Native Vegetation Clearing Permit Application Supporting Document

CEL North – Henley Brook

Western Power

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Basis of Report

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Acronyms and Abbreviations

BAM Act	Biosecurity and Agriculture Management Act 2007
BC Act	Biodiversity Conservation Act 2016
BoM	Bureau of Meteorology
CCW	Conservation Category Wetlands
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DBCA	Department of Biodiversity, Conservation and Activities
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DEE	Department of the Environment and Energy
DER	Department of Environment Regulation's
DPIRD	Department of Primary Industries and Regional Development
DWER	Department of Water and Environmental Regulation
EP Act	Environmental Protection Act 1986
EPBC Act	Environmental Protection and Biodiversity Conservation Act 1999
ELA	Eco Logical Australia
Ha	hectares
IBRA	Interim Biogeographic regionalisation of Australia
ILUA	Indigenous Land Use Agreement
Km	kilometres
kV	kilovolt
M	metre
mAHD	metres Australian Height Datum
PEC	Priority Ecological Community
PMST	Protected Matters Search Tool
TEC	Threatened Ecological Community

1.0 Introduction

1.1 Background

Western Power is proposing to construct a new 132 kilovolt (kV) wooden pole transmission line between an existing transmission line running between Northern Terminal in Malaga to Northam, northwards along Drumpellier Drive to the Henley Brook Substation, which is located on Starflower Road, Henley Brook (the Project) (Figure 1). The wood pole transmission line will run approximately 4 kilometres (km) long.

The purpose of the project is to upgrade the existing network to enable future connections of large-scale renewable energy generation and load in the Northern region of the Southwest Interconnected System (SWIS), in support of the State Government's decarbonisation strategy. A future-ready transmission network is critical to deliver Western Australia's wind and solar resources to major loads.

A recent SWIS demand assessment concluded that the location of the renewable resources at the fringe of the grid, coupled with the substantial footprint of the SWIS, means substantial upgrading of the network is required to meet industry demand for greener energy.

The project comprises:

- Installation of 132 kV overhead conductors, grounding wires and communication wires and 47 wooden poles
- Construction of a 4 metre (m) wide permanent maintenance access track, where the line is not running within public road reserve
- Establishment of a vegetation clearance zone up to 16 m wide (8 m either side of the line route), with maximum vegetation height in this zone being 3 m.

In addition, the proposed works will include the following temporary construction activities:

- Construction access track
- Break and winch sites spaced along the line for stringing conductors
- Clearing where necessary for turnaround areas, laydown/storage areas, laying of conductors and other construction activities.

The total Project Area is 26 hectares (ha) and the anticipated Disturbance Footprint is 6ha. The Project requires the clearing of up to 2.56 ha of native vegetation within the Project Area, comprising:

- 0.15ha *Banksia attenuata* woodland
- 1.87ha *Corymbia calophylla* woodland
- 0.54ha of isolated native trees and shrubs
- 2.56 ha fauna habitat
- 2.56 ha Black Cockatoo foraging habitat
- 9 potential Black Cockatoo breeding trees (none of which contain hollows suitable for breeding) (based on anticipated Disturbance Footprint).

The Project Area is defined as the total area covered by this application. The Disturbance Footprint is the area proposed for clearing within the Project Area, based on the current transmission line design. While clearing will be limited to 2.56 ha for the anticipated Disturbance Footprint, a larger Project Area envelope is being applied for to allow for minor

changes to the Disturbance Footprint as the design process continues, and account for minor or unexpected changes that can occur during construction. The AECOM biological survey (2024) area defined in the application is referred to as the Survey Area. The total Survey Area covered 119 ha.

The proposed clearing is required to enable the connection of Western Power's Henley Brook 132kV zone substation to the existing Northern Terminal – Northam 132kV transmission line. These works will contribute to reinforcing and de-meshing the existing network to support the movement of generation capacity into and around the SWIS.

1.2 Purpose of the Document

The purpose of this document is to present the assessment of the proposed clearing for the Project against the ten clearing principles as defined in Schedule 5 of the *Environmental Protection Act 1986* (EP Act) and outlined in the (then) Department of Environment Regulation's (DER) A guide to the assessment of applications to clear native vegetation (2014) under Part V Division 2 of the EP Act.

1.3 Disturbance Footprint Justification and Alternatives

Western Power has considered alternative designs for the proposed clearing to minimise environmental impact whilst maximising efficiency and cost effectiveness for the proposed transmission line of the future of Western Power operations. These designs have been considered by other government authorities, with the preferred design being that submitted in this application.

Alternatives to clearing considered by Western Power during the development of the Project are summarised in Table 1.

Table 1: Alternatives to Clearing

Alternative to Clearing	Applicable	Discussion
Directional drilling of underground cables instead of open trenching	Not applicable	The proposed clearing does not include the installation of underground cables.
Existing tracks are utilised where possible	Yes	The proposed clearing will ensure that site access will be via existing roads and tracks during those works associated with the development of the Project.
Utilising previously cleared areas where possible	Yes	The proposed clearing is predominantly located within already cleared areas running parallel to Drumpellier Drive and the principal shared path alongside.
Consideration of alternative engineering and design options	Yes	Alternate transmission line routes and options have been considered by Western Power. Consultation with relevant government authorities, particularly with respect to rail, water and existing transmission infrastructure and the need to avoid future housing planned for the Henley Brook area (between Drumpellier Drive and Starflower Road) assisted with confirming the preferred transmission line route. The alternative line routes that were considered included: 1. Installing a line on the western side of Drumpellier Drive; however, this was not pursued due to impacts to Whiteman Park and Aboriginal Heritage.

Alternative to Clearing	Applicable	Discussion
		2. The line route entering Henley Brook substation from its eastern side. This was amended so that the line entered the substation from the west, around a Water Corporation pumping station to avoid clearing black cockatoo habitat on the eastern side. This change has reduced clearing by 0.32 ha.
Other	Yes	Western Power has completed detailed planning studies in considering feasible options to migrate all the identified network limitations within the North Region over the medium to long term, and specifically, the ability to address the immediate need to address the generation constraints. These studies included a steady-state analysis as well as other technical assessments to determine the capacity of distinct options to adequately reduce the identified network risks. Alternatives to the overall Project were considered, including a 'do nothing' scenario and reconfiguration elsewhere. However, the proposed option best meets the deliverability, sustainability, risk mitigation, investment and prudence objectives for this Project.

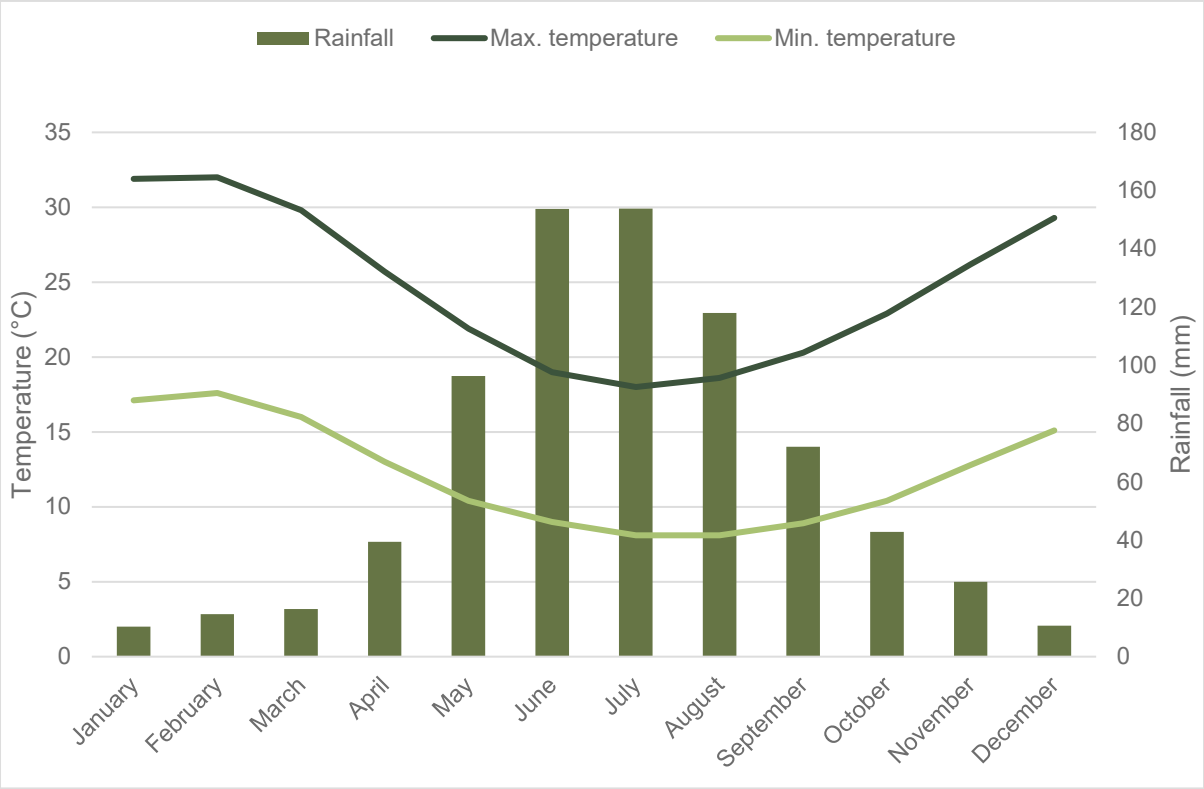
2.0 Receiving Environment

2.1 Climate

The closest long-term Bureau of Meteorology (BoM) weather station with a complete dataset is Perth Airport Weather Station (Station 9021), located approximately 13 km from the Project Area (BoM, 2025). 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 (BoM, 2007).

The long-term mean minimum temperature for Perth Airport Weather Station ranges from 8.1ºC (July and August) to 17.6 °C (February), and the long-term mean maximum temperature ranges from 18ºC (July) to 32 °C (January) (1944 to 2025) (Graph 1) (BoM, 2025).

The long-term annual mean rainfall recorded at Perth Airport Weather Station is 754.2 mm, recorded from 1944 to 2025 (BoM, 2025). The month with the highest long-term mean rainfall recorded at Perth Airport Weather Station is July (153.8 mm), and the lowest is January (10.3 mm).



Graph 1: Climate Statistics for Perth Airport Weather Station

2.2 Interim Biogeographic Regionalisation of Australia

The Interim Biographic Regionalisation of Australia (IBRA) categorises the Australian continent into 89 bioregions of similar geology, landforms, vegetation, fauna, and climate (Department of Climate Change, Energy, the Environment and Water (DCCEEW), 2000).

The Project Area lies within the Swan Coastal Plain IBRA region and the Perth subregion (SWA02). The Swan Coastal Plain bioregion is described as a low-lying coastal plain, mainly covered with woodlands (Mitchell, Williams, & Desmond, 2022). It is dominated by Banksia or Tuart on sandy soils*, Casuarina obesa* on outwash plains and paperbark in swampy areas. In the east, the plain rises to duricrusted Mesozoic sediments dominated by Jarrah woodland. The outwash plains, once dominated by *Casuarina obesa*-marri woodlands and Melaleuca shrublands, are extensive only in the south of the IBRA bioregion (Mitchell, Williams, & Desmond, 2022).

2.3 Landform and Soils

2.3.1 Soil Landscape Systems

Soil landscapes and land system mapping of WA describes broad soil and landscape characteristics from regional to local scales, ranging from 1:20,000 to 1:125,000 (DPIRD, 2022). The Project Area occurs within the Bassendean System, which is characterised by sand dunes and sandplains with pale, deep sand, semi-wet and wet soil, as well as Banksia paperbark woodlands and mixed heaths (DPIRD, 2022).

The Project Area occurs within three soil landscape subsystems, described below:

- Bassendean, Gavin Phase Subsystem: Flat or gently undulating landscape. Iron-humus podzols and some diatomite deposits. Banksia spp. Low open woodland with

scattered emergent *Eucalyptus calophylla* and *Melaleuca pressiana* dense shrub layer.

- Bassendean, Jandakot Phase Subsystem: Jandakot low dunes. Slopes <10% and generally more than 5m relief. Grey sand over pale yellow sands generally underlain by humic and iron podsols; Banksia spp. low open woodland with a dense shrub layer.
- Bassendean Yanga Phase Subsystem: Flat, poorly drained complex landscape; soils include shallow sand over limestone or ferruginous pan, deep leached sand, and saline soils; dense Melaleuca spp. along drainage lines (DPIRD, 2022).

2.3.2 Acid Sulphate Soils

A review of the Commonwealth Scientific and Industrial Research Organisation (CSIRO) Acid Sulfate Soil (ASS) mapping identified the majority of the Project Area as having a low probability of ASS occurrence (Fitzpatrick et al., 2011). The remaining area of the site, the southern end of the Project Area, is mapped as having an extremely low probability of ASS occurrence (Fitzpatrick et al., 2011).

2.4 Topography

Elevation within the Project Area ranges from approximately 43 metres Australian Height Datum (mAHD) at the northern end of the Project Area, to 37 mAHD towards the centre of the Project Area, and 31 mAHD at the southern end of the Project Area (Google Earth Pro, 2025). The change in elevation occurs over a distance of approximately 3.1 km.

2.5 Hydrology

The Project Area is located in the Swan River and Tributaries surface water area (Department of Water and Environmental Regulation (DWER), 2025a). The Project Area falls within the proclaimed Mirrabooka groundwater area (DWER, 2025b). The Project Area overlaps or is in close proximity to the following Public Drinking Water Source Areas (PDWSA) (DWER, 2025c):

- Priority 2 PDWSA: Gnangara Underground Water Pollution Control Area (UF ID: 365), overlaps the Project Area.
- Priority 3 PDWSA: Gnangara Underground Water Pollution Control Area (UF ID: 1067), overlaps Project Area
- Priority 3* PDWSA: Gnangara Underground Water Pollution Control Area (UF ID: 1065), overlaps Project Area
- Priority 1 PDWSA: Gnangara Underground Water Pollution Control Area (Unique Feature (UF) ID: 1066), located 0.05 km west Project Area

There are no RAMSAR sites within the Project Area (Department of Biodiversity, Conservation and Attractions (DBCA) 2017b). An unnamed geomorphic wetland (UF ID: 13,396) overlaps the Project Area and is classified as a ‘palusplain’ wetland mapped across 760 ha (DBCA, 2017). The management category of this wetland is ‘Multiple Use’.

Three Conservation Category Wetlands (CCWs) are located west of the Project Area, on the opposite side of Drumpellier Drive, within Bush Forever Site Number 304:

- UF ID: 8548, located approximately 199 m west of the Project Area.
- UF ID: 8550, located approximately 378 m west of the Project Area
- UF ID: 8546, located approximately 920 m west of the Project Area.

No surface water features interest in the Project Area (DWER, 2018). The nearest are Henley Brook, located approximately 1.9 km east of the Project Area, Bennett Brook, located approximately 2.2 km southwest, and the Swan River, located approximately 3.9 km east (DWER, 2018).

2.6 National Parks, Conservation Reserve and State Forest

No National Parks, Conservation Reserves or State Forests were identified within the Project Area. The Gnangara-Moore River State Forest (Parcel Identifier F65) is located 0.2 km north of the Project Area (DBCA, 2023).

2.7 Environmentally Sensitive Areas

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, TECs or significant wetlands. Proximity of the Project to ESAs must be considered.

No ESAs were identified within the Project Area (DWER, 2021). The nearest ESA is approximately 0.04 km west of the Project Area, running parallel to the Project's western boundary. This ESA is associated with Bush Forever Site Number 304. Five additional ESAs occur within 3 km of the Project Area.

2.8 Bush Forever Sites

No Bush Forever sites were identified in the Project Area. Four (4) Bush Forever sites were identified in close proximity to the Project Area (DPLH, 2019), including:

- Site 304 located approximately 0.04 km west of the Project Area
- Site 192 located approximately 1 km northwest of the Project Area
- Site 200 located approximately 1.5 km southeast of the Project Area
- Site 302 located approximately 3.9 km east of the Project Area.

2.9 Bushfire Prone Areas

The State Planning Policy (SPP) No. 3.7 Planning in Bushfire Prone Areas intersects the Project Area, primarily at the southern portion of the Project Area (DFES, 2024).

2.10 Biological Surveys

2.10.1 Existing Surveys

Numerous biological surveys have been undertaken within the Project Area. AECOM completed a spring flora, vegetation, fauna and black cockatoo assessment for defined corridors within the Clean Energy Link (CEL) project, including CEL North – Henley Brook Tee (referred to in the survey as NT- NOR to HBK 132kV (the Survey Area)) (AECOM, 2024) (refer to Appendix A). This entailed a comprehensive desktop assessment, detailed flora and vegetation assessment and targeted flora searches, a basic fauna survey and a targeted Black Cockatoo and habitat assessment. The Survey Area covered a total of 119 ha along Drumpellier Drive.

The field assessments were undertaken by experienced personnel across multiple days in October and November 2023, within the ideal detection period for significant flora.

The AECOM 2024 report presents a compilation of existing data from the field assessment completed in Spring 2023 and previous data from the following surveys:

- RPS, 2020. Detailed flora and vegetation assessment – METRONET Morley-Ellenbrook Line. This survey represented a two-season vegetation survey where permanent quadrats were scored twice, and multiple targeted searches were undertaken to maximise the detection of significant flora species.
- AECOM, 2016. Ellenbrook Bus Rapid Transit Biological Assessment. This report represents a single survey event where vegetation was recorded at defined non-permanent quadrats during Spring 2015.
- Woodman, 2020. Banksia Woodland Community Assessment – Patch 5. Verification of FCT analysis and Banksia Woodland Threatened Ecological Community (TEC) assessment.

2.11 Flora and Vegetation

2.11.1 Regional Vegetation

Mapping of pre-European broad vegetation within Western Australia was completed on a broad scale (1:1,000,000) by Beard (1976). These vegetation types were later re-assessed by Shepherd et al. (2002), resulting in 819 vegetation associations within WA.

Regional vegetation association mapping identifies that the Project Area occurs across two vegetation associations, Bassendean 1001 and Bassendean 1018 (DPRID, 2018):

- **Bassendean 1001** – Low forest, woodland, or low woodland with scattered trees; Jarrah, banksia or casuarina, *Eucalyptus marginata, Banksia spp., Allocausarina spp.*
- **Bassendean 1018** – Woodland/Low woodland/Low forest or Woodland.

Representation of the Bassendean 1001 system and Bassendean 1018 system at a local, regional and state level is presented in Table 2 and Table 3.

Table 2: Representation at the State, Regional and Local Level of the Bassendean 1001 Vegetation System Association

Pre-European Extent (ha)	Current Extent (ha)	Remaining (%)	Proportion of Current Extent in DBCA Managed Lands (%)
Representation across Western Australia			
57,410.23	12,660.76	22.05	14.19
Representation across the Swan Coastal Plain Bioregion			
57,410.23	12,660.76	22.05	14.19
Representation across the Perth (SWA02) Subregion			
57,410.23	12,660.72	22.05	14.19
Representation across the City of Swan			
8,868.19	2,321.48	26.18	3.98

Table 3: Representation at the State, Regional and Local Level of the Bassendean 1018 Vegetation System Association

Pre-European Extent (ha)	Current Extent (ha)	Remaining (%)	Proportion of Current Extent in DBCA Managed Lands (%)
Representation across Western Australia			
14,059.36	2,444.87	17.39	4.58
Representation across the Swan Coastal Plain Bioregion			
14,059.36	2,444.87	17.39	4.58
Representation across the Perth (SWA02) Subregion			
13,946.31	2,418.49	17.34	4.63
Representation across the City of Swan			
6,013.45	987.22	16.42	0.91

Within constrained areas on the Swan Coastal Plain, Guidance Statement No. 33: Environmental Guidance for Planning and Development identifies a threshold for retention of 10% of the pre-existing extent of native vegetation (EPA, 2008). The vegetation extent for both Bassendean 1001 and Bassendean 1018 is above the expected threshold remaining for the State.

2.11.2 Vegetation Types

A total of four vegetation communities were defined and mapped within the Survey Area, three of which occur within the Project Area and Disturbance Footprint (Figure 2). The vegetation communities recorded are described in Table 4.

Table 4: Vegetation Types Mapped within Project Area and Disturbance Footprint (AECOM, 2025)

Vegetation Type	Description	Extent in Project Area (ha)	Extent in Disturbance Footprint (ha)
BaBmBiXp *Banksia attenuata* Woodland	*Banksia attenuata*, *B. menziesii* and *B. ilicifolia* low woodland over *Xanthorrhoea preissii* mid open shrubland *over Scholtzia involucrate* low sparse shrubland over an open to closed rushland/forbland. Situated on white-grey sandy soil on low flat terrain.	0.54 (2.08%)	0.15 (2.50%)
BaBmSiPo *Banksia attenuata* Woodland	*Banksia attenuata* and *B. menziesii* low woodland over a mixed low shrubland *including Scholtzia involucrata, Eremaea pauciflora* var. *pauciflora, Hibbertia hypericoides* and *Calytrix angulata* over *Patersonia occidentalis* var. *occidentalis* sparse forbland. Situated on a dune crest with grey sandy soils.	Nil	Nil
CcMpXp *Corymbia calophylla* Woodland	*Corymbia calophylla* mid open forest to mid closed forest over *Melaleuca preissiana* low isolated trees to low Woodland over *Xanthorrhoea preissii* isolated shrubs to mid open shrubland over *Dielsia*	6.93 (26.65%)	1.87 (31.17%)

Vegetation Type	Description	Extent in Project Area (ha)	Extent in Disturbance Footprint (ha)
	stenostachya rushland with a mixed exotic open grassland. Located on grey sandy soil on low flats and slopes.		
Trees	Isolated native trees and shrubs over weeds.	1.54 (5.92%)	0.54 (9.00%)
Total		9.01	2.56
Cleared	Devoid of vegetation	16.98 (65.31%)	3.44 (57.33%)

2.11.3 Vegetation Condition

Vegetation condition within the Project Area ranged from Degraded to Completely Degraded (AECOM, 2024). Significant weed invasion was also observed during the survey. No vegetation was rated in Good or Very Good condition within the Project Area (AECOM, 2024).

The extent (ha) of each vegetation condition in the Project Area and anticipated Disturbance Footprint is presented in Table 5 and Figure 3.

Table 5: Vegetation Condition Across the Project Area and Disturbance Footprint (AECOM, 2024)

Condition Rating	Area (ha) in the Project Area	Area (ha) in the Disturbance Footprint
Degraded	4.72 (18.15%)	1.45 (24.17%)
Completely Degraded	4.30 (16.54%)	1.11 (18.50%)
Cleared	16.98 (65.31%)	3.44 (57.33%)

2.11.4 Significant Vegetation

A desktop assessment of the Protected Matters Search Tool (PMST) identified two (2) TECs/Priority Ecological Communities (PEC) as potentially occurring in the Project Area (DCCEEW, 2025):

- Banksia Woodlands of the Swan Coastal Plain ecological community (Endangered; Priority 3).
- Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain ecological community (Critically Endangered; Priority 3).

No conservation significant vegetation was recorded within the Project Area or Disturbance Footprint.

On the western side of Drumpellier Drive, outside of the Project Area, the BaBmSiPo vegetation community recorded within the Survey Area is consistent with the Federally listed Banksia Woodland TEC and the Priority 3 PEC at a State level (AECOM, 2024). The BaBmSiPo community that represents Banksia Woodland TEC is described as:

- **BaBmSiPo** (Banksia attenuata Woodland) – *Banksia attenuata* and *B. menziesii* low woodland over a mixed low shrubland including *Scholtzia involucrata, Eremaea pauciflora* var. *pauciflora*, *Hibbertia hypericoides* and *Calytrix angulata* over *Patersonia occidentalis* var. *occidentalis* sparse forbland. Situated on a dune crest with grey sandy soils.

This patch of Banksia Woodland TEC is mapped for 0.2 ha within the Survey Area and does not intersect the Project Area (Figure 4).

A second patch located on the eastern side of Drumpellier Drive was originally classified as Banksia Woodland TEC by RPS in 2020; however, this vegetation is now separated from Whiteman Park vegetation by more than 30 metres and therefore does not meet the requirements to qualify as a patch of Banksia Woodland TEC due to size and segregation (AECOM. 2024).

Tuart TEC was not recorded during the survey and is not present within the Project Area (AECOM, 2024).

2.11.5 Flora Composition

Surveys undertaken in the broader Survey Area recorded the following:

- The RPS (2020) survey recorded 374 flora taxa, consisting of 290 native species and 84 weed species. The dominant families were Fabaceae (38 taxa), Cyperaceae (34 taxa) and Myrtaceae (31 taxa) (RPS, 2020).
- The AECOM (2016) survey recorded 129 flora taxa, consisting of 78 native species and 49 weed species. The dominant families were Fabaceae (34 taxa), Myrtaceae (36 taxa) and Poaceae (31 taxa) (AECOM, 2016).

Of the introduced species recorded in the RPS (2020) survey, two species were Declared Pests listed under the *Biosecurity and Management Act 2007* (BAM Act), *Zantedeschia aethiopica* (Arum Lily) and *Moraea flaccida* (Cape Tulip). None of the weeds recorded were listed as Weeds of National Significance (WoNS).

2.11.6 Conservation Significant Flora

A desktop assessment conducted by AECOM (2024) identified 15 Threatened flora species as potentially occurring in the Survey Area.

An assessment of the likelihood of occurrence of each of the conservation significant flora recorded in the desktop assessment was undertaken, based on consideration of recorded distribution and habitat suitability in the Project Area. In a post-survey likelihood assessment, five (5) species were found to have a Low likelihood of occurrence, and ten (10) species were found to have a Negligible likelihood of occurrence post-survey (AECOM, 2024). The likelihood assessment is presented in Table 6.

Table 6: Likelihood Assessment of Threatened Flora Potentially Occurring in the Project Area (AECOM, 2024)

Scientific Name	Common Name	Conservation Status (Federal)	Habitat in the Project Area	Post-survey Likelihood of Occurrence
Andersonia gracilis	Slender Andersonia	Endangered	No	**Negligible**: No suitable habitat present. No recent records in the vicinity.
Anigozanthos viridis subsp. *terraspectans*	Dwarf Green Kangaroo Paw	Vulnerable	No	**Negligible**: No suitable habitat present. No recent records in the vicinity.

Scientific Name	Common Name	Conservation Status (Federal)	Habitat in the Project Area	Post-survey Likelihood of Occurrence
Banksia mimica	Summer Honeypot	Endangered	No	**Negligible**: No suitable habitat present. No recent records in the vicinity.
Caladenic huegelii	King Spider-orchid	Endangered	No	**Low**: Species not recorded; no suitable habitat identified during survey.
Chamelaucium lullfitzii listed as *Chamelaucium* sp. *Gingin (N.G.Marchant 6)*	Gingin Wax	Endangered	No	**Negligible**: No suitable habitat present. No recent records in the vicinity.
Diuris drummondii	Tall Donkey Orchid	Vulnerable	No	**Low:** Species not recorded; no suitable habitat identified during survey.
Diuris purdiei	Purdie's Donkey-orchid	Endangered	No	**Negligible**: No suitable habitat present. No recent records in the vicinity.
Drakaea elastica	Glossy-leafed Hammer Orchid	Endangered	No	**Negligible**: No suitable habitat present. No recent records in the vicinity.
Eleocharis keigheryi	Keighery's Eleocharis	Vulnerable	No	**Low:** Species not recorded; no suitable habitat during survey.
Grevillea curviloba subsp. curviloba	Curved-leaf Grevillea	Endangered	No	**Low:** Species not recorded; no suitable habitat identified during survey.
Grevillea curviloba subsp. incurva	Narrow curved-leaf Grevillea	Endangered	No	**Negligible**: No suitable habitat present. No recent records in the vicinity.
Macarthuria keigheryi	Keighery's Macarthuria	Endangered	No	**Negligible**: No suitable habitat present. No recent records in the vicinity.
Synaphea sp. Fairbridge Farm (D.Papenfus 696)	Selena's Synaphea	Critically Endangered	No	**Negligible**: No suitable habitat present. No recent records in the vicinity.
Thelymitra dedmaniarum	Cinnamon Su Orchid	Endangered	No	**Negligible**: No suitable habitat present. No recent records in the vicinity.
Trithuria occidentalis	Swan Hydatella	Endangered	No	**Low:** Species not recorded; no suitable habitat identified during survey.

No Threatened flora species pursuant to the EPBC Act and/ or gazetted as Threatened/ Declared Rare Flora pursuant to the BC Act or listed as Priority by the DBCA were recorded during the survey (AECOM, 2024).

2.12 Terrestrial Vertebrate Fauna

2.12.1 Fauna Habitat

A total of five (5) fauna habitats were identified and mapped across the Survey Area, three of which occur within the Project Area and anticipated Disturbance Footprint. Fauna habitats are described in Table 7 and presented in Figure 5.

Table 7: Fauna Habitat Across the Project Area and Disturbance Footprint (AECOM, 2024)

Fauna Habitat	Habitat Description	Extent in the Project Area (ha)	Extent in the Disturbance Footprint (ha)
Banksia Woodland	Occurring at three locations along Drumpellier Drive, this habitat is characterised by a variable understory of low shrublands and grasslands, with higher density in the northernmost patch located on the eastern side of Drumpellier Drive. Overstorey plant species included *Banksia attenuata, Banksia menziesii* and *Eucalyptus todtiana*. Shrubs range from low-lying to tall, with density varying across the landscape. Shrub species included *Scholtzia invulcrata, Eremaea pauciflora* var. *pauciflora, Hibbertia hypercoides* and *Calytrix angulata*. This habitat type represents the edges of larger areas that extend beyond the project area, where condition is potentially better. Quenda (*Isoodon fusciventer*) (Priority 4) and small reptiles like the Black-striped Snake (*Neelaps calonotus*) (Priority 3), which live in Banksia Woodlands, may forage in the coarse leaf litter of this habitat. The large Eucalyptus and Banksia trees found within this habitat are suitable for birds to feed and perch on. Carnaby's Cockatoo (*Zanda* latirostris) (Endangered) and Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksia naso*) (Vulnerable) were recorded foraging in this area.	0.54 (2.08%)	0.15 (2.50%)
Eucalyptus Woodland	This habitat is characterised by an overstorey of Marri (*Corymbia calophylla*), Jarrah (*Eucalyptus marginata*) and Paperbark (*Melaleuca preissiana*). The understory varies in density and species but is largely represented by paddocks with common weedy grasses and herbs. Coarse leaf litter may provide shelter and foraging habitat for the Quenda. The mature trees are a suitable habitat for Carnaby's Cockatoo, Forest Red-tailed Black Cockatoo and Baudin's Cockatoo (*Zanda baudinii*) (Endangered). As with the Banksia Woodland, this habitat type extends beyond the project area boundary.	6.93 (26.65%)	1.87 (31.17%)
Trees Over Cleared	It consists of planted street trees and isolated native trees over common weedy grasses and herbs. There is minimal variation and limited microhabitats throughout the habitat type. Leaf litter is infrequent, with minimal logs and fallen branches present. The habitat provides refuge and foraging habitat for invertebrates, including native bees and flighted species such as birds and microbats	1.54 (5.92%)	0.54 (9.00%)

Fauna Habitat	Habitat Description	Extent in the Project Area (ha)	Extent in the Disturbance Footprint (ha)
Cleared	Areas that have been previously cleared and are devoid of vegetation.	16.98 (65.31%)	3.44 (57.33%)

2.12.2 Fauna Composition

A total of 21 vertebrate fauna species were recorded during the AECOM (2024) survey, comprising 17 bird, three (3) mammal and one (1) reptile species. One (1) of the fauna species recorded during the survey is introduced, the European Rabbit (*Oryctolagus cuniculus*), which is listed under the BAM Act as a Declared Pest (s22(2)).

Three (3) fauna species of conservation significance were recorded during the survey (AECOM, 2024):

- Carnaby's Cockatoo (*Zanda latirostris*), listed as Endangered under the EPBC Act and BC Act, was directly observed (seen and heard) during the survey.
- Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksia naso*), listed as Vulnerable under the EPBC Act and BC Act, was directly observed (seen and heard) during the survey, and foraging evidence was also recorded.
- Quenda (*Isoodon fusciventer*) is listed as Priority 4 by the DBCA. The survey recorded evidence of foraging by the species.

2.12.3 Conservation Significant Fauna

A desktop assessment and biological survey were conducted by AECOM (2024) to identify fauna species of conservation significance that potentially occur within the Survey Area.

A post-survey assessment of the likelihood of occurrence of each of the conservation-significant fauna species recorded in the desktop assessment was undertaken, based on consideration of recorded distribution and habitat suitability in the Project Area.

Three (3) conservation-significant fauna species are known to occur within the Survey Area, and one of these three species was recorded in the Project Area. One (1) species has a high likelihood of occurrence, seven (7) species have a low likelihood of occurrence, and two (2) are considered to have a negligible likelihood of occurrence. The results of the likelihood assessment are presented in Table 8.

Table 8: Likelihood Assessment of Threatened Fauna Potentially Occurring in the Project Area (AECOM, 2024)

Scientific Name	Common Name	Conservation Status (Federal)	Post-survey Likelihood of Occurrence
Bettongia penicillata ogilbyi	Woylie	Critically Endangered	**Low** – Limited recent records in proximity
Botaurus poiciloptilus	Australasian Bittern	Endangered	**Low** – No surface water identified.
Calidris acuminata	Sharp-tailed Sandpiper	Vulnerable, Migratory, Marine	**Low** - Marine species, no coastal habitat. No waterbodies identified in the project area.

Scientific Name	Common Name	Conservation Status (Federal)	Post-survey Likelihood of Occurrence
Calidris ferruginea	Curlew Sandpiper	Critically Endangered, Migratory, Marine	**Low** - Marine species, no coastal habitat. No waterbodies identified in the project area.
Calyptorhynchus banksii naso	Forest Red-tailed Black Cockatoo	Vulnerable	**Known** – Identified during survey, recorded in the Project Area. This species is likely to use the Eucalyptus Woodland, Trees Over Cleared and Banksia Woodland habitat types within the Project Area. These habitats are also found directly adjacent to the Project Area.
Dasyurus geoffroii	Chuditch, Western Quoll	Vulnerable	**Low** – Limited suitable habitat identified.
Isoodon fusciventer	Quenda	P4	**Known** – Identified during the survey, outside of the Project Area. The nearest record is 48 m east of the Project Area. This species is likely to use all the fauna habitats recorded within the Project Area. The presence of course leaf litter is a suitable foraging habitat for the quenda. These habitats are also found directly adjacent to the Project Area.
Leipoa ocellata	Malleefowl	Vulnerable	**Negligible** – No suitable habitat identified. No associated species identified.
Numenius madagascariensis	Eastern Curlew	Critically Endangered, Migratory, Marine	**Negligible** - Marine species, no coastal habitat. No waterbodies identified in the Project Area.
Rostratula australis	Australian Painted Snipe	Endangered	**Low** – No surface water identified.
Tringa nebularia	Common Greenshank	Endangered, Migratory, Marine	**Low** – No surface water identified.
Zanda baudinii	Baudin's Cockatoo	Endangered	**High** – Suitable habitat identified. This species is likely to use the Eucalyptus Woodland, Trees Over Cleared and Banksia Woodland habitat types within the Project Area. These habitats are also found directly adjacent to the Project Area.
Zanda latirostris	Carnaby's Cockatoo	Endangered	**Known** – Identified during survey, outside of the Project Area. The nearest record is 8 m east of the Project Area.

Scientific Name	Common Name	Conservation Status (Federal)	Post-survey Likelihood of Occurrence
			This species is likely to use the Eucalyptus Woodland, Trees Over Cleared and Banksia Woodland habitat types within the Project Area. These habitats are also found directly adjacent to the Project Area.

2.12.4 Black Cockatoo

The Project Area is within the known range for the three threatened Black Cockatoo species, Carnaby's Cockatoo (*Zanda latirostris),* Baudin's Cockatoo (*Zanda baudinii) and* Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso).* The AECOM (2024) survey recorded the presence of Carnaby's Cockatoo and Forest Red-tailed Black Cockatoo and determined a High likelihood of occurrence for Baudin's Cockatoo. A total of 43.56 ha of Black Cockatoo foraging habitat was recorded in the Survey Area (AECOM, 2024).

The foraging habitat was evaluated using the Commonwealth Black Cockatoo Referral Guidelines foraging tool (DAWE, 2022) and the Bamford Methodology per the 'Scoring system for the assessment of foraging value of vegetation for Black Cockatoos' developed by Bamford Consulting Ecologists (BCE) (BCE, 2020).

For the purpose of the clearing permit application, the results from the BCE Methodology have been applied to this Project, as this methodology provides a more refined and site-specific evaluation of foraging quality. The results are presented in Table 9 and Figure 6.

Table 9: Black Cockatoo Foraging Habitat Across the Project Area and Disturbance Footprint (AECOM, 2024)

Black Cockatoo Species	Black Cockatoo Foraging Habitat Quality		
	Foraging Habitat Quality Score (BCE, 2020)	Total Extent (ha) in the Project Area	Extent (ha) in the Disturbance Footprint
Carnaby's Cockatoo	Moderate (5)	7.48 (28.77%)	2.02 (33.67%)
	Low (2)	1.54 (5.92%)	0.54 (9.00%)
	None (0)	16.98 (65.31%)	3.44 (57.33%)
Forest Red-tailed Cockatoo	Moderate to High (7)	6.93 (26.65%)	1.87 (31.17%)
	Moderate (4)	1.54 (5.92%)	0.53 (8.83%)
	Low (2)	0.54 (2.08%)	0.15 (2.50%)
	None (0)	16.98 (65.31%)	3.44 (57.33%)
Baudin's Cockatoo	Moderate (4)	8.48 (32.61%)	2.41 (40.16%)
	Low (2)	0.54 (2.08%)	0.15 (2.50%)
	None (0)	16.98 (65.31%)	3.44 (57.33%)

The AECOM (2024) assessed the breeding habitat within the Project Area by quantifying the number of trees that have the potential to form hollows. Potential breeding trees are categorised as follows:

- Known nesting trees: Trees (live or dead but still standing) which contain a hollow where black cockatoo breeding has been recorded or which demonstrate evidence of breeding (i.e. showing evidence of use through scratches, chew marks or feathers).
- Suitable nesting trees: Trees with suitable nesting hollows present, although no evidence of use. Note that any species of tree may develop suitable hollows for breeding.
- Suitable nest hollow: Any hollow with dimensions suitable for use for nesting by black cockatoos. Characteristics of hollows used by each species are available in the SPRAT database. Suitable nest hollows are only found in live trees with a DBH of at least 500 mm. Usually, this will be a natural hollow, but artificial hollows may also be suitable in some circumstances (for example, where the artificial hollow has been specifically designed for use by black cockatoos).
- Potential nesting trees: Trees that have a suitable DBH to develop a nest hollow, but do not currently have hollows. Trees suitable for developing a nest hollow in the future are 300-500 mm DBH. Note: that many species of eucalypt may develop suitable hollows for breeding.

Hollows are considered potentially suitable when the entrance hole is above a size of 10 cm in diameter and the hollow appears to continue inwards to reach a hollow with a base size greater than 30 cm (AECOM, 2024).

AECOM (2024) survey considered the fauna and black cockatoo habitat assessment completed by Eco Logical Australia (ELA) in 2020 (refer to Appendix B). However, at the time of the ELA survey, the black cockatoo habitat assessment confirmed an additional 67 potential breeding trees, with 6 hollows.

There is a slight difference in the potential nesting trees as defined in the AECOM (2024) report, which identified 351 potential nesting trees within the Survey Area. In fact, combining the results from the ELA and AECOM survey, and taking into account trees that have been removed as part of other clearing activities in the area since the ELA survey, there are 396 potential nesting trees and 8 suitable nesting trees within the Survey Area, with the majority consisting of Marri (*Corymbia calophylla*) trees. Of the total number of nesting trees recorded in the Survey Area, 27 trees potential nesting trees, , are located within the Project Area and 9 potential nesting trees occur in the anticipated Disturbance Footprint (refer to Figure 7). No trees with suitable hollows for breeding occur in the Project Area or Disturbance Footprint.

No roosting sites were observed during the survey (AECOM, 2024). 67 confirmed white-tailed Black Cockatoo and Forest Red-tailed Black Cockatoo roosting sites are known to occur within 15 km of the Survey Area. Twelve of these occur within 5 km and five within 2.5 km of the Survey Area (AECOM, 2024).

3.0 Environmental Management Measures

To minimise the risk of impact from the activities associated with the proposed clearing, the following environmental management measures will be implemented during clearing and construction:

- Clearing of vegetation shall not exceed the approved limits of clearing. All vegetation to be cleared will be demarcated on site prior to the commencement of clearing.
- Clearing will progress slowly in one direction to ensure fauna have the opportunity to move on.
- Potential nesting trees that can be retained will be demarcated prior to the commencement of clearing.
- Implementation of Phytophthora (Dieback) and weed hygiene management practices during clearing and construction.
- Waste will be collected onsite in appropriate bins that prevent native and non-native fauna from accessing the waste. Waste will be removed from the Project Area to an appropriately licensed landfill.
- Weed control and hygiene measures will be implemented in the Project Area to prevent new weed infestations and minimise the spread of existing weeds.
- Hydrocarbons and chemicals will be stored in appropriately bunded areas.
- Spill kits will be available in areas where hydrocarbons and chemicals are used or stored.
- Hydrocarbon or chemical spills will be cleaned up promptly, and the spill cleanup material disposed of at a suitably licensed waste disposal facility.
- Firebreaks will continue to be maintained, and hot work procedures will continue to be implemented to reduce the risk of fire starting in the Project Area.
- Fire control equipment will be available in the Project Area for use in the event of a fire, and fire control procedures will be implemented should fire occur in the Project Area. In the event a fire starts in the Project Area, fire control actions will be implemented should a fire start in the Project Area.
- Erosion and sediment control measures to be implemented during clearing and construction.

4.0 Assessment Against Ten Clearing Principles

Principle	Assessment
Principle (a) – Native vegetation should not be cleared if it comprises a high level of biological diversity	**Assessed Outcome:** The proposed clearing is **not likely** to be at variance with this Principle. **Flora and Vegetation** A desktop assessment conducted by AECOM (2024) identified 15 Threatened flora species as potentially occurring in the Survey Area. An assessment of the likelihood of occurrence of each of the conservation significant flora recorded in the desktop assessment was undertaken, based on consideration of recorded distribution and habitat suitability in the Survey Area. Five (5) species were found to have a Low likelihood of occurrence post-survey, and ten (10) species had a Negligible likelihood of occurrence post-survey (AECOM, 2024). AECOM (2024) completed a single-season spring survey of the Survey Area across multiple days in October and November 2023, including a comprehensive desktop assessment, detailed flora and vegetation assessment and targeted flora searches. The survey was undertaken by experienced personnel during the ideal detection period for significant flora. A total of 119 ha was surveyed along Drumpellier Drive for the Henley Brook Tee project. No Threatened flora species pursuant to the EPBC Act and/ or gazetted as Threatened/ Declared Rare Flora pursuant to the BC Act or listed as Priority by the DBCA were recorded in the Project Area or surrounds during the survey (AECOM, 2024). A total of four vegetation communities were defined and mapped within the Survey Area, three of which occur within the Project Area and anticipated Disturbance Footprint, and include (Figure 2): • **BaBmBiXp** (*Banksia attenuata* Woodland) – *Banksia attenuata*, *B. menziesii* and *B. ilicifolia* low woodland over *Xanthorrhoea preissii* mid open shrubland over *Scholtzia involucrate* low sparse shrubland over an open to closed rushland/forbland. Situated on white-grey sandy soil on low flat terrain. • **CcMpXp** (*Corymbia calophylla* Woodland) – *Corymbia calophylla* mid open forest to mid closed forest over *Melaleuca preissiana* low isolated trees to low Woodland over *Xanthorrhoea preissii* isolated shrubs to mid open shrubland over *Dielsia stenostachya* rushland with a mixed exotic open grassland. Located on grey sandy soil on low flats and slopes. • **Trees** – isolated native trees and shrubs over weeds. The remaining area has been previously cleared, amounting to approximately 65.31% of the Project Area. Vegetation condition within the Project Area ranges from Degraded to Completely Degraded (AECOM, 2024). Significant weed invasion was observed during the survey.

Principle	Assessment
	None of the vegetation communities recorded within the Project Area represents a TEC or PEC. A PMST search identified the Tuart TEC (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain ecological community (Critically Endangered; Priority 3) as potentially occurring within the Survey Area, however, this community was not recorded during the field survey (AECOM, 2024). Up to 2.56 ha of native vegetation will be cleared for the Project. Based on the anticipated Disturbance Footprint for the Project, the clearing area comprises the following vegetation types: 0.15 ha BaBmBiXp, 1.87 ha CCMpXp and 0.54 ha Trees. The vegetation to be cleared is in Degraded to Completely Degraded condition. **Fauna** A desktop assessment and biological survey were conducted by AECOM (2024) to identify fauna species of conservation significance that potentially occur within the Survey Area. A total of 21 vertebrate fauna species were recorded during the field survey, comprising 17 bird, three (3) mammal and one (1) reptile species (AECOM, 2024). Three fauna species of conservation significance were recorded within or near the Project Area during the field survey: • Carnaby's Cockatoo (*Zanda latirostris*) listed as Endangered under the EPBC Act and BC Act • Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksia naso*) listed as Vulnerable under the EPBC Act and BC Act • Quenda (*Isoodon fusciventer*) listed as Priority 4 by the DBCA. A post-survey assessment of the likelihood of occurrence of each of the conservation-significant fauna species recorded in the desktop assessment was undertaken, based on consideration of recorded distribution and habitat suitability in the Survey Area. Three (3) conservation-significant fauna species are known to occur within the Survey Area, and one of these three species was recorded in the Project Area (Forest Red-tailed Black Cockatoo). One (1) species, Baudin's Cockatoo (*Zanda baudinii*), listed as Endangered under the EPBC Act and BC Act, has a high likelihood of occurrence, seven (7) species have a low likelihood of occurrence, and two (2) are considered to have a negligible likelihood of occurrence. One introduced species was recorded during the survey, the European Rabbit (*Oryctolagus cuniculus*), which is listed under the (BAM Act) as a Declared Pest (s22(2)). Five fauna habitats were defined and mapped within the Survey Area, three of which occur within the Project Area (Figure 3): Banksia Woodland, Eucalyptus Woodland and Trees Over Cleared (AECOM, 2024). The Banksia Woodlands and Eucalyptus Woodlands, representing 2.08% and 26.65% of the Project Area respectively, are considered the most suitable habitat for the three conservation significant Black Cockatoo species and Quenda. These habitats are also found directly adjacent to the Project Area at Bush Forever Site Number 304 (Whiteman Park). During the survey it was noted that all fauna habitats are reduced to a native

Principle	Assessment
	overstory with a predominantly weedy understory (AECOM, 2024). Large parts of the Project Area are disconnected from remnant native vegetation and have been disturbed. **Black Cockatoos** A Targeted Black Cockatoo Survey identified a total of 9.02 ha of black cockatoo foraging habitat within the Project Area. The foraging habitat was evaluated according to the BCE (2020) Methodology to determine the value of the habitat for each of the three threatened Black Cockatoo species. Foraging habitat in the Project Area consists of: • Carnaby's Cockatoo: 7.48 ha of 'Moderate' quality and 1.54 ha of 'Low' quality foraging habitat • Forest Red-tailed Black Cockatoo: 6.93 ha of 'Moderate to High' quality, 1.54 ha of 'Moderate' quality and 0.54 ha of 'Low' quality foraging habitat • Baudin's Cockatoo: 8.48 ha of 'Moderate' quality and 0.54 ha of 'Low' quality foraging habitat An additional 16.98 ha within the Project Area is considered to provide no foraging value to Black Cockatoo species. A total of 27 potential breeding trees are known to occur within the Project Area, none of which contained hollows suitable for breeding (ELA, 2020; AECOM, 2024). No roosting sites were recorded during the survey (AECOM, 2024). The proposed clearing of the anticipated Disturbance Footprint will result in the clearing of up to: • 2.56 ha foraging habitat, the majority of which ranges from Low to Moderate quality • 9 potential breeding trees, none of which contain hollows suitable for breeding. There are large areas of remnant native vegetation in Good or better condition protected within Whiteman Park (total approximate area of 2,320 ha) and Gnangara-Moore River State Forest (total approximate area of 66,100 ha), which would provide similar foraging habitat as what is present within the Project Area (AECOM, 2024). The proposed clearing will result in the clearing of 2.56 ha of native vegetation, ranging from Degraded to Completely Degraded condition. No Threatened or Priority flora species, PECs or TECs have been recorded within the Project Area. Fauna habitat types and Black Cockatoo foraging habitat recorded within the Project Area are also found directly adjacent to the Project Area at Bush Forever Site Number 304 (Whiteman Park), which is separated from the Project by Drumpellier Drive. Considering this, the proposed clearing is not likely to be at variance with this Principle.
Principle (b) – Native vegetation should not be cleared if it comprises the whole or part of, or is necessary for the maintenance of a	**Assessed Outcome:** The proposed clearing **maybe** at variance with this Principle. A total of five fauna habitats were mapped within the Survey Area, three of which occur within the Project Area (Figure 3). The fauna habitats are described below (AECOM, 2024):

Principle	Assessment
significant habitat for fauna indigenous to Western Australia	• **Banksia Woodland –**1.55 ha of the habitat was recorded during the survey, totalling 0.54 ha (2.08%) of the Project Area. • **Eucalyptus Woodland –** 36.22 ha of the habitat was recorded during the survey, totalling 6.93 ha (26.65%) of the Project Area. • **Trees Over Cleared –** 4.54 ha of the habitat was 43corded during the survey, totalling 1.54 ha (5.92%) of the Project Area. • The remainder of the Project Area is previously cleared and is devoid of vegetation, representing 16.98 ha (65.31%) of the Project Area. The Banksia Woodlands and Eucalyptus Woodlands habitat types are considered the most suitable for the three conservation-significant Black Cockatoo species and Quenda. All fauna habitats are reduced to a native overstory with a predominantly weedy understory. As identified in Principle (a) above, large parts of the Project Area have been disturbed and are disconnected from remnant native vegetation. These habitats are also found directly adjacent to the Project Area at Bush Forever Site 304 (Whiteman Park). Additionally, a Targeted Black Cockatoo Survey identified a total of 9.02 ha of black cockatoo foraging habitat within the Project Area, along with 27 potential breeding trees were recorded, none of which contained hollows suitable for breeding (AECOM, 2024). No roosting sites were recorded during the survey. The proposed clearing within the anticipated Disturbance Footprint will result in the clearing of up to: • 2.56 ha foraging habitat, the majority of which is Moderate-quality to Low-quality • 9 potential breeding trees, none of which contain hollows suitable for breeding. The DER (2014) notes that clearing of native vegetation that is habitat for specially protected or Threatened Fauna is likely to be at variance with this Principle. Although the Project has been designed to minimise impacts to the fauna habitat, clearing of Black Cockatoo foraging habitat is required. It is noted that the fauna habitat within the anticipated Disturbance Footprint is not integral to the habitat connectivity of the surrounding area, as it comprises a relatively small sliver of roadside vegetation and is separated from the eastern boundary of Bush Forever Site Number 304 by Drumpellier Drive. There are large areas of remnant native vegetation in Good or better condition protected within Whiteman Park (total approximate area of 2,320 ha) and Gnangara-Moore River State Forest (total approximate area of 66,100 ha), which would provide similar foraging habitat and fauna habitat as to what was captured within the Project Area. It is therefore considered that the proposed clearing of up to 2.56 ha of native vegetation, including fauna habitat, may be at variance with this Principle.
Principle (c) – Native vegetation should not be cleared if it includes or is necessary for the continued existence of rare flora.	**Assessed Outcome:** The proposed clearing is **not likely** to be at variance with this Principle. A desktop assessment conducted by AECOM (2024) identified 15 Threatened flora species as potentially occurring in the Survey Area. An assessment of the likelihood of occurrence of each of the conservation

Principle	Assessment
	significant flora recorded in the desktop assessment was undertaken, based on consideration of recorded distribution and habitat suitability in the Survey Area. Five (5) species were found to have a Low likelihood of occurrence post-survey, and ten (10) species had a Negligible likelihood of occurrence post-survey (AECOM, 2024). No Threatened flora species pursuant to the EPBC Act and/ or gazetted as Threatened/ Declared Rare Flora pursuant to the BC Act were recorded during the survey (AECOM, 2024). Considering the absence of Threatened flora species within the Survey Area, the proposed clearing of up to 2.56 ha of native vegetation is considered not likely to be at variance with this Principle.
Principle (d) – Native vegetation should not be cleared if it comprises the whole or a part of or is necessary for the maintenance of a Threatened Ecological Community (TEC).	**Assessed Outcome:** The proposed clearing is **not** at variance with this Principle. Based on the desktop assessment, two Federally listed TECs have the potential to occur in the Project Area: the Banksia Woodlands TEC and the Tuart Woodlands TEC. No TECs were recorded during the survey (AECOM, 2024). The proposal is not at variance with this Principle.
Principle (e) – Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.	**Assessed Outcome:** The proposed clearing is **not likely** to be at variance with this Principle. The National Objectives and Targets for Biodiversity Conservation 2001 – 2005 include a target to have clearing controls in place that prevent the clearance of ecological communities with a pre-European extent below 30% (Commonwealth of Australia, 2001). Within constrained areas on the Swan Coastal Plain, Guidance Statement No. 33: Environmental Guidance for Planning and Development identifies a threshold for retention of 10% of the pre-existing extent of native vegetation (EPA, 2008). The Project Area intersects the Bassendean 1001 and Bassendean 1018 pre-European vegetation associations, both of which have a current remaining extent in excess of 10%: • Vegetation association 1001 has a 22.05% representation across the Swan Coastal Plain bioregion. • Vegetation association 1018 has a 17.39% representation across the Swan Coastal Plain bioregion. The vegetation extent for both Bassendean 1001 and Bassendean 1018 is above the expected threshold remaining for the State. Additionally, there are large areas of remnant native vegetation in Good or better condition protected within Bush Forever Site Number 304 (Whiteman Park). Given the representation of the vegetation system associations, similar vegetation is protected in the nearby Bush Forever Site Number 304 (Whiteman Park) and Gnangara State Forest and vegetation condition within the Project Area is predominantly in 'Degraded' to 'Completely Degraded' condition, the vegetation in the Project Area is not considered to be a significant remnant of native vegetation. The proposed clearing of 2.56 ha of native vegetation is, therefore, not likely to be at variance with this Principle.
Principle (f) – Native vegetation should not be cleared if it is growing in, or in	**Assessed Outcome:** The proposed clearing is **not** at variance with this Principle.

Principle	Assessment
association with, an environment associated with a watercourse or wetland.	Consultation of the DWER Geomorphic Wetlands of the Swan Coastal Plain (DWER, 2024) depicted the Project Area, including the Disturbance Area, as largely within Multiple Use Wetland Unique Feature Identification (UF ID) 13396, a palusplain wetland mapped across 760 ha. The area mapped as UF ID 13396 has been largely cleared and developed, containing both road reserve and residential properties. Three Conservation Category Wetlands (CCWs) are located west of the Project Area, on the opposite side of Drumpellier Drive, within Bush Forever Site Number 304: • UF ID: 8550, located approximately 300 m west of the Project Area • UF ID: 8546, located approximately 990 m west of the Project Area • UF ID: 8548, located approximately 210 m west of the Project Area. The survey conducted in 2023 did not identify any native vegetation growing in, or in association with, an environment associated with a watercourse or wetland within the Project Area (AECOM, 2024). Considering this, the proposal is not at variance with this Principle.
Principle (g) – Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.	**Assessed Outcome:** The proposed clearing is **not likely** to be at variance with this Principle. The then Department of Environmental Regulation (DER) (now DWER) defines land degradation as including the following (DER, 2014): • The clearing of vegetation • Decline in vegetation condition (including spread of weeds) • Soil erosion and soil acidity caused by wind and water erosion due to vegetation clearing • Salinity • Waterlogging/ flooding. Soil erosion is generally caused by insufficient vegetation cover to protect soils from high intensity winds and rainfall (DER, 2014). The Project Area is situated across one land system, the Bassendean System, described as sand dunes and sandplains with pale deep sand, semi-wet and wet soils with Bankia-Paperbark woodlands and mixed heathlands (AECOM, 2024). The site is predominantly mapped within an area considered to have a low to extremely low risk of ASS (Fitzpatrick et al., 2011). Vegetation within the Project Area ranges from Degraded to Completely Degraded condition, with many areas already cleared (AECOM, 2024). Additionally, a significant weed invasion was observed during the field assessment. The proposed action will require the clearing of up to 2.56 ha of native vegetation in Degraded to Completely Degraded Condition. The wind erosion risk of the Project Area, as per the DPIRD (2025) mapping, ranges from moderate (10-50%) to high (50-70%). Considering the already degraded condition of the vegetation and disturbed areas

Principle	Assessment
	within the Project Area, the proposed clearing is unlikely to cause appreciable land degradation. However, given the potential for wet or semi-wet soils, appropriate hygiene management and dust management actions as outlined in Section 3 will be implemented to mitigate potential impacts from clearing activities. Therefore, the proposed clearing is not likely to be at variance with this principle.
Principle (h) – Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.	**Assessed Outcome:** The proposed clearing is **not likely** to be at variance with this Principle. Environmental values of conservation areas are largely impacted by habitat fragmentation, when core habitat reserves are isolated from one another by human land uses (DER, 2014). Native vegetation near conservation reserves improves the conservation values of the reserve by buffering the reserve from edge effects and increasing biological diversity (DER, 2014). The proposed clearing does not intersect any conservation or protected areas. Adjacent to the Project Area, on the opposite side of Drumpellier Drive, is Bush Forever Site Number 304 (Whiteman Park). Given the proposed clearing is separated from this conservation area by a road and rail corridor, direct or indirect impacts to Whiteman Park are not expected. Considering this, it is unlikely that the proposal will have any significant direct or indirect impact on the environmental values of the nearby conservation areas and is therefore not likely to be at variance with this Principle.
Principle (i) – Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water	**Assessed Outcome:** The proposed clearing is **not likely** to be at variance with this Principle. There are no surface water flows intersecting the Project Area. The Project Area is mapped within Multiple Use Wetland UF ID 13396 (DWER, 2024), however, the site inspection conducted in 2023 did not identify any native vegetation in, or in association with, an environment associated with a watercourse or wetland within the Survey Area (AECOM, 2024). There are no RAMSAR sites within the Project Area DBCA 2017b). The Project Area is located in the Swan River and Tributaries surface water area (DWER, 2025a). The Project Area falls within the proclaimed Mirrabooka groundwater area (DWER, 2025b). The Project Area overlaps or is in close proximity to the following Public Drinking Water Source Areas (PDWSA) (DWER, 2025c): • Priority 2 PDWSA: Gnangara Underground Water Pollution Control Area (UF ID: 365), overlaps the Project Area. • Priority 3 PDWSA: Gnangara Underground Water Pollution Control Area (UF ID: 1067), overlaps Project Area • Priority 3* PDWSA: Gnangara Underground Water Pollution Control Area (UF ID: 1065), overlaps Project Area • Priority 1 PDWSA: Gnangara Underground Water Pollution Control Area (Unique Feature (UF) ID: 1066), located 0.05 km west Project Area

Principle	Assessment
	Potential impacts to surface water and drainage relate to the maintenance of existing surface water flows and surface water quality, including: • Altered water quality associated with silt deposition, increased turbidity, road runoff and accidental spills and releases (contamination of surface water) • Potential water quality impacts to sensitive systems • Interruption or obstruction to existing surface water flows • Changes to local surface water hydrology, including altered surface water runoff volumes from vegetation clearing • Excess runoff or ponding, which could lead to localised soil erosion and flood risk, respectively • Development of new areas of waterlogging. The proposed clearing occurs in a highly developed area which has already been altered by other infrastructure activities such as roads, public transport, housing and water pipelines. The potential impacts to surface and groundwater can be adequately managed through mitigation measures as outlined in Section 3. Minimising disturbance to soil and vegetation and stabilising disturbed areas will help manage the potential impacts to surface water flows and drainage. Given the absence of surface water flows intersecting the anticipated Disturbance Footprint and the implementation of appropriate mitigation measures, the clearing of 2.56 ha of native vegetation is considered not likely to be at variance with this Principle.
Principle (j) – Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence of flooding.	**Assessed Outcome:** The proposed clearing is considered **not likely** to be at variance with this Principle. The Project Area has not been identified as a significant risk of flooding, waterlogging or erosion from soil landscape quality analysis. There are no watercourses or surface water flows within the Project Area. The Project Area is mapped within Multiple Use Wetland UF ID 13396 (DWER, 2024), however, the site inspection conducted in 2023 did not identify any native vegetation in, or in association with, an environment associated with a watercourse or wetland within the Survey Area (AECOM, 2024). Elevation within the Project Area ranges from approximately 43 metres mAHD at the northern end of the Project Area, to 37 mAHD towards the centre of the Project Area, to 31 mAHD at the southern end of the Project Area (Google Earth Pro, 2025). The change in elevation occurs over a distance of approximately 3.1 km. Given the low flood risk and lack of water courses in the Project Area, the proposed clearing is not likely to cause or exacerbate the incidence of flooding and is therefore not likely to be at variance with this Principle.

5.0 Summary of Assessment

The assessment of the proposed clearing of 2.56 ha of native vegetation indicates the Project is not at variance with two (2) Principles, unlikely to be at variance with seven (7) Principles, and may be at variance with one (1) Principle.

Not at variance with:

- **Principle (d)** – Native vegetation should not be cleared if it comprises the whole or a part of or is necessary for the maintenance of a Threatened Ecological Community (TEC).
- **Principle (f)** – Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.

Not likely to be at variance with:

- **Principle (a)** – Native vegetation should not be cleared if it comprises a high level of biological diversity
- **Principle (c)** – Native vegetation should not be cleared if it includes or is necessary for the continued existence of rare flora.
- **Principle (e)** – Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.
- **Principle (g)** – Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.
- **Principle (h)** – Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.
- **Principle (i)** – Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water
- **Principle (j)** – Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence of flooding.

May be at variance with:

- **Principle (b)** – Native vegetation should not be cleared if it comprises the whole or part of or is necessary for the maintenance of a significant habitat for fauna indigenous to Western Australia.

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Figures

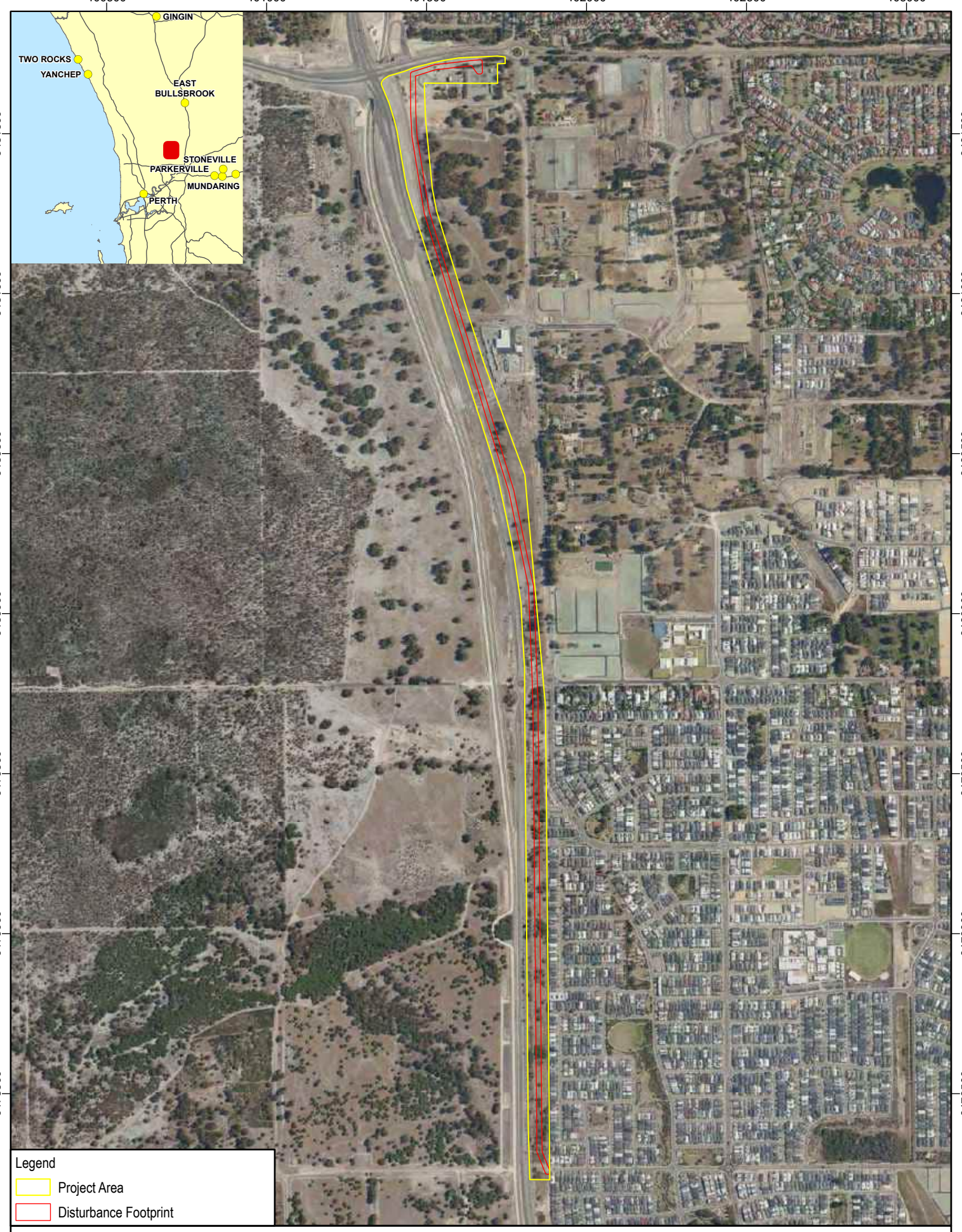
Native Vegetation Clearing Permit Application Supporting Document

CEL North – Henley Brook

Western Power

SLR Project No.: 675.073051.00001

17 September 2025



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WESTERN POWER NVCP

SITE LOCATION PLAN

FIGURE 1

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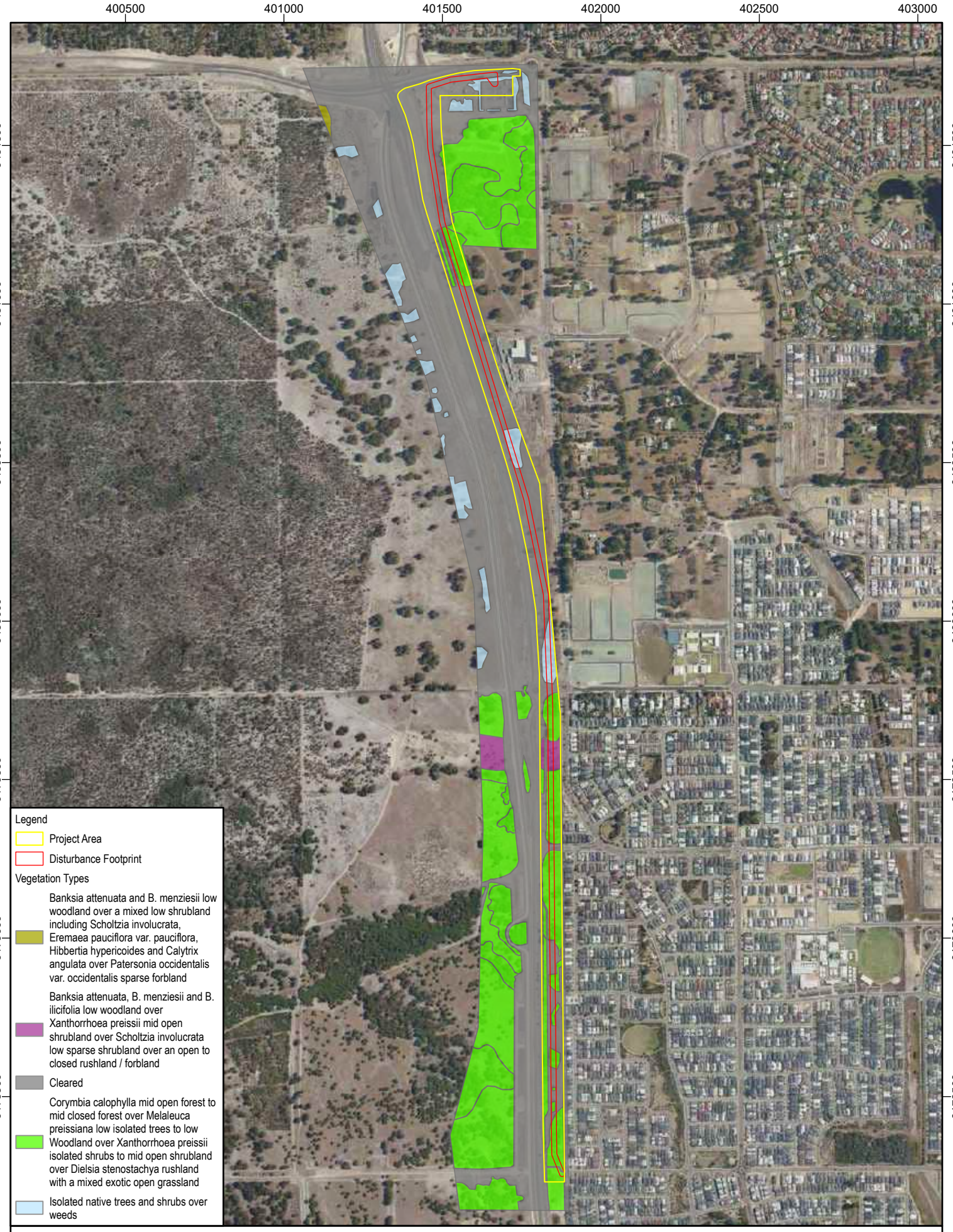

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VEGETATION TYPES

FIGURE 2

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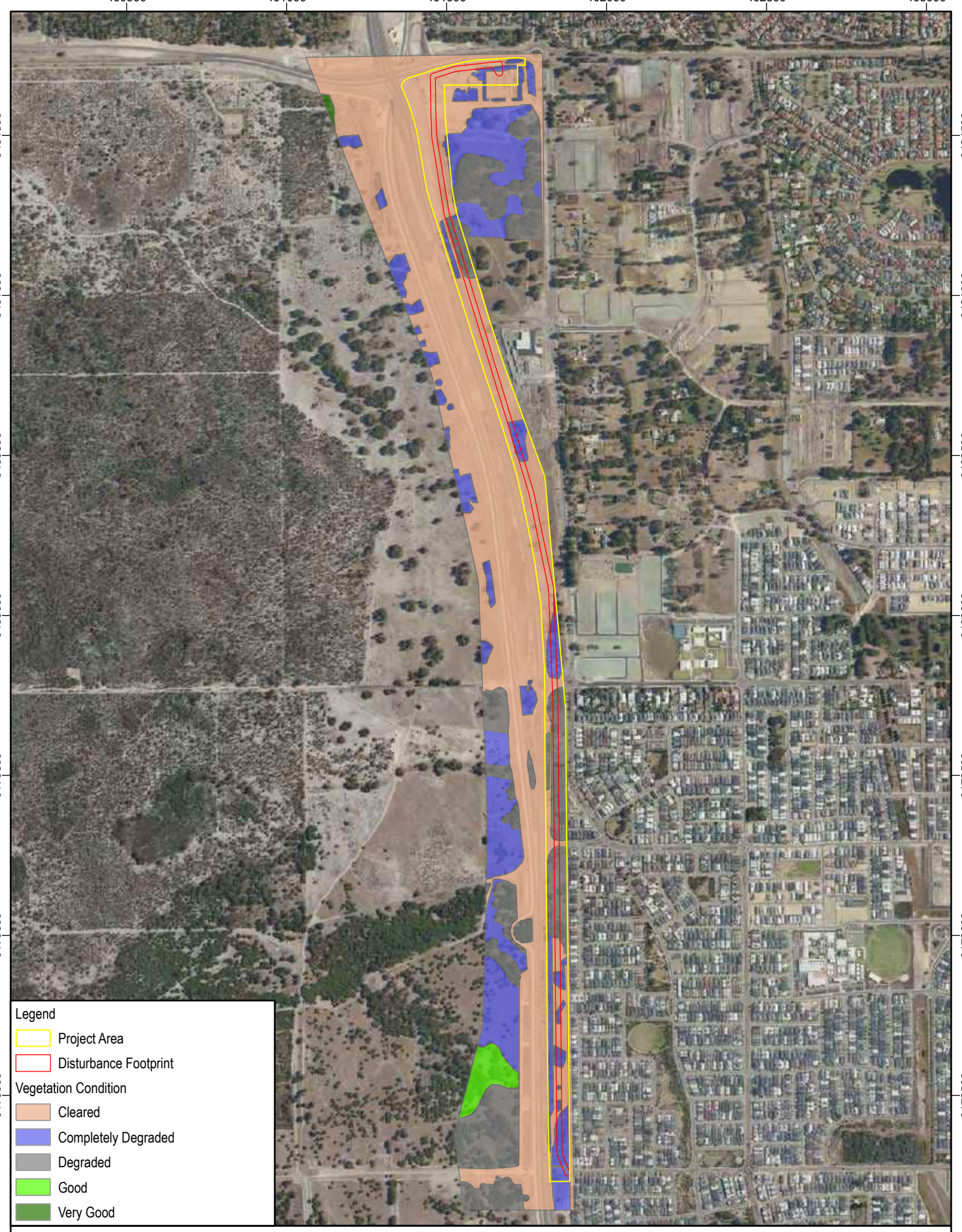

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VEGETATION CONDITION

FIGURE 3

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TEC

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FIGURE 4

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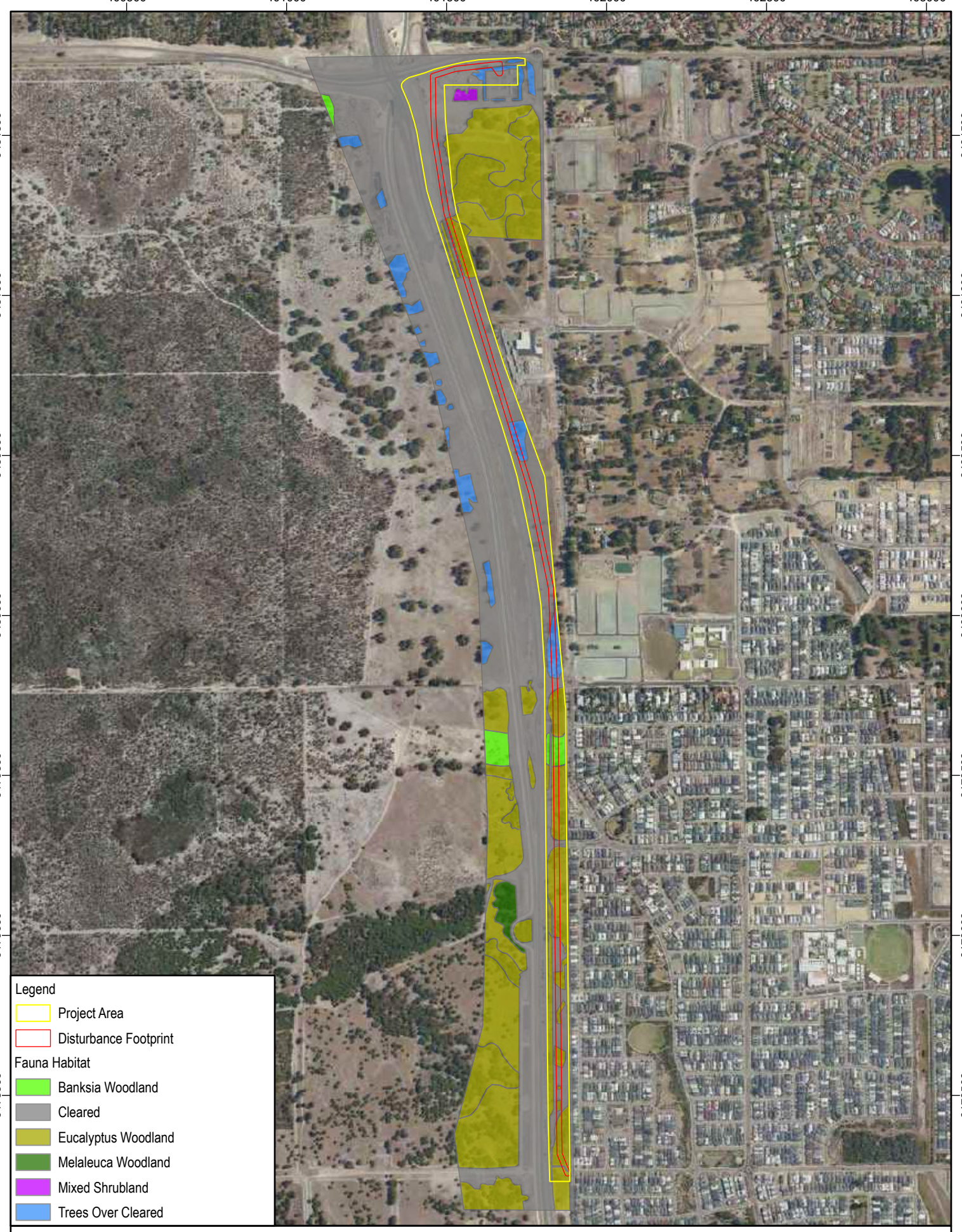

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FAUNA HABITAT

FIGURE 5

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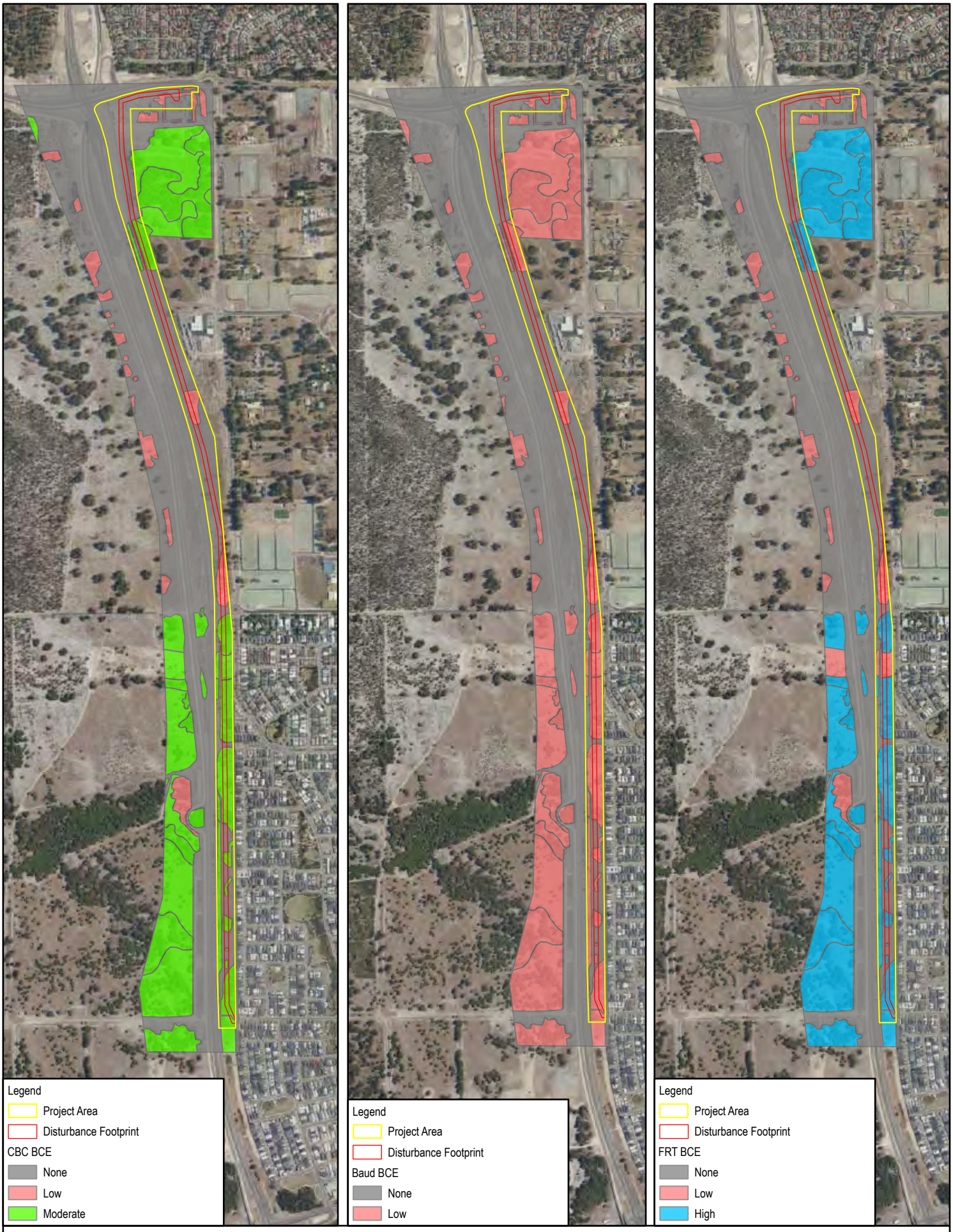

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BLACK COCKATOO FORAGING HABITAT

FIGURE 6

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BLACK COCKATOO POTENTIAL BREEDING TREES

FIGURE 7

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Appendix A Clean Energy Link Swan Coastal Plain Flora, Vegetation and Fauna Assessment (AECOM, 2024)

Native Vegetation Clearing Permit Application Supporting Document

CEL North – Henley BrookWestern Power

SLR Project No.: 675.073051.00001

17 September 2025

Prepared for
Western Power
ABN: 18 540 492 861

Clean Energy Link Swan Coastal Plain Flora, Vegetation and Fauna Assessment

25-Jun-2024

Clean Energy Link Swan Coastal Plain Flora, Vegetation and Fauna Assessment

Client: Western Power

ABN: 18 540 492 861

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Originator	Cassandra House
Checker/s	Floora de Wit
Verifier/s	Floora de Wit

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			Name/Position	Signature
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B	12-Mar-2024	Draft for Client Review	Floora de Wit Team Lead - Natural Resources	
0	25-Jun-2024	Final Submission	Kate Thomson Team Lead - Impact Assessment and Permitting	

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Executive Summary

AECOM Australia Pty Ltd (AECOM) was engaged by Western Power to undertake a spring flora, vegetation, fauna and black cockatoo assessment for defined linear corridors within the Perth Metropolitan Region on the Swan Coastal Plain (SCP). This Project is referred to as the Clean Energy Link (CEL). The five sites include: Padbury - Wangara, Pinjar Terminal, Neerabup Terminal and East Wanneroo, NT-NOR to HBK 132kV Line and Northern Terminal.

A summary of the Padbury - Wangara results is presented below:

- One patch of -Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain Threatened Ecological Community (Tuart Woodlands TEC) listed as Critically Endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and as Priority 3 by Department of Biodiversity, Conservation and Attractions (DBCA). The patch extends for 0.54 ha.
- No significant flora listed under the EPBC Act or the *Biodiversity Conservation Act 2016* (BC Act) or by DBCA were recorded during the survey.
- Three conservation significant fauna species were recorded during the survey, including two bird species and one mammal species:
    - Carnaby's Cockatoo (*Zanda latirostris)* listed as Endangered under the EPBC Act and the *Biodiversity Conservation Act 2016* (BC Act)
    - Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso)* listed as Vulnerable under the EPBC Act and BC Act
    - Quenda (*Isoodon fusciventer)* listed as Priority 4 by DBCA.

A summary of the Pinjar Terminal results is presented below:

- No significant flora listed under the EPBC Act, BC Act or by DBCA were recorded during the survey.
- Banksia Woodlands of the Swan Coastal Plain (Banksia Woodlands TEC) listed as Endangered under the EPBC Act and as Priority 3 by DBCA, mapped for 14.75 ha.
- One conservation significant fauna species was recorded during the survey, Quenda (*Isoodon fusciventer*) listed as Priority 4 by DBCA.

A summary of the Neerabup Terminal and East Wanneroo results are presented below:

- Eight patches of Banksia Woodlands TEC were confirmed and mapped for 15.13 ha. In most instances, this TEC is synonymous with a Priority 3 Ecological Community (PEC) unless assessment through Floristic Community Type analysis determines otherwise.
- One patch of Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain TEC was mapped within the survey area for 1.71 ha.
- One Priority 3 PEC listed by the DBCA (2023) was confirmed to occur through FCT analysis, FCT 21c – Low lying Banksia attenuata woodlands or shrublands, mapped for 0.6 ha.
- One Priority 4 species, *Jacksonia sericea,* was collected and formal identification confirmed at the WA Herbarium. One individual was recorded within the survey area, with a second individual recorded in a quadrat adjacent to the survey area.
- A sample of *Calectasia* sp. was collected and may represent the Priority 2 species *C. elegans.* The record was more than 800m from the survey area therefore no further verification is required at this time.
- Three conservation significant fauna species were recorded during the survey:
    - Quenda (*Isoodon fusciventer*) listed as Priority 4 by DBCA.

- Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksia naso*) listed as Vulnerable under the EPBC Act and BC Act.
- Carnaby's Cockatoo (*Zanda latirostris*) listed as Endangered under the EPBC Act and BC Act.

A summary of the NT-NOR to HBK 132KV results are presented below:

-
- No significant flora listed under the EPBC Act or the BC Act or by DBCA were recorded during the survey.
- Three conservation significant fauna species were recorded during the survey:
  - Quenda (*Isoodon fusciventer*) listed as Priority 4 by DBCA.
  - Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksia naso*) listed as Vulnerable under the EPBC Act and BC Act.
  - Carnaby's Cockatoo (*Zanda latirostris*) listed as Endangered under the EPBC Act and BC Act.

A summary of the Northern Terminal results is presented below:

- No significant flora listed under the EPBC Act or the BC Act or by DBCA were recorded during the survey.
- No significant vegetation communities were recorded in the survey area.
- Two conservation significant fauna species were recorded during the survey:
  - Quenda (*Isoodon fusciventer*) listed as Priority 4 by DBCA.
  - Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksia naso*) listed as Vulnerable under the EPBC Act and BC Act.

The survey was undertaken by experienced personnel during the ideal detection period for significant flora. Survey effort was considered satisfactory, and no access issues were encountered that affected the outcome of the results.

1.0 Introduction

1.1 Background

In support for the WA state decarbonisation goal, and in line with Western Power's corporate strategy, an investment for North Region strategy titled Clean Energy Link Program (CELP) was created to conduct scoping phase activities for future works.

AECOM Australia Pty Ltd (AECOM) was engaged to undertake spring flora, vegetation, fauna, and black cockatoo assessment to be used to analyse options for new line routes. The details outlined in this report are in relation to the spring surveys conducted for five discreet survey areas within the Swan Coastal Plain (SCP) between Malaga and Pinjar (the survey areas). These areas and the Western Power shapefiles they represent is outlined in Table 1.

1.2 Location

The survey area represents multiple discreet corridors extending between Malaga and Pinjar within the SCP. The southern portion of the survey area is located approximately 14km north/northeast of the Perth Central Business District (CBD) and extends north to Pinjar Terminal, located approximately 55km north of the Perth CBD. The survey areas intersect the Cities of Wanneroo, Joondalup and Swan (Figure 1). The locations are presented in the Table below (Table 1).

Table 1 Locations of survey areas

Survey areas	Area (ha)	Location	Associated Figure
Padbury-Wangara	31.26	Along Whitfords Ave	Figure 1.2
Pinjar Terminal	16.58	East of Perry Rd	Figure 1.3
Neerabup Terminal and East Wanneroo	204.98	North of Gnangara Rd, South of Skink Rd. This comprises six survey areas including: • Neerabup Terminal • NBT-WGA 81 • NBT-WGA 81 STR 49-60 • NBT MUL Option 1 via Lenore Rd • NBT MUL Option 2 via Badgerup • NT-NBT 330kV Clearing Shapefile	Figure 1.4
NT-NOR to HBK 132kV	119.00	Along Drumpellier Dr	Figure 1.5
Northern Terminal	25.78	North of Beach Rd, South of Vale St	Figure 1.6

1.3 Objectives

The purpose of the flora, vegetation, fauna, and black cockatoo assessment was to define the environmental values present within the survey area. The scope included:

- A desktop assessment and literature review for flora, communities, and fauna.
- Field surveys to record floristic data, define vegetation communities, vegetation condition and fauna habitat, and search for conservation significant flora, fauna, and communities, targeted black cockatoo habitat assessment.
- Technical report and data package.

This document represents the final technical report covering the desktop assessment, literature review and field surveys for the five areas within the SCP.

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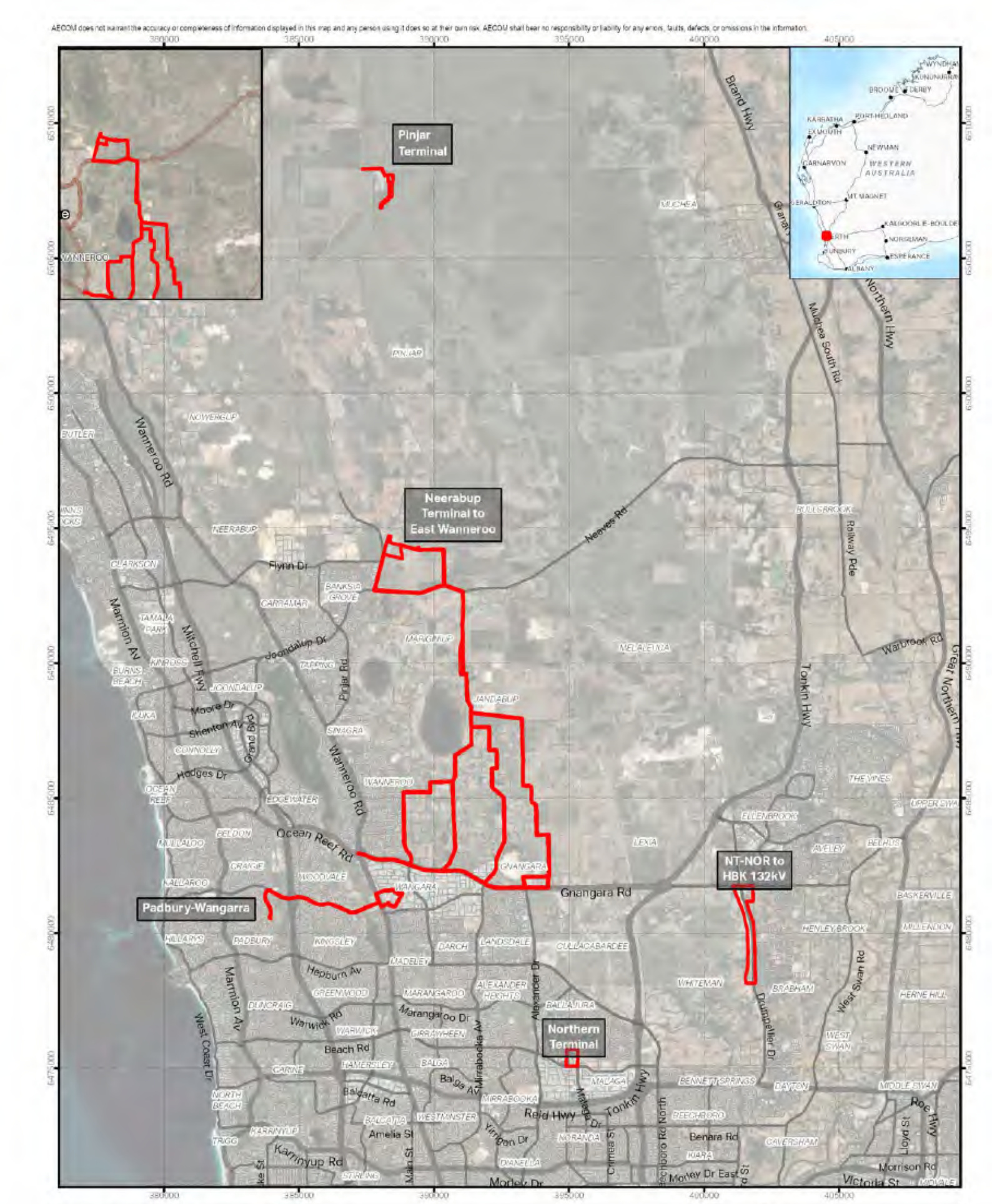

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		Figure 1.1

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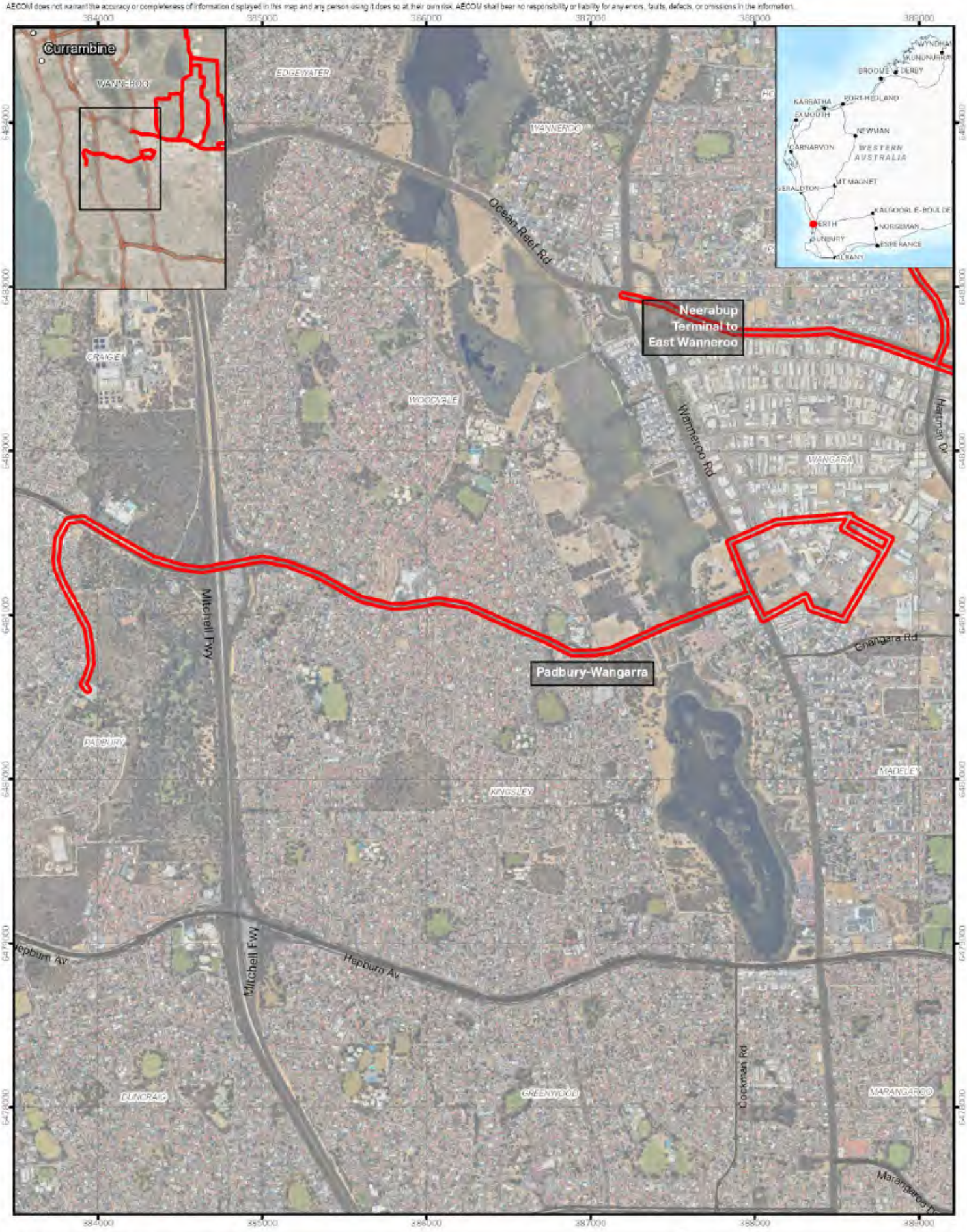

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Survey Area

Survey Area - Padbury - Wangarra

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **1.2**

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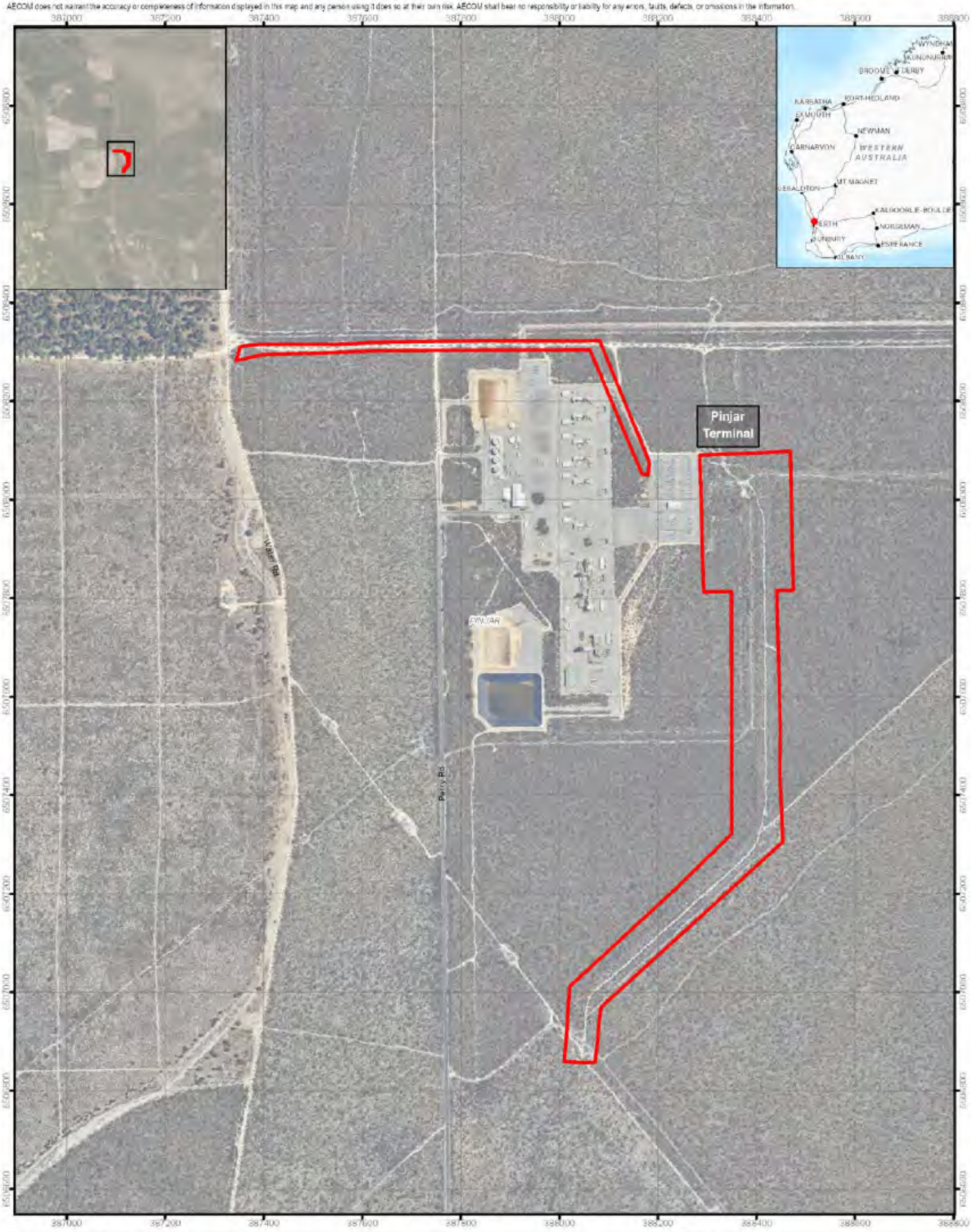

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LEGEND

Survey Area

Survey Area - Pinjar Terminal

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure 1.3

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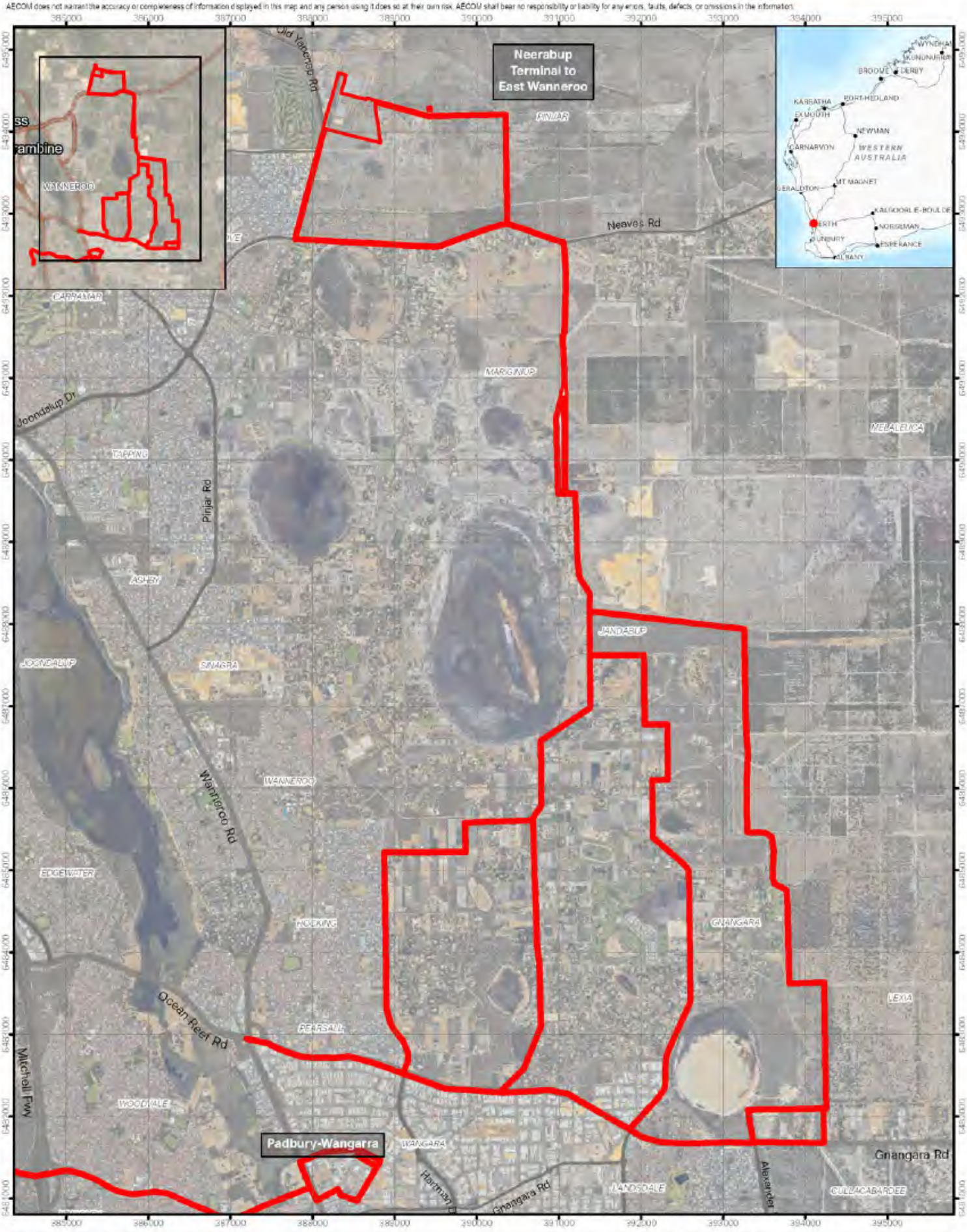

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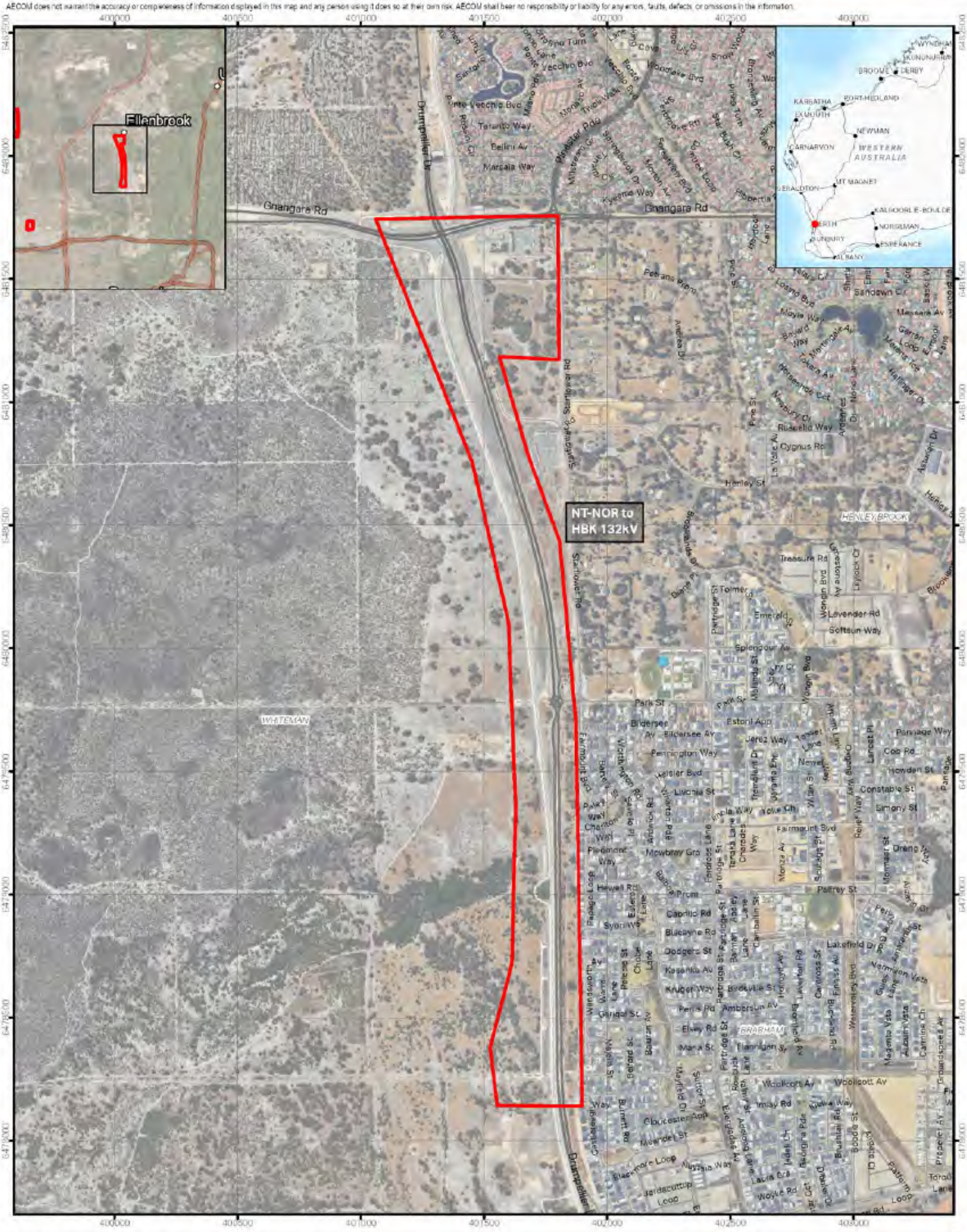

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Survey Area

Survey Area - NT-NOR to HBK 132kB

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure 1.5

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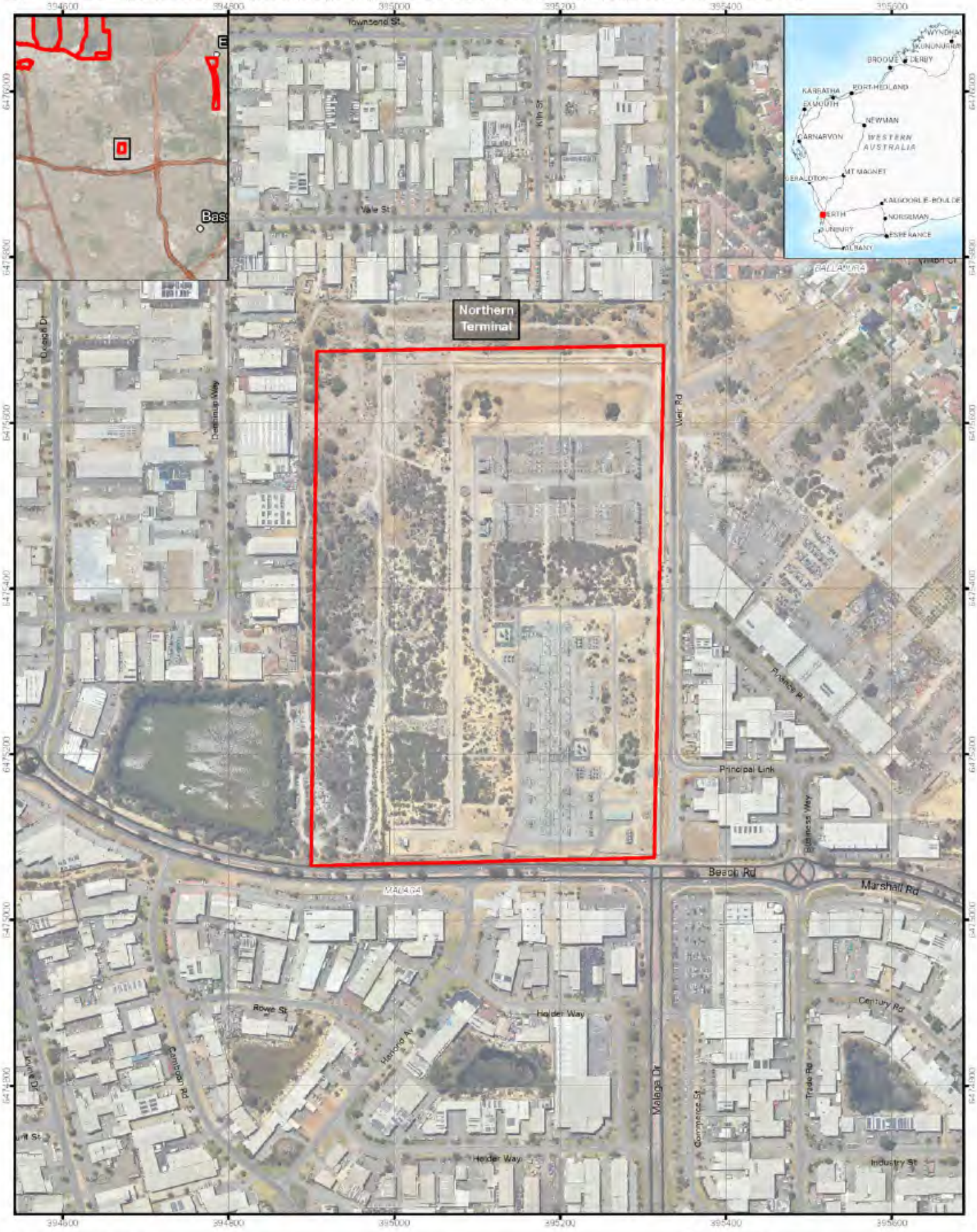

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LEGEND

Survey Area

Survey Area - Northern Terminal

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **1.6**

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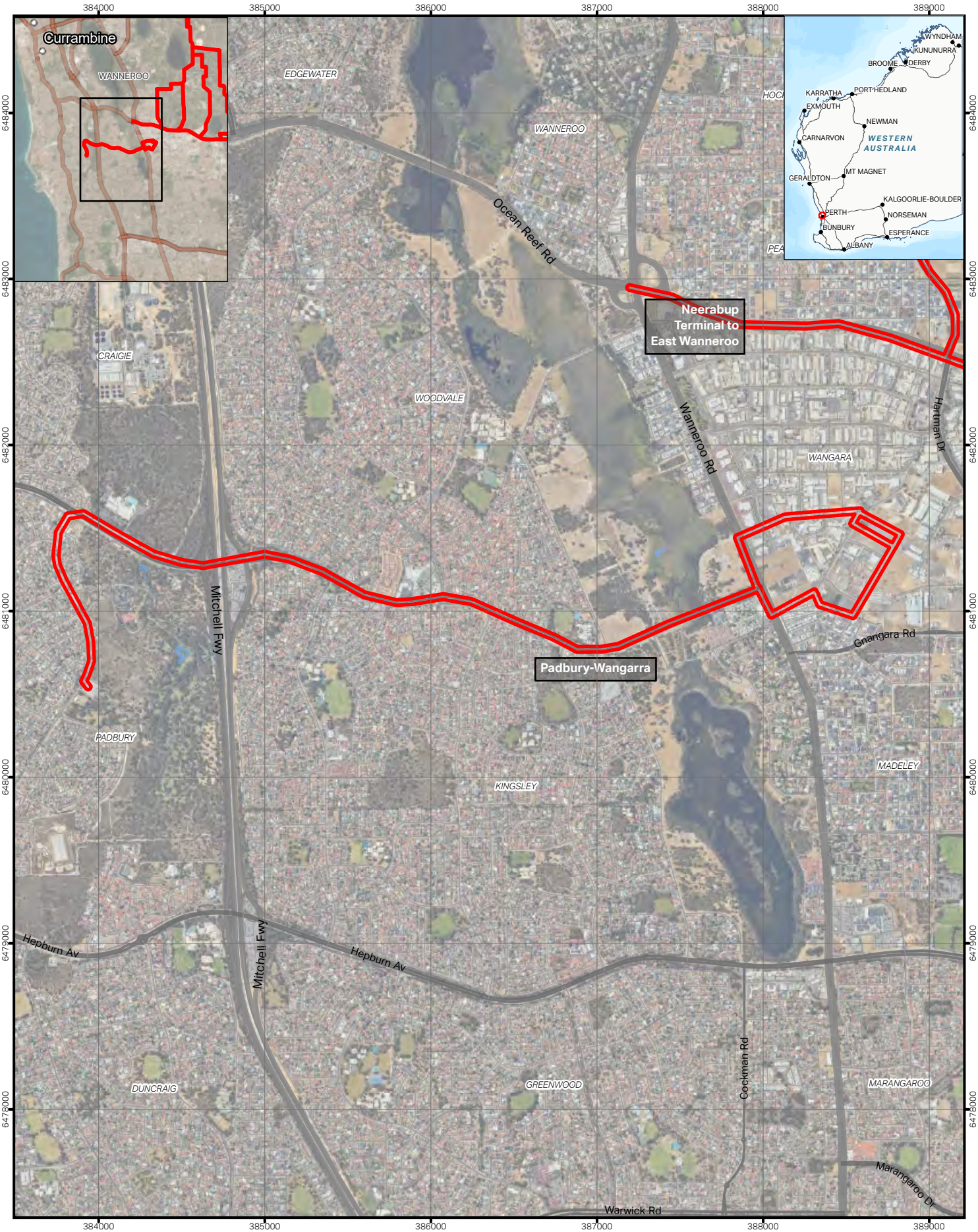

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LEGEND

Survey Area

Survey Area - Padbury - Wangarra

WESTERN POWER

NREP SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure 1.2

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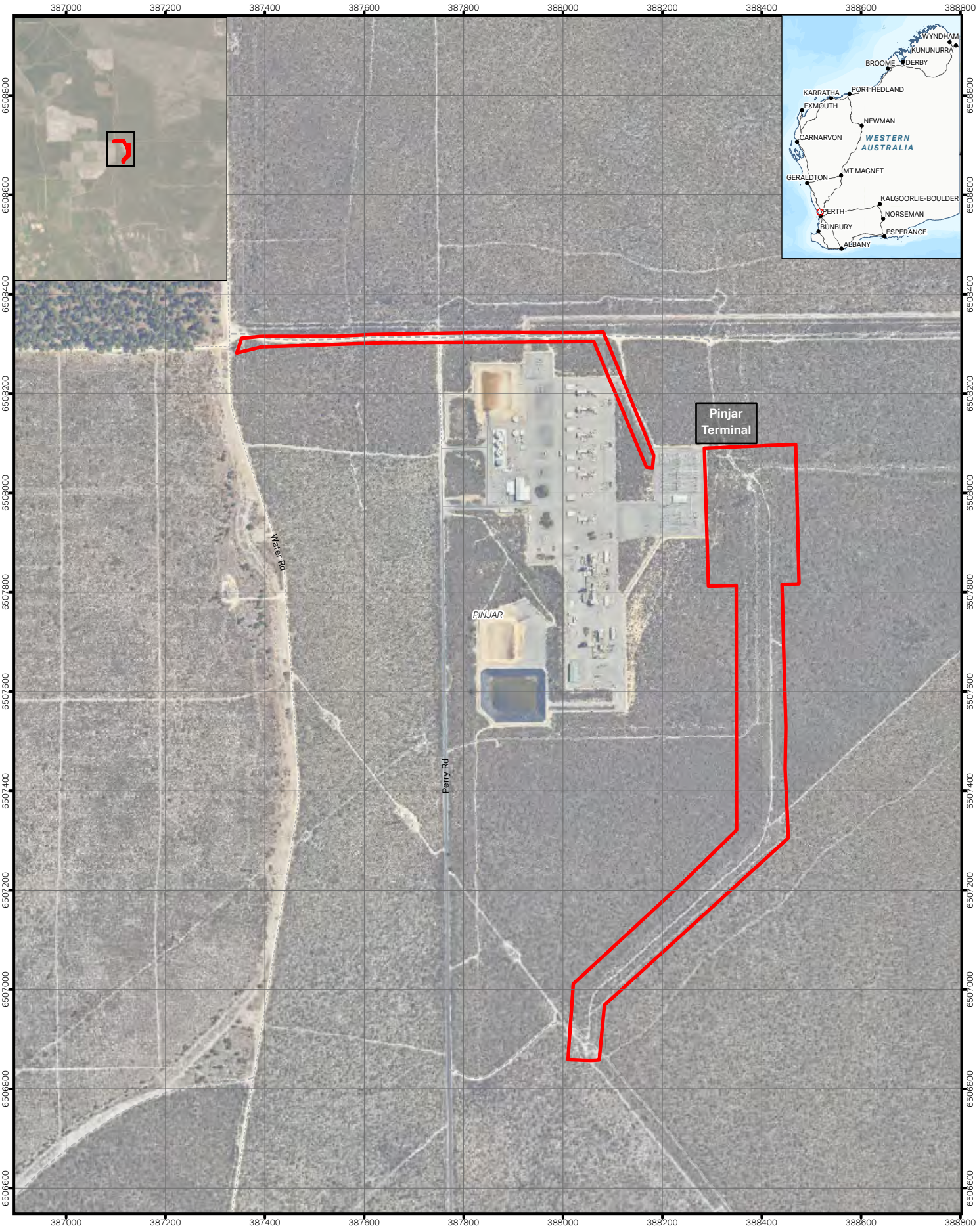

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LEGEND

Survey Area

Survey Area - Pinjar Terminal

WESTERN POWER

NREP SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure 1.3

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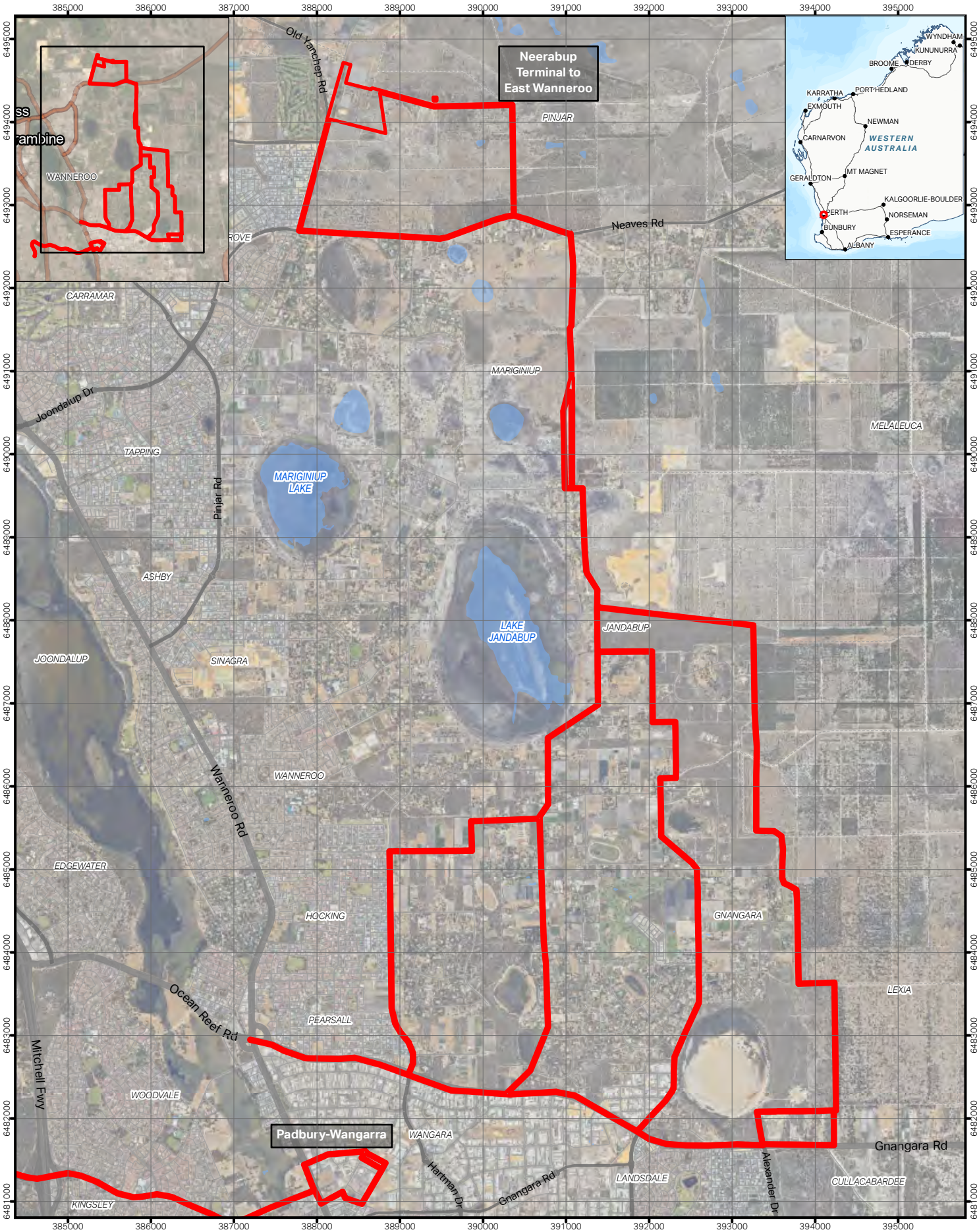

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LEGEND

Survey Area

Survey Area - Neerabup Terminal and East Wanneroo

WESTERN POWER

NREP SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure 1.4

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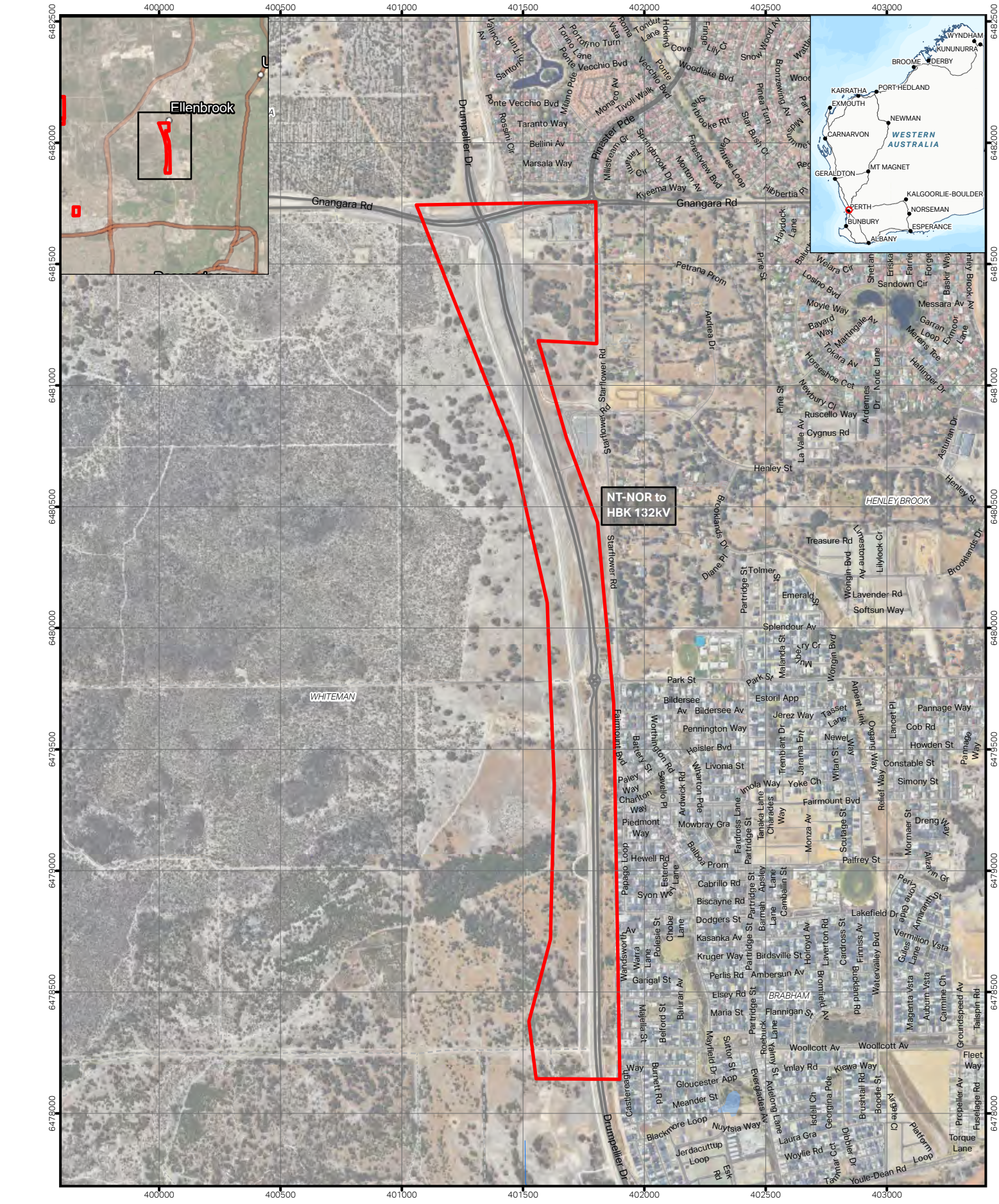

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LEGEND

Survey Area

Survey Area - NT-NOR to HBK 132kB

WESTERN POWER

NREP SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure 1.5

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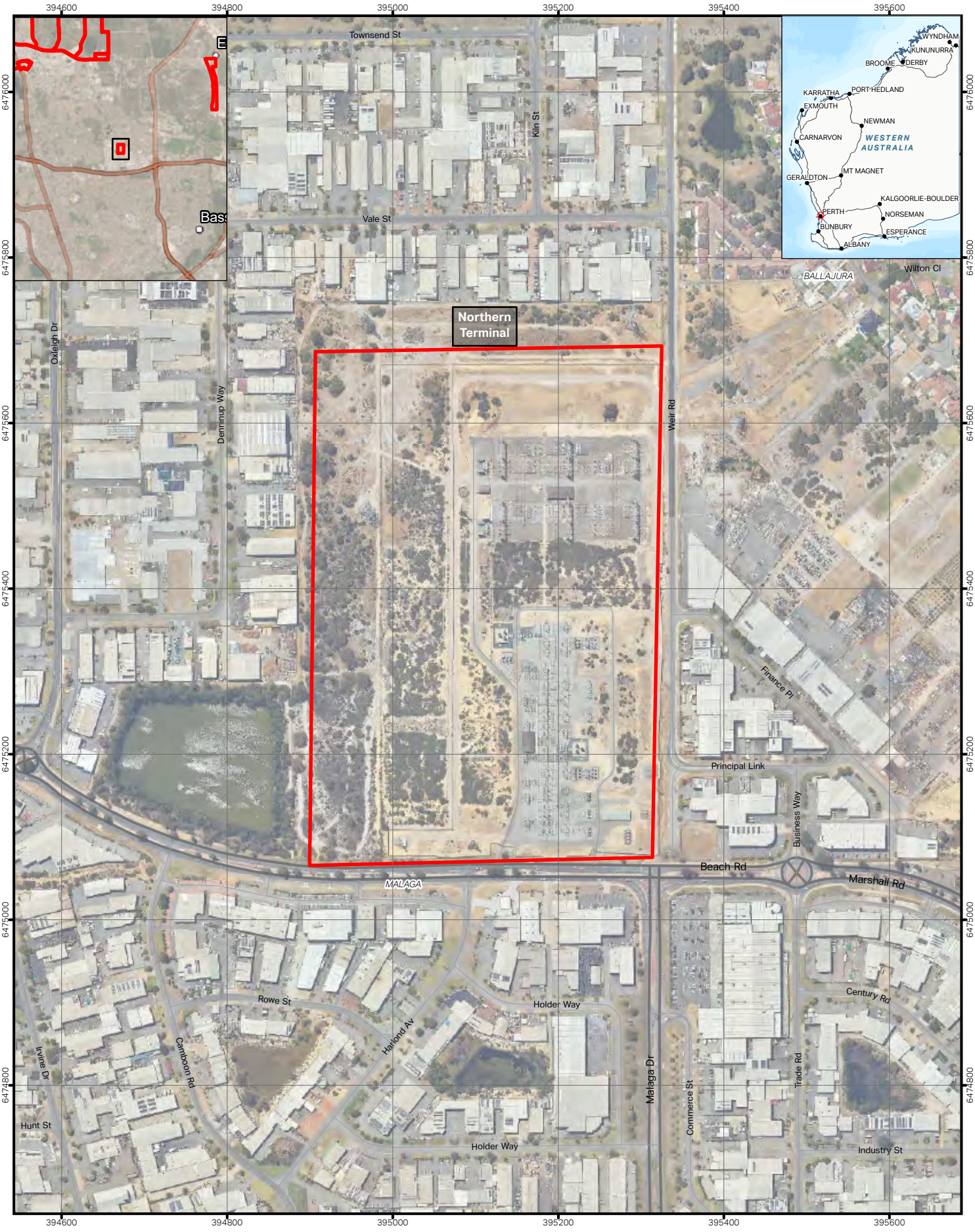

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LEGEND

Survey Area

Survey Area - Northern Terminal

WESTERN POWER

NREP SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure 1.6

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2.0 Existing Environment

2.1 Climate

All survey areas occur north of the Perth CBD within the Perth Metropolitan Region. The climate is warm Mediterranean with mild wet winters and hot dry summers. Precipitation occurs predominantly during the winter months, with the possibility of some summer storms.

Rainfall data was obtained from Wanneroo Station (Station Number 009105), located approximately 5.5km from the centre of the Survey Area (Gnangara Lake). Temperature data was obtained from Pearce RAAF WA (Station Number 009053), located approximately 18.7km from Gnangara Lake. These stations represent the closest mid-point to all survey areas, thus representing average conditions across all areas. The long-term rainfall and temperature data is compared against data from November 2023 to December 2022 in Figure 2 (BOM, 2023), to determine if climatic conditions posed a constraint to the survey.

The survey was undertaken across multiple days, from 16 to 20 of October and 6 to 8 of November in 2023. This followed a year of below average rainfall, with a total of 550.2 mm recorded, 241.2mm less than the long-term average of 791.4 mm. Rainfall was particularly low across the late spring and summer months (October to February). Lower than average rainfall did not appear to affect the germination of annual species, with ample present during the field survey which were confidently identified in the field or at the herbarium.

Maximum temperatures were higher for eight of the ten months, relative to the long-term average prior to the survey. Minimum temperatures varied less from the long-term average, with three months experiencing lower than average minimum temperatures. For both months of the field survey, as well as the month prior to the survey, both minimum and maximum temperatures exceeded the long-term average. During periods of increased temperature, fauna struggle to lose excess body heat through evaporation, and have an elevated probability to develop heat stress. As a result, fauna will likely seek shelter from the sun. This would in turn reduce the number of sightings of fauna during the survey, however as habitat assessments were conducted this does not have a significant impact on the survey efforts.

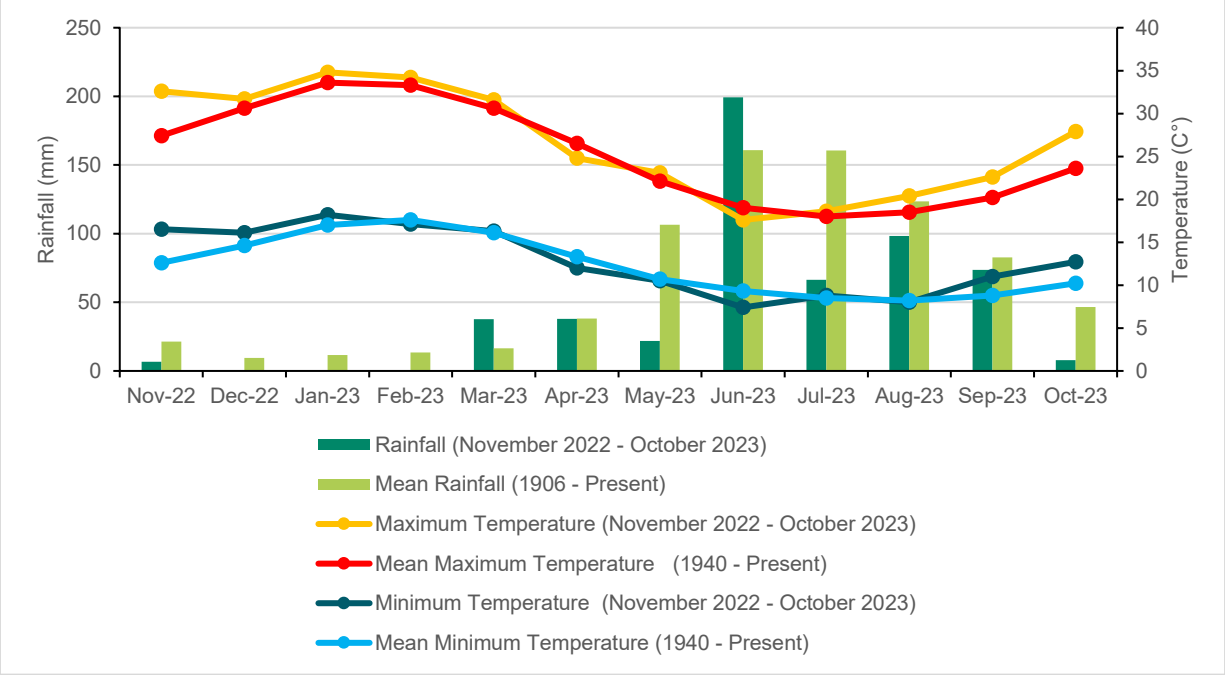

Figure 2 Rainfall data from Wanneroo Station (Station Number 009105) and temperature data from Pearce RAAF WA (Station Number 009053) (BOM, 2023).

2.2 Interim Biogeographical Region of Australia Regions

The largest regional vegetation classification scheme recognised by Environmental Protection Authority (EPA) is the Interim Biogeographical Region of Australia (IBRA). The IBRA regions provide the planning framework for the systematic development of a comprehensive, adequate, and representative (CAR) national reserve system. There are 89 recognised IBRA regions across Australia that have been defined based on climate, geology, landforms and characteristic vegetation and fauna (IBRA7, 2012). The survey area is situated within the Swan Coastal Plain IBRA Region.

The Swan Coastal Plain bioregion, described in CALM (2002), includes Perth and the outer suburbs (excluding the Hills suburbs). The Swan Coastal Plain is comprised of a narrow belt less than 30km wide of Aeolian, alluvial and colluvial deposits of Holocene or Pleistocene age (Gibson et al, 1994). A complex series of seasonal freshwater wetlands, alluvial river flats, coastal limestone and several offshore islands are included in the bioregion. Younger sandy areas and limestone are dominated by heath and/or tuart woodlands, while Banksia and Jarrah-Banksia woodlands are found on the older dune systems. Extensive clearing has occurred on the Swan Coastal Plain for urban and agricultural development.

The Swan Coastal Plain subregion, described by Mitchell et al. (2002), is a low-lying coastal plain covered with woodlands dominated by Banksia or Tuart on sandy soils, *Casuarina obesa* on outwash plains, and paperbark in swampy areas. The area includes a complex series of seasonal wetlands and includes Rottnest, Carnac and Garden Islands. Land use is predominantly cultivation, conservation, urban and rural residential. The area contains a number of rare features including Holocene dunes and wetlands and a large number of threatened species and ecological communities.

2.3 Soil Landscape Mapping

The survey is situated across four land systems. A depiction of the soil landscape of the survey areas can be found in Figure 3 and Table 2.

Table 2 Soil Landscape mapping systems

Soil System	Description	Padbury-Wangara	Neerabup Terminal and East Wanneroo	NT-NOR to HBK 132kV	Northern Terminal	Pinjar Terminal
Spearwood System	Sand dunes and plains on yellow deep sands, pale deep sands and yellow/brown shallow sands.	Occurs across the majority of the west of survey area	Small patch intersects land system	NA	NA	NA
Quindalup System	Coastal dunes of the Swan Coastal Plain, with calcareous deep sands and yellow sands with coastal scrub.	Intersects with western most portion of survey area	NA	NA	NA	NA
Bassendean System	Sand dunes and sandplains with pale deep sand, semi-wet and wet soils with Banksia-Paperbark woodlands and mixed heathlands.	NA	Occurs across majority or all of the survey area			
Pinjarra System	Poorly drained coastal plain with variable alluvial and aeolian soils. Vegetation is variable and includes Jarrah, Marri, Paperbark, Sheoak and Flooded Gum.	NA	NA	NA	Intersects with southern extent of survey area	NA

2.4 Geology

The survey area is situated across five geological systems. These are described below in Table 3. A depiction of the soil landscape of the survey areas can be found in Figure 4.

Table 3 Geological systems of the Survey Area

Code	Description	Padbury-Wangara	Neerabup Terminal and East Wanneroo	NT-NOR to HBK 132kV	Northern Terminal	Pinjar Terminal
Qpb	Quartz sand, fixed dunes		X	X	X	X
Qrw	Swamp and lacustrine deposits-peat, peaty sand and clay	X	X	X		
Qpcs	Predominantly quartz sand	X	X			
Qpck	Predominantly calcarenite and kankar	X				
Qrs	Eolian and beach lime sand, slightly lithified	X				

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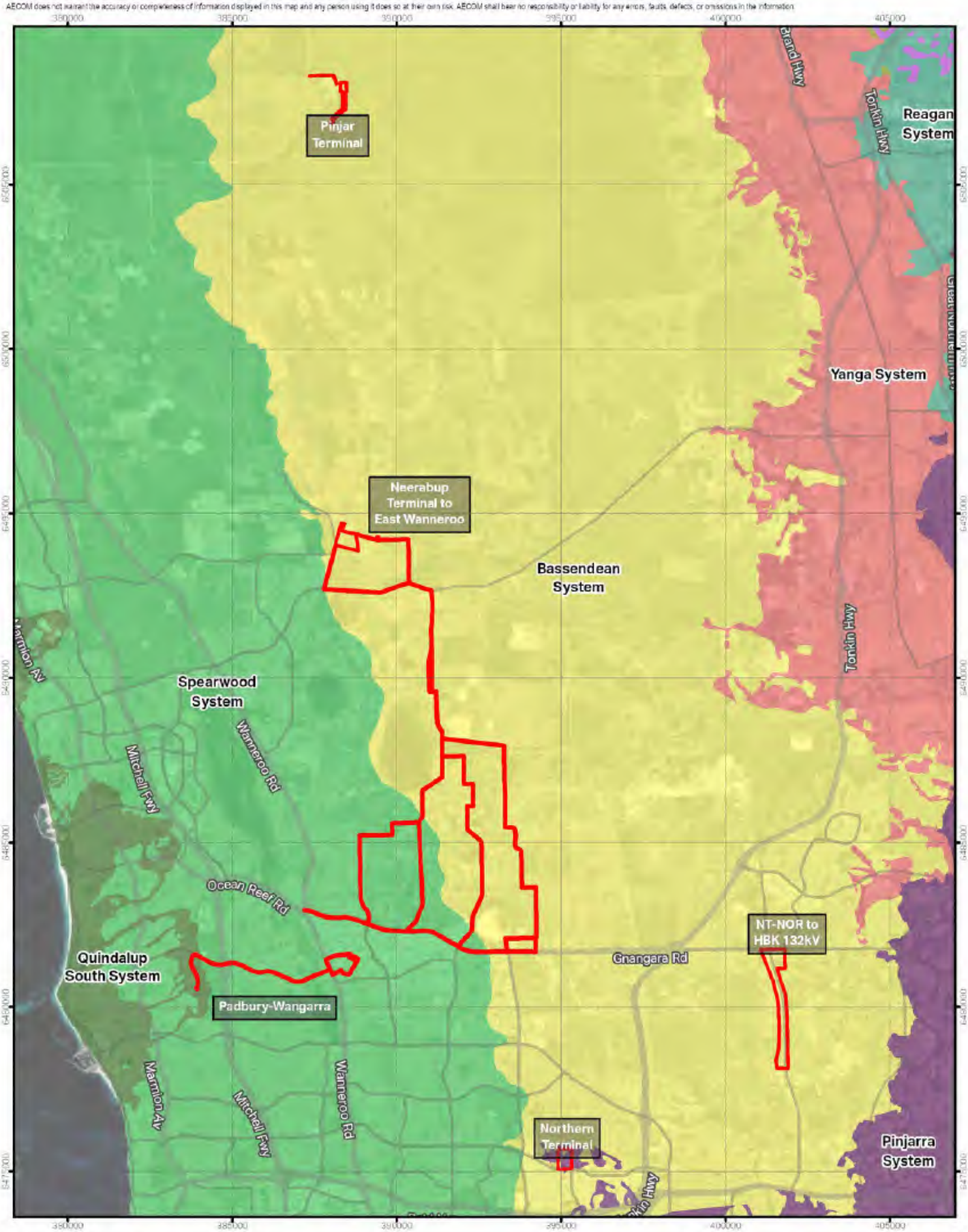

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LEGEND

- Survey Area
- Soil Landscape Mapping - Systems (DPIRD-064)
  - Bassendean System
  - Coonambidgee System
  - Mogumber System
  - Pinjarra System
  - Quindalup South System
  - Reagan System
  - Spearwood System
  - Yanga System

Land Systems

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CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure 3

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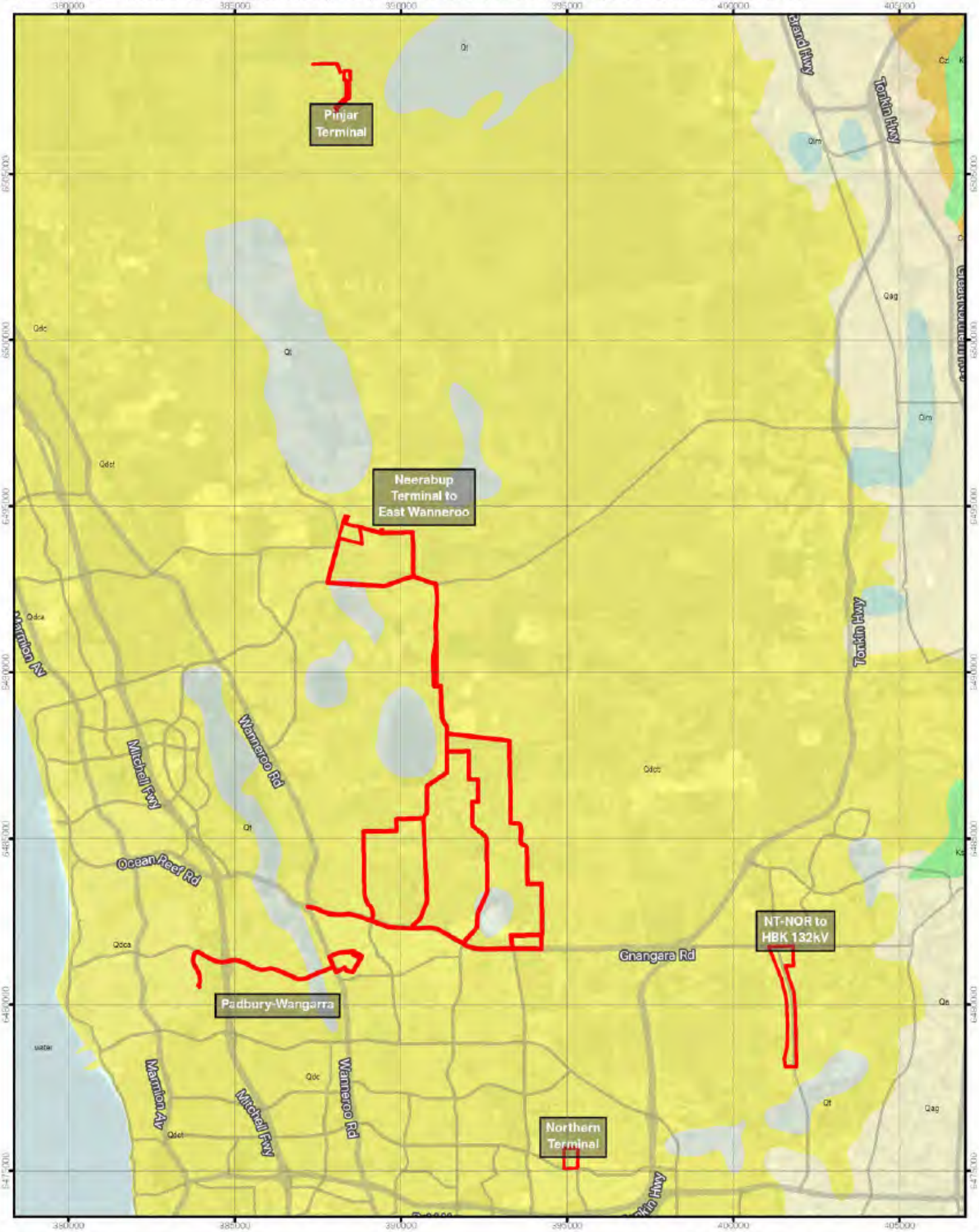

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LEGEND

- Survey Area
- Geoscience Australia (2012) Surface Geology of Australia, 1:1 000 000 scale, 2012 edition
- water

QUATERNARY
- Qa
- Qag
- Qdc
- Qdca
- Qdcb
- Qdct
- Qrm
- Qt

CENOZOIC
- Czl
- Czs

CRETACEOUS
- Ksco

Geology and Soils

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CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure 4

A4 size

2.5 Vegetation

Beard et al. (2013) mapping is used to determine the current extent of remnant vegetation remaining when compared to pre-European vegetation extent. The survey areas span eight Vegetation Associations within three Local Government Areas (LGAs), described below in Table 4 and depicted in Figure 5.

Table 4 Beard et al (2013) Vegetation Associations and Percentage Remaining (Govt. of WA, 2019).

Vegetation Association	Description	Percentage Remaining (%)				
		WA	SCP	City of Wanneroo	City of Joondalup	City of Swan
Padbury-Wangara						
6	Medium woodland; tuart & jarrah	23.72	23.72	21.94	14.24	
37	Shrublands; Teatree thicket	62.92	34.61	47.60	51.58	
998	Medium woodland; tuart	36.25	36.35	60.13	9.62	
1007	Mosaic: Shrublands*; Acacia lasiocarpa* & *Melaleuca acerosa* heath / Shrublands*; Acacia rostellifera* & *Acacia cyclops* thicket	68.05	68.68	59.94	8.03	
Pinjar Terminal						
949	Low woodland; banksia	56.42	57.28	46.30		
Neerabup Terminal and East Wanneroo						
949	Low woodland; banksia	56.42	57.28	46.30		
6	Medium woodland; tuart & jarrah	23.72	23.72	21.94		
1001	Medium very sparse woodland; jarrah, with low woodland; banksia & casuarina	22.05	22.05	22.71		
126	Bare areas; freshwater lakes	40.72	23.61	36.24		
NT-NOR to HBK 132kV						
1018	Mosaic: Medium forest; jarrah-marri / Low woodland; banksia / Low Forest; Teatree / Low woodland; *Casuarina obesa*	17.39	17.39			16.42
1001	Medium very sparse woodland; jarrah, with low woodland; banksia & casuarina	22.05	22.05			26.18
Northern Terminal						
1001	Medium very sparse woodland; jarrah, with low woodland; banksia & casuarina	22.05	22.05			26.18

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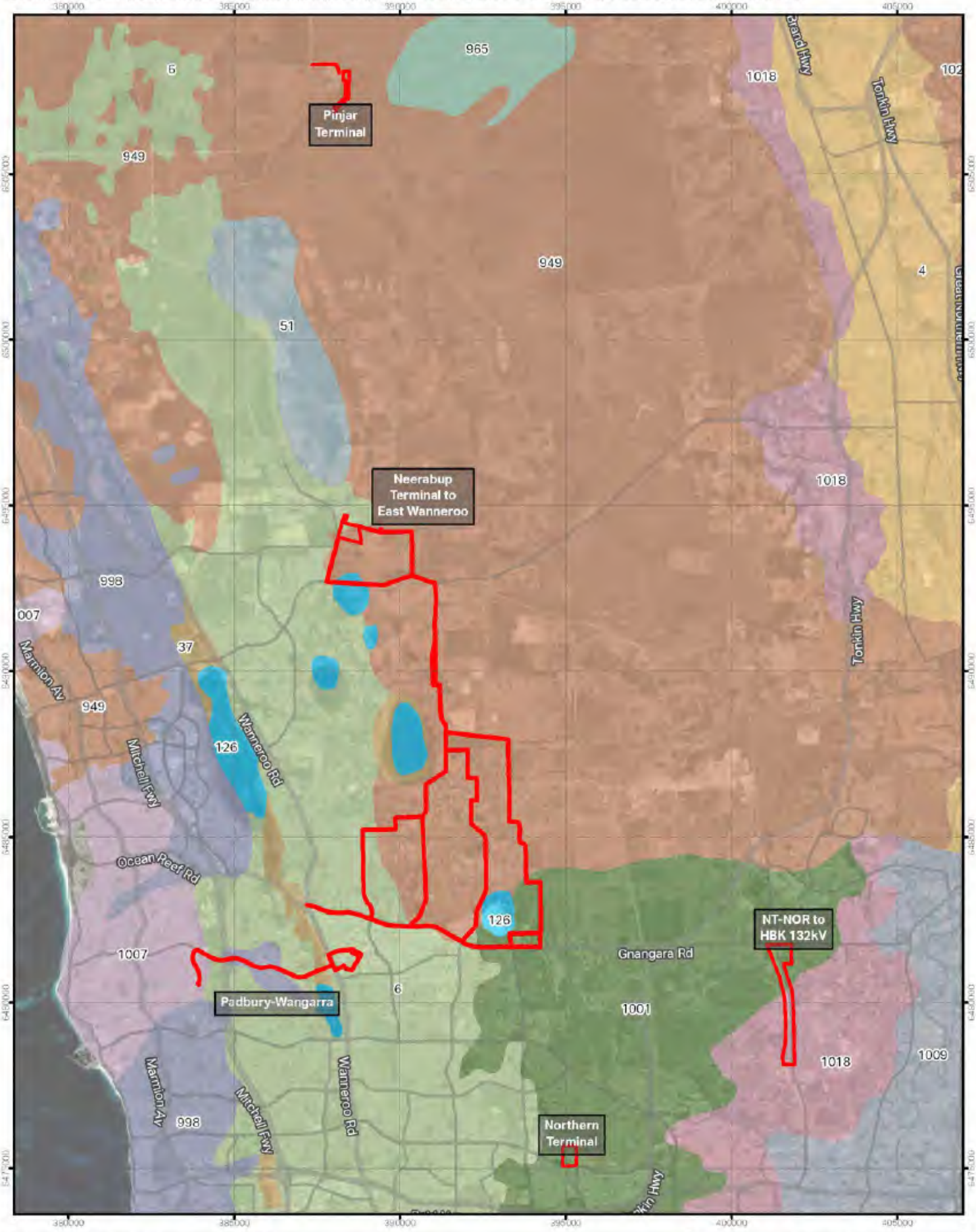

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LEGEND

- Survey Area
- *Only those intersecting Survey Areas shown in legend*
- 949,Low woodland or open low woodland,Other acacia, Banksia, peppermint, cypress pine, casuarina, York gum Acacia spp., Banksia spp., Agonis flexuosa, Callitris spp., Allocasuarina spp., Eucalyptus loxophleba.
- 6,Woodland southwest,Jarrah, marri and wandoo Eucalyptus marginata, Corymbia calophylla, E. wandoo.
- 37,Thicket,Wattle, casuarina and teatree acacia-allocasuarina-melaleuca alliance.
- 126,Freshwater lake,
- 998,Woodland southwest,Jarrah, marri and wandoo Eucalyptus marginata, Corymbia calophylla, E. wandoo.
- 1001,Low forest, woodland or low woodland with scattered trees,Jarrah, banksia or casuarina Eucalyptus marginata, Banksia spp., Allocasuarina spp.
- 1007,Scrub-heath / Thicket,
- 1018,Woodland / Low woodland / Low forest or Woodland.

Pre-European Vegetation

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CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure 5

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2.6 Conservation Reserves and Environmentally Sensitive Areas

2.6.1 Conservation Reserves

Approximately 104.15 ha of the survey areas occurs within the Class A Gnangara-Moore River State Forest, located on crown land. This State Forest is vested under the Conservation Commission of Western Australia. A further 0.64 ha of the survey areas intersects the gazetted Class A Jandabup Nature Reserve, for the purpose of conservation of flora and fauna, located on crown land. Approximately 0.34 ha of land is classified as Crown Freehold (department managed).

The conservation reserves and the percent of each survey area that they intersect is presented in Table 5 and depicted in Figure 6.

Table 5 Conservation Reserves intersecting the survey areas.

Survey Area	Conservation Reserve Intersected	Area (ha)	Percentage of Survey Area (%)
Neerabup Terminal and East Wanneroo	Gnangara-Moore River State Forest	99.30	48.44
	Jandabup Nature Reserve	0.64	0.31
Pinjar Terminal	Gnangara-Moore River State Forest	4.85	29.25
Padbury-Wangara	Un-named Crown Freehold land – Represents Bush Forever Site 303.	0.34	1.09

2.6.2 Bush Forever Sites

There are nine Bush Forever Sites that intersect the survey areas (Figure 6). They are listed below:

- Neerabup: Site 193, 463, 327, 326, 324.
- Pinjar: Site 280.
- NT-NOR: Site 304.
- PADBURY - WANGARA: Site 303, 299.

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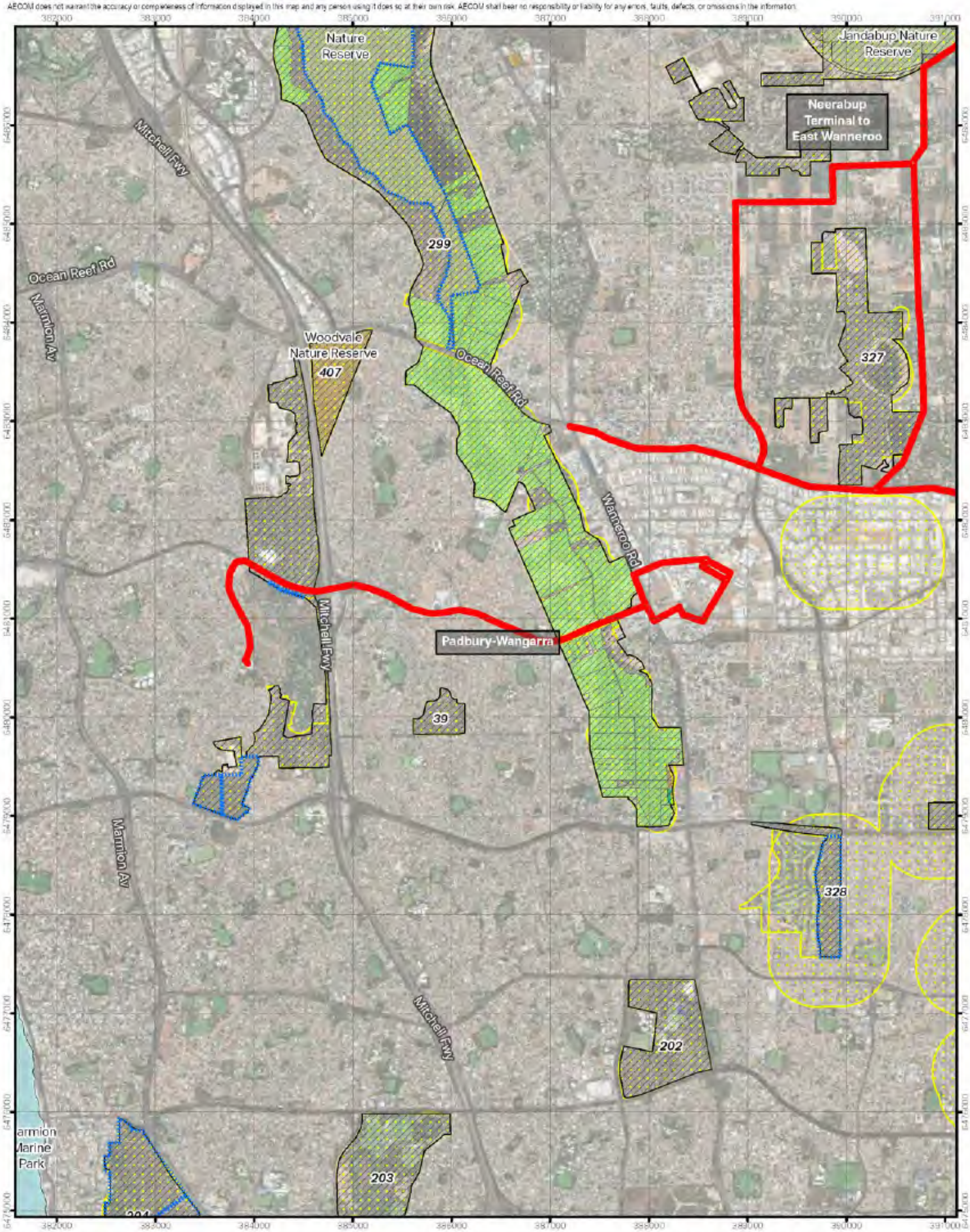

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LEGEND

- Survey Area
- DBCA - Legislated Lands and Waters (DBCA-011)
  - Nature Reserve
  - Conservation Park
  - Section 5(1)(h) Reserve
  - Marine Park
- Crown Freehold - Dept Managed
- Clearing Regulations - Environmentally Sensitive Areas (DWER-046)
- Bush Forever Areas - 2000 (DPLH-019)
- A Class Reserve

Conservation Reserves, Bush Forever Sites and ESAs

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure 6.1

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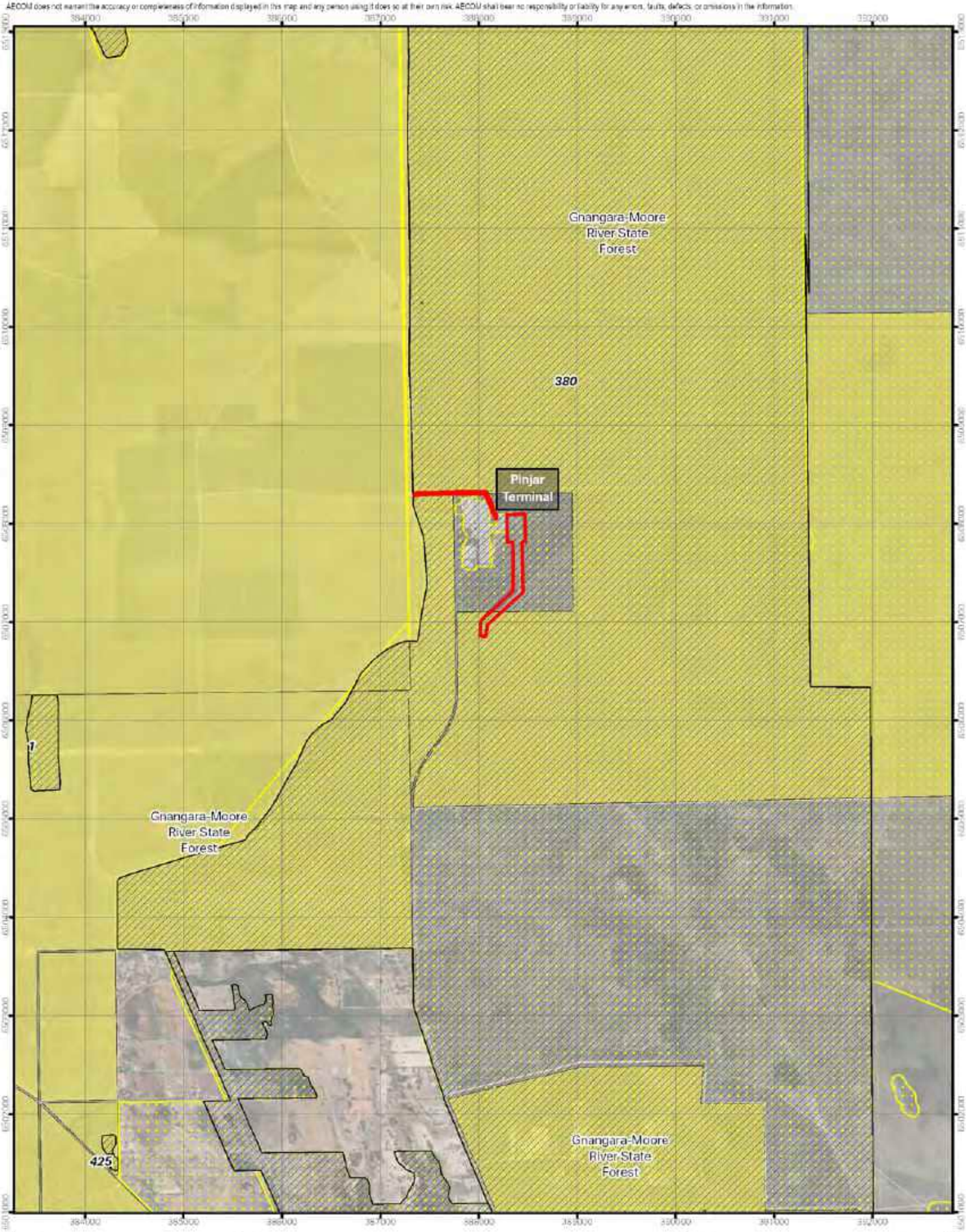

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LEGEND

- Survey Area
- DBCA - Legislated Lands and Waters (DBCA-011)
- State Forest
- Clearing Regulations - Environmentally Sensitive Areas (DWER-046)
- Bush Forever Areas - 2000 (DPLH-019)

Conservation Reserves, Bush Forever Sites and ESAs

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **6.2**

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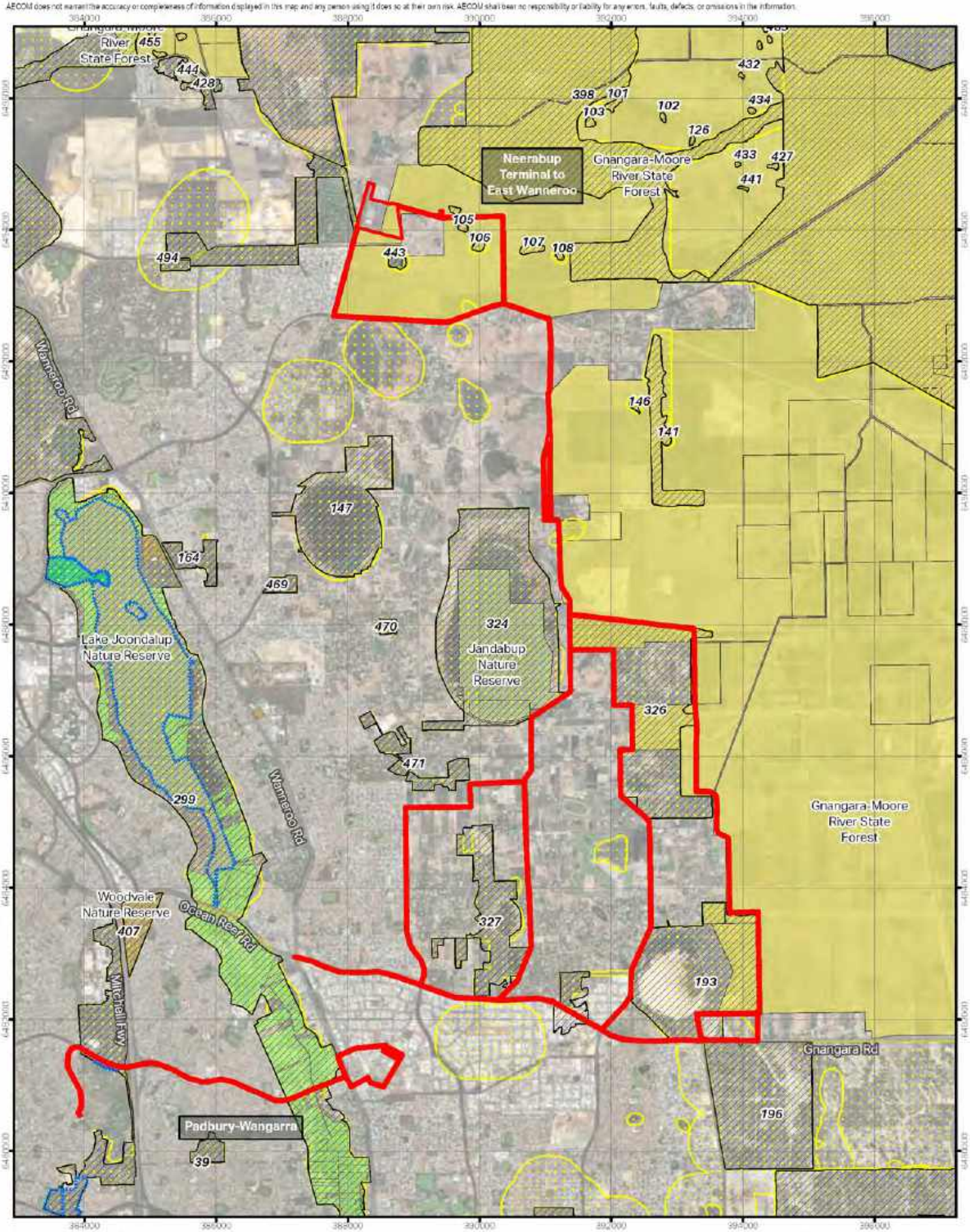

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LEGEND

- Survey Area
- DBCA - Legislated Lands and Waters (DBCA-011)
  - Nature Reserve
  - Conservation Park
  - Section 5(1)(h) Reserve
  - State Forest
- Crown Freehold - Dept Managed
- Clearing Regulations - Environmentally Sensitive Areas (DWER-046)
- Bush Forever Areas - 2000 (DPLH-019)
- A Class Reserve

Conservation Reserves, Bush Forever Sites and ESAs

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure 6.3

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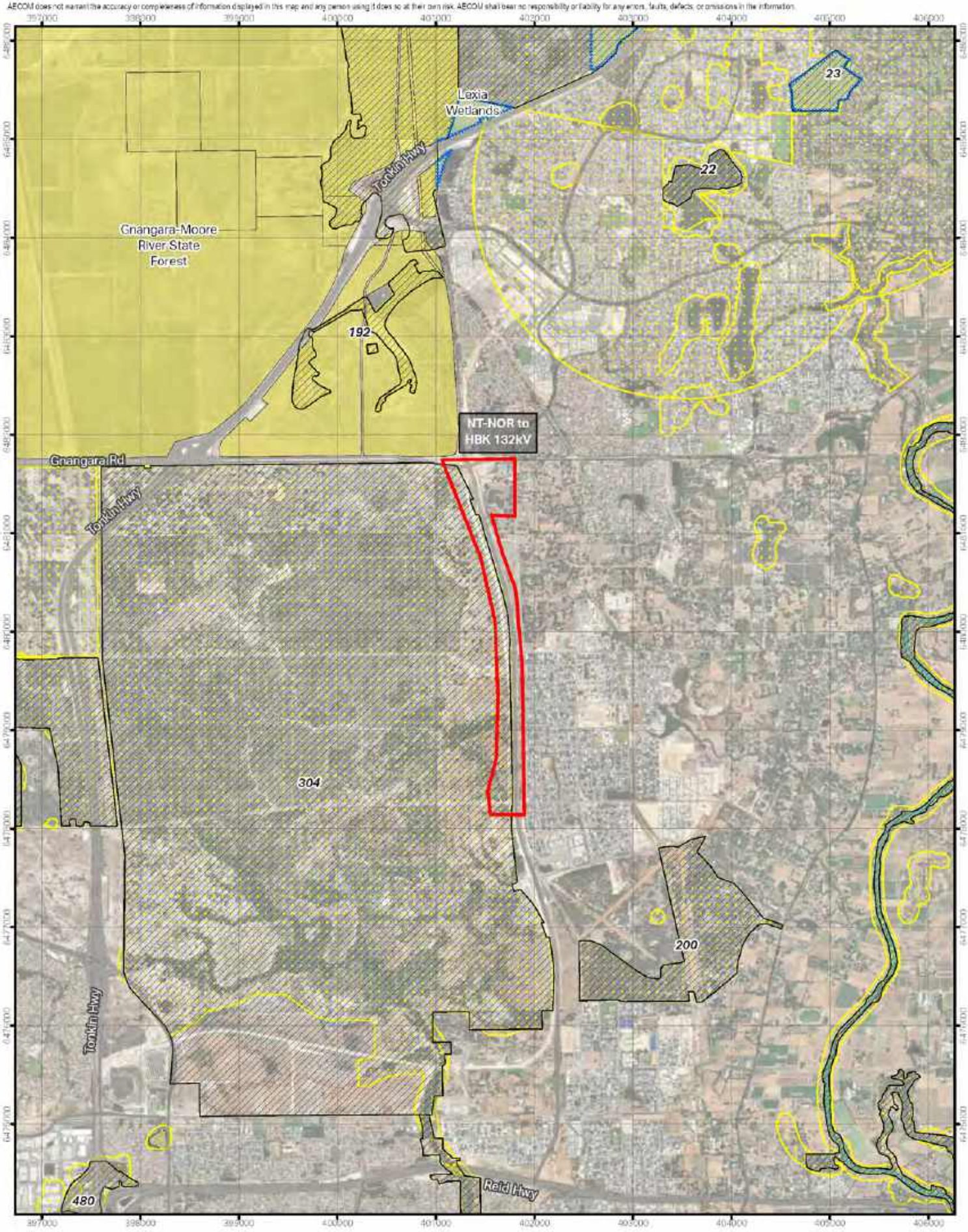

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LEGEND

- Survey Area
- DBCA - Legislated Lands and Waters (DBCA-011)
  - Nature Reserve
  - State Forest
  - SCRM Act - River Reserve
- Clearing Regulations - Environmentally Sensitive Areas (DWER-046)
- Bush Forever Areas - 2000 (DPLH-019)
- A Class Reserve

Conservation Reserves, Bush Forever Sites and ESAs

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure 6.4

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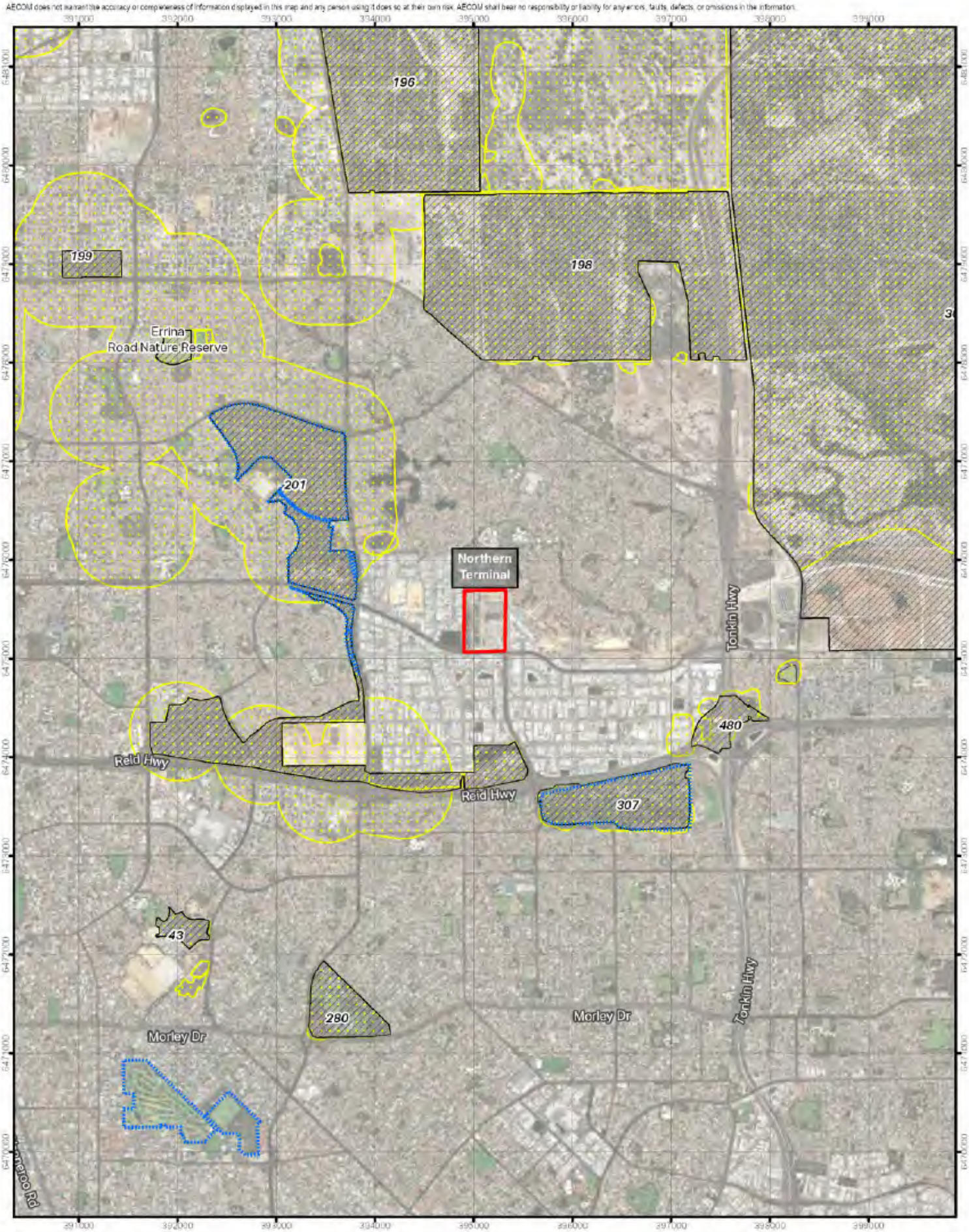

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LEGEND

- Survey Area
- DBCA - Legislated Lands and Waters (DBCA-011)
- Nature Reserve
- Clearing Regulations - Environmentally Sensitive Areas (DWER-046)
- Bush Forever Areas - 2000 (DPLH-019)
- A Class Reserve

Conservation Reserves, Bush Forever Sites and ESAs

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure 6.5

A4 size

3.0 Conservation Codes

3.1 Flora and Fauna

Species at risk of extinction are recognised at a Commonwealth level under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and are categorised as outlined in Table 6.

Table 6 Categories of species listed under Schedule 179 of the EPBC Act

Code	Category
Ex	**Extinct Taxa** A species which at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.
ExW	**Extinct in the Wild Taxa** A specie which is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or 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.
CE	**Critically Endangered Taxa** A specie which 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.
E	**Endangered Taxa** A specie which is not critically endangered, and it is facing a very high risk of extinction in the wild in the immediate or near future, as determined in accordance with the prescribed criteria.
V	**Vulnerable Taxa** A specie which is not critically endangered or endangered and is facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with the prescribed criteria.
CD	**Conservation Dependent Taxa** A specie which at a particular time if, at that time: 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 the following subparagraphs are satisfied: • the species is a species of fish, • the species is the focus of a plan of management that provides for 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 the plan of management is in force under a law of the Commonwealth or of a State or Territory cessation of the plan of management would adversely affect the conservation status of the species.
Mi	**Migratory Taxa** The EPBC Act also requires the compilation of a list of migratory species that are recognised under international treaties including the: • Japan Australia Migratory Bird Agreement 1981 (JAMBA) • China Australia Migratory Bird Agreement 1998 (CAMBA) • Republic of Korea-Australia Migratory Bird Agreement 2007 (ROKAMBA) • Bonn Convention 1979 (The Convention on the Conservation of Migratory Species of Wild Animals). All migratory bird species listed in the annexes to these bilateral agreements are protected in Australia as a MNES under the EPBC Act.
Ma	**Marine Taxa** A specie established under s248 of the EPBC Act.

Flora and fauna species that are considered Threatened and need to be specially protected because they are under identifiable threat of extinction are listed under the *Biodiversity Conservation Act 2016* (BC Act). These categories are defined in Table 7.

Table 7 Conservation codes for WA flora and fauna listed under the BC Act (DBCA, 2019)

Code	Category
CR	**Critically Endangered Taxa** 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 under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines.
EN	**Endangered Taxa** 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 20 and the ministerial guidelines.
VU	**Vulnerable Taxa** Threatened species considered to be facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines. Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines.
EX	**Extinct Taxa** Species which have been adequately searched for and there is no reasonable doubt that the last individual has died, and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act).
MI	**Migratory Taxa** 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.
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).
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).

Species that have not yet been adequately surveyed to warrant being listed under the BC Act, or are otherwise data deficient, are added to a Priority List as Priority 1, 2 or 3 by the state minister for Environment. 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 listed as Priority 4. Categories and definitions of Priority Flora and Fauna species are provided in Table 8.

Table 8 Conservation codes for WA flora and fauna as listed By DBCA and endorsed by the Minister for the Environment

Code	Category
P1	**Priority One – 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.
P2	**Priority Two – 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.
P3	**Priority Three – 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.
P4	**Priority Four – Rare, Near Threatened and other species in need of monitoring** 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. 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. Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

3.2 Vegetation Communities

Threatened Ecological Communities (TECs) are naturally occurring biological assemblages that occur in a particular type of habitat and that may be subject to processes that threaten to destroy or significantly modify the assemblage across its range. TECs are listed by both State and Commonwealth legislation.

Communities can be classified as Threatened Ecological Communities (TECs) under the EPBC Act. Categories of EPBC Act listed TECs are described in Table 9.

Table 9 Categories of TECs that are listed under the EPBC Act

Code	Category
CE	**Critically Endangered** If, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future.
E	**Endangered** If, at that time, it is not critically endangered and is facing a very high risk of extinction in the wild in the near future.
V	**Vulnerable** If, at that time, it is not critically endangered or endangered, and is facing a high risk of extinction in the wild in the medium-term future.

Vegetation communities in Western Australia are described as TECs if they have been endorsed by the Western Australian Minister for Environment following recommendations made by the Threatened Species Scientific Committee. TECs are listed under the BC Act in one of four categories defined in Table 10.

The Department of Biodiversity, Conservation and Attractions (DBCA) maintains a database of state listed TECs which is available for online searches via their website. Possible TECs that do not meet survey criteria or are not adequately defined are listed as Priority Ecological Communities (PECs) under Priorities 1, 2 and 3. Ecological communities that are adequately known and are rare but not threatened, or meet criteria for Near Threatened, or that have been recently removed from the threatened list, are placed in Priority 4. Conservation dependent communities are classified as Priority 5. PECs are endorsed by the Minister for Environment and are described in Table 11.

DBCA requires that all Priority and Threatened ecological communities are considered during environmental impact assessments and clearing permit applications.

Table 10 Conservation codes for State listed Ecological Communities

Code	Category
PD	*Presumed Totally Destroyed*
CR	*Critically Endangered*
EN	*Endangered*
VU	*Vulnerable*

Table 11 Categories for Priority Ecological Communities

Code	Category
P1	**Priority One**: poorly known ecological communities
P2	**Priority Two**: poorly known ecological communities
P3	**Priority Three**: poorly known ecological communities
P4	**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.

3.3 Biosecurity and Agriculture Management Act 2007 (BAM Act)

Biosecurity is the management of the risk of animal and plant pests and diseases entering, emerging, establishing or spreading in WA to protect the economy, environment, and community. Biosecurity is managed under the BAM Act which came into effect 1 May 2013. Exotic animals and plants can become an invasive species if they can establish in new areas where local conditions are favourable for their growth. Each organism listed under the BAM Act comes with certain legal / import requirements:

- Declared Pest (DP), Prohibited - s12. Prohibited organisms are declared pests by virtue of section 22(1) and may only be imported and kept subject to permits.
- Permitted - s11. Permitted organisms may be subject to an import permit if they are potential carriers of high-risk organisms.
- Declared Pest - s22(2). Declared pests may be subject to an import permit if they are potential carriers of high-risk organisms and may also be subject to control and keeping requirements once within Western Australia.
- Permitted, Requires Permit - r73. Regulation 73 permitted organisms may only be imported subject to an import permit.

- Declared pests can be assigned to a C1, C2 or C3 control category under the Biosecurity and Agriculture Management Regulations 2013:
  - C1 Exclusion - Organisms which should be excluded from part or all of Western Australia
  - C2 Eradication - Organisms which should be eradicated from part or all of Western Australia
  - C3 Management - Organisms that should have some form of management applied that will alleviate the harmful impact of the organism, reduce the numbers or distribution of the organism, or prevent or contain the spread of the organism.
- Unassigned - Declared pests that are recognised as having a harmful impact under certain circumstances, where their subsequent control requirements are determined by a Plan or other legislative arrangements under the BAM Act.

4.0 Methodology

4.1 Desktop Assessment

A comprehensive desktop assessment was undertaken prior to the field survey to identify significant environmental values likely to be present in the survey area including flora, fauna and vegetation communities. Desktop database searches were requested from the following government databases (including a 10 km radius):

- DBCA Threatened Species and Communities database including Threatened and Priority flora, communities, and Threatened and Priority fauna.
- Western Australian Herbarium (WAH, 1998) records
- EPBC Act Protected Matters Search Tool (PMST)
- BirdLife Australia Black Cockatoo data.

Additional sources utilised included the following reports:

- AECOM, 2016. Ellenbrook Bus Rapid Transit Biological Assessment. Unpublished report prepared for Public Transport Authority of Western Australia.
- AECOM, 2022a. Scar 4 – Flora, Vegetation and Black Cockatoo Assessment. Unpublished report prepared for Western Power.
- AECOM, 2022b. North Region Energy Program - Flora, Vegetation and Fauna Assessment. Unpublished report prepared for Western Power.
- RPS, 2020. Detailed flora and vegetation assessment – METRONET Morley-Ellenbrook Line. Unpublished report prepared for Public Transport Authority of Western Australia.

Significant flora and fauna species likelihood of occurrence was assessed systematically using a point-based system which takes into account proximity (defined as less than 5 km) and date of known records (defined as less than 20 years old), presence within the Local Government Area (LGA) and habitat suitability (Table 12 and Table 13).

Due to the overlapping nature of some survey areas, a centre point was taken to calculate the distance from the Neerabup Terminal and NBT Group and the nearest DBCA records.

The likelihood of significant ecological communities occurring depends on the presence of suitable landforms, land systems, known occurrences and distance of known occurrences.

Table 12 Categories of likelihood of occurrence for flora species

Likelihood of Occurrence	Score	Definition
Known	6	Species is known to occur in the survey area.
High (Likely)	5	Not known to occur in the survey area however there are records nearby and suitable habitat for the species is known or likely to be present within the survey area.
Moderate (Possible)	4 (if suitable habitat is known to be, or likely to be present) 3 (if suitable habitat may be present within the survey area)	Species is not known to occur within the survey area however there are nearby records AND/OR recent records OR records within the LGA AND suitable habitat for the species is known or likely to be present within the survey area. OR Not known to occur within the survey area but there are records nearby AND recent records AND records within the LGA, and suitable habitat for the species may be present (marginal habitat).

Likelihood of Occurrence	Score	Definition
Low (Unlikely)	2,3	Species is not known to occur within the survey area but there are records nearby OR recent records OR within the LGA AND suitable habitat for the species may be present (marginal habitat).
Negligible (Suitable Habitat not Present)	1,2,3	Despite records nearby OR being present within the LGA OR recent records, no suitable habitat is present within the survey area and therefore the likelihood of the species occurring is negligible.

Table 13 Categories of likelihood of occurrence for fauna species

Likelihood of Occurrence	Score	Definition
Known	5	Species is known to occur in the survey area
High (Likely)	3,4	Not known to occur in the survey area but there are records within close proximity of the survey area and suitable habitat for the species is known to be, or likely to be, present within the survey area OR not known to occur within the survey area but there are recent records in close proximity of the survey area and suitable habitat for the species is known to be, or likely to be present within the survey area OR not known to occur within the survey area but there are recent records and suitable habitat for the species may be present.
Moderate (Possible)	2,3	Not known to occur within the survey area but there are recent records in close proximity/within the LGA and suitable habitat for the species may be present (marginal habitat) OR suitable habitat present.
Low (Unlikely)	1,2	Records present within the LGA, and marginal suitable habitat is present within the survey area, therefore the likelihood of the species occurring there is low OR marginal habitat present OR recent record within LGA
Negligible (Suitable Habitat not Present)	0,1	No nearby records or suitable habitat OR recent record with no suitable habitat within the survey area OR records nearby with no suitable habitat within the survey area

4.2 Flora and Vegetation Survey

A detailed flora and vegetation assessment was undertaken utilising methods outlined in the *Flora Survey Technical Guide* (EPA, 2016). The field surveys were undertaken by Cassandra House (collection permit FB62000118-2) assisted by Environmental Scientist Nina Sergeev (collection permit FB62000544) and Graduate Environmental Scientists Deborah Robinson and Beau Eaton. Cassandra has over 8 years' experience undertaking flora and vegetation assessments. Cassandra completed a Bachelor of Science in Conservation Biology and Environmental Science and a Master of Science in Conservation Biology.

The survey was undertaken across multiple days in October (16/10-20/10) and November (6/11-17/11) in 2023. Floristic data was collected from 16 quadrats, 21 Relevés, and multiple observation points as well as mapping notes. Data collected included the presence of plant species, their cover abundance, structural composition of vegetation, physical environment, and presence/absence of disturbance.

Each site was given a unique site number, and the following parameters recorded:

- date
- location using hand-held GPS (accuracy of 5 m)
- sample site type and size
- photograph (north-west corner)
- soil details (type, colour, moisture)

- landform
- vegetation condition
- fire history
- species list including:
  - estimated height
  - estimated percentage cover (for trees both percentage within relevé and within community was recorded to enable better description of vegetation community).

Any species unable to be identified in the field were collected for identification in AECOM's in-house herbarium and the specimens and taxonomic references and keys at the Western Australian Herbarium (WAH). Naming of species followed the convention of the WAH (1998).

4.2.1 Vegetation Mapping

Vegetation communities were described and mapped based on changes in dominant species composition and landform. Vegetation community descriptions were based on the Association Level V in accordance with the National Vegetation Information System (NVIS) Framework (DotEE, 2017a). Delineation of vegetation communities was supported by analysing floristic data collected within quadrats.

Vegetation condition was determined using the Keighery (1994) vegetation condition scale as recommended in the *Flora Survey Technical Guide* (EPA, 2016).

The Keighery (2012) SCP dataset was used for the Floristic Community Type (FCT) analysis. The survey data was reconciled with this dataset and analysis was undertaken using Primer-e.

The Bray Curtis dissimilarity measure was used to quantify the compositional similarity between the quadrats based on presence absence data. This method is easily interpretable and provides meaningful results. A sense check was completed incorporating appropriate geology, soils, landscape and the description provided in the Gibson *et al*. (1994) reference material and Bush Forever (Government of WA, 2000).

FCT analysis was undertaken using methods recommended by DBCA. That is, one quadrat was incorporated into the dataset at a time, and a resemblance matrix was produced. For a dataset of this size, finding the SCP quadrats it most closely resembles seems a reasonable method of inferring FCTs. Some issues that are constantly encountered with inferring FCTs include:

- Survey effort is not comparable between a single visit for Projects and multi-seasonal and ongoing survey effort.
- Nomenclature of the 2012 Keighery and 1994 Gibson dataset have been superseded. It is often times not possible to accurately align species with their former phrase names. Some have split into multiple species; others have been grouped together. This includes complexes such as *Thysanotus patersonii/manglesianus, Hibbertia hypericoides, Hemiandra incana,* to name a few.
- The validity of original clustering and grouping method is dubious. Often a quadrat will resemble a variety of FCTs within a supergroup.
- FCTs are mapped at a larger scale compared to project datasets.
- New FCTs are not considered, one is therefore forced to select the nearest neighbour / closest resemblance which may or may not be accurate.

Furthermore, in some instances it is not accurate to extrapolate the inferred FCT from the point data across an entire community. This again represents a scale issue.

4.2.2 Banksia Woodlands TEC Mapping

The survey area lies within the known range of the Banksia Woodlands of the Swan Coastal Plain Threatened Ecological Community (Banksia Woodlands TEC). Patches that included a dominant or co-dominant overstorey of *B. attenuata, B. menziesii B. prionotes* or *B. ilicifolia* were considered for further assessment. Patches that were clearly not associated with Banksia Woodlands, e.g. had no Banksia overstorey species, were excluded.

For each patch the key diagnostic characteristics, condition, size and relevant contextual information was considered as published in the Conservation Advice (DEE, 2016). The condition of the patch was informed by species richness of quadrat data compared to available datasets, most notably the Keighery et al. (2012) Swan Coastal Plain (SCP) dataset and weed cover. The condition of the patch and size thresholds are then used to determine whether the quality of the patch is suitable to meet the federally protected ecological community standards.

4.2.3 Tuart Woodlands TEC Mapping

The Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain TEC was assessed using the Approved Conservation Advice (DEE, 2019). All mature Tuart trees with a Diameter at Breast Height (DBH) of 15 cm or more were captured with a hand-held GPS unit. A 5 m canopy buffer was applied, followed by the 30 m buffer that depicts the edge of a discreet patch. Each patch was represented by at least one relevé or quadrat to inform the condition assessment.

Each patch was assessed against the key diagnostic characteristics:

- Occurs on the Swan Coastal Plain Bioregion, Western Australia.
- Primarily occurs on the Spearwood and Quindalup dune systems but can on Bassendean dunes and Pinjarra Plain. Can occur on banks of rivers and wetlands.
- Presence of at least two living established *E. gomphocephala* trees in uppermost canopy layer, although they may co-occur with trees of other species. There is a gap of no more than 60 m between the outer edges of the canopies of adjacent Tuart trees (single-stemmed or mallee growth form).
- Occurs as woodland or forest, open forest, woodland, open woodland and various mallee forms.
- Other canopy or sub-canopy species may be present including *Agonis flexuosa, Banksia grandis, Banksia attenuata, Eucalyptus marginata, Corymbia calophylla, Banksia menziesii* and *Banksia prionotes*.

The condition and size thresholds pertain to patches smaller than 5 ha, outlined in Table 14.

Table 14 Condition categories and thresholds for the Tuart Woodland TEC

Patch Size	≥2 ha <5 ha	≥0.5 ha <2 ha
Biotic Thresholds		
Very high condition ≥80 % of all understorey^ vegetation cover is native# Or At least 12 native understorey^ species per 0.01 ha (10x10 m)	Medium sized patches with very high condition understorey. Considered TEC	Smaller patches with very high condition understorey. Considered TEC
High condition ≥60 % of all understorey^ vegetation cover is native# Or At least 8 native understorey^ species per 0.01 ha (10x10 m)	Medium sized patches with high condition understorey. Considered TEC	Smaller patches with high condition understorey. AND That either: have an important landscape role (≤100 m to native vegetation)* OR have a habitat role (≥2 very large trees per 0.5 ha)* OR show regeneration (≥15 seedlings and/or saplings per 0.5 ha)* Considered TEC
Moderate condition ≥50 % of all understorey^ vegetation cover is native# Or	Smaller patches with high condition understorey.	Not the TEC but may be a focus for local protection or restoration

Patch Size	≥2 ha <5 ha	≥0.5 ha <2 ha
Biotic Thresholds		
At least 4 native understorey^ species per 0.01 ha (10x10 m)	AND That either: have an important landscape role (≤100 m to native vegetation)* OR have a habitat role (≥2 very large trees per 0.5 ha)* OR show regeneration (≥15 seedlings and/or saplings per 0.5 ha)* Considered TEC	
Poor Has minimal or no native cover and species richness. That is: <50 % of all understorey^ vegetation cover is native# And Less than 4 native understorey^ species per 0.01 ha (10x10 m)	Not the TEC but may be a focus for local protection or restoration	Not the TEC but may be a focus for local protection or restoration

4.2.4 Targeted Flora Searches

Targeted searches were undertaken for conservation significant flora species that were known or likely to occur. A detailed field guide was produced which included photographs and describing morphological features that would assist in identifying the species in the survey area.

Where a potential Priority species was encountered, the following was recorded:

- location (using a hand-held GPS accuracy 5m)
- the number of individuals in the immediate population, or an estimate of the size (number) of the population with an estimated radius of its spatial extent plant height
- vegetation condition
- associated dominant species
- soil type and colour
- topography
- additional information relevant to the area including key characteristics and landforms.

4.3 Fauna Survey

A basic fauna survey was conducted in accordance with *Technical Guidance – Terrestrial Fauna Surveys* (EPA, 2020). The fauna survey was conducted in conjunction with the detailed flora and vegetation survey in October and November 2023. Conducting the two surveys concurrently enabled consistent and clear mapping of the fauna habitats and vegetation communities.

Fauna habitats were assessed for specific habitat components, including consideration of structural diversity and refuge opportunities for fauna, to determine the potential for these habitats to support conservation significant species. Eighteen detailed habitat assessments were completed throughout the survey area. The fauna habitat assessments include:

- location
- general habitat description
- habitat condition and disturbance types
- dominant / characteristic flora species and vegetation layers

- presence and abundance of key habitat features such as large mature trees, small and large hollows, fallen logs, course and fine litter, decorticating bark, bare ground, grass, stones and boulders, rock crevices, soil cracks, vines, dense shrubs, water bodies etc.
- presence of fauna and secondary signs (e.g. scats, diggings, tracks, burrows, eggshells, bones, feathers, etc.)
- connectivity of habitat.

The fauna survey primarily focused on mapping of fauna habitat and searching for the evidence of presence of conservation significant fauna. Other data recorded included observations (direct and indirect) of fauna species present. This can include distinctive calls, scats, tracks and diggings. All observations were made between daylight hours of 0700 and 1700. Attention was given to searching for conservation significant species identified in the desktop assessment as having the potential to occur in the area. Nomenclature adheres to the Checklist of Terrestrial Vertebrates of Western Australia (WAM, 2023).

4.4 Targeted Black Cockatoo Survey

The survey targeted all three Threatened Western Australian black cockatoo species which are Carnaby's Cockatoo, Baudin's Cockatoo, and the Forest-Red-tailed Black Cockatoo. Breeding, foraging and roosting assessments were completed in the survey areas. Methodologies for these assessments have been developed based on the current EPBC Act Referral Guidelines for Three Threatened Black Cockatoo Species (DAWE, 2022).

4.4.1 Breeding Habitat

Breeding habitat was assessed by quantifying the number of trees that have the potential to form hollows (based on their diameter at breast height [DBH]), and those with potentially suitable hollows). Any hollow forming native eucalypts with a DBH > 500 mm was assessed, their location, species, and hollow presence were recorded.

Potential breeding trees are categorised as follows:

- Known nesting trees: Trees (live or dead but still standing) which contains a hollow where black cockatoo breeding has been recorded or which demonstrates evidence of breeding (i.e. showing evidence of use through scratches, chew marks or feathers).
- Suitable nesting trees: Trees with suitable nesting hollows present, although no evidence of use. Note that any species of tree may develop suitable hollows for breeding.
- Suitable nest hollow: Any hollow with dimensions suitable for use for nesting by black cockatoos. Characteristics of hollows used by each species is available in the SPRAT database. Suitable nest hollows are only found in live trees with a DBH of at least 500 mm. Usually this will be a natural hollow, but artificial hollows may also be suitable in some circumstances (for example, where the artificial hollow has been specifically designed for use by black cockatoos).
- Potential nesting trees: Trees that have a suitable DBH to develop a nest hollow, but do not currently have hollows. Trees suitable to develop a nest hollow in the future are 300-500 mm DBH. Note: that many species of eucalypt may develop suitable hollows for breeding.

Hollows are considered potentially suitable when the entrance hole is above a size of 10 cm in diameter and the hollow appears to continue inwards to reach a hollow with a base size greater than 30 cm. Tree hollow presence and suitability is assessed from ground level with the use of binoculars. Suitability and utilisation by black cockatoos cannot always be assessed adequately at ground level, and hence the Precautionary Principle is used where appropriate.

4.4.2 Roosting Habitat

An assessment of roosting habitat was conducted during the field surveys. This includes consideration of preferred roosting habitat and features such as water sources, tall trees, specific tree species as defined in the Referral Guidelines.

4.4.3 Foraging Habitat Potential

Two foraging habitat scoring methods were applied including the DAWE (2022) scoring tool and the more detailed BCE (2020) scoring tool. Both tools consider native vegetation, proximity of known breeding, roosting and foraging habitat, and field observations such as foraging evidence.

The DAWE (2022) Referral Guideline scoring tool defines one foraging score for an entire survey area. All areas of vegetation that support suitable foraging species (defined in Table 15), are automatically assigned a score of 10. Following this, several detractors are considered to inform the final score. Survey areas that do not support any of these, are considered to have no foraging value. Plant disease was assessed during the vegetation and flora assessment. All notable signs of disease were recorded, and the impact of the disease was assessed. If the disease impacts over 50% of the preferred food or plant species, deductions were taken from the foraging score.

Table 15 Black Cockatoo foraging quality tool from the Federal guidelines (DAWE, 2022)

Starting score		Baudin's Cockatoo (*Zanda baudinii*)		Carnaby's Cockatoo (*Zanda latirostris*)		Forest Red-Tailed Black Cockatoo *(Calyptorhynchus banksii naso)*	
		Start at a score of 10 if your site is native eucalypt woodlands and forest, and proteaceous woodland and heath, particularly Marri, within the range of the species, including along roadsides and parkland cleared areas. Can include planted vegetation**. This tool only applies to sites equal to or larger than 1 hectare in size.**		**Start at a score of 10** if your site is native shrubland, kwongan heathland or woodland, dominated by proteaceous plant species such as *Banksia* spp. (including *Dryandra* spp.), *Hakea* spp. and *Grevillea* spp., as well as native eucalypt woodland and forest that contains foraging species, within the range of the species, including along roadsides and parkland cleared areas. Also includes planted native vegetation. **This tool only applies to sites equal to or larger than 1 hectare in size.**		**Start at a score of 10** if your site is Jarrah or Marri woodland and/or forest, or if it is on the edge of Karri Forest, or if Wandoo and Blackbutt occur on the site, within the range of the subspecies, including along roadsides and parkland cleared areas. **This tool only applies to sites equal to or larger than 1 hectare in size.**	
Attribute	Sub-tractions	Context adjustor (attributes reducing functionality of foraging habitat).					
Foraging potential	**-2**	**Subtract 2** from your score if there is no evidence of feeding debris on your site.	☒	**Subtract 2** from your score if there is no evidence of feeding debris on your site.	☐	**Subtract 2** from your score if there is no evidence of feeding debris on your site.	☐
Connectivity	**-2**	**Subtract 2** from your score if you have evidence to conclude that there is no other foraging habitat within 12 km of your site.	☐	**Subtract 2** from your score if you have evidence to conclude that there is no other foraging habitat within 12 km of your site.	☐	**Subtract 2** from your score if you have evidence to conclude that there is no other foraging habitat within 12 km of your site.	☐
Proximity to breeding	**-2**	**Subtract 2** if you have evidence to conclude that your site is more than 12 km from breeding habitat.	☐	**Subtract 2** if you have evidence to conclude that your site is more than 12 km from breeding habitat.	☐	**Subtract 2** if you have evidence to conclude that your site is more than 12 km from breeding habitat.	☐

Starting score		Baudin's Cockatoo (*Zanda baudinii*)		Carnaby's Cockatoo (*Zanda latirostris*)		Forest Red-Tailed Black Cockatoo *(Calyptorhynchus banksii naso)*	
Proximity to roosting	**-1**	**Subtract 1** if you have evidence to conclude that your site is more than 20 km from a known night roosting habitat.	☐	**Subtract 1** if you have evidence to conclude that your site is more than 20 km from a known night roosting habitat.	☐	**Subtract 1** if you have evidence to conclude that your site is more than 20 km from a known night roosting habitat.	☐
Impact from significant plant disease	**-1**	**Subtract 1** if your site has disease present (e.g. *Phytophthora* spp. or Marri canker) and the disease is affecting more than 50% of the preferred food plants present.	☐	**Subtract 1** if your site has disease present (e.g. *Phytophthora* spp. or Marri canker) and the disease is affecting more than 50% of the preferred food plants present.	☐	**Subtract 1** if your site has disease present (e.g. *Phytophthora* spp. or Marri canker) and the disease is affecting more than 50%of the preferred food plants present.	☐
		8		**10**		**10**	

The Bamford Consulting Ecologists (BCE, 2020) scoring tool considered the prevalence of suitable favoured foraging species, referred to as site condition, and site context and species stocking rate. This enables the differentiation between areas of vegetation that represent high quality foraging habitat based on potential actual use now and in the future.

Site condition is outlined in Table 17 and is the starting point. Any areas that score higher than '2' will then be further assessed for site context and species stocking rate. Site context is a function of site size, availability of nearby habitat and the availability of nearby breeding areas (Table 16). For this assessment, 'local area' is defined as within a 15 km radius of survey area. This is greater than the maximum distance of 12 km known to be flown by Carnaby's Black-Cockatoo when feeding chicks in the nest. For linear corridors this may over-value some areas.

Table 16 Site context weighting

Site Context Score	Percentage of the existing native vegetation within the 'local' area that the study site represents	
	'Local' breeding known/likely	'Local' breeding unlikely
3	>5%	>10%
2	1-5%	5-10%
1	0.1-1%	1-5%
0	<0.1%	<1%

Next, a species stocking rate score is applied. Species stocking rate is described as "the usage and/or density of a species at a particular site" in the offsets guide. Assignation of the species density score (0 or 1) is based on the Black-Cockatoo species being either abundant (score of 1) or not abundant (score of 0).

BCE tool scoring is transposed into one of the following categories:

- 0: None.
- 1: Negligible.
- 2: Low.
- 3: Low to Moderate.
- 4-6: Moderate.
- 7: Moderate to High.
- 8-10: High

Table 17 Site condition described by BCE.

Site Score	Description of Vegetation Values		
	Carnaby's Black Cockatoo	Baudin's Black Cockatoo	Forest Red-tailed Black Cockatoo
0	No foraging value. No Proteaceae, eucalypts or other potential sources of food. Examples: • Water bodies (e.g. salt lakes, dams, rivers); • Bare ground; • Developed sites devoid of vegetation (e.g. infrastructure, roads, gravel pits) or with vegetation of no food value, such as some suburban landscapes. • Mown grass	No foraging value. No eucalypts or other potential sources of food. Examples: • Water bodies (e.g. dams, rivers); • Bare ground; • Developed sites devoid of vegetation (e.g. infrastructure, roads, gravel pits).	No foraging value. No eucalypts or other potential sources of food. Examples: • Water bodies (e.g. dams, rivers); • Bare ground; • Developed sites devoid of vegetation (e.g. infrastructure, roads, gravel pits)
1	Negligible to low foraging value. Examples: • Scattered specimens of known food plants but projected foliage cover of these is < 2%. This could include urban areas with scattered foraging trees; • Paddocks that are lightly vegetated with melons or other known food-source weeds (e.g. Erodium spp.) that represent a short-term and/or seasonal food source; • Blue Gum plantations (foraging by Carnaby's Black-Cockatoos has been reported but appears to be unusual).	Negligible to low foraging value. Scattered specimens of known food plants but projected foliage cover of these < 1%. This could include urban areas with scattered foraging trees.	Negligible to low foraging value. Scattered specimens of known food plants but projected foliage cover of these < 1%. Could include urban areas with scattered foraging trees.
2	Low foraging value. Examples: • Shrubland in which species of foraging value, such as shrubby banksias, have <10% projected foliage cover; • Woodland with tree banksias 2-5% projected foliage cover; • Open eucalypt woodland/mallee of small-fruited species; • Paddocks that are densely vegetated with melons or other known food-source weeds (e.g. Erodium spp.) that represent a short-term and/or seasonal food source.	Low foraging value. Examples: • Woodland with scattered specimens of known food plants (e.g. Marri and Jarrah) 1-5% projected foliage cover; • Urban areas with scattered foraging trees.	Low foraging value. Examples: • Woodland with scattered specimens of known food plants (e.g. Marri, Jarrah or Sheoak) 1-5% projected foliage cover; • Urban areas with scattered food plants such as Cape Lilac, *Eucalyptus caesia* and *E. erythrocorys*.

Site Score	Description of Vegetation Values		
	Carnaby's Black Cockatoo	Baudin's Black Cockatoo	Forest Red-tailed Black Cockatoo
3	Low to Moderate foraging value. Examples: • Shrubland in which species of foraging value, such as shrubby banksias, have 10-20% projected foliage cover; • Woodland with tree banksias 5-20% projected foliage cover; • Eucalypt Woodland/Mallee of small-fruited species; • Eucalypt Woodland with Marri < 10% projected foliage cover	Low to Moderate foraging value. Examples: • Eucalypt Woodland with known food plants (especially Marri) 5-20% projected foliage cover; • Parkland-cleared Eucalypt Woodland/Forest with known food plants 10-40% projected foliage cover (poor long-term viability without management); • Younger areas of (managed) revegetation with known food plants 10-40% projected foliage cover (establishing food sources with good long-term viability).	Low to Moderate foraging value. Examples: • Eucalypt Woodland with known food plants (especially Marri and Jarrah) 5-20% projected foliage cover; • Parkland-cleared Eucalypt Woodland/Forest with known food plants 10-40% projected foliage cover (poor long-term viability without management); • Younger areas of (managed) revegetation with known food plants 10-40% projected foliage cover (establishing food sources with good long-term viability).
4	Moderate foraging value. Examples: • Woodland/low forest with tree banksias (of key species B. attenuata and B. menziesii) 20-40% projected foliage cover; • Kwongan/ Shrubland in which species of foraging value, such as shrubby banksias, have 20-40% projected foliage cover; • Eucalypt Woodland/Forest with Marri 20-40% projected foliage cover.	Moderate foraging value. Examples: • Marri-Jarrah Woodland/Forest with 20-40% projected foliage cover; • Marri-Jarrah Forest with 40-60% projected foliage cover but vegetation condition reduced due to weed invasion and/or some tree deaths. • Eucalypt Woodland/Forest with diverse, healthy understorey and known food trees (especially Marri) 10-20% projected foliage cover. • Orchards with highly desirable food sources (e.g. apples, pears, some stone fruits).	Moderate foraging value. Examples: • Marri-Jarrah Woodland/Forest with 20-40% projected foliage cover; • Marri-Jarrah Forest with 40-60% projected foliage cover but vegetation condition reduced due to weed invasion and/or some tree deaths; • Sheoak Forest with 40-60% projected foliage cover.

Site Score	Description of Vegetation Values		
	Carnaby's Black Cockatoo	Baudin's Black Cockatoo	Forest Red-tailed Black Cockatoo
5	Moderate to High foraging value. Examples: • Banksia Low Forest (of key species B. attenuata and B. menziesii) with 40-60% projected foliage cover; • Banksia Low Forest (of key species B. attenuata and B. menziesii) with > 60% projected foliage cover but vegetation condition reduced due to weed invasion and/or some tree deaths; • Pine plantations with trees more than 10 years old (but see pine note below in moderation section).	Moderate to High foraging value. Examples: • Marri-Jarrah Forest with 40-60% projected foliage cover; • Marri-Jarrah Forest with > 60% projected foliage cover but vegetation condition reduced due to weed invasion and/or some tree deaths.	Moderate to High foraging value. Examples: • Marri-Jarrah Forest with 40-60% projected foliage cover; • Marri-Jarrah Forest with > 60% projected foliage cover but vegetation condition reduced due to weed invasion and/or some tree deaths. • Sheoak Forest with > 60% projected foliage cover.
6	High foraging value. Example: Banksia Low Forest (of key species B. attenuata and B. menziesii) with > 60% projected foliage cover and vegetation condition good with low weed invasion and/or low tree deaths (indicating it is robust and unlikely to decline in the medium term).	High foraging value. Example: • Marri-Jarrah Forest with > 60% projected foliage cover and vegetation condition good with low weed invasion and/or low tree deaths (indicating it is robust and unlikely to decline in the medium term).	High foraging value. Example: • Marri-Jarrah Forest with > 60% projected foliage cover and vegetation condition good with low weed invasion and/or low tree deaths (indicating it is robust and unlikely to decline in the medium term).

Vegetation structural class terminology follows Keighery (1994).

4.5 Survey Limitations

Limitations of the survey are discussed in Table 18. No limitations were identified that would influence the outcome of the flora, vegetation and black cockatoo surveys.

Table 18 Limitations considered for the biological assessment.

Limitation	Flora and Vegetation	Fauna and Black Cockatoo
Availability of contextual information on the region	**Nil** Contextual information was derived from publicly available datasets for pre-European vegetation mapping, geology, landforms and climate. DBCA database searches were obtained to inform desktop studies. The Keighery (2012) and Gibson et al (1994) Swan Coastal Plain data was used for FCT analysis. Additional reports for the surrounding area were also used to inform the assessment, including: • AECOM, 2016. Ellenbrook Bus Rapid Transit Biological Assessment. Unpublished report prepared for Public Transport Authority of Western Australia. • AECOM, 2022a. Scar 4 – Flora, Vegetation and Black Cockatoo Assessment. Unpublished report prepared for Western Power. • AECOM, 2022b. North Region Energy Program - Flora, Vegetation and Fauna Assessment. Unpublished report prepared for Western Power. • RPS, 2020. Detailed flora and vegetation assessment – METRONET Morley-Ellenbrook Line. Unpublished report prepared for Public Transport Authority of Western Australia.	**Nil** Conservation significant fauna information was gathered utilising sufficient resources. Resources used to inform surveys included publicly available databases (PMST, Atlas of Living Australia), DBCA Priority and Threatened fauna data and black cockatoo known breeding and roosting locations (DBCA, 2019).
Competency/experience of consultant conducting survey	**Nil** The field surveys were led by ecologist Cassandra House who has more than 8 years' experience conducting surveys of similar scope.	**Nil** The survey was conducted by Zoologist Hannah Spanswick (3+ years' experience) and ecologist Cassandra House (8 years' experience).

Limitation	Flora and Vegetation	Fauna and Black Cockatoo
Proportion of flora/fauna identified, recorded and/or collected (based on sampling, timing and intensity)	**Nil** Floristic data was collected from 16 quadrats, 21 Relevés, and observation points. All species not recorded in quadrats were collected and recorded opportunistically. Some tracklogs were lost during the Program due to technical issues. The areas walked is therefore under-represented on Figure 8.	**Nil** The fauna survey search effort was distributed effectively to provide a representative assessment of fauna habitats across the survey area. The survey areas were traversed on foot covering the accessible locations of the polygon.
Completion (is further work needed)	**Minor** Survey effort focussed on areas of remnant native vegetation in 'Good' or better condition. Several vegetation communities are represented by less than three quadrats. These are largely Completely Degraded or Degraded vegetation including 'Trees', Pine Regrowth, and 'CcMpEr' (each more than 5 hectares). The lack of representation was justified in the absence of native understorey species. Further, some vegetation communities were better able to be represented using unbounded Relevés to accommodate "slivers" and smaller patches. Some patches of significant vegetation (TECs) are represented by one quadrat due to the relatively small size of the area present within the survey area.	**Nil** Fauna habitats were described based on 21 fauna habitat assessments. All areas were accessible or able to be assessed from the edge. All breeding habitat (i.e. trees with DBH >500 mm) was able to be recorded. Eight potentially suitable hollows were assessed from the ground only, with suitability dependent on the ability to see the hollow entrance. Further assessment of these hollows may be required to meet regulatory requirements.
Remoteness and/or access issues	**Nil** The entire survey area was not accessible on foot, several private properties were not accessible and the patch of Banksia woodland near Malaga-Ellenbrook Train station was not accessible. This had no serious implications for the flora survey as the private properties represented degraded vegetation while the patch of Banksia Woodland near the Train has been extensively surveyed as part of ongoing monitoring for the Malaga-Ellenbrook train (2021-2024).	**Moderate** The entire survey area was not accessible on foot. Access to areas of private residential lots and large-scale construction projects limited the access to the entire corridor. This may have limited the ability of the survey to capture black cockatoo breeding tree data within private properties.
Timing, weather, season, cycle	**Nil** The field survey was undertaken during the typical ideal survey season in accordance with EPA (2016) Flora Survey Technical Guide. Numerous orchids and annual species were confidently identified in the field or sampled and confirmed at the WA Herbarium.	**Nil** The survey occurred within the known active periods for all three of WA's Black Cockatoos. The survey timing is within range for basic fauna surveys based on the EPA Guidelines (2020).

Limitation	Flora and Vegetation	Fauna and Black Cockatoo
Disturbances (e.g. fire, flood, accidental human intervention) which affected results of the survey	**Minor** Native vegetation within the Neerabup survey area throughout Gnangara State Forest was burnt following the survey. Post-survey floristic composition will reflect natural succession rather than results presented here. The historical land use of the pine plantation within the Neerabup survey area made it difficult to differentiate vegetation communities. These areas were grouped together as one “vegetation community” although the composition of vegetation varied greatly.	**Nil** No disturbances were observed that would influence the outcome of the survey.

5.0 Desktop Assessment Results

5.1 Threatened and Priority Ecological Communities

Twenty-four significant communities were identified in the desktop assessment. This included 16 listed under the EPBC Act, 13 listed under the BC Act and 11 listed by DBCA. Note that at the State level numerous TECs and PECs can be representative of a single EPBC Act-listed community.

The comprehensive desktop study is presented in Appendix A The communities most pertinent to this Project are:

- Banksia Woodlands of the Swan Coastal Plain (Banksia Woodlands TEC) listed as Endangered under the EPBC Act and Priority 3 by DBCA; and
- Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain (Tuart Woodlands TEC) listed as Critically Endangered under the EPBC Act and Priority 3 by DBCA.

All other significant communities are associated with unique landforms, IBRA regions or hydrology that were not present within the survey area.

5.2 Significant Flora

A systematic review of significant flora records and their preferred habitat has determined the likelihood of Threatened and Priority flora species occurring within each survey area. These results are summarised in Table 19. The Priority 3 *Styphelia filifolia* is known in the Neerabup survey area. No other significant flora are known to occur within any of the survey areas.

Significant flora species which have a 'high' likelihood of occurrence are outlined in Table 20. The comprehensive desktop assessment is presented in Appendix B and results displayed in Figure 7.

Table 19 Desktop Assessment Result Summary – Flora

Survey Area	Number of Species Identified					
	Known	High Likelihood	Moderate Likelihood	Low Likelihood	Negligible Likelihood	Total
Neerabup Terminal and East Wanneroo	1	9	19	24	33	86
Padbury-Wangara	0	7	26	27	20	81
Northern Terminal	0	10	24	33	33	100
Pinjar Terminal	0	0	18	13	35	66
NT-NOR to HBK 132kV line	0	3	31	47	23	104

Table 20 Significant flora species that were considered likely to occur within the survey areas pre-survey.

Taxon	Cons. Code[1]		Habitat
	BC Act / DBCA	EPBC Act	
Neerabup Terminal and East Wanneroo			
Anigozanthos humilis subsp. *chrysanthus*	P4		Grey or yellow sand.
Baeckea sp. Limestone (N. Gibson & M.N. Lyons 1425)	P1		Known from North of Perth only within 100km of coast. Found in Banksia woodland on sand over limestone.
Calectasia elegans	P1		Between Pinjar and Bullsbrook on deep, grey, quartz sand in habitats that have experienced infrequent fires. Recorded growing in Banksia menziesii and B. attenuata woodland (Barrett, R and Barret, M, 2015).
Conostylis bracteata	P3		Sand, limestone. Consolidated sand dunes.
Cyathochaeta teretifolia	P3		Brown, grey sand. Sandy clay. Swamps, creek edges. Jarrah forest, SCP.
Dampiera triloba	P3		Loamy sand (WAH, 2024).
Jacksonia sericea	P4		Calcareous and sandy soils.
Poranthera moorokatta	P2		The species is known from two locations: Kings Park and Ellenbrook. In Kings Park it was recorded on white silica sand in open spaces between shrubs, not in shaded areas or in areas of high leaf litter cover (Barret, 2012). In Ellenbrook it was recorded in a shallow dampland on mixed grey-white sand with scattered leaf litter (Barret, 2012).
Stenanthemum sublineare	P2		Littered white sand. Coastal plain.
Styphelia filifolia	P3		Sandy soils of the coastal plain, usually in banksia or Jarrah woodland and low-lying situations (Hislop, M, Puente-Lelievre, C, 2017).
Verticordia lindleyi subsp. *lindleyi*	P4		Sand, sandy clay. Winter-wet depressions.
Padbury - Wangara			
Acacia benthamii	P2		Typically, on limestone breakaways.
Baeckea sp. Limestone (N. Gibson & M.N. Lyons 1425)	P1		Grey sand, yellow sand with limestone outcropping, hills.
Caladenia huegelii	CR	CE	Grey or brown sand, clay loam.

Taxon	Cons. Code[1]		Habitat
	BC Act / DBCA	EPBC Act	
Dampiera triloba	P3		Loamy sand (WA Herbarium, 2023).
Drosera patens	P1		Sandy soils. Margins of winter-wet depressions, swamps and lakes.
Jacksonia sericea	P4		Limestone/ limestone outcrops in heath and sandy soils in coastal areas. Sometimes on fixed dunes and slopes of hills (DCCEEW, 2023).
Styphelia filifolia	P4		Calcareous and sandy soils
Northern Terminal			
Caladenia huegelii	CR	CE	Grey or brown sand, clay loam.
Drosera patens	P3		Seasonally wet drainage lines and margins of permanent water sources, flat ground. Grey sand with clay, poor drainage (WA Herbarium 2023).
Drosera x *sidjamesii*	P1		Sandy soils. Margins of winter-wet depressions, swamps and lakes.
Jacksonia sericea	P1		Peaty sand. Along lake margins, close to winter high-water line.
Netrostylis sp. Chandala (G.J. Keighery 17055)	P4		Calcareous and sandy soils
Poranthera moorokatta	P2		Dampland with thick leaf litter over dark grey sand (WA Herbarium, 2023)
Stachystemon exilis	P2		Very gently inclined plain, white silica sand in open spaces between shrubs, not in shaded areas or in areas of high litter cover (WA Herbarium, 2023)
Stylidium longitubum	P1		On grey sand, seasonally damp (WA Herbarium, 2023)
Verticordia lindleyi subsp. *lindleyi*	P4		Sandy clay, clay, seasonal wetlands
NT-NOR to HBK 132kV			
Anigozanthos humilis subsp. *chrysanthus*	P4		Grey or yellow sand.
Hydrocotyle striata	P1		Open, low-lying Banksia woodland (Hislop, M & Davies, R, 2020).
Stylidium longitubum	P4		Sand, sandy clay. Winter-wet depressions.

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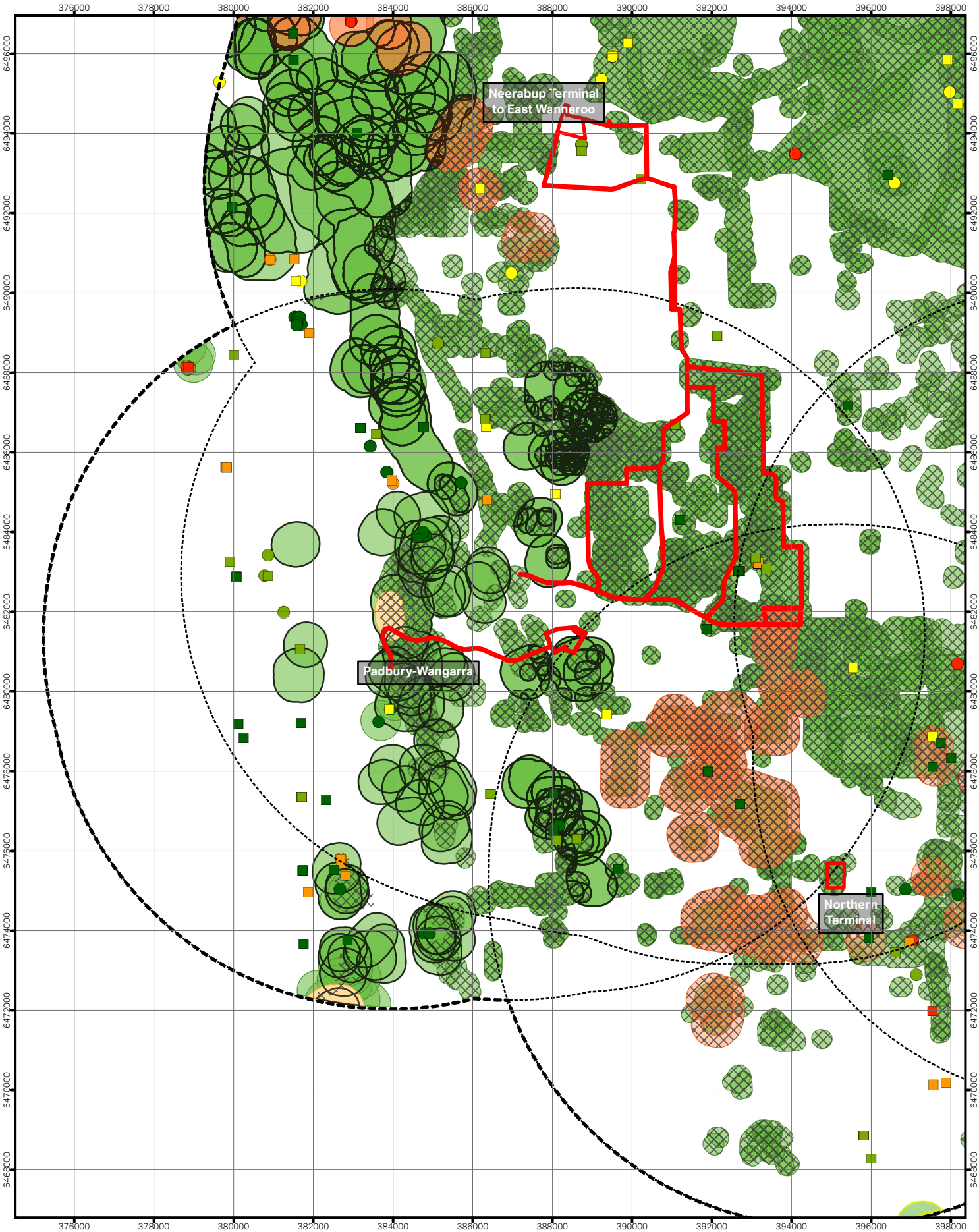

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LEGEND

- Survey Area
- 8.5km Buffer Survey Area

WA Herbarium database (WAHERB)

- Threatened
- P1
- P2
- P3
- P4

Threatened and Priority Flora database (TPFL)

- Threatened
- P1
- P2
- P3
- P4

TEC / PEC (State Listed)

- Critically Endangered
- Endangered
- Vulnerable
- Priority 3

TEC / PEC (Federally Listed)

- Critically Endangered
- Endangered
- Vulnerable

Conservation Significant Flora and Communities Desktop Results: Padbury-Wangarra

WESTERN POWER

NREP SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure 7a.1

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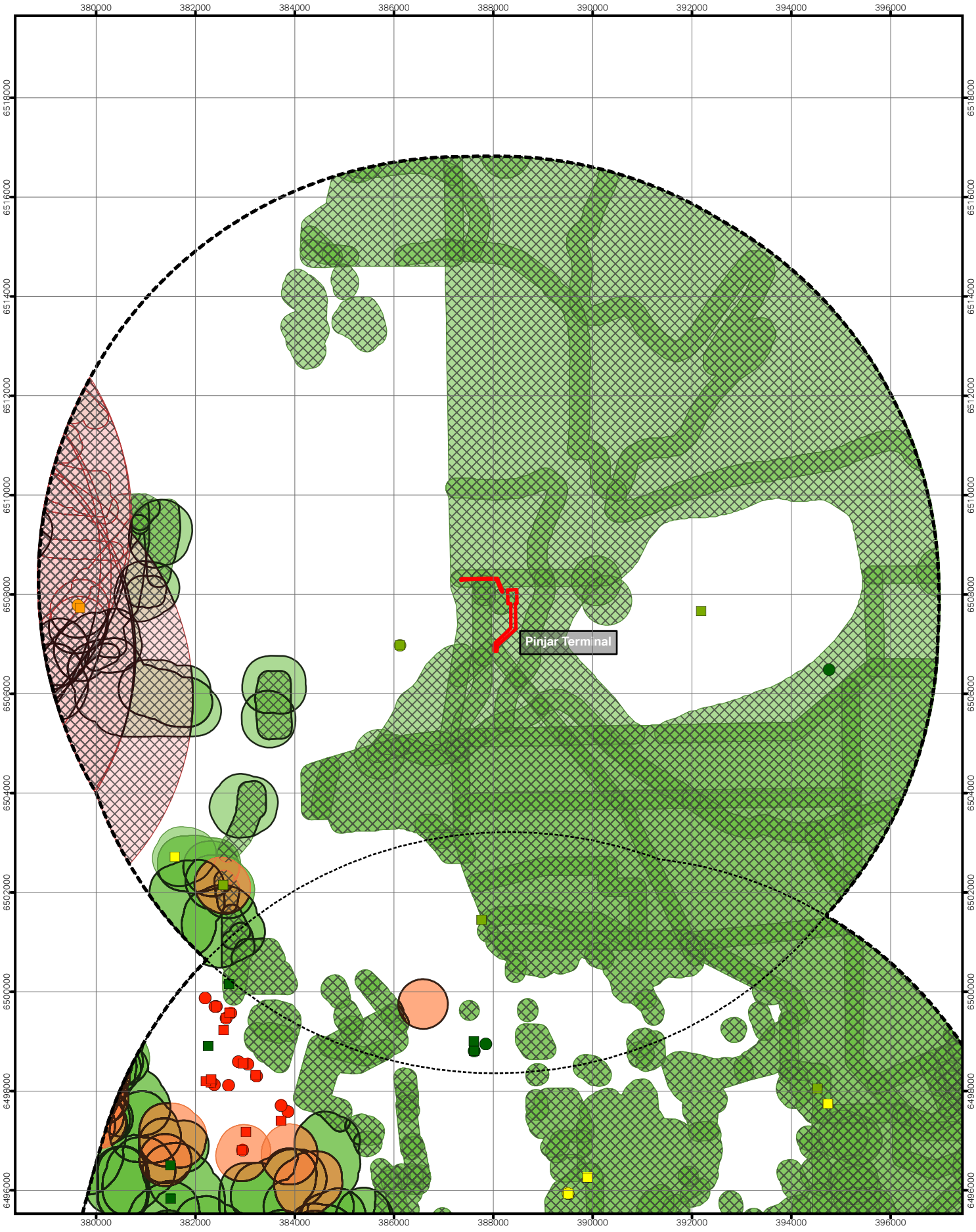

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LEGEND

- Survey Area
- 8.5km Buffer Survey Area

WA Herbarium database (WAHERB)

- Threatened
- P1
- P2
- P3
- P4

Threatened and Priority Flora database (TPFL)

- Threatened
- P1
- P2
- P3
- P4

TEC / PEC (State Listed)

- Critically Endangered
- Endangered
- Priority 3

TEC / PEC (Federally Listed)

- Critically Endangered
- Endangered

Conservation Significant Flora and Communities Desktop Results: Pinjar Terminal

WESTERN POWER

NREP SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure 7a.2

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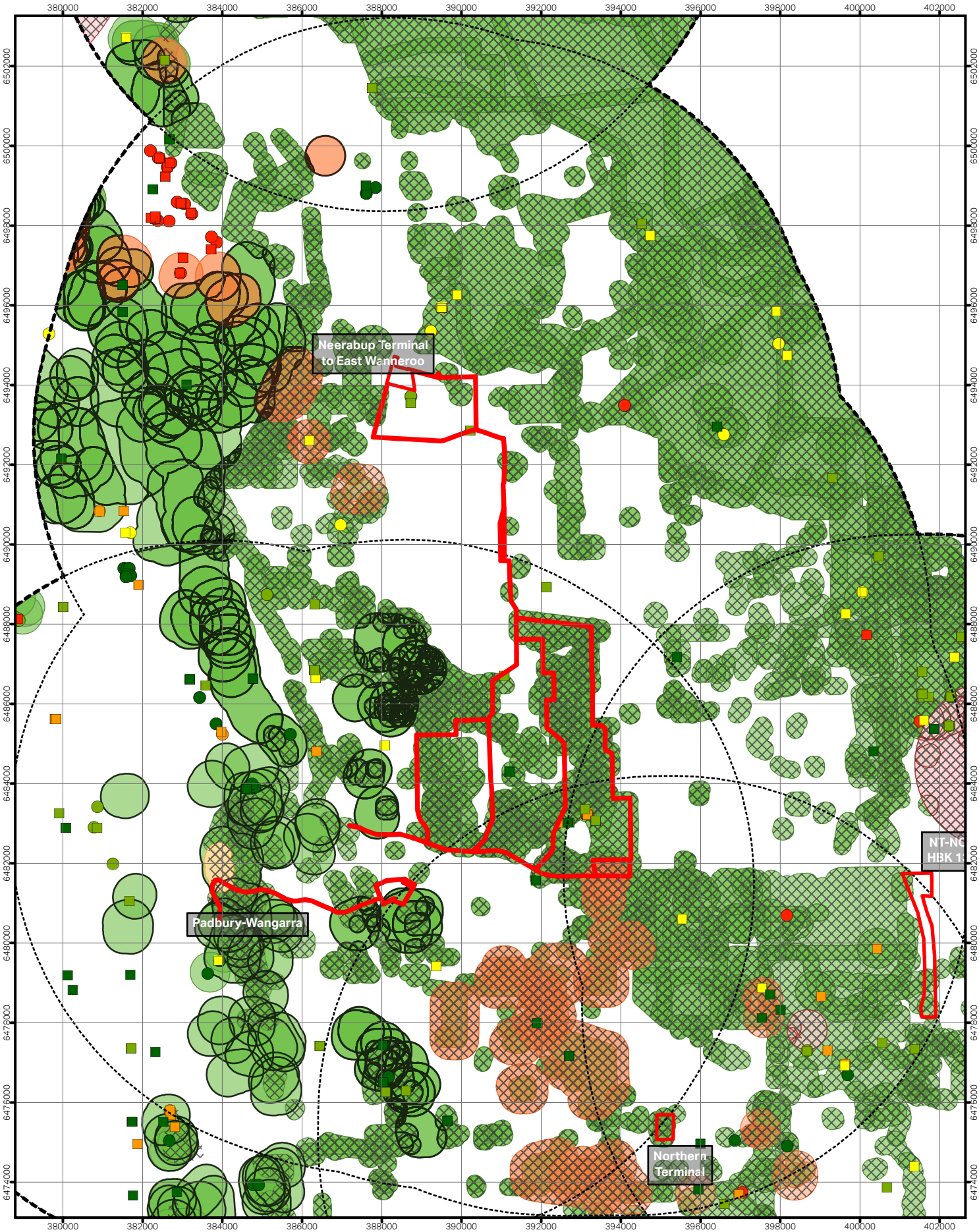

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LEGEND

- Survey Area
- 8.5km Buffer Survey Area

WA Herbarium database (WAHERB)
- Threatened
- P1
- P2
- P3
- P4

Threatened and Priority Flora database (TPFL)
- Threatened
- P1
- P2
- P3
- P4

TEC / PEC (State Listed)
- Critically Endangered
- Endangered
- Vulnerable
- Priority 3

TEC / PEC (Federally Listed)
- Critically Endangered
- Endangered

Conservation Significant Flora and Communities Desktop Results: Neerabup Terminal to East Wanneroo

WESTERN POWER

NREP SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure 7a.3

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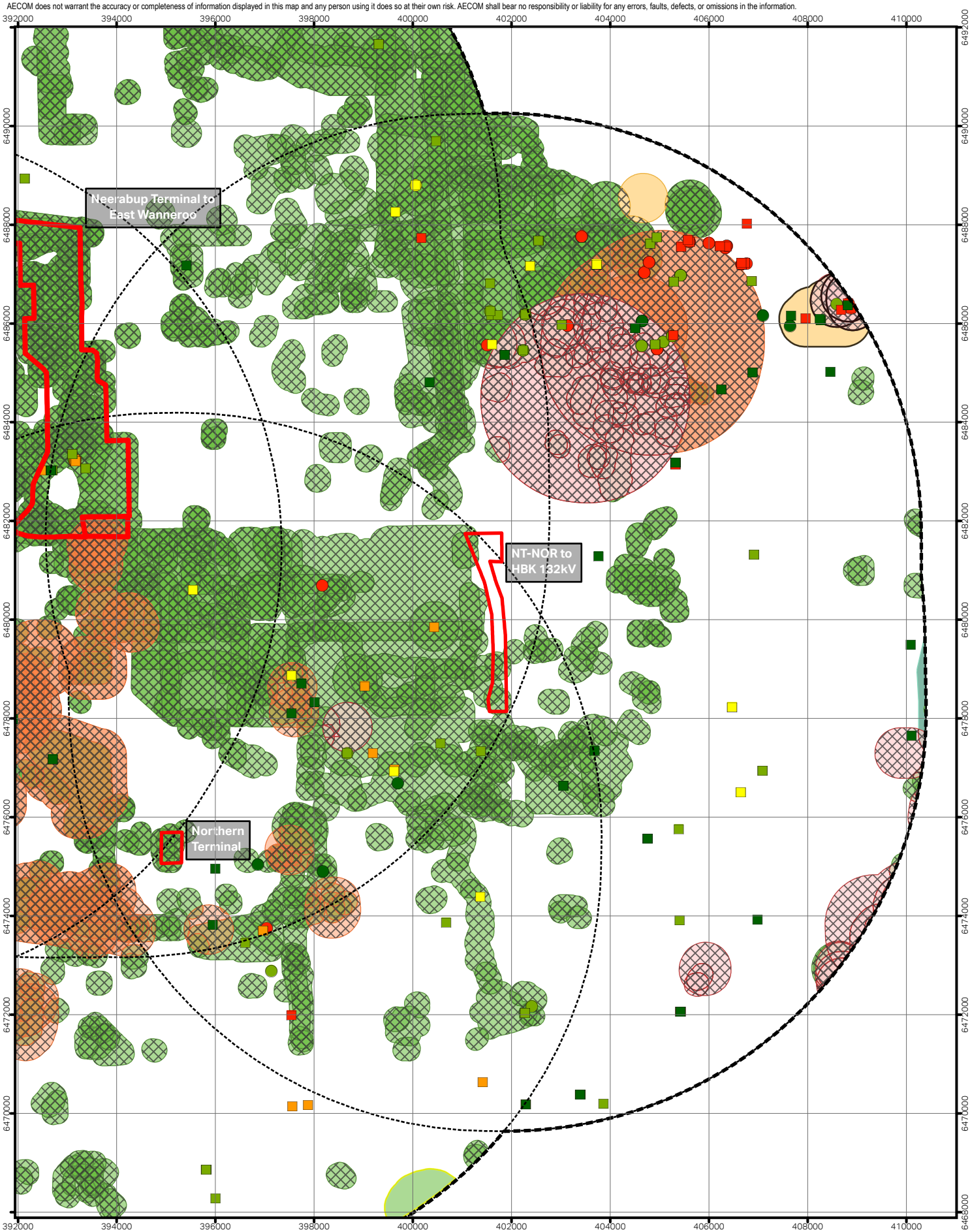

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LEGEND

- Survey Area
- 8.5km Buffer Survey Area

WA Herbarium database (WAHERB)

- Threatened
- P1
- P2
- P3
- P4

Threatened and Priority Flora database (TPFL)

- Threatened
- P2
- P3
- P4

TEC / PEC (State Listed)

- Critically Endangered
- Endangered
- Vulnerable
- Priority 3
- Priority 4

TEC / PEC (Federally Listed)

- Critically Endangered
- Endangered
- Vulnerable

Conservation Significant Flora and Communities Desktop Results: NT-NOR to HBK 132kV

WESTERN POWER

NREP SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure 7a.4

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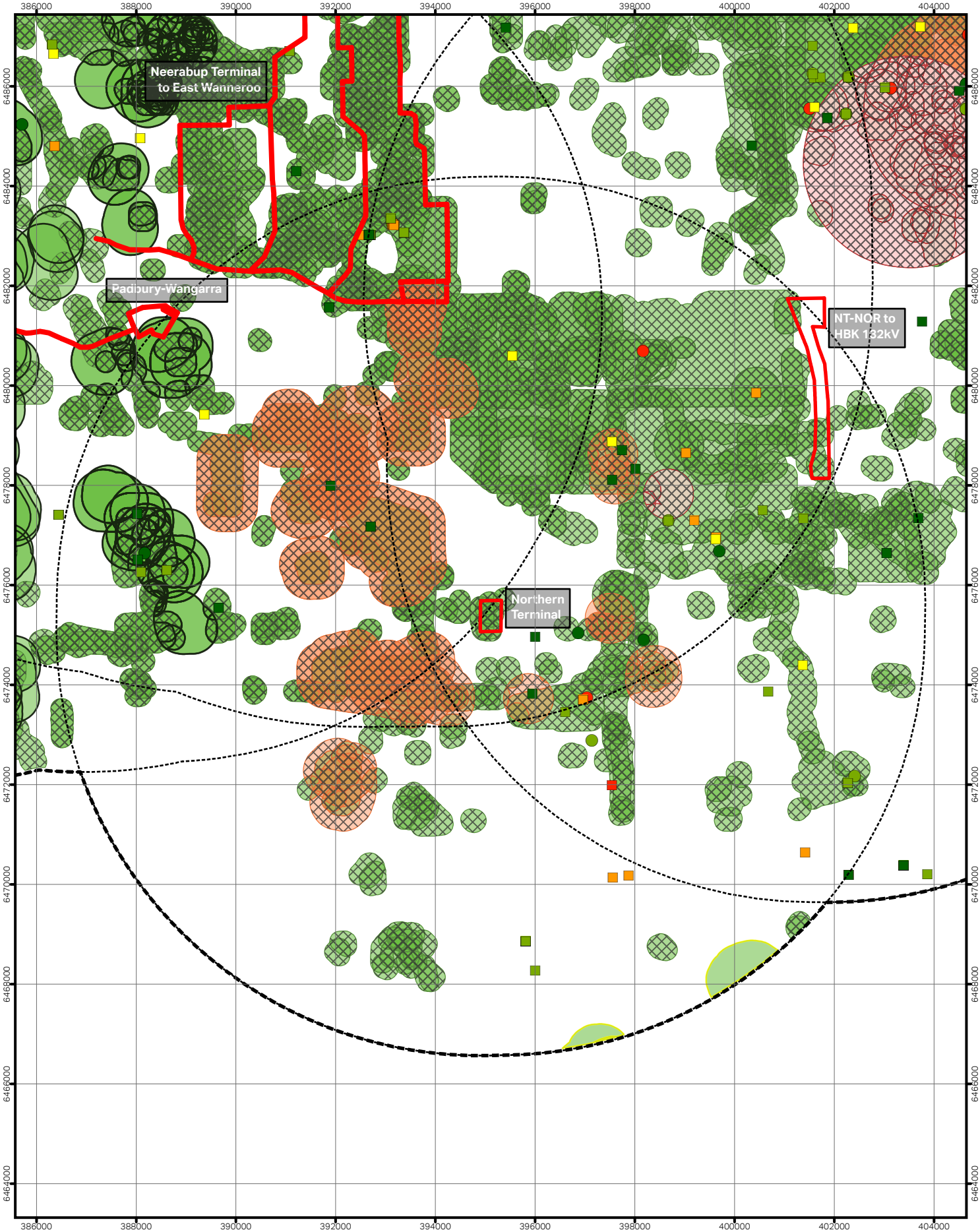

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LEGEND

- Survey Area
- 8.5km Buffer Survey Area

WA Herbarium database (WAHERB)

- Threatened
- P1
- P2
- P3
- P4

Threatened and Priority Flora database (TPFL)

- Threatened
- P3
- P4

TEC / PEC (State Listed)

- Critically Endangered
- Endangered
- Priority 3

TEC / PEC (Federally Listed)

- Critically Endangered
- Endangered
- Vulnerable

Conservation Significant Flora and Communities Desktop Results: Northern Terminal

WESTERN POWER

NREP SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure 7a.5

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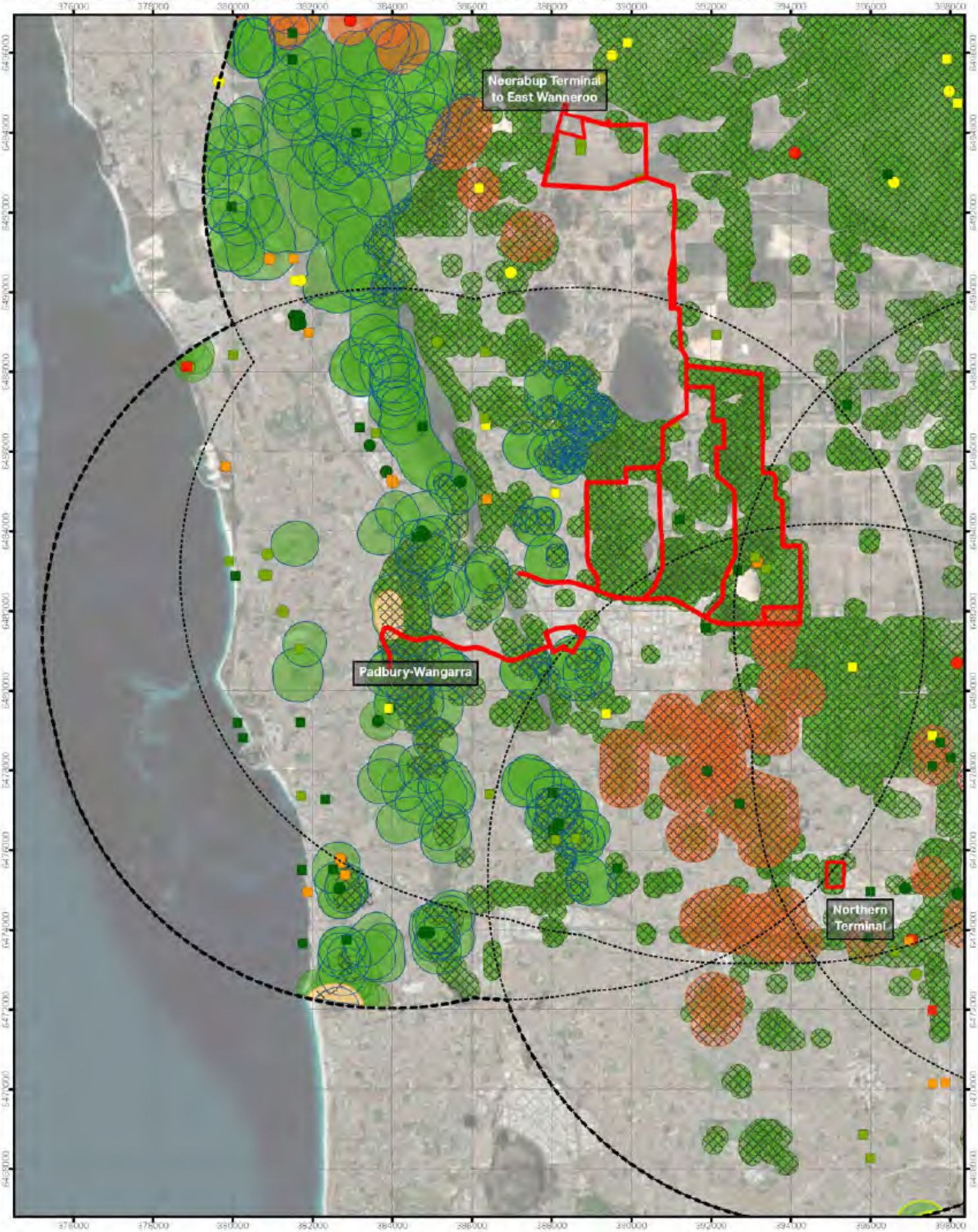

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GDA2020 MGA ZONE 50

LEGEND

- Survey Area
- 8.5km Buffer Survey Area

WA Herbarium database (WAHERB)

- Threatened
- P1
- P2
- P3
- P4

Threatened and Priority Flora database (TPFL)

- Threatened
- P1
- P2
- P3
- P4

TEC / PEC (State Listed)

- Critically Endangered
- Endangered
- Vulnerable
- Priority 3

TEC / PEC (Federally Listed)

- Critically Endangered
- Endangered
- Vulnerable

Conservation Significant Flora and Communities Desktop Results: Padbury-Wangarra

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure 7a.1

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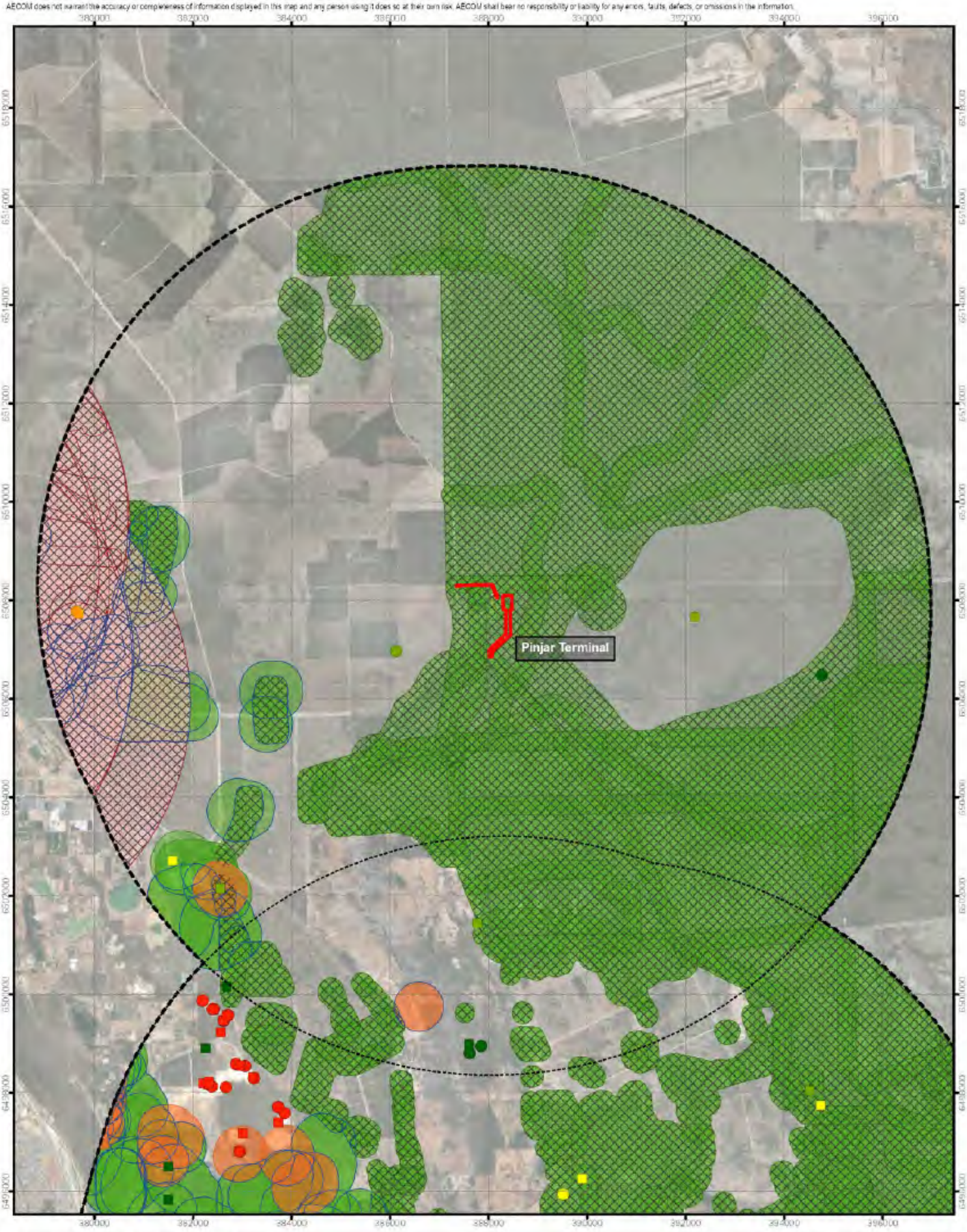

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GDA2020 MGA ZONE 50

LEGEND

- Survey Area
- 8.5km Buffer Survey Area

WA Herbarium database (WAHERB)

- Threatened
- P1
- P2
- P3
- P4

Threatened and Priority Flora database (TPFL)

- Threatened
- P1
- P2
- P3
- P4

TEC / PEC (State Listed)

- Critically Endangered
- Endangered
- Priority 3

TEC / PEC (Federally Listed)

- Critically Endangered
- Endangered

Conservation Significant Flora and Communities Desktop Results: Pinjar Terminal

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure 7a.2

A4 size

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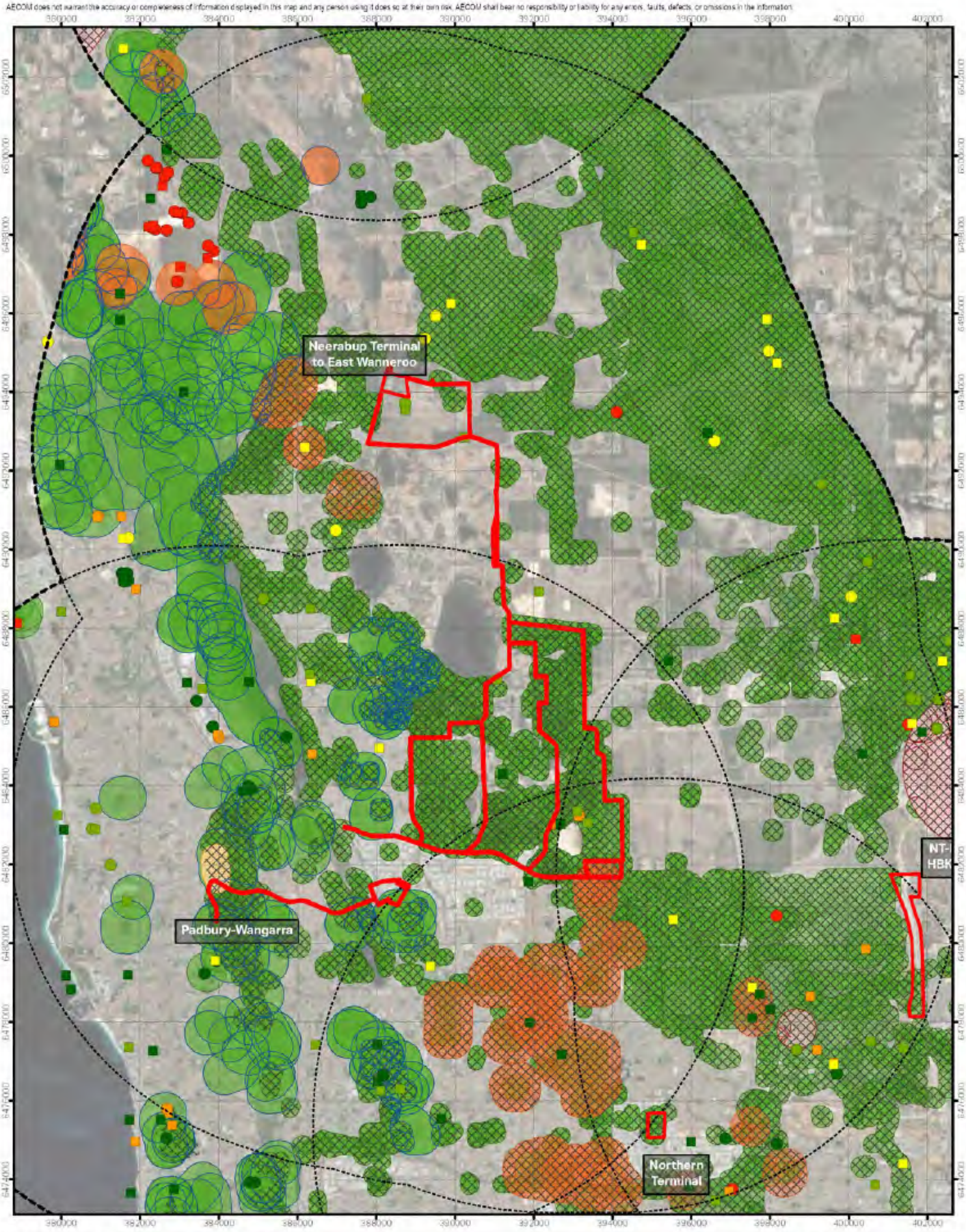

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LEGEND

- Survey Area
- 8.5km Buffer Survey Area
- WA Herbarium database (WAHERB)
  - Threatened
  - P1
  - P2
  - P3
  - P4
- Threatened and Priority Flora database (TPFL)
  - Threatened
  - P1
  - P2
  - P3
  - P4
- TEC / PEC (State Listed)
  - Critically Endangered
  - Endangered
  - Vulnerable
  - Priority 3
- TEC / PEC (Federally Listed)
  - Critically Endangered
  - Endangered

Conservation Significant Flora and Communities Desktop Results: Neerabup Terminal to East Wanneroo

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **7a.3**

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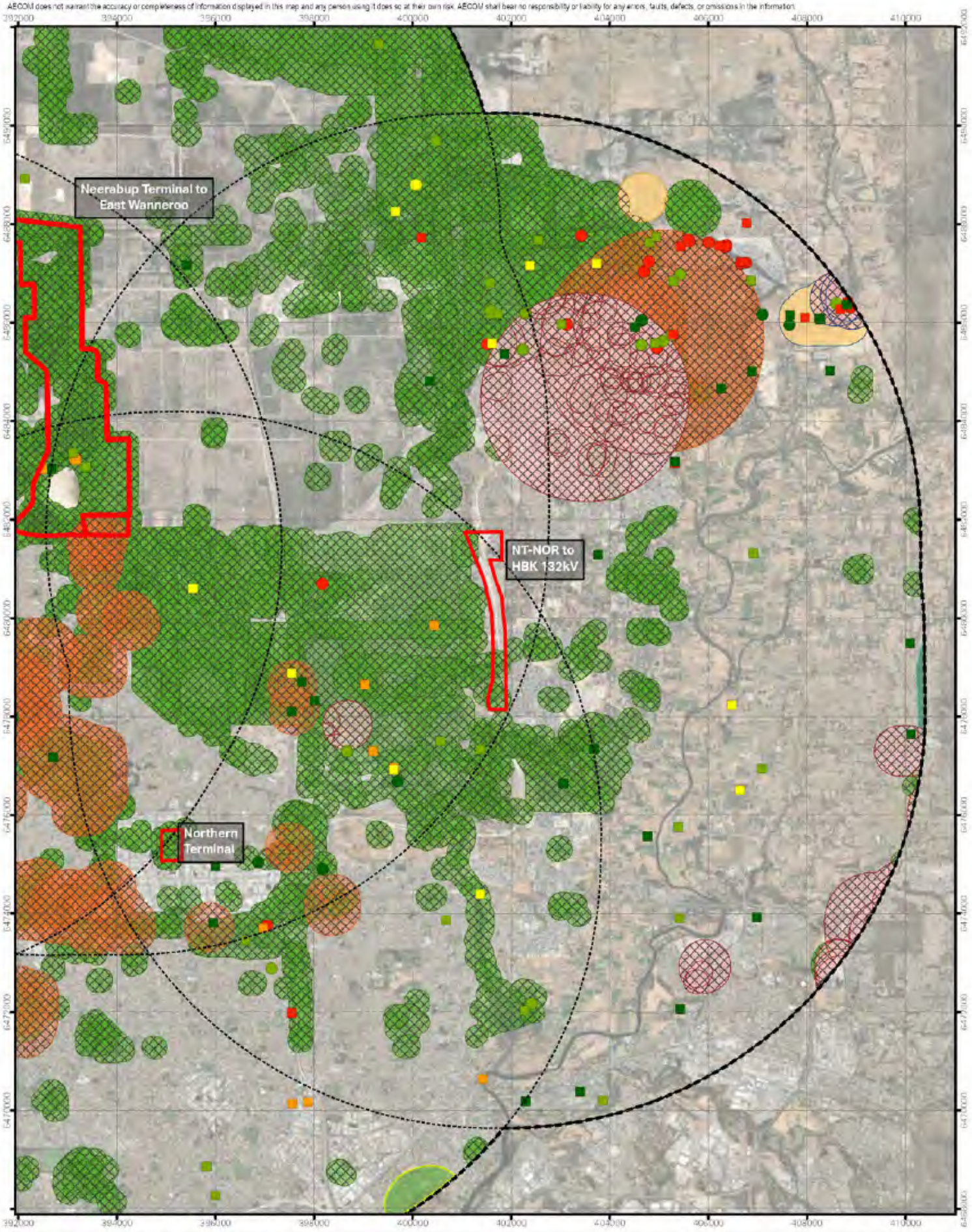

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GDA2020 MGA ZONE 50

LEGEND

Survey Area
8.5km Buffer Survey Area
WA Herbarium database (WAHERB)
- Threatened
- P1
- P2
- P3
- P4

Threatened and Priority Flora database (TPFL)
- Threatened
- P2
- P3
- P4

TEC / PEC (State Listed)
- Critically Endangered
- Endangered
- Vulnerable
- Priority 3
- Priority 4

TEC / PEC (Federally Listed)
- Critically Endangered
- Endangered
- Vulnerable

Conservation Significant Flora and Communities Desktop Results: NT-NOR to HBK 132kV

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure 7a.4

A4 size

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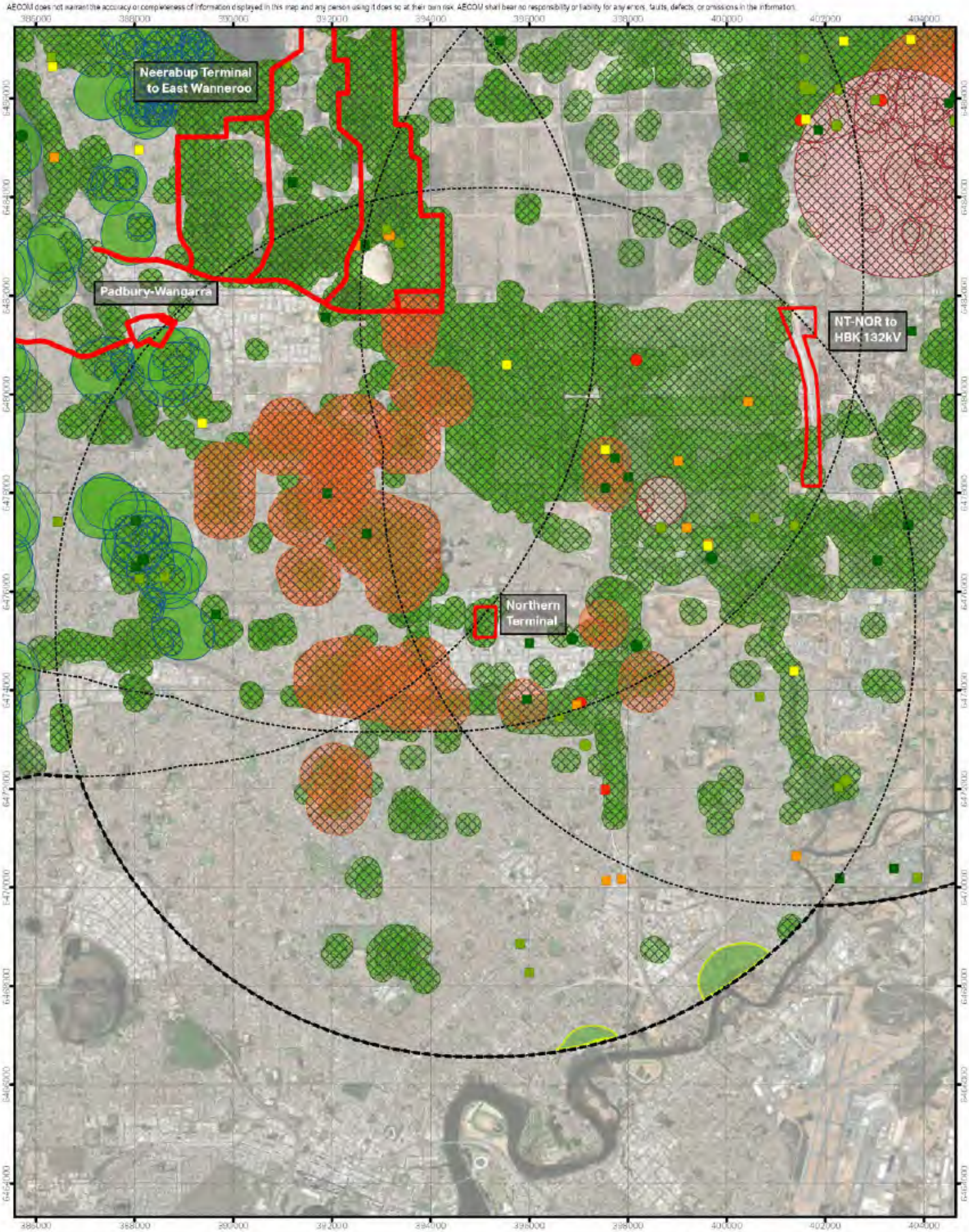

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LEGEND

- Survey Area
- 8.5km Buffer Survey Area

WA Herbarium database (WAHERB)

- Threatened
- P1
- P2
- P3
- P4

Threatened and Priority Flora database (TPFL)

- Threatened
- P3
- P4

TEC / PEC (State Listed)

- Critically Endangered
- Endangered
- Priority 3

TEC / PEC (Federally Listed)

- Critically Endangered
- Endangered
- Vulnerable

Conservation Significant Flora and Communities Desktop Results: Northern Terminal

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure 7a.5

A4 size

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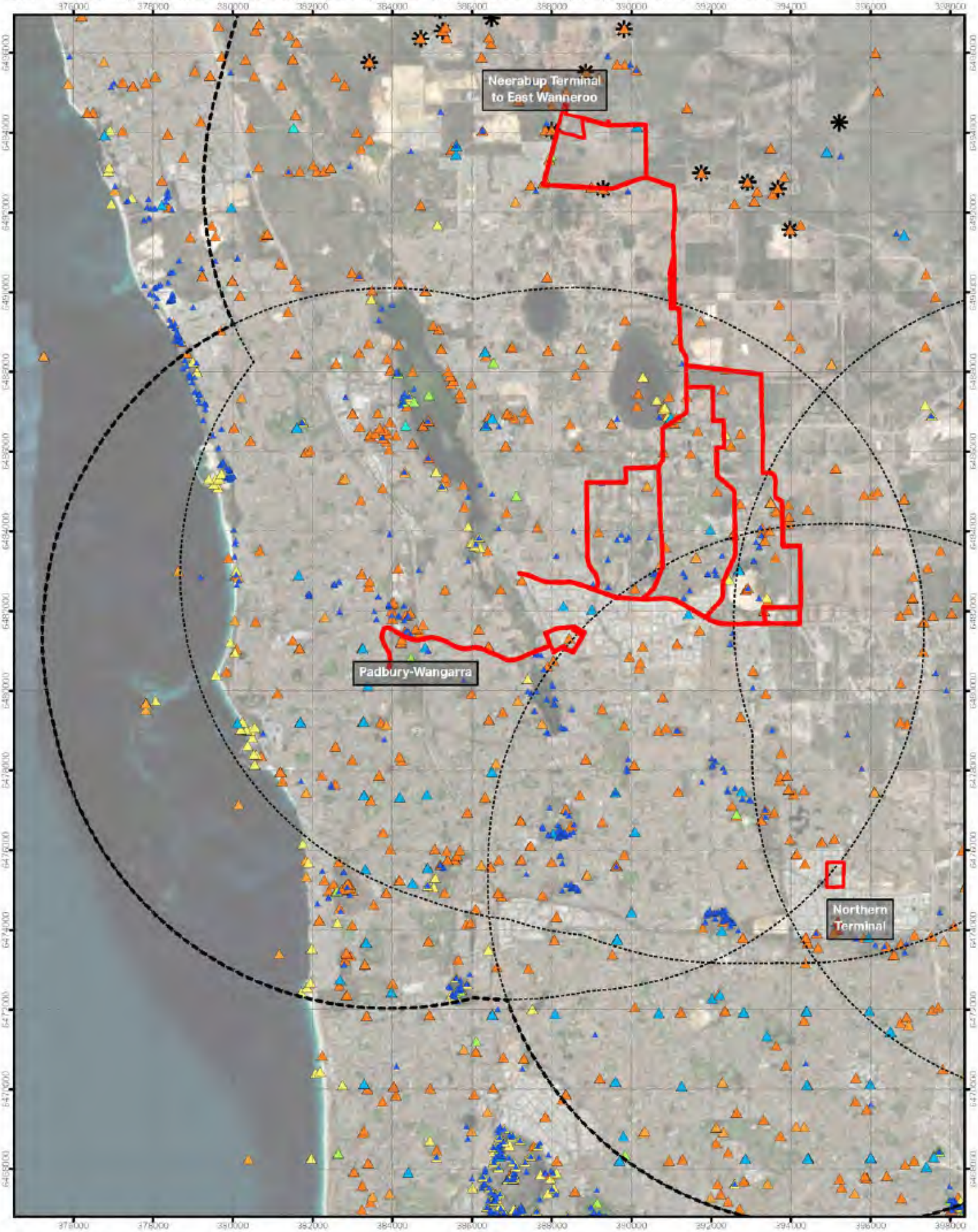

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GDA2020 MGA ZONE 50

LEGEND

- Survey Area
- 8.5km Buffer Survey Area
- Black Cockatoo Roosting Sites

Threatened Fauna database (DBCA)

- Critically Endangered
- Endangered
- Vulnerable
- Migratory Species
- Conservation Dependant
- Specially Protected
- Priority 2
- Priority 3
- Priority 4

Conservation Significant Fauna Desktop Results: Padbury-Wangarra

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure 7b.1

A4 size

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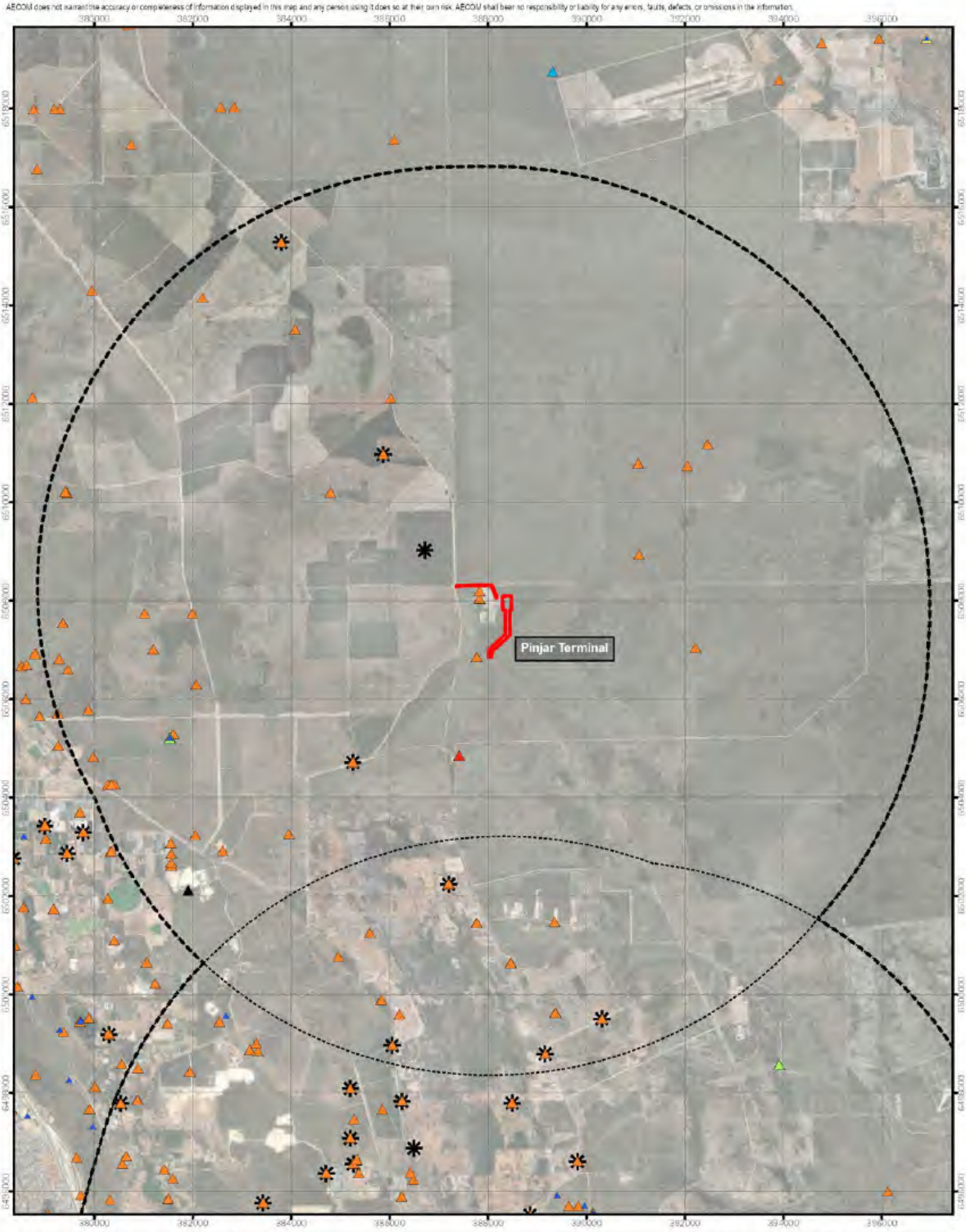

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GDA2020 MGA ZONE 50

LEGEND

- Survey Area
- 8.5km Buffer Survey Area
- Black Cockatoo Roosting Sites

Threatened Fauna database (DBCA)

- Critically Endangered
- Endangered
- Vulnerable
- Migratory Species
- Specially Protected
- Priority 3
- Priority 4
- Extinct

Conservation Significant Fauna Desktop Results: Pinjar Terminal

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **7b.2**

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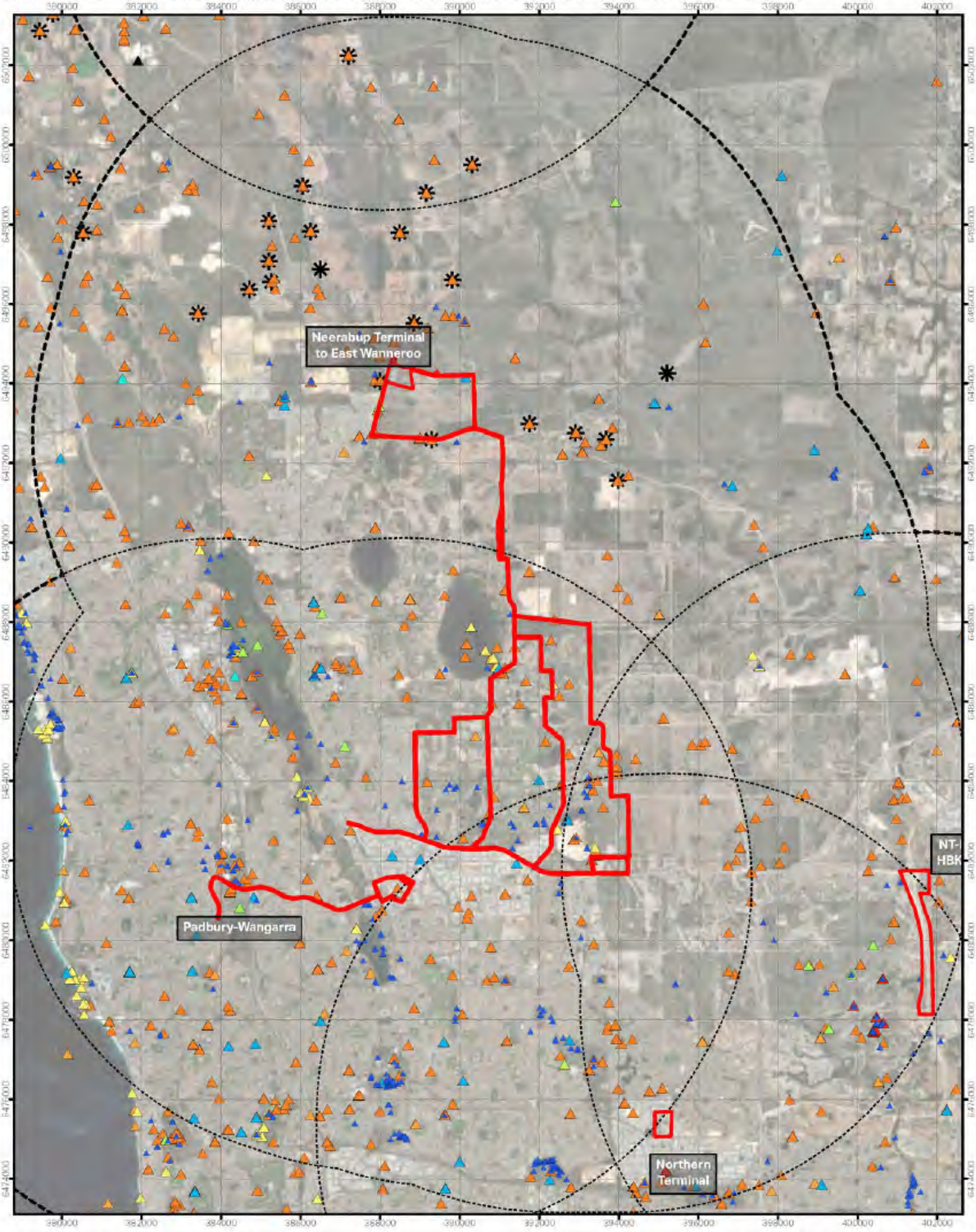

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LEGEND

- Survey Area
- 8.5km Buffer Survey Area
- Black Cockatoo Roosting Sites

Threatened Fauna database (DBCA)

- Critically Endangered
- Endangered
- Vulnerable
- Migratory Species

- Conservation Dependant
- Specially Protected
- Priority 2
- Priority 3
- Priority 4
- Extinct

Conservation Significant Fauna Desktop Results: Neerabup Terminal to East

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure 7b.3

A4 size

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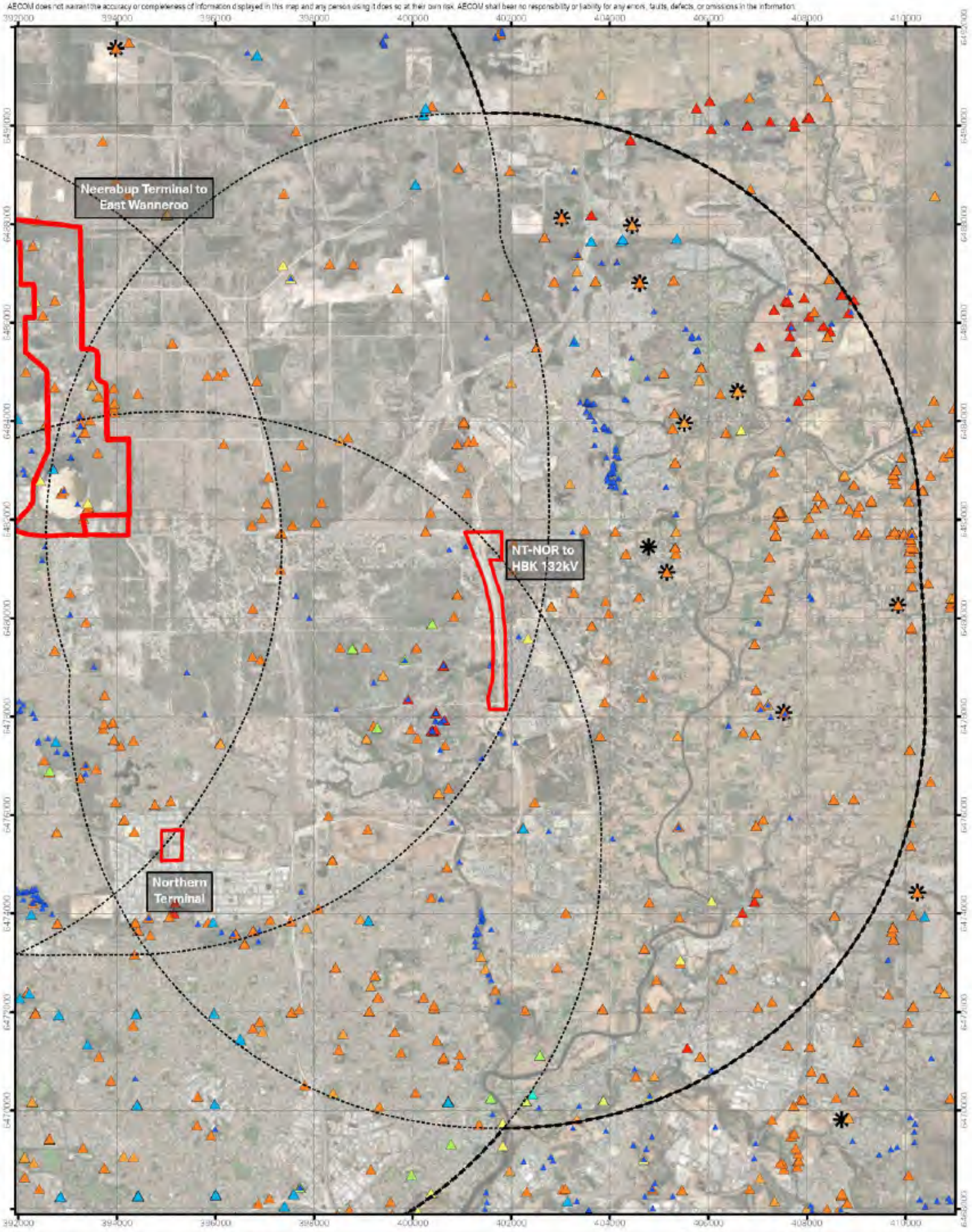

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0 1 2 km
GDA 2020 MGA ZONE 50

LEGEND

- Survey Area
- 8.5km Buffer Survey Area
- Black Cockatoo Roosting Sites

Threatened Fauna database (DBCA)

- Critically Endangered
- Endangered
- Vulnerable
- Migratory Species
- Conservation Dependant
- Specially Protected
- Priority 2
- Priority 3
- Priority 4

Conservation Significant Fauna Desktop Results: NT-NOR to HBK 132kV

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure 7b.4

A4 size

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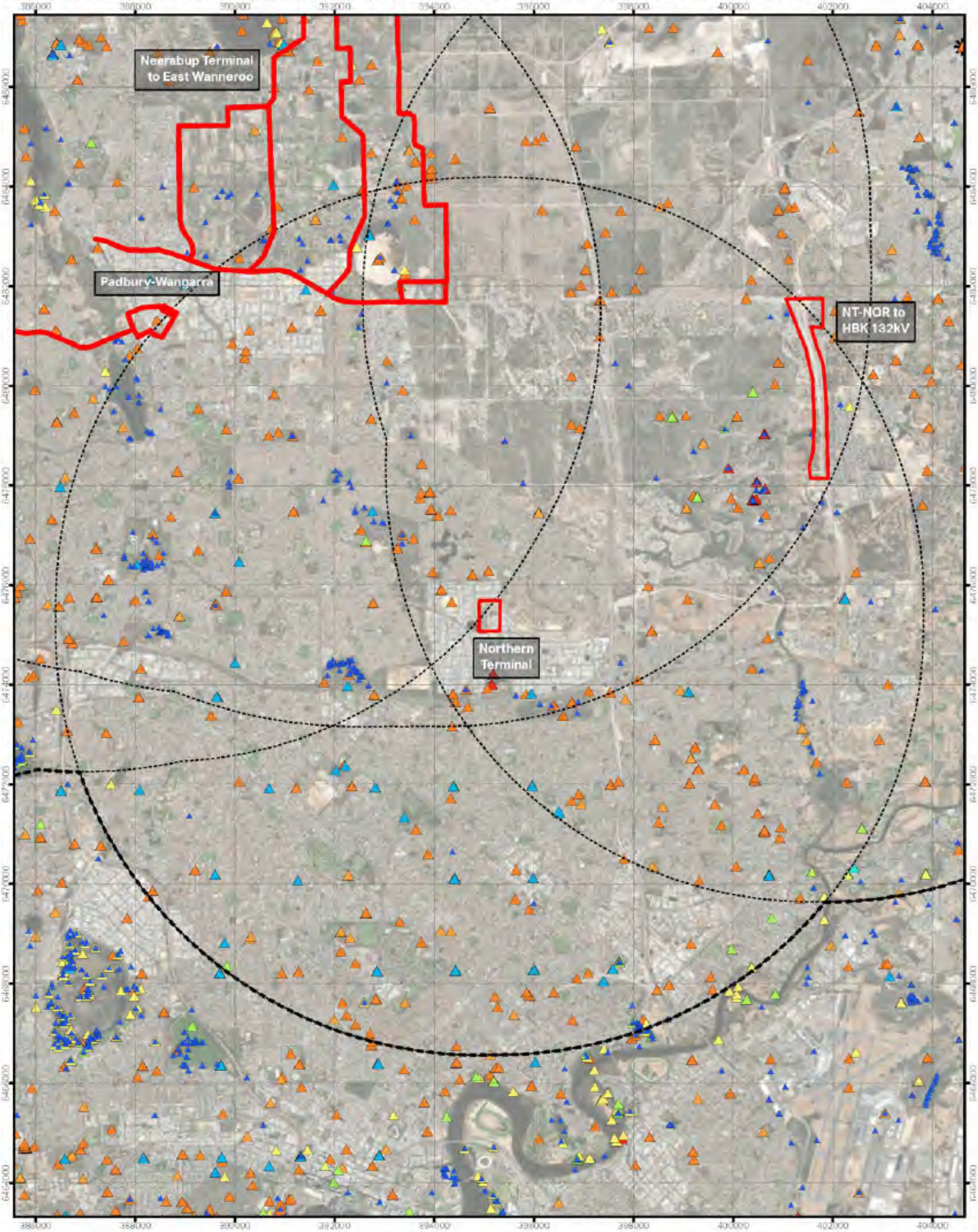

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GDA2020 MGA ZONE 50

LEGEND

- Survey Area
- 8.5km Buffer Survey Area
- Black Cockatoo Roosting Sites

Threatened Fauna database (DBCA)

- Critically Endangered
- Endangered
- Vulnerable
- Migratory Species
- Conservation Dependant
- Specially Protected
- Priority 2
- Priority 3
- Priority 4

Conservation Significant Fauna Desktop Results: Northern Terminal

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure 7b.5

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5.3 Significant Fauna

Between 71 to 79 significant fauna species were identified to potentially occur for the survey areas. Species identified in the desktop that are oceanic species, or strictly marine were excluded from the desktop assessment as the survey does not include marine waters. The results of the desktop assessments completed for the survey areas are included in Table 21. Species with a 'high' likelihood of occurrence are presented in Table 22. and the results are mapped in Figure 7. The comprehensive desktop results are presented in Appendix C and mapped in Figure 7.

Table 21 Significant fauna desktop assessment results summary

Survey Area	Likelihood of Each Species Identified					
	Known	High Likelihood	Moderate Likelihood	Low Likelihood	Negligible Likelihood	Total
Padbury - Wangara	0	6	12	39	22	79
Pinjar Terminal	0	6	8	32	30	76
Neerabup Terminal and East Wanneroo	0	4	3	22	42	71
NT-NOR to HBK 132kV Line	0	3	9	36	28	76
Northern Terminal	0	2	14	33	29	78

Table 22 Significant fauna species considered to have a 'high' likelihood of occurrence within the survey area.

Scientific Name	Common Name	Conservation status		Ecology	Padbury - Wangara	Pinjar Terminal	Neerabup Terminal and East Wanneroo	NT-NOR to HBK 132 JKv Line	Northern Terminal
		BC Act /DBCA[1]	EPBC Act[2]						
Calyptorhynchus banksii naso	Forest Red-tailed Black Cockatoo	VU	V	Inhabits dense *Eucalyptus marginata* (Jarrah), *E. diversicolor* (Karri) and *Corymbia calophylla* (Marri) forests (TSSC, 2009).	High	High	High	High	High
Idiosoma sigillatum	Swan Coastal Plain Shield-backed Trapdoor Spider	P3		Remnant habitats in Banksia woodland and heathland on sandy soils (Rix et al., 2018).	High	High	High		
Isoodon fusciventer	Quenda, Southern Brown Bandicoot	P4		Forest, woodland, heath and shrub communities, with sandy soils and dense heathy vegetation (Van Dyck & Strahan, 2008).	High	High	High		
Neelaps calonotos	Black-striped Snake	P3		Confined to the Swan Coastal Plain between Mandurah and Lancelin, sheltering in upper layers of loose soil beneath leaf litter in Eucalyptus/Banksia woodlands, typically at the base of trees and shrubs (Bush et al., 2010).	High	High	High		
Zanda baudinii	Baudin's Cockatoo	EN	E	Temperate forest and woodland dominated by *Eucalyptus marginata* (jarrah), *Corymbia calophylla* (marri) and *E. diversicolor* (karri) (TSSC, 2018).	High	High		High	
Zanda latirostris	Carnaby's Cockatoo	EN	E	Uncleared or remnant native eucalypt woodlands containing salmon gum and wandoo, and in shrubland or kwongan heathland dominated by hakea, dryandra, banksia and grevillea species. It also occurs in remnant patches of native vegetation on land otherwise cleared for agriculture. Forages seasonally in pine plantations (DCCEEW, 2023)	High	High	High	High	High

1. BC Conservation status codes: VU Vulnerable, EN Endangered P1-5 Priority Species, OS Other Specially Protected.
2. EPBC Conservation status codes: V Vulnerable, E Endangered.

6.0 Padbury-Wangara Results and Discussion

6.1 Flora

6.1.1 Vegetation Communities

Five native vegetation communities were defined and mapped including:

- Banksia Woodlands BaAbAb for (0.15 ha, 1%),
- Banksia Woodlands BaAlTe (0.58 ha, 2%),
- Tuart Woodlands EgHcPp (1.12 ha, 4%),
- Callitris Woodland CpMsLo (0.48 ha, 2%),
- Trees (0.61 ha, 0.6%).

Non-native communities included Paddock (2.26 ha) and Cleared (20.97 ha).

Vegetation community descriptions are presented in Table 23 and mapped on Figure 8.

Table 23 WGA vegetation community descriptions and photographs

Description	Additional Details	Photograph
Native Vegetation		
BaAbAb *Banksia attenuata* Woodland *Banksia attenuata* and *Callitris preissii* woodland over *Acacia blakelyi, Melaleuca huegelii, *Grevillea preissii* open shrubland over *Avena barbata, *Bromus diandrus* and *Austrostipa flavescens* grassland. Recorded on white-grey sand on a gentle slope.	Survey effort: CHR04 Native species richness: 5 Weed species richness: 9 Condition: Degraded Extent: 0.15 ha	
BaAlTe *Banksia attenuata* Woodland *Banksia attenuata* and *Banksia grandis* woodland over *Acacia lasiocarpa* var. *lasiocarpa, Xanthorrhoea preissii, Daviesia divaricata* subsp. *divaricate* open shrubland over *Tricoryne elatior, *Euphorbia terracina* and *Conostylis setigera* forbland. Recorded on white sand on a flat landform.	Survey effort: CHQ16 Native species richness: 8 Weed species richness: 8 Condition: Good Extent: 0.58 ha	

Description	Additional Details	Photograph
EgHcPp Tuart Woodland *Eucalyptus gomphocephala*, *Corymbia calophylla* and *Melaleuca huegelii* open woodlands over *Hibbertia cuneiformis* and *Acacia saligna* sparse shrubland over *Poa porphyroclados*, **Ehrharta calycina* and **Avena barbata* grassland. Represents the Tuart Woodlands TEC. Recorded on brown sandy loam soils on a gentle slope.	Survey effort: CHQ05 Native species richness: 7 Weed species richness: 12 Condition: Completely Degraded to Good Extent: 1.12 ha	
CpMsLo Callitris Woodland *Callitris preissii* low open woodland over *Melaleuca seriata, Acacia lasiocarpa var. sedifolia* and *Rhagodia baccata* sparse shrubland over **Lagurus ovatus, *Cynodon dactylon* and **Ehrharta calycina* open grassland. Recorded on white sand on a flat landform.	Survey effort: CHQ05 Native species richness: 8 Weed species richness: 9 Condition: Degraded to Good Extent: 0.48 ha	
Trees Scattered native species including but not limited to *Eucalyptus, Banksia, Acacia, Xanthorrhoea* and *Melaleuca* species. Recorded on a variety of soil types.	Survey effort: observations only Area: 0.61 ha	N/A
Non-native Communities		
Paddock Largely comprised of common pasture weeds, with occasional native species Recorded on a variety of soil types.	Survey effort: observations only Area: 2.26 ha	N/A

6.1.2 Conservation Significant Vegetation

6.1.2.1 Banksia Woodlands TEC Assessment

Two patches of Banksia Woodlands were assessed against the key diagnostic characteristics outlined in the DEE (2016) Conservation Advice.

Banksia Woodlands Patch 1 is mapped for 0.15 ha within the survey area and was considered Good, which does not meet the key diagnostic characteristics to be considered representative of the federally protected ecological community. The patch does not extend beyond the survey area, with the closest remnant native vegetation more than 30 m away. The patch assessment is presented in Table 24 below.

Table 24 Patch 1 Banksia Woodlands TEC Assessment

<table>
<tr><td>ID</td><td>Patch 1</td></tr>
<tr><td>Date</td><td>CHR04 scored on 17-Oct-23</td></tr>
<tr><td>Location</td><td>On the Swan Coastal Plain, on the Spearwood System.</td></tr>
<tr><td>Patch vegetation description</td><td>Represents BaAbAb, a Banksia woodland dominated by B. attenuata</td></tr>
<tr><td>Structure</td><td>Represents a low woodland.</td></tr>
<tr><td>Tree Data incl. height, canopy percent cover and dominance</td><td>
<table>
<tr><th rowspan="2">Species</th><th colspan="2">CHR04</th></tr>
<tr><th>Ht (cm)</th><th>Cover</th></tr>
<tr><td>B. attenuata</td><td>600</td><td>45</td></tr>
<tr><td>C. preissii</td><td>400</td><td>1</td></tr>
</table>
</td></tr>
<tr><td>Native understorey present (%) and diversity</td><td>Excludes trees.
<table>
<tr><th>Species</th><th>CHR04</th></tr>
<tr><td>Cover (%)</td><td>32.2</td></tr>
<tr><td>Diversity total</td><td>3</td></tr>
</table>
</td></tr>
<tr><td>Weed cover (%) and dominant weed species</td><td>
<table>
<tr><th>Species</th><th>CHR04</th></tr>
<tr><td>Cover (%)</td><td>7.4</td></tr>
<tr><td>Dominant species</td><td>*Avena barbata</td></tr>
</table>
</td></tr>
<tr><td>Soil type and colour</td><td>White-grey sand</td></tr>
<tr><td>Landform</td><td>Undulating sandy terrain</td></tr>
<tr><td>Size of patch</td><td>Within survey area: 0.15 ha. Does not extend beyond survey area.</td></tr>
<tr><td>Summary</td><td>The patch does not meet the condition and size thresholds to be considered representative of the Commonwealth listed TEC.</td></tr>
<tr><td>Photograph</td><td> </td></tr>
</table>

Patch 2 does not meet the key characteristics, size and condition threshold to be considered representative of the federally protected ecological community. The Banksia Woodlands Patch 2 is mapped for 0.58 ha within the survey area and is in Good condition. Woodlands that are in Good condition require a minimum extent of 2 ha to be considered representative of the TEC. The patch is surrounded by Tuart Woodland and is disconnected (by more than 30 m) from patches of Banksia Woodland.

The patch assessment is presented in Table 25.

Table 25 Patch 2 Banksia Woodlands TEC Assessment

<table>
<tr><td>ID</td><td>Patch 2</td></tr>
<tr><td>Date</td><td>CHQ16 scored on 17-Oct-23</td></tr>
<tr><td>Location</td><td>On the Swan Coastal Plain, on the Spearwood System.</td></tr>
<tr><td>Patch vegetation description</td><td>Represents BaAlTe, a Banksia woodland dominated by B. attenuata and B. grandis</td></tr>
<tr><td>Structure</td><td>Represents a low woodland.</td></tr>
<tr><td>Tree Data incl. height, canopy percent cover and dominance</td><td>
<table>
<tr><th rowspan="2">Species</th><th colspan="2">CHQ16</th></tr>
<tr><th>Ht (cm)</th><th>Cover</th></tr>
<tr><td>B. attenuata</td><td>700</td><td>25</td></tr>
<tr><td>B. grandis</td><td>800</td><td>5</td></tr>
</table>
</td></tr>
<tr><td>Native understorey present (%) and diversity</td><td>Excludes trees.
<table>
<tr><th>Species</th><th>CHQ16</th></tr>
<tr><td>Cover (%)</td><td>16.7</td></tr>
<tr><td>Diversity</td><td>6</td></tr>
</table>
</td></tr>
<tr><td>Weed cover (%) and dominant weed species</td><td>
<table>
<tr><th>Species</th><th>CHQ16</th></tr>
<tr><td>Cover (%)</td><td>5.3</td></tr>
<tr><td>Dominant species</td><td>*Euphorbia terracina</td></tr>
</table>
</td></tr>
<tr><td>Soil type and colour</td><td>White-grey sand</td></tr>
<tr><td>Landform</td><td>Undulating sandy terrain</td></tr>
<tr><td>Size of patch</td><td>Within survey area: 0.58 ha</td></tr>
<tr><td>Summary</td><td>Native diversity is not comparable with the mean species richness for the closest matching FCT, with only eight recorded of the mean 55.2 native species (FCT 28). The patch does not meet the condition and size thresholds to be considered representative of the Commonwealth listed TEC.</td></tr>
<tr><td>Photograph</td><td> </td></tr>
</table>

6.1.2.2 Tuart Woodlands TEC Assessment

There are two patches of Tuart Woodlands in the Padbury-Wangara survey area. One patch (Patch 2) meets the key diagnostic characteristics in accordance with the DEE (2019) Conservation Advice and is mapped for 0.78 ha. Both Patches are discussed below.

Patch 1 is located to the east of Mitchell Freeway and north of Whitfords Avenue and consists of minimal remnant vegetation (two native species) mixed with planted introduced Eucalyptus trees. The area is in Degraded condition and is 0.43 ha representing the edge of a larger patch that extends approximately 2 ha.

The minimum size threshold for Degraded vegetation is 5 ha, as such, the patch does not meet the key diagnostic characteristics for the federally protected ecological community. The assessment is presented in Table 26.

Table 26 Patch 1 Tuart Woodlands TEC assessment

Patch identification and location	The patch is located to the east of Mitchell Freeway, north of Whitfords Avenue and south of a residential area.
Key diagnostic characteristics	Yes • Occurs on Swan Coastal Plain. • Occurs on the Spearwood System. • Four mature (DBH >500 mm) *E. gomphocephala* trees were counted in the portion of the patch. • Patch 1 occurs as an open woodland. • Minimal native understorey was present, indicative of historical disturbance. • Planted introduced eucalyptus trees were also recorded within the patch.
Species richness	Two native understorey species were observed: *Melaleuca huegelii* and *Acacia saligna*
Condition	Poor condition (DEE, 2019). The vegetation condition is mapped as Degraded.
Size	0.43 ha
Variety within patch	The patch is small, segregated from other mature Tuart trees by more than 60 m, and has minimal variety within it. It consists of mature Tuart trees over two native shrub species and cleared / common pasture weeds.
Additional information	The patch is disconnected from other Tuart Woodland patches due to the large freeway and urban development.

Plate 1 Tuart Woodlands Patch 1

Patch 2

Patch 2 represents a large area of Tuart Forest that extends north and south of Whitfords Avenue, west of Mitchell Freeway, and west of Gibson Avenue. The total area of Patch 2 within the survey area is 0.54 ha, representing part of a larger patch more than 30 ha. The total patch size is greater than 5 ha, therefore condition thresholds are not applicable.

An assessment against the key diagnostic characteristics was undertaken, and condition was determined using a quadrat to further support the patch assessment. The patch meets the key diagnostic characteristics for the federally protected ecological community. The assessment is presented in Table 27 and Figure 8.

Table 27 Patch 2 Tuart Woodlands TEC assessment

<table>
<tr><td>Patch identification and location</td><td>Remnant native vegetation north and south of Whitfords Avenue and west of Mitchell Freeway, and west of Gibson Avenue. The patch is represented by CHQ05 scored on 17 October 2023.</td></tr>
<tr><td>Key diagnostic characteristics</td><td>Yes
Occurs on Swan Coastal Plain.
Occurs on both the Quindalup South system and the Spearwood System.
More than 32 mature (DBH >500 mm) E. gomphocephala trees were counted which represents a small portion of the larger patch continuing outside the survey area.
Patch 1 occurs as an open woodland.
Includes native understorey species that vary in density reflective of level of disturbance.</td></tr>
<tr><td>Species richness</td><td>Key indicators for the condition thresholds are outlined in the table below.<table><tr><th>Parameter</th><th>CHQ05</th></tr><tr><td>Proportion of understorey foliage that is native</td><td>23.7%</td></tr><tr><td>Native species richness</td><td>7</td></tr></table></td></tr>
<tr><td>Condition</td><td>Moderated condition (DEE, 2019).
Mapped as Good condition.</td></tr>
<tr><td>Size</td><td>Within survey area: 1.63 ha
Total: over 30 ha</td></tr>
<tr><td>Variety within patch</td><td>The patch is open woodland, with some minor variation in the density of understorey shrubs, particularly Acacia saligna, Hibbertia cuneiformis and Melaleuca huegelii. The variation is attributed to historical disturbance, with common introduced weeds displacing many smaller herbs and annual native species.
Vegetation condition was mapped as Good with weeds displacing native understorey species and the extensive clearing in the area has further limited biodiversity. Native understorey is entirely absent near the edge. The patch represents the southern edge of Tuart Woodlands protected in Bush Forever Site 303.</td></tr>
<tr><td>Additional information e.g. buffer, connectedness, land use history</td><td>Although intersected by Whitfords Avenue and residential developments, the patch is large and represents an important local refuge for native flora and fauna. The patch condition is anticipated to be in better condition further from the edge.</td></tr>
</table>

Plate 2 Tuart Woodlands Patch 2

6.1.2.3 State-Listed Ecological Communities

No state-listed TEC or PEC were confirmed to occur. One FCT was able to be confidently inferred, FCT 28 Spearwood *B. attenuata* or *B. attenuata-Eucalyptus* woodland. This FCT was confirmed for CHQ16 (see Table 28). The similarity was relatively low (28% using Keighery data), and the group clustering was ambiguous. This was attributed to the degradation of the vegetation.

FCT 28 is associated with the Banksia Woodlands TEC. As discussed in Section 6.1.3.1, the Banksia Woodlands patch was too small and too degraded to meet the size and conditions thresholds for the federally protected ecological community.

No FCT was confidently inferred for CHQ05. There was some correlation to FCT 25 Southern Swan Coastal Plain *Eucalyptus gomphocephala - Agonis flexuosa* woodlands which represents a PEC. Similarity was low and results from Gibson and Keighery data was ambiguous. The quadrat is missing a key indicator species for FCT 25 (*Agonis flexuosa*). The other FCT inferred was FCT 24 Scattered heath with Tuart. This seems unlikely due to the absence of key species such as *Calothamnus quadrifidus*, *Chaetospora curvifolia* (previously *Schoenus curvifolius*), and *Banksia sessilis*.

Table 28 Padbury-Wangara FCT analysis results

Quadrat	Gibson (1994)				Keighery (2012)				Final Determination
	% Similar	FCT	Site	Dendrogram	% Similar	FCT	Site	Dendrogram	
CHQ16	27	28	YAN-6	Broadly clustering with FCT 18 and 19.	30	24	cool 08	Broadly clustering with FCT 19 and 29a.	FCT28 Spearwood *B. attenuata* or *B. attenuata-Eucalyptus* woodland. Suits description and confirms similarity. Low similarity is likely due to the disturbed and isolated nature of the vegetation patch, which is located next to a road, cleared land and a pathway. Weeds are also abundant. Known to be associated with Banksia Woodlands TEC, however, does not represent a PEC or TEC as explained in Section 6.1.2.1.
	26	28	WOODV-2		30	25	much04		
	23	28b	WOODV-1		28	28	WOODV-2		
CHQ05	32	24	TRIG-6	Broadly clustering with FCTs 11 and 19.	37	s11	m6402	Broadly clustering with FCTs s11, s15, 30a2 and 29b	Indeterminate Does not represent FCT24 Scattered health with Tuart. Is missing key species such as *Calothamnus quadrifidus, Chaetospora curvifolia* (previously *Schoenus curvifolius*), and *Banksia sessilis*. Low similarity to all FCTs likely relates to high presence of weeds and low abundance of native understorey species due to historical disturbance.
	29	25	C71-4		34	24	xbeer01		
	28	24	NEER-1		34	24	star01		

6.1.3 Vegetation Condition

The survey area comprises 2.95 ha of native vegetation. The majority of this was in Completely Degraded condition. A high level of weed invasion was present which is expected in a highly developed area on the Swan Coastal Plain.

Cleared areas represent areas devoid of native vegetation and are not included in percentage calculations below. Vegetation condition is mapped on Figure 8 and extent of each category is presented in Table 29 below.

Table 29 Vegetation condition extent

Condition Rating	Extent (ha)	Percent of Total Area
Completely Degraded	0.65	22%
Degraded	0.63	21%
Good	1.67	57%
Total	**2.95**	**100%**
Cleared	26.12	

6.1.4 Conservation Significant Flora

No significant flora species were recorded in the Padbury-Wangara survey area.

6.1.5 Flora Inventory

A total of 69 flora species from 27 families were recorded. The total includes 39 (56.6%) locally native species and 30 (43.5%) introduced or naturalised weed species. No weed species listed as Weeds of National Significance (WONS) or listed as Declared Pests under the BAM Act were recorded.

Families with the highest representation are Myrtaceae (11 native taxa), Fabaceae (four native taxa), and Asparagaceae (four native taxa).

The comprehensive list of vascular flora species recorded, organised by site and the community they occur in is presented in Appendix D. Quantitative data recorded from individual samples sites is presented in Appendix E.

6.2 Fauna

6.2.1 Fauna Habitat Assessment

Four fauna habitats representing native vegetation were mapped, including Banksia Woodland, Eucalyptus Woodland, Mixed Shrubland and Trees Over Cleared. Trees Over Cleared (4.82 ha, 16.6% of the survey area) and Mixed Shrubland (1.41 ha, 4.8%) were the two most dominant habitat types. Fauna habitat types and suitability for significant fauna species is described below and mapped in Figure 9.

Cleared represents 23.23 ha and is devoid of vegetation.

6.2.1.1 Banksia Woodland

The Banksia Woodland habitat is mapped for 0.74 ha (3% of the survey area) occurs as isolated occurrences in two locations along Whitfords Avenue. It is characterised by an overstorey of *Banksia attenuata, Banksia grandis*, and *Callitris preissii* over mixed shrublands and grasslands of variable density. Shrub species included *Acacia lasiocarpa var. lasiocarpa, Daviesia divaricata subsp. divaricata, Hibbertia hypericoides* and *Melaleuca huegelii*. A grassy understorey was common throughout.

Microhabitat features such as logs and rocks are limited in their abundance, attributed to the restricted size. Coarse litter is abundant, whilst fine leaf litter is sparse and bare ground is common throughout.

Plate 3 Banksia Woodland Habitat

6.2.1.2 Eucalyptus Woodland

The Eucalyptus Woodland habitat extends for 1.12 ha (4% of the survey area) and represents the edge of a larger area of remnant native vegetation. Areas of larger remnant native vegetation provides an important refuge for fauna species within the surrounding developed area. The Eucalyptus Woodland habitat consists of large mature trees, primarily Tuart *Eucalyptus gomphocephala* and Marri *Corymbia calophylla* over a variable understorey species.

Coarse leaf litter is abundant through the habitat, providing excellent shelter and foraging habitat which may be utilised by species such as the Quenda *Isoodon fusciventer* and the Black-striped Snake *Neelaps calonotos.* Large logs (>30cm) were infrequent while small logs were abundant.

The Eucalyptus Woodland habitat represents suitable roosting, foraging and breeding habitat for Black Cockatoo species due to the presence of mature tall trees and proximity of a water source.

Plate 4 Eucalyptus Woodland Habitat

6.2.1.3 Mixed Shrubland

The Mixed Shrubland habitat extends for 1.84 ha (5% of the survey area), occurring sporadically throughout the survey area and varying in size. Composition alters, but it provides a unique ecological niche within the survey area for smaller animals such as birds and reptiles due to a higher plant density generally observed compared to more open habitats such as a Eucalyptus Woodland. Densely branched shrubs provide greater protection from predation when foraging and nesting. The habitat includes isolated planted shrubs, as well as remnant native vegetation shrublands. Species included *Acacia saligna, Calothamnus quadrifidus, Callistemon phoenicus* and various *Melaleuca* species.

Smaller logs occur throughout the habitat type, but large logs and rocks were rarely observed. Grasses were abundant, with coarse leaf litter occurring occasionally.

Plate 5 Mixed Shrubland Habitat

6.2.1.4 Trees Over Cleared

The Trees Over Cleared habitat type is the most abundant habitat type. It extends for 2.13 ha (7% of the survey area) and consists of planted street trees along with isolated native trees over grasses and weeds. There is minimal variation and limited microhabitats throughout the habitat type. Leaf litter is infrequent, with minimal logs and fallen branches present. The habitat would primarily be used by invertebrates and flighted species such as birds and microbats that shelter, breed and forage in the mature trees.

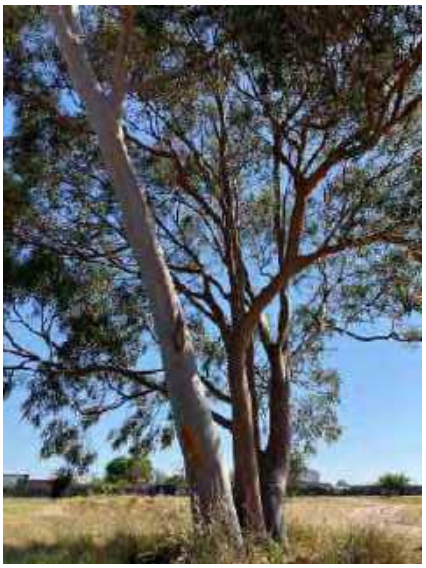

Plate 6 Trees Over Cleared Habitat

6.2.2 Fauna Inventory

A total of 15 vertebrate fauna species were recorded during the field survey. This comprised of 11 bird, three mammal and one reptile species. A complete inventory of fauna species recorded within the survey area is provided in Table 30.

One introduced species was recorded, the European Rabbit *Oryctolagus cuniculus*, listed as a Declared Pest (s22(2)) under the BAM Act. The species is common throughout Western Australia.

Table 30 Fauna observations within the Padbury-Wangara survey area

Class	Scientific Name	Common Name	Method
Mammal	*Isoodon fusciventer*	Quenda	Foraging evidence
Mammal	*Macropus fuliginosus melanops*	Western Grey Kangaroo	Seen. Scats observed
Mammal	*Oryctolagus cuniculus*	European Rabbit	Seen
Bird	*Rhipidura leucophrys*	Willie Wagtail	Seen and heard
Bird	*Eolophus roseicapilla*	Galah	Seen and heard
Bird	*Calyptorhynchus banksii naso*	Forest Red-tailed Black Cockatoo	Foraging evidence
Bird	*Zanda latirostris*	Carnaby's Cockatoo	Seen and heard. Foraging evidence
Bird	*Falco cenchroides*	Nankeen Kestrel	Seen
Bird	*Phylidonyris longirostris*	New Holland Honeyeater	Seen and heard
Bird	*Spilopelia senegalensis*	Laughing Dove	Seen and heard

Class	Scientific Name	Common Name	Method
Bird	*Threskiornis molucca*	Australian White Ibis	Seen
Bird	*Anthochaera carunculata*	Red Wattlebird	Seen and heard
Bird	*Trichoglossus moluccanus*	Rainbow Lorikeet	Seen and heard
Bird	*Cacatua sanguinea*	Little Corella	Seen and heard
Reptile	*Tiliqua rugosa rugosa*	Bobtail/Shingleback Lizard	Seen

6.2.3 Conservation Significant Fauna

Three conservation significant fauna species were recorded including two bird species and one mammal species:

- Carnaby's Cockatoo (*Zanda latirostris)* listed as Endangered under the EPBC Act and BC Act
- Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso)* listed as Vulnerable under the EPBC Act and BC Act
- Quenda (*Isoodon fusciventer)* listed as Priority 4 by DBCA.

Carnaby's Cockatoos were seen and heard during the survey. Foraging evidence was recorded for the Forest Red-tailed Black Cockatoo. Quenda presence was recorded via distinct foraging evidence (Plate 7). Evidence of conservation significant species is mapped in Figure 9.

Fauna habitat is considered suitable for another four conservation significant fauna species, assessed as moderately likely to occur post-survey:

- Baudin's Cockatoo (*Zanda baudinii*) listed as Endangered under the EPBC Act and BC Act
- Peregrine Falcon (*Falco peregrinus*) listed as Other Specially Protected Fauna under the BC Act
- Black-striped Snake (*Neelaps calonotos*) listed as Priority 3 by DBCA
- Swan Coastal Plain Shield-backed Trapdoor Spider (*Idiosoma sigillatum*) listed as Priority 3 by DBCA

Habitat descriptions and conservation significant species likely to utilise this habitat is defined in Table 31.

Plate 7 Typical conical-shaped Quenda digging - foraging evidence

Table 31 Area (ha) of suitable habitat for significant fauna species within the survey area

Species	Area of Suitable Habitat (ha)				Total (ha)
	Eucalyptus Woodland	Banksia Woodland	Trees Over Cleared	Mixed Shrubland	
Carnaby's Cockatoo (*Zanda latirostris*)	1.12	0.74	2.13		6.68
Baudin's Cockatoo (*Zanda baudinii)*	1.12		2.13		5.94
Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*)	1.12		2.13		5.94
Peregrine Falcon (*Falco peregrinus*)	1.12	0.74	2.13	1.84	8.09
Quenda (*Isoodon fusciventer*)	1.12	0.74		1.84	3.27
Black-striped Snake (*Neelaps calonotos*)	1.12	0.74		1.84	3.27
Swan Coastal Plain Shield-backed Trapdoor Spider (*Idiosoma sigillatum*)		0.74			0.74

6.3 Targeted Black Cockatoo Survey

6.3.1 Foraging

The survey area has been assessed as a score of 10 ‘High-quality foraging habitat’ for both the Carnaby’s Cockatoo and Forest Red-tailed Black Cockatoo in accordance with the Commonwealth Black Cockatoo Referral Guidelines foraging tool (DAWE, 2022) (Table 32). No subtractions were made for these two species. The survey area has been assessed as a score of 8 for Baudin’s Cockatoo due to an absence of foraging evidence during the survey.

The survey area contains mature Banksia Woodlands and Eucalyptus Woodlands, with suitable foraging species including multiple proteaceous species, Marri *Corymbia calophylla* and Tuart *Eucalyptus gomphocephala* trees.

Table 32 Black Cockatoo Foraging Habitat Assessment (DAWE, 2022)

Starting score		Baudin's Cockatoo (*Zanda baudinii)*		Carnaby's Cockatoo (*Zanda latirostris)*		Forest Red-Tailed Black Cockatoo *(Calyptorhynchus banksii naso)*	
		Start at a score of 10 if your site is native eucalypt woodlands and forest, and proteaceous woodland and heath, particularly Marri, within the range of the species, including along roadsides and parkland cleared areas. Can include planted vegetation**. This tool only applies to sites equal to or larger than 1 hectare in size.**		**Start at a score of 10** if your site is native shrubland, kwongan heathland or woodland, dominated by proteaceous plant species such as *Banksia* spp. (including *Dryandra* spp.), *Hakea* spp. and *Grevillea* spp., as well as native eucalypt woodland and forest that contains foraging species, within the range of the species, including along roadsides and parkland cleared areas. Also includes planted native vegetation. **This tool only applies to sites equal to or larger than 1 hectare in size.**		**Start at a score of 10** if your site is Jarrah or Marri woodland and/or forest, or if it is on the edge of Karri Forest, or if Wandoo and Blackbutt occur on the site, within the range of the subspecies, including along roadsides and parkland cleared areas. **This tool only applies to sites equal to or larger than 1 hectare in size.**	
Attribute	Sub-tractions	Context adjustor (attributes reducing functionality of foraging habitat).					
Foraging potential	**-2**	**Subtract 2** from your score if there is no evidence of feeding debris on your site.	☒	**Subtract 2** from your score if there is no evidence of feeding debris on your site.	☐	**Subtract 2** from your score if there is no evidence of feeding debris on your site.	☐
Connectivity	**-2**	**Subtract 2** from your score if you have evidence to conclude that there is no other foraging habitat within 12 km of your site.	☐	**Subtract 2** from your score if you have evidence to conclude that there is no other foraging habitat within 12 km of your site.	☐	**Subtract 2** from your score if you have evidence to conclude that there is no other foraging habitat within 12 km of your site.	☐
Proximity to breeding	**-2**	**Subtract 2** if you have evidence to conclude that your site is more than 12 km from breeding habitat.	☐	**Subtract 2** if you have evidence to conclude that your site is more than 12 km from breeding habitat.	☐	**Subtract 2** if you have evidence to conclude that your site is more than 12 km from breeding habitat.	☐

Starting score		Baudin's Cockatoo (*Zanda baudinii)*		Carnaby's Cockatoo (*Zanda latirostris)*		Forest Red-Tailed Black Cockatoo *(Calyptorhynchus banksii naso)*	
Proximity to roosting	**-1**	**Subtract 1** if you have evidence to conclude that your site is more than 20 km from a known night roosting habitat.	☐	**Subtract 1** if you have evidence to conclude that your site is more than 20 km from a known night roosting habitat.	☐	**Subtract 1** if you have evidence to conclude that your site is more than 20 km from a known night roosting habitat.	☐
Impact from significant plant disease	**-1**	**Subtract 1** if your site has disease present (e.g. *Phytophthora* spp. or Marri canker) and the disease is affecting more than 50% of the preferred food plants present.	☐	**Subtract 1** if your site has disease present (e.g. *Phytophthora* spp. or Marri canker) and the disease is affecting more than 50% of the preferred food plants present.	☐	**Subtract 1** if your site has disease present (e.g. *Phytophthora* spp. or Marri canker) and the disease is affecting more than 50%of the preferred food plants present.	☐
		8		**10**		**10**	

The refined foraging habitat value using the BCE (2020) method considered known breeding and roosting sites, and the characteristics associated with each fauna habitat type. The following factors influenced the results:

- There is a confirmed white-tailed Black Cockatoo (Baudin's or Carnaby's) roosting site less than 200 m south of the survey area (DBCA, 2023c).
- The survey area is less than 2 km from the buffer zone of a confirmed breeding site (DBCA, 2023c).
- There is 13,250 ha of native vegetation within 15 km of the survey area. Native vegetation within the survey area (2.95 ha) represents 0.01% of the available foraging habitat therefore species context is rated as 0.
- Carnaby's Cockatoos were observed resting and foraging in *Banksia grandis* within the survey area, as well as flying over (Plate 8).
- Foraging evidence was identified for Forest Red-Tailed Black Cockatoos within the survey area, with individuals also heard calling.

Plate 8 Carnaby's Cockatoos seen foraging on a *Banksia grandis* in the survey area.

The Banksia Woodland represents 'Moderate to High' Carnaby's Cockatoo foraging habitat. This represents a site condition score of 6 and a stocking score of 1 attributed to the presence of favourable foraging species and foraging evidence. This same fauna habitat represents 'Low' foraging habitat for Baudin's Cockatoo and Forest Red-tailed Black Cockatoo due to the lack of preferred foraging species such as *Eucalyptus marginata*, *Eucalyptus todtiana* or *Corymbia calophylla*.

The Eucalyptus Woodland fauna habitat represented 'Moderate' quality for the three Cockatoos with site scores of 3 and 4 and stocking rate of 1 for Carnaby's and Forest Red-tailed Black Cockatoos. The score was influenced by the abundance of suitable foraging species such as *Corymbia calophylla*, *Eucalyptus gomphocephala* and *Banksia grandis* and presence of foraging evidence.

The Mixed Shrubland habitat scored a 1 and 2 for the three Cockatoos, representing 'Negligible' and 'Low' quality lacking suitable foraging species.

The Trees over Cleared represented 'Low' quality for Carnaby's representing open woodland of small-fruited Eucalypt species. It was considered 'Low to Moderate' for Baudin's and Forest Red-tailed Black Cockatoo with a total score of 3 for Baudin's and 4 for Forest Red-tailed Black Cockatoos due to foraging evidence being present.

The low values reflect the absence or low abundance of foraging species present resulting in lower site condition scores and lower site context scores.

Foraging habitat scores for each habitat type are shown in Table 33 and mapped in Figure 10.

Table 33 Padbury-Wangara refined foraging score calculation (Bamford, 2020)

Habitat Type	Carnaby's Cockatoo	Baudin's Cockatoo	Forest Red-tailed Black Cockatoo	Extent (ha)
Mixed Shrubland	2	1	1	1.84
Banksia Woodlands	7	2	2	0.73
Eucalyptus Woodland	4	4	5	1.12
Trees Over Cleared	2	3	4	2.13

Table 34 Padbury-Wangara foraging habitat extent

Foraging Habitat Quality	Carnaby's Cockatoo (ha)	Baudin's Cockatoo (ha)	Forest Red-tailed Black Cockatoo (ha)
1: Negligible	0	1.84	1.84
2: Low	3.97	0.74	0.74
4-6: Moderate	1.86	3.25	3.25
7: Moderate to High	0	0	0
8-10: High.	0	0	0
Total	5.83	5.83	5.83

6.3.2 Breeding

A total of 103 potential nesting trees with a suitable DBH (>500 mm) were recorded within and adjacent to the survey area (Table 35, Figure 10). The majority were Tuart (*Eucalyptus gomphocephala*) and Marri (*Corymbia calophylla*) trees.

Two suitable nesting trees (Tuart) were identified supporting five potentially suitable nest hollows (Plate 9, Plate 10). One of these hollows is currently occupied by Little Corellas and one may be too small to be suitable, however this is unable to be determined from ground-level observations. This assessment is limited to observations made from the ground.

Table 35 Potential nesting trees

Tree Species	Total Trees with DBH >500 mm
Tuart (*Eucalyptus gomphocephala*)	47
Marri (*Corymbia calophylla*)	29
Jarrah (*Eucalyptus marginata*)	5
Other	6
Introduced	16
Total	**103**

Table 36 Suitable nesting tree details including species and hollow dimensions.

ID	Species	Hollow Entrance (Depth x Width)	Height Above Ground (m)	Hollow Angle	Facing	Hollow Type	Evidence of Use
54	Tuart (*Eucalyptus gomphocephala*)	15 x 15 cm	12	Vertical	North-west	Trunk	Chew Marks
		10 x 10 cm	8	Vertical	South-west	Branch	None
		20 x 20 cm	18	Vertical	North-west	Trunk	Chew Marks
		10 x 10 cm	8	Vertical	South	Trunk	Chew Marks
84	Tuart (*Eucalyptus gomphocephala*)	15 x 15 cm	8	Vertical	North-west	Trunk	Chew Marks

Plate 9 Hollow on potentially suitable nesting tree ID84 Tuart (*Eucalyptus gomphocephala*)

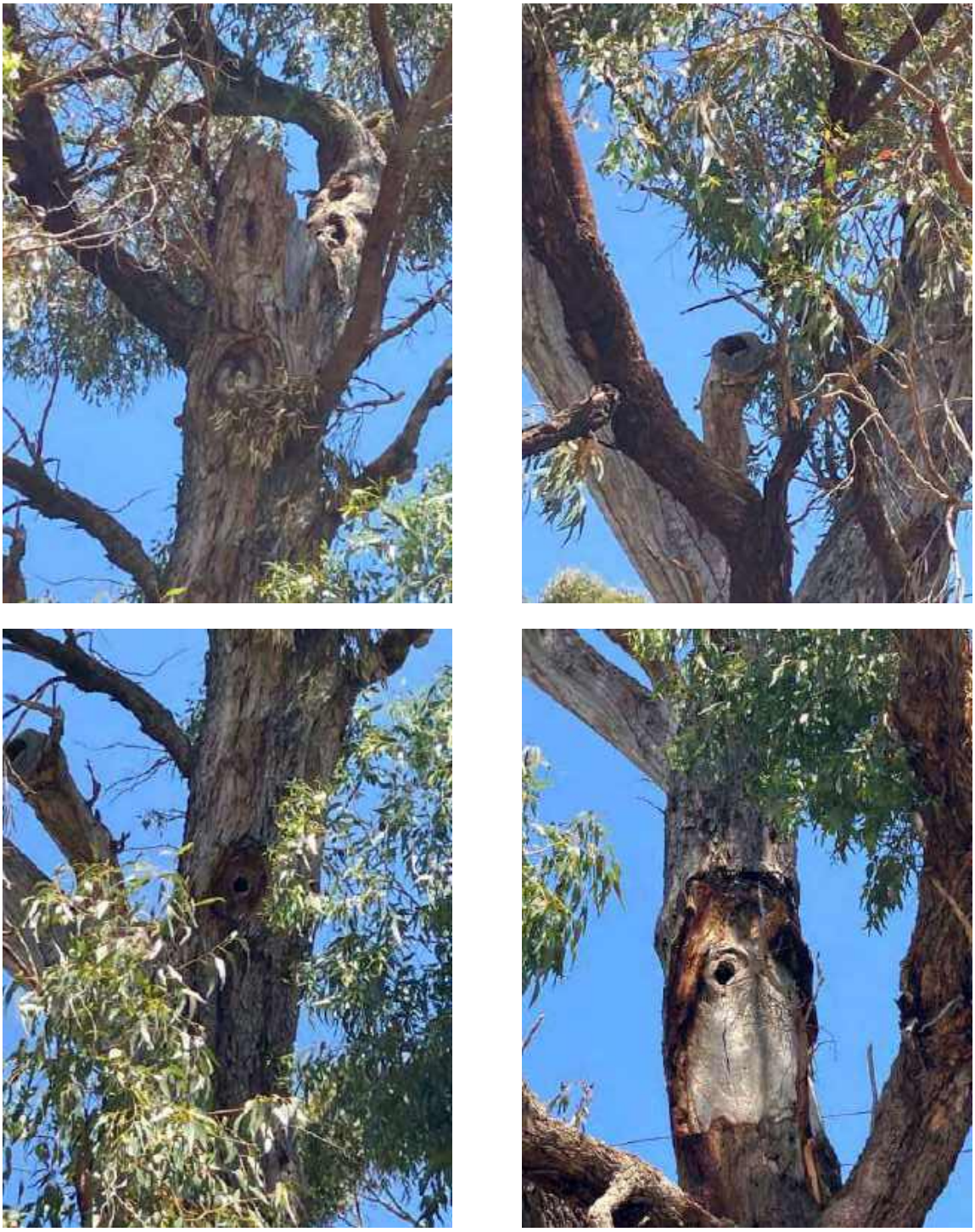

Plate 10 Hollows recorded on potentially suitable nesting tree ID54 Tuart (*Eucalyptus gomphocephala*)

6.3.3 Roosting

Sixty-nine confirmed white-tailed Black Cockatoo and Forest Red-tailed Black Cockatoo roosting sites occur within 15 km of the survey area. Seven of these occur within 5 km and one within 1 km of the survey area (DBCA, 2023c).

No roosting sites were observed within the survey area. There is a water source within 2 km of the survey area, foraging habitat is present in the local area and there are mature Eucalypt trees present. The Eucalyptus Woodland fauna habitat would therefore provide suitable roosting habitat. There is a known roosting site within Pinnaroo Valley Memorial Park, adjacent to the survey area.

6.4 Discussion

6.4.1 Flora and Vegetation

Native vegetation was mapped for 2.95ha of the survey area, representing 10% of the total area. The survey area intersects with Bush Forever Sites 299 and 303. Site 299 Yellagonga Regional Park represents Tamala Limestone and holocene swamp deposits on Spearwood and Quindalup dune systems (Govt. of WA, 2000). It comprises mostly Banksia and Jarrah woodlands, Marri woodlands and Tuart woodlands and is part of a recognised Greenway (Govt. of WA, 2000). Site 303 Whitfords Avenue Bushland represents Spearwood and Quindalup dunes and includes limestone ridges and vegetated uplands. It comprises Tuart woodlands and Banksia woodlands with emergent Jarrah trees (Govt. of WA, 2000).

Four native vegetation communities and three modified communities were mapped two Banksia Woodlands communities BaAbAb (0.15 ha, 0.5%) and BaAlTe (0.58 ha, 2%), one Tuart Woodland EgHcPp (1.12 ha, 3.9%) and one Callitris Woodland CpMsLo (0.48 ha, 1.6%). patch met the requirements presented in the Conservation Advice. Each patch represents isolated occurrences that are less than 2 ha, supported low native diversity, and therefore did not meet the condition and size thresholds.

Tuart Woodlands TEC was anticipated to occur, as a known occurrence is mapped within this area. One patch of Tuart Woodlands TEC was confirmed. It extends for 0.50 ha within the survey area, representing the edge of a larger patch estimated at more than 30 ha. This patch represents Bush Forever Site 303 which is mapped as more than 75% Very Good to Good and 25% Degraded (Govt of WA, 2000). The vegetation within the survey area is part of the 25% of mapped Degraded vegetation. It is adjacent to native vegetation for 50% of the edge (north) and a major road (Whitfords Avenue). The vegetation continues on the south side of Whitfords Avenue. The patch is within the highly developed and cleared urban area of Perth and provides an important refuge for native flora and fauna species.

All native vegetation was close to roads and urban development. Historical impacts from these including clearing and introduction and spread of weeds have resulted in a reduction in flora diversity and absence of suitable habitat for significant flora species. Flora diversity equally represented native and weed species (39 native compared to 30 weed species). A biological survey completed nearby along Mitchell Freeway found 217 flora species (145 native compared to 72 weed species) within 42.2 ha (Astron, 2020). Flora diversity is comparable given the smaller size of the survey area.

No significant flora species were recorded. This was expected, as the desktop assessment did not identify any species considered to have a high likelihood of occurrence, and large parts of the survey area were historically disturbed.

All areas of native vegetation were traversed on foot during the ideal detection period for target significant species. Further, all species that were not recorded in sample sites were sampled opportunistically. No suitable habitat was identified for most species given the degradation of the area and proximity to development. As such, all species considered to have a moderate likelihood of occurrence were downgraded to a low likelihood post-survey. Table 37 provides a summary of pre-survey and post-survey likelihood of occurrence for species identified as potentially occurring within the survey area.

Table 37 Summary of Padbury-Wangara likelihood of occurrence pre-survey and post-survey

Likelihood	Number of Species Identified					
	Known	High Likelihood	Moderate Likelihood	Low Likelihood	Negligible Likelihood	Total
Pre-survey	0	0	34	27	21	82
Post-survey	0	0	0	34	48	82

6.4.2 Fauna

Fifteen fauna species were recorded during the field survey. This included eleven birds, three mammals and one reptile. Three significant fauna species were recorded including two bird species and one mammal species:

- Carnaby's Cockatoo (*Zanda latirostris)* listed as Endangered under the EPBC Act and BC Act
- Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso)* listed as Vulnerable under the EPBC Act and BC Act
- Quenda (*Isoodon fusciventer)* listed as Priority 4 by DBCA.

Following the survey, a post-survey likelihood desktop assessment was completed. Details of all the conservation significant species considered to have a high or known post-survey likelihood and their associated habitats is presented in Table 38. Those which have been downgraded from a high likelihood due to the post-survey assessment are also discussed.

Four native fauna habitats were defined and mapped for the survey area based on the results of the field assessment. These habitats include Banksia Woodland, Eucalyptus Woodland, Trees Over Cleared and Mixed Shrubland.

The significant fauna species are most likely to utilise Eucalyptus Woodland and Banksia Woodland areas where native understorey density was higher, generally associated with vegetation condition of 'Good' or better.

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Table 38 Fauna species which are known or moderately likely to utilise associated fauna habitat within the Padbury-Wangara survey area.

Species	Conservation code (EPBC/State WA)	Habitat	Number of DBCA Records and Distance	Pre survey likelihood of occurrence	Post survey likelihood of occurrence	Discussion
Carnaby's Cockatoo (*Zanda latirostris*)	E (EPBC Act) EN (BC Act)	Uncleared or remnant native Eucalypt woodlands containing Salmon gum and Wandoo, and in shrubland or Kwongan heathland dominated by Hakea, Dryandra, Banksia and Grevillea species. It also occurs in remnant patches of native vegetation on land otherwise cleared for agriculture. Forages seasonally in pine plantations (DCCEEW, 2023)	There are 9264 records on the DBCA database, the closest record is 0.08 km away from the survey area and was most recently sighted in 2020.	High	Known	This species was observed foraging in Banksia trees within the survey area. It is likely to use the Eucalyptus Woodland, Banksia Woodland and Trees Over Cleared habitat types for foraging and roosting within the survey area. These habitats are found outside of and directly adjacent to the survey area.
Baudin's Cockatoo (*Zanda baudinii*)	E (EPBC Act) EN (BC Act)	Temperate forest and woodland dominated by *Eucalyptus marginata* (Jarrah), *Corymbia calophylla* (Marri) and *E. diversicolor* (Karri) (TSSC, 2018).	There are 136 records on the DBCA database, the closest record is 7.51 km away from the survey area and was most recently sighted in 2015.	High	Moderate	This species may use the Eucalyptus Woodland, Banksia Woodland and Trees Over Cleared habitat types within the survey area. This habitat is found outside of and directly adjacent to the survey area.
Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*)	V (EPBC Act) VU (BC Act)	Inhabits dense *Eucalyptus marginata* (Jarrah), *E. diversicolor* (Karri) and *Corymbia calophylla* (Marri) forests (TSSC, 2009).	There are 363 records on the DBCA database, the closest record is 1.2 km away from the survey area and was most recently sighted in 2020.	High	Known	This species is likely to use the Eucalyptus Woodland, Banksia Woodland and Trees Over Cleared habitat types within the survey area. Foraging evidence for the Forest Red-tailed Black Cockatoo was also recorded within the survey area. These habitats are found outside of and directly adjacent to the survey area.
Quenda (*Isoodon fusciventer*)	P4	Forest, woodland, heath, and shrub communities, with sandy soils and dense heathy vegetation (Van Dyck & Strahan, 2008). The presence of accumulated coarse leaf litter is suitable foraging habitat for the Quenda.	There are over 1588 records within 10 km of the survey area, with the closest record occurring at 0.04 km. The most recent of these was recorded in 2021.	High	High	This species is likely to use Eucalyptus Woodland, Mixed Shrubland and Banksia Woodland habitats within the survey area. These habitats are found outside of and directly adjacent to the survey area.

Species	Conservation code (EPBC/State WA)	Habitat	Number of DBCA Records and Distance	Pre survey likelihood of occurrence	Post survey likelihood of occurrence	Discussion
		Quenda foraging activity was observed throughout these habitat types.				
Black-striped Snake (*Neelaps calonotos*) listed as Priority 3 by DBCA	P3	Restricted to sandy coastal strip near Perth, WA between Mandurah and Cataby, with isolated populations north, near Eneabba and Dongara. Dunes and vegetated sand plains with heaths and Eucalyptus/Banksia woodlands are preferred habitats (Wilson and Swan 2023).	There are 97 records on the DBCA database, the closest record is 0.61 km away from the survey area. The most recent record is in 2017.	High	Moderate	Dense leaf litter which is known to occur in sandy Banksia Woodlands of the survey area (Bush et al., 2010) is the preferred habitat type of this species. This species may utilise areas where native understorey density in Banksia Woodlands and Eucalyptus Woodlands was higher, generally associated with vegetation condition of 'Good' or better. These habitats are found outside of and directly adjacent to the survey area.
Swan Coastal Plain Shield-backed Trapdoor Spider (*Idiosoma sigillatum*)	P3	Remnant habitats in Banksia woodland and heathland on sandy soils (Rix et al., 2018).	There are 124 records on the DBCA database, the closest record is 0.24 km away from the survey area. The most recent record is in 2019.	High	Moderate	This species may utilise areas where native understorey density in Banksia Woodlands was higher, generally associated with vegetation condition of 'Good' or better. This habitat is found outside of and directly adjacent to the survey area.
Peregrine Falcon (*Falco peregrinus*)	OS	Utilises most habitat types, from forests to urban areas. The greatest influence on presence is the abundance of prey and secure nest sites (Birdlife Australia, 2024).	There are 109 records on the DBCA database, with the closest record 0.54 km away from the survey area. The most recent record is 2014.	Moderate	Moderate	The species may utilise the area for hunting, particularly the Eucalyptus Woodland and Banksia Woodland habitats. Breeding is unlikely, as suitably high buildings are not present within the survey area. The suitable habitat types are not limited to the survey area.

6.4.3 Targeted Black Cockatoo

The survey area is within the known range for the three threatened Black Cockatoo species. Both the Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksia naso*) and Carnaby's Cockatoo (*Zanda latirostris*) were observed foraging and resting within the survey area. There were 103 potential nesting trees with a suitable DBH (>500 mm) identified with the survey area. Two potentially suitable nesting trees were identified, which have multiple hollows with a potentially suitable entrance size for black cockatoos. Presently, this survey area is not within the known breeding range of any of the black cockatoo species.

The survey area scored a foraging habitat score of 10 for both the Carnaby's Cockatoo and Forest Red-tailed Black Cockatoo in accordance with the DAWE 2022 guidelines. The survey area has been assessed as a score of 8 for Baudin's Cockatoo, due to an absence of foraging evidence during the survey. The BCE (2020) scoring method defined the area as supporting Negligible to High foraging quality. This quality is primarily associated with the Banksia Woodland and Eucalyptus Woodland habitat types, which includes suitable foraging species such as *Banksia attenuata*, *Banksia menziesii, Eucalyptus gomphocephala* and *Eucalyptus todtiana*. A permanent water source presence nearby, confirmed sighting during the survey, and extent of suitable foraging habitat in the vicinity all contributed to the foraging score. The small size and reduced quality of the foraging habitat within the survey area limited the overall quality score for Forest Red-tailed Black Cockatoos, with higher quality foraging habitat occurring outside the survey area. The small patch of Banksia Woodlands was observed to be well utilised by Carnaby's Cockatoos, with a small flock observed foraging on *Banksia grandis* during the survey. This patch was rated as High quality for the species.

The trees within the survey area are unlikely to be utilised as a roosting site. The entire survey area corridor incorporates busy metropolitan roads and crosses a Freeway. Alternative roosting sites would be present further from infrastructure and potentially light pollution further from the survey area. A large roosting site for black cockatoos is known to occur in the Tuart Woodland within Pinnaroo Valley Memorial Park, which is directly adjacent to the survey area.

The local area supports both urban and conservation land use. It is situated on the edge of a significant corridor of native vegetation which includes Craigie Bushland. The native vegetation in the vicinity is in better condition, protected in Bush Forever Sites 299 and 303 that support favoured foraging species in higher abundance compared to that found in the survey area.

7.0 Pinjar Terminal Results and Discussion

7.1 Flora

7.1.1 Vegetation Communities

One native Banksia Woodland community, BaAcCc was defined and mapped for 14.75 ha (89%). The remaining 1.82 ha represents cleared areas devoid of vegetation. Vegetation community descriptions are presented in Table 39 and mapped on Figure 8.

Table 39 Pinjar vegetation community descriptions and photographs

Description	Additional Details	Photograph
Native Vegetation		
BaAcCc *Banksia attenuata* Woodland *Banksia attenuata and Banksia menziesii* woodland over *Adenanthos cygnorum* subsp. *cygnorum, Xanthorrhoea preissii, Kunzea glabrescens* open shrubland over *Conostylis candicans, Patersonia occidentalis* and *Lomandra sericea* forbland. Represents the Banksia Woodlands TEC. It was located on white sandy soil on gently undulating terrain.	Survey effort: NSR05, CHQ06, CHQ07 supplemented by AECOM (2022b) Q12 situated 200 m from survey area. Species richness: 55 species Condition: Very Good to Excellent Extent: 14.75 ha	

7.1.2 Conservation Significant Vegetation

One TEC listed under the EPBC Act was verified to occur. No communities listed under the BC Act were identified in the survey area.

One patch of Banksia Woodland TEC (Patch 3) was assessed against the key diagnostic characteristics outlined in the DEE (2016) Conservation Advice. The patch met the key characteristics, size and condition threshold to be considered representative of the federally protected ecological community. The Banksia Woodlands TEC is mapped for 14.75 ha in the survey area.

One Priority 3 PEC was also identified through FCT analysis, FCT 23b Swan Coastal Plain *B. attenuata-B. menziesii* woodlands. This FCT represent a component of the Banksia Woodlands TEC. Similarity was high when comparing against Gibson and Keighery data varying between 43-47% across CHQ06 and CHQ07 (Table 41). Clustering further supported the inferred FCT23b. FCT23b is inferred for all Banksia Woodlands within the survey area and represents the federally listed Banksia Woodlands TEC.

The patch assessment is presented in Table 40 below.

Table 40 Pinjar Banksia TEC patch assessment

<table>
<tr><td>ID</td><td>Patch 3</td></tr>
<tr><td>Date</td><td>CH06, CHQ07, NSR05 scored on 18-Oct-23</td></tr>
<tr><td>Location</td><td>On the Swan Coastal Plain, on the Bassendean System.</td></tr>
<tr><td>Patch vegetation description</td><td>Represents BaAcCc, a Banksia woodland dominated by B. attenuata and B. menziesii.</td></tr>
<tr><td>Structure</td><td>Represents a low woodland.</td></tr>
<tr><td>Tree Data incl. height, canopy percent cover and dominance</td><td>
<table>
<tr><th rowspan="2">Species</th><th colspan="2">CHQ06</th><th colspan="2">CHQ07</th><th colspan="2">NSR05</th></tr>
<tr><th>Ht (cm)</th><th>Cover</th><th>Ht (cm)</th><th>Cover</th><th>Ht (cm)</th><th>Cover</th></tr>
<tr><td>B. attenuata</td><td>1000</td><td>40</td><td>700</td><td>30</td><td>350</td><td>7</td></tr>
<tr><td>B. menziesii</td><td>850</td><td>10</td><td>500</td><td>4</td><td>-</td><td>-</td></tr>
<tr><td>Allocasuarina humilis</td><td>160</td><td>8</td><td>-</td><td>-</td><td>-</td><td>-</td></tr>
</table>
</td></tr>
<tr><td>Native understorey present (%) and diversity</td><td>Excludes trees.
<table>
<tr><th>Species</th><th>CHQ06</th><th>CHQ07</th><th>NSR05</th></tr>
<tr><td>Cover (%)</td><td>76.8</td><td>58.6</td><td>57.2</td></tr>
<tr><td>Diversity total</td><td>36</td><td>36</td><td>17</td></tr>
</table>
</td></tr>
<tr><td>Weed cover (%) and dominant weed species</td><td>
<table>
<tr><th>Species</th><th>CHQ06</th><th>CHQ07</th><th>NSR05</th></tr>
<tr><td>Cover (%)</td><td>0.1</td><td>0.1</td><td>0.2</td></tr>
<tr><td>Dominant species</td><td>*Gladiolus caryophyllaceus</td><td>*Gladiolus caryophyllaceus</td><td>No clear dominant</td></tr>
</table>
</td></tr>
<tr><td>Soil type and colour</td><td>White-grey sand</td></tr>
<tr><td>Landform</td><td>Undulating sandy terrain</td></tr>
<tr><td>Size of patch</td><td>Within survey area: 14.75 ha
Estimated total extent: >1,000 ha</td></tr>
<tr><td>Summary</td><td>The patch meets the condition and size thresholds to be considered representative of the Commonwealth listed TEC.</td></tr>
</table>

Photograph	

Table 41 Pinjar floristic community type analysis results

Quadrat	Gibson (1994)				Keighery (2012)			Final Determination	
	% Similar	FCT	Site	Dendrogram	% Similar	FCT	Site	Dendrogram	
CHQ06	43	23b	YAN-19	Broadly clustering with FCT 23a and 23b (super group 3).	44	12	MP04	Broadly clustering with FCT 23b and 23c (super group 3).	**FCT 23b** • Correct landform: Bassendean system • Soils: white-grey sand • Key species: 13 of 19 typical species present
	42	21a	NINE-2		43	23b	YAN-19		
	39	23b	MILT-3		43	21c	ELE25		
CHQ07	49	21a	NINE-2	Broadly clustering with FCT 23a and 23b (super group 3).	52	21a	NINE-2	Broadly clustering with FCT 23b S (super group 3).	**FCT 23b** • Correct landform: Bassendean system • Soils: white-grey sand • Key species: 10 of 19 typical species present
	45	23b	ELDO-1		47	23b	ELE28		
	43	23b	YAN-19		46	23b	ELE08		

7.1.3 Vegetation Condition

Areas of native vegetation were mostly in Excellent condition (12.48 ha, 85%). Minor weed invasion was present which is expected on the Swan Coastal Plain, particularly where parcels of vegetation have been dissected by tracks. Areas where rubbish, or more aggressive weeds were present were mapped as Very Good. No areas of Pristine vegetation were encountered since the survey area generally followed existing powerlines and associated access tracks.

Cleared areas represent areas devoid of vegetation and are not included in percentage calculations below. Vegetation condition is mapped on Figure 8 and extent of each category is presented in Table 42 below.

Table 42 Vegetation condition extent

Condition Rating	Extent (ha)	Percent of Total Area
Excellent	12.48	85%
Very Good	2.27	15%
Total	**14.75**	**100%**
Cleared	1.82	

7.1.4 Conservation Significant Flora

No significant flora species were recorded in the Pinjar survey area.

7.1.5 Flora Inventory

A total of 55 flora species from 27 families were recorded. The total includes 53 (96%) locally native species and two (4%) introduced or naturalised weed species. No weed species listed as Weeds of National Significance (WONS) or listed as Declared Pests under the BAM Act were recorded.

Families with the highest representation are Myrtaceae (6 native taxa), Proteaceae (six native taxa), and Goodeniaceae (four native taxa).

The comprehensive list of vascular flora species recorded, organised by family and the community they occur in is presented in Appendix D. Quantitative data recorded from individual samples sites is presented in Appendix E.

7.2 Fauna

7.2.1 Fauna Habitat Assessment

One fauna habitat was mapped, described below and mapped in Figure 9. Cleared areas are mapped for occurs over 1.82 ha and comprising 11% of the survey area. Tracks and scats were sporadically observed along the cleared tracks that provides connectivity between areas of native vegetation. Predatory species such as foxes, hawks or falcons may take advantage of these spaces for hunting smaller species.

Banksia Woodland was mapped for 14.75 ha, comprising 89% of the survey area. It is characterised by an overstorey of *Banksia attenuata*, *Banksia menziesii, Nuytsia floribunda* and *Eucalyptus todtiana* over predominantly Proteaceous and Myrtaceous shrubs of variable density and height.

This habitat type contains occasional large logs (>30cm in diameter) and abundant small logs (<10cm). Vines are not present. Small hollows were observed in mature trees. Rocks occur sporadically on the deep grey sands typical of the Swan Coastal Plain. Coarse and fine leaf litter was abundant, fine leaf litter is common and areas of bare ground was rare.

Plate 11 Banksia Woodland Habitat

7.2.2 Fauna Inventory

A total of 13 vertebrate fauna species were recorded during the field survey. This comprised of seven bird, three mammal and three reptile species. A complete inventory of fauna species recorded within the survey area is provided in Table 43.

One introduced species was recorded, the European Rabbit *Oryctolagus cuniculus*, which is listed as a Declared Pest (s22(2)) under the BAM Act.

Table 43 Fauna observations within the Pinjar Terminal survey area

Class	Scientific Name	Common Name	Observation Method
Mammal	*Isoodon fusciventer*	Quenda	Foraging evidence
Mammal	*Macropus fuliginosus melanops*	Western Grey Kangaroo	Seen, tracks and scats recorded
Mammal	*Vulpes vulpes*	Red Fox	Seen
Bird	*Phylidonyris longirostris*	New Holland Honeyeater	Seen
Bird	*Colluricincla harmonica*	Grey Shrike-thrush	Seen and heard
Bird	*Phylidonyris niger*	White-cheeked Honeyeater	Seen and heard
Bird	*Lichmera indistincta*	Brown Honeyeater	Seen and heard
Bird	*Acanthiza uropygialis*	Chestnut-rumped Thornbill	Seen
Bird	*Malurus splendens*	Splendid Fairy-wren	Seen and heard
Bird	*Accipiter fasciatus*	Brown Goshawk	Seen and heard
Reptile	*Pseudonaja affinis*	Dugite	Seen
Reptile	*Tiliqua occipitalis*	Blue tongue	Seen
Reptile	*Tiliqua rugosa rugosa*	Bobtail/Shingleback Lizard	Seen

7.2.3 Conservation Significant Fauna

One conservation significant fauna species was recorded during the survey, Quenda (*Isoodon fusciventer)* listed as Priority 4 by DBCA. Distinct foraging evidence was observed (Plate 12), mapped in Figure 9.

An additional three species are considered to have a high potential to occur within the survey area due to the presence of suitable habitat and recent records within the surrounding area. These include:

- Carnaby's Cockatoo (*Zanda latirostris*) listed as Endangered under the EPBC Act and BC Act
- Black-striped Snake (*Neelaps calonotos*) listed as Priority 3 by DBCA
- Swan Coastal Plain Shield-backed Trapdoor Spider (*Idiosoma sigillatum*) listed as Priority 3 by DBCA

Plate 12 Typical Conical-Shaped Quenda Digging - Foraging Evidence

7.3 Targeted Black Cockatoo Survey

7.3.1 Foraging

The survey area has been assessed as a score of 8 ‘High-quality foraging habitat’ for Carnaby’s Cockatoo in accordance with the Commonwealth Black Cockatoo Referral Guidelines foraging tool (DAWE, 2022) (Table 44). The survey area contains mature Banksia Woodlands, with suitable foraging species including multiple proteaceous species and one subtraction was relevant due to a lack of foraging evidence.

No evidence of any of the three Threatened Black Cockatoo species were observed during the survey. No suitable breeding trees, foraging evidence or hollows were recorded.

Table 44 Black Cockatoo Foraging Habitat Assessment (DAWE, 2022)

Starting score		Carnaby's Cockatoo (*Zanda latirostris*)	
		Start at a score of 10 if your site is native eucalypt woodlands and forest, and proteaceous woodland and heath, particularly Marri, within the range of the species, including along roadsides and parkland cleared areas. Can include planted vegetation. **This tool only applies to sites equal to or larger than 1 hectare in size.**	
Attribute	Sub-tractions	Context adjustor (attributes reducing functionality of foraging habitat).	
Foraging potential	**-2**	**Subtract 2** from your score if there is no evidence of feeding debris on your site.	☒
Connectivity	**-2**	**Subtract 2** from your score if you have evidence to conclude that there is no other foraging habitat within 12 km of your site.	☐
Proximity to breeding	**-2**	**Subtract 2** if you have evidence to conclude that your site is more than 12 km from breeding habitat.	☐
Proximity to roosting	**-1**	**Subtract 1** if you have evidence to conclude that your site is more than 20 km from a known night roosting habitat.	☐
Impact from significant plant disease	**-1**	**Subtract 1** if your site has disease present (e.g. *Phytophthora* spp. or Marri canker) and the disease is affecting more than 50% of the preferred food plants present.	☐
		8	

Table 45 Pinjar Terminal refined foraging score calculation (Bamford, 2020)

Habitat Type	Carnaby's Cockatoo	Extent (ha)
Banksia Woodlands	6	14.75

Table 46 Pinjar Terminal foraging habitat extent

Foraging Habitat Quality	Carnaby's Cockatoo (ha)
1: Negligible	0
2: Low	0
4-6: Moderate	14.75
7: Moderate to High	0
Total	14.75

The refined foraging habitat value considered known breeding and roosting sites, and the characteristics associated with each fauna habitat type. The following factors influenced the results:

- There is a confirmed white-tailed Black Cockatoo roosting site less than 400 m west of the survey area (DBCA, 2023c).
- The survey area is 15 km from the buffer zone of a confirmed breeding area (DBCA, 2023c).
- There is suitable foraging habitat adjacent to the survey area. Native vegetation within the survey area represents <0.1% of the available foraging habitat within a 15 km radius. Site context is therefore 0.
- No evidence of foraging, or potential nesting trees were observed. Stocking rate was therefore 0.

The Banksia Woodland fauna habitat areas scored 6 for Carnaby's Cockatoo according to the BCE (2020) scoring tool representing 'Moderate' Quality. This is attributed to the condition of the vegetation and the number of Proteaceous foraging species present.

No score was given for Baudin's Cockatoo or Forest Red-tailed Black Cockatoo as the survey area falls outside their known range. Foraging habitat is mapped in Figure 10.

7.3.2 Breeding

No breeding habitat was observed within the survey area.

7.3.3 Roosting

No roosting sites were observed within the survey area. There are no tall trees or riparian vegetation within 2 km of the survey area, therefore roosting is unlikely. There are 32 confirmed roosting sites for white-tailed Black Cockatoos and Forest Red-tailed Black Cockatoos within 15 km from the survey area.

7.4 Discussion

7.4.1 Flora and Vegetation

The survey area is situated within Gnangara State Forest and Bush Forever Site 280. This Site is characterised by a mixture of *Eucalyptus* and *Banksia* woodlands. The survey area is intersected by a powerline and associated access track.

The vegetation was mapped as Banksia Woodland, extending 14.75

One Priority 3 PEC listed by the DBCA (2023) was confirmed, supported by FCT analysis. FCT23b northern *Banksia attenuata – B. menziesii* woodlands was considered likely to occur. This FCT represents Banksia woodlands generally restricted to the Bassendean system, with subgroup b having lower species richness than the other subgroups and a significantly lower mean weed frequency, reflecting the more extensive intact *Banksia* woodlands that occur north of Perth (Gibson et al. 1993).

Flora diversity was considered average with 53 species recorded. The diversity is typical of FCT23b (54.8 species per 10x10 m quadrat). Diversity is comparable to a nearby biological survey undertaken for the SCAR 4 Project (AECOM, 2022a) recorded 145 flora species from a long linear corridor encompassing eight vegetation communities. No significant flora species were recorded. Approximately 25% of the survey area has been subjected to targeted flora searches previously (AECOM, 2022a) and no significant flora species were recorded at that time within or near the survey

area. Following the two survey events, 17 of the 18 species with a moderate likelihood have been reduced to low or negligible (Table 47). These all represent perennial species that would have been detectable at the time of the surveys.

One species, *Poranthera moorokatta* (P2), was investigated further to determine its post-survey likelihood. *P. moorokatta* is an inconspicuous annual herb that may have been overlooked. The species was described in 2012 at which time it was known from two locations: Kings Park and Ellenbrook. In Kings Park it was recorded on white silica sand in open spaces between shrubs, not in shaded areas or in areas of high leaf litter cover (Barret, 2012). In Ellenbrook it was recorded in a shallow dampland on mixed grey-white sand with scattered leaf litter (Barret, 2012).

The Banksia Woodlands in the survey area supports 'open spaces between shrubs' and therefore represents suitable habitat. This annual species is 16-47 mm tall, flowers late September to early November and is often confused with the common *P. microphylla* (Barret, 2012). The Ellenbrook population is 17 km from the survey area situated low in the landscape. The Pinjar survey area is on a sand dune, more than 15 km from a known location and has been surveyed twice (partially). The species was therefore reduced to having a 'Low' likelihood.

Table 47 Summary of Pinjar likelihood of occurrence pre-survey and post-survey

Likelihood	Number of Species Identified					
	Known	High Likelihood	Moderate Likelihood	Low Likelihood	Negligible Likelihood	Total
Pre-survey	0	0	18	13	35	66
Post-survey	0	0	0	18	48	66

7.4.2 Fauna

Thirteen vertebrate fauna species were recorded during the field survey. This included seven birds, three mammals and three reptile species. Foraging evidence of the Priority 4 Quenda (*Isoodon fusciventer*) was recorded at three locations within the survey area. This species was considered likely to occur in the desktop study, with 1588 DBCA records known from the vicinity and the habitat present is typical Quenda habitat as described below.

All native vegetation was mapped as Banksia Woodland fauna habitat. This habitat represented an overstorey of Banksia species over a diverse native sclerophyllous understorey over herbs and scattered grasses. This habitat provides ideal refuge and foraging habitat for common fauna species. It is highly connected, with 90% of the perimeter buffered by intact native vegetation. This high connectivity supports fauna movement into and through the survey area.

Following the survey, a post-survey likelihood desktop assessment was completed. Details of all the conservation significant species considered to have a high or known post-survey likelihood and their associated habitats is presented in Table 48. Those which have been downgraded from a high likelihood due to the post-survey assessment are also discussed.

The Banksia Woodlands habitat is considered suitable habitat for Quenda (*Isoodon fusciventer*), Carnaby's Cockatoos (*Zanda latirostris*), the Swan Coastal Plain Shield-backed Trapdoor Spider (*Idiosoma sigillatum*), and Black-striped Snake (*Neelaps calonotos*).

The accumulated coarse leaf litter provides shelter for lizards to dig small burrows, suitable hunting habitat for many birds of prey, and shelter and foraging habitat for small mammals like Priority listed Quenda and Black-striped Snake (*Neelaps calonotos*). The Black-striped Snake is known to prefer sheltering and foraging within leaf litter in Banksia Woodlands in sandy soil (Bush et al., 2010). The sandy soil and presence of leaf litter are also a key habitat component for the Swan Coastal Plain Shield-backed Trapdoor Spider (*Idiosoma sigillatum*).

The larger trees present within the Banksia Woodlands provide nesting, perching and roosting locations for various bird species. These trees are also suitable foraging species for Carnaby's Cockatoo which was observed foraging in *Banksia* trees within the survey area.

Table 48 Fauna species and associated fauna habitat within the Pinjar Terminal survey area

Species	Conservation code (EPBC/State WA)	Habitat	Number of DBCA Records and Distance	Pre survey likelihood of occurrence	Post survey likelihood of occurrence	Discussion
Fauna species likely to utilise fauna habitat within the Pinjar Terminal survey area						
Carnaby's Cockatoo (*Zanda latirostris*)	E (EPBC Act) EN (BC Act)	Uncleared or remnant native Eucalypt woodlands containing Salmon gum and Wandoo, and in shrubland or Kwongan heathland dominated by Hakea, Dryandra, Banksia, and Grevillea species. It also occurs in remnant patches of native vegetation on land otherwise cleared for agriculture. Forages seasonally in Pine plantations (DCCEEW, 2023)	There are 9264 records on the DBCA database, the closest record is 0.12 km away from the survey area. The most recent record is in 2020.	High	High	This species is likely to use the Banksia Woodland habitats within the survey area. This habitat can also be found outside, and surrounding, the survey area.
Quenda (*Isoodon fusciventer*)	P4	Forest, woodland, heath, and shrub communities, with sandy soils and dense heathy vegetation (Van Dyck & Strahan, 2008). The presence of accumulated coarse leaf litter is suitable foraging habitat for the Quenda. Quenda foraging activity was observed throughout these habitat types.	There are 1588 records on the DBCA database, the closest record is 9.09 km away from the survey. The most recent record is in 2021.	High	Known	This species is likely to use the Banksia Woodland habitats within the survey area. This habitat can also be found outside, and surrounding, the survey area.
Black-striped Snake (*Neelaps calonotos*) listed as Priority 3 by DBCA	P3	Restricted to sandy coastal strip near Perth, WA between Mandurah and Cataby, with isolated populations north, near Eneabba and Dongara. Dunes and vegetated sand plains with heaths and Eucalyptus/Banksia woodlands are preferred habitats (Wilson and Swan 2023).	There are 97 records on the DBCA database, the closest record is 12.37 km away from the survey area. The most recent record is in 2017.	High	High	Dense leaf litter which is known to occur in Banksia Woodlands of the survey area (Bush et al., 2010) is also the preferred habitat type of this species. This species may utilise areas where native understorey density in Banksia Woodlands was higher, generally associated with vegetation condition of 'Good' or better. Banksia woodland habitat is also found outside, the survey area.

Species	Conservation code (EPBC/State WA)	Habitat	Number of DBCA Records and Distance	Pre survey likelihood of occurrence	Post survey likelihood of occurrence	Discussion
Swan Coastal Plain Shield-backed Trapdoor Spider (*Idiosoma sigillatum*)	P3	Remnant habitats in Banksia woodland and heathland on sandy soils (Rix et al., 2018).	There are 124 records on the DBCA database, the closest record is 14.46 km away from the survey area. The most recent record is in 2019.	High	High	This species is likely to use the Banksia Woodland habitats within the survey area. This habitat can also be found outside, and surrounding, the survey area.
Fauna species unlikely to utilise fauna habitat within the Pinjar Terminal survey area						
Baudin's Cockatoo (*Zanda baudinii*)	E (EPBC Act) EN (BC Act)	Temperate forest and woodland dominated by *Eucalyptus marginata* (Jarrah), *Corymbia calophylla* (Marri) *and E. diversicolor* (Karri) (TSSC, 2018).	There are 136 records on the DBCA database, the closest record is 20.79 km away from the survey area. The most recent record is in 2015.	High	Low	This species is unlikely to use the Banksia Woodland habitats within the survey area. This habitat can also be found outside, and surrounding, the survey area.
Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*)	V (EPBC Act) VU (BC Act)	Inhabits dense *Eucalyptus marginata* (Jarrah), *E. diversicolor* (Karri) and *Corymbia calophylla* (Marri) forests (TSSC, 2009).	There are 363 records on the DBCA database, the closest record is 16.93 km away from the survey area. The most recent record is in 2020.	High	Low	This species is unlikely to use Banksia Woodland habitats within the survey area. This habitat can also be found outside, and surrounding, the survey area.

7.4.3 Targeted Black Cockatoo

The survey area is within the known range for Carnaby's Cockatoo and Forest Red-tailed Black Cockatoo species. No foraging evidence or breeding habitat was recorded, and no Cockatoos were observed flying or heard 'calling' during the field survey.

The survey area has a DAWE (2022) foraging habitat score of 8 for Carnaby's Cockatoo. One detractor was relevant, a lack of foraging evidence, and the survey area represents intact vegetation. There was no evidence of Dieback observed during the survey. These observations are limited to assessing Banksia condition which was noted to be healthy.

The BCE (2020) score for Banksia Woodlands is considered 'Moderate' quality (score of 6) for Carnaby's Cockatoo. This is associated with the presence of suitable foraging species such as *Banksia attenuata*, *Banksia menziesii,* and *Eucalyptus todtiana*. The known occurrence of multiple roosting sites within 15 km of the survey area, and extent of suitable foraging habitat in the vicinity all contributed to the foraging score.

Black Cockatoo species prefer to roost in tall trees high in the landscape. No such trees were present in the survey area therefore roosting is considered unlikely.

8.0 Neerabup Terminal and East Wanneroo Results and Discussion

8.1 Flora

8.1.1 Vegetation Communities

Native vegetation was mapped for 77.09 ha represented by 12 vegetation communities. Non-native vegetation represented Planted vegetation (Pine and street trees), mapped for 15.07 ha and Cleared mapped for 109.50 ha. The vegetation is summarised below and presented in detail in Table 49 and mapped in Figure 8:

- five Banksia Woodlands
  - BaAcDf: low-lying *Banksia attenuata* woodland, represents the federal TEC and a Priority 3 PEC (FCT 21c)
  - BaAhDf: high diversity *Banksia attenuata* woodland recorded in Wanneroo adjacent to Lake Gnangara, represents the federal TEC
  - BaRcGt: a low-diversity *Banksia attenuata-Banksia menziesii* woodland isolated to Neerabup Terminal, represents the federal TEC
  - BmAcPo: remnant *Banksia menziesii* woodland occurring in an isolated location in Gnangara State Forest, represents the federal TEC.
  - BmEpLi: remnant *Banksia menziesii* woodland occurring in an isolated location in Gnangara State Forest, with a denser understorey than BmAcPo and also epresenting the federal TEC.
- two Eucalypt Woodlands
  - CcXpDf: diverse Marri woodland adjacent to Banksia Woodland and pine plantation throughout Gnangara State Forest
  - EgGlCe: a Tuart Woodland limited to Neerabup Terminal
- three Melaleuca Woodlands representing riparian vegetation
  - MpHaDb: isolated remnant wetland community.
  - MpHaEc: diverse *Melaleuca preissiana* woodlands community.
  - MpXpDb: disturbed wetland community, surrounded by development and historically disturbed.
- disturbed native vegetation
  - PpAcCe: Pine plantation regrowth with variable native understorey component.
  - Trees: parkland cleared with stands or isolated native trees and/or shrubs.

Two non-native areas:

- Planted: **Pinus pinaster* plantations and planted street trees/shrubs
- Cleared: devoid of any species

Table 49 Vegetation community descriptions and photographs

Description	Additional Detail	Photograph
Banksia Woodlands		
BaAcDf *Banksia attenuata, Banksia menziesii* and *Nuytsia floribunda* low open woodland over *Adenanthos cygnorum, Macrozamia fraseri* and *Gompholobium tomentosum* mid open shrubland over *Desmocladus flexuosus, Patersonia occidentalis* and *Corynotheca micrantha* low forbland. Represents Banksia Woodland TEC and FCT 21C PEC. Associated with surface water hydrology, adjacent to Jandabup Lake and provides important ecological functions including erosion control and prevention of sedimentation for the Lake. It was located on grey-white sandy soil on gently sloping terrain.	Survey effort: CHQ10 Native species richness: 28 Weed species richness: 4 Area: 0.85 ha, represents 1% of vegetation Condition: Very Good to Excellent	
BaAhDf *Banksia attenuata, B. menziesii* and *Eucalyptus todtiana* low open woodland over *Allocasuarina humilis, Calytrix flavescens* and *Eremaea pauciflora* var. *pauciflora* low shrubland over *Desmocladus flexuosus, Patersonia occidentalis* and **Ursinia anthemoides* low open forbland. Represents Banksia Woodland TEC. It was located on white sandy soil on flat terrain.	Survey effort: CHQ14, CHQ15 Native species richness: 48 Weed species richness: 10 Area: 2.27 ha, represents 3% of vegetation Condition: Degraded to Excellent	

Description	Additional Detail	Photograph
BaRcGt *Banksia attenuata, B. menziesii* and *Eucalyptus rudis* open woodland over *Regelia ciliata, Kunzea glabrescens* and *Gompholobium tomentosum* shrubland over *Ficinia nodosa* and *Lyginia imerbis* sedgeland Represents Banksia Woodlands TEC. It was located on white sandy soil on undulating terrain. Relevé completed in the 0.6 ha of Excellent vegetation.	Survey effort: CHR07 Native species richness: 14 Weed species richness: 3 Area: 3.03 ha, represents 4% of vegetation Condition: Good to Excellent	
BmAcPo *Banksia menziesii* and *Banksia attenuata* low open woodland over *Adenanthos cygnorum* subsp. *cygnorum, Regelia ciliata* and *Acacia pulchella* open shrubland over *Patersonia occidentalis, *Carpobrotus edulis* and *Dampiera linearis* forbland. Represents Banksia Woodland TEC. It was located on white-grey sandy soil on flat terrain.	Survey effort: NSR08 Native species richness: 19 Weed species richness: 7 Area: 0.1 ha, represents <1% of vegetation Condition: Very Good	

Description	Additional Detail	Photograph
BmEpLi *Banksia menziesii, Banksia attenuata, Allocasuarina fraseriana* low open woodland over *Eremaea purpurea, Hibbertia hypercoides* and *Macrozamia fraseri* open shrubland over *Lyginia imerbis, Lepidosperma leptostachyum* and *Mesomelaena pseudostygia* sedgeland. Represents Banksia Woodland TEC. It was located on white sandy soil on gently undulating terrain.	Survey effort: CHQ11, CHQ12 and CHQ13 Native species richness: 68 Weed species richness: 7 Area: 8.88 ha, represents 11% of vegetation Condition: Excellent	
Eucalypt Woodlands		
CcXpDf *Corymbia calophylla, Eucalyptus marginata* and *Banksia attenuata* open woodland over *Xanthorrhoea preissii, Jacksonia floribunda* and *Leucopogon pulchellus* shrubland over *Desmocladus flexuosus, Lomandra micrantha* and *Dasypogon bromeliifolius* forbland. It was located on grey sandy soil on flat terrain. Under-represented with only one relevé completed.	Survey effort: CHR10 Native species richness: 20 Weed species richness: 4 Area: 3.30 ha, represents 4% of vegetation Condition: Very Good to Excellent	

Description	Additional Detail	Photograph
EgGlCe *Eucalyptus gomphocephala, Eucalyptus rudis* and *Banksia grandis* open woodland over *Gastrolobium linearifolium, Kunzea glabrescens* and *Xanthorrhoea preissii* over **Carpobrotus edulis, *Disa bracteata* and **Euphorbia terracina* sparse forbland. It was located on grey sandy soil on flat terrain.	Survey effort: CHQ08, NSR06, CHR06 Native species richness: 28 Weed species richness: 14 Area: 1.37 ha, represents 2% of vegetation Condition: Degraded and Very Good	
Wetland		
MpHaDb *Melaleuca preissiana* and **Pinus pinaster* woodlands over *Hypocalymma angustifolium, Kunzea glabrescens* and **Acacia longifolia* subsp. *longifolia* shrubland over *Dasypogon bromeliifolius, Dianella revoluta* and **Carpobrotus edulis* forbland. Represents a degraded isolated wetland. Could be representative of other wetlands mapped in survey area but difficult to tell due to degradation. Represents riparian vegetation. It was located on white-grey sandy soil on sloped terrain.	Survey effort: NSR09 Native species richness: 8 Weed species richness: 8 Area: 0.58 ha, represents 1% of vegetation Condition: Good	

Description	Additional Detail	Photograph
MpHaEc *Melaleuca preissiana* woodlands over *Hypocalymma angustifolium, Kunzea glabrescens* and *Jacksonia furcellata* shrubland over **Ehrharta calycina* and *Microlaena stipoides* grassland. Represents riparian vegetation situated on the edge of a basin that is likely to be winter-wet. Has an association with surface and/or groundwater hydrology. It was located on grey sandy soil on sloped terrain.	Survey effort: CHQ09 Native species richness: 10 Weed species richness: 6 Area: 0.12 ha, represents <1% of vegetation Condition: Very Good	
MpXpDb *Melaleuca preissiana open woodland* over *Xanthorrhoea preissii, Banksia dallanneyi* and *Beaufortia elegans* open shrubland over *Dasypogon bromeliifolius, Desmocladus fasciculatus* and *Patersonia occidentalis* closed forbland. Likely represents remnant native vegetation in an ephemeral wetland, although it is not mapped as a known geomorphic wetland. It was located on grey sandy soil on low flat terrain.	Survey effort: CHR09 Native species richness: 12 Weed species richness: 3 Area: 0.38 ha, represents <1% of vegetation Condition: Excellent	
Disturbed Native Vegetation		
Trees	Survey effort: observations only	

Description	Additional Detail	Photograph
Scattered native species including but not limited to *Eucalyptus, Banksia, Acacia, Xanthorrhoea* and *Melaleuca* species. Soil type and terrain varied throughout the survey area.	Area: 8.13 ha, represents 11% of vegetation Condition: Completely Degraded	
PpAcCe Pine regrowth **Pinus pinaster* tall, isolated trees over *Adenanthos cygnorum* var. *cygnorum*, *Xanthorrhoea preissii* and *Macrozamia fraseri* tall to mid sparse shrubland over **Carpobrotus edulis, *Pelargonium capitatum* and **Ornithopus pinnatus* low sparse forbland. Includes isolated occurrences of common native species *E. todtiana, E. marginata, Acacia pulchella, Hemiandra pungens, Lechenaultia floribunda, Jacksonia furcellata.* Located on grey-white sandy soil with terrain varying throughout the survey area.	Survey effort: CHR08, NSR07 Native species richness: 22 Weed species richness: 15 Area: 48.08 ha, represents 62% of vegetation Condition: Completely Degraded and Degraded	
Non-Native Vegetation		
Planted Dominated by **Pinus pinaster* or planted street trees/shrubs. Soil type and terrain varied throughout the survey area.	Survey effort: observations only Area: 15.07 ha	N/A

8.1.2 Conservation Significant Vegetation

Eight patches of Banksia Woodland TEC were assessed against the key diagnostic characteristics outlined in the DEE (2016) Conservation Advice. All eight patches met the key characteristics, size and condition threshold to be considered representative of the federally protected ecological community. The Banksia Woodlands TEC is mapped for 15.13 ha, shown in Figure 8. Detailed assessments are provided below.

Three patches of Tuart Woodlands TEC were assessed against the key diagnostic characteristics outlined in the DEE (2019) Conservation Advice. One of these represents the federally protected ecological community, mapped for 1.71 ha. Detailed assessments are provided below.

8.1.2.1 Banksia Woodlands TEC Assessments

Patch 4 (Table 50) represents Banksia Woodlands located on Hawkins Road, on the edge of Jandabup Nature Reserve. The patch is 0.60 ha within the survey area and is part of a larger patch greater than 4 ha. It is in Excellent condition, represents the federal TEC and FCT 21c – a Priority 3 PEC.

Patch 5 (Table 51) represents Banksia Woodlands located in Gnangara State Forest east of Lake Gnangara. The patch is 2.26 ha as part of a larger patch approximately 100 ha. It is in Good to Excellent condition, represents the federal TEC and FCT 23a.

Patch 6 (Table 52) represents Banksia Woodlands within Neerabup Terminal in Wanneroo. The patch is 3.03 ha within the survey area and is not part of a larger patch. It is in Good to Excellent condition. No FCT was inferred for this patch. It represents the federal TEC.

Patch 7 (Table 53) represents regenerated native vegetation in Gnangara State Forest. The patch is 0.10 ha within the survey area and is part of a larger patch greater than 10 ha. It is in Very Good condition. No FCT was inferred for this patch. It represents the federal TEC.

Patch 8 (Table 54) represents Banksia Woodlands within Gnangara State Forest south of Neaves Road. The patch extends for 0.72 ha within the survey area and is part of a larger patch greater than 17 ha. It is in Excellent condition and represents FCT 23a. It represents the federal TEC.

Patch 9 (Table 55) represents Banksia Woodland within Gnangara State Forest, north of Gnangara Road. The patch extends 8.16 ha and is part of a larger, greater than 200 ha patch. It is in Excellent condition and represents FCT 23a. It represents the federal TEC.

Patch 10 (Table 56) and Patch 11 (Table 57) represent Banksia Woodlands that extend from the road verge within the survey area (largely Degraded) into private property. Patch assessments are based on observations made from the edge as any accessible areas were Degraded and not representative of the values of the patch observed within the property. In both cases, the Banksia Woodland outside the survey area was considered in Very Good condition. The patches represent areas of 0.17 ha and 0.09 ha within the survey area respectively and are part of larger patches more than 5 ha. This assumes that inaccessible vegetation is in similar condition and of similar diversity. These patches represent the federal TEC.

Table 50 Patch 4 Banksia TEC Assessment

<table>
<tr><td>ID</td><td>Patch 4</td></tr>
<tr><td>Date</td><td>CHQ10, scored on 20-Oct-23</td></tr>
<tr><td>Location</td><td>On Hawkins Road, on the edge of Jandabup Nature Reserve.</td></tr>
<tr><td>Patch vegetation description</td><td>Represents BaAcDf, described in Section 8.1.1</td></tr>
<tr><td>Structure</td><td>Low open woodland</td></tr>
<tr><td>Tree Data incl. height, canopy percent cover and dominance</td><td>
<table>
<tr><th rowspan="2">Species</th><th colspan="2">CHQ10</th></tr>
<tr><th>Ht</th><th>Cover</th></tr>
<tr><td>B. attenuata</td><td>800</td><td>40</td></tr>
<tr><td>B. menziesii</td><td>700</td><td>15</td></tr>
</table>
</td></tr>
<tr><td>Native understorey present (%) and diversity</td><td>Excludes trees.
<table>
<tr><th>Species</th><th>CHQ10</th></tr>
<tr><td>Cover (%)</td><td>86.7</td></tr>
<tr><td>Diversity total</td><td>25</td></tr>
</table>
</td></tr>
<tr><td>Weed cover (%) and dominant weed species</td><td>
<table>
<tr><th>Species</th><th>CHQ10</th></tr>
<tr><td>Cover (%)</td><td>6.3</td></tr>
<tr><td>Dominant species</td><td>*Briza maxima</td></tr>
</table>
</td></tr>
<tr><td>Soil type and colour</td><td>Grey sand</td></tr>
<tr><td>Landform</td><td>Undulating terrain</td></tr>
<tr><td>Size of patch</td><td>Within survey area: 0.60 ha
Estimated total extent: 4.08 ha</td></tr>
<tr><td>Summary</td><td>This patch connects to other native vegetation, is mapped as Excellent condition and extends beyond the survey area boundary for over 4 ha. The patch meets the condition and size thresholds to be considered representative of the Commonwealth listed TEC.
It represents FCT 21c, a Priority 3 Ecological Community.</td></tr>
<tr><td>Photograph</td><td> </td></tr>
</table>

Table 51 Patch 5 Banksia TEC Assessment

<table>
<tr><td>ID</td><td>Patch 5</td></tr>
<tr><td>Date</td><td>Quadrats CHQ14 scored on 6-Nov-23, CHQ15 scored on 8-Nov-23</td></tr>
<tr><td>Location</td><td>Gnangara State Forest, to the east of Lake Gnangara.</td></tr>
<tr><td>Patch vegetation description</td><td>Represents BaAhDf, described in Section 8.1.1</td></tr>
<tr><td>Structure</td><td>Low open woodland</td></tr>
<tr><td>Tree Data incl. height, canopy percent cover and dominance</td><td>Low Banksia cover in CHQ15 is attributed to Quadrat placement rather than a reflection of Banksia absence.
<table>
<tr><th rowspan="2">Species</th><th colspan="2">CHQ14</th><th colspan="2">CHQ15</th></tr>
<tr><th>Ht</th><th>Cover</th><th>Ht</th><th>Cover</th></tr>
<tr><td>B. attenuata</td><td>600</td><td>4</td><td>800</td><td>15</td></tr>
<tr><td>B. menziesii</td><td>500</td><td>3.5</td><td>-</td><td>-</td></tr>
<tr><td>E. todtiana</td><td>250</td><td>2</td><td>-</td><td>-</td></tr>
</table></td></tr>
<tr><td>Native understorey present (%) and diversity</td><td>Excludes trees.
<table>
<tr><th>Species</th><th>CHQ14</th><th>CHQ15</th></tr>
<tr><td>Cover (%)</td><td>89.3</td><td>107.9</td></tr>
<tr><td>Diversity total</td><td>30</td><td>27</td></tr>
</table></td></tr>
<tr><td>Weed cover (%) and dominant weed species</td><td>
<table>
<tr><th>Species</th><th>CHQ14</th><th>CHQ15</th></tr>
<tr><td>Cover (%)</td><td>11.2</td><td>10.9</td></tr>
<tr><td>Dominant species</td><td>*Pentameris airoides</td><td>*Ursinia anthemoides</td></tr>
</table></td></tr>
<tr><td>Soil type and colour</td><td>White sand</td></tr>
<tr><td>Landform</td><td>Undulating terrain</td></tr>
<tr><td>Size of patch</td><td>Within survey area: 2.26 ha
Estimated total extent: >100 ha</td></tr>
<tr><td>Summary</td><td>The patch within the survey area represents the edge of a patch in Excellent condition. Within the survey area vegetation is mapped as Degraded, Good and Very Good with a small area along the northern edge mapped as Excellent. Adjacent vegetation outside the survey area is in Excellent condition and part of a large, connected area of native vegetation surrounding Lake Gnangara.</td></tr>
<tr><td>Photograph</td><td> </td></tr>
</table>

Table 52 Patch 6 Banksia TEC Assessment

<table>
<tr><td>ID</td><td>Patch 6</td></tr>
<tr><td>Date</td><td>Relevé CHR07 scored on 19-Oct-23</td></tr>
<tr><td>Location</td><td>Inside the fenced area within Neerabup Terminal.</td></tr>
<tr><td>Patch vegetation description</td><td>Represents BaRcGt – described in Section 8.1.1</td></tr>
<tr><td>Structure</td><td>Low open woodland</td></tr>
<tr><td>Tree Data incl. height, canopy percent cover and dominance</td><td>
<table>
<tr><th rowspan="2">Species</th><th colspan="2">CHR07</th></tr>
<tr><th>Ht</th><th>Cover</th></tr>
<tr><td>B. attenuata</td><td>500</td><td>7</td></tr>
<tr><td>B. menziesii</td><td>400</td><td>5</td></tr>
<tr><td>E. rudis</td><td>800</td><td>3</td></tr>
</table>
</td></tr>
<tr><td>Native understorey present (%) and diversity</td><td>Excludes trees.
<table>
<tr><th>Species</th><th>CHR07</th></tr>
<tr><td>Cover (%)</td><td>36.7</td></tr>
<tr><td>Diversity total</td><td>11</td></tr>
</table>
</td></tr>
<tr><td>Weed cover (%) and dominant weed species</td><td>
<table>
<tr><th>Species</th><th>CHR07</th></tr>
<tr><td>Cover (%)</td><td>0.7</td></tr>
<tr><td>Dominant species</td><td>*Carpobrotus edulis</td></tr>
</table>
</td></tr>
<tr><td>Soil type and colour</td><td>White sand</td></tr>
<tr><td>Landform</td><td>Gently undulating terrain</td></tr>
<tr><td>Size of patch</td><td>Within survey area: 3.03 ha</td></tr>
<tr><td>Summary</td><td>Banksia Woodland is isolated to within the Neerabup Terminal, disconnected from other areas of native vegetation by industrial development and internal roads.
Vegetation condition varied from Good to Excellent representing historical disturbance and partial clearing.
Patch meets size and condition thresholds.
Represents natural regeneration, as Landgate aerial imagery shows the vegetation was absent in 2010 (Plate 15).
.</td></tr>
<tr><td>Photograph</td><td> </td></tr>
</table>

Table 53 Patch 7 Banksia TEC Assessment

<table>
<tr><td>ID</td><td>Patch 7</td></tr>
<tr><td>Date</td><td>NSR08 scored on 20-Oct-23</td></tr>
<tr><td>Location</td><td>South of Neaves Road, west of Buloke Road in Gnangara State Forest</td></tr>
<tr><td>Patch vegetation description</td><td>BmAcPo – described in Section 8.1.1</td></tr>
<tr><td>Structure</td><td>Low open woodland</td></tr>
<tr><td>Tree Data incl. height, canopy percent cover and dominance</td><td>
<table>
<tr><th rowspan="2">Species</th><th colspan="2">NSR08</th></tr>
<tr><th>Ht</th><th>Cover</th></tr>
<tr><td>B. attenuata</td><td>600</td><td>4</td></tr>
<tr><td>B. menziesii</td><td>400</td><td>5</td></tr>
</table>
</td></tr>
<tr><td>Native understorey present (%) and diversity</td><td>Excludes trees.
<table>
<tr><th>Species</th><th>NSR08</th></tr>
<tr><td>Cover (%)</td><td>24.7</td></tr>
<tr><td>Diversity total</td><td>17</td></tr>
</table>
</td></tr>
<tr><td>Weed cover (%) and dominant weed species</td><td>
<table>
<tr><th>Species</th><th>NSR08</th></tr>
<tr><td>Cover (%)</td><td>0.9</td></tr>
<tr><td>Dominant species</td><td>No dominant</td></tr>
</table>
</td></tr>
<tr><td>Soil type and colour</td><td>Grey sand</td></tr>
<tr><td>Landform</td><td>Undulating terrain</td></tr>
<tr><td>Size of patch</td><td>Within survey area: 0.10 ha
Estimated total extent: >10 ha</td></tr>
<tr><td>Summary</td><td>Banksia Woodlands mapped as Very Good condition. Represents part of a larger patch that is connected to native vegetation. Intersected by various tracks and fence lines.
Patch meets size and condition thresholds.</td></tr>
<tr><td>Photograph</td><td> </td></tr>
</table>

Table 54 Patch 8 Banksia TEC Assessment

<table>
<tr><td>ID</td><td>Patch 8</td></tr>
<tr><td>Date</td><td>Quadrat CHQ11 scored on 20-Oct-23</td></tr>
<tr><td>Location</td><td>Gnangara State Forest, south of Neaves Road.</td></tr>
<tr><td>Patch vegetation description</td><td>BmEpLi – described in Section 8.1.1</td></tr>
<tr><td>Structure</td><td>Low open woodland</td></tr>
<tr><td>Tree Data incl. height, canopy percent cover and dominance</td><td>
<table>
<tr><th rowspan="2">Species</th><th colspan="2">CHQ11</th></tr>
<tr><th>Ht</th><th>Cover</th></tr>
<tr><td>B. attenuata</td><td>650</td><td>3</td></tr>
<tr><td>B. menziesii</td><td>750</td><td>12</td></tr>
<tr><td>Allocasuarina fraseriana</td><td>800</td><td>5</td></tr>
</table>
</td></tr>
<tr><td>Native understorey present (%) and diversity</td><td>Excludes trees.
<table>
<tr><th>Species</th><th>CHQ11</th></tr>
<tr><td>Cover (%)</td><td>20.8</td></tr>
<tr><td>Diversity total</td><td>21</td></tr>
</table>
</td></tr>
<tr><td>Weed cover (%) and dominant weed species</td><td>
<table>
<tr><th>Species</th><th>CHQ11</th></tr>
<tr><td>Cover (%)</td><td>2.4</td></tr>
<tr><td>Dominant species</td><td>* Pentameris airoides</td></tr>
</table>
</td></tr>
<tr><td>Soil type and colour</td><td>Grey sand</td></tr>
<tr><td>Landform</td><td>Flat</td></tr>
<tr><td>Size of patch</td><td>Within survey area: 0.72 ha
Estimated total extent: >17 ha</td></tr>
<tr><td>Summary</td><td>Banksia Woodland in Excellent condition with high connectivity to areas of native vegetation. Patch represents FCT 23a. Some weeds were present. Patch meets size and condition thresholds.</td></tr>
<tr><td>Photograph</td><td> </td></tr>
</table>

Table 55 Patch 9 Banksia TEC Assessment

<table>
<tr><td>ID</td><td>Patch 9</td></tr>
<tr><td>Date</td><td>Quadrats CHQ12 on 20-Oct-23, CHQ13 on 6-Nov-23</td></tr>
<tr><td>Location</td><td>Gnangara State Forest, north of Gnangara Road.</td></tr>
<tr><td>Patch vegetation description</td><td>BmEpLi – described in Section 8.1.1</td></tr>
<tr><td>Structure</td><td>Low open woodland</td></tr>
<tr><td>Tree Data incl. height, canopy percent cover and dominance</td><td>
<table>
<tr><th rowspan="2">Species</th><th colspan="2">CHQ12</th><th colspan="2">CHQ13</th></tr>
<tr><th>Ht</th><th>Cover</th><th>Ht</th><th>Cover</th></tr>
<tr><td>B. attenuata</td><td>700</td><td>10</td><td>800</td><td>6</td></tr>
<tr><td>B. menziesii</td><td>500</td><td>5</td><td>700</td><td>3</td></tr>
</table>
</td></tr>
<tr><td>Native understorey present (%) and diversity</td><td>Excludes trees.
<table>
<tr><th>Species</th><th>CHQ12</th><th>CHQ13</th></tr>
<tr><td>Cover (%)</td><td>50.8</td><td>61.4</td></tr>
<tr><td>Diversity total</td><td>46</td><td>38</td></tr>
</table>
</td></tr>
<tr><td>Weed cover (%) and dominant weed species</td><td>
<table>
<tr><th>Species</th><th>CHQ12</th><th>CHQ13</th></tr>
<tr><td>Cover (%)</td><td>1.5</td><td>1.2</td></tr>
<tr><td>Dominant species</td><td>No dominant</td><td>*Ursinia anthemoides</td></tr>
</table>
</td></tr>
<tr><td>Soil type and colour</td><td>White-grey sand</td></tr>
<tr><td>Landform</td><td>Gentle slopes, undulating terrain.</td></tr>
<tr><td>Size of patch</td><td>Within survey area: 8.16 ha
Estimated total extent: >200 ha</td></tr>
<tr><td>Summary</td><td>Patch meets size and condition thresholds.
This patch is part of a large area of Banksia Woodland in Gnangara State Forest in Excellent condition. Diversity was high. Patch represents FCT 23a.</td></tr>
<tr><td>Photograph</td><td> </td></tr>
</table>

Table 56 Patch 10 Banksia TEC Assessment

<table>
<tr><td>ID</td><td>Patch 10</td></tr>
<tr><td>Date</td><td>No sample site, patch observed from the edge.</td></tr>
<tr><td>Location</td><td>Located on Badgerup Road, south of Ashby Street and north of Jambanis Road.</td></tr>
<tr><td>Patch vegetation description</td><td>BaAcDf</td></tr>
<tr><td>Structure</td><td>Low open woodland</td></tr>
<tr><td>Tree Data incl. height, canopy percent cover and dominance</td><td>
<table>
<tr><th rowspan="2">Species</th><th colspan="2">Opportunistic Estimate</th></tr>
<tr><th>Ht</th><th>Cover</th></tr>
<tr><td>B. attenuata</td><td>600</td><td>10</td></tr>
<tr><td>B. menziesii</td><td>500</td><td>5</td></tr>
<tr><td>E. marginata</td><td>300</td><td>5</td></tr>
</table>
</td></tr>
<tr><td>Native understorey present (%) and diversity</td><td>Unable to be verified by quadrat data.</td></tr>
<tr><td>Weed cover (%) and dominant weed species</td><td>Unable to be verified by quadrat data.</td></tr>
<tr><td>Soil type and colour</td><td>White/grey sand</td></tr>
<tr><td>Landform</td><td>Flat</td></tr>
<tr><td>Size of patch</td><td>Within survey area: 0.17 ha
Estimated total extent: >5 ha</td></tr>
<tr><td>Summary</td><td>The assessment relied on observations made from the edge. Visual observation determined a condition rating of ‘Very Good’ is applicable. The patch represents part of a larger area greater than 2 ha. As such, the patch is considered representative of the federally listed TEC.</td></tr>
<tr><td>Photograph</td><td> </td></tr>
</table>

Table 57 Patch 11 Banksia TEC Assessment

<table>
<tr><td>ID</td><td>Patch 11</td></tr>
<tr><td>Date</td><td>No sample site, patch observed from the edge.</td></tr>
<tr><td>Location</td><td>Located on the corner of Lenore Road and Mary Street, Wanneroo, WA.</td></tr>
<tr><td>Patch vegetation description</td><td>BaAcDf</td></tr>
<tr><td>Structure</td><td>Low open woodland</td></tr>
<tr><td>Tree Data incl. height, canopy percent cover and dominance</td><td>
<table>
<tr><th rowspan="2">Species</th><th colspan="2">Opportunistic Estimate</th></tr>
<tr><th>Ht</th><th>Cover</th></tr>
<tr><td>B. attenuata</td><td>500</td><td>20</td></tr>
<tr><td>B. menziesii</td><td>400</td><td>15</td></tr>
</table>
</td></tr>
<tr><td>Native understorey present (%) and diversity</td><td>Unable to be verified by quadrat data.</td></tr>
<tr><td>Weed cover (%) and dominant weed species</td><td>Unable to be verified by quadrat data.</td></tr>
<tr><td>Soil type and colour</td><td>White-grey sand</td></tr>
<tr><td>Landform</td><td>Flat</td></tr>
<tr><td>Size of patch</td><td>Within survey area: 0.09 ha
Estimated total extent: >5 ha</td></tr>
<tr><td>Summary</td><td>The assessment relied on observations made from the edge. Visual observation determined a condition rating of ‘Good’ or potentially higher is applicable. The patch represents part of a larger area greater than 2 ha. As such, the patch is considered representative of the federally listed TEC.</td></tr>
<tr><td>Photograph</td><td> </td></tr>
</table>

8.1.2.2 Tuart Woodlands TEC Assessment

The three Tuart Woodland patches, including two verified as the Tuart Woodland TEC (Patch 4 and 5) are described below.

Patch 3

Patch 3 is located adjacent to Old Yanchep Road and the Neerabup Terminal and consists of minimal remnant vegetation with a limited understorey. The area is in Degraded condition, with only one native understorey species present. As the size of Patch 3 is greater than 0.5 ha but less than 5 ha in total, patch size condition thresholds apply. The patch does not meet the key diagnostic characteristics for the federally protected ecological community due to its small size and lack of a native understorey. The assessment is presented Table 58.

Table 58 Patch 3 Tuart Woodlands TEC assessment

Patch identification and location	The patch is located to the east of Old Yanchep Road, and west of Neerabup Terminal.
Key diagnostic characteristics	Yes • Occurs on Swan Coastal Plain. • Occurs on the Bassendean System. • Six mature (DBH >500 mm) *E. gomphocephala* trees were counted. • Patch 3 occurs as an open woodland. • Minimal native understorey was present, indicative of disturbance.
Species richness	Key indicators for the condition thresholds are outlined in the table below.

Parameter	CHR06
Proportion of understorey foliage that is native	22.2%
Native species richness	2

Condition	Poor condition (DEE, 2019) and Degraded (Keighery, 1994).
Size	0.68 ha
Variety within patch	The patch is small and has minimal variety within it. It consists of mature Tuart trees over one native shrub species and cleared / common pasture weeds.
Additional information e.g. buffer, connectedness, land use history	The patch is disconnected from other Tuart Woodland patches due to historical clearing. One native understorey species was observed: *Xanthorrhoea preissii*

Plate 13 Tuart Woodlands Patch 3

Patch 4

Patch 4 represents an area of Tuart Woodland east of Neerabup Terminal. The total area of Patch 4 is 1.71 ha and is restricted to the survey area. Condition thresholds are applicable. An assessment against the key diagnostic characteristics was undertaken, and condition was determined using quadrat data. The quadrat data indicates that the patch is somewhere between Very high and high condition with 12 native understorey species, but not more than 80% of the understorey is represented by native species.

In accordance with the condition and size thresholds, the patch would have to represent high condition understorey and either have an important landscape role, a habitat role, or show regeneration. This particular patch supports two mature Tuart trees with a DBH greater than 50 cm. As such, it meets the key diagnostic characteristics for the federally protected ecological community. The assessment is presented in Table 59 and mapped in Figure 8.

Table 59 Patch 5 Tuart Woodlands TEC assessment

<table>
<tr><td>Patch identification and location</td><td>Located to the east of Neerabup Terminal. The patch is represented by CHQ08.</td></tr>
<tr><td>Key diagnostic characteristics</td><td>Yes
Occurs on Swan Coastal Plain.
Occurs on the Bassendean System.
More than 37 mature (DBH >500 mm) E. gomphocephala trees were counted within the survey area.
Patch 4 occurs as an open woodland.
Includes native understorey species that vary in density reflective of level of disturbance.</td></tr>
<tr><td>Species richness</td><td>Key indicators for the condition thresholds are outlined in the table below.<table><tr><th>Parameter</th><th>CHQ08</th></tr><tr><td>Proportion of understorey foliage that is native</td><td>63.2%</td></tr><tr><td>Native species richness</td><td>12</td></tr></table></td></tr>
<tr><td>Condition</td><td>High condition (DEE, 2019).
Mapped as Very Good condition.</td></tr>
<tr><td>Size</td><td>Within survey area: 1.71 ha excluding non-native vegetation.
Does not extend beyond the survey area.</td></tr>
<tr><td>Variety within patch</td><td>The patch is open woodland, with minor variation in the density of understorey shrubs attributed to historical disturbance. Common introduced weeds have displaced native herbs.</td></tr>
<tr><td>Additional information e.g. buffer, connectedness, land use history</td><td>The patch represents rehabilitated land. Landgate aerial imagery shows the vegetation was absent in 2010 (Plate 15). It is disconnected from other patches of Tuart Woodland.</td></tr>
</table>

Plate 14 Tuart Woodlands Patch 4

Plate 15 Historically cleared areas within Neerabup Terminal: 2010 to current

Patch 5

Patch 5 represents Tuart Woodland east of Ziatas Road, west of Neerabup Terminal. The total area of Patch 5 (excluding non-native vegetation mapped as Cleared or Planted) is 1.63 ha and it does not extend beyond the survey area. Condition thresholds are applicable.

An assessment against the key diagnostic characteristics was undertaken, and condition was determined using a quadrat and additional observational points. Patches that are <2ha representing 'High' condition will have to have:

- an important landscape role <100 m from native vegetation
- OR have a habitat role with more than 2 large trees per 0.5 ha
- OR show regeneration with more than 15 seedlings or saplings per 0.5 ha.

Patch 5 represents an isolated linear occurrence of a stand of *Eucalyptus gomphocephala* trees surrounded by Pine, the power station, and cleared areas. It does not have an important landscape role, or a habitat role. The area supports a suite of trees that are all similar age, between a sapling and adult tree with DBH approximately 15- 20 cm. No new recruits were recorded. The southern half of the Tuart TEC is mapped as Degraded, reflecting the lack of native understorey and regular pruning under powerlines.

Based on the above, this patch is not considered representative of the Tuart Woodlands TEC.

The assessment is presented in Table 27 and Figure 8.

Table 60 Patch 4 Tuart Woodlands TEC assessment

<table>
<tr><td>Patch identification and location</td><td>The patch is located to the east of Ziatas Road, and west of Neerabup Terminal. The patch is represented by NSR06, scored on 19-Oct-2023.</td></tr>
<tr><td>Key diagnostic characteristics</td><td>Yes
Occurs on Swan Coastal Plain.
Occurs on the Bassendean System.
Patch 5 occurs as an open woodland.
Includes native understorey species in the top half of the Tuart TEC.</td></tr>
<tr><td>Species richness</td><td>Key indicators for the condition thresholds are outlined in the table below.<table><tr><th>Parameter</th><th>NSR06</th></tr><tr><td>Proportion of understorey foliage that is native</td><td>66.7%</td></tr><tr><td>Native species richness</td><td>17</td></tr></table></td></tr>
<tr><td>Condition</td><td>More than 60% is native and there are 17 native species. The condition is considered 'High' (DEE, 2019) and Very Good (Keighery, 1994). The southern end of the Patch is mapped as Degraded.</td></tr>
<tr><td>Size</td><td>Within survey area: 1.63 ha.
Does not extend outside the survey area.</td></tr>
<tr><td>Variety within patch</td><td>The patch is open woodland, with understorey varying in response to historical disturbance. Common introduced weeds displacing many smaller herbs and annual native species.</td></tr>
<tr><td>Additional information e.g. buffer, connectedness, land use history</td><td>The patch represents rehabilitated vegetation following clearing in 2010 (Plate 15).
It is disconnected from other areas of native vegetation by roads, clearing for plantations and industrial development.</td></tr>
</table>

Plate 16 Tuart Woodlands Patch 5

8.1.2.3 State-Listed Ecological Communities

Three PECs are confirmed within the survey area including:

- FCT 21c Low lying Banksia attenuata woodlands or shrublands (Priority 3) mapped as Patch 4 Banksia Woodland TEC for 0.60 ha.
- Banksia Dominated Woodlands of the Swan Coastal Plain (Priority 3), synonymous with the Banksia Woodlands TEC where no other listed TEC or PEC associated with an FCT is inferred. This PEC is mapped for 15.13 ha.
- Tuart Woodlands and Forests of the Swan Coastal Plain (Priority 3), synonymous with the Tuart Woodlands TEC where no other listed TEC or PEC associated with an FCT is inferred. This PEC is mapped for 1.71 ha.

Analysis results confidently inferred three FCTs for seven of the eight quadrats analysed. One quadrat was inconclusive. A brief description of each is presented below. The comprehensive results for each quadrat, including similarity percentage, cluster dendrogram results and justification for the inferred FCT, is presented in Table 61.

FCT 21c Low lying *Banksia attenuata* Woodlands or Shrublands

This FCT was inferred for quadrat CHQ10. This quadrat is situated in a low-lying area, potentially winter-wet, and includes an overstorey of *M. preissiana* outside of the quadrat. Species richness is comparable, with an average of 32 spp. compared to 40 spp. in Gibson data. Similarity to FCT 21c was moderate, with 41%. It is likely that this would improve with more scoring events as the FCT is associated with water availability. Edge effects from the road may have also influenced diversity. The quadrat was in Excellent condition vegetation.

FCT 21c represents a Priority 3 Ecological Community.

FCT 23a Central *Banksia attenuata – B. menziesii* Woodlands

Five quadrats represent FCT 23a (11, 12, 13, 14 and 15). These quadrats are situated in various patches of Banksia Woodland along the edge of Gnangara State Forest in Wanneroo. Species richness was comparable (30-53 spp. compared to 52 spp. in the Gibson data). The variation in species richness is a reflection of the degradation of the vegetation associated with proximity to development and weed incursion. Numerous key species were present, and similarity was relatively high (40% to 49%).

FCT23a is not listed as a PEC or TEC and is therefore representative of the Priority 3 Banksia Dominated Woodlands of the Swan Coastal Plain.

FCT 5 *M. preissiana* Damplands

This FCT was inferred for quadrat CHQ09. This quadrat is in a wetland basin with an overstorey of *M. preissiana* as part of an open woodland to forest community. The area is disturbed caused by weed invasion typical of many wetland communities on the Swan Coastal Plain. Wetlands often require multiple scoring events to capture all species present and can be particularly driven by rainfall events. This contributed to low similarity (23%) to the Keighery data and incomparable species richness (10 native spp. compared to average 38.4 spp. in SCP dataset).

FCT 5 does not represent a TEC or PEC but does represent riparian vegetation.

Table 61 Neerabup Terminal and NBT Group floristic community type analysis results

Quadrat	Gibson (1994)				Keighery (2012)				Final Determination
	% Similar	FCT	Site	Dendrogram	% Similar	FCT	Site	Dendrogram	
CHQ08	23	6	card11	Clustering with FCT 6.	24	6	card11	Clustering with FCT 6.	Indeterminate. Low similarity to FCT 6, which is described in Gibson et al. (1994) as 'Weed dominated wetlands on heavy soils. This is not a suitable match, as the community is not a wetland and does not contain *Hypocalymma angustifolium.* The match is likely suggested due to a high presence of weeds and reduced condition.
	22	6	card4		22	6	card4		
	21	6	TWIN-1		22	6	TWIN-1		
CHQ09	23	5	AUSTB-4	Broadly clustering with FCTs 10b, 15 and 14.	28	11	hymus01	Clustering with FCT 14, s07 and s17.	FCT 5, low similarity. The Gibson et al (1994) community description of *Melaleuca preissiana* dominated wetlands with an open understorey is suitable. The mapped community has a sparse understorey below *Melaleuca preissiana*, with a high abundance of weeds likely resulting in the low similarity.
	22	11	hymus01		24	4	perth10		
	21	28	TRIG-4		24	21c	MODO-2		
CHQ10	41	21c	FL-5	Clustered with FCT 21a. Outlier of group with FCT 21c and 20c.	41	21a	Cavs10	Outlier of a group including FCTs 23c and 25	FCT 21c, confidently inferred, moderate similarity. Gibson et al (1994) description states that this community is dominated by *Banksia attenuata* and *B. menziesii* and often occurs in wetter areas. This site within the survey area was present next to a wetland and included species characteristic of the community.
	40	21c	FL-6		40	21c	FL-5		
	37	23a	WIRR-2		39	23a	WIRR-2		
CHQ11	37	23a	hurst03	Outlier, broadly clustering with FCTs 22 and 3b.	41	23b	SF01	Outlier of FCT 23c group	FCT 23a, confidently inferred, moderate similarity. Described as *Banksia attenuata-B. menziesii* woodlands (Gibson et al. 1994). The community description, landform and location are a suitable match.
	36	23a	WARB-3		40	23a	WHITE-1		
	36	23a	WHITE-1		38	23b	BNR03		
CHQ12	54	28	BULL-11	Clustered with FCT 28.	50	28	BULL-11	Clustered with FCT 23c	FCT 23a, confidently inferred, moderate similarity.

Quadrat	Gibson (1994)				Keighery (2012)				Final Determination
	% Similar	FCT	Site	Dendrogram	% Similar	FCT	Site	Dendrogram	
	46	23a	BULL-3		49	23a	perth04		Described as *Banksia attenuata-B. menziesii* woodlands (Gibson et al. 1994). The community description, landform and location are a suitable match.
	45	23b	SINT-1		48	23a	perth08		
CHQ13	48	28	BULL-11	Clustered with FCT 20a.	49	23a	perth08	Outlier of a group including FCTs 23b and s09	FCT 23a, confidently inferred, moderate similarity. Described as *Banksia attenuata-B. menziesii* woodlands (Gibson et al. 1994). The community description, landform and location are a suitable match.
	46	23a	WIRR-1		46	23a	Tele01		
	45	20a	KOON-1		46	20a	KOON-1		
CHQ14	40	20a	KOON-1	Clustered with FCTs 28, 21c and 20c.	51	23b	ELE24	Clustered with FCT 23a.	FCT 23a is suitable, confidently inferred, moderate similarity. Described as *Banksia attenuata-B. menziesii* woodlands (Gibson et al. 1994). The community description, landform and location are a suitable match.
	40	24	THOM-2		43	23a	perth04		
	40	23a	hurst03		43	23a	Tele01		
CHQ15	37	28	KING-2	Outlier. Broadly clustering with FCTs 3b and 22.	44	23a	gnan03	Clustered with FCT 23c and outlier of a group containing 28.	FCT 23a, confidently inferred, moderate similarity. Described as *Banksia attenuata-B. menziesii* woodlands (Gibson et al. 1994). The community description, landform and location are a suitable match.
	35	24	THOM-2		38	23a	Tele01		
	34	21c	FL-5		38	28	KING-2		

8.1.3 Vegetation Condition

Native vegetation was largely Degraded condition (44.60 ha the Swan Coastal Plain. The majority of the survey area follows existing road, track and powerline corridors, with some deviations into areas of intact native vegetation i.e. near Jandabup Lake and in Gnangara State Forest.

Vegetation in Excellent condition was mapped along the edge of intact native vegetation protected as part of Bush Forever Site 326, represented by quadrats CHQ12 and CHQ13, and in isolated occurrences throughout Gnangara State Forest.

Cleared areas represent areas devoid of vegetation (buildings, firebreaks, roads) and are not included in percentage calculations below. Vegetation condition is mapped on Figure 8 and extent of each category is presented in Table 62.

Table 62 Vegetation condition extent

Condition Rating	Extent (ha)	Percent of Total Area
Excellent	13.85	18
Very Good	2.25	3
Good	4.19	5
Degraded	44.60	58
Completely Degraded	12.20	16
Total	**77.09**	**100**
Cleared	124.56	

8.1.4 Conservation Significant Flora

A Priority 4 species *Jacksonia sericea* was collected (CH231108-168) in CHQ15. The sample was submitted to the WAH for formal identification (M. Hislop ACC/10546/E). Mike confirmed the identification and advised the following:

> "*Jacksonia sericea and J. calcicola intergrade to a significant extent in the N Perth suburbs and in its vegetative parts a case could be made for either species in this case. The bright orange standard however is better for the former species*."

Jacksonia sericea was recorded at two locations including in CHQ15 outside the survey area and opportunistically along Gnangara Road within the survey area, shown on Figure 8.

An unknown species, *Calectasia* sp. was collected in the survey area (CH231106-156). The sample was submitted to the WAH for formal identification (M. Hislop ACC/10690/E). Mike has advised whilst this specimen is more likely to be *C. narragarra*, photographs of the root system are needed to verify whether the specimen represents the Priority 2 species *C. elegans*.

This species was recorded within a quadrat (CHQ14) at one location within Banksia Woodland north of Gnangara Road. The location is outside the survey area, mapped on Figure 8.

8.1.5 Flora Inventory

A total of 178 flora species were recorded including and 144 native and 34 weed species. Native species were best represented by Myrtaceae (31 species) and Fabaceae (12 species), followed by Asparagaceae (nine species), and Proteaceae (nine species). One weed listed as a Declared Pest under the BAM Act was recorded, **Asparagus asparagoides*. It was identified within a relevé (NSR08), within a Banksia Woodland community. No species listed as a Weed of National Significance (WONS) were recorded.

A comprehensive species list, organised by family and the community they occur in, is presented in Appendix D. The flora quadrat data is presented in Appendix E.

8.2 Fauna

8.2.1 Fauna Habitat Assessment

Seven fauna habitats representing native vegetation were mapped, including Banksia Woodland, Adenanthos/Plantation, Pine Plantation, Eucalyptus Woodland, Melaleuca Woodland, Trees Over Cleared and Mixed Shrubland. Adenanthos/Plantation (56.61 ha, 27.6%) and Trees Over Cleared (34.65 ha, 16.9%) were the two most dominant habitat types. Fauna habitat types and suitability for significant fauna species is described below and mapped in Figure 9.

8.2.1.1 Banksia Woodland

The Banksia Woodland habitat is abundant throughout the survey area, primarily occurring through the Gnangara State Forest and totalling 15.14 ha (7.5% of the survey area). Overstorey plant species within the community include *Banksia attenuata, Banksia menziesii*, *Eucalyptus todtiana, Eucalyptus rudis, Allocasuarina fraseriana* and *Nuytsia floribunda*. Shrub species included *Acacia pulchella, Acacia sessilis, Adenanthos cygnorum* subsp. *cygnorum, Hibbertia hypericoides, Eremaea purpurea* and *Gompholobium tomentosum* among many others. The density and composition of these shrubs vary throughout the habitat type, with areas in better condition and further from disturbance likely to have greater diversity and foliage cover.

Large logs (>30cm in diameter) are found throughout the Banksia Woodlands habitat type, with small logs (<10cm) occurring more frequently. Bare ground is common, with coarse leaf litter also abundant. The sandy soil in combination with the abundant coarse leaf litter provide suitable habitat for the Swan Coastal Plain Shield-backed Trapdoor Spider *Idiosoma sigillatum* (listed as Priority 3 by DBCA). The Black-striped Snake *Neelaps calonotos* (listed as Priority 3 by DBCA) and the Quenda *Isoodon fusciventer* (listed as Priority 4 by DBCA) would utilise denser areas of understorey for shelter.

Within the Banksia Woodlands habitat type, numerous plant species provide suitable foraging habitat for the three black cockatoo species. Sporadic Eucalyptus trees within the habitat type have the potential to contain hollows which may be suitable for breeding, however these are limited in number.

Plate 17 Banksia Woodland Habitat

8.2.1.2 Adenanthos/Plantation

The Adenanthos/Plantation habitat type is the most abundant throughout the survey area (48.08 ha, 23.8% of the survey area). It consists of isolated pine trees (*Pinus pinaster*) over native regrowth. Regrowth species include Woollybush (*Adenanthos cygnorum var. cygnorum*), Grasstree (*Xanthorrhoea preissii*) and *Macrozamia fraseri*. The habitat type varies in shrub density, with minimal leaf litter present throughout. As the habitat is primarily open, it provides little variety in terms of microhabitats for conservation significant fauna species.

Plate 18 Adenanthos/Plantation

8.2.1.3 Pine Plantation

The Pine (*Pinus pinaster*) plantation habitat is found throughout Gnangara State Forest, with a total of 2.97 ha (1.5% of the survey area). Fine leaf litter occurs consistently throughout, with coarse leaf litter sparse. No understorey is present and large logs are common. The Pine trees provide suitable foraging habitat for Carnaby's Cockatoo but are otherwise limited in their suitability of use for both common and conservation significant fauna species.

Plate 19 Pine Plantation Habitat

8.2.1.4 Eucalyptus Woodland

The Eucalyptus Woodland habitat extends for 4.67 ha (2.3%) within the survey area, extending beyond the survey area boundary. The Eucalyptus Woodland habitat consists of large mature trees, primarily Marri *Corymbia calophylla* and Jarrah *Eucalyptus marginata.*

The habitat has a variable understorey of herbs, sedges, shrubs and grasses, influenced by past disturbances. The ground is covered with thick leaf litter, which offers shelter and food for animals like the Quenda *Isoodon fusciventer* and the Black-striped Snake *Neelaps calonotos*. There are few large logs present, but many small logs and branches are present throughout. The tall trees are used by various birds for foraging, roosting and breeding, including the three threatened species: Carnaby's Cockatoo, Forest Red-tailed Black Cockatoos and Baudin's Cockatoo. Roosting habitat is confirmed within and near the survey area (Black Cockatoo Roosting Sites - Buffered [DBCA-064]).

Plate 20 Eucalyptus Woodland Habitat

8.2.1.5 Melaleuca Woodland

The Melaleuca Woodland habitat consists of remnant native vegetation, dominated by *Melaleuca preissiana* with a variable understorey. The shrub species included within this habitat type include tall shrubs such as *Kunzea glabrescens*, *Jacksonia furcellata* and *Xanthorrhoea preissii*. Ground cover, herb and sedge species vary in their density, including *Dianella revoluta*, *Patersonia occidentalis* and *Dasypogon bromeliifolius*. These low plants, particularly in high density, provide suitable habitat for Quenda to forage and shelter in. Other habitat features include sporadic small logs and occasional coarse leaf litter. The overall habitat type extends for 1.08 ha (0.5% of the survey area), limited to small, isolated pockets spread throughout the survey area.

Plate 21 Melaleuca Woodland Habitat

8.2.1.6 Trees Over Cleared

This is the third-most dominant habitat in the survey area, occurring over 11.66 ha and comprising 5.8% of the survey area. The understorey is comprised mostly of weedy grasses and herbs, with sporadic native shrubs occurring. Plant species which occur within the Trees Over Cleared habitat include isolated trees of *Eucalyptus* and *Banksia* species. Shrubs present primarily include sporadic clusters of *Acacia* and *Adenanthos.*

This habitat consists of sparse bushes and solitary large trees that often serve as a refuge within the surrounding cleared areas for animals such as birds and kangaroos. Hollows and large logs are sparse, with small logs more common throughout. Coarse leaf litter is present under bushes or trees, with grasses covering most of the area. The grasses and the leaf litter offer foraging and shelter opportunities for Quenda, whilst suitable foraging species may be utilised by the three black cockatoo species.

8.2.1.7 Mixed Shrubland

The Mixed Shrubland habitat is restricted in size but provides an ecological niche for smaller animals such as birds and reptiles. It consists of isolated native shrubs as well as planted shrubs in gardens or along the roadside and extends for 8.58 ha (4.3% of the survey area).

Scattered small logs are present, whilst coarse leaf litter and grasses are abundant throughout. The grass and coarse leaf litter provide excellent foraging and shelter for the Quenda *Isoodon fusciventer*.

Plate 22 Mixed Shrubland Habitat

8.2.2 Fauna Inventory

A total of 37 vertebrate fauna species were recorded during the field survey. This comprised of 28 bird, four mammal and five reptile species. A complete inventory of fauna species recorded within the survey area is provided in Table 63.

Two introduced species were recorded, both of which are listed under the BAM Act:

- Feral Cat *Felis catus* (Declared Pest - s22(2)
- European Rabbit *Oryctolagus cuniculus* (Declared Pest - s22(2)).

Table 63 Fauna observations within the Neerabup Terminal and NBT Group survey area

Class	Scientific Name	Common Name	Method
Mammal	*Felis catus*	Feral Cat	Tracks
Mammal	*Isoodon fusciventer*	Quenda	Foraging evidence
Mammal	*Macropus fuliginosus melanops*	Western Grey Kangaroo	Seen
Mammal	*Oryctolagus cuniculus*	European Rabbit	Scats
Mammal	*Equus caballus*	Horse	Seen
Mammal	*Canis lupus familiaris*	Dog	Seen
Bird	*Dacelo novaeguineae*	Laughing Kookaburra	Seen and heard
Bird	*Lichmera indistincta*	Brown Honeyeater	Seen and heard
Bird	*Barnardius zonarius*	Australian Ringneck	Seen and heard
Bird	*Anthochaera carunculata*	Red Wattlebird	Seen and heard
Bird	*Malurus splendens*	Splendid Fairywren	Seen and heard
Bird	*Phylidonyris novaehollandiae*	New Holland Honeyeater	Seen and heard
Bird	*Smicrornis brevirostris*	Weebil	Seen and heard
Bird	*Falco longipennis*	Australian Hobby	Seen and heard
Bird	*Pachycephala rufiventris*	Rufous Whistler	Seen and heard
Bird	*Sericornis maculatus*	Spotted Scrubwren	Seen and heard
Bird	*Rhipidura albiscapa*	Grey Fantail	Seen and heard
Bird	*Colluricincla harmonica*	Grey Shrikethrush	Seen and heard
Bird	*Gymnorhina tibicen*	Australian Magpie	Seen and heard
Bird	*Zosterops lateralis*	Silvereye	Seen and heard
Bird	*Artamus cyanopterus*	Dusky Woodswallow	Seen
Bird	*Rhipidura leucophrys*	Willie Wagtail	Seen and heard
Bird	*Falco cenchroides*	Nankeen Kestrel	Seen
Bird	*Geophaps plumifera*	Spinifex Pigeon	Seen and heard
Bird	*Sericornis maculatus*	Spotted Scrubwren	Seen and heard
Bird	*Artamus cinereus*	Black-faced Woodswallow	Seen and heard
Bird	*Eolophus roseicapilla*	Galah	Seen and heard
Bird	*Falco berigora*	Brown Falcon	Seen
Bird	*Corvus coronoides*	Australian Raven	Seen and heard

Class	Scientific Name	Common Name	Method
Bird	*Cracticus torquatus*	Grey Butcherbird	Seen and heard
Bird	*Trichoglossus moluccanus*	Rainbow Lorikeet	Seen and heard
Bird	*Dromaius novaehollandiae*	Emu	Seen
Bird	*Calyptorhynchus banksia naso*	Forest Red-tailed Black Cockatoo	Seen and heard. Foraging evidence
Bird	*Zanda latirostris*	Carnaby's Cockatoo	Seen and heard. Foraging evidence
Reptile	*Varanus gouldii*	Gould's Monitor	Seen
Reptile	*Pseudonaja affinis*	Dugite	Seen. Tracks also observed
Reptile	*Notechis scutatus*	Tiger Snake	Seen
Reptile	*Tiliqua rugosa rugosa*	Bobtail/Shingleback Lizard	Seen
Reptile	*Ctenotus fallens*	West Coast Laterite Ctenotus	Seen

8.2.3 Conservation Significant Fauna

Three conservation significant fauna species were recorded during the survey:

- Quenda (*Isoodon fusciventer*) listed as Priority 4 by DBCA.
- Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksia naso*) listed as Vulnerable under the EPBC Act and BC Act.
- Carnaby's Cockatoo (*Zanda latirostris*) listed as Endangered under the EPBC Act and BC Act.

Quenda were recorded via distinct foraging evidence (Plate 12). Evidence of conservation significant species is mapped in Figure 9.

An additional six species are considered to have the potential to occur within the survey area due to the presence of suitable habitat and recent records within the surrounding area. The total area (ha) of suitable habitat for these species which occurs within the survey area is included in Table 64 below.

Table 64 Total area (ha) of suitable habitat for significant fauna species known or likely to occur within the survey area.

Species	Cons. Status[1]	Area of Suitable Habitat (ha)							Total (ha)
		Eucalyptus Woodland	Melaleuca Woodland	Adenanthos /Plantation	Pine Plantation	Banksia Woodland	Trees Over Cleared	Mixed Shrubland	
Carnaby's Cockatoo (*Zanda latirostris*)	E	4.67		48.08	2.97	15.14	11.66		82.51
Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*)	V	4.67				15.14	11.66		31.46
Quenda (*Isoodon fusciventer*)	P4	4.67	1.08	48.08	2.97	15.14		8.58	80.51
Black-striped Snake (*Neelaps calonotos*)	P3	4.67				15.14			19.80
Swan Coastal Plain Shield-backed Trapdoor Spider (*Idiosoma sigillatum*)	P3			48.08		15.14			63.22
Native Bee (*Hylaeus globuliferus*)	P3			48.08		15.14			63.22
A short-tongued Bee (*Leioproctus contrarius*)	P3					15.14			15.14
Graceful Sun Moth (*Synemon gratiosa*)	P4					15.14			15.14

1. E Endangered, V Vulnerable, P Priority

Plate 23 Quenda foraging evidence

8.3 Targeted Black Cockatoo Survey

8.3.1 Foraging

The survey area has been assessed as a score of 10 ‘High-quality foraging habitat’ for both the Carnaby’s Cockatoo and Forest Red-tailed Black Cockatoo in accordance with the Commonwealth Black Cockatoo Referral Guidelines foraging tool (DAWE, 2022) (Table 32). No subtractions were made for these two species. The survey area has been assessed as a score of 8 for Baudin’s Cockatoo, due to an absence of foraging evidence during the survey.

The survey area contains mature Banksia Woodlands and Eucalyptus Woodlands, with suitable foraging species including Proteaceous species, Marri *Corymbia calophylla* and Tuart *Eucalyptus gomphocephala* trees.

Table 65 Black Cockatoo Foraging Habitat Assessment (DAWE, 2022)

Starting score		**Baudin's Cockatoo (*Zanda baudinii*)**		**Carnaby's Cockatoo (*Zanda latirostris*)**		**Forest Red-Tailed Black Cockatoo *(Calyptorhynchus banksii naso)***	
10		**Start at a score of 10** if your site is native eucalypt woodlands and forest, and proteaceous woodland and heath, particularly Marri, within the range of the species, including along roadsides and parkland cleared areas. Can include planted vegetation**. This tool only applies to sites equal to or larger than 1 hectare in size.**		**Start at a score of 10** if your site is native shrubland, kwongan heathland or woodland, dominated by proteaceous plant species such as *Banksia* spp. (including *Dryandra* spp.), *Hakea* spp. and *Grevillea* spp., as well as native eucalypt woodland and forest that contains foraging species, within the range of the species, including along roadsides and parkland cleared areas. Also includes planted native vegetation. **This tool only applies to sites equal to or larger than 1 hectare in size.**		**Start at a score of 10** if your site is Jarrah or Marri woodland and/or forest, or if it is on the edge of Karri Forest, or if Wandoo and Blackbutt occur on the site, within the range of the subspecies, including along roadsides and parkland cleared areas. **This tool only applies to sites equal to or larger than 1 hectare in size.**	
Attribute	Sub-tractions	Context adjustor (attributes reducing functionality of foraging habitat).					
Foraging potential	**-2**	**Subtract 2** from your score if there is no evidence of feeding debris on your site.	☒	**Subtract 2** from your score if there is no evidence of feeding debris on your site.	☐	**Subtract 2** from your score if there is no evidence of feeding debris on your site.	☐
Connectivity	**-2**	**Subtract 2** from your score if you have evidence to conclude that there is no other foraging habitat within 12 km of your site.	☐	**Subtract 2** from your score if you have evidence to conclude that there is no other foraging habitat within 12 km of your site.	☐	**Subtract 2** from your score if you have evidence to conclude that there is no other foraging habitat within 12 km of your site.	☐
Proximity to breeding	**-2**	**Subtract 2** if you have evidence to conclude that your site is more than 12 km from breeding habitat.	☐	**Subtract 2** if you have evidence to conclude that your site is more than 12 km from breeding habitat.	☐	**Subtract 2** if you have evidence to conclude that your site is more than 12 km from breeding habitat.	☐

Starting score		Baudin's Cockatoo (*Zanda baudinii*)		Carnaby's Cockatoo (*Zanda latirostris*)		Forest Red-Tailed Black Cockatoo *(Calyptorhynchus banksii naso)*	
Proximity to roosting	**-1**	**Subtract 1** if you have evidence to conclude that your site is more than 20 km from a known night roosting habitat.	☐	**Subtract 1** if you have evidence to conclude that your site is more than 20 km from a known night roosting habitat.	☐	**Subtract 1** if you have evidence to conclude that your site is more than 20 km from a known night roosting habitat.	☐
Impact from significant plant disease	**-1**	**Subtract 1** if your site has disease present (e.g. *Phytophthora* spp. or Marri canker) and the disease is affecting more than 50% of the preferred food plants present.	☐	**Subtract 1** if your site has disease present (e.g. *Phytophthora* spp. or Marri canker) and the disease is affecting more than 50% of the preferred food plants present.	☐	**Subtract 1** if your site has disease present (e.g. *Phytophthora* spp. or Marri canker) and the disease is affecting more than 50%of the preferred food plants present.	☐
Total score		**8**		**10**		**10**	

The refined foraging habitat value considered known breeding and roosting sites, and the characteristics associated with each fauna habitat type. The following factors influenced the results:

- There are three confirmed white-tailed and Forest Red-tailed Black Cockatoo roosting sites less than 3 km from the survey area (DBCA, 2023c).
- The survey area is approximately 5 km from the buffer zone of a confirmed Black Cockatoo breeding area (DBCA, 2023c).
- Vegetation in the survey area represents 0.26% of native vegetation within 15 km where local breeding is known/likely. Site context score is therefore 1.

Carnaby's Cockatoo foraging habitat ranged from 'Moderate to High' (score of 7) down to 'None' (score of 0). The presence of favourable foraging species affected the site condition, with Banksia Woodland and Pine Plantation scoring 5, while other habitats scored according to the presence of Eucalypt trees. Foraging evidence was recorded therefore 1 context point was added.

Forest Red-tailed Black Cockatoo foraging habitat ranged from 'Moderate' (score of 6) to 'None' (score of 0). The Eucalyptus Woodland supported suitable foraging species with a site condition score of 4. One context score and one stocking rate score was added to result in the 'Moderate' quality. All other habitats had a site condition score of 2 or less.

Foraging habitat quality for Baudin's Cockatoo was similar to the Forest Red-tailed Black Cockatoo. The Eucalyptus Woodland was rated as 4 for site condition and 1 for context. No stocking rate score was added. This fauna habitat is therefore considered 'Moderate' quality. This reduction is due to a lack of foraging evidence and direct observations within the survey area.

The foraging habitat type, it's corresponding Bamford (2020) rating and the habitat's extent, (ha) is presented for each Black Cockatoo species in Table 66. The foraging habitat quality and extent is presented in Table 67 and mapped in Figure 10.

Table 66 Neerabup and East Wanneroo Terminal refined foraging score calculation (Bamford, 2020)

Habitat Type	Carnaby's Cockatoo	Baudin's Cockatoo	Forest Red-tailed Black Cockatoo	Extent (ha)
Adenanthos/Plantation	6	2	2	48.08
Banksia Woodlands	7	2	1	15.13
Eucalyptus Woodland	5	5	6	4.67
Melaleuca Woodland	2	2	2	1.07
Mixed Shrubland	1	1	1	8.58
Pine Plantation	7	1	1	2.97
Trees over Cleared	1	1	1	11.66
Cleared	0	0	0	109.51

Table 67 Neerabup and East Wanneroo BCE foraging habitat extent

Foraging Habitat Quality	Carnaby's Cockatoo (ha)	Baudin's Cockatoo (ha)	Forest Red-tailed Black Cockatoo (ha)
1: Negligible	20.03	23.08	2.08
2: Low	1.08	64.21	64.21
4-6: Moderate	52.84	4.67	4.67
7: Moderate to High	18.2		
Total	**91.96**	**91.96**	**91.96**

Plate 24 Carnaby's Cockatoos foraging within the survey area.

Plate 25 Forest Red-tailed Black Cockatoos foraging within the survey area

8.3.2 Breeding

A total of 118 potential nesting trees with a suitable DBH (>500 mm) were recorded within and directly adjacent to the survey area (Table 68, Figure 10). The majority consisted of Introduced (planted) species and those identified as 'Other', which are trees where species are not confidently able to be determined in the field and are often also introduced. Potential nesting trees are defined by DAWE (2022) as "*trees that have a suitable DBH to develop a nest hollow, but do not currently have hollows. Trees suitable to develop a nest hollow in the future are 300-500 mm DBH*".

One suitable nesting tree was identified, a stag with a large hollow. No active Black Cockatoo breeding activity or nesting was observed during the field survey. This assessment is limited to observations made from the ground.

Table 68 Potential nesting trees from Neerabup Terminal and East Wanneroo

Tree Species	Total Trees Per Survey Area				Grand Total
	NBT MUL 1 via Lenore Rd	NBT MUL 2 - via Badgerup Rd	NBT-WGA 81	Neerabup Terminal	
Coastal Blackbutt (*Eucalyptus todtiana*)			8		8
Introduced	6		20		26
Jarrah (*E. marginata*)	3		24		27
Marri (*Corymbia calophylla*)			14		14
Other		12	19		31
Stag		2 (1 suitable hollow)	2		4
Tuart (*E. gomphocephala*)			5	3	8
Grand Total	**9**	**14**	**92**	**3**	**118**

8.3.3 Roosting

No roosting sites were observed within the survey area. The Eucalyptus Woodland fauna habitat represents suitable roosting habitat. One hundred and fifteen confirmed white-tailed Black Cockatoo and Forest Red-tailed Black Cockatoo roosting sites are known to occur within 15 km of the survey area from Birdlife Data provided by DBCA. Three of these sites occur within 3 km of the survey area (DBCA, 2023c).

Plate 26 Hollow recorded on potentially suitable nesting tree ID 593 - Stag

Table 69 Potentially suitable nesting tree hollow details

ID	Species	Hollow Entrance (Depth x Width)	Height Above Ground (m)	Hollow Angle	Facing	Hollow Type	Evidence of Use
291	Stag	25 x 25 cm	4	Vertical	East	Trunk	Chew Marks

8.4 Discussion

8.4.1 Flora and Vegetation

The survey area intersects with five Bush Forever Sites, one State Forest and one Nature Reserve. The survey area represents several linear corridors that travel in a largely north south direction and follows existing infrastructure corridors including roads, tracks, and powerline corridors. The eastern most corridor traverses the Gnangara State Forest, while the central and western lines capture more urbanised areas with heavily fragmented patches of vegetation that were generally degraded. Within the Gnangara State Forest, large areas represented natural regeneration following a history of Pine plantations. Natural succession is in early stages and weed invasion including scattered Pine trees have led to degradation. These areas were largely mapped as Degraded.

Ten vegetation communities were defined and mapped. The large number of vegetation communities reflect the length of the linear corridor as well as the impact of historical disturbance and isolation. The vegetation communities include five Banksia Woodlands, two Eucalypt Woodlands, three Melaleuca Woodlands, and two disturbed communities.

The five Banksia Woodlands are typical of the northern Swan Coastal Plain, occurring on gently undulating terrain on deep white-grey sandy soils. All areas mapped as Banksia Woodlands represent the Banksia Woodlands TEC listed as Endangered under the EPBC Act. The Woodlands generally represented edges of larger patches that extended beyond the survey area. Many of these were protected in Bush Forever and/or Nature Reserve. The Banksia Woodlands varied in condition depending on how severe weed invasion had affected native species diversity. In general, patches that represented larger areas of intact native vegetation were in better condition than the smaller fragmented patches that had low connectivity to other patches.

The majority of the Banksia Woodlands TEC represents the Priority 3 Banksia Dominated Woodlands of the Swan Coastal Plain, except one Patch. Patch 4 represents FCT 21c Low-lying *Banksia attenuata* Woodlands or Shrublands. This PEC was identified in the desktop study and was mapped adjacent to Jandabup Lake. The community provides important ecological functions that support Lake Jandabup including erosion control, sedimentation, and provides an important refuge for fauna species that use the Lake.

Two Patches of Tuart Woodlands TEC were confirmed to occur, restricted to the northern end of the survey area adjacent to Neerabup Terminal. Both patches represent stands of mature trees that are largely disconnected from one another by clearing and were planted as part of rehabilitation efforts. Condition varied and affected the density of native species. Weed invasion and historical disturbance has reduced the condition of both patches with only a small pocket of Excellent vegetation remaining.

Three wetland communities were mapped, all representing Melaleuca Woodlands ranging from Good condition to Excellent condition. Wetlands often are subject to rapid weed invasion as surface water encourages weed seed deposition. The drying climate and historical droughts are also likely to have an impact although this is difficult to measure. All wetland communities provide important refuge in a highly fragmented landscape. These wetlands represent 1.08 ha.

Flora diversity was considered moderate, with 178 species recorded, including 144 native and 34 weed species. This is comparable to the SCAR 4 Project survey (AECOM, 2022a) where 145 native species were recorded. The length of the corridors and diversity of vegetation communities encountered contributed to the high diversity despite representing largely Degraded vegetation.

One Priority 4 species, *Jacksonia sericea,* was collected and formal identification confirmed at the WA Herbarium. It was recorded at two locations including one outside the survey area near Lake Wangara, and once along the road south of the Lake within the survey area. There are seven WA Herbarium locations within 5 km and 15 records within 10 km of the survey area. Majority of records describe the species as locally common.

A sample of *Calectasia* sp. was collected for identification but was unable to be confirmed to species level as photographs of the root system are required. It is likely to represent the common species *C. narragarra*, but the Priority 2 species *C. elegans* cannot be excluded without the roots being identified. Ten DBCA records were found in proximity to the survey area, with the closest identified 1.04 km away. Suitable habitat is present for the species, with the habitat described as unburnt *Banksia menziesii* and *B. attenuata* woodland (Barrett, R and Barret, M, 2015).

There is a 'known' record of *Styphelia filifolia* in the survey area. It is evident following a review of its location that it is unlikely to be present. The record is dated 2007, with habitat described as 'Banksia woodland' and is situated in what now represents a cleared area, surrounded on either side by pine plantation and a road. Twenty-two significant flora species were considered to have a 'known', 'high' or 'moderate' likelihood of occurring prior to the survey (Table 70). Of these, 20 species were downgraded to 'low' following the completion of the field survey. These species would have been detectable at the time of the survey, yet they were not recorded. All areas of intact native vegetation were traversed on foot to conduct targeted searches. Further, the degradation observed across large areas meant habitat was unlikely to be suitable for many species.

Poranthera moorokatta (P2) was considered to have a 'High' likelihood to occur prior to the survey. The species was described in 2012 at which time it was known from two locations: Kings Park and Ellenbrook. In Kings Park it was recorded on white silica sand in open spaces between shrubs, not in shaded areas or in areas of high leaf litter cover (Barret, 2012). In Ellenbrook it was recorded in a shallow dampland on mixed grey-white sand with scattered leaf litter (Barret, 2012). There are five records located along or near the Tonkin Highway between Reid Highway and Neaves Road including one record from 2018. Detection periods were September and October months.

The survey was undertaken in November 2024. This may have been too late for detecting this 4 cm tall annual herb. Furthermore, rainfall likely affects germination and population size. At this time, it cannot be confidently reduced to 'Low' and remains to have a 'Moderate' likelihood of occurring. Suitable habitat would be the Banksia Woodlands BaAhDf near Lake Gnangara and BmEpLi associated with Bush Forever 326.

Table 70 Summary of Neerabup Terminal and NBT Group likelihood of occurrence pre-survey and post-survey

Likelihood	Number of Species Identified					
	Known	High Likelihood	Moderate Likelihood	Low Likelihood	Negligible Likelihood	Total
Pre-survey	1	10	11	6	26	55
Post-survey	1	0	1	20	33	55

8.4.2 Fauna

Thirty-seven vertebrate fauna species were recorded during the field survey. This included 28 birds, four mammals and five reptile species. Three conservation significant fauna species were recorded during the survey:

- Quenda (*Isoodon fusciventer*) listed as Priority 4 by DBCA.
- Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksia naso*) listed as Vulnerable under the EPBC Act and BC Act.
- Carnaby's Cockatoo (*Zanda latirostris*) listed as Endangered under the EPBC Act and BC Act.

The local area supports both urban, agriculture and conservation land use. It is situated on the edge of a significant north-south corridor of native vegetation which includes Gnangara Moore River State Forest.

Seven native fauna habitats were defined and mapped within the survey area including Banksia Woodland, Adenanthos/Plantation, Pine Plantation, Eucalyptus Woodland, Melaleuca Woodland, Trees Over Cleared and Mixed Shrubland.

The Banksia Woodlands fauna habitat covers 7.8% (15.94 ha) of the survey area. It has the potential to support eight significant fauna species that could benefit from the combination of native woodlands and a diverse native understorey on sandy soil. Black Cockatoos can find food and nesting sites in the Banksia, Jarrah and Marri trees.

Eucalyptus Woodlands (4.86 ha, 2.4%) represents suitable habitat for Black Cockatoos, Black-striped Snake, and Quenda. The Eucalyptus Woodlands were open in nature with a sparse tree canopy, with

dominant species consisting of *Eucalyptus marginata* and *Corymbia calophylla.* The open vegetation is ideal for hunting and the presence of Jarrah and Marri could be utilised by the species for temporary roosting.

Mixed Shrubland provides suitable habitat for small marsupials and species that can utilise low-lying and dense shrubs for shelter. Quenda and Black-striped Snakes are known to inhabit low shrubland habitats, particularly those that are unburnt and dense. This habitat allows for high levels of nesting and foraging for small marsupial and reptile species (Haby et al., 2013).

Melaleuca Woodlands represent ephemeral Paperbark (*Melaleuca preissiana)* wetlands, with *Kunzea glabrescens* dominated shrub and mixed heath patches. Wetland migratory birds may utilise this habitat when inundated, however likelihood remains low due to the small size of these areas within the survey area. Quenda may also utilise the edges of this habitat type, as well as typically inundated areas that become seasonally dry.

Trees over Cleared represents scattered native species in paddocks. Tree species may include *Eucalyptus, Banksia* and *Acacia.* This habitat presents foraging and roosting habitat for avian species including listed species such as Black Cockatoos.

Following the survey, a post-survey likelihood desktop assessment was completed. Details of all the conservation significant species considered to have a high or known post-survey likelihood and their associated habitats is presented in Table 71. Those which have been downgraded from a high likelihood due to the post-survey assessment are also discussed. To verify the presence of the invertebrate species a targeted Short-range Endemic survey would be required, which was not completed at this time.

Table 71 Fauna species and associated fauna habitat within the Neerabup Terminal and East Wanneroo survey area

Species	Conservation code (EPBC/State WA)	Habitat	Number of DBCA Records and Distance	Pre survey likelihood of occurrence	Post survey likelihood of occurrence	Discussion
Carnaby's Cockatoo (*Zanda latirostris*)	E (EPBC Act) EN (BC Act)	Uncleared or remnant native Eucalypt woodlands containing Salmon gum and Wandoo, and in shrubland or Kwongan heathland dominated by Hakea, dryandra, Banksia, and Grevillea species. It also occurs in remnant patches of native vegetation on land otherwise cleared for agriculture. Forages seasonally in Pine plantations (DCCEEW, 2023)	There are 3009 records on the DBCA database, the closest record is 0.01 km away from the survey area. The most recent record is in 2020.	Known	Known	This species is likely to use Eucalyptus Woodland, Pine plantations, Trees over Cleared and Banksia Woodland habitats within the survey area. These habitats are also found outside and directly adjacent to the survey area.
Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*)	V (EPBC Act) VU (BC Act)	Inhabits dense *Eucalyptus marginata* (Jarrah), *E. diversicolor* (Karri) and *Corymbia calophylla* (Marri) forests (TSSC, 2009).	There are 71 records on the DBCA database, the closest record is 0.20 km away from the survey area The most recent record is in 2020.	High	Known	This species is likely to use Eucalyptus Woodland, Pine Plantations, Trees over Cleared and Banksia Woodland habitats within the survey area. Some of these habitats are also found outside, directly adjacent to the survey area.
Quenda (*Isoodon fusciventer*)	P4	Forest, woodland, heath and shrub communities, with sandy soils and dense heathy vegetation (Van Dyck & Strahan, 2008). The presence of accumulated coarse leaf litter is suitable foraging habitat for the Quenda. Quenda foraging activity was observed throughout these habitat types.	There are 629 records on the DBCA database, the closest record is 0.01 km away from the survey area. The most recent record is in 2020.	Known	Known	This species is likely to use Eucalyptus Woodland, Pine Plantations, Melaleuca Woodland, Mixed Shrubland and Banksia Woodland habitats within the survey area. Some of these habitats are also found outside, directly adjacent to the survey area.
Black-striped Snake (*Neelaps calonotos*) listed as Priority 3 by DBCA	P3	Restricted to sandy coastal strip near Perth, WA between Mandurah and Cataby, with isolated populations north, near Eneabba and Dongara. Dunes and vegetated sand plains with heaths and Eucalyptus/Banksia woodlands are preferred habitats (Wilson and Swan 2023).	There are 67 records on the DBCA database, the closest record is 0.08 km away from the survey area. The most recent record is in 2017.	High	Moderate	Dense leaf litter which is known to occur in Banksia Woodlands of the survey area is the preferred habitat type of this species (Bush et al., 2010). It may also utilise the Eucalyptus Woodland and Mixed Shrubland habitats.

Species	Conservation code (EPBC/State WA)	Habitat	Number of DBCA Records and Distance	Pre survey likelihood of occurrence	Post survey likelihood of occurrence	Discussion
						This species may utilise areas where native understorey density was higher, generally associated with vegetation condition of 'Good' or better. These habitats are also found outside of and adjacent to the survey area.
Swan Coastal Plain Shield-backed Trapdoor Spider (*Idiosoma sigillatum*)	P3	Remnant habitats in Banksia woodland and heathland on sandy soils (Rix et al., 2018).	There are 70 records on the DBCA database, the closest record is 0.16 km away from the survey area. The most recent record is in 2019.	High	Moderate	This species may utilise areas where native understorey density in Banksia Woodlands was higher, generally associated with vegetation condition of 'Good' or better. Banksia woodland habitat is also found just outside of the survey area.
Native Bee (*Hylaeus globuliferus*)	P3	Habitats containing flowers from *Adenanthos cygnorum* and also *Banksia attenuata* (Western Wildlife, 2009).	There are ten records in the vicinity of Neerabup, with the closest 2.71 km away and the most recent in 1996.	High	Moderate	The Adenanthos/Plantation fauna habitat represents a mixed habitat of Woollybush (*Adenanthos cygnorum var. cygnorum*) regrowth and *Pinus pinaster** trees. This habitat dominated the survey area, occupying 56.61 ha or 27.6% of the land. This habitat type may be utilised by the Woollybush Bee (*Hylaeus globuliferus*), which feeds on the nectar of Woollybush flowers (Houston, 2018). Woollybush (*Adenanthos cygnorum* var. *cygnorum)* was also observed within the Banksia

Species	Conservation code (EPBC/State WA)	Habitat	Number of DBCA Records and Distance	Pre survey likelihood of occurrence	Post survey likelihood of occurrence	Discussion
						Woodlands, as a result the Woollybush Bee would also likely reside within the habitat type (Western Wildlife, 2009).
A short-tongued bee (*Leioproctus contrarius*)	P3	Western Australia, associated with *Goodenia* sp. and *Lechenaultia* sp. (South Metro Connect, 2011).	There are 3 records in the vicinity of Neerabup, with the closest 0.06 km away and the most recent in 1982.	High	Moderate	The Banksia Woodland fauna habitat includes *Lechenaultia floribunda*, which is associated heavily with the short-tongued bee species *Leioproctus contrarius* (South Metro Connect, 2011). The species is therefore considered moderately likely to utilise the Banksia Woodland habitat type.
Graceful Sun Moth (*Synemon gratiosa*)	P4	1. Coastal heathland on Quindalup dunes where it is restricted to secondary sand dunes due to the abundance of the host plant *Lomandra maritima*, the preferred habitat (denser population). 2. Banksia woodland on Spearwood and Bassendean dunes, where the second known host plant *L. hermaphrodita* is widespread. Throughout the Swan Coastal Plain, extending into the Geraldton Sandplains (DEC, 2011).	There are 397 records in the vicinity of Neerabup, with the closest 0.17 km away and the most recent in 2019.	High	Moderate	Multiple sterile *Lomandra sp.* individuals were recorded within the Banksia Woodlands. As these individuals were unable to be identified to species level, the species *Lomandra hermaphrodita* may be present within the survey area. The Graceful Sun moth (*Synemon gratiosa)* is associated with Banksia woodland where the known host plant *L. hermaphrodita* is widespread (DEC, 2011). The Graceful Sun moth may therefore utilise the Banksia Woodland habitat within the survey area.

8.4.3 Targeted Black Cockatoo

The survey area is within the known range for the three Threatened Black Cockatoo species. The Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksia naso*) and Carnaby's Cockatoo (*Zanda latirostris*) were observed foraging and resting within the survey area. There were 118 potential nesting trees identified with the survey area. Only one suitable nesting tree was identified, representing a stag (unidentifiable dead tree) with a hollow that could accommodate Black Cockatoo breeding. The hollow was vertical, with an entrance over 25 cm in diameter and located on the roadside verge in Badgerup Road.

The survey area scored a foraging habitat score of 10 for both the Carnaby's Cockatoo and Forest Red-tailed Black Cockatoo in accordance with the DAWE 2022 guidelines. The survey area has been assessed as a score of 8 for Baudin's Cockatoo in the absence of foraging evidence recorded during the survey acting as a detractor.

At a fauna habitat level, the BCE score varied from 1 'Negligible' to 8 'High'. The value was largely influenced by the abundance of desirable foraging species present and the fragmentation that has occurred in the local area. Native vegetation in the survey area represents approximately 1-5% of available foraging habitat, particularly for Forest Red-tailed Black Cockatoo and Baudin's Cockatoo who do not feed on Pine trees.

The Moderate to High foraging qualities for all three Black Cockatoo species are associated with the Banksia Woodland and Eucalyptus Woodland habitat types. These fauna habitats include suitable foraging species such as *Banksia attenuata*, *Banksia menziesii, Corymbia calophylla, Eucalyptus marginata* and *Eucalyptus todtiana*. The known occurrence of a roosting site within 3 km of the survey area, permanent water source presence nearby, confirmed sighting during the survey, and extent of suitable foraging habitat in the vicinity all contributed to the foraging score.

9.0 NT-NOR to HBK 132kV Results and Discussion

The NT-NOR to HBK 132kV survey area is along Drumpellier Drive and includes the west side (Whiteman Park) and a small corridor on the east side of this major road. Large parts of the survey area are currently inaccessible due to the development of the Morley-Ellenbrook railway corridor.

Numerous surveys have been undertaken within this corridor including:

- RPS, 2020. Detailed flora and vegetation assessment – METRONET Morley-Ellenbrook Line. This survey represented a two-season vegetation survey where permanent quadrats were scored twice, and multiple targeted searches were undertaken to maximise detection of significant flora species. The report supported the Morley-Ellenbrook Project submission to EPA under Part IV of the *Environment Protection Act 1986*.
- AECOM, 2016. Ellenbrook Bus Rapid Transit Biological Assessment. This report represents a single survey event where vegetation was recorded at defined non-permanent quadrats during Spring 2015.
- Woodman, 2020. Banksia Woodland Community Assessment – Patch 5. Verification of FCT analysis and Banksia Woodland TEC Assessment.

The results present a compilation of existing data that was verified through a site visit in Spring 2024. Areas that were accessible were visited and the existing mapping verified. Where necessary, mapping was updated to reflect current condition and native vegetation extent.

9.1 Flora

9.1.1 Vegetation Communities

Four native vegetation communities were defined and mapped including:

- Two Banksia Woodland communities BaBmSiPo and BaBmBiXp
- One *Corymbia* Woodland which dominated the survey area.
- Trees over paddock weeds.

Native vegetation was mapped for 43.58 ha. The remaining 75.42 ha is mapped as cleared and is devoid of vegetation.

Vegetation community descriptions are presented in Table 72 and mapped on Figure 8.

Table 72 NT-NOR to HBK 132kV vegetation community descriptions and photographs

Description	Additional Details	Photograph
BaBmSiPo *Banksia attenuata* Woodland *Banksia attenuata* and *B. menziesii* low woodland over a mixed low shrubland including *Scholtzia involucrata, Eremaea pauciflora* var. *pauciflora, Hibbertia hypericoides* and *Calytrix angulata* over *Patersonia occidentalis* var. *occidentalis* sparse forbland. Represents the Banksia Woodlands TEC. Situated on a dune crest with grey sandy soils.	RPS survey effort: METQ08, METQ09 Extent: 0.20 ha Condition: Very Good	
BaBmBiXp *Banksia attenuata* Woodland *Banksia attenuata, B. menziesii* and *B. ilicifolia* low woodland over *Xanthorrhoea preissii* mid open shrubland over *Scholtzia involucrata* low sparse shrubland over an open to closed rushland/forbland. Situated on white-grey sandy soil on low flat terrain.	RPS survey effort: PTAR02, PTAR04 Extent: 1.34 ha Condition: Completely Degraded to Degraded	

Description	Additional Details	Photograph
CcMpXp *Corymbia calophylla* Woodland *Corymbia calophylla* mid open forest to mid closed forest over *Melaleuca preissiana* low isolated trees to low Woodland over *Xanthorrhoea preissii* isolated shrubs to mid open shrubland over *Dielsia stenostachya* rushland with a mixed exotic open grassland. Located on grey sandy soil on low flats and slopes.	RPS survey effort: METQ01, METQ11, METQ06, METQ17, PTAQ21, PTAQ15 Extent: 37.23 ha Condition: Completely Degraded to Good	
Trees Isolated native trees and shrubs over weeds.	Survey effort: observation points Extent: 4.80 ha Condition: Completely Degraded	No photo available.

9.1.2 Conservation Significant Vegetation

9.1.2.1 Banksia Woodlands TEC Assessment

One patch of Banksia Woodlands TEC was assessed by RPS and considered representative of the federally protected ecological community. The Banksia Woodlands TEC is mapped for 0.20 ha in the survey area as the community BaBmSiPo. FCT 23a was inferred for this Patch (Woodman, 2020) therefore this TEC is represented by the synonymous Priority 3 PEC at the State level.

A second patch, recognised as Patch 12 (RPS, 2020) was originally classified as the Banksia Woodlands TEC. The vegetation east of Drumpellier Drive is now separated from the Whiteman Park vegetation by more than 30 m and is therefore not considered part of the federally protected ecological community.

On the west side of Drumpellier Drive there is a stand of Banksia trees mapped as Completely Degraded. Due to degradation and segregation from vegetation in Good or better condition, it is not considered representative of the Banksia Woodlands TEC.

9.1.3 Vegetation Condition

Areas of native vegetation were mostly Completely Degraded or Degraded condition. Significant weed invasion was present which is expected on the Swan Coastal Plain, particularly where parcels of vegetation have been dissected by roads and development. Whiteman Park has a history of grazing where large areas along the west side of Drumpellier Drive remain cow paddocks.

Cleared areas represent areas devoid of vegetation and are not included in percentage calculations below.

Vegetation condition is mapped on Figure 8 and extent of each category is presented in Table 73 below.

Table 73 Vegetation condition extent

Condition Rating	Extent (ha)	Percent of Total Area
Very Good	0.20	0%
Good	2.06	5%
Degraded	19.65	45%
Completely Degraded	21.67	50%
Total	**43.58**	**100%**
Cleared	75.42	

9.1.4 Conservation Significant Flora

No significant flora species were recorded in the survey area.

9.1.5 Flora Inventory

The vegetation mapping relied on existing information published by RPS (2020) and AECOM (2016). It would be inaccurate to represent floristic diversity from these surveys as boundaries differ.

9.2 Fauna

9.2.1 Fauna Habitat Assessment

Five fauna habitats representing native vegetation were mapped, including Banksia Woodland, Melaleuca Woodland, Eucalyptus Woodland, Mixed Shrubland and Trees Over Cleared. Fauna habitat types and suitability for significant fauna species is described below and mapped in Figure 9.

9.2.1.1 Banksia Woodland

The Banksia Woodland habitat occurs at three locations along Drumpellier Drive and totalling 1.55 ha (1.3% of the survey area). It is characterised by a variable understorey of low shrublands and grasslands, with higher density in the northernmost patch. Overstorey plant species within the community include *Banksia attenuata, Banksia menziesii*, and *Eucalyptus todtiana*. Shrubs range from low-lying to tall, with density varying across the landscape. Shrub species included *Scholtzia involucrata, Eremaea pauciflora* var*. pauciflora, Hibbertia hypericoides,* and *Calytrix angulata* among others.

This habitat type represents edges of larger areas that extend beyond the survey area where condition is potentially better. It has few logs and rocks as microhabitats. Grass is common, with abundant bare ground. The shrubby understorey varies in density, along with coarse leaf litter. Small reptiles and mammals like the Quenda (Priority 4) and Black-striped Snake (Priority 3), which live in Banksia Woodlands, may forage in the coarse litter. This habitat type has large trees like Banksias and Eucalyptus, which are suitable for birds to feed and perch on. Carnaby's Cockatoo (Endangered) and Forest Red-tailed Black Cockatoo (Vulnerable) were seen foraging in the survey area.

9.2.1.2 Eucalyptus Woodland

The Eucalyptus Woodland habitat extends for 36.24 ha representing 30.5% of the survey area. Similar to the Banksia Woodland, this habitat extends beyond the survey area boundary. This habitat type is large and offers refuge for wildlife in the urbanised landscape. The overstorey includes Marri *Corymbia calophylla,* Jarrah *Eucalyptus marginata* and Paperbark *Melaleuca preissiana*. The understorey varies in density and species but largely represents paddocks with common weedy grasses and herbs. There is plenty of coarse leaf litter ideal for shelter and foraging for the *Quenda Isoodon fusciventer*. Large logs are scarce, but small logs and vines are common. The mature trees are suitable habitat for the Carnaby's Cockatoo, Forest Red-tailed Black Cockatoos and Baudin's Cockatoo.

Plate 27 Eucalyptus Woodland Habitat

9.2.1.3 Mixed Shrubland

The Mixed Shrubland habitat includes open native shrubland and planted shrubs mapped for 0.26 ha, representing 0.2% of the survey area. There are small logs which occur sporadically throughout the habitat type. Grasses were abundant, with coarse leaf litter occurring occasionally. The leaf litter and grassy understorey provide suitable foraging habitat and shelter for the Quenda *Isoodon fusciventer*.

9.2.1.4 Melaleuca Woodland

The Melaleuca Woodland habitat consists of *Melaleuca preissiana* overstorey in paddocks, mapped for 0.99 ha representing 0.8% of the survey area. It is limited to small pockets representing the edge of larger patches of vegetation that extend beyond the survey area. There are small logs which occur sporadically throughout the habitat type. Grasses were abundant, with coarse leaf litter occurring occasionally.

9.2.1.5 Trees Over Cleared

The Trees Over Cleared habitat type is mapped for 4.54 ha representing 4% of the survey area. It consists of planted street trees and isolated native trees over common weedy grasses and herbs. There is minimal variation and limited microhabitats throughout the habitat type. Leaf litter is infrequent, with minimal logs and fallen branches present. The habitat provides refuge and foraging habitat for invertebrates including native bees, and flighted species such as birds and microbats.

9.2.2 Fauna Inventory

A total of 21 vertebrate fauna species were recorded during the field survey. This comprised of 17 bird, three mammal and one reptile species. A complete inventory of fauna species recorded within the survey area is provided in Table 74.

One introduced species was recorded, the European Rabbit *Oryctolagus cuniculus*, which is listed under the BAM Act as a Declared Pest (s22(2)).

Table 74 Fauna observations in the NT-NOR to HBK 132kV Line survey area

Class	Scientific Name	Common Name	Method
Mammal	*Isoodon fusciventer*	Quenda	Seen. Foraging evidence
Mammal	*Macropus fuliginosus melanops*	Western Grey Kangaroo	Scats
Mammal	*Oryctolagus cuniculus*	European Rabbit	Tracks
Bird	*Barnardius zonarius*	Australian Ringneck	Seen and heard
Bird	*Spilopelia senegalensis*	Laughing Dove	Seen
Bird	*Cacatua pastinator*	Western Corella	Seen and heard
Bird	*Gymnorhina tibicen*	Australian Magpie	Seen and heard
Bird	*Anthochaera carunculata*	Red Wattlebird	Seen and heard
Bird	*Rhipidura leucophrys*	Willie Wagtail	Seen and heard
Bird	*Pachycephala rufiventris*	Rufous Whistler	Seen and heard
Bird	*Cracticus torquatus*	Grey Butcherbird	Seen
Bird	*Smicrornis brevirostris*	Weebil	Seen
Bird	*Zosterops lateralis*	Silvereye	Seen
Bird	*Purpureicephalus spurius*	Red capped parrot	Seen and heard
Bird	*Eolophus roseicapilla*	Galah	Seen and heard
Bird	*Hirundo neoxena*	Welcome Swallow	Seen
Bird	*Falco cenchroides*	Nankeen Kestrel	Seen
Bird	*Merops ornatus*	Rainbow Bee eater	Seen and heard

Class	Scientific Name	Common Name	Method
Bird	*Calyptorhynchus banksia naso*	Forest Red-tailed Black Cockatoo	Seen. Foraging evidence
Bird	*Zanda latirostris*	Carnaby's Black Cockatoo	Seen and heard. Foraging evidence
Reptile	*Varanus tristis*	Black-headed Monitor	Seen

9.2.3 Conservation Significant Fauna

Three conservation significant fauna species were recorded during the survey:

- Carnaby's Cockatoo (*Zanda latirostris)* listed as Endangered under the EPBC Act and BC Act
- Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso)* listed as Vulnerable under the EPBC Act and BC Act
- Quenda (*Isoodon fusciventer)* listed as Priority 4 by DBCA.

Carnaby's Cockatoos and Forest Red-tailed Black Cockatoo were seen and heard during the survey. Foraging evidence was recorded for Quenda and the Forest Red-tailed Black Cockatoo. Evidence of conservation significant species is mapped in Figure 9.

Four additional significant fauna species are likely to utilise the fauna habitats within the survey area. The total area (ha) of suitable habitat for these species which occurs within the survey area is included in Table 75 below.

Table 75 Total area (ha) of suitable habitat for significant fauna species within the survey area

Species	Area of Suitable Habitat (ha)					Total (ha)
	Eucalyptus Woodland	Banksia Woodland	Melaleuca Woodland	Trees Over Cleared	Mixed Shrubland	
Carnaby's Cockatoo (*Zanda latirostris*)	36.24	1.55	-	4.54	-	42.32
Baudin's Cockatoo (*Zanda baudinii)*	36.24	1.55	-	4.54	-	42.32
Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*)	36.24	1.55	-	4.54	-	42.32
Quenda (*Isoodon fusciventer*)	36.24	1.55	0.99	-	0.26	39.04

9.3 Targeted Black Cockatoo Survey

9.3.1 Foraging

The survey area has been assessed as a score of 10 'High-quality foraging habitat' for both the Carnaby's Cockatoo and Forest Red-tailed Black Cockatoo in accordance with the Commonwealth Black Cockatoo Referral Guidelines foraging tool (DAWE, 2022) (Table 76). No subtractions were made for these two species. The survey area has been assessed as a score of 8 for Baudin's Cockatoo due to an absence of foraging evidence during the survey.

The survey area contains mature Banksia Woodlands and Eucalyptus Woodlands with suitable foraging species including multiple Proteaceous species, Marri *Corymbia calophylla* and Jarrah *Eucalyptus marginata* trees.

Table 76 Black Cockatoo Foraging Habitat Assessment (DAWE, 2022)

Starting score		Baudin's Cockatoo (*Zanda baudinii)*		Carnaby's Cockatoo (*Zanda latirostris)*		Forest Red-Tailed Black Cockatoo *(Calyptorhynchus banksii naso)*	
		Start at a score of 10 if your site is native eucalypt woodlands and forest, and proteaceous woodland and heath, particularly Marri, within the range of the species, including along roadsides and parkland cleared areas. Can include planted vegetation**. This tool only applies to sites equal to or larger than 1 hectare in size.**		**Start at a score of 10** if your site is native shrubland, kwongan heathland or woodland, dominated by proteaceous plant species such as *Banksia* spp. (including *Dryandra* spp.), *Hakea* spp. and *Grevillea* spp., as well as native eucalypt woodland and forest that contains foraging species, within the range of the species, including along roadsides and parkland cleared areas. Also includes planted native vegetation. **This tool only applies to sites equal to or larger than 1 hectare in size.**		**Start at a score of 10** if your site is Jarrah or Marri woodland and/or forest, or if it is on the edge of Karri Forest, or if Wandoo and Blackbutt occur on the site, within the range of the subspecies, including along roadsides and parkland cleared areas. **This tool only applies to sites equal to or larger than 1 hectare in size.**	
Attribute	Sub-tractions	Context adjustor (attributes reducing functionality of foraging habitat).					
Foraging potential	**-2**	**Subtract 2** from your score if there is no evidence of feeding debris on your site.	☒	**Subtract 2** from your score if there is no evidence of feeding debris on your site.	☐	**Subtract 2** from your score if there is no evidence of feeding debris on your site.	☐
Connectivity	**-2**	**Subtract 2** from your score if you have evidence to conclude that there is no other foraging habitat within 12 km of your site.	☐	**Subtract 2** from your score if you have evidence to conclude that there is no other foraging habitat within 12 km of your site.	☐	**Subtract 2** from your score if you have evidence to conclude that there is no other foraging habitat within 12 km of your site.	☐
Proximity to breeding	**-2**	**Subtract 2** if you have evidence to conclude that your site is more than 12 km from breeding habitat.	☐	**Subtract 2** if you have evidence to conclude that your site is more than 12 km from breeding habitat.	☐	**Subtract 2** if you have evidence to conclude that your site is more than 12 km from breeding habitat.	☐

Starting score		Baudin's Cockatoo (*Zanda baudinii)*		Carnaby's Cockatoo (*Zanda latirostris)*		Forest Red-Tailed Black Cockatoo *(Calyptorhynchus banksii naso)*	
Proximity to roosting	**-1**	**Subtract 1** if you have evidence to conclude that your site is more than 20 km from a known night roosting habitat.	☐	**Subtract 1** if you have evidence to conclude that your site is more than 20 km from a known night roosting habitat.	☐	**Subtract 1** if you have evidence to conclude that your site is more than 20 km from a known night roosting habitat.	☐
Impact from significant plant disease	**-1**	**Subtract 1** if your site has disease present (e.g. *Phytophthora* spp. or Marri canker) and the disease is affecting more than 50% of the preferred food plants present.	☐	**Subtract 1** if your site has disease present (e.g. *Phytophthora* spp. or Marri canker) and the disease is affecting more than 50% of the preferred food plants present.	☐	**Subtract 1** if your site has disease present (e.g. *Phytophthora* spp. or Marri canker) and the disease is affecting more than 50%of the preferred food plants present.	☐
		8		**10**		**10**	

The BCE foraging habitat value considered known breeding and roosting sites, and the characteristics associated with each fauna habitat type. The following factors influenced the results:

- There are five confirmed white-tailed and Forest Red-tailed Black Cockatoo roosting sites less than 2.5 km from the survey area (DBCA, 2023c).
- The survey area is approximately 20 km from the buffer zone of two confirmed Black Cockatoo breeding areas (DBCA, 2023c).
- There is suitable foraging habitat adjacent to the survey area. The survey area represents 0.26% of available foraging habitat where breeding is likely and within 15 km therefore site context scores 1 where relevant.

Carnaby's Cockatoos were observed resting and foraging in Marri *Corymbia calophylla* within the survey area. Forest Red-tailed Black Cockatoos were observed flying over as well as foraging evidence (Plate 28).

The Banksia Woodland fauna habitat was considered 'Moderate to High' and 'Moderate' based on the density of suitable Banksia foraging species.

Areas that were Degraded had a lower site condition score (3 or 4) with a site context score and stocking rate of 1.

This same habitat was 'Low' for Baudin's and Forest Red-tailed Black Cockatoo in the absence of suitable foraging species.

The Eucalyptus Woodland fauna habitat was predominantly *Corymbia calophylla* and *Melaleuca preissiana* trees. Site context and stocking rate added two points for Carnaby's and Forest Red-tailed Black Cockatoos.

This habitat type varied depending on condition for Carnaby's, from 'Low' to 'Moderate'.

It was rated as 'Moderate' for Baudin's, and 'Moderate to High' for Forest Red-tailed Black Cockatoos.

The Trees over Cleared and Mixed Shrubland habitat was mapped as Completely Degraded and considered 'Low' for Carnaby's,

and 'Moderate' for Forest Red-tailed Black Cockatoos and Baudin's Cockatoo. The score was largely influenced by site condition in the absence of dense favourable foraging species.

The Melaleuca Woodland represents 'Negligible' quality habitat for all three species in the absence of suitable foraging species.

Foraging habitat for each habitat type is shown in Table 78 and it is mapped in Figure 10.

Table 77 NT-NOR TO HBK 132KV Terminal refined foraging score calculation (Bamford, 2020)

Habitat Type	Carnaby's Cockatoo	Baudin's Cockatoo	Forest Red-tailed Black Cockatoo	Extent (ha)
Banksia Woodlands	5	2	2	1.55
Eucalyptus Woodland	5	4	7	36.24
Melaleuca Woodland	1	1	1	0.99
Mixed Shrubland	2	2	2	0.26
Trees over Cleared	2	4	4	4.54
Cleared	0	0	0	75.42

Table 78 NT-NOR TO HBK 132KV Terminal foraging habitat extent

Foraging Habitat Quality	Carnaby's Cockatoo (ha)	Baudin's Cockatoo (ha)	Forest Red-tailed Black Cockatoo (ha)
1: Negligible.	0.99	0.99	0.99
2: Low	4.80	1.55	1.81
4-6: Moderate		40.78	4.54
7: Moderate to High	37.78		36.23
Total	**43.58**	**43.58**	**43.58**

Plate 28 Carnaby's Cockatoo foraging within the survey area

9.3.2 Breeding

A total of 351 potential nesting trees were recorded within the survey area (Table 79, Figure 10). The majority consisted of Marri (*Corymbia calophylla*) trees.

Two suitable nesting trees were recorded (Table 80 and Plate 29) with suitable hollows that could facilitate Black Cockatoo breeding. This included a Jarrah tree with a spout hollow, and a stag also with a spout hollow. The stag hollow was occupied by a beehive. This assessment is limited to observations made from the ground only.

Table 79 Potential nesting trees within the survey area

Tree Species	Total Trees with DBH >500 mm
Tuart (*Eucalyptus gomphocephala*)	1
Marri (*Corymbia calophylla*)	302
Jarrah (*Eucalyptus marginata*)	8
Coastal Blackbutt (*Eucalyptus todtiana)*	2
Stag	36
Introduced	2
Grand Total	**351**

Table 80 Potentially suitable nesting tree hollow details

ID	Species	Hollow Entrance (Depth x Width)	Height Above Ground (m)	Hollow Angle	Facing	Hollow Type	Evidence of Use
291	Stag	30 x 30 cm	12	Horizontal	West	Spout	None, occupied by bees.
507	Jarrah (*Eucalyptus marginata*)	20 x 20 cm	12	Horizontal	North	Spout	None

Plate 29 Left: Hollow recorded on potentially suitable nesting tree ID 291 - Stag
Right: Hollow recorded on potentially suitable nesting tree ID 507 - Jarrah (*Eucalyptus marginata*)

9.3.3 Roosting

No roosting sites were observed within the survey area. Sixty-seven confirmed white-tailed Black Cockatoo and Forest Red-tailed Black Cockatoo roosting sites are known to occur within 15 km of the survey area from Birdlife Data provided by DBCA. Twelve of these occur within 5 km and five within 2.5 km of the survey area (DBCA, 2023c). The Trees over Cleared and Eucalyptus Woodland would provide suitable roosting habitat.

9.4 Discussion

9.4.1 Flora and Vegetation

The survey area represents a wide linear corridor that follows Drumpellier Drive in a north-south trajectory. It includes the east side of Drumpellier Drive which adjoins urban development and has been disconnected from the vegetation on the west side. The west side represents Whiteman Park and Bush Forever Site 304. This area, although representing a Reserve, is currently used for cattle grazing and encompasses the Morley-Ellenbrook Rail Corridor which is currently under construction.

Access to the area was restricted due to ongoing Rail works. The current survey verified the RPS (2020) flora and vegetation assessment undertaken to support the Morley-Ellenbrook Public Environment Review documentation submitted to EPA. This mapping was refined and updated to reflect current conditions excluding the clearing footprint and refining trees in paddocks.

All areas of native vegetation have been historically disturbed from grazing, urban development, and altered hydrology. Large parts of the area are low-lying and winter-wet and therefore represent ideal grazing country where grasses grow prolifically. Weeds have displaced most native understorey species, leading to the majority of the area being mapped as Completely Degraded and Degraded. Historically the wetlands in Whiteman Park suffer from significant weed invasion including the Declared pest **Zantedeschia aethiopica* (Arum Lily) (RPS, 2020).

Native vegetation represents five vegetation communities, mapped for 57.98 ha. The remaining 59.74 ha is cleared. Vegetation is largely reduced to a native overstorey over hardy native shrubs and common pasture weeds.

Table 81 Summary of NT-NOR TO HBK 132KV likelihood of occurrence pre-survey and post-survey

Likelihood	Number of Species Identified					
	Known	High Likelihood	Moderate Likelihood	Low Likelihood	Negligible Likelihood	Total
Pre-survey	0	3	31	47	23	104
Post-survey	0	0	0	34	70	104

9.4.2 Fauna

Twenty-one vertebrate fauna species were recorded during the field survey. This included 17 birds, three mammals and one reptile species. Three conservation significant fauna species were recorded during the survey:

- Quenda (*Isoodon fusciventer*) listed as Priority 4 by DBCA.
- Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksia naso*) listed as Vulnerable under the EPBC Act and BC Act.
- Carnaby's Cockatoo (*Zanda latirostris*) listed as Endangered under the EPBC Act and BC Act.

Five native fauna habitats were defined and mapped for the survey area based on the results of the field assessment. These habitats include Banksia Woodland, Eucalyptus Woodland, Melaleuca Woodland, Trees Over Cleared and Mixed Shrubland. All fauna habitats were reduced to a native overstorey with a predominantly weedy understorey.

Following the survey, a post-survey likelihood desktop assessment was completed. Details of all the conservation significant species considered to have a high or known post-survey likelihood and their associated habitats is presented in Table 82.

The Banksia Woodlands and Eucalyptus Woodland habitats are considered the most suitable habitat for Quenda (*Isoodon fusciventer*), Carnaby's Cockatoos (*Zanda latirostris*), Baudin's Cockatoo (*Zanda baudinii*), and Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksia naso*). Large parts of the survey area are disconnected from remnant native vegetation and have been disturbed.

These significant fauna species may utilise areas where native understorey density was higher, generally associated with vegetation condition of 'Good' or better.

Table 82 Fauna species and associated fauna habitat within the NT-NOR to HBK 132kV survey area

Species	Conservation code (EPBC/State WA)	Habitat	Number of DBCA Records and Distance	Pre survey likelihood of occurrence	Post survey likelihood of occurrence	Discussion
Carnaby's Cockatoo (*Zanda latirostris*)	E (EPBC Act) EN (BC Act)	Uncleared or remnant native Eucalypt woodlands containing Salmon gum and Wandoo, and in shrubland or Kwongan heathland dominated by Hakea, Dryandra, *Banksia* and *Grevillea* species. It also occurs in remnant patches of native vegetation on land otherwise cleared for agriculture. Forages seasonally in Pine plantations (DCCEEW, 2023)	There are 9264 records on the DBCA database, the closest record is 0.29 km away from the survey area. The most recent record is in 2020.	High	Known	This species is likely to use Eucalyptus Woodland, Trees Over Cleared, and Banksia Woodland habitats within the survey area. These habitats are also found outside, directly adjacent to the survey area.
Baudin's Cockatoo (*Zanda baudinii*)	E (EPBC Act) EN (BC Act)	Temperate forest and woodland dominated by *Eucalyptus marginata* (Jarrah), *Corymbia calophylla* (Marri) and *E. diversicolor* (Karri) (TSSC, 2018).	There are 136 records on the DBCA database, the closest record is 0.70 km away from the survey area. The most recent record is in 2015.	High	High	This species is likely to use Eucalyptus Woodland, Trees Over Cleared, and Banksia Woodland habitats within the survey area. These habitats are also found outside, directly adjacent to the survey area.
Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*)	V (EPBC Act) VU (BC Act)	Inhabits dense *Eucalyptus marginata* (Jarrah*), E. diversicolor* (Karri) and *Corymbia calophylla* (Marri) forests (TSSC, 2009).	There are 363 records on the DBCA database, the closest record is 2.00 km away from the survey area. The most recent record is in 2020.	High	Known	This species is likely to use Eucalyptus Woodland, Trees Over Cleared, and Banksia Woodland habitats within the survey area. These habitats are also found outside, directly adjacent to the survey area.
Quenda (*Isoodon fusciventer*)	P4	Forest, woodland, heath, and shrub communities, with sandy soils and dense heathy vegetation (Van Dyck & Strahan, 2008).	There are over 1588 records within 10 km of the survey area, with the closest record occurring at 0.06 km. The most recent of these was recorded in 2021.	High	Known	This species is likely to use Eucalyptus Woodland, Melaleuca Woodland, Mixed Shrubland and Banksia Woodland habitats within the survey area. The presence of accumulated coarse leaf litter is suitable foraging habitat for the Quenda. Quenda foraging activity was observed throughout these habitat types. These habitats are also found outside, directly adjacent to the survey area.

9.4.3 Targeted Black Cockatoo

The survey area is within the known range for the three threatened Black Cockatoo species. Both the Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksia naso*) and Carnaby's Cockatoo (*Zanda latirostris*) were observed foraging and resting within the survey area. There were 118 potential nesting trees recorded, including two suitable nesting trees. The suitable nesting trees include a stag and a Jarrah tree, both with spout hollows. There was no evidence of current use, but they could be utilised for nesting in the future.

The survey area scored a foraging habitat score of 10 for both the Carnaby's Cockatoo and Forest Red-tailed Black Cockatoo in accordance with the DAWE 2022 guidelines. The survey area has been assessed as a score of 8 for Baudin's Cockatoo due to an absence of foraging evidence during the survey.

Foraging scores were largely attributed to the variable site condition score, influenced by the *Banksia Corymbia calophylla* and *Eucalyptus marginata* overstorey. This includes potential breeding trees and two trees with suitable hollows. For Carnaby's the Banksia Woodlands would be the preferred habitat, rated as 'Moderate to High'. For Forest Red-tailed Black Cockatoos, the Trees over Cleared and Eucalyptus Woodlands would be the preferred habitat, also scoring 'Moderate to High'.

Foraging quality for Baudin's Cockatoo was largely Moderate. The species prefer to forage on Marri (*Corymbia calophylla*), which is present in the survey area. Due to a lack of sightings and foraging evidence the score meant no stocking rate score was included and breeding is unlikely with breeding likely to occur on the southern Swan Coastal Plain (DAWE, 2022).

There are large areas of remnant native vegetation in Good or better condition protected within Whiteman Park and Gnangara State Forest which would provide similar foraging habitat as what was captured in the survey area.

10.0 Northern Terminal Results and Discussion

10.1 Flora

10.1.1 Vegetation Communities

Two intact and one modified native vegetation community was defined and mapped including:

- Eucalypt Woodland CcXpEc
- Low-lying Eucalypt Woodland ErAcCc which represents a winter-wet area
- Trees representing a modified community.

The native vegetation communities were mapped for 12.21 ha, representing 47% of the survey area. The remaining 13.57 ha was mapped as Cleared and was devoid of native vegetation. Vegetation community descriptions are presented in Table 83 and mapped on Figure 8.

10.1.2 Conservation Significant Vegetation

No TECs or PECs were identified in the survey area.

FCT analysis results were ambiguous with no strong similarity for Quadrats CHQ01 and CHQ02. This outcome reflects the isolated nature and degradation of vegetation within the survey area. Numerous key species were missing, and no strong similarity was noted for any one particular FCT.

Quadrat CHQ03 had a weak affiliation with FCT 4 *Melaleuca preissiana* Damplands. This is inferred with low confidence with 29% as the highest similarity and then only for the Gibson data.

Results for the FCT analysis are presented in Table 84) including similarity percentages and cluster dendrogram results.

Table 83 Northern Terminal vegetation community descriptions and photographs

Description	Additional Details	Photograph
CcXpEc *Corymbia calophylla* Woodland *Corymbia calophylla* and *Nuytsia floribunda* tall open woodland over *Xanthorrhoea preissii, Conostephium pendulum* and *Petrophile linearis* low sparse shrubland over **Ehrharta calycina* and **Pentameris airoides* open grassland. Situated on grey- white sandy soil on flat terrain.	Survey effort: CHQ02 Native species richness: 10 Weed species richness: 3 Condition: Completely Degraded to Very Good Extent: 1.52 ha	
ErAcCc *Eucalyptus rudis* Woodland *Eucalyptus rudis, Melaleuca preissiana and Callitris pyramidalis* tall open woodland over *Adenanthos cygnorum* subsp. *cygnorum, Jacksonia furcellata, Taxandria linearifolia* low closed shrubland over *Conostylis candicans* subsp. *candicans, Phlebocarya ciliata* and *Tricoryne tenella* sparse forbland. Situated on grey sandy soil on low flat terrain. Represents low-lying terrain which may be winter-wet.	Survey effort: CHQ01, CHQ03, CHR01, NSR01, NSR02, NSR03, NSR04 Native species richness: 38 Weed species richness: 23 Condition: Completely Degraded to Excellent Extent: 9.82 ha	

Description	Additional Details	Photograph
Trees Isolated native trees and shrubs over weeds. Situated on grey- white sandy soil on flat terrain.	Survey effort: Observation points Condition: Completely Degraded Extent: 0.87 ha	

Table 84 Floristic community type analysis results for Northern

Quadrat	Gibson (1994)				Keighery (2012)			Final Determination	
	% Similar	FCT	Site	Dendrogram	% Similar	FCT	Site	Dendrogram	
CHQ01	27	28	NEER-6	Broadly clustering with FCT 20b and 6.	30	21c	FL-6	Clustering with FCT 6.	Indeterminate. FCT21c low lying *B. attenuata* woodlands or shrublands is not a good fit. It is dominated by a mix of *Melaleuca preissiana, B. attenuata, B. menziesii* according to the Gibson et al. (1994) description. The mapped community lacks the key *Banksia* species and is therefore not considered to represent this FCT. The low similarity to multiple FCTs likely relates to the high level of disturbance.
	27	21c	DEJONG-c		29	24	bold13		
	25	21c	FL-6		28	21c	DEJONG02		
CHQ02	22	21a	PLINE-3	Broadly clustering with FCTs 15 and 10b. Outlier of a large group.	25	21c	ELE29	Outlier of a large group, clustering with FCTs s10, s08.	Indeterminate. FCT21a central *B. attenuata-Eucalyptus marginata* woodlands is not a good fit. It is dominated by a mix of *E. marginata* and *B. attenuata* according to the Gibson et al. (1994) description. The mapped community lacks the key *Banksia* and *Eucalyptus* species and is therefore not considered to represent this FCT. The low similarity to multiple FCTs likely relates to the high level of disturbance.
	21	21a	MILT-6		24	21c	ELE27		
	20	24	THOM-2		24	22	MR11		
CHQ03	29	4	PLINE-4	Broadly clustering with FCTs 22 and 14.	35	s02	ELE06	Outlier of a group including FCTs 6, s20, and s01	FCT 4, low similarity, unable to infer FCT with confidence. Vegetation present was a mix of wetland and woodland. FCT4 vegetation description is suitable. Low similarity may be influenced by quadrat location (ecotone potentially), historical disturbance, or survey effort (single scoring event, time of year, time spent searching).
	24	4	MELA-1		31	21a	Cavs02		
	23	21c	FL-5		31	4	perth10		

10.1.3 Vegetation Condition

The survey area included 13.37 ha of native vegetation which was largely Degraded (4.91 ha, 19%) and Completely Degraded (2.34 ha, 9%). Degradation was a result of fragmentation, clearing for the existing substations, numerous tracks, and the exacerbated edge effects. The native vegetation is completely isolated from other areas of remnant vegetation, thereby exacerbating lower diversity. This power station was historically cleared (1960s) for construction of the substation infrastructure.

Cleared areas represent areas devoid of vegetation and are not included in percentage calculations below. Vegetation condition is mapped on Figure 8 and extent of each category is presented in Table 85 below.

Table 85 Vegetation condition extent

Condition Rating	Extent (ha)	Percent of Total Area
Completely Degraded	2.34	19
Degraded	4.91	40
Good	3.02	25
Very Good	0.85	7
Excellent	1.09	9
Total	**12.21**	**100**
Cleared	13.57	

10.1.4 Conservation Significant Flora

No significant flora species were recorded in the Northern Terminal survey area.

10.1.5 Flora Inventory

A total of 70 flora species from 31 families were recorded. The total includes 46 (65.7%) locally native species and 24 (34.3%) introduced or naturalised weed species. No weed species listed as Weeds of National Significance (WONS) or listed as Declared Pests under the BAM Act were recorded.

Families with the highest representation are Myrtaceae (29 native taxa), Poaceae (17 native taxa), and Fabaceae (12 native taxa).

The comprehensive list of vascular flora species recorded, organised by family and the community they occur in is presented in Appendix D. Quantitative data recorded from individual samples sites is presented in Appendix E.

10.2 Fauna

10.2.1 Fauna Habitat Assessment

10.2.1.1 Eucalyptus Woodland

The Eucalyptus Woodland habitat extends for 11.33 ha within the survey area. This habitat type is the largest within the survey area and acts as a refuge for wildlife from the surrounding urbanised landscape. The main trees are Marri *Corymbia calophylla,* Flooded Gum *Eucalyptus rudis* and *Melaleuca preissiana*, some of which contain small hollows. Historical disturbance has impacted the abundance of a shrubby understorey, which varies in density throughout. Coarse leaf litter, sedges and grasses are abundant which are ideal for shelter and foraging for animals like the Quenda *Isoodon fusciventer*. Vines and small logs are abundant, whilst large logs are infrequent. The mature trees are suitable habitat for the three threatened species: Carnaby's Cockatoo, Forest Red-tailed Black Cockatoos and Baudin's Cockatoo.

Plate 30 Eucalyptus Woodland Habitat

10.2.1.2 Mixed Shrubland

The Mixed Shrubland habitat includes isolated planted shrubs, as well as remnant native shrubland vegetation. It is in a degraded condition and extends for 0.73 ha, limited to small pockets throughout the survey area.

There are small logs which occur sporadically throughout the habitat type. Grasses were abundant, with coarse leaf litter occurring occasionally.

Plate 31 Mixed Shrubland Habitat

10.2.1.3 Trees Over Cleared

The Trees Over Cleared habitat type is the second-most abundant habitat type, other than Cleared. It extends for 0.14 ha and consists of isolated native trees over grasses and weeds. Habitat quality is poor, as there is minimal variation and limited microhabitats throughout the habitat type. Leaf litter is infrequent, with minimal logs and fallen branches present. The habitat is primarily likely to be used by invertebrates and flighted species, such as birds and microbats. The mature trees may provide shelter, breeding and foraging for many species.

Plate 32 Trees Over Cleared Habitat

10.2.2 Fauna Inventory

A total of 16 vertebrate fauna species were recorded during the field survey. This comprised of nine bird, six mammal and one reptile species. A complete inventory of fauna species recorded within the survey area is provided in Table 86.

Two introduced species were recorded, both of which are listed under the BAM Act:

- Feral Cat *Felis catus* (Declared Pest - s22(2)
- European Rabbit *Oryctolagus cuniculus* (Declared Pest - s22(2)).

Table 86 Fauna observations within the Northern survey area

Class	Scientific Name	Common Name	Method
Mammal	*Felis catus*	Feral Cat	Seen and heard
Mammal	*Isoodon fusciventer*	Quenda	Foraging evidence
Mammal	*Macropus fuliginosus melanops*	Western Grey Kangaroo	Bones
Mammal	*Oryctolagus cuniculus*	European Rabbit	Seen. Foraging evidence
Mammal	*Tachyglossus aculeatus*	Short-beaked Echidna	Scats
Mammal	*Vulpes vulpes*	Red Fox	Seen
Bird	*Phylidonyris niger*	White-cheeked Honeyeater	Seen and heard
Bird	*Lichmera indistincta*	Brown Honeyeater	Seen and heard
Bird	*Merops ornatus*	Rainbow Bee-eater	Seen
Bird	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike	Seen
Bird	*Spilopelia chinensis*	Spotted Dove	Seen
Bird	*Pachycephala rufiventris*	Rufous Whistler	Seen
Bird	*Rhipidura albiscapa*	Grey Fantail	Seen
Bird	*Gavicalis virescens*	Singing Honeyeater	Seen and heard
Bird	*Calyptorhynchus banksii naso*	Forest Red-tailed Black Cockatoo	Foraging evidence
Reptile	*Pseudonaja affinis*	Dugite	Seen

10.2.3 Conservation Significant Fauna

Distinct foraging evidence was recorded for two significant fauna species, Quenda (*Isoodon fusciventer)* listed as Priority 4 by DBCA, and Forest Red-tailed Black Cockatoos (*Calyptorhynchus banksia naso*) listed as Vulnerable under the EPBC Act and BC Act(Plate 33, Plate 34). Evidence of conservation significant species is mapped in Figure 9.

The Baudin's Cockatoo and Forest Red-tailed Black Cockatoo are also considered likely to utilise habitat in the survey area. total area (ha) of suitable habitat for these species which occurs within the survey area is included in Table 87.

Plate 33 Typical conical-shaped Quenda digging - foraging evidence

Table 87 Total area (ha) of suitable habitat for significant fauna species within the survey area

Species	Area of Suitable Habitat (ha)			
	Eucalyptus Woodland	Trees Over Cleared	Mixed Shrubland	Total (ha)
Carnaby's Cockatoo (*Zanda latirostris*)	11.34	0.14	-	11.48
Baudin's Cockatoo (*Zanda baudinii)*	11.34	0.14	-	11.48
Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*)	11.34	0.14	-	11.48
Quenda (*Isoodon fusciventer*)	11.34	-	0.73	12.07

Plate 34 Forest Red-tailed Black Cockatoo Foraging Evidence

10.3 Targeted Black Cockatoo Survey

10.3.1 Foraging

The survey area has been assessed as a score of 10 ‘High-quality foraging habitat’ for the Forest Red-tailed Black Cockatoo in accordance with the Commonwealth Black Cockatoo Referral Guidelines foraging tool (DAWE, 2022) (Table 32). No subtractions were made for this species. The survey area has been assessed as a score of 8 for both the Carnaby’s Cockatoo and Baudin’s Cockatoo due to an absence of foraging evidence during the survey.

The survey area contains mature Banksia Woodlands and Eucalyptus Woodlands, with suitable foraging species including multiple proteaceous species, Marri *Corymbia calophylla* and Tuart *Eucalyptus gomphocephala* trees.

Table 88 Black Cockatoo Foraging Habitat Assessment (DAWE, 2022)

Starting score		Baudin's Cockatoo (*Zanda baudinii)*		Carnaby's Cockatoo (*Zanda latirostris)*		Forest Red-Tailed Black Cockatoo *(Calyptorhynchus banksii naso)*	
		Start at a score of 10 if your site is native eucalypt woodlands and forest, and proteaceous woodland and heath, particularly Marri, within the range of the species, including along roadsides and parkland cleared areas. Can include planted vegetation**. This tool only applies to sites equal to or larger than 1 hectare in size.**		**Start at a score of 10** if your site is native shrubland, kwongan heathland or woodland, dominated by proteaceous plant species such as *Banksia* spp. (including *Dryandra* spp.), *Hakea* spp. and *Grevillea* spp., as well as native eucalypt woodland and forest that contains foraging species, within the range of the species, including along roadsides and parkland cleared areas. Also includes planted native vegetation. **This tool only applies to sites equal to or larger than 1 hectare in size.**		**Start at a score of 10** if your site is Jarrah or Marri woodland and/or forest, or if it is on the edge of Karri Forest, or if Wandoo and Blackbutt occur on the site, within the range of the subspecies, including along roadsides and parkland cleared areas. **This tool only applies to sites equal to or larger than 1 hectare in size.**	
Attribute	Sub-tractions	Context adjustor (attributes reducing functionality of foraging habitat).					
Foraging potential	**-2**	**Subtract 2** from your score if there is no evidence of feeding debris on your site.	☒	**Subtract 2** from your score if there is no evidence of feeding debris on your site.	☒	**Subtract 2** from your score if there is no evidence of feeding debris on your site.	☐
Connectivity	**-2**	**Subtract 2** from your score if you have evidence to conclude that there is no other foraging habitat within 12 km of your site.	☐	**Subtract 2** from your score if you have evidence to conclude that there is no other foraging habitat within 12 km of your site.	☐	**Subtract 2** from your score if you have evidence to conclude that there is no other foraging habitat within 12 km of your site.	☐
Proximity to breeding	**-2**	**Subtract 2** if you have evidence to conclude that your site is more than 12 km from breeding habitat.	☐	**Subtract 2** if you have evidence to conclude that your site is more than 12 km from breeding habitat.	☐	**Subtract 2** if you have evidence to conclude that your site is more than 12 km from breeding habitat.	☐

Starting score		Baudin's Cockatoo (*Zanda baudinii)*		Carnaby's Cockatoo (*Zanda latirostris)*		Forest Red-Tailed Black Cockatoo *(Calyptorhynchus banksii naso)*	
Proximity to roosting	**-1**	**Subtract 1** if you have evidence to conclude that your site is more than 20 km from a known night roosting habitat.	☐	**Subtract 1** if you have evidence to conclude that your site is more than 20 km from a known night roosting habitat.	☐	**Subtract 1** if you have evidence to conclude that your site is more than 20 km from a known night roosting habitat.	☐
Impact from significant plant disease	**-1**	**Subtract 1** if your site has disease present (e.g. *Phytophthora* spp. or Marri canker) and the disease is affecting more than 50% of the preferred food plants present.	☐	**Subtract 1** if your site has disease present (e.g. *Phytophthora* spp. or Marri canker) and the disease is affecting more than 50% of the preferred food plants present.	☐	**Subtract 1** if your site has disease present (e.g. *Phytophthora* spp. or Marri canker) and the disease is affecting more than 50%of the preferred food plants present.	☐
		8		**8**		**10**	

The refined foraging habitat value considered known breeding and roosting sites, and the characteristics associated with each fauna habitat type. The following factors influenced the results:

- There are three confirmed white-tailed and Forest Red-tailed Black Cockatoo roosting sites less than 3 km from the survey area (DBCA, 2023c).
- The survey area is outside the mapped distribution of breeding for Baudin's Cockatoo and Carnaby's Cockatoo.
- There are 4,444 records of Carnaby's Cockatoo within 15 km of the survey area. There was foraging evidence for the Forest Red-tailed Black Cockatoo within the survey area. Stocking rate for these two species was scored at 1.
- There is suitable foraging habitat within 15 km of the survey area, however the immediately surrounding area is largely developed and cleared. Native vegetation within the survey area represents 0.1-1% of the available foraging habitat within a 15 km radius.

The Eucalyptus Woodland fauna habitat was split into two components for scoring, relating to the dominant overstorey species. Carnaby's Cockatoo and Forest-Red-tailed Black Cockatoo foraging habitat was rated as 'Moderate' (scoring 4, 5 or 6) for the Eucalyptus Woodland habitat that supported Marri *Corymbia calophylla* tree species.

Areas dominated by Flooded Gum *Eucalyptus rudis* scored a 2, representing 'Low' quality habitat.

Trees Over Cleared was rated as 'Negligible'.

Baudin's Cockatoo foraging habitat was largely 'Low', with small areas mapped as 'Low to Moderate' and 'Moderate' where Marri trees dominated. Similar to the Carnaby's Cockatoo, this reflects the dominant tree overstorey species.

Foraging habitat areas and the Bamford (2020) rating for each habitat quality type is shown in Table 89, Table 90 and Figure 10.

Table 89 Norther Terminal refined foraging score calculations (Bamford, 2020) and extent.

Habitat Type	Carnaby's Cockatoo	Baudin's Cockatoo	Forest Red-tailed Black Cockatoo	Extent (ha)
Eucalyptus Woodlands	3	3	3	11.34
Mixed Shrubland	1	1	1	0.73
Trees Over Cleared	1	1	1	0.14
Cleared	0	0	0	13.57

Table 90 Northern Terminal foraging habitat extent

Foraging Habitat Quality	Carnaby's Cockatoo (ha)	Baudin's Cockatoo (ha)	Forest Red-tailed Black Cockatoo (ha)
1: Negligible.	0.14	0.14	0.14
2: Low.	9.81	9.81	9.81
3: Low to Moderate.	-	0.67	-
4-6: Moderate.	1.52	1.52	1.52
Total	**11.47**	**12.14**	**11.47**

10.3.2 Breeding

A total of 33 potential nesting trees were recorded within the survey area (Table 91, Figure 10). This included Flooded Gum (*Eucalyptus rudis*), Marri (*Corymbia calophylla*) and 'Other' trees.

No suitable nesting trees were identified.

Table 91 Potential nesting trees within the survey area

Tree Species	Total Trees with DBH >500 mm
Flooded Gum (*Eucalyptus rudis*)	17
Marri (*Corymbia calophylla*)	12
Other	4
Grand Total	**33**

10.3.3 Roosting

No roosting sites were observed within the survey area. The Eucalyptus Woodland fauna habitat type could provide suitable roosting habitat.

One hundred and fifteen confirmed white-tailed Black Cockatoo and Forest Red-tailed Black Cockatoo roosting sites are known to occur within 15 km of the survey area from Birdlife Data provided by DBCA. Three of these sites occur within 3 km of the survey area (DBCA, 2023c).

10.4 Discussion

10.4.1 Flora and Vegetation

The Northern survey area is characterised by fragmented remnant native vegetation in a highly developed landscape. It includes an area that is fenced as part of the power terminal. Vegetation within the fenced area represented regenerated vegetation comprised largely of hardy perennial disturbance opportunist species and weeds. Two native Eucalyptus Woodlands were mapped including CcXpEc for 1.52 ha and ErAcCc for 9.81 ha. No TECs or PECs were anticipated to occur, and none were identified.

Flora diversity was considered high with 70 species recorded, including 46 native and 24 weed species within 12.21 ha. The species diversity is likely a reflection of survey effort (three quadrats and five relevés). This survey effort was implemented to capture the variation in vegetation observed, likely a result of regrowth and fragmentation due to historical clearing.

No significant flora species were known to occur, and none were recorded. Ten flora species had a 'high' likelihood of occurring due to the proximity and date of known records. All of these were downgraded to 'low' following the survey due to the degradation and isolation of habitat. All areas were traversed on foot during the ideal detection period and no significant flora was recorded. Table 92 provides a summary of pre-survey and post-survey likelihood of occurrence for species identified as potentially occurring within the survey area.

Table 92 Summary of Northern Terminal likelihood of occurrence pre-survey and post-survey

Likelihood	Number of Species Identified					
	Known	High Likelihood	Moderate Likelihood	Low Likelihood	Negligible Likelihood	Total
Pre-survey	0	10	24	33	32	99
Post-survey	0	0	0	34	65	99

10.4.2 Fauna

Sixteen vertebrate fauna species were recorded during the field survey. This included nine birds, six mammals and one reptile species. Two conservation significant fauna species were recorded during the survey:

- Quenda (*Isoodon fusciventer*) listed as Priority 4 by DBCA.
- Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksia naso*) listed as Vulnerable under the EPBC Act and BC Act.

Three native fauna habitats were defined and mapped for the survey area based on the results of the field assessment. These habitats include Eucalyptus Woodland, Trees Over Cleared and Mixed Shrubland.

As a fence is present around two-thirds of the survey area and the surrounding area is heavily developed, the movement of most conservation significant fauna species will be limited. The fauna habitats are fragmented and degraded throughout, with large areas of road base tracks and infrastructure dividing it. The Eucalyptus Woodland fauna habitat is the most intact, with mature trees present as well as a variable native understorey.

The Eucalyptus Woodland habitat is considered the most suitable habitat for Quenda (*Isoodon* fusciventer), Carnaby's Cockatoos (*Zanda latirostris*), Baudin's Cockatoo (*Zanda baudinii*), and Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksia naso*). These significant fauna species may utilise areas where native understorey density was higher, generally associated with vegetation condition of 'Good' or better.

Following the survey, a post-survey likelihood desktop assessment was completed. Details of all the conservation significant species considered to have a high or known post-survey likelihood and their associated habitats is presented in Table 93.

Table 93 Fauna species likely to occur and associated fauna habitat within the Northern Terminal survey area.

Species	Conservation code (EPBC/State WA)	Habitat	Number of DBCA Records and Distance	Pre survey likelihood of occurrence	Post survey likelihood of occurrence	Discussion
Carnaby's Cockatoo (*Zanda latirostris*)	E (EPBC Act) EN (BC Act)	Uncleared or remnant native Eucalypt woodlands containing Salmon gum and Wandoo, and in shrubland or Kwongan heathland dominated by Hakea, Dryandra, Banksia and Grevillea species. It also occurs in remnant patches of native vegetation on land otherwise cleared for agriculture. Forages seasonally in Pine plantations (DCCEEW, 2023).	There are 9264 records on the DBCA database, the closest record is 0.65 km away from the survey area (2020).	High	High	All three species are likely to use the Eucalyptus Woodland and Trees Over Cleared habitats within the survey area. The Eucalyptus Woodland habitat does not occur directly adjacent to the survey area. The closest large patch of remnant bushland is approximately 1 km to the west. Isolated trees along a waterway are also located approximately 500m to the east.
Baudin's Cockatoo (*Zanda baudinii*)	E (EPBC Act) EN (BC Act)	Temperate forest and woodland dominated by *Eucalyptus marginata* (Jarrah), *Corymbia calophylla* (Marri) and *E. diversicolor* (Karri) (TSSC, 2018).	There are 136 records on the DBCA database, the closest record is 0.64 km away from the survey area (2015).	High	High	
Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*)	V (EPBC Act) VU (BC Act)	Inhabits dense *Eucalyptus marginata* (Jarrah), *E. diversicolor* (Karri) and *Corymbia calophylla* (Marri) forests (TSSC, 2009).	There are 363 records on the DBCA database, the closest record is 2.26 km away from the survey area (2.26).	High	Known	
Quenda (*Isoodon fusciventer*)	P4	Forest, woodland, heath, and shrub communities, with sandy soils and dense heathy vegetation (Van Dyck & Strahan, 2008).	There are over 1589 records within 10 km of the survey area, with the closest record occurring at 0.06 km. The most recent of these was recorded in 2021.	Moderate	Known	This species is likely to use Eucalyptus Woodland, and Mixed Shrubland habitats within the survey area. The presence of accumulated coarse leaf litter is suitable foraging habitat for the Quenda.

Species	Conservation code (EPBC/State WA)	Habitat	Number of DBCA Records and Distance	Pre survey likelihood of occurrence	Post survey likelihood of occurrence	Discussion
						Quenda foraging activity was observed throughout these habitat types. These habitats are also found outside the survey area, but not directly adjacent to it due to development.

10.4.3 Targeted Black Cockatoo

The survey area is within the known range for the three threatened Black Cockatoo species. Foraging evidence was recorded for the Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksia naso*) within the survey area. There were 33 potential nesting trees with a suitable DBH (>500 mm) identified with the survey area. No potentially suitable nesting trees were identified.

The survey area scored a foraging habitat score of 10 for the Forest Red-tailed Black Cockatoo in accordance with the DAWE 2022 guidelines. The survey area has been assessed as a score of 8 for Baudin's Cockatoo and Carnaby's Cockatoo, due to an absence of foraging evidence during the survey. The BCE (2020) scoring method defined the area as supporting Negligible to Moderate foraging quality. The Moderate foraging quality is associated with the Eucalyptus Woodland habitat type, which includes suitable foraging species such as *Corymbia calophylla, Eucalyptus marginata* and *Eucalyptus todtiana*. The known occurrence of three roosting sites within 3 km of the survey area, permanent water source presence nearby, confirmed foraging evidence during the survey, and extent of suitable foraging habitat in the vicinity all contributed to the foraging score.

11.0 Conclusion

AECOM Australia Pty Ltd (AECOM) was engaged by Western Power to undertake a spring flora, vegetation, fauna and black cockatoo assessment for defined linear corridors within the Perth Metropolitan Region on the Swan Coastal Plain (SCP). This Project is referred to as the Clean Energy Link (CEL). The five sites include: Padbury - Wangara, Pinjar Terminal, Neerabup Terminal and East Wanneroo, NT-NOR to HBK 132kV Line and Northern Terminal.

A summary of the Padbury-Wangara results is presented below:

- One patch of -Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain Threatened Ecological Community (Tuart Woodlands TEC) listed as Critically Endangered under the EPBC Act and as Priority 3 by DBCA. The patch extends for 0.54 ha.
- No significant flora listed under the EPBC Act or the BC Act or by DBCA were recorded during the survey.
- Three conservation significant fauna species were recorded during the survey, including two bird species and one mammal species:
  - Carnaby's Cockatoo (*Zanda latirostris)* listed as Endangered under the EPBC Act and the BC Act
  - Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso)* listed as Vulnerable under the EPBC Act and BC Act
  - Quenda (*Isoodon fusciventer)* listed as Priority 4 by DBCA.

A summary of the Pinjar Terminal results is presented below:

- No significant flora listed under the EPBC Act, BC Act or by DBCA were recorded during the survey.
- Banksia Woodlands of the Swan Coastal Plain (Banksia Woodlands TEC) listed as Endangered under the EPBC Act and as Priority 3 by DBCA, mapped for 14.75 ha.
- One conservation significant fauna species was recorded during the survey, Quenda (*Isoodon fusciventer*) listed as Priority 4 by DBCA.

A summary of the Neerabup Terminal and East Wanneroo results are presented below:

- Eight patches of Banksia Woodlands TEC were confirmed and mapped for 15.13 ha. This TEC is synonymous with a Priority 3 Ecological Community (PEC) unless otherwise assessed.
- One patch of Tuart (*Eucalyptus* gomphocephala) Woodlands and Forests of the Swan Coastal Plain TEC was mapped within the survey area for 1.71 ha.
- One Priority 3 PEC listed by the DBCA (2023) was confirmed to occur through FCT analysis, FCT 21c – Low lying Banksia attenuata woodlands or shrublands, mapped for 0.60 ha.
- One Priority 4 species, *Jacksonia sericea,* was collected and formal identification confirmed at the WA Herbarium. 1 individual was recorded within the survey area, with a second individual recorded in a quadrat adjacent to the survey area.
- A sample of *Calectasia* sp. was collected for identification but was unable to be confirmed and could potentially represent the Priority 2 *C. narragarra* species. This individual was recorded outside the survey area.
- Three conservation significant fauna species were recorded during the survey:
  - Quenda (*Isoodon fusciventer*) listed as Priority 4 by DBCA.
  - Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksia naso*) listed as Vulnerable under the EPBC Act and BC Act.
  - Carnaby's Cockatoo (*Zanda latirostris*) listed as Endangered under the EPBC Act and BC Act.

A summary of the NT-NOR to HBK 132KV results are presented below:

- quadrat and relevé data produced by RPS (2020) and reviewed by Woodman (2020).
- No significant flora listed under the EPBC Act or the BC Act or by DBCA were recorded during the survey.
- Three conservation significant fauna species were recorded during the survey:
  - Quenda (*Isoodon fusciventer*) listed as Priority 4 by DBCA.
  - Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksia naso*) listed as Vulnerable under the EPBC Act and BC Act.
  - Carnaby's Cockatoo (*Zanda latirostris*) listed as Endangered under the EPBC Act and BC Act.

A summary of the Northern Terminal results are presented below:

- No significant flora listed under the EPBC Act or the *Biodiversity Conservation Act 2016* (BC Act) or by DBCA were recorded during the survey.
- No significant vegetation communities were recorded in the survey area.
- Two conservation significant fauna species were recorded during the survey:
  - Quenda (*Isoodon fusciventer*) listed as Priority 4 by DBCA.
  - Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksia naso*) listed as Vulnerable under the EPBC Act and BC Act.

The survey was undertaken by experienced personnel, during the ideal detection period for significant flora. Survey effort was considered satisfactory, and no access issues were encountered that affected the outcome of the results.

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AECOM Delivering a better world	LEGEND
PROJECT ID 60713462 CREATED BY ROB.MCGREGOR	Survey Area
DATE MODIFIED 13 JUN 2024 APPROVED BY C. HOUSE	Sample Sites
N	Relevé
1:7,500 When printed at A4	Tracklog
0 50 100 150 200 metres	TEC Tuart Woodlands and Forests of the Swan Coastal Plain Buffer
GDA2020 MGA ZONE 50	TEC
	TEC Tuart Woodlands and Forests of the Swan Coastal Plain
	Vegetation Community
	BaAlTe
	CpMsLo
	EgHcPp
	Planted
	Cleared
	Vegetation Condition
	Good
	Degraded
	Completely Degraded
	Cleared

Vegetation Communities, Condition, Significant Flora and Survey Effort: *Padbury-Wangarra*

WESTERN POWER

NREP SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **8.1**

A4 size

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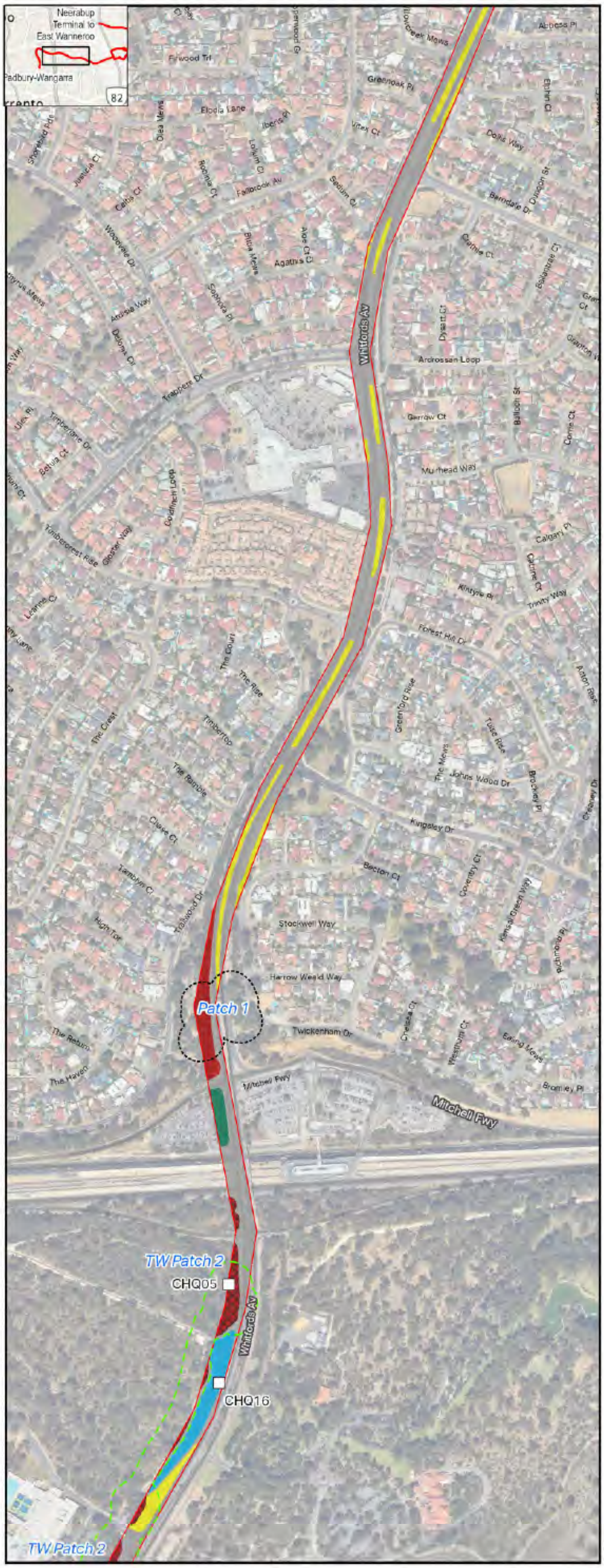

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DATE MODIFIED	13 JUN 2024	APPROVED BY	C. HOUSE

0 50 100 150 200 metres

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GDA2020 MGA ZONE 50

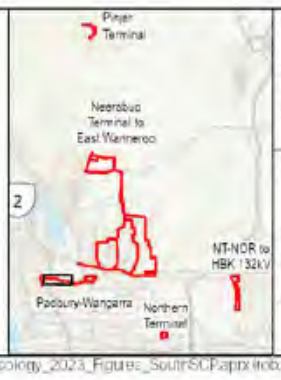
LEGEND

- Survey Area
- Sample Sites
  - Quadrat
  - Tracklog
- TEC Tuart Woodlands and Forests of the Swan Coastal Plain Buffer
- TEC
- Not a TEC

TEC Tuart Woodlands and Forests of the Swan Coastal Plain

Vegetation Community
- BaAbAb
- BaAlTe
- EgHcPp
- Planted
- Trees
- Cleared

Vegetation Condition
- Good
- Degraded
- Completely Degraded
- Cleared



Vegetation Communities, Condition, Significant Flora and Survey Effort: *Padbury-Wangarra*

WESTERN POWER

NREP SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **8.2**

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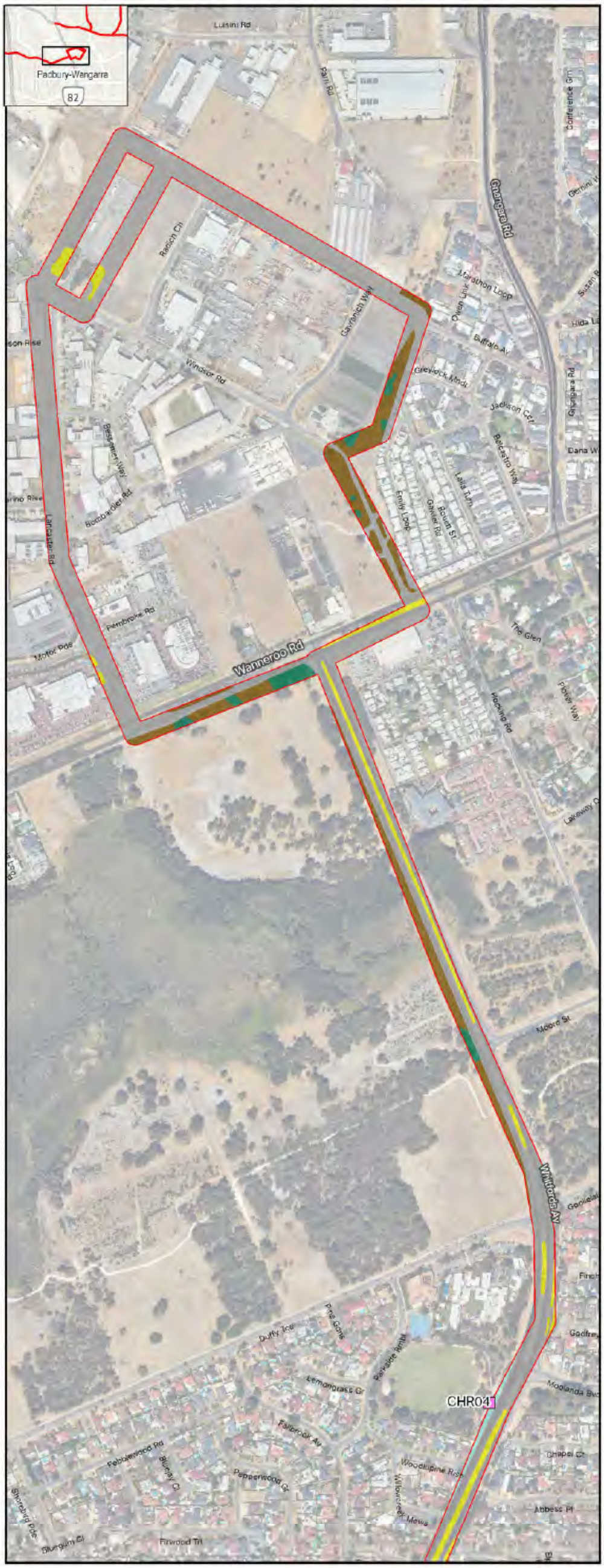

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0 50 100 150 200 metres

GDA2020 MGA ZONE 50

LEGEND

- Survey Area
- Sample Sites
  - Relevé
  - Tracklog
- Vegetation Community
  - BaAbAb
  - Planted
  - Trees
- Cleared
- Paddock
- Vegetation Condition
  - Good
  - Completely Degraded
  - Cleared

Vegetation Communities, Condition, Significant Flora and Survey Effort: *Padbury-Wangarra*

WESTERN POWER

NREP SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **8.3**

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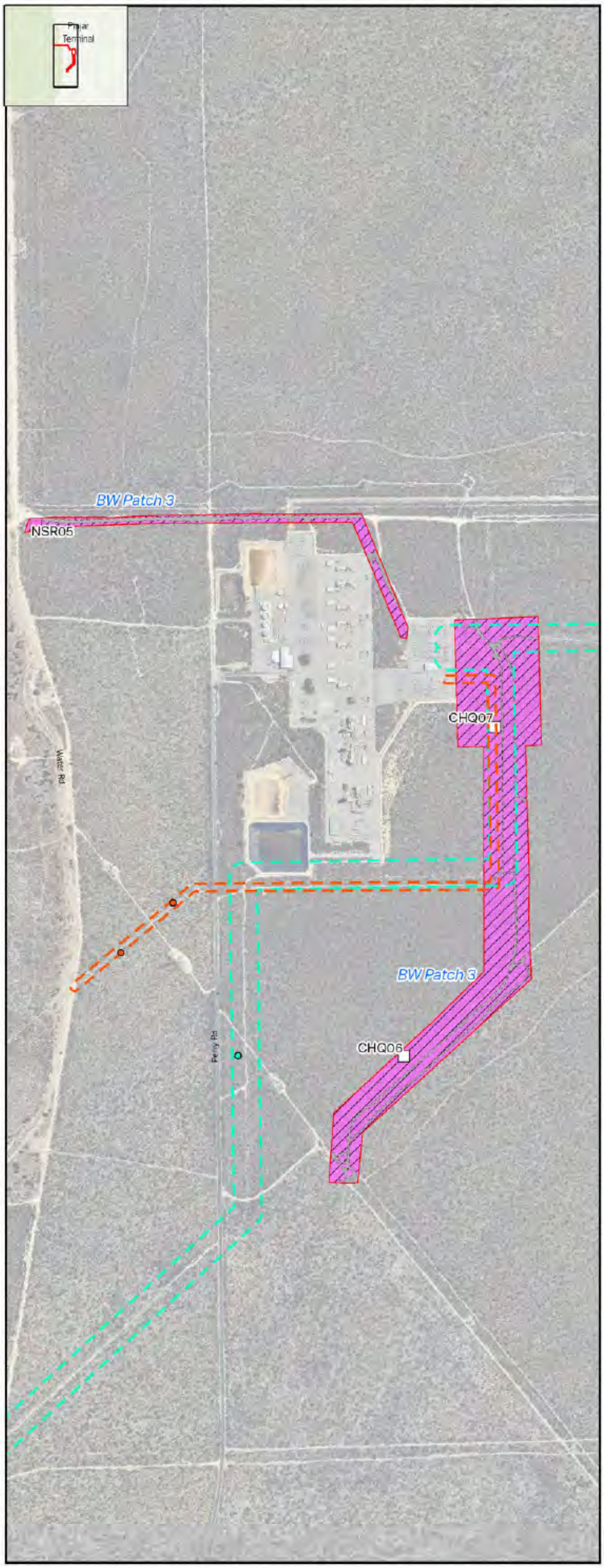

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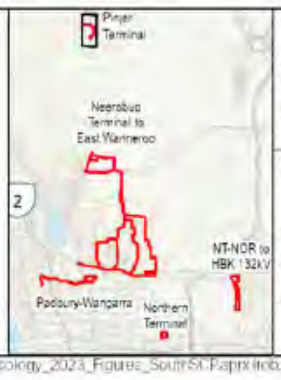
0 50 100 150 200
metres

GDA2020 MGA ZONE 50

LEGEND
- Survey Area
- Sample Sites
  - Quadrat
  - Relevé
  - Tracklog
- WA PEC, EPBC TEC
  - Banksia Woodlands of the Swan Coastal Plain
- Vegetation Community
  - BaAcCc
  - Cleared
- Vegetation Condition
  - Excellent
  - Very Good
  - Cleared
- Sample Sites:
  - AECOM (2002a) Scar 4
- Survey Area:
  - AECOM (2002a) Scar 4
- Sample Sites:
  - AECOM (2022b) NREP
- Survey Area:
  - AECOM (2022b) NREP



Vegetation Communities, Condition, Significant Flora and Survey Effort: *Pinjar Terminal*

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NREP SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **8.4**

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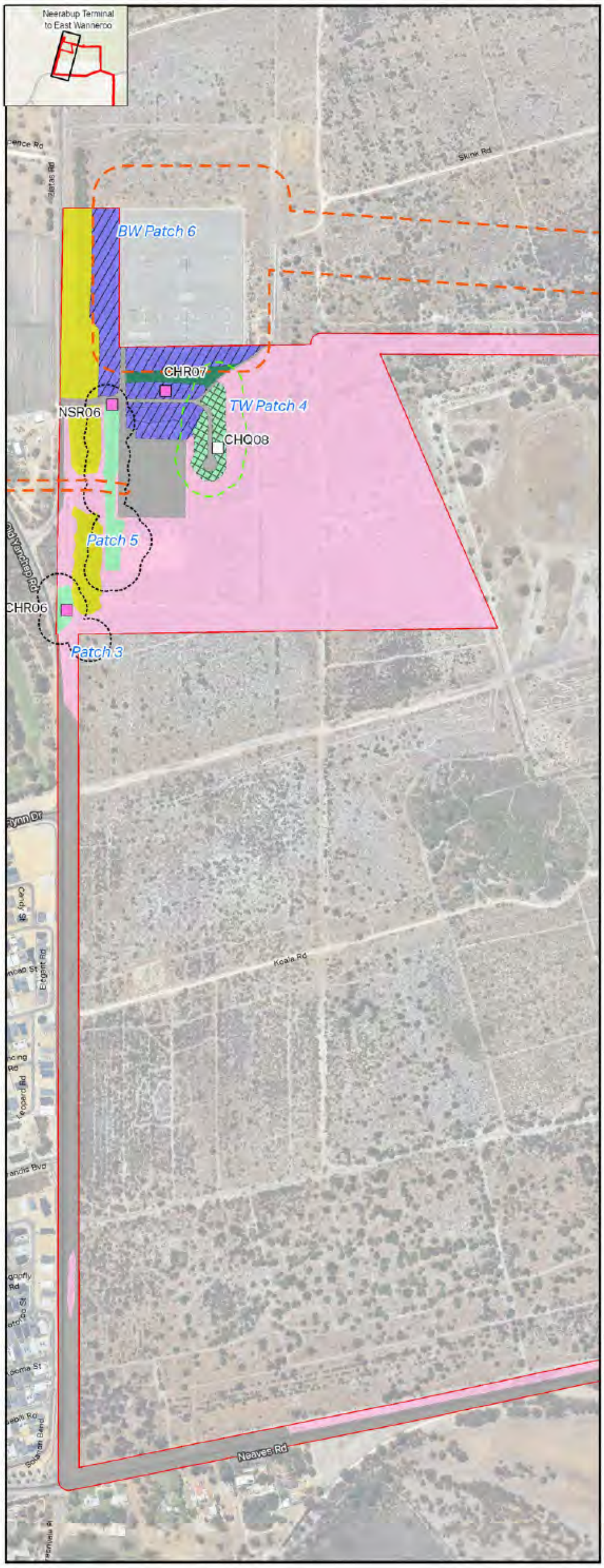

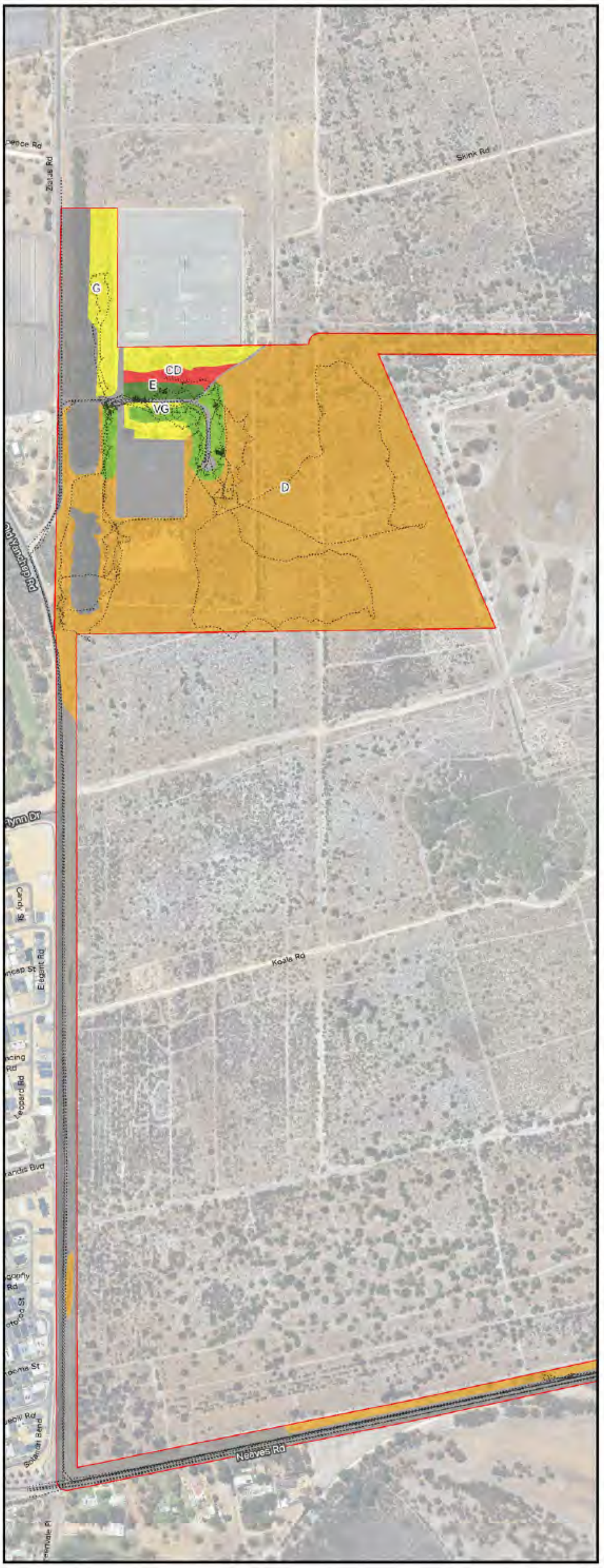

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0 50 100 150 200 metres

GDA2020 MGA ZONE 50

LEGEND

Survey Area

Sample Sites
- Quadrat
- Relevé
- Tracklog

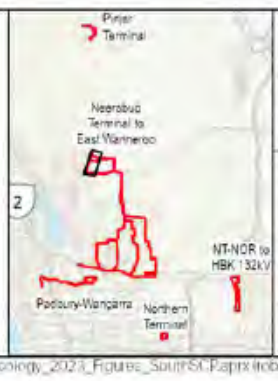
TEC Tuart Woodlands and Forests of the Swan Coastal Plain Buffer
- TEC
- Not a TEC

TEC Tuart Woodlands and Forests of the Swan Coastal Plain
WA PEC, EPBC TEC
Banksia Woodlands of the Swan Coastal Plain

Vegetation Community
- BaRcGt
- EgGlCe
- PpAcCe
- Planted
- Trees
- Cleared

Vegetation Condition
- Excellent
- Very Good
- Good
- Degraded
- Completely Degraded
- Cleared

Survey Area: AECOM (2022b) NREP



Vegetation Communities, Condition, Significant Flora and Survey Effort: *Neerabup Terminal to East Wanneroo*

WESTERN POWER

NREP SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **8.5**

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When printed at A4r

0 50 100 150 200
metres

GDA2020 MGA ZONE 50

DATA SOURCES: Base Data (c) Landgate unless otherwise specified by another data custodian. Landgate makes no representations or warranties about its data and to the extent permitted by law excludes all liability for loss or damage arising from its use. Imagery: Maxar/Vexcel/Nearmap (acq. Sequential dates) 60cm (RGB).

LEGEND

Survey Area

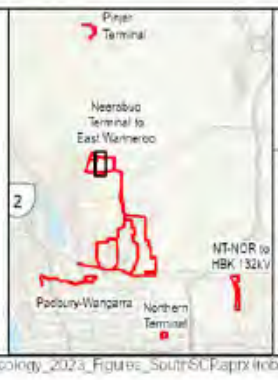
Sample Sites
- Relevé
- Tracklog

Vegetation Community
- PpAcCe
- Cleared

Vegetation Condition
- Degraded
- Cleared

Sample Sites:
- AECOM (2022b)
- NREP

Survey Area:
- AECOM (2022b)
- NREP



Vegetation Communities, Condition, Significant Flora and Survey Effort: *Neerabup Terminal to East Wanneroo*

WESTERN POWER

NREP SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **8.6**

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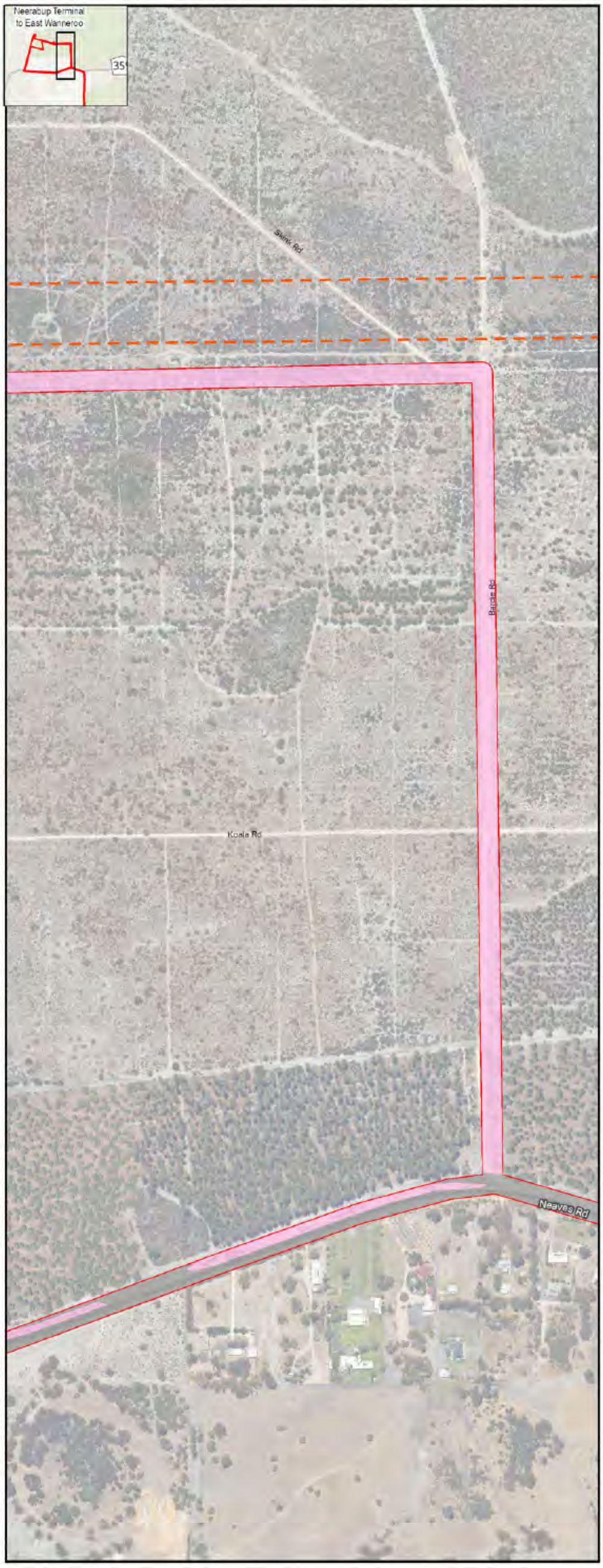

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N
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When printed at A4r

0 50 100 150 200
metres

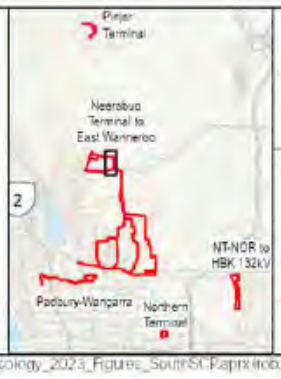
GDA2020 MGA ZONE 50

LEGEND
- Survey Area
- Tracklog

Vegetation Community
- PpAcCe
- Cleared

Vegetation Condition
- Degraded
- Cleared

Survey Area:
- AECOM (2022b)
- NREP



Vegetation Communities, Significant Flora and Survey Effort: *Neerabup Terminal to East Wanneroo*

WESTERN POWER

NREP SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **8.7**

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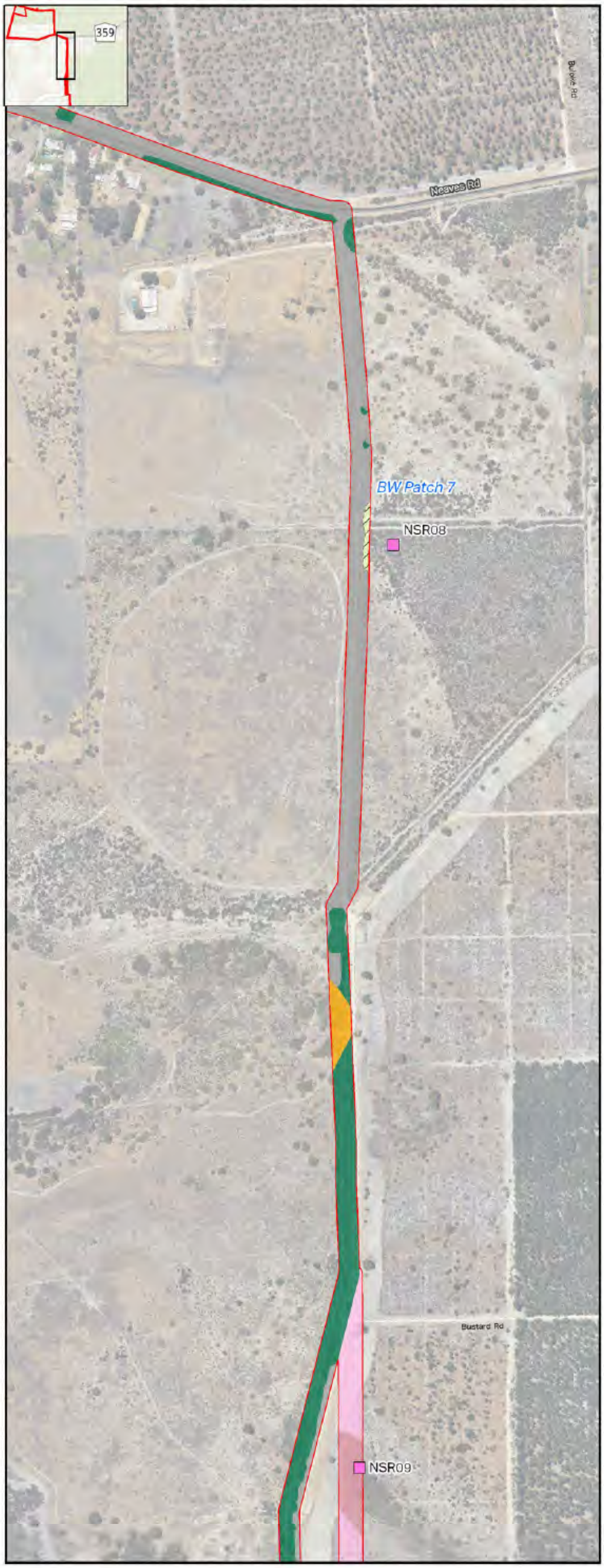

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0 50 100 150 200
metres
GDA2020 MGA ZONE 50

LEGEND

Survey Area

Sample Sites
- Relevé
- Tracklog

WA PEC, EPBC TEC
- Banksia Woodlands of the Swan Coastal Plain

Vegetation Community
- BmAcPo
- CcXpDf
- MpHaDb
- PpAcCe
- Trees
- Cleared

Vegetation Condition
- Very Good
- Good
- Degraded
- Completely Degraded
- Cleared

Vegetation Communities, Condition, Significant Flora and Survey Effort: *Neerabup Terminal to East Wanneroo*

WESTERN POWER

NREP SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **8.8**

A4 size

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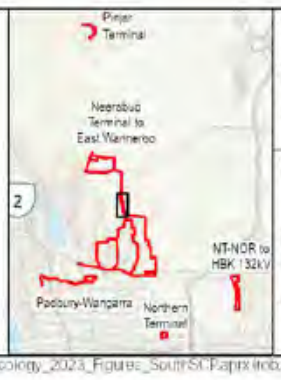
LEGEND

Survey Area

Sample Sites
- Quadrat
- Tracklog
- WA PEC, EPBC TEC Banksia Woodlands of the Swan Coastal Plain

Vegetation Community
- BmEpLi
- MpHaDb
- MpHaEc
- PpAcCe
- Planted
- Trees
- Cleared

Vegetation Condition
- Excellent
- Very Good
- Good
- Degraded
- Completely Degraded
- Cleared



Vegetation Communities, Condition, Significant Flora and Survey Effort: *Neerabup Terminal to East Wanneroo*

WESTERN POWER

NREP SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **8.9**

Project: \\na.aecomnet.com\ffs\APAC\Perth-AUPER1\Legacy\Projects\60713462\60713462_NREP_Ecology_20239000_CAD_GIS\620_GIS_NREP\02_MXD_APRX\60713462_NREP_Ecology_2023_Figures_South\C.Papin\robumcgregori
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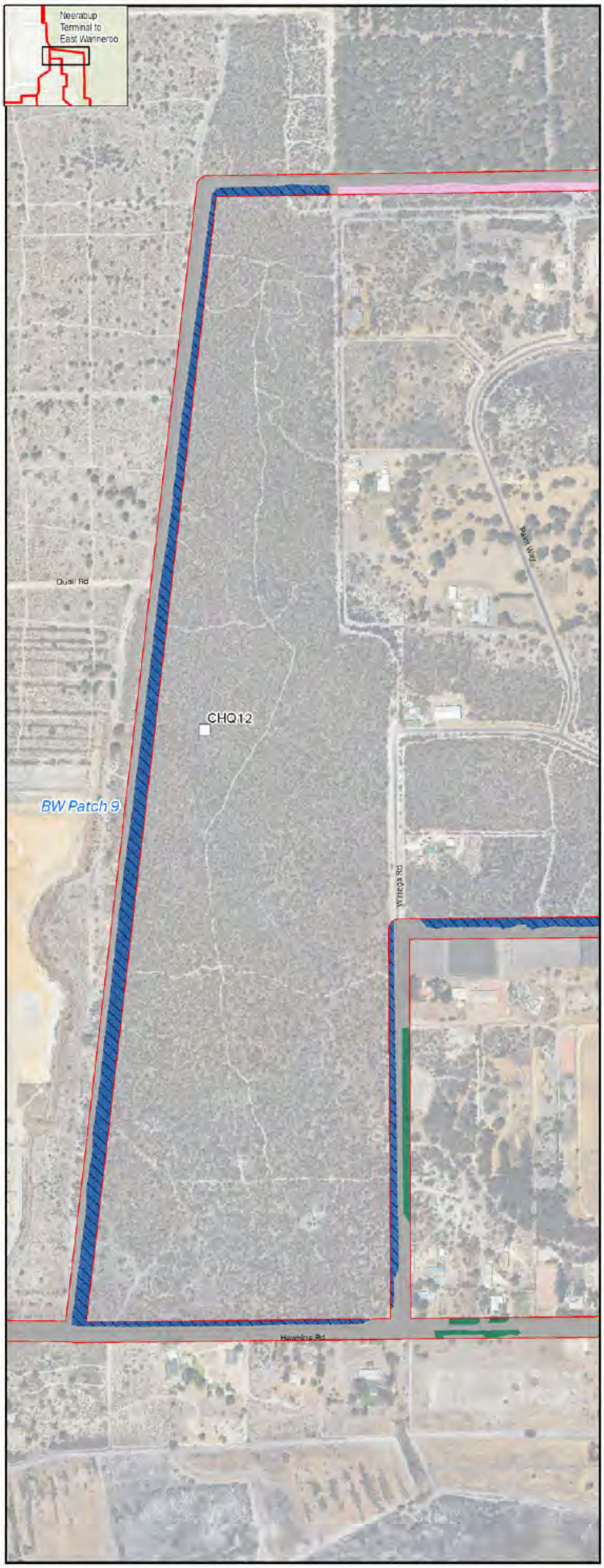

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GDA2020 MGA ZONE 50

LEGEND

- Survey Area
- Sample Sites
  - Quadrat
  - Tracklog
- WA PEC, EPBC TEC
  - Banksia Woodlands of the Swan Coastal Plain
- Vegetation Community
  - BmEpLi
  - PpAcCe
  - Planted
  - Trees
  - Cleared
- Vegetation Condition
  - Excellent
  - Degraded
  - Completely Degraded
  - Cleared

Vegetation Communities, Condition, Significant Flora and Survey Effort:
Neerabup Terminal to East Wanneroo

WESTERN POWER

NREP SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **8.10**

A4 size

Project: \\na.aecomnet.com\lfs\APAC\Perth-AUPER1\Legacy\Projects\60713462\60713462_NREP_Ecology_2023\900_CAD_GIS\020_GIS_NREP\02_MXD_APRX\60713462_NREP_Ecology_2023_Figures_South\C.Paprix\rob.mcgregor\
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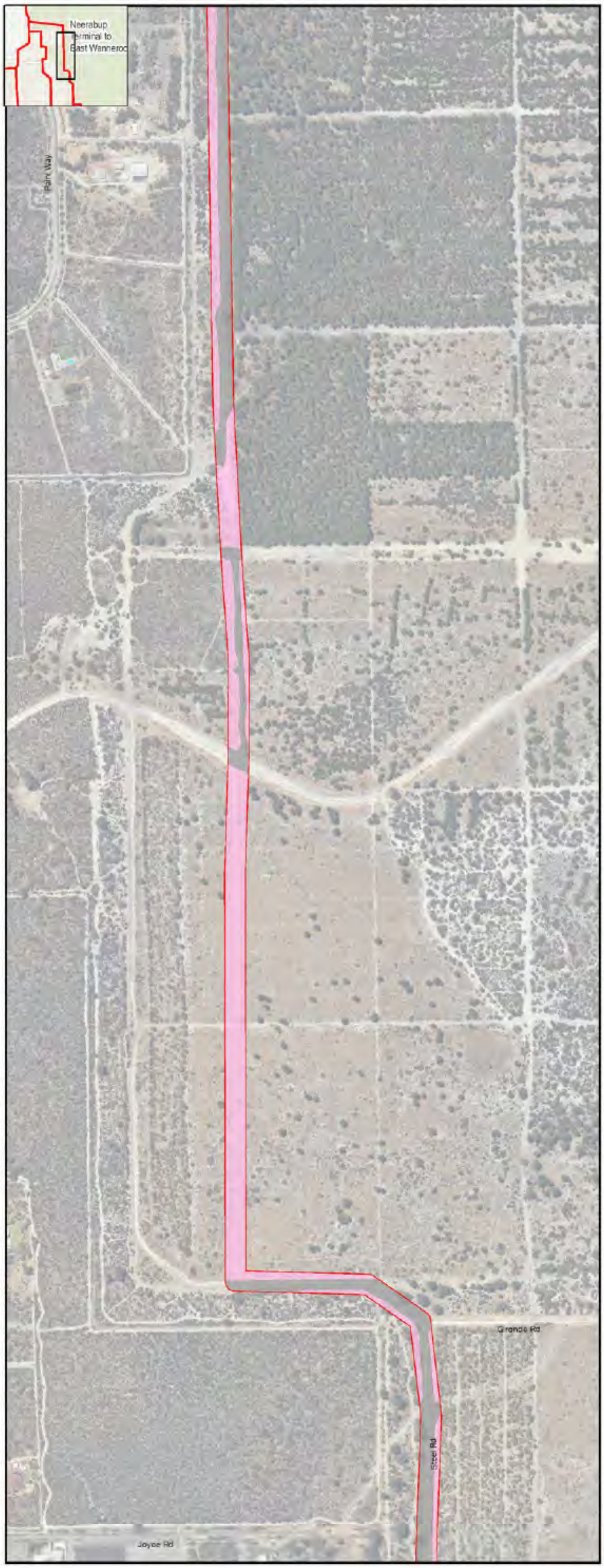

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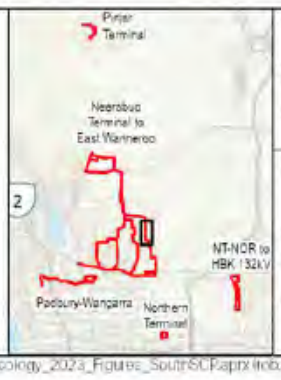
0 50 100 150 200
metres

GDA2020 MGA ZONE 50

LEGEND
- Survey Area

Vegetation Community
- PpAcCe
- Cleared

Vegetation Condition
- Degraded
- Cleared



Vegetation Communities, Condition, Significant Flora and Survey Effort: *Neerabup Terminal to East Wanneroo*

WESTERN POWER

NREP SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **8.11**

A4 size

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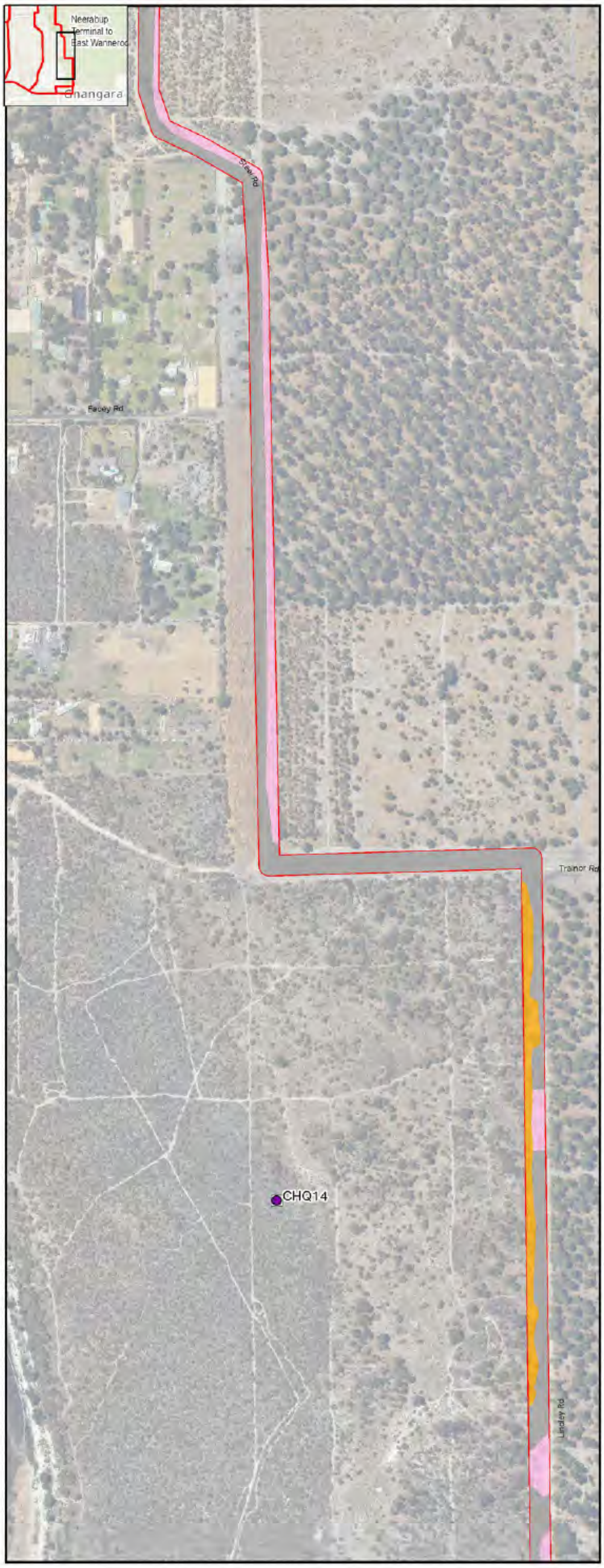

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0 50 100 150 200 metres

GDA2020 MGA ZONE 50

LEGEND

- Survey Area
- Significant Flora
  - *Calectasia* sp. (potential P2)
- Sample Sites
  - Quadrat
  - Tracklog
- Vegetation Community
  - CcXpDf
  - PpAcCe
  - Cleared
- Vegetation Condition
  - Excellent
  - Degraded
  - Completely Degraded
  - Cleared

Vegetation Communities, Condition, Significant Flora and Survey Effort: *Neerabup Terminal to East Wanneroo*

WESTERN POWER

NREP SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **8.12**

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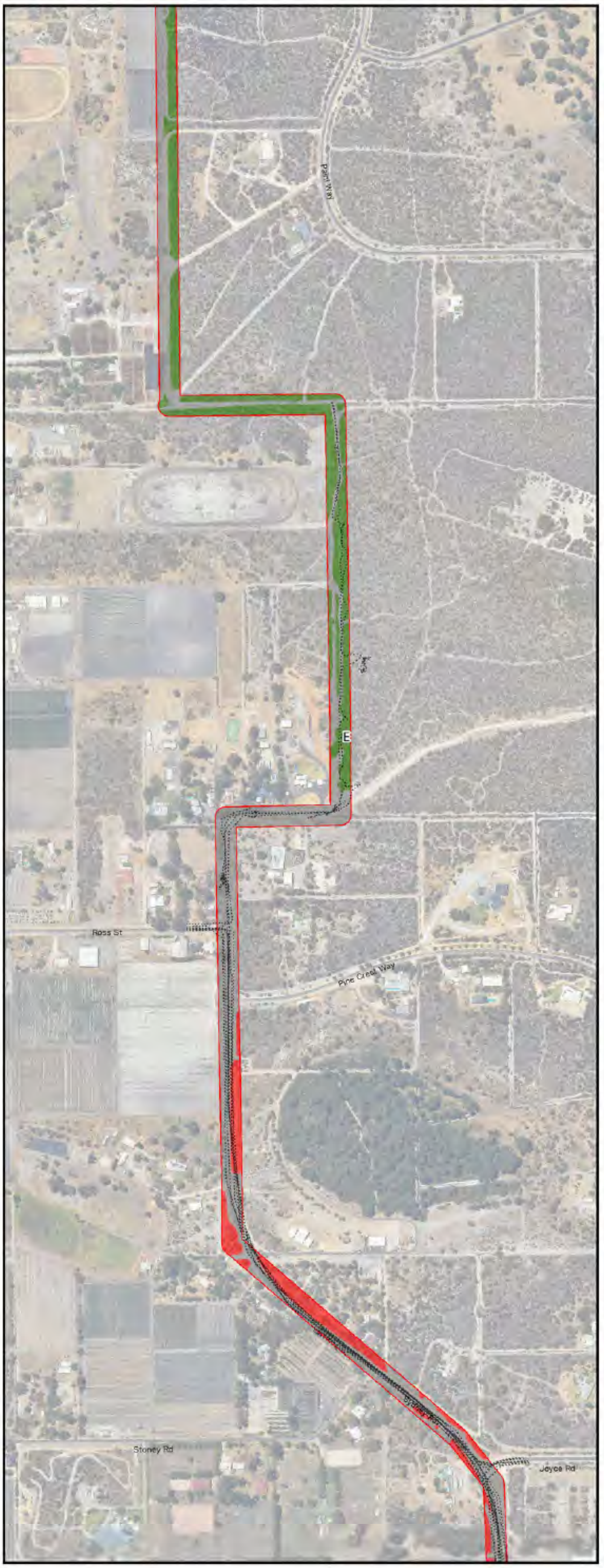

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0 50 100 150 200
metres

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LEGEND

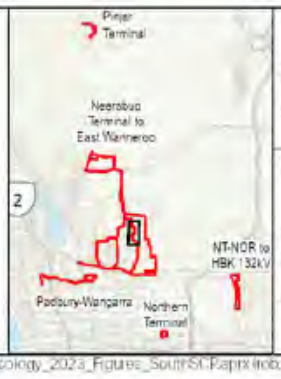
Survey Area

Sample Sites
- Quadrat
- Tracklog
- WA PEC, EPBC TEC Banksia Woodlands of the Swan Coastal Plain

Vegetation Community
- BmEpLi

- Planted
- Trees
- Cleared

Vegetation Condition
- Excellent
- Completely Degraded
- Cleared



Vegetation Communities, Condition, Significant Flora and Survey Effort: *Neerabup Terminal to East Wanneroo*

WESTERN POWER

NREP SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **8.13**

A4 size

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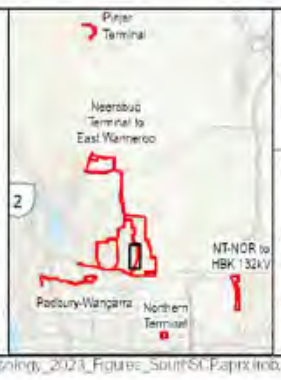
0 50 100 150 200
metres

GDA2020 MGA ZONE 50

LEGEND
- Survey Area
- Tracklog

Vegetation Community
- Planted
- Trees
- Cleared

Vegetation Condition
- Completely Degraded
- Cleared



Vegetation Communities, Condition, Significant Flora and Survey Effort: *Neerabup Terminal to East Wanneroo*

WESTERN POWER

NREP SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **8.14**

A4 size

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0 50 100 150 200 metres

GDA2020 MGA ZONE 50

LEGEND

Survey Area

Significant Flora
- *Jacksonia sericea* (P4)

Sample Sites
- Quadrat
- Relevé
- Tracklog
- WA PEC, EPBC TEC Banksia Woodlands of the Swan Coastal Plain

Vegetation Community
- BaAhDf
- CcXpDf
- MpXpDb
- PpAcCe
- Planted
- Trees
- Cleared

Vegetation Condition
- Excellent
- Very Good
- Good
- Degraded
- Completely Degraded
- Cleared

Sample Sites: AECOM (2016)

Survey Area: AECOM (2016)

Vegetation Communities, Condition, Significant Flora and Survey Effort: *Neerabup Terminal to East Wanneroo*

WESTERN POWER

NREP SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **8.15**

A4 size

Project: \\naaecomnet.com\ffs\APAC\Perth-AUPER1\Legacy\Projects\60713462_NREP_Ecology_2023\900_CAD_GIS\020_GIS_NREP\02_MXD_APRX\60713462_NREP_Ecology_2023_Figures_South\Scripts\rob.mcgregor\

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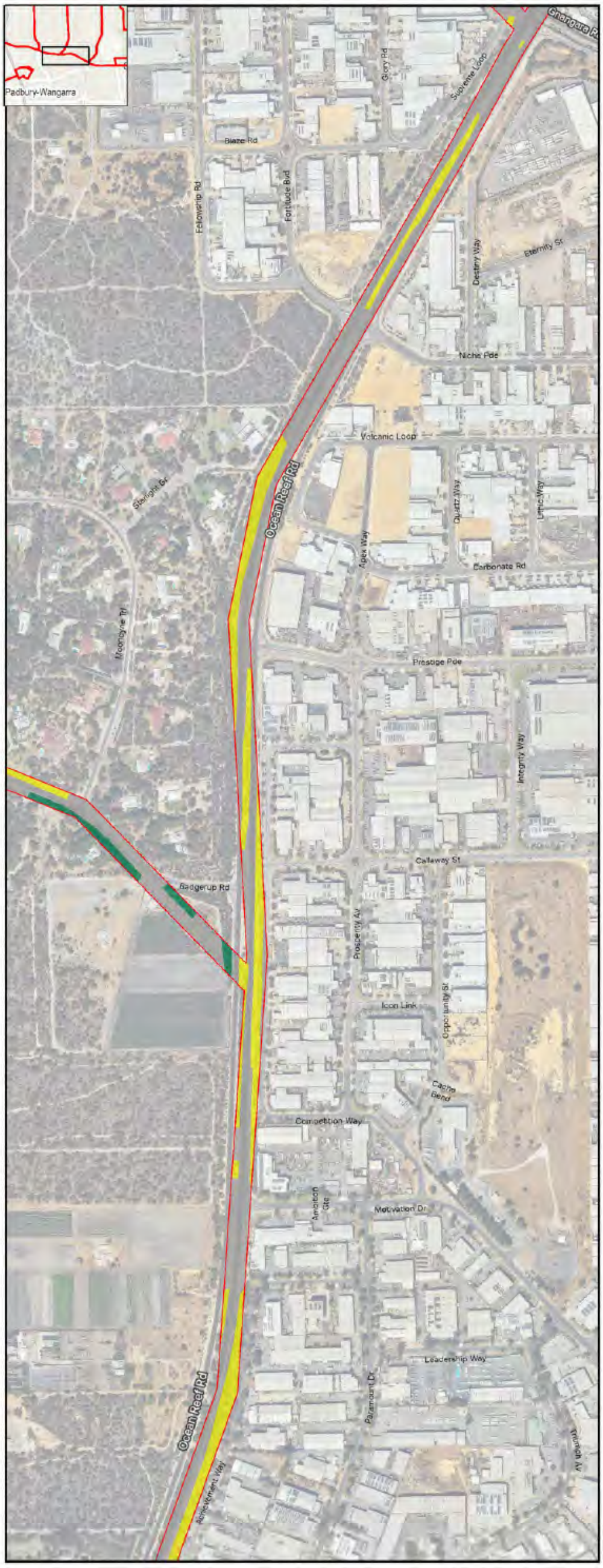

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LEGEND
- Survey Area
- Tracklog

Vegetation Community
- Planted
- Trees
- Cleared

Vegetation Condition
- Completely Degraded
- Cleared

Vegetation Communities, Condition, Significant Flora and Survey Effort: *Neerabup Terminal to East Wanneroo*

WESTERN POWER

NREP SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **8.16**

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LEGEND

- Survey Area
- Tracklog
- WA PEC, EPBC TEC Banksia Woodlands of the Swan Coastal Plain

Vegetation Community
- BaAcDf
- Planted
- Cleared

Vegetation Condition
- Very Good
- Cleared

Vegetation Communities, Condition, Significant Flora and Survey Effort: *Neerabup Terminal to East Wanneroo*

WESTERN POWER

NREP SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **8.17**

A4 size

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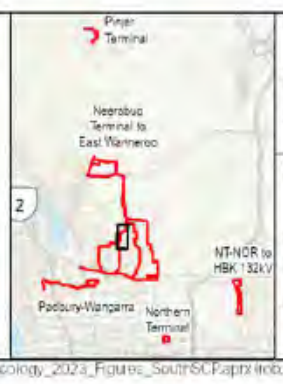
When printed at A4

0 50 100 150 200
metres

GDA2020 MGA ZONE 50

LEGEND
- Survey Area
- Sample Sites
  - Quadrat
  - Tracklog
- WA PEC FCT 21c, EPBC TEC Banksia Woodlands of the Swan Coastal Plain
- WA PEC, EPBC TEC Banksia Woodlands of the Swan Coastal Plain
- Vegetation Community
  - BaAcDf
  - Planted
  - Trees
- Cleared
- Vegetation Condition
  - Excellent
  - Very Good
  - Completely Degraded
  - Cleared



Vegetation Communities, Condition, Significant Flora and Survey Effort: *Neerabup Terminal to East Wanneroo*

WESTERN POWER

NREP SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **8.18**

A4 size

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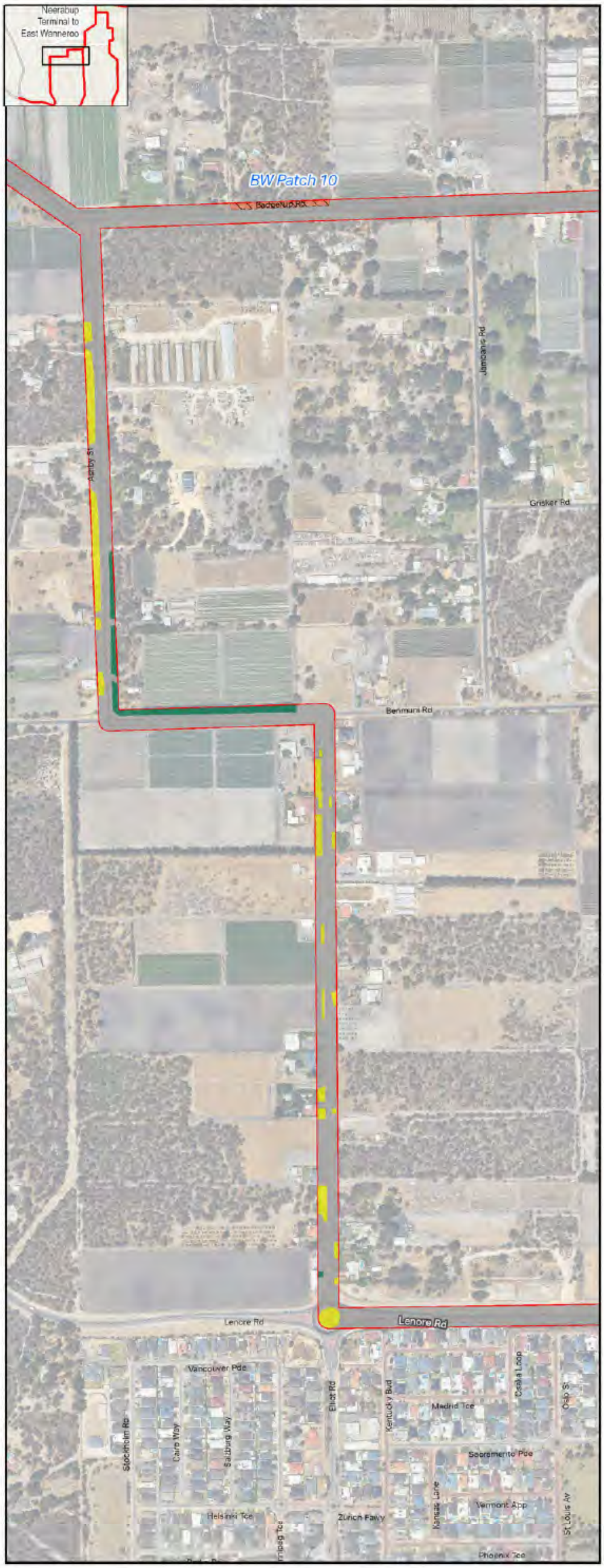

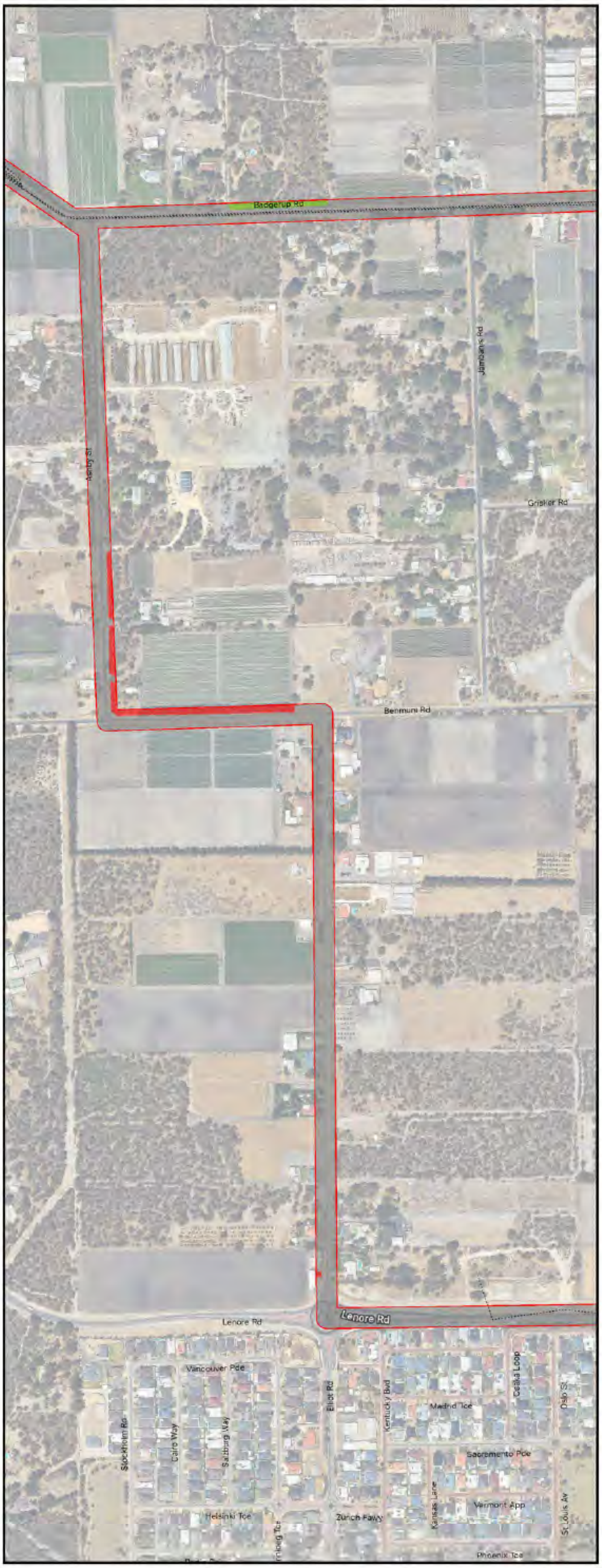

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GDA2020 MGA ZONE 50

LEGEND

- Survey Area
- Tracklog
- WA PEC, EPBC TEC
- Banksia Woodlands of the Swan Coastal Plain

Vegetation Community
- BaAcDf

- Planted
- Trees
- Cleared

Vegetation Condition
- Very Good
- Completely Degraded
- Cleared

Vegetation Communities, Condition, Significant Flora and Survey Effort: *Neerabup Terminal to East Wanneroo*

WESTERN POWER

NREP SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **8.19**

Project: \\naaecomnet.com\ifs\APAC\Perth-AUPER1\Legacy\Projects\60713462\60713462_NREP_Ecology_20230906_CAD_GIS\020_GIS_NREP\02_MXD_APRX\60713462_NREP_Ecology_2023_Figures_SouthSC.aprx (robm.mcgregor)
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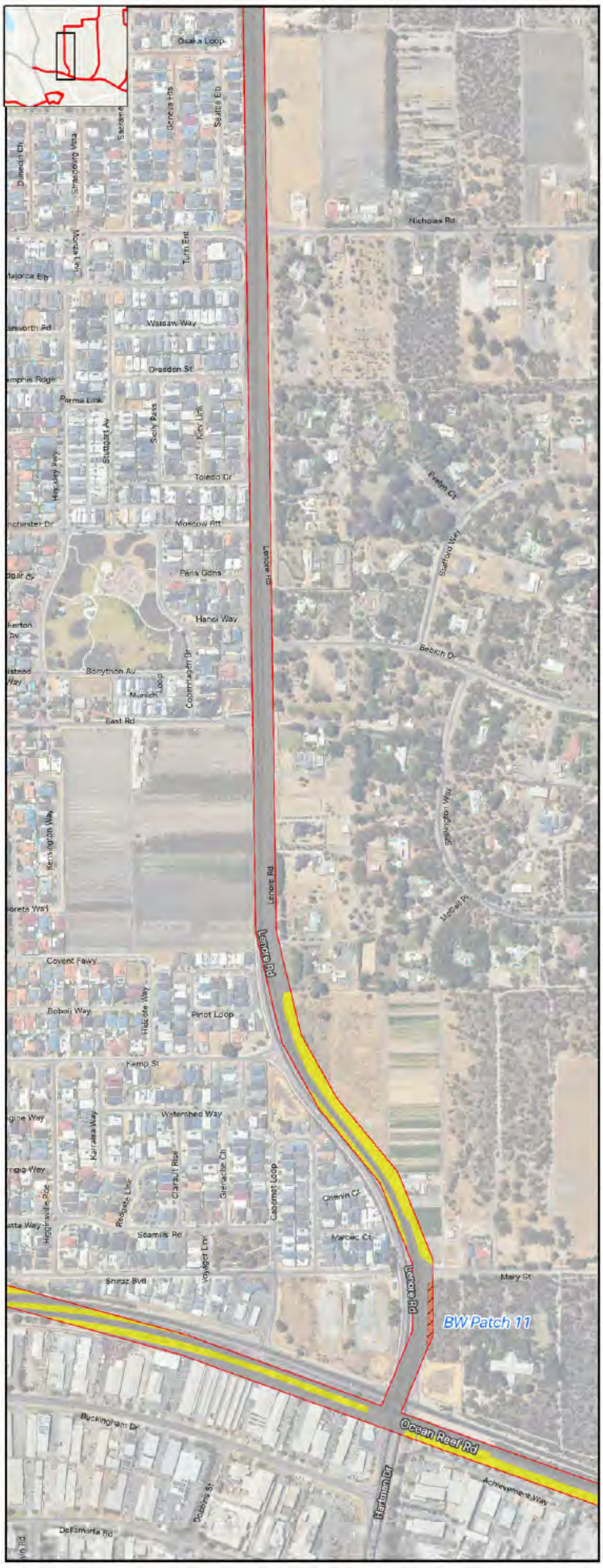

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When printed at A4

0 50 100 150 200
metres

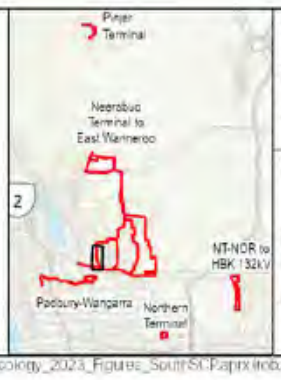
GDA2020 MGA ZONE 50

LEGEND

Survey Area
Tracklog
WA PEC, EPBC TEC
Banksia Woodlands of the Swan Coastal Plain

Vegetation Community
BaAcDf
Planted
Cleared

Vegetation Condition
Very Good
Cleared



Vegetation Communities, Significant Flora and Survey Effort:
Neerabup Terminal to East Wanneroo

WESTERN POWER

NREP SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure
8.20

A4 size

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metres

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LEGEND
- Survey Area
- Tracklog

Vegetation Community
- Planted
- Trees
- Cleared

Vegetation Condition
- Completely Degraded
- Cleared

Vegetation Communities, Condition, Significant Flora and Survey Effort: *Neerabup Terminal to East Wanneroo*

WESTERN POWER

NREP SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **8.21**

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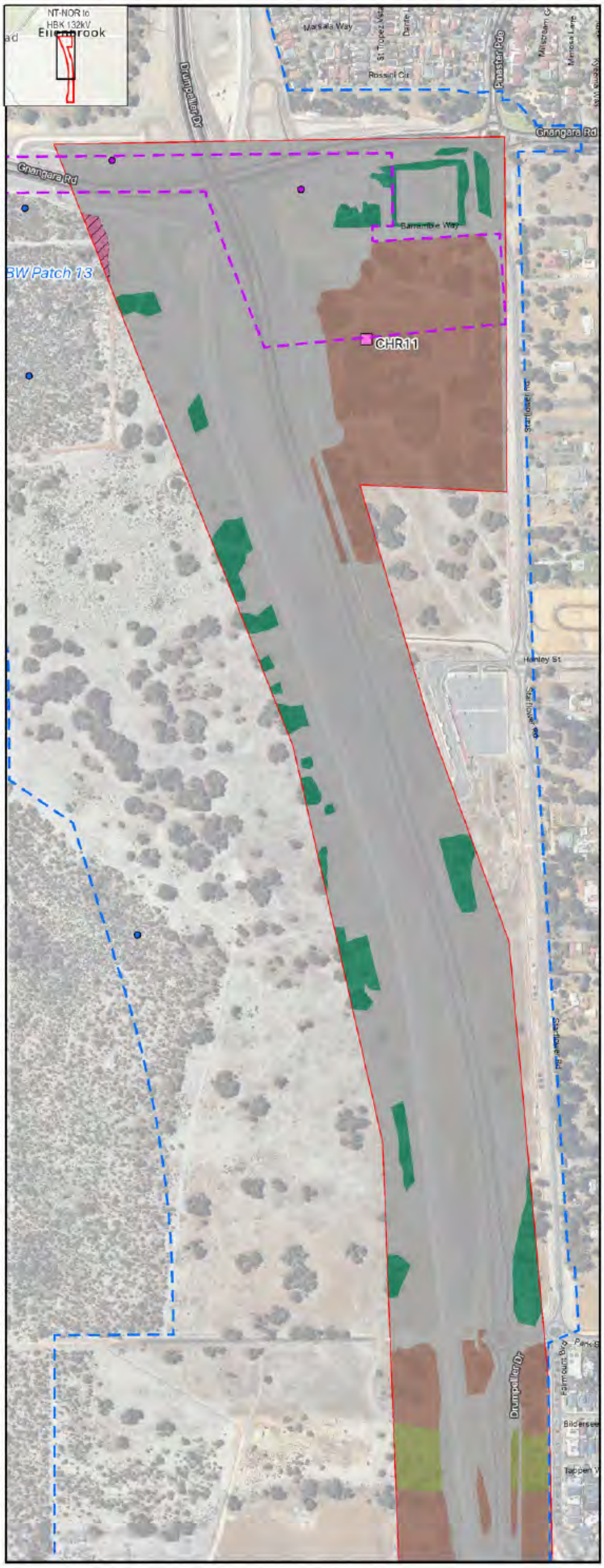

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LEGEND

Survey Area
Sample Sites
Relevé
Tracklog
WA PEC, EPBC TEC
Banksia Woodlands of the Swan Coastal Plain
Vegetation Community
BaBmBlXp
BaBmSlPo
CcMpXp
Trees
Cleared
Vegetation Condition
Very Good
Degraded
Completely Degraded
Cleared
Sample Sites: (RPS (2020)
Survey Area: (RPS (2020)
Sample Sites: AECOM (2016)
Survey Area: AECOM (2016)

Vegetation Communities, Significant Flora and Survey Effort: *NT-NOR to HBK 132kV*

WESTERN POWER

NREP SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **8.22**

Project: \\naaecomnet.com\ifs\APAC\Perth-AUPER1\Legacy\Projects\60713462_NREP_Ecology_2023\900_CAD_GIS\020_GIS_NREP\02_MXD_APRX\60713462_NREP_Ecology_2023_Figures_South\SC.Paprx [e.b.n.cgregor]
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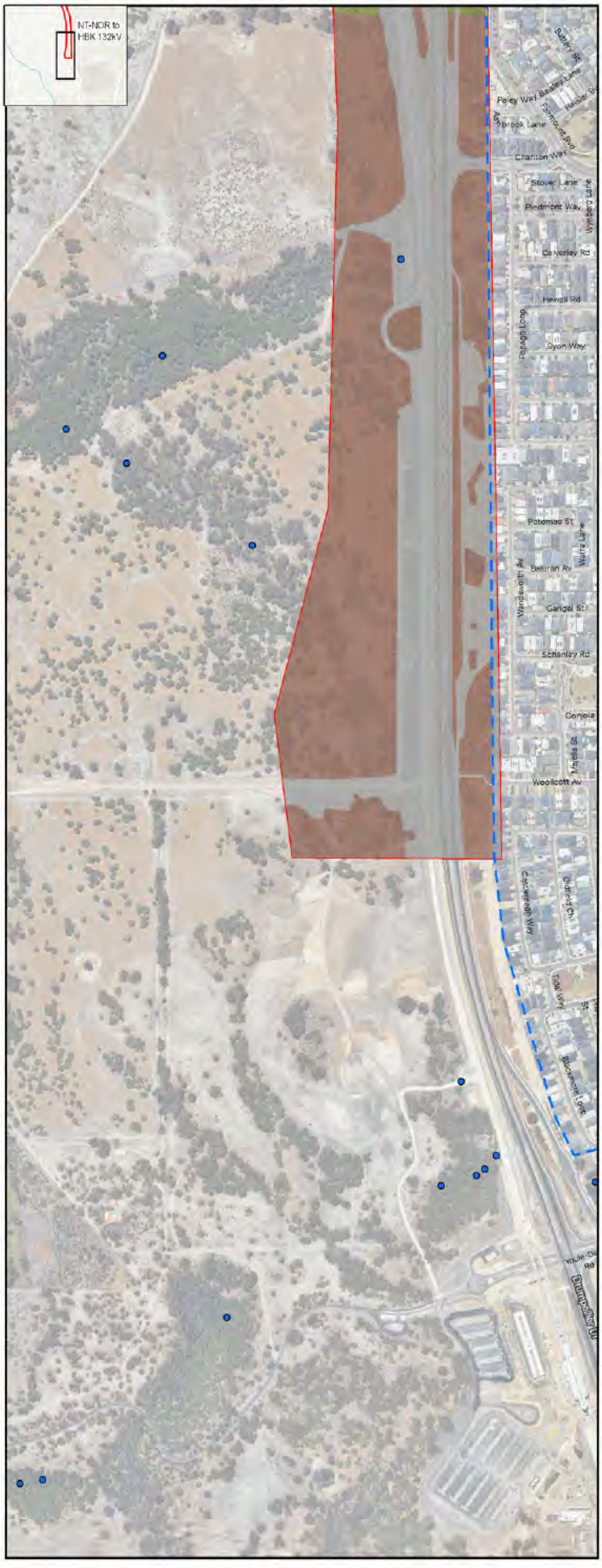

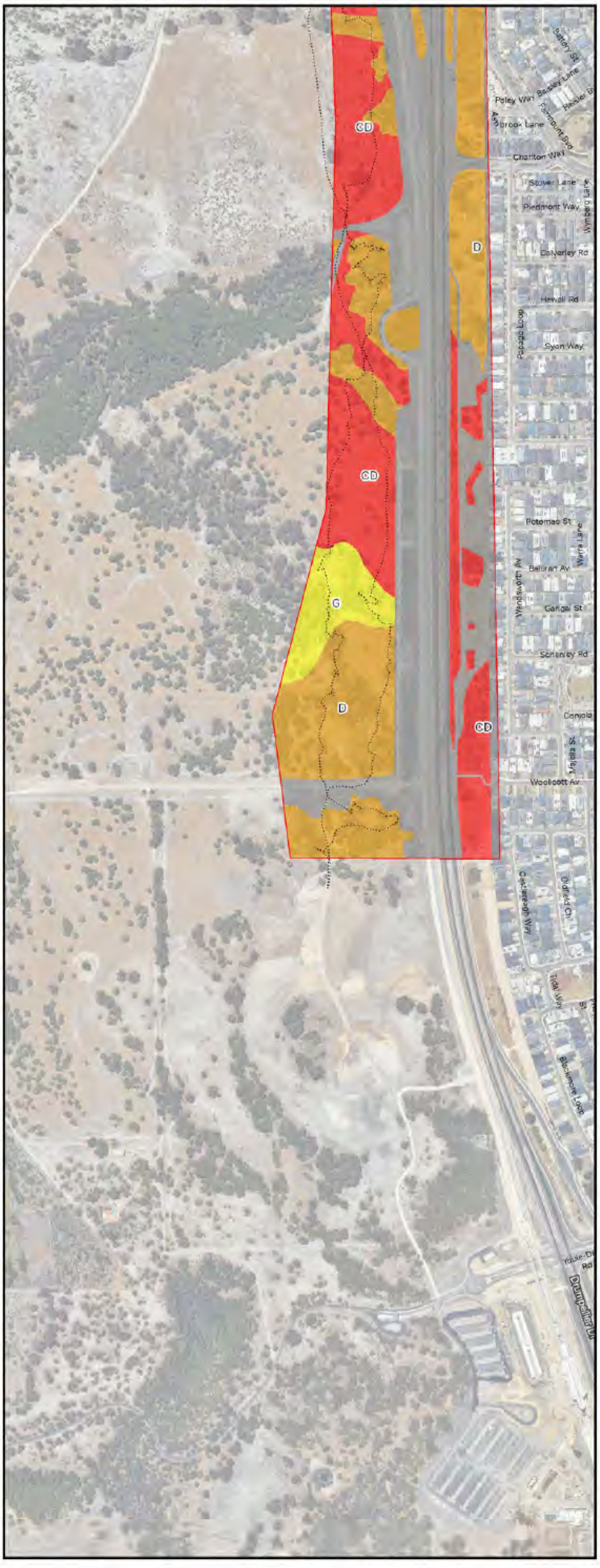

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metres
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LEGEND
- Survey Area
- Tracklog

Vegetation Community
- BaBmBlXp
- CcMpXp
- Cleared

Vegetation Condition
- Good
- Degraded
- Completely Degraded
- Cleared
- Sample Sites: (RPS (2020)
- Survey Area: (RPS (2020)

Vegetation Communities, Condition, Significant Flora and Survey Effort: *NT-NOR to HBK 132kV*

WESTERN POWER

NREP SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **8.23**

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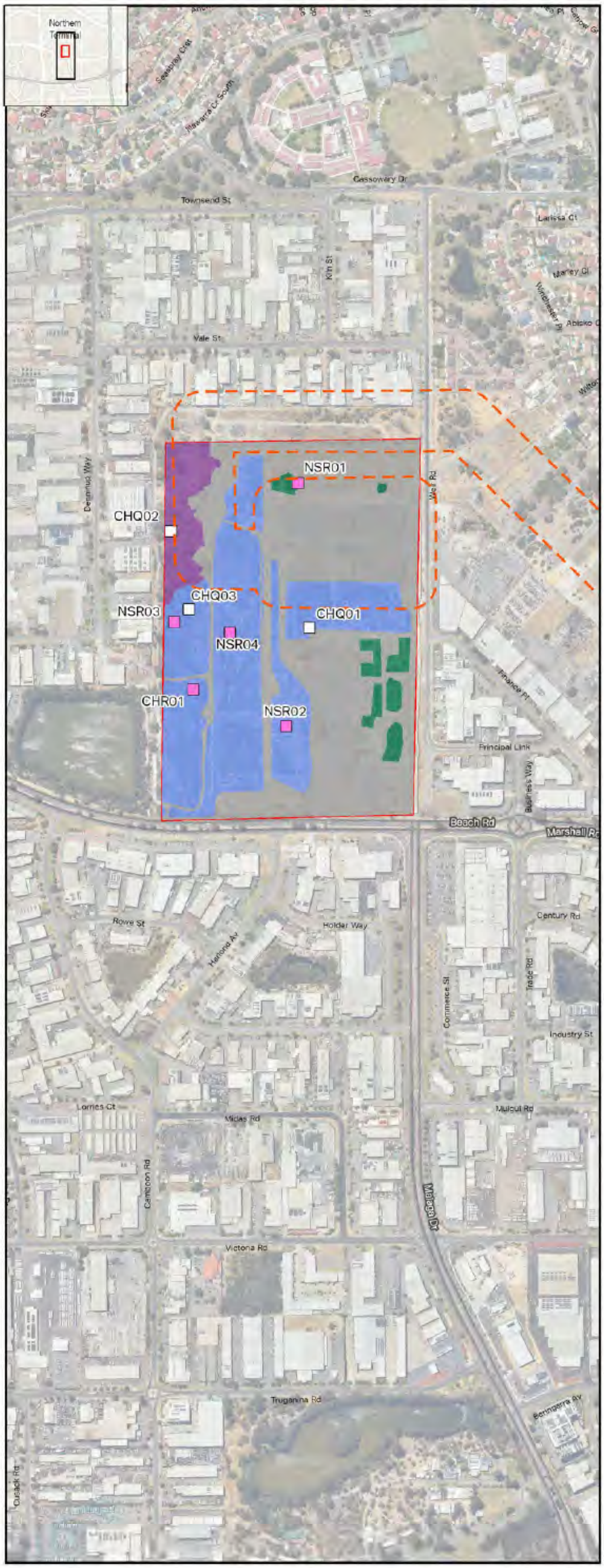

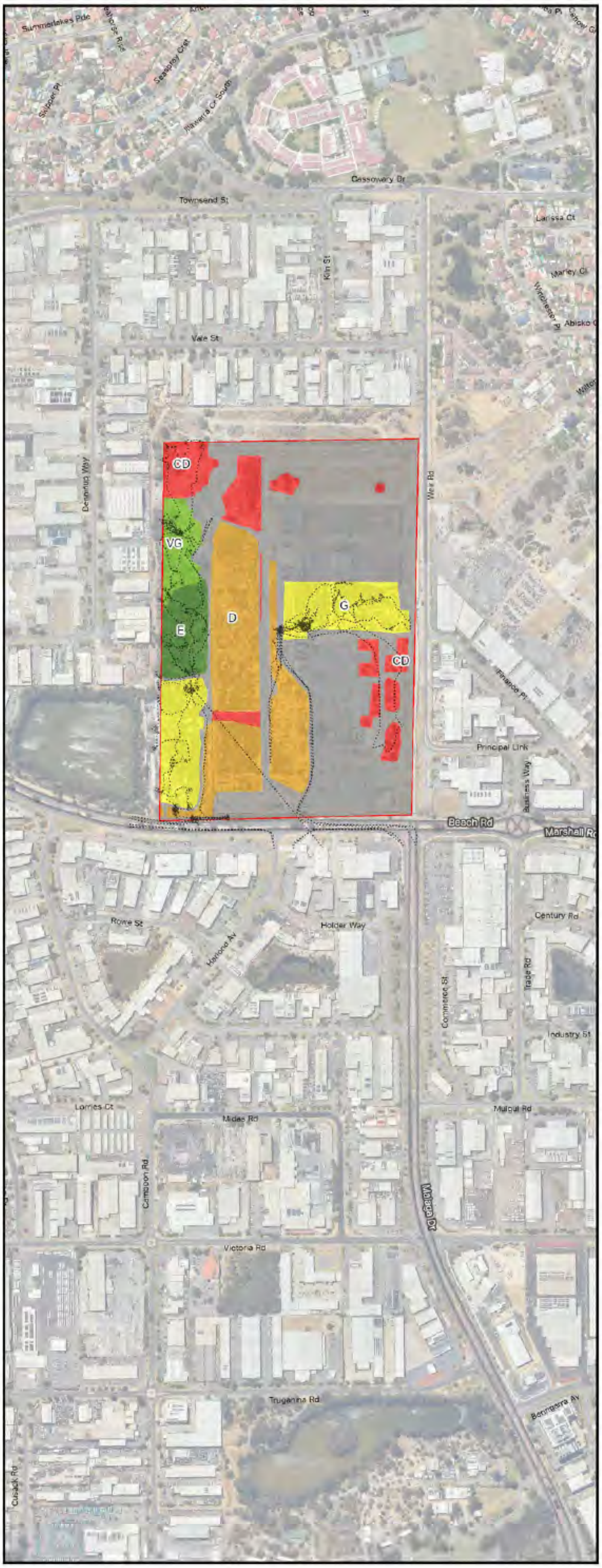

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LEGEND

Survey Area

Sample Sites
- Quadrat
- Relevé
- Tracklog

Vegetation Community
- CcXpEc
- ErAcCc
- Trees
- Cleared

Vegetation Condition
- Excellent
- Very Good
- Good
- Degraded
- Completely Degraded
- Cleared

Survey Area:
- AECOM (2022b)
- NREP

Vegetation Communities, Condition, Significant Flora and Survey Effort: *Northern Terminal*

WESTERN POWER

NREP SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **8.24**

Project: \\na.aecomnet.com\ifs\APAC\Perth-AUPER1\Legacy\Projects\607x\60713462_NREP_Ecology_2023900\CAD_GIS\020_GIS_NREP\02_MXD_APRX\60713462_NREP_Ecology_2023_Figures_SouthSC\aprx\robumcgregor\

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metres

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LEGEND

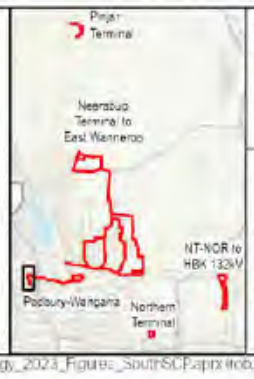
- Survey Area

Fauna Habitat
- Banksia Woodland
- Eucalyptus Woodland
- Mixed Shrubland
- Trees Over Cleared
- Cleared

Significant Fauna
- Carnaby's Cockatoo

Forest Red-tailed Black Cockatoo Foraging Habitat Quality (Bamford, 2020)
- None
- Negligible
- Low
- Moderate

Black Cockatoo Breeding Habitat
- Marri (*Corymbia calophylla*)
- Tuart (*Eucalyptus gomphocephala*)
- Tree with Suitable Hollow



Significant Fauna and Fauna Habitat, including *Calyptorhynchus* sp. foraging

Padbury-Wangarra

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **9.1**

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Forest Red-tailed Black Cockatoo Foraging Habitat

Foraging Evidence

Seen and Heard

Seen and Heard

Foraging Evidence

4 hollows

Whitfords Av

Mitchell Fwy

Ardrossan Loop

Trappers Dr

Murihead Way

Ardrossan Loop

Stockwell Way

Harrow Weald Way

Twickenham Dr

Kingsley Dr

Forest Hill Dr

Elodia Lane

Firwood Trl

Greenoak Pl

Ardrossan Loop

Neerabup Terminal to East Wanneroo

Padbury-Wangarra

82

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GDA2020 MGA ZONE 50

LEGEND

Survey Area

Fauna Habitat
- Banksia Woodland
- Eucalyptus Woodland
- Mixed Shrubland
- Trees Over Cleared
- Cleared

Significant Fauna
- Carnaby's Cockatoo
- Forest Red-tailed Black Cockatoo

Forest Red-tailed Black Cockatoo Foraging Habitat Quality (Bamford, 2020)
- None
- Negligible
- Low
- Moderate

Black Cockatoo Breeding Habitat
- Marri (*Corymbia calophylla*)
- Jarrah (*Eucalyptus marginata*)
- Tuart (*Eucalyptus gomphocephala*)
- Introduced
- Other
- Tree with Suitable Hollow

Pinjar Terminal

Neerabup Terminal to East Wanneroo

NT-NOR to HBK 132kV

Padbury-Wangarra

Northern Terminal

Significant Fauna and Fauna Habitat, including *Calyptorhynchus* sp. foraging

Padbury-Wangarra

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **9.2**

A4 size

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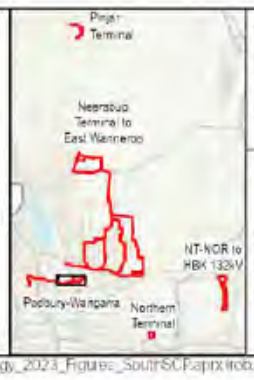
GDA2020 MGA ZONE 50

LEGEND

- Survey Area
- Fauna Habitat
  - Banksia Woodland
  - Mixed Shrubland
  - Trees Over Cleared
  - Cleared
  - Fauna Habitat Sample Sites
- Significant Fauna
  - Carnaby's Cockatoo
  - Forest Red-tailed Black Cockatoo
  - Quenda
- Forest Red-tailed Black Cockatoo Foraging Habitat Quality (Bamford, 2020)
  - None
  - Negligible
  - Low
  - Moderate
- Black Cockatoo Breeding Habitat
  - Marri (*Corymbia calophylla*)
  - Jarrah (*Eucalyptus marginata*)
  - Introduced
  - Other



Significant Fauna and Fauna Habitat, including *Calyptorhynchus* sp. foraging

Padbury-Wangarra

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **9.3**

A4 size

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metres

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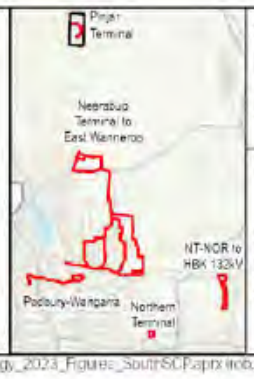
LEGEND
- Survey Area

Fauna Habitat
- Banksia Woodland
- Cleared
- Fauna Habitat Sample Sites

Significant Fauna
- Quenda

Forest Red-tailed Black Cockatoo Foraging Habitat Quality (Bamford, 2020)
- None



Significant Fauna and Fauna Habitat, including *Calyptorhynchus* sp. foraging

Pinjar Terminal

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **9.4**

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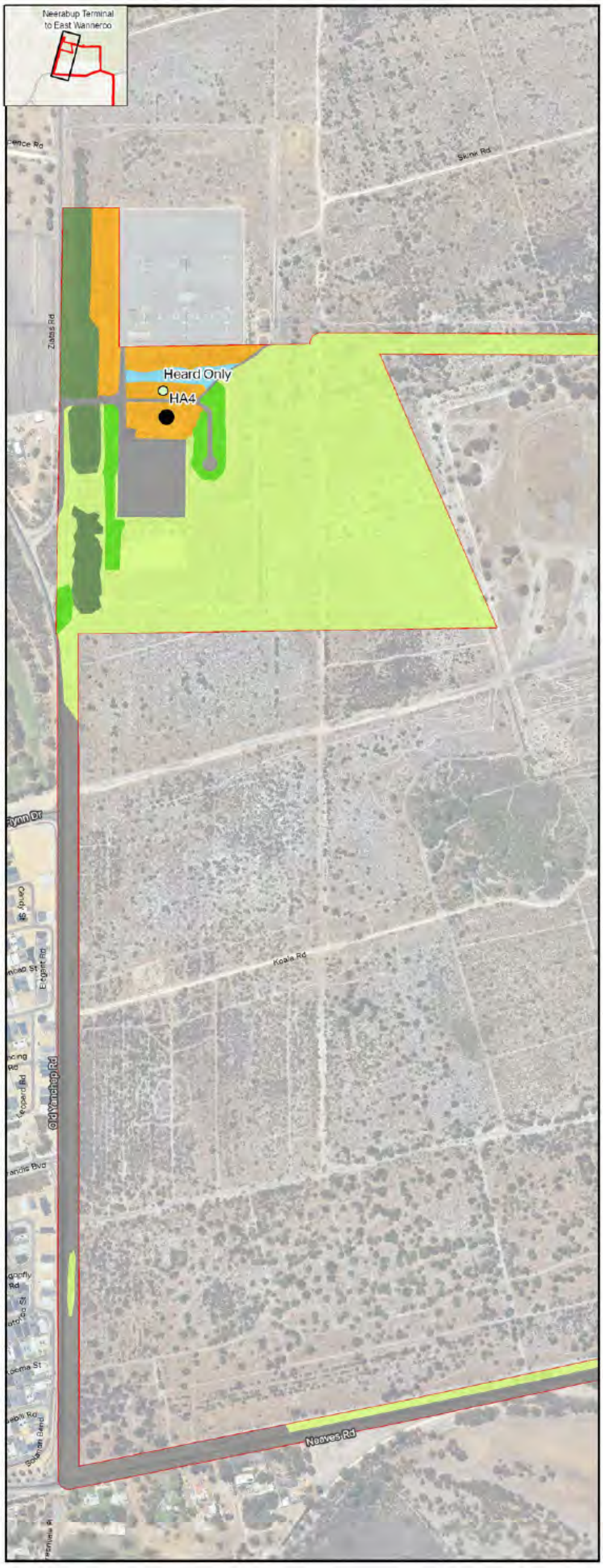

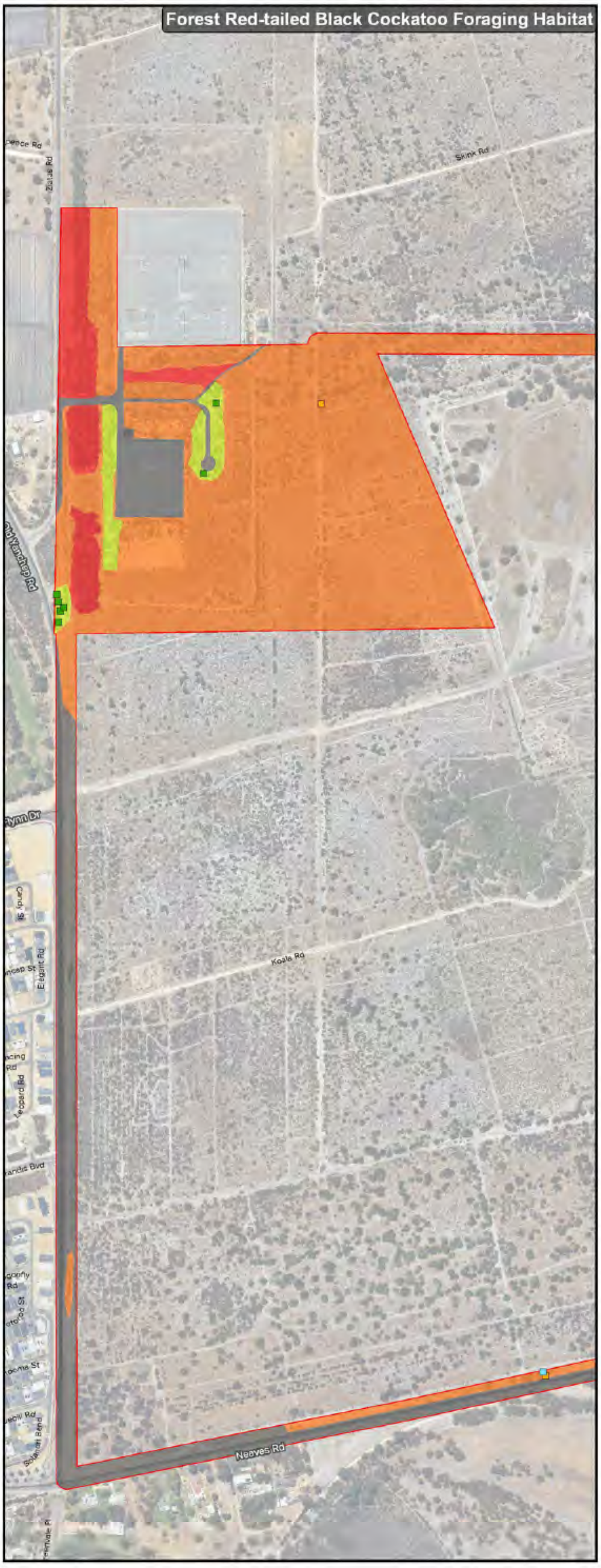

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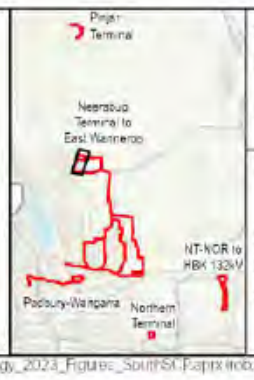
LEGEND

- Survey Area
- Fauna Habitat
  - Adenanthos/Plantation
  - Banksia Woodland
  - Eucalyptus Woodland
  - Pine Plantation
  - Trees Over Cleared
  - Cleared
  - Fauna Habitat Sample Sites
- Significant Fauna
  - Black-faced Cuckooshrike
- Forest Red-tailed Black Cockatoo Foraging Habitat Quality (Bamford, 2020)
  - None
  - Negligible
  - Low
  - Moderate
- Black Cockatoo Breeding Habitat
  - Jarrah (*Eucalyptus marginata*)
  - Tuart (*Eucalyptus gomphocephala*)
  - Introduced



Significant Fauna and Fauna Habitat, including *Calyptorhynchus* sp. foraging

Neerabup Terminal to East Wanneroo

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure 9.5

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LEGEND

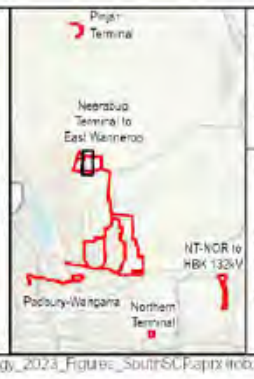
Survey Area

Fauna Habitat
- Adenanthos/Plantation
- Cleared

Significant Fauna
- Quenda

Forest Red-tailed Black Cockatoo Foraging Habitat Quality (Bamford, 2020)
- None
- Low

Black Cockatoo Breeding Habitat
- Jarrah (*Eucalyptus marginata*)
- Stag (old dead tree, unknown species)



Significant Fauna and Fauna Habitat, including *Calyptorhynchus* sp. foraging

Neerabup Terminal to East Wanneroo

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **9.6**

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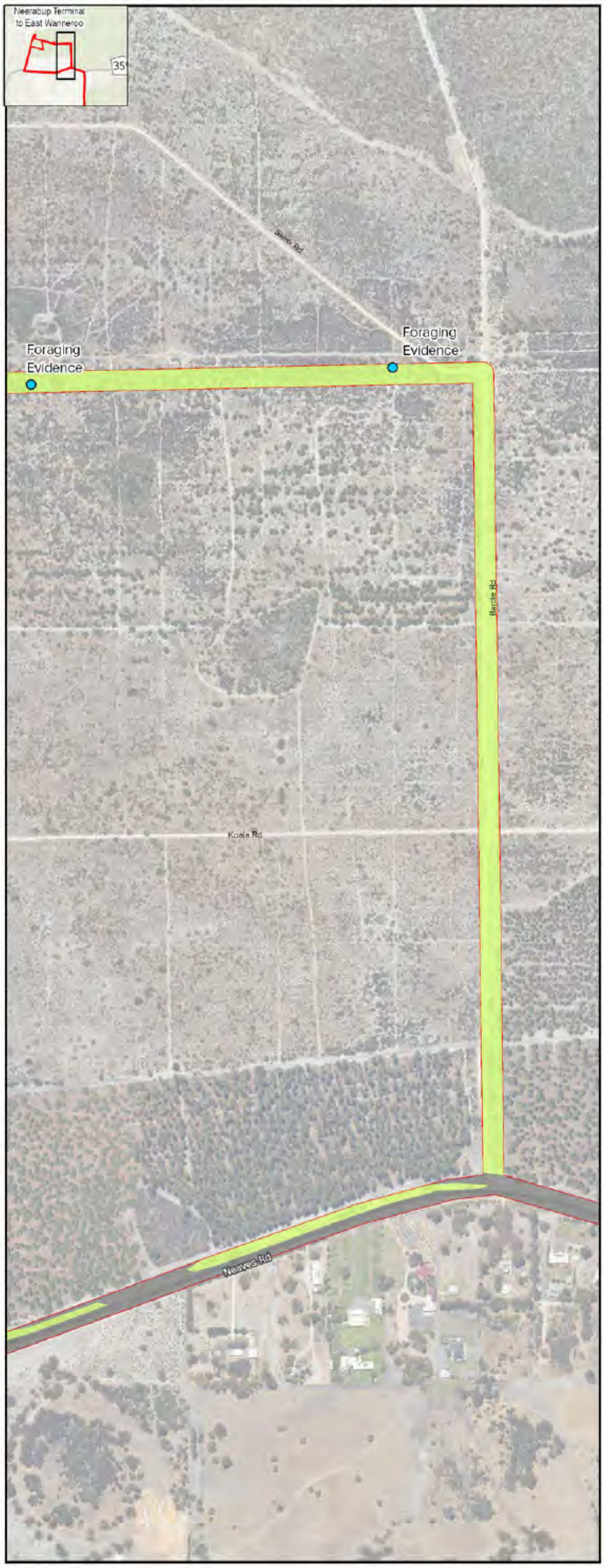

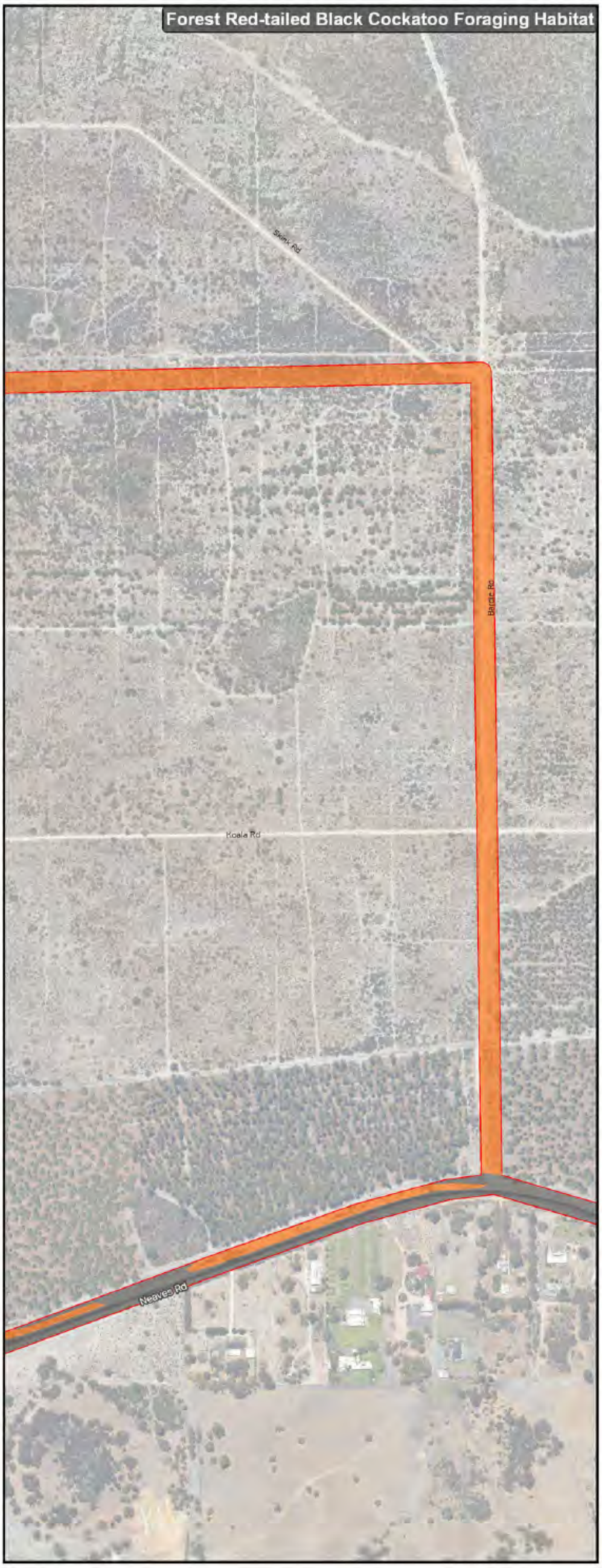

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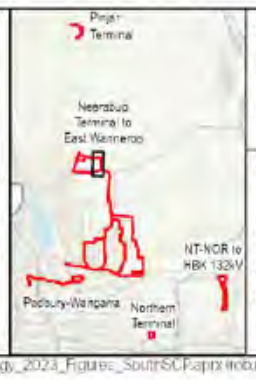
LEGEND
- Survey Area

Fauna Habitat
- Adenanthos/Plantation
- Cleared

Significant Fauna
- Quenda

Forest Red-tailed Black Cockatoo Foraging Habitat Quality (Bamford, 2020)
- None
- Low



Significant Fauna and Fauna Habitat, including *Calyptorhynchus* sp. foraging

Neerabup Terminal to East Wanneroo

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **9.7**

A4 size

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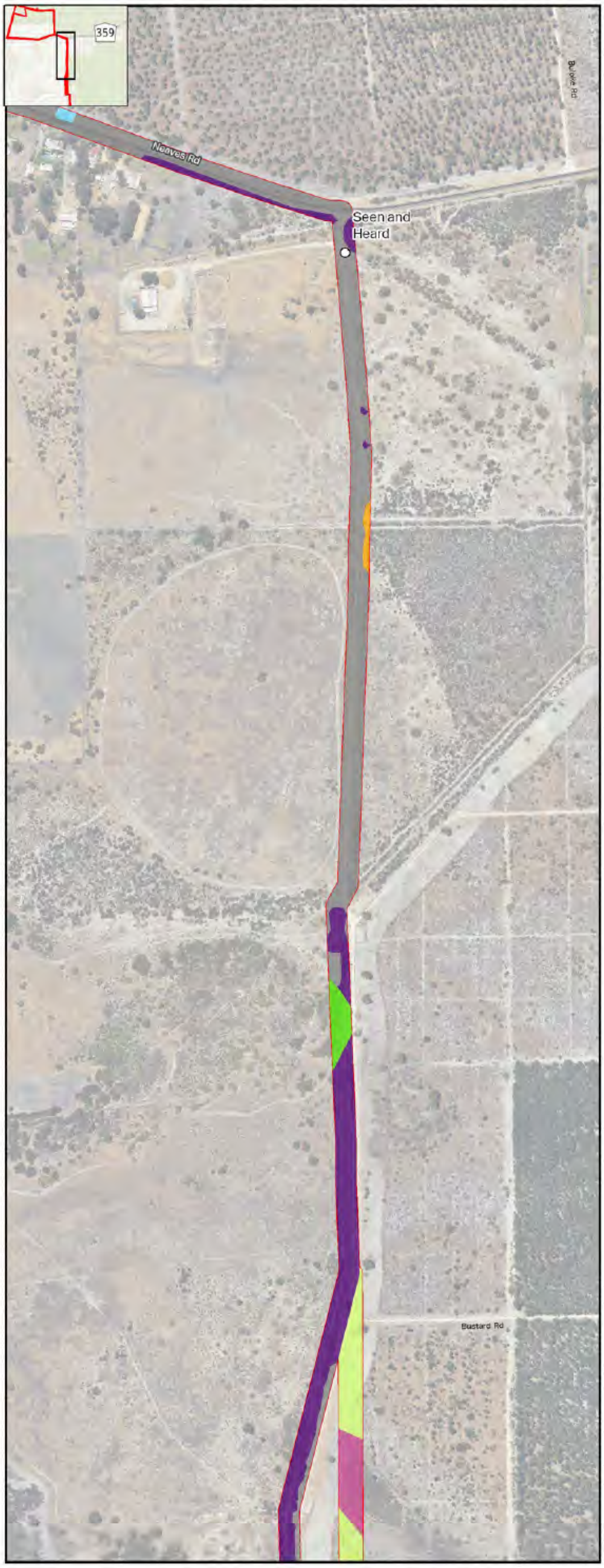

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GDA2020 MGA ZONE 50

LEGEND

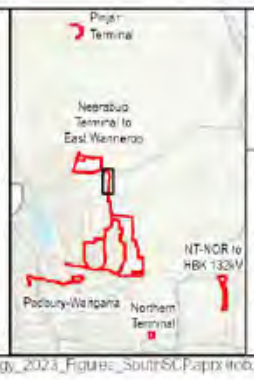
Survey Area

Fauna Habitat
- Adenanthos/Plantation
- Banksia Woodland
- Eucalyptus Woodland
- Melaleuca Woodland
- Mixed Shrubland
- Trees Over Cleared
- Cleared

Significant Fauna
- Carnaby's Cockatoo

Forest Red-tailed Black Cockatoo Foraging Habitat Quality (Bamford, 2020)
- None
- Negligible
- Low
- Moderate

Black Cockatoo Breeding Habitat
- Jarrah (*Eucalyptus marginata*)
- Stag (old dead tree, unknown species)



Significant Fauna and Fauna Habitat, including *Calyptorhynchus* sp. foraging

Neerabup Terminal to East Wanneroo

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **9.8**

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GDA2020 MGA ZONE 50

LEGEND

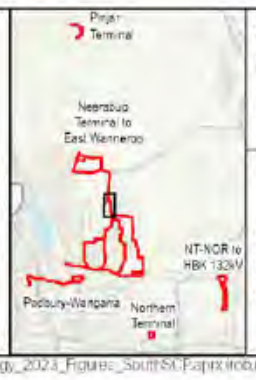
Survey Area

Fauna Habitat
- Adenanthos/Plantation
- Banksia Woodland
- Melaleuca Woodland
- Mixed Shrubland
- Trees Over Cleared
- Cleared

Significant Fauna
- Forest Red-tailed Black Cockatoo

Forest Red-tailed Black Cockatoo Foraging Habitat Quality (Bamford, 2020)
- None
- Negligible
- Low

Black Cockatoo Breeding Habitat
- Coastal Blackbutt (*Euc. todtiana*)



Significant Fauna and Fauna Habitat, including *Calyptorhynchus* sp. foraging

Neerabup Terminal to East Wanneroo

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **9.9**

Project: \\na.aecomnet.com\ffs\APAC\Perth-AUPER1\Legacy\Projects\60713462_NREP_Ecology_2023\903_CAD_GIS\20_GIS_NREP\02_MXD_APRX\60713462_NREP_Ecology_2024_Figures_SouthSC.aprx robmcgregor
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GDA2020 MGA ZONE 50

LEGEND

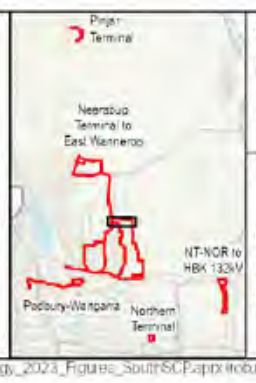
Survey Area

Fauna Habitat
- Adenanthos/Plantation
- Banksia Woodland
- Trees Over Cleared
- Cleared

Significant Fauna
- Quenda

Forest Red-tailed Black Cockatoo Foraging Habitat Quality (Bamford, 2020)
- None
- Negligible
- Low

Black Cockatoo Breeding Habitat
- Jarrah (*Eucalyptus marginata*)
- Coastal Blackbutt (*Euc. todtiana*)



Significant Fauna and Fauna Habitat, including *Calyptorhynchus* sp. foraging

Neerabup Terminal to East Wanneroo

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **9.10**

A4 size

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metres

GDA2020 MGA ZONE 50

LEGEND

Survey Area

Fauna Habitat
- Adenanthos/Plantation
- Cleared

Forest Red-tailed Black Cockatoo Foraging Habitat Quality (Bamford, 2020)
- None
- Low

Black Cockatoo Breeding Habitat
- Jarrah (*Eucalyptus marginata*)

Significant Fauna and Fauna Habitat, including *Calyptorhynchus* sp. foraging

Neerabup Terminal to East Wanneroo

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **9.11**

Project: \\na.aecomnet.com\lfs\APAC\Perth-AUPER1\Legacy\Projects\60713462_NREP_Ecology_20239000_CAD_GIS\020_GIS_NREP\02_MXD_APRX\60713462_NREP_Ecology_2023_Figures_South\C.Paprzik\burncgregori
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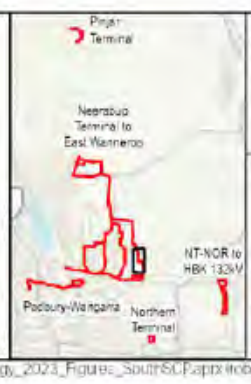
LEGEND

- Survey Area
- Fauna Habitat
  - Adenanthos/Plantation
  - Eucalyptus Woodland
  - Cleared
- Fauna Habitat Sample Sites
- Forest Red-tailed Black Cockatoo Foraging Habitat Quality (Bamford, 2020)
  - None
  - Low
  - Moderate



Significant Fauna and Fauna Habitat, including *Calyptorhynchus* sp. foraging

Neerabup Terminal to East Wanneroo

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **9.12**

A4 size

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GDA2020 MGA ZONE 50

LEGEND
- Survey Area
- Fauna Habitat
  - Banksia Woodland
  - Trees Over Cleared
  - Cleared
  - Fauna Habitat Sample Sites
- Significant Fauna
  - Black-faced Cuckooshrike
  - Carnaby's Cockatoo
  - Forest Red-tailed Black Cockatoo
  - Quenda
- Forest Red-tailed Black Cockatoo Foraging Habitat Quality (Bamford, 2020)
  - None
  - Negligible
  - Low
- Black Cockatoo Breeding Habitat
  - Tuart (*Eucalyptus gomphocephala*)
  - Coastal Blackbutt (*Euc. todtiana*)
  - Introduced

Significant Fauna and Fauna Habitat, including *Calyptorhynchus* sp. foraging

Neerabup Terminal to East Wanneroo

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **9.13**

A4 size

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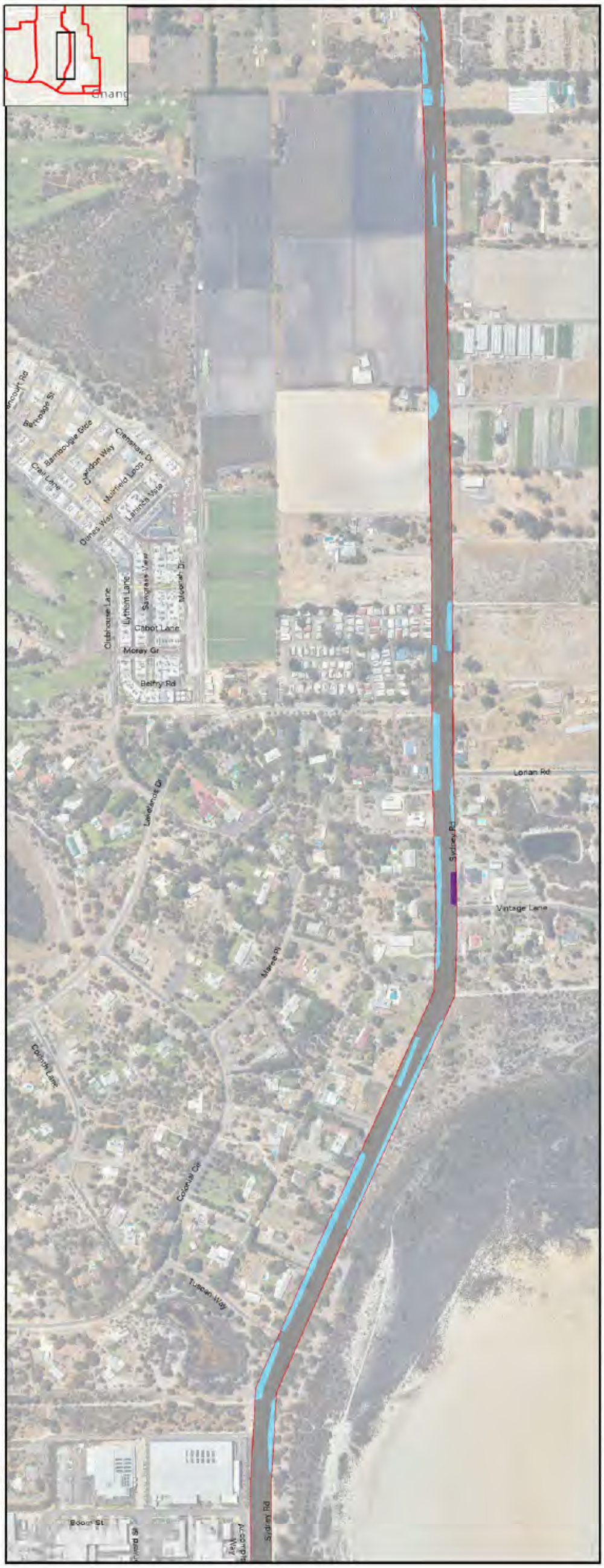

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LEGEND

Survey Area

Fauna Habitat
- Mixed Shrubland
- Trees Over Cleared
- Cleared

Forest Red-tailed Black Cockatoo Foraging Habitat Quality (Bamford, 2020)
- None
- Negligible

Black Cockatoo Breeding Habitat
- Introduced

Significant Fauna and Fauna Habitat, including *Calyptorhynchus* sp. foraging

Neerabup Terminal to East Wanneroo

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **9.14**

A4 size

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GDA2020 MGA ZONE 50

LEGEND

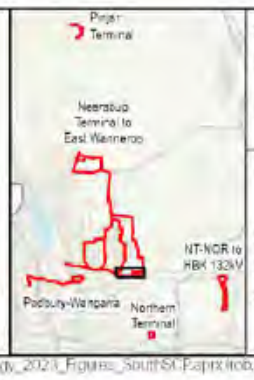
Survey Area

Fauna Habitat
- Adenanthos/Plantation
- Banksia Woodland
- Eucalyptus Woodland
- Melaleuca Woodland
- Mixed Shrubland
- Trees Over Cleared
- Cleared
- Fauna Habitat Sample Sites

Significant Fauna
- Carnaby's Cockatoo
- Forest Red-tailed Black Cockatoo

Forest Red-tailed Black Cockatoo Foraging Habitat Quality (Bamford, 2020)
- None
- Negligible
- Low
- Moderate

Black Cockatoo Breeding Habitat
- Marri (*Corymbia calophylla*)
- Jarrah (*Eucalyptus marginata*)
- Coastal Blackbutt (*Euc. todtiana*)
- Introduced



Significant Fauna and Fauna Habitat, including *Calyptorhynchus* sp. foraging

Neerabup Terminal to East Wanneroo

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **9.15**

A4 size

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LEGEND

- Survey Area

Fauna Habitat

- Mixed Shrubland
- Trees Over Cleared
- Cleared

Forest Red-tailed Black Cockatoo Foraging Habitat Quality (Bamford, 2020)

- None
- Negligible

Significant Fauna and Fauna Habitat, including *Calyptorhynchus* sp. foraging

Neerabup Terminal to East Wanneroo

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **9.16**

A4 size

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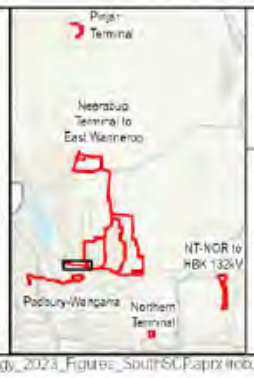
LEGEND

Survey Area

Fauna Habitat
- Banksia Woodland
- Mixed Shrubland
- Trees Over Cleared
- Cleared

Forest Red-tailed Black Cockatoo Foraging Habitat Quality (Bamford, 2020)
- None
- Negligible
- Low

Black Cockatoo Breeding Habitat
- Other



Significant Fauna and Fauna Habitat, including *Calyptorhynchus* sp. foraging

Neerabup Terminal to East Wanneroo

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure 9.17

A4 size

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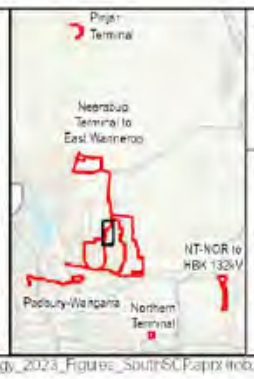
LEGEND

Survey Area

Fauna Habitat
- Banksia Woodland
- Trees Over Cleared
- Cleared

Forest Red-tailed Black Cockatoo Foraging Habitat Quality (Bamford, 2020)
- None
- Negligible
- Low

Black Cockatoo Breeding Habitat
- Jarrah (*Eucalyptus marginata*)
- Introduced



Significant Fauna and Fauna Habitat, including *Calyptorhynchus* sp. foraging

Neerabup Terminal to East Wanneroo

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **9.18**

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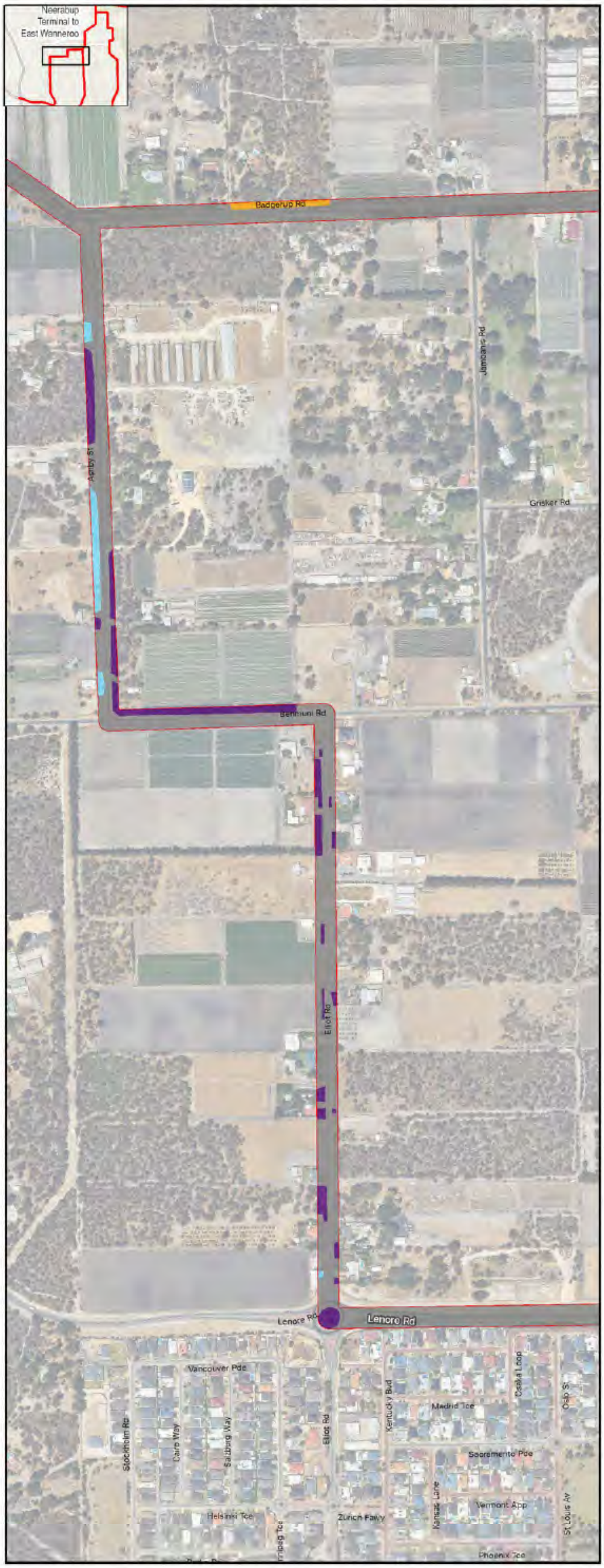

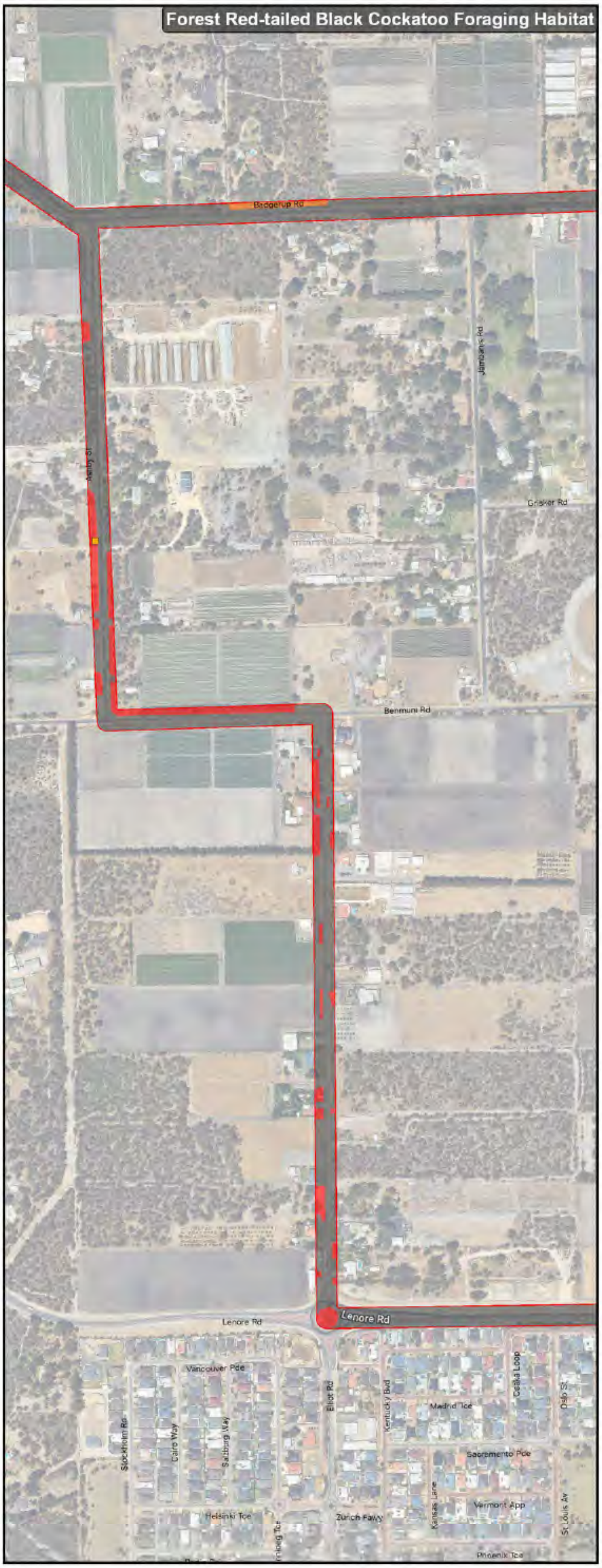

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GDA2020 MGA ZONE 50

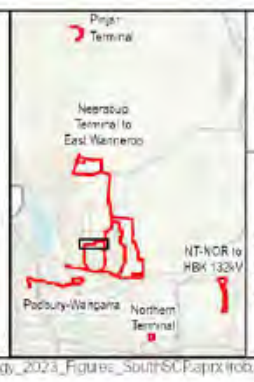
LEGEND

Survey Area

Fauna Habitat
- Banksia Woodland
- Mixed Shrubland
- Trees Over Cleared
- Cleared

Forest Red-tailed Black Cockatoo Foraging Habitat Quality (Bamford, 2020)
- None
- Negligible
- Low

Black Cockatoo Breeding Habitat
- Jarrah (*Eucalyptus marginata*)



Significant Fauna and Fauna Habitat, including *Calyptorhynchus* sp. foraging

Neerabup Terminal to East Wanneroo

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **9.19**

A4 size

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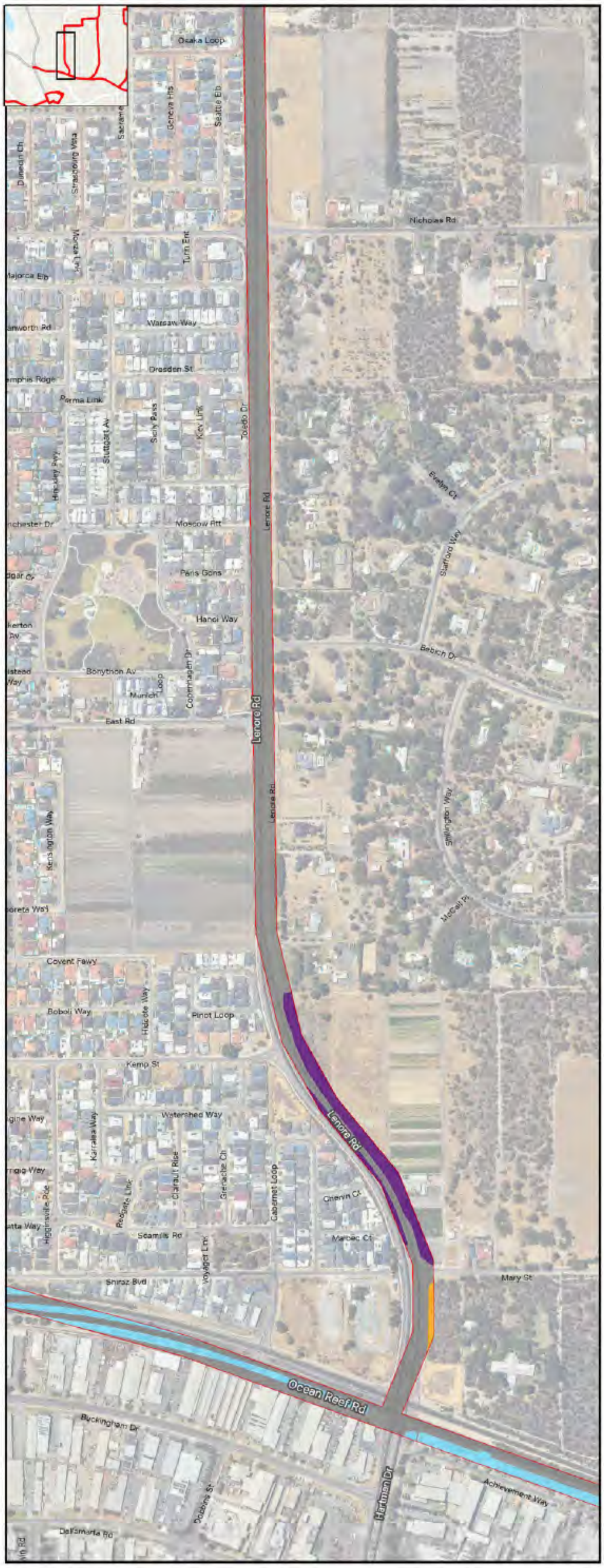

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GDA2020 MGA ZONE 50

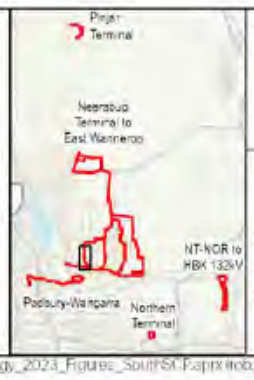
LEGEND

- Survey Area

Fauna Habitat
- Banksia Woodland
- Mixed Shrubland
- Trees Over Cleared
- Cleared

Forest Red-tailed Black Cockatoo Foraging Habitat Quality (Bamford, 2020)
- None
- Negligible
- Low

Black Cockatoo Breeding Habitat
- Other



Significant Fauna and Fauna Habitat, including *Calyptorhynchus* sp. foraging

Neerabup Terminal to East Wanneroo

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **9.20**

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metres

GDA2020 MGA ZONE 50

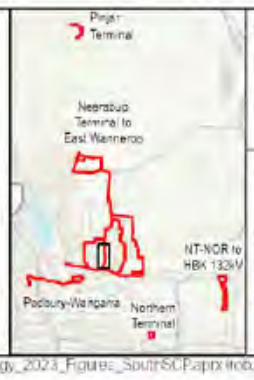
LEGEND

Survey Area

Fauna Habitat
- Mixed Shrubland
- Trees Over Cleared
- Cleared

Forest Red-tailed Black Cockatoo Foraging Habitat Quality (Bamford, 2020)
- None
- Negligible

Black Cockatoo Breeding Habitat
- Stag (old dead tree, unknown species)
- Other
- Tree with Suitable Hollow



Significant Fauna and Fauna Habitat, including *Calyptorhynchus* sp. foraging

Neerabup Terminal to East Wanneroo

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **9.21**

A4 size

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Layout: G60713462_Fig9_NREP_South_FaunaHab_FRTHab_A3P_v1 Last exported: 20/06/2024 1:37 PM

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GDA2020 MGA ZONE 50

LEGEND
- Survey Area
- Fauna Habitat
  - Banksia Woodland
  - Eucalyptus Woodland
  - Mixed Shrubland
  - Trees Over Cleared
  - Cleared
  - Fauna Habitat Sample Sites
- Significant Fauna
  - Black-faced Cuckooshrike
  - Carnaby's Cockatoo
  - Forest Red-tailed Black Cockatoo
  - Quenda
- Forest Red-tailed Black Cockatoo Foraging Habitat Quality (Bamford, 2020)
  - None
  - Low
  - Moderate
  - Moderate to High
- Black Cockatoo Breeding Habitat
  - Marri (*Corymbia calophylla*)
  - Jarrah (*Eucalyptus marginata*)
  - Tuart (*Eucalyptus gomphocephala*)
  - Stag (old dead tree, unknown species)
  - Introduced
  - Tree with Suitable Hollow

Significant Fauna and Fauna Habitat, including *Calyptorhynchus* sp. foraging

NT-NOR to HBK 132kV

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **9.22**

A4 size

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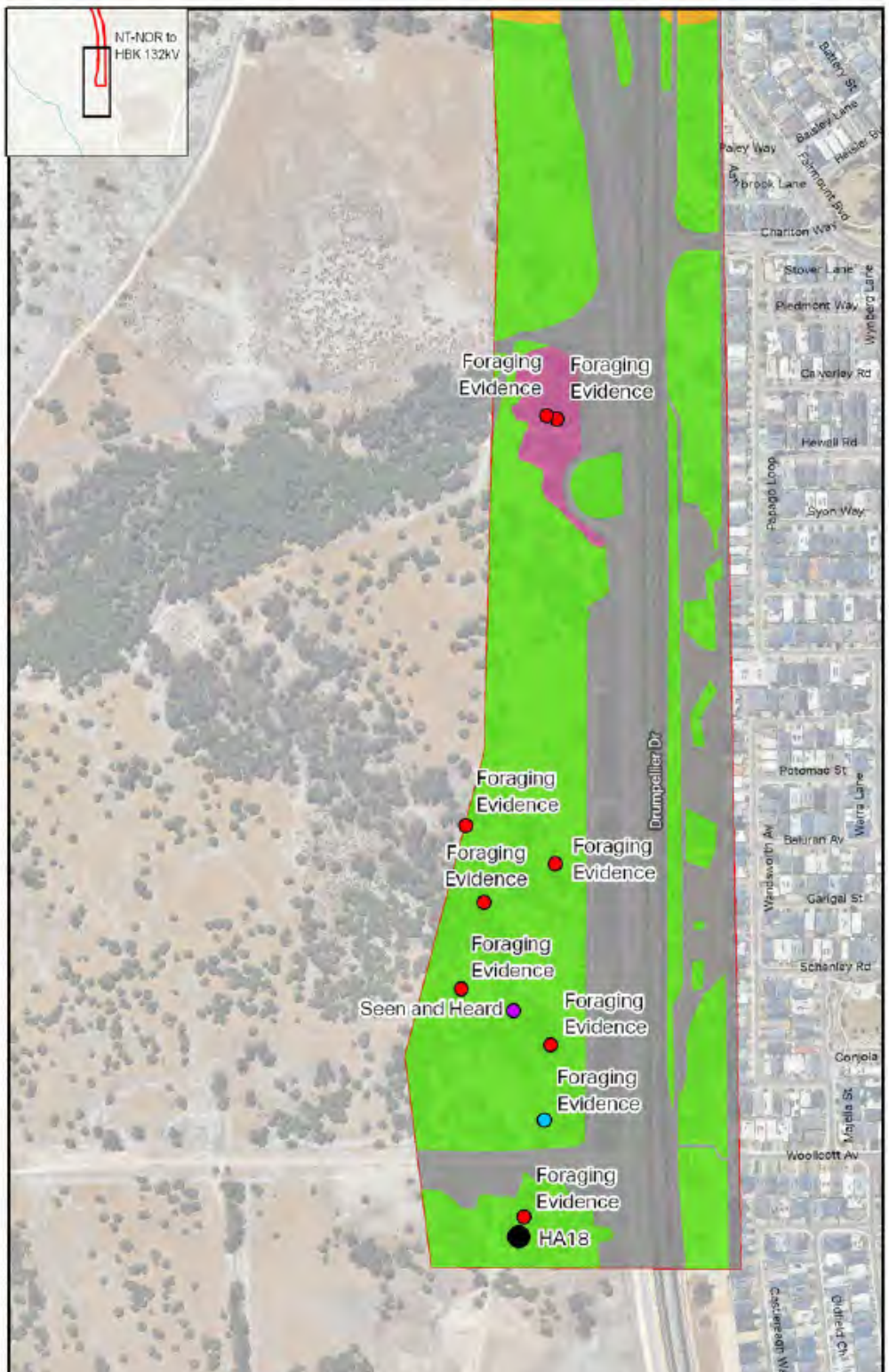

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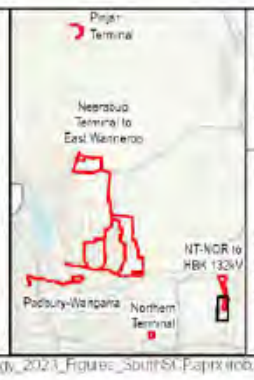
GDA2020 MGA ZONE 50

LEGEND

- Survey Area
- Fauna Habitat
  - Banksia Woodland
  - Eucalyptus Woodland
  - Melaleuca Woodland
  - Cleared
  - Fauna Habitat Sample Sites
- Significant Fauna
  - Forest Red-tailed Black Cockatoo
  - Quenda
  - Rainbow Bee-eater
- Forest Red-tailed Black Cockatoo Foraging Habitat Quality (Bamford, 2020)
  - None
  - Negligible
  - Low
  - Moderate to High
- Black Cockatoo Breeding Habitat
  - Marri (*Corymbia calophylla*)
  - Jarrah (*Eucalyptus marginata*)
  - Coastal Blackbutt (*Euc. todtiana*)
  - Stag (old dead tree, unknown species)



Significant Fauna and Fauna Habitat, including *Calyptorhynchus* sp. foraging

NT-NOR to HBK 132kV

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **9.23**

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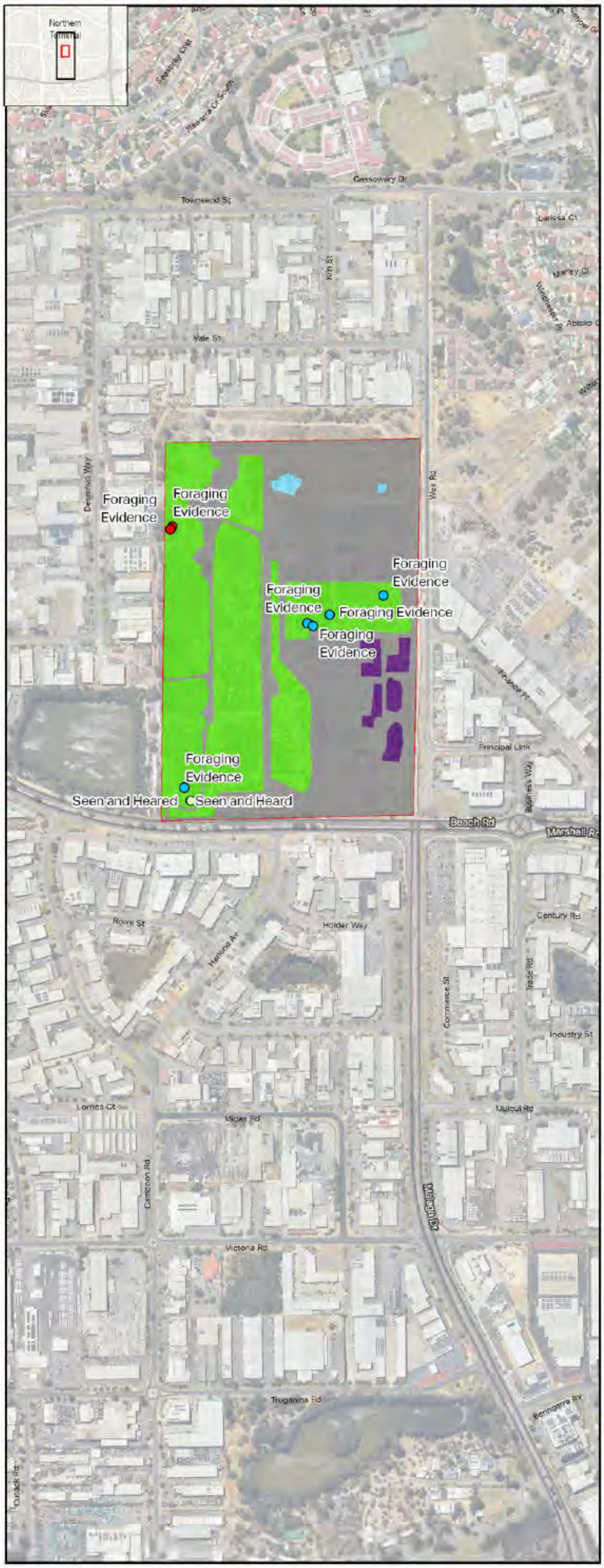

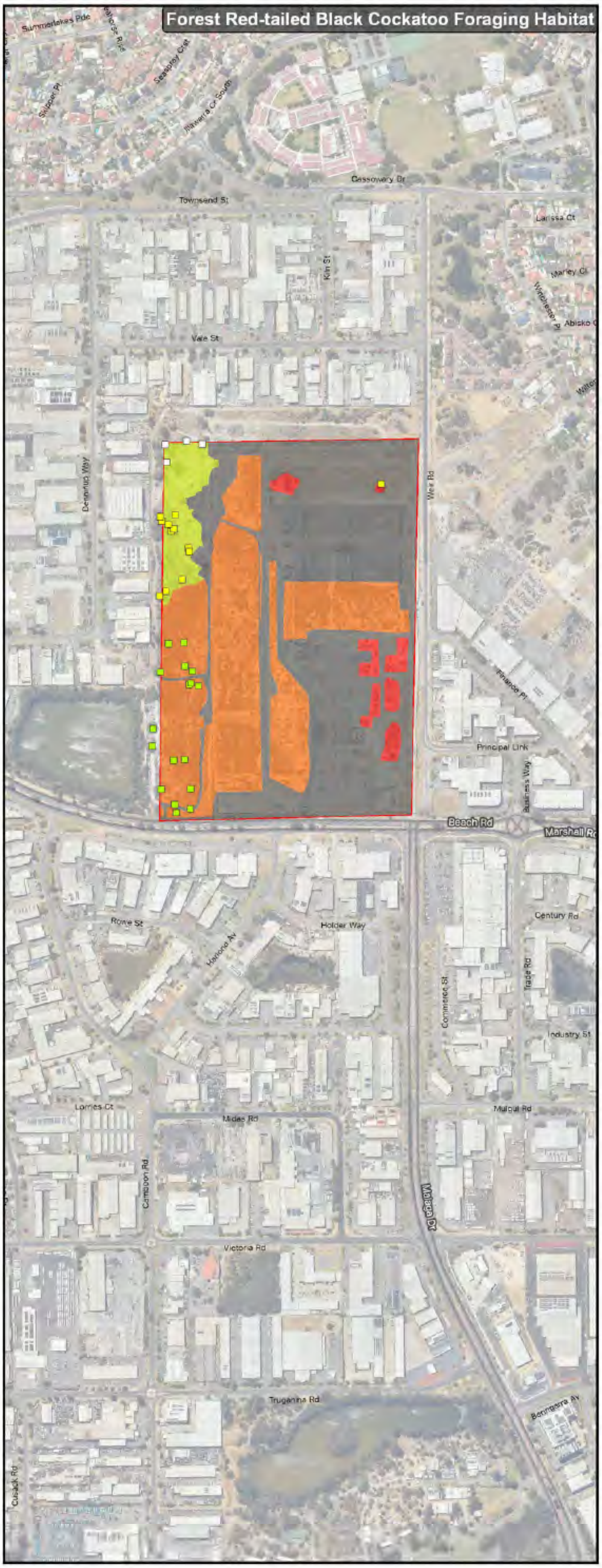

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LEGEND

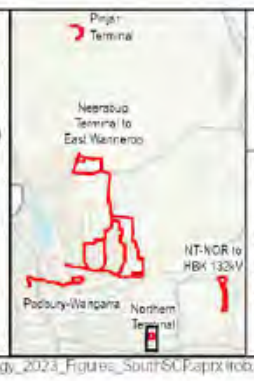
Survey Area

Fauna Habitat
- Eucalyptus Woodland
- Mixed Shrubland
- Trees Over Cleared
- Cleared

Significant Fauna
- Black-faced Cuckooshrike
- Forest Red-tailed Black Cockatoo
- Quenda
- Rainbow Bee-eater

Forest Red-tailed Black Cockatoo Foraging Habitat Quality (Bamford, 2020)
- None
- Negligible
- Low
- Moderate

Black Cockatoo Breeding Habitat
- Marri (*Corymbia calophylla*)
- Flooded Gum (*Euc. rudis*)
- Other



Significant Fauna and Fauna Habitat, including *Calyptorhynchus* sp. foraging

Northern Terminal

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **9.24**

A4 size

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metres

GDA2020 MGA ZONE 50

LEGEND

Survey Area

Baudin's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
- None
- Negligible
- Low
- Moderate

Carnaby's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
- None
- Low
- Moderate

Black Cockatoo Foraging (*Zanda* sp.)

Padbury-Wangarra

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure 10.1

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LEGEND

Survey Area

Baudin's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
- None
- Negligible
- Low
- Moderate

Carnaby's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
- None
- Low
- Moderate

Black Cockatoo Foraging (*Zanda* sp.)

Padbury-Wangarra

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **10.2**

A4 size

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LEGEND

- Survey Area
- Baudin's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
  - None
  - Negligible
  - Low
  - Moderate
- Carnaby's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
  - None
  - Low
  - Moderate

Black Cockatoo Foraging (*Zanda* sp.)

Padbury-Wangarra

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **10.3**

A4 size

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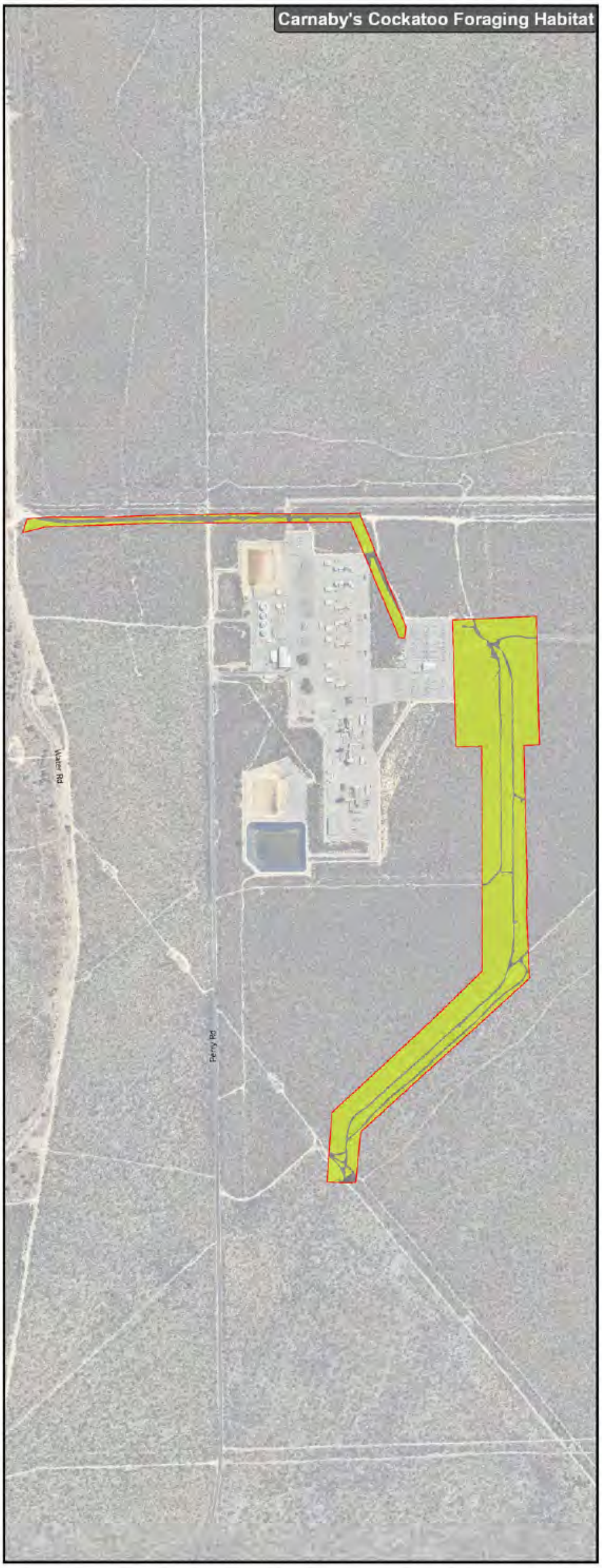

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LEGEND
- Survey Area

Baudin's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
- None

Carnaby's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
- None
- Moderate

Black Cockatoo Foraging (*Zanda* sp.)

Pinjar Terminal

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **10.4**

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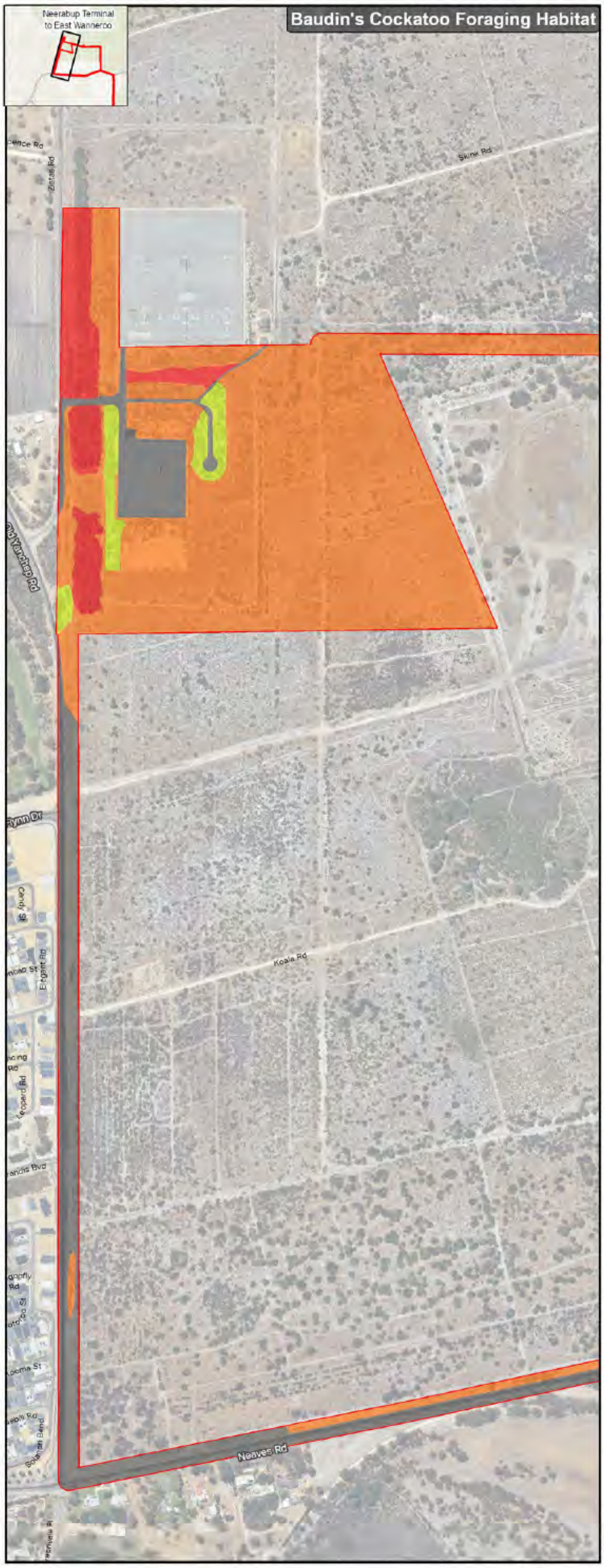

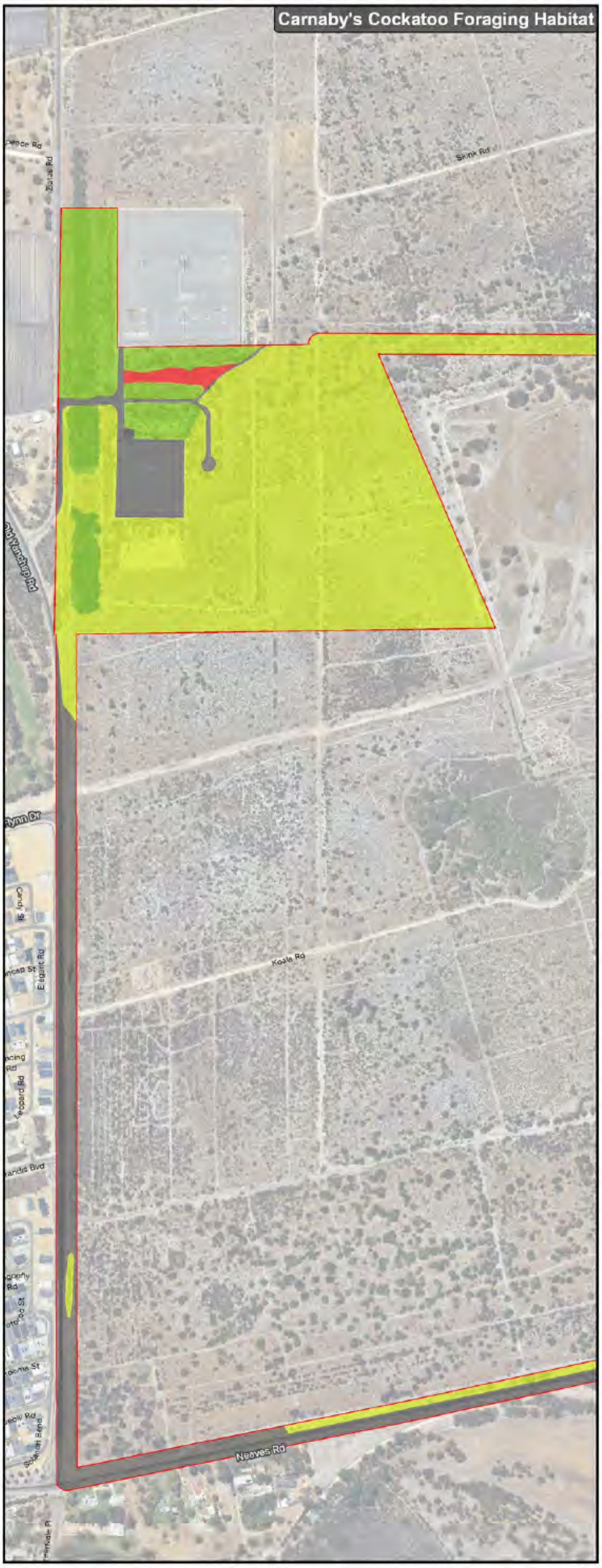

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LEGEND

Survey Area

Baudin's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
- None
- Negligible
- Low
- Moderate

Carnaby's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
- None
- Negligible
- Moderate
- Moderate to High

Black Cockatoo Foraging (*Zanda* sp.)

Neerabup Terminal to East Wanneroo

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **10.5**

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metres

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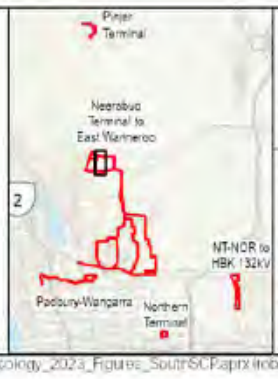
LEGEND

Survey Area

Baudin's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
- None
- Low

Carnaby's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
- None
- Moderate



Black Cockatoo Foraging (*Zanda* sp.)

Neerabup Terminal to East Wanneroo

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **10.6**

A4 size

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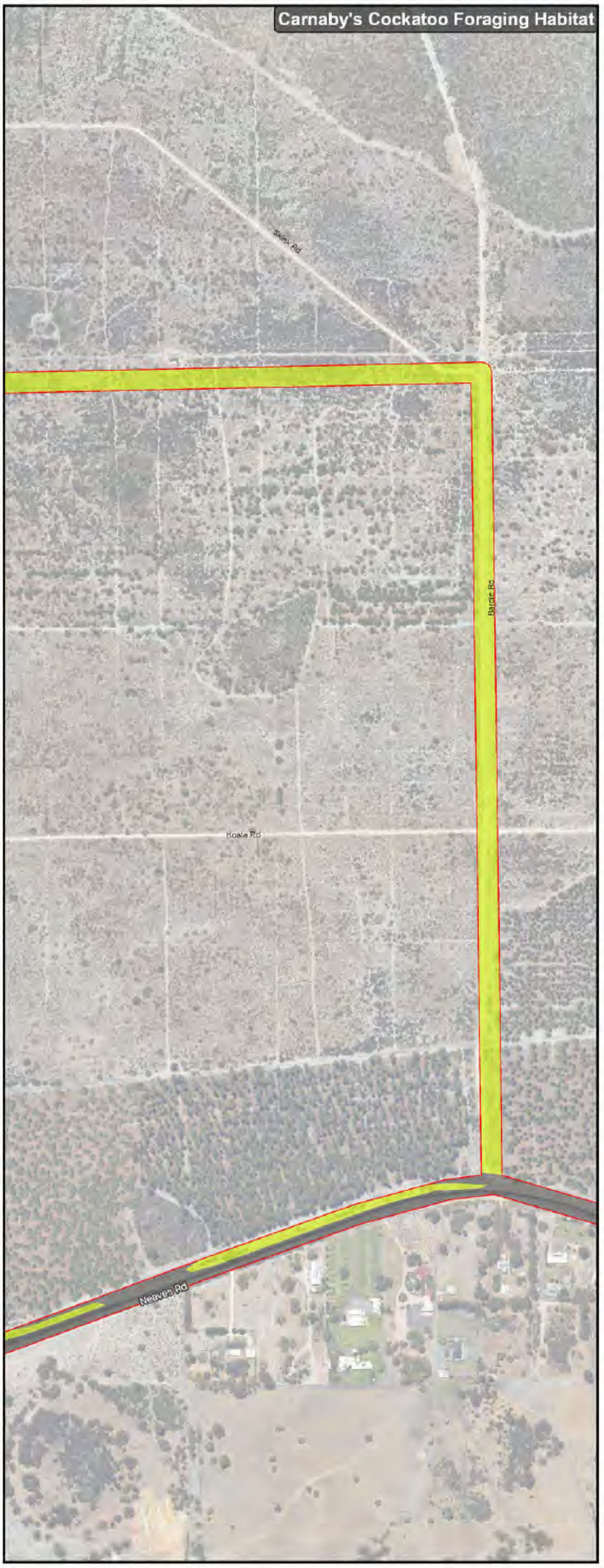

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LEGEND
Survey Area
Baudin's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
None
Low
Carnaby's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
None
Moderate

Black Cockatoo Foraging (*Zanda* sp.)

Neerabup Terminal to East Wanneroo

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **10.7**

A4 size

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LEGEND

- Survey Area
- Baudin's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
  - None
  - Negligible
  - Low
  - Moderate
- Carnaby's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
  - None
  - Negligible
  - Low
  - Moderate
  - Moderate to High

Black Cockatoo Foraging (*Zanda* sp.)

Neerabup Terminal to East Wanneroo

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **10.8**

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metres

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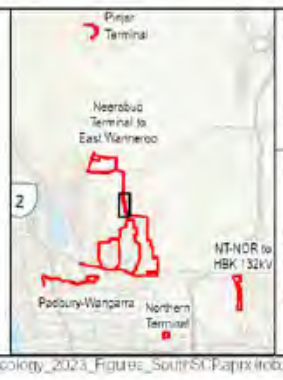
LEGEND

Survey Area

Baudin's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
- None
- Negligible
- Low

Carnaby's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
- None
- Negligible
- Low
- Moderate
- Moderate to High



Black Cockatoo Foraging (*Zanda* sp.)

Neerabup Terminal to East Wanneroo

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **10.9**

A4 size

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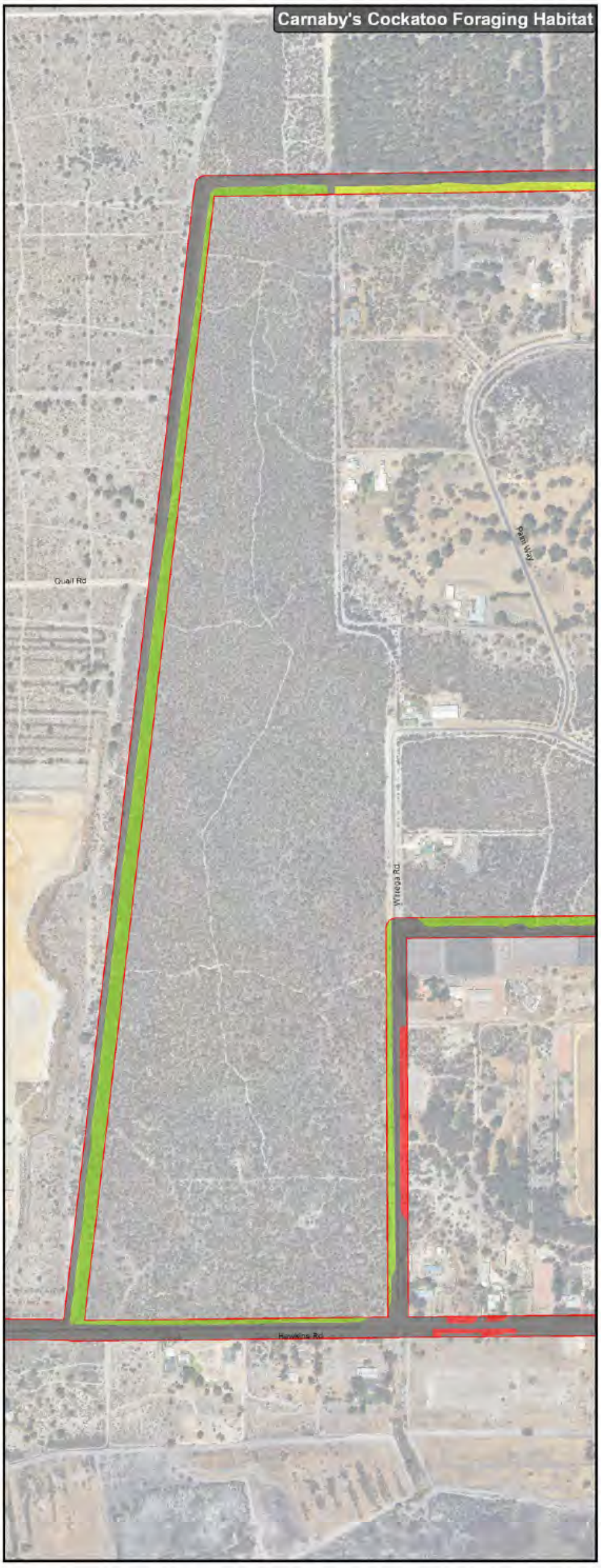

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0 50 100 150 200 metres

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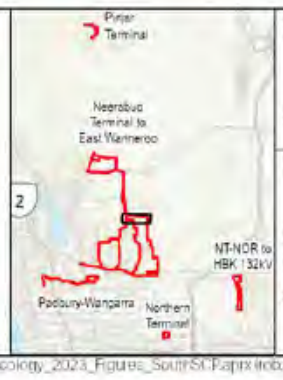
GDA2020 MGA ZONE 50

LEGEND

Survey Area

Baudin's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
- None
- Negligible
- Low

Carnaby's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
- None
- Negligible
- Moderate
- Moderate to High



Black Cockatoo Foraging (*Zanda* sp.)

Neerabup Terminal to East Wanneroo

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **10.10**

A4 size

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0 50 100 150 200
metres

GDA2020 MGA ZONE 50

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LEGEND

Survey Area

Baudin's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
- None
- Low

Carnaby's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
- None
- Moderate

Black Cockatoo Foraging (*Zanda* sp.)

Neerabup Terminal to East Wanneroo

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **10.11**

A4 size

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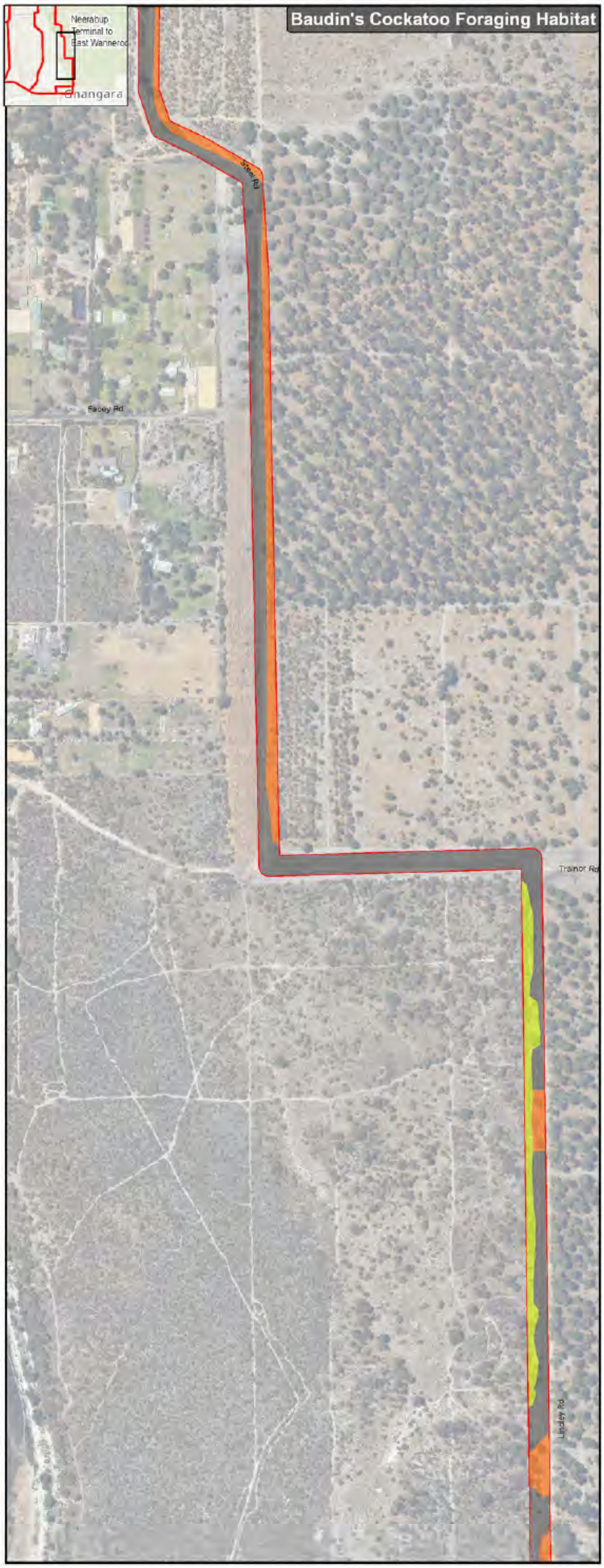

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0 50 100 150 200 metres

GDA2020 MGA ZONE 50

LEGEND

- Survey Area
- Baudin's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
  - None
  - Low
  - Moderate
- Carnaby's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
  - None
  - Moderate

Black Cockatoo Foraging (*Zanda* sp.)

Neerabup Terminal to East Wanneroo

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **10.12**

A4 size

Project: \\na.aecomnet.com\ifs\APAC\Perth-AUPER1\Legacy\Projects\60713462_NREP_Ecology_2023\900_CAD_GIS\020_GIS_NREP\02_MXD_APRX\60713462_NREP_Ecology_2023_Figures_South\SC\Aprx\robmcgregor\

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0 50 100 150 200
metres

GDA2020 MGA ZONE 50

LEGEND

Survey Area

Baudin's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
- None
- Negligible
- Low

Carnaby's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
- None
- Negligible
- Moderate to High

Black Cockatoo Foraging (*Zanda* sp.)

Neerabup Terminal to East Wanneroo

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **10.13**

Project: \\na.aecomnet.com\ffs\APAC\Perth-AUPER1\Legacy\Projects\60713462_NREP_Ecology_2023\900_CAD_GIS\020_GIS_NREP\02_MXD_APRX\60713462_NREP_Ecology_2023_Figures_SouthSC.aprx (robmcgregor)
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0 50 100 150 200
metres

GDA2020 MGA ZONE 50

LEGEND
- Survey Area

Baudin's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
- None
- Negligible

Carnaby's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
- None
- Negligible

Black Cockatoo Foraging (*Zanda* sp.)

Neerabup Terminal to East Wanneroo

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **10.14**

Project: \\na.aecomnet.com\ffs\APAC\Perth-ALPER1\Legacy\Projects\60713462_NREP_Ecology_20230920_CAD_GIS\020_GIS_NREP\02_MXD_APRX\60713462_NREP_Ecology_2023_Figures_South\SC\Paprx\robmcgregor\
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0 50 100 150 200 metres

GDA2020 MGA ZONE 50

LEGEND

Survey Area

Baudin's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
- None
- Negligible
- Low
- Moderate

Carnaby's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
- None
- Negligible
- Low
- Moderate
- Moderate to High

Black Cockatoo Foraging (*Zanda* sp.)

Neerabup Terminal to East Wanneroo

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **10.15**

A4 size

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0 50 100 150 200
metres

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GDA2020 MGA ZONE 50

LEGEND
- Survey Area

Baudin's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
- None
- Negligible

Carnaby's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
- None
- Negligible

Black Cockatoo Foraging (*Zanda* sp.)

Neerabup Terminal to East Wanneroo

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **10.16**

A4 size

Project: \\na.aecomnet.com\ifs\APAC\Perth-AUPER1\Legacy\Project\60713462_NREP_Ecology_2023\900_CAD_GIS\020_GIS_NREP\02_MXD_APRX\60713462_NREP_Ecology_2023_Figures_SouthSC.aprx (robmcgregor)
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GDA2020 MGA ZONE 50

LEGEND

Survey Area

Baudin's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
- None
- Negligible
- Low

Carnaby's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
- None
- Negligible
- Moderate to High

Black Cockatoo Foraging (*Zanda* sp.)

Neerabup Terminal to East Wanneroo

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **10.17**

Project: \\naaecomnet.com\ths\APAC\Perth-AUPER1\Legacy\Projects\607\60713462_NREP_Ecology_20239000_CAD_GIS\020_GIS_NREP\02_MXD_APRX\60713462_NREP_Ecology_2023_Figures_SouthSC.aprx (robumcgregor)
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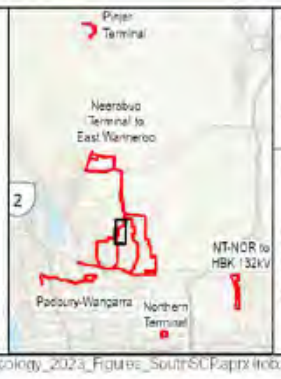
LEGEND

Survey Area

Baudin's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
- None
- Negligible
- Low

Carnaby's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
- None
- Negligible
- Moderate to High



Black Cockatoo Foraging (*Zanda* sp.)

Neerabup Terminal to East Wanneroo

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **10.18**

Project: \\na.aecomnet.com\ifs\APAC\Perth-AUPER1\Legacy\Projects\607x60713462_NREP_Ecology_2023900_CAD_GIS\020_GIS_NREP\02_MXD_APRX\60713462_NREP_Ecology_2023_Figures_South\CP.aprx (rob.mcgregor)
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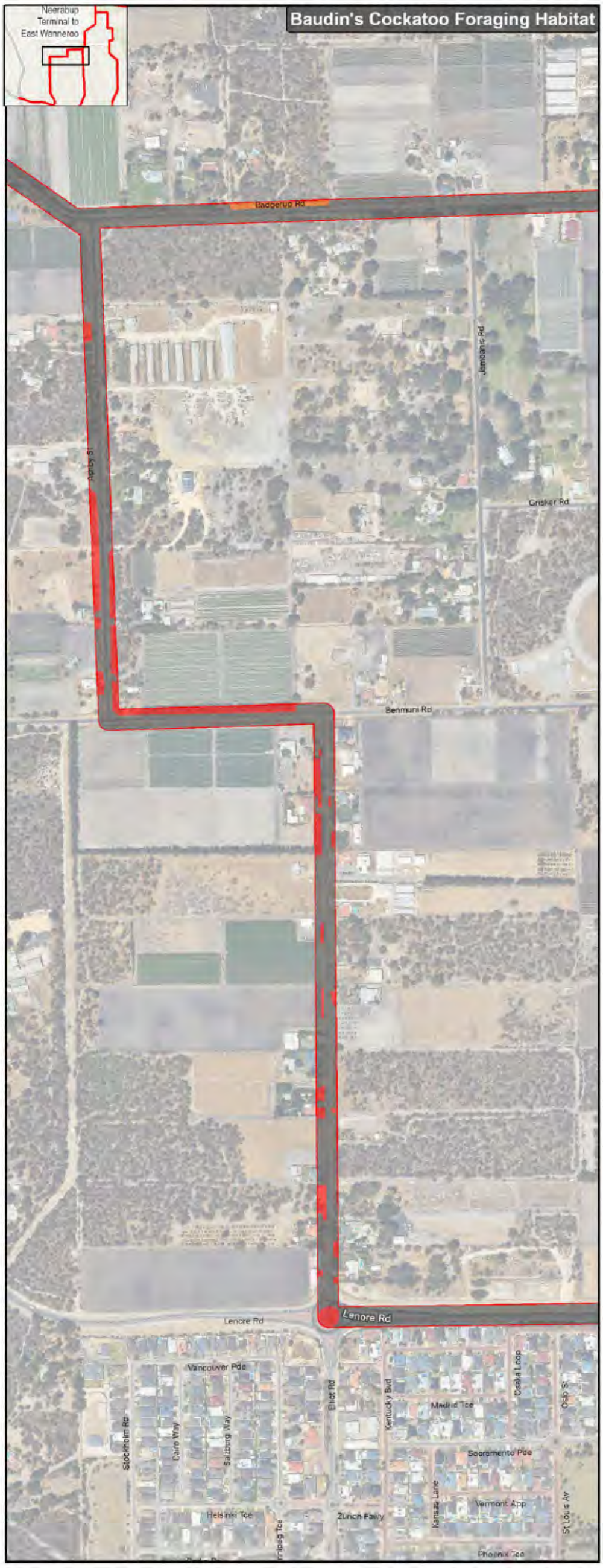

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LEGEND

Survey Area

Baudin's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
- None
- Negligible
- Low

Carnaby's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
- None
- Negligible
- Moderate to High

Black Cockatoo Foraging (*Zanda* sp.)

Neerabup Terminal to East Wanneroo

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **10.19**

A4 size

Project: \\naaecomnet.com\ifs\APAC\Perth-AUPER1\Legacy\Projects\607x\60713462_NREP_Ecology_2023\900_CAD_GIS\020_GIS_NREP\02_MXD_APRX\60713462_NREP_Ecology_2023_Figures_SouthSC.aprx (robmcgregor)
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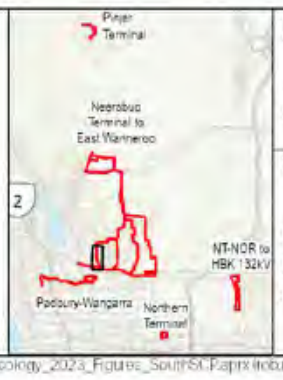
GDA2020 MGA ZONE 50

LEGEND

Survey Area

Baudin's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
- None
- Negligible
- Low

Carnaby's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
- None
- Negligible
- Moderate to High



Black Cockatoo Foraging (*Zanda* sp.)

Neerabup Terminal to East Wanneroo

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **10.20**

A4 size

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0 50 100 150 200
metres

GDA2020 MGA ZONE 50

LEGEND
- Survey Area

Baudin's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
- None
- Negligible

Carnaby's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
- None
- Negligible

Black Cockatoo Foraging (*Zanda* sp.)

Neerabup Terminal to East Wanneroo

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **10.21**

A4 size

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0 50 100 150 200
metres

GDA2020 MGA ZONE 50

LEGEND

Survey Area

Baudin's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
- None
- Low
- Moderate

Carnaby's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
- None
- Low
- Moderate

Black Cockatoo Foraging (*Zanda* sp.)

NT-NOR to HBK 132kV

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **10.22**

A4 size

Project: \\na.aecomnet.com\ffs\APAC\Perth-AUPER1\Legacy\Projects\60713462_NREP_Ecology_20230803_CAD_GIS\020_GIS_NREP\02_MXD_APRX\60713462_NREP_Ecology_2023_Figures_South\SC1\aprx\robmcgregor\
Layout: G60713462_Fig10_NREP_South_FaunaHab_Zanda_sp_A3P_v1 Last exported: 16/05/2024 4:36 PM

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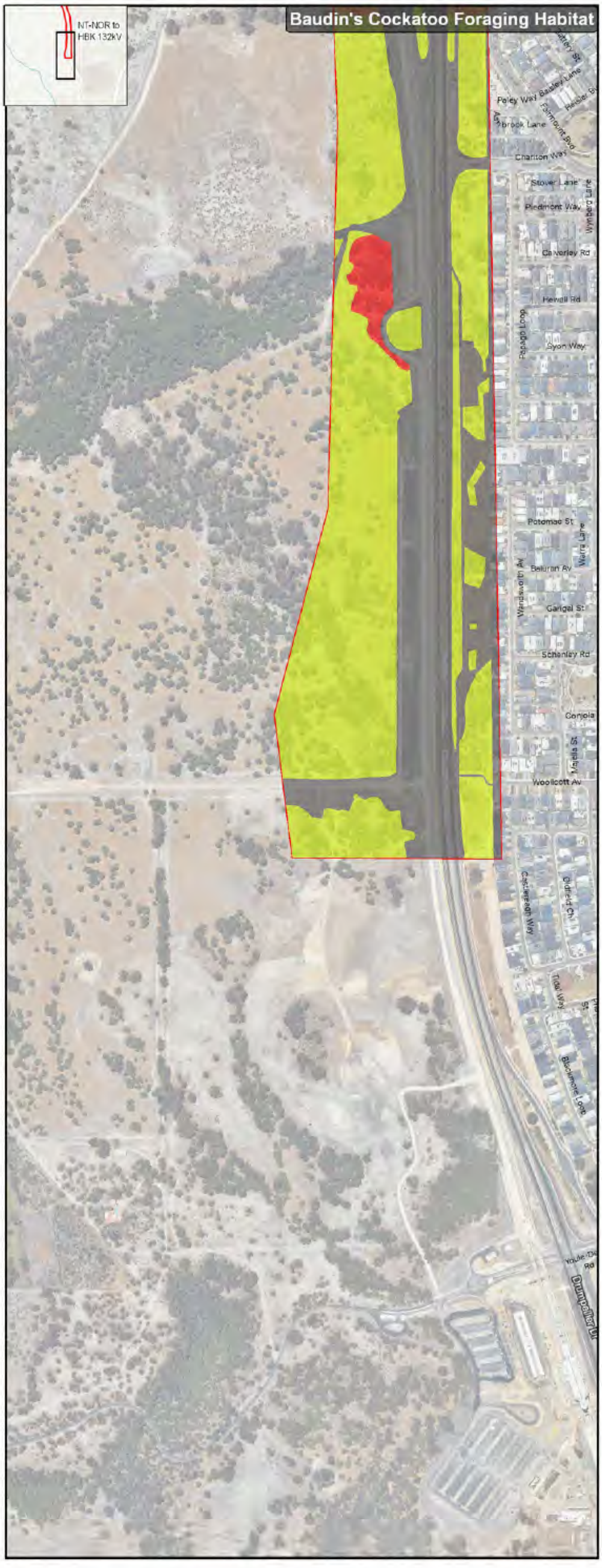

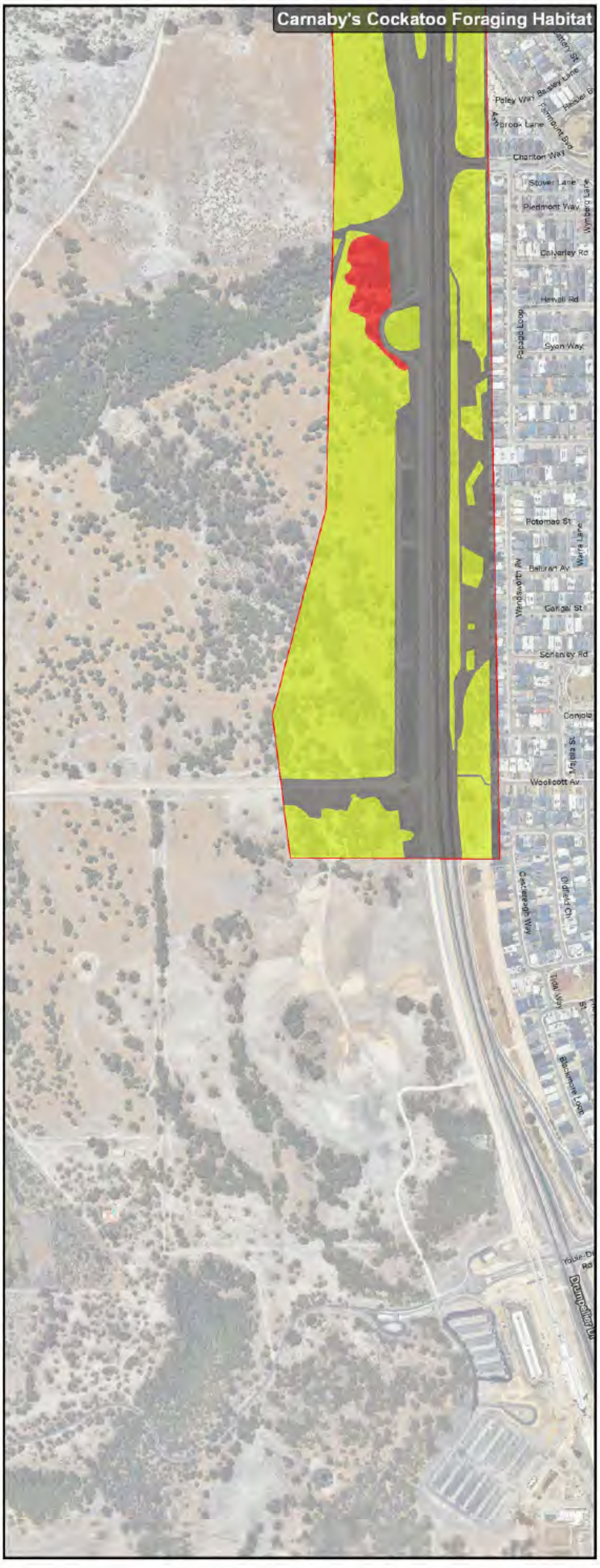

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0 50 100 150 200 metres

GDA2020 MGA ZONE 50

LEGEND

Survey Area

Baudin's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
- None
- Negligible
- Low
- Moderate

Carnaby's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
- None
- Negligible
- Moderate

Black Cockatoo Foraging (*Zanda* sp.)

NT-NOR to HBK 132kV

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **10.23**

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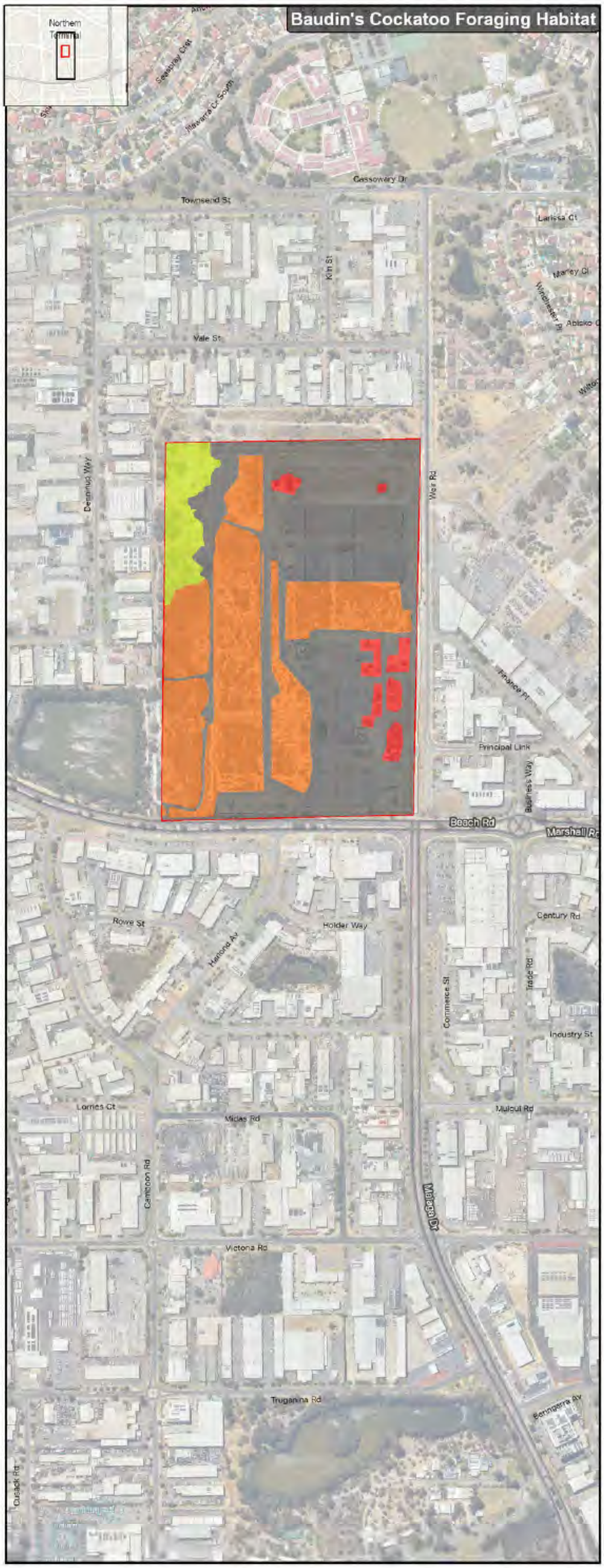

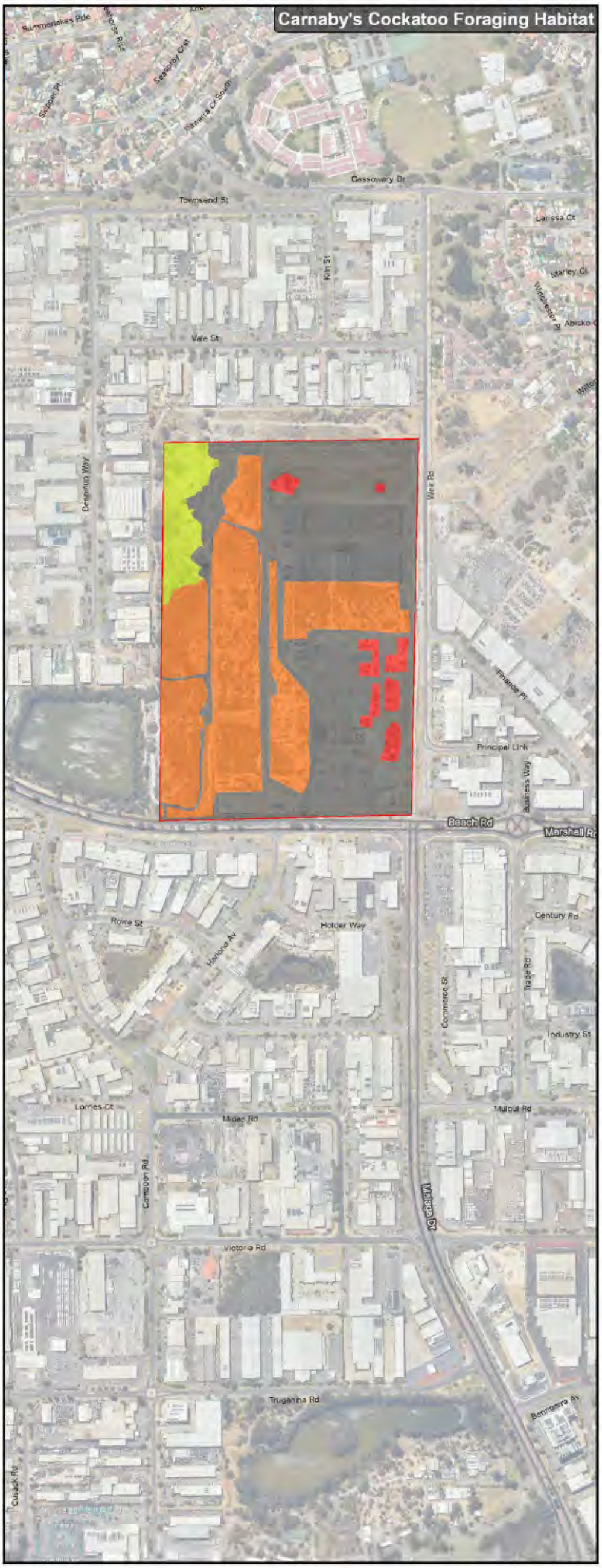

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LEGEND

Survey Area

Baudin's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
- None
- Negligible
- Low
- Moderate

Carnaby's Cockatoo Foraging Habitat Quality (Bamford Consulting Ecologists (BCE), 2020)
- None
- Negligible
- Low
- Moderate

Black Cockatoo Foraging (*Zanda* sp.)

Northern Terminal

WESTERN POWER

CLEAN ENERGY LINK SWAN COASTAL PLAIN FLORA, VEGETATION AND FAUNA ASSESSMENT

Figure **10.24**

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Layout: G60713462_Fig10_NREP_South_FaunaHab_Zanda_sp_A3P_v1, Last exported: 16/05/2024 4:36 PM

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Appendix A

Significant Communities Desktop Assessment

NREP Swan Coastal Plain Flora, Vegetation and Fauna Assessment

D R A F T

Significant Communities Desktop Assessment

TECs/PECs listed under the EPBC Act, BC Act and by DBCA that occur in the vicinity of the survey area

Community Name[1]	Cons. Code[2]		Likelihood				
	EPBC Act	BC Act / DBCA	Neerabup Terminal and NBT Group	Northern Terminal	NT-NOR to HBK 132kV Line	Pinjar Terminal	WGA-MUL PBY 81
Acacia shrublands on taller dunes, southern Swan Coastal Plain ('floristic community type 29b') Community is dominated by Acacia shrublands or mixed heaths on the larger dunes. This community stretches from Seabird to south of Mandurah. No consistent dominant but species such as *Acacia rostellifera, Acacia lasiocarpa*, and *Melaleuca acerosa* were important.		P3	Unlikely to occur. Nearest record 10.6 km	Unlikely, incorrect habitat and distribution. Nearest record 11.6 km	Unlikely to occur. No close records or suitable habitat.	Unlikely to occur. Nearest record 34.0 km	Unlikely, incorrect habitat and distribution. Nearest record 7.4 km
Aquatic Root Mat Community Number 1 of Caves of the Swan Coastal Plain The community occurs in caves at sites that include Yanchep National Park and surrