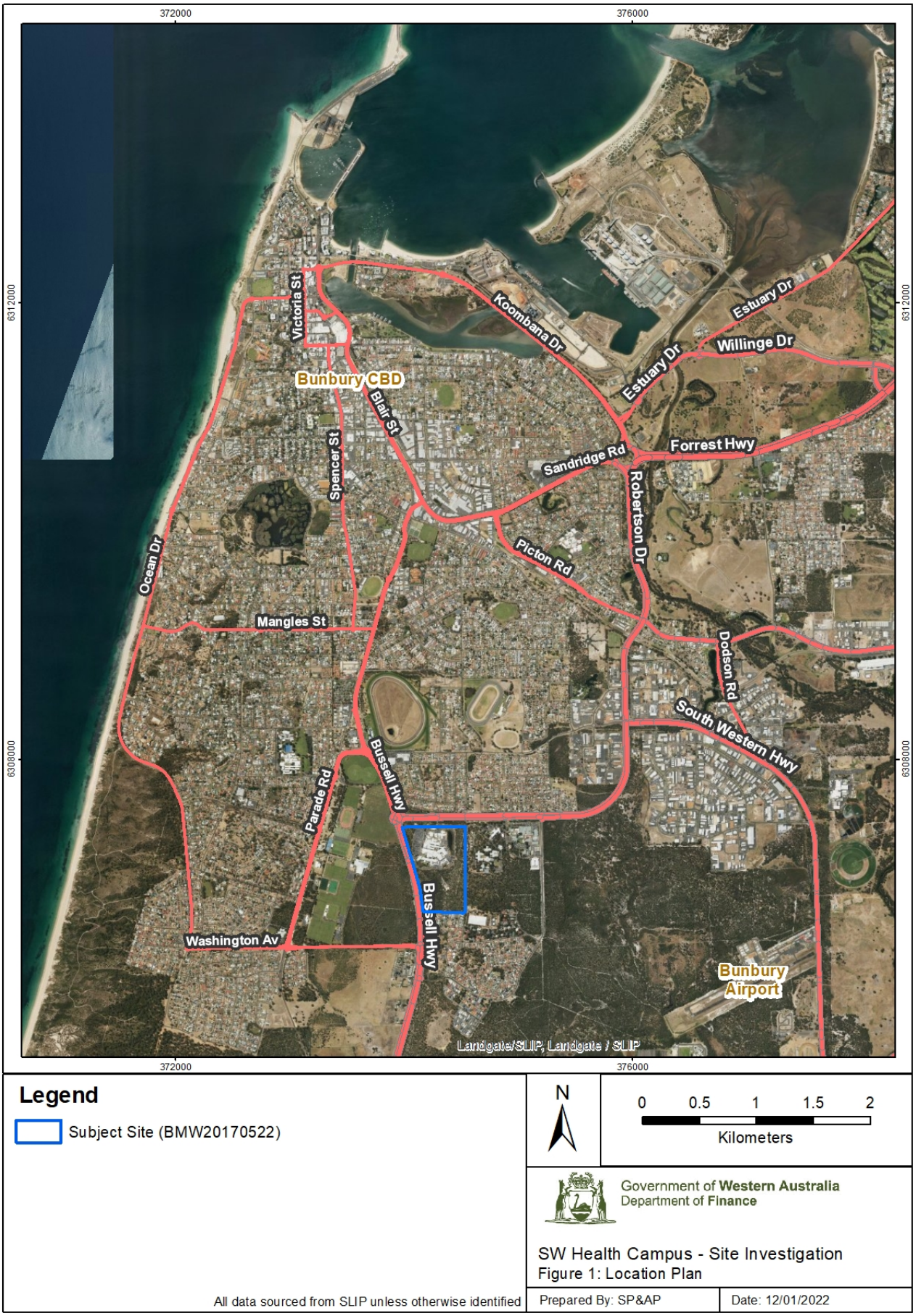

Figure 1: Location Plan

3. Site Details

The subject site is comprised of 3 separate lots, which are all Crown Reserves. The South West Health Campus is on Lot 3000 (Crown Reserve 44281). The other two lots (Lots 664 and 684) form part of the adjacent ECU campus (Crown Reserve 32805).

The current details of all 3 lots are provided in Table 1 below and Figure 2 on the following page.

Table 1		Lot 3000	Lot 664	Part Lot 684
	Certificate of Title	LR3136/212	LR3128/811	LR3128/812
	Address:	Lot 3000 Bussell Hwy, College Grove	Lot 664 Robertson Dr, College Grove	Lot 684 Bussell Hwy, College Grove
	Parcel Identifier:	Lot 3000 on Plan 43553	Lot 664 on Plan 35336	Lot 684 On Plan 35337
	Area (ha)	15.7	3.26	15.13
	Memorial:	N/A	N/A	L737273 - Contamination
	Easements:	N/A	N/A	N/A
Tenure	**Proprietor:**	State of WA	State of WA	State of WA
	Crown Reserve:	R44281	Part R32805	Part R32805
	Reserve Purpose	Health (Hospital & Allied Purposes)	Secondary and Advanced Education Centre	Secondary and Advanced Education Centre
	Management Order:	Minister for Health	Edith Cowan University	Edith Cowan University
	Responsible Agency:	Health Department of WA	Edith Cowan University	Edith Cowan University
Planning	**Greater Bunbury Region Scheme**	Public Purposes – Hospital	Public Purposes – University	Public Purposes – University
	City of Bunbury Town Planning Scheme No.7	Public Purposes – Hospital	Public Purposes – University	Public Purposes – University

Table 1: Site Details Summary

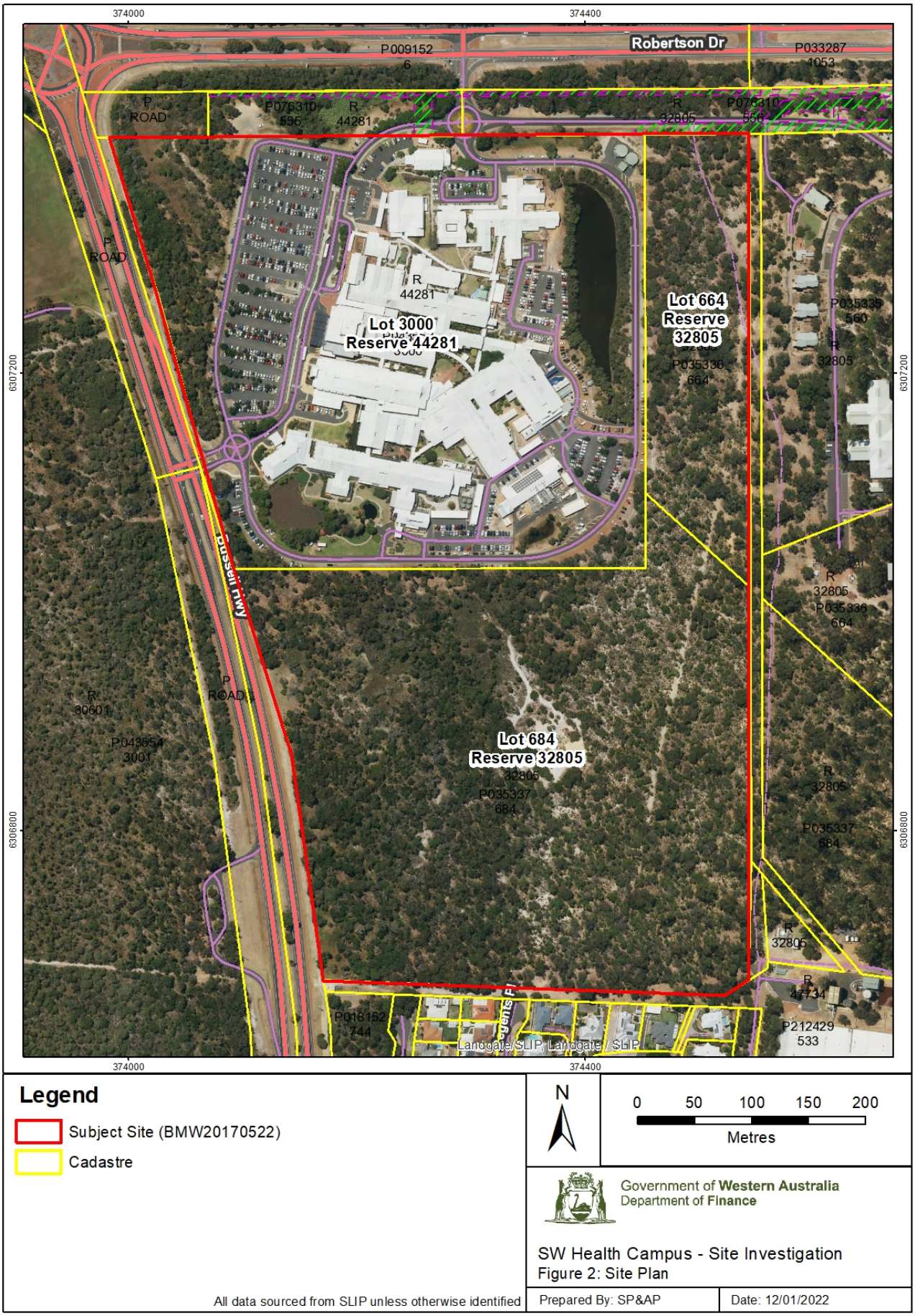

Figure 2: Site Plan

4. Improvements

Lot 3000 has been heavily developed as the South West Health Campus and as a result contains a variety of improvements. There are numerous single storey buildings, with one two storey building at the hospital entrance on the western side of the campus adjacent to the large car park. There are also numerous hard stand car parking areas, service/plant infrastructure and internal roads.

The hospital was first constructed in 1997-1998. Various additions and redevelopments have occurred since, including new operating theatres, palliative care unit and birthing suite ~2006/7, alterations and extensions to dental, mental health, oncology and critical care units ~2007/8, a new cancer centre in 2010-2011, critical care unit and emergency department upgrades 2011-2013, a new sub-acute care building in 2014 and a new pathology centre in 2016. A site plan is provided at Figure 3.

Various minor developments were approved in 2021, including:

- a new car park in the north west corner of the site;
- a temporary transportable in the staff parking area adjacent to the lake; and
- a 30-bed modular COVID inpatient unit.

Lots 664 and 684 have not been developed and remain heavily vegetated.

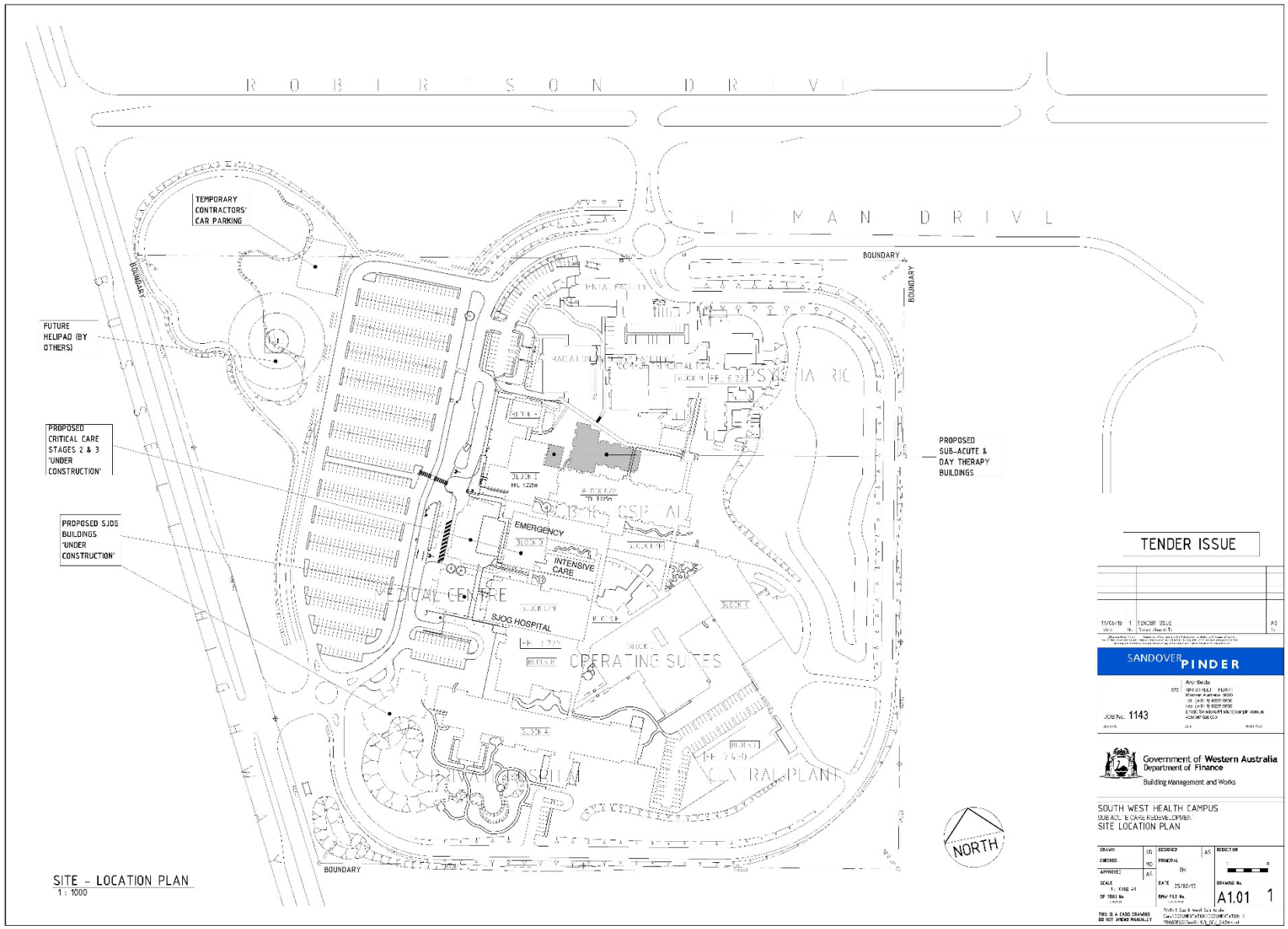

Figure 3: SW Health Campus site plan (Department of Finance Corporate Register)

5. Site Constraints

5.1. Encumbrances

There are various registered encumbrances on the Certificates of Title for the 3 subject lots. All three lots have Management Orders registered as they are Crown Reserves. Management Orders typically restrict the use of the land to the Reserve Purpose. Lot 3000 is reserved for the purpose of Health (Hospital and Allied Purposes). Any future hospital redevelopment would be in keeping with this purpose. Lots 664 and 684 are both part of the same reserve, for the purpose of Secondary and Advanced Education Centre. Locating health/hospital uses on this land would not be in keeping with the Reserve purpose and Management Order.

Lot 3000 also has two leases registered on the Certificate of Title. The first is to the South West Health Board for a peppercorn rent of $1. The lease was originally signed in 1999 for 20 years, with six consecutive further terms of five years each. The second lease is to St John of God Health Care. The copy of the registered document is incomplete and missing information regarding the term and rent details.

The lease apportions the grounds of Lot 3000 and approximately half the buildings to the 'Bunbury Health Service', and the remaining buildings to St John of God. Car parks are nominated as common areas. The Lease Tenure Plan, as provided in the lease documents, is shown in Figure 4.

Lot 684 has a contamination Memorial indicating that the site has been classified as 'possibly contaminated – investigation required'. There is no spatial representation of this possible contamination, so further information should be obtained from the Department of Water and Environment Regulation (DWER).

There are also two leases registered on the Certificate of Title for lot 684, which are outside the subject site.

5.2. Environment

5.2.1. Topography & Vegetation

The subject site has a fall from east to west of approximately 30m, with the high point of 40m in the south eastern corner of Lot 684 and a slope downwards to between 5-10m at the western boundary on Bussell Hwy. The slope is steepest on the eastern half of the site.

As Lot 3000 is heavily developed, there is only a small portion of remnant vegetation in the north western corner, and smaller areas around a lake on the eastern boundary of the lot and in the south east corner.

Lots 664 and 684 are both heavily vegetated with remnant bushland.

All of the remnant vegetation has been identified as Category C (medium) Suitability for Western Ringtail Possum Habitat, as well as requiring investigation for Carnabys Cockatoo feeding habitat area. Both the Western Ringtail Possum and Carnabys Cockatoo are protected under the Commonwealth *Environment Protection & Biodiversity Act 1999*.

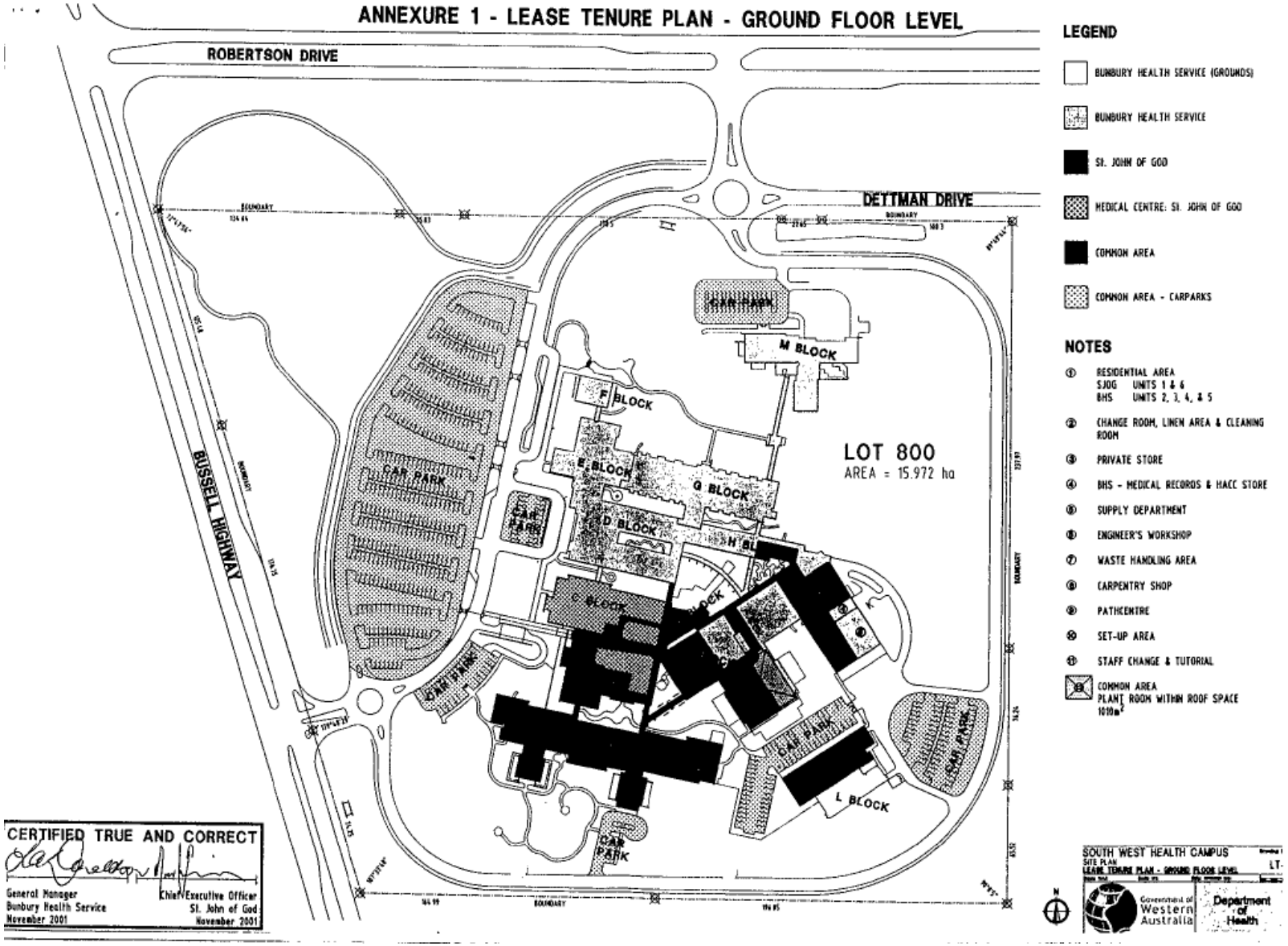

Figure 4: Lot 3000 Lease Plan

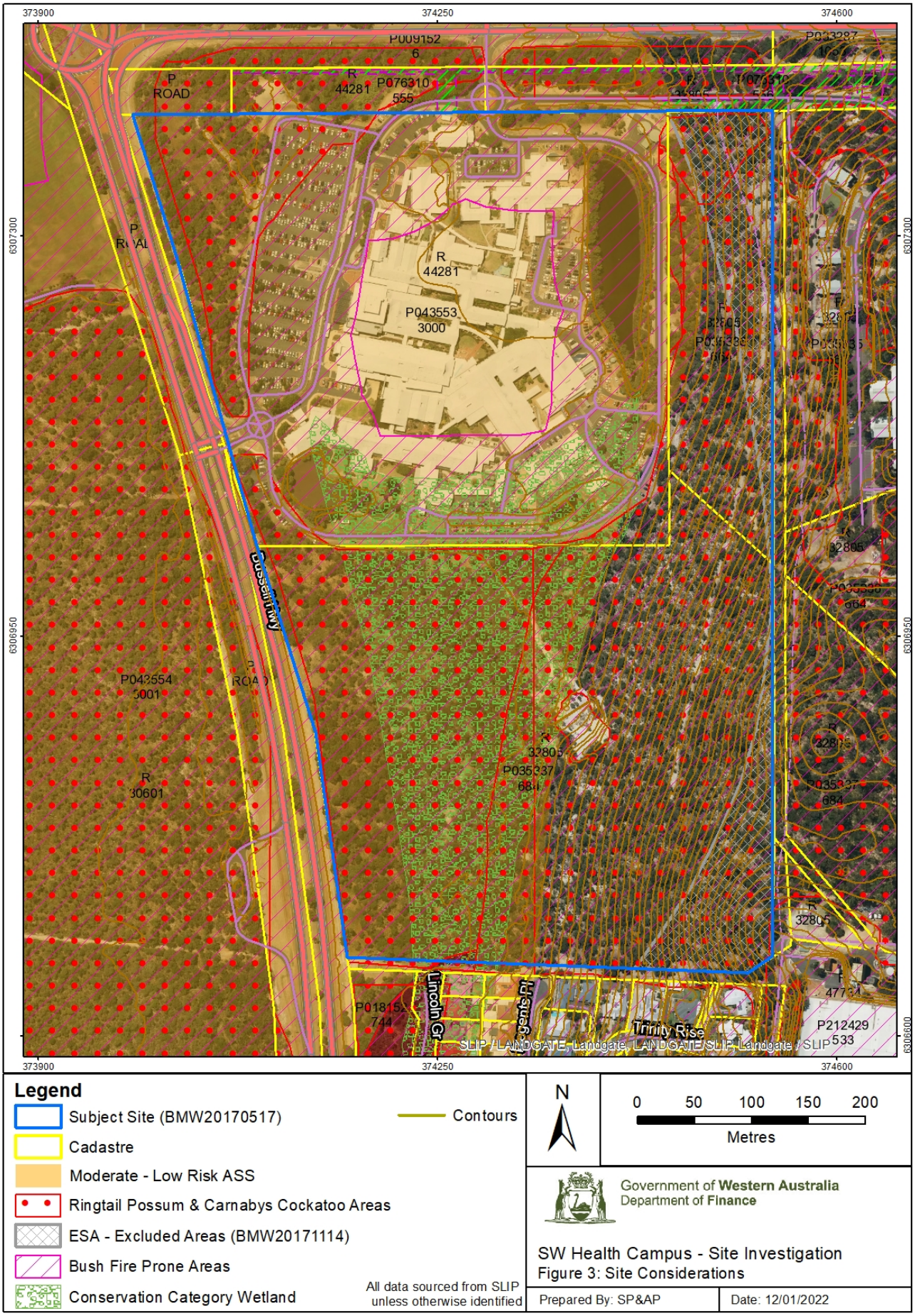

Figure 5: Site Considerations

A preliminary flora and fauna survey of Lot 684 was undertaken in November 2021. Survey maps are attached at Appendix 1. The survey identified that the majority of the site supports intact native vegetation in 'very good' and 'excellent' condition. The eastern portion represents banksia woodland community which is protected under the EPBC Act. Lot 684 also supports habitat for the Black Cockatoo, also protected under the EPBC Act. The survey concluded that there are 'significant ecological constraints to development of the site'.

A Clearing Permit from the Department of Water and Environmental Regulation (DWER) may be required if any of the native vegetation on site is to be removed. Certain exemptions do exist for the lawful construction of buildings and structures. The DWER permit process has a target timeframe of finalising assessments and determinations within 60 business days from the date the application is received and is not inclusive of the 21-day appeal period.

The survey identified various habitats that are protected under the EPBC Act. Notwithstanding any approval requirements or possible exemption from DWER, Commonwealth approval may be required. Further investigation and flora and fauna surveys would be required to confirm approval requirements. The timeframes for assessment and determination under the EPBC Act can be lengthy, dependent on the proposed impact, and the level of assessment required. Offset contributions are often required under the Commonwealth process and may include off-site land as part of that contribution.

5.2.2. Environmentally Sensitive Areas

The majority of the site is within an Environmentally Sensitive Area (ESA), with the exception of two small areas in the north east and south east corners. These are areas declared by the Minister for Environment under the *Environmental Protection Act 1986*. ESAs override some existing exemptions under clearing regulations.

5.2.3. Geomorphic Wetlands

The site is affected by two identified wetland areas. One is a Conservation Category wetland (CCW), mainly affecting the western portion of Lot 684, and the other is a Multiple Use wetland (MUW) affecting most of Lot 3000 and a small area along the western boundary of Lot 684.

The preliminary environmental survey confirmed that the CCW category was appropriate, and also that the MUW on the western portion of Lot 684 actually reflected CCW values.

Wetlands are categorised, with Conservation Category wetlands having the highest priority for protection and conservation. The objective of these wetlands are to preserve the wetland's attributes and functions, and there is a general presumption against development that would result in the clearing of vegetation within the wetland or 50m buffer area.

The objective of Multiple Use wetlands is to use, develop and manage wetlands in the context of water, town and environmental planning.

Further consultation with DWER and the Department of Biodiversity, Conservation and Attractions (DBCA) will be required.

5.2.4. Contamination

The subject site is not registered as a Contaminated Site, but this does not preclude the possibility that unregistered contamination exists. As noted in Section 5.1, a Memorial registered on Lot 684 notes that the site has been classified as 'possibly contaminated – investigation required.' It is not known whether asbestos exists in any of the buildings.

5.2.5. Designated Bushfire Prone Area

A majority of the site, with the exception of a small area covering the middle of the hospital buildings, is within a Designated Bushfire Prone Area. It is Department of Finance policy that all projects that constitute 'development' under the *Planning & Development Act 2005*, and that are within designated bushfire prone areas, are to comply with the requirements of State Planning Policy 3.7: Planning in Bushfire Prone Areas (SPP3.7).

Any habitable development will be required to comply with SPP 3.7. Hospital uses would also be classed as a vulnerable use, which attracts further requirements under SPP3.7. These requirements include:

1. A Bushfire Attack Level (BAL) Assessment: The BAL classifies an area of land into one of six categories: BAL-LOW, BAL-12.5, BAL-19, BAL-29, BAL-40 and BAL Flame Zone (FZ). The BAL must be prepared by an accredited Level 1 BAL Assessor or an accredited Bushfire Planning Practitioner.

   The requirements below do not apply to a proposed development if the BAL is classified as BAL-LOW.

2. The identification of any issues arising from the BAL assessment.
3. An assessment against the bushfire protection criteria requirements contained within the Guidelines for Planning in Bushfire Prone Areas demonstrating compliance.
4. For areas classified as BAL-12.5 to BAL-29, a Bushfire Management Plan (BMP), prepared by an accredited Bushfire Planning Practitioner, and jointly endorsed by the relevant Local Government and the State authority for emergency services (the BMP can include the information required in 1-3 above).

Development in areas classified as BAL-40 or BAL-FZ will not be supported unless it meets the definition of 'unavoidable development':

> *"Development that, in the opinion of the decision-maker, represents exceptional circumstances where full compliance with this policy would be unreasonable, no alternative location exists, it is not minor development, and is not contrary to the public interest".*

It is worth noting that the Department of Fire & Emergency Services (DFES) also does not support vulnerable land uses within areas of BAL-29 and above.

5.2.6. Acid Sulphate Soils

Lot 3000, a very small portion of Lot 664 and the western half of Lot 684 are within a 'Moderate to Low Risk' area of Acid Sulphate Soils (ASS). Activities with the potential to disturb ASS must be managed carefully to avoid serious environmental harm.

Investigation and management of any potential ASS may be required during construction, through the development of an ASS Management Plan.

5.3. Utilities

As the site is already substantially developed, it is expected to be adequately serviced with scheme water, mains sewer, gas, electricity and communications infrastructure. The National Broadband Network is also available in this area.

5.4. State Heritage

The subject site is not on the State Register of Heritage Places.

Under the Government Heritage Property Disposal Policy (GHPDP), any building or structure will generally need to be considered as part of the associated process if they are more than 60 years old, are already listed on a local government inventory or display other evidence of potential significance in terms of aesthetic, historic, social or scientific value.

5.5. Local Heritage

The subject site is not on the City's Heritage List.

5.6. Aboriginal Heritage

The subject site is not on the Aboriginal Heritage Register.

Advice received from DPLH in December 2021 confirms a number of historical heritage surveys have been conducted in the area which did not identify any Aboriginal Heritage in this specific location.

Notwithstanding, development in areas that are previously undisturbed may require heritage surveys. If this is the case, a Noongar Standard Heritage Agreement (NSHA) will need to be formalised.

Standard Heritage Agreements have been introduced for use by Agencies across State Government to enable a consistent approach to be adopted when engaging with traditional owners to determine the implications (if any) for Aboriginal heritage when undertaking ground disturbing work throughout the State. Entering into a NSHA is required prior to any Aboriginal Heritage surveys being undertaken.

Further consultation with the South West Land and Sea Council (SWLSC) will be required in the first instance.

6. Planning Framework

6.1. Statutory Planning Schemes

6.1.1. Greater Bunbury Region Scheme

The current health campus, on Lot 3000, is reserved for Public Purposes – Hospital in the Greater Bunbury Region Scheme (GBRS). Lots 664 and 684 are reserved for Public Purposes – University.

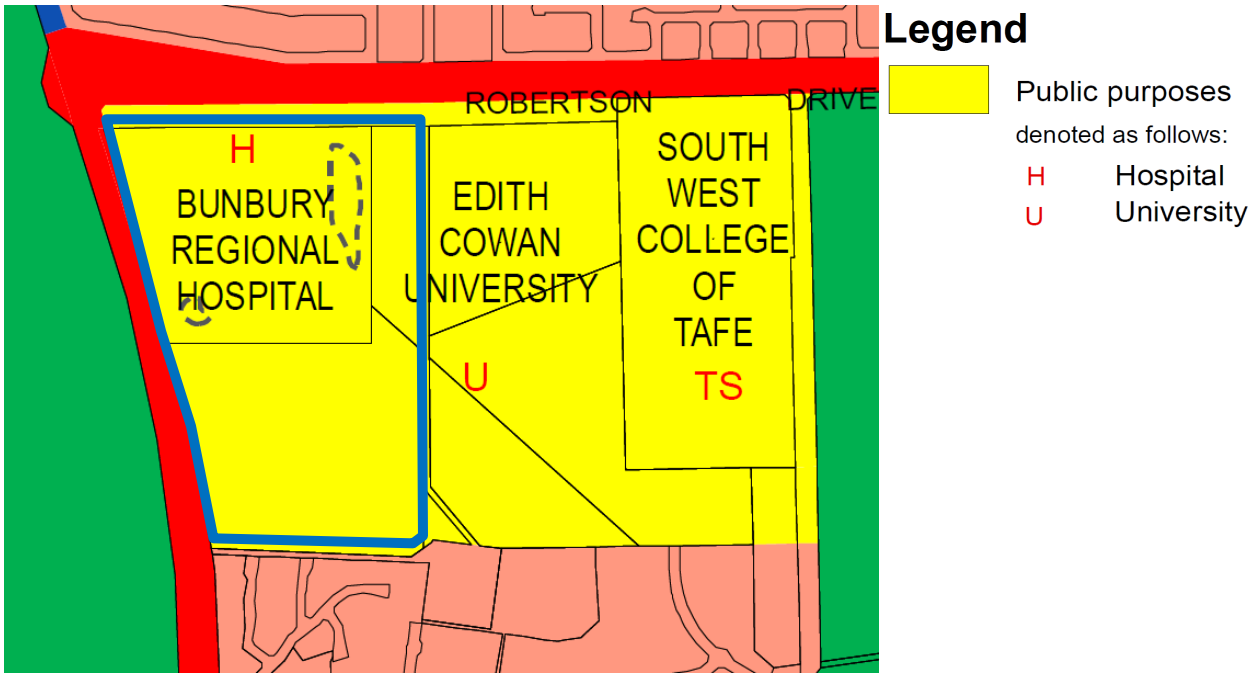

Figure 6: GBRS Zoning

The purpose of public purposes reserves are 'to provide for other public purposes as denoted on the Scheme Map.'

Any new or redeveloped health facilities within Lot 3000 would be considered a suitable use within the current GBRS reservation. Additional health facilities within Lots 664 and 684 will likely not be considered compatible with the reservation for University under the GBRS.

6.1.2. City of Bunbury Town Planning Scheme No. 7

As subject site is reserved under the GBRS, it is also reserved for the same purposes in the City's Town Planning Scheme (TPS), and there are no specified development requirements within the TPS. Development is governed by, and any approval issued under, the GBRS and not the TPS. Due regard is still required to be given to the TPS however.

6.2. Planning Approvals

6.2.1. Rezoning

It is not anticipated that any rezoning under the GBRS will be required for additional health facilities on Lot 3000.

If health facilities are to be expanded to either Lot 664 or 684, then it is likely that a GBRS rezoning will be required to amend the reservation from University to Hospital for the affected portion.

Region Scheme amendments can be classed as either Minor or Major:

- Minor amendment: where the WAPC determines that the amendment does not constitute a substantial alteration to the Region Scheme. After a public consultation period of not less than 60 days, the WAPC will consider submissions and provide a recommendation to the Minister for Planning for approval. This process may take 6-9 months to complete.
- Major amendment: where the proposal constitutes a substantial alteration to the Region Scheme. Includes a public consultation period of not less than three months, after which the recommendations of the WAPC are presented by the Minister to the Governor. If approved by the Governor, the amendment is placed before each house of Parliament for 12 sitting days. This process may take up to 24 months to complete.

The Minor amendment process is now considered the default process, however further consultation with the Department of Planning, Lands & Heritage (DPLH) would be required if a rezoning was to be pursued.

6.2.2. Subdivision

If any future development is located on portions of either Lot 664 or Lot 684, then it is likely a subdivision would be required. This would require agreement from ECU and will involve an adjustment to its Management Order by excising the portion of land needed for the health campus which could then be then brought under the management of the Minister for Health. This could occur as a new standalone lot, or as an amalgamation into Lot 3000.

This process could be actioned by DPLH as a Crown Land subdivision which is anticipated to be quicker than the standard Western Australian Planning Commission (WAPC) process of 90 days.

6.2.3. Development Approval

Under Section 6 of the *Planning & Development Act 2005*, public works are exempt from approval from Local Governments. Public works are still required to have regard to:

- to the purpose and intent of a Local Planning Scheme; and
- the orderly and proper planning, and preservation of the amenity, of the area.

Consultation with the Local Government is also required under Section 6 during the formulation of a proposal.

Section 5 of the *Planning & Development Act 2005* binds the Crown to Region Schemes. There are only limited exemptions from the requirement for development approval for public works on reserved land within the GBRS, which additional health facilities would not meet. Therefore, development approval will be required from the WAPC.

If any new development proposal has a value greater than $10 million, the application would be determined by a Development Assessment Panel (DAP). As a public work, the Responsible Authority Report would be prepared by the WAPC.

The statutory timeframe for determining a standard WAPC development application is 60 days, and a DAP application is between 60 and 90 days, depending on whether advertising is required.

7. Key Considerations

The key considerations for this site include:

7.1. Environmental Considerations

The subject site has several environmental constraints present that will require further investigation as part of any master planning for the future of the South West Health Campus. The highest priority are considered to include:

- The contamination Memorial registered on Lot 684, indicating the site is 'possibly contaminated – investigation required'. There is no spatial representation of this possible contamination, so further information should be obtained from DWER. Lot 684 extends to the east of the subject site, so the Memorial may be referencing this area.
- EPBC considerations – given the outcomes of the preliminary environmental survey, further spring flora and fauna surveys will be required if Lot 684 is proposed for future development. EPBC approvals can take anywhere up to 18 months and potential land and/or cash offsets outcomes considered. Any major expansion of the current hospital facilities southwards into Lot 684 may be severely impacted by the apparent high quality native vegetation.
- Wetlands/ESA – Conservation Category wetlands generally preclude any development that will have a significant adverse impact on the wetland, including clearing of bushland. Any major expansion of the current hospital facilities southwards into Lot 684 may be severely impacted by the Conservation Category wetland and ESA clearing restrictions.
- The Designated Bushfire Prone Area – DFES will not support any development of vulnerable uses in areas of BAL-19 and above. A BAL contour map should be developed for the site to indicate the areas in which new hospital development would be most appropriate and acceptable. If higher BAL levels are unavoidable, consultation should be undertaken with DFES to determine acceptable solutions to reduce the BAL or other approaches to mitigating the bushfire risk. A BAL Assessment and BMP will also be required for any development approval application.

7.2. Land Tenure

The current Crown reserve purpose and Management Orders for Lots 664 and 684 provide for the management, use and development of these lots for secondary and advanced education uses by Edith Cowan University. If the master planning exercise for the South West Health campus identifies future health related development on these lots, then amendments to the current land tenure arrangements will be required. This would include:

1. An agreement with Edith Cowan University for the relinquishment of a portion of Lots 664/684 within the subject site (as required).
2. A subdivision application to excise the portion of Lots 664/684 required for future health facilities, and potentially an amalgamation into Lot 3000.

3. Modification of the current SW Health Campus Crown reserve to include the portion of Lot/s 664/684, to bring it under the management of the Minister for Health for the purposes of 'Health (Hospital & Allied Purposes)'.

7.3. GBRS Reservation

As Lots 664 and 684 are reserved under the GBRS for Public Purposes – University, a rezoning is likely to be required to permit health/hospital uses. As outlined in Section 6.2.1, this process can take anywhere between 12-24 months, depending on whether it is classed as minor or major.it is anticipated that a minor amendment could be pursued which may take 6-9 months.

7.4. Aboriginal Heritage

As Lot 684 is undisturbed, and despite there being no registered Aboriginal Heritage Sites, consultation with SWLSC is required to determine the requirement for a Noongar Standard Heritage Agreement for the project. SWLSC will advise if heritage surveys are required, in which case a NSHA will be required which will determine the requirements and implications for any ground disturbing work on Lot 684.

8. Conclusion

Whilst there are no signficant planning constraints on the subject site that would preclude the redevelopment/expansion of the South West Health Campus, there are a series of other environmental considerations which need to be addressed as part of any master planning exercise for future development.

8.1. Recommendated Actions

1. Confirm with DWER the location and detail of the noted possible contamination, as described by the Memorial.
2. Undertake flora and fauna surveys to inform any required approval processes under the EPBC Act.
3. Undertake BAL contour mapping to identify areas of the site that are above BAL 19 and therefore won't be supported by DFES for additional development of vulnerable uses, unless measures are taken to reduce the risk.
4. Confirm with DWER and Department of Biodiversity, Conservation and Attractions - Parks & Wildlife Service the impact of the ESA and Conservation Category wetland potentially restricting any future development on the subject site.
5. For lots 664 and 684, confirm with DPLH whether any potential amendment of a portion of the GBRS reservation from University to Hospital would:
    a. be supported;
    b. be considered a minor amendment (and confirm likely timeframe).
6. Consult with Edith Cowan University if a portion of Lots 664/684 is required for future health purposes.
7. Consult with SWLSC regarding the requirement for Aboriginal Heritage surveys and the implementation of a NSHA for any ground disturbing works on Lot 684.

Appendix 1 – Preliminary Flora & Fauna Survey Results

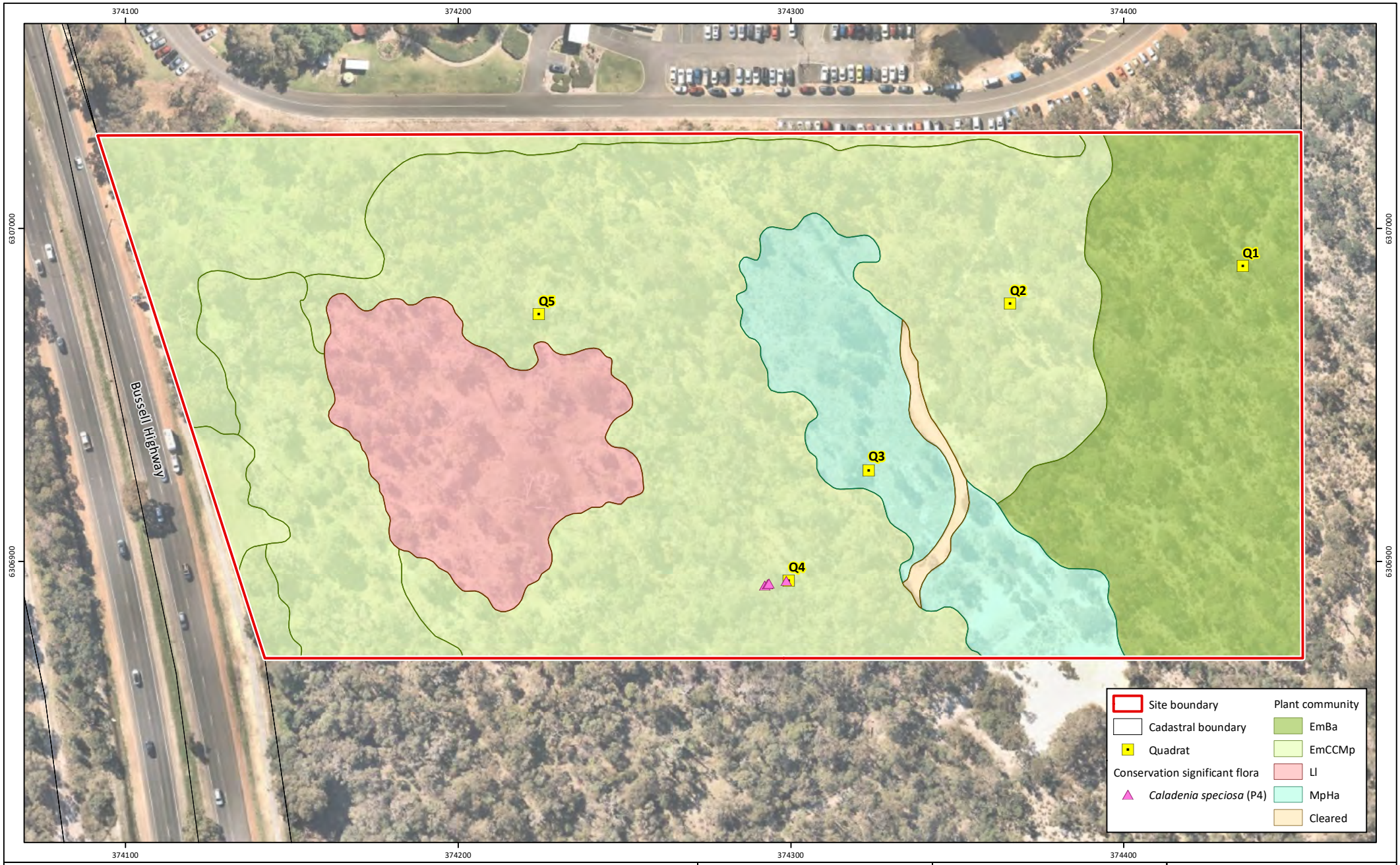

Figure 1: Conservation Significant Flora and Plant Communities

Project: Bunbury Health Campus Environmental Support

Client: Department of Finance

Plan Number:
EP21-117(01)--F01

Drawn:	GAR
Date:	06/01/2022
Checked:	RAW
Approved:	RAW
Date:	19/01/2022

N

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Metres

Scale: 1:1,500@A4

GDA 1994 MGA Zone 50

emerge ASSOCIATES

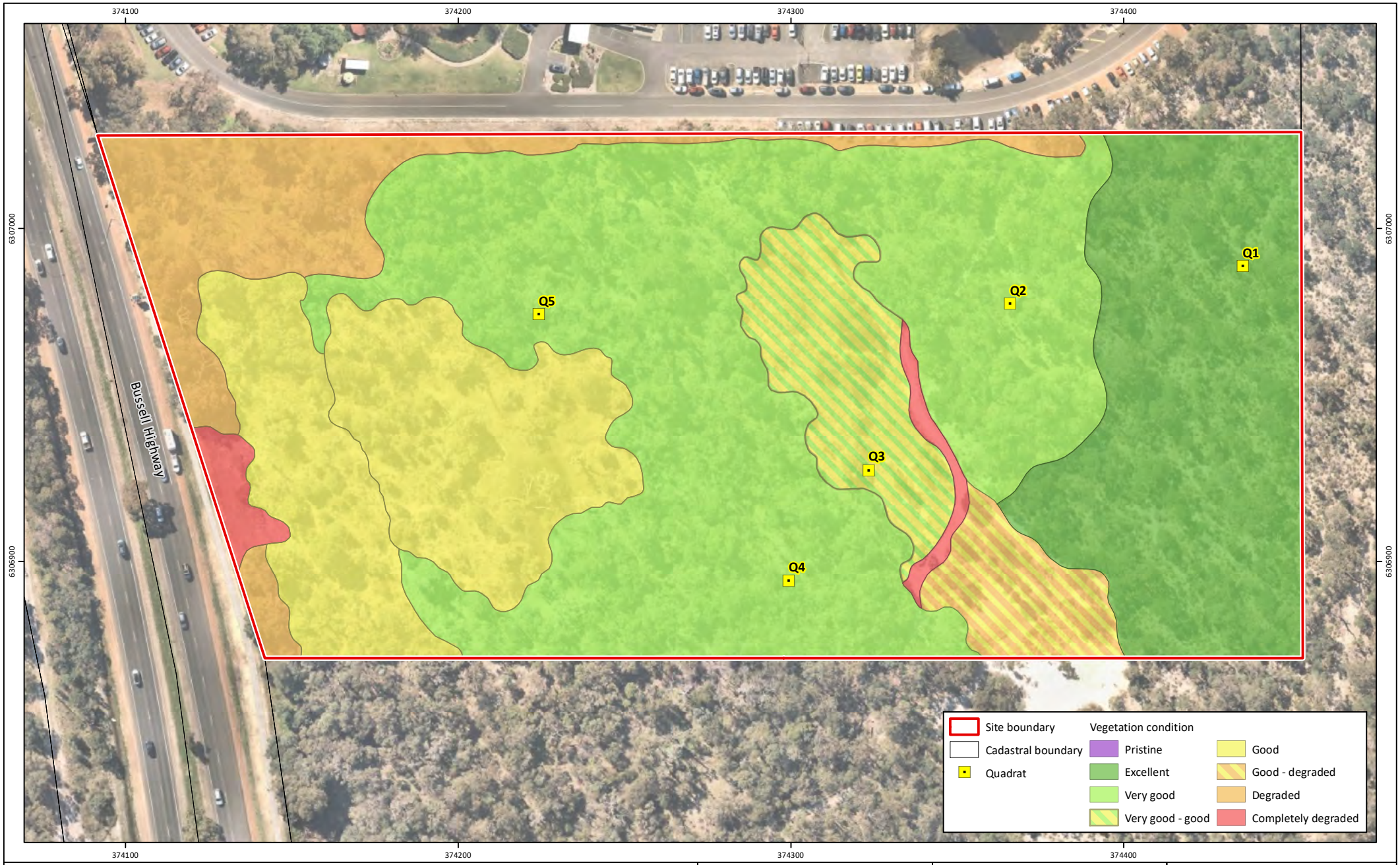

Figure 2: Vegetation Condition

Project: Bunbury Health Campus Environmental Support

Client: Department of Finance

Plan Number:
EP21-117(01)--F02

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Checked:	RAW
Approved:	RAW
Date:	19/01/2022

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GDA 1994 MGA Zone 50

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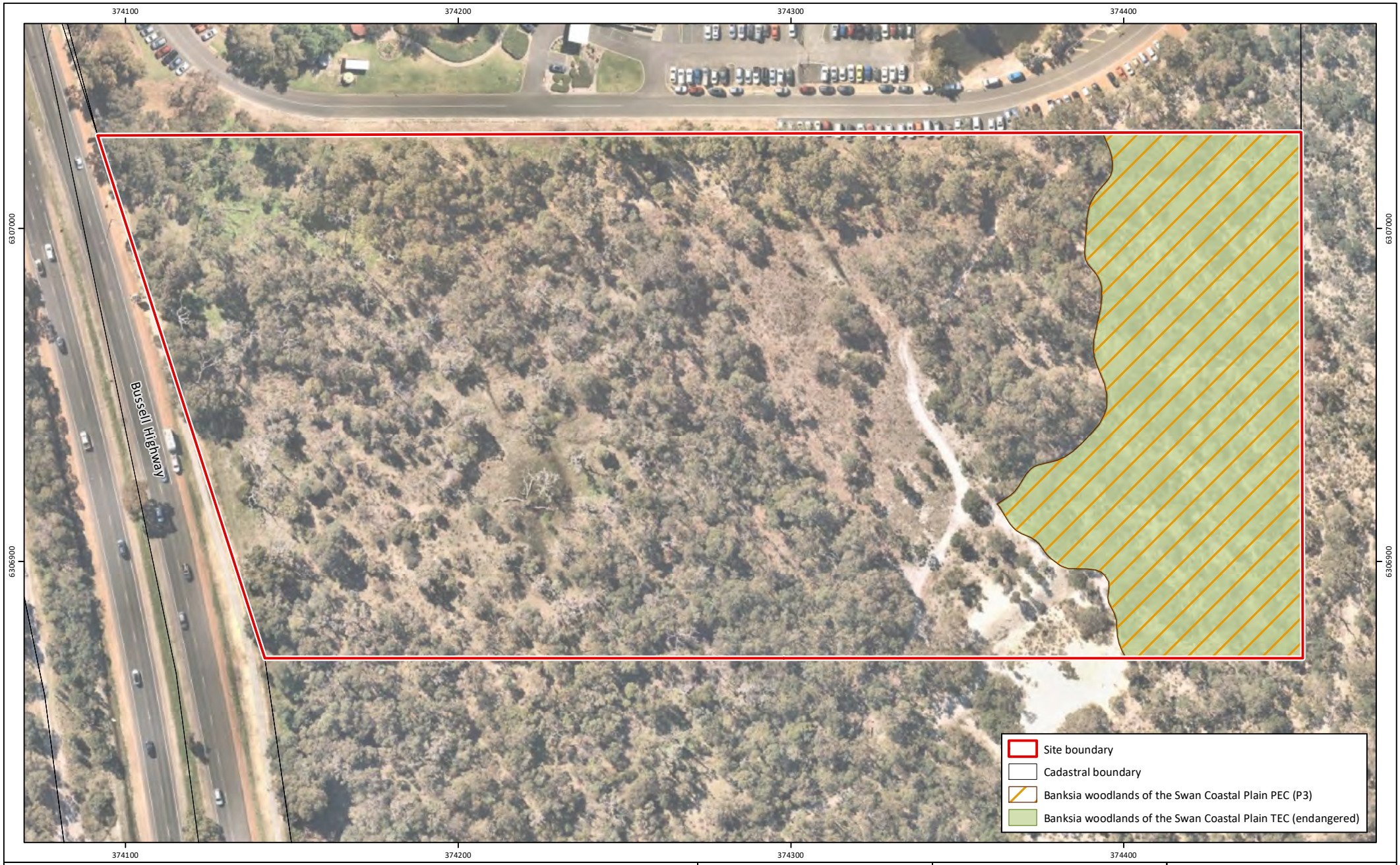

Figure 3: Threatened and Priority Ecological Communities

Project: Bunbury Health Campus Environmental Support

Client: Department of Finance

Plan Number:
EP21-117(01)--F03

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Approved:	RAW
Date:	19/01/2022

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GDA 1994 MGA Zone 50

emerge ASSOCIATES

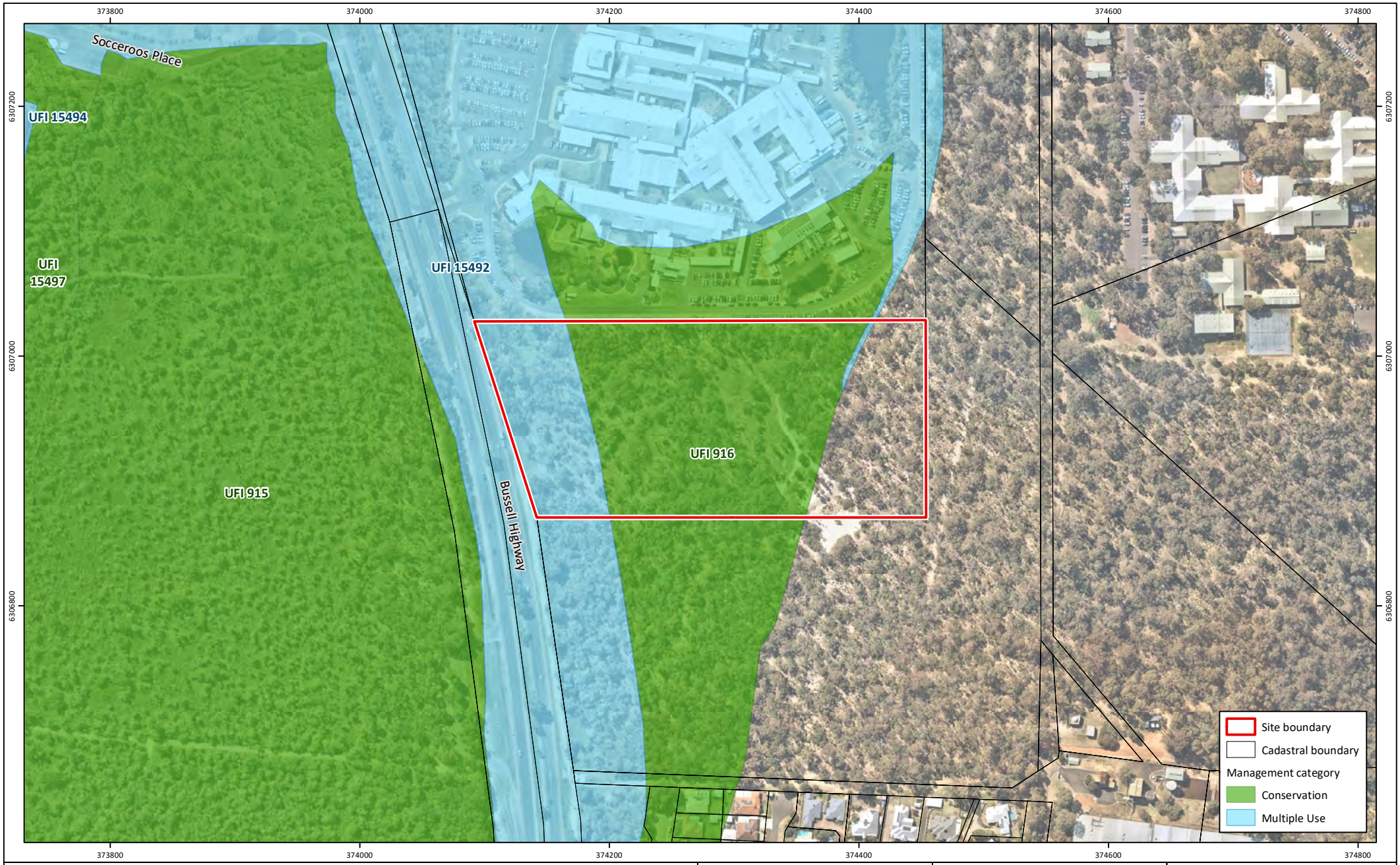

Figure 4: Geomorphic Wetlands (DBCA 2021)

Project: Bunbury Health Campus Environmental Support

Client: Department of Finance

Plan Number:
EP21-117(01)--F04

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Checked:	RAW
Approved:	RAW
Date:	19/01/2022

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Metres

Scale: 1:4,000@A4

GDA 1994 MGA Zone 50

emerge ASSOCIATES

Figure 5: Likely Geomorphic Wetlands

Project: Bunbury Health Campus Environmental Support

Client: Department of Finance

Plan Number:
EP21-117(01)--F05

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Approved:	RAW
Date:	19/01/2022

N

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Metres

Scale: 1:1,500@A4

GDA 1994 MGA Zone 50

emerge ASSOCIATES

Figure 6: Black Cockatoo Foraging Habitat

Project: Bunbury Health Campus Environmental Support

Client: Department of Finance

Plan Number:
EP21-117(01)--F06

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Date:	10/01/2022
Checked:	RAW
Approved:	RAW
Date:	19/01/2022

N

0 20 40 60
Metres

Scale: 1:1,500@A4

GDA 1994 MGA Zone 50

emerge ASSOCIATES

Document Control

Version	Date	Author	Reviewed	Approved	Signature
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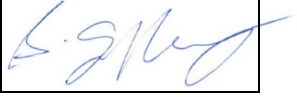
2.0	24/1/2022	V Madigan	S Jeffrey	S Jeffrey	

Appendix G : Black Cockatoo Potential Breeding Trees

Potential, Suitable and Known Black Cockatoo Nest Trees.

Tree Number	Date	Species	Bamford Class	DBH	Hollow Data	Eastings	Northings	Comments
1	1/10/2024	Jarrah	P	45		374465.4	6307241	30 -50 Dbh
2	1/10/2024	Jarrah	P	40		374467.1	6307232	
3	1/10/2024	Marri	P	35		374469.7	6307218	
4	7/08/2024	Marri	5	50		374154.1	6307419	
5	1/10/2024	Marri	4	90	some small hollows forming	374467.7	6307216	
6	1/10/2024	Marri	P	30		374465.8	6307214	
7	1/10/2024	Marri	5	55		374464.8	6307212	Nest in top of tree
8	1/10/2024	Marri	4	60		374464.7	6307208	Branches with small potential hollows,
9	7/08/2024	Marri		15		374148.9	6307414	
10	1/10/2024	Marri	P	30		374469.9	6307189	
11	1/10/2024	Marri	5	65	No hollows	374460.6	6307182	
12	1/10/2024	River Red Gum	5	60	No hollows, breaks from disease?	374461.9	6307161	
13	1/10/2024	Jarrah	4	55	Hollow present 3m from ground. Not suitable for Black cockatoo	374457.1	6307117	
14	7/08/2024	Marri		20		374159.6	6307415	
15	1/10/2024	Marri	4	70	Small brach with hollows forming, nothing suitable for black cocky	374476.5	6307319	
16	1/10/2024	Marri	5	50		374475.1	6307298	
17	1/10/2024	Marri	5	70	No hollows	374470.2	6307338	
18	7/08/2024	Marri	5	55		374160.6	6307413	

Tree Number	Date	Species	Bamford Class	DBH	Hollow Data	Eastings	Northings	Comments
19	1/10/2024	River Red Gum	P	40		374457.7	6307332	
20	1/10/2024	Marri	5	80		374465.6	6307384	
21	1/10/2024	Jarrah	P	40		374480.8	6307399	
22	7/08/2024	Marri	P	45		374160.8	6307414	
23	1/10/2024	Marri	5	50		374462.6	6307406	
24	1/10/2024	Jarrah	P	30		374466.8	6307410	
25	1/10/2024	Marri	5	55		374460.8	6307429	
26	7/08/2024	Marri	5	80		374165.9	6307420	
27	1/10/2024	Jarrah	P	35		374464.5	6307430	
28	1/10/2024	Marri	P	40		374469.3	6307441	
29	1/10/2024	Marri	P	35		374470.7	6307443	
30	7/08/2024	Marri	P	35		374173.4	6307419	
31	1/10/2024	Marri	P	30		374462.9	6307445	
32	1/10/2024	Marri	P	30		374440.3	6307444	
33	1/10/2024	Marri	P	30		374432.9	6307446	
34	1/10/2024	Marri	5	50		374423.4	6307450	
35	7/08/2024	River Red Gum	5	55		374425.4	6307165	
36	1/10/2024	Marri	P	30		374400	6307439	
37	1/10/2024	Dead	4	60	Small hollows in top branches, unsuitable for BC	374387.3	6307444	

Tree Number	Date	Species	Bamford Class	DBH	Hollow Data	Eastings	Northings	Comments
38	7/08/2024	River Red Gum	5	55		374422	6307171	
39	1/10/2024	Marri	3	110	Multiple suitable sized hollows. Approx 20-25cm. Openings. 8m from ground. Bees occupy hollows.	374313	6307439	Occupied by large colony of bees
40	7/08/2024	River Red Gum	5	55		374385.5	6307317	
41	22/08/2024	Marri		0		374326	6307414	
42	22/08/2024	Marri	5	55		374332.2	6307414	
43	22/08/2024	Marri		0		374332.2	6307414	
44	22/08/2024	Marri		0		374344.8	6307414	
45	22/08/2024	Marri	5	60		374372.6	6307414	
46	22/08/2024	Marri		0		374377.4	6307416	
47	22/08/2024	Marri		0		374380.9	6307416	
48	1/10/2024	Jarrah	5	60		374483.1	6307256	
49	1/10/2024	Marri	P	35		374474.3	6307234	
50	1/10/2024	Marri	P	40		374482	6307232	
51	1/10/2024	Marri	5	55		374476.5	6307227	

Tree Number	Date	Species	Bamford Class	DBH	Hollow Data	Eastings	Northings	Comments
52	1/10/2024	Marri	P	45		374487.2	6307220	
53	1/10/2024	Jarrah	P	30		374481.9	6307208	
54	1/10/2024	Jarrah	P	40		374477.8	6307197	
55	1/10/2024	Jarrah	5	65		374472.9	6307182	
56	1/10/2024	River Red Gum	P	30		374460.4	6307174	
57	1/10/2024	River Red Gum	P	45		374461.2	6307169	
58	1/10/2024	River Red Gum	P	35		374453.2	6307113	
59	1/10/2024	River Red Gum	P	30		374452.7	6307109	
60	1/10/2024	River Red Gum	P	35		374451.7	6307106	
61	1/10/2024	Marri	P	35		374454.7	6307103	
62	1/10/2024	Marri	P	30		374450.8	6307097	
63	1/10/2024	Marri	5	55		374477.9	6307126	
64	1/10/2024	Dead	4	90	Small hollows - unsuitable for BC	374503.1	6307266	
65	1/10/2024	Marri	5	50		374488.2	6307320	
66	1/10/2024	Marri	P	30		374484.3	6307331	

Tree Number	Date	Species	Bamford Class	DBH	Hollow Data	Eastings	Northings	Comments
67	1/10/2024	Jarrah	5	55		374484.4	6307389	
68	1/10/2024	Jarrah	4	105		374494.8	6307401	
69	1/10/2024	Jarrah	5	60		374483.9	6307408	
70	1/10/2024	Jarrah	P	35		374452.9	6307443	
71	1/10/2024	Jarrah	P	35		374451.9	6307438	
72	1/10/2024	Marri	5	75		374433.5	6307442	
73	1/10/2024	Marri	5	70		374430.7	6307440	
74	1/10/2024	Marri	P	35		374420.5	6307444	
75	1/10/2024	Jarrah	P	45		374415.6	6307443	
76	1/10/2024	Jarrah	4	120	Large, snapped branches with burnt out sections and cavities. Not hollow forming	374402.8	6307439	
77	1/10/2024	Marri	P	40		374399.2	6307442	
78	1/10/2024	Dead	4	55	Several	374385.5	6307443	
79	1/10/2024	Marri	P	35		374372.1	6307445	
80	1/10/2024	Marri	5	90		374361.9	6307439	
81	1/10/2024	Marri	5	60		374334.9	6307447	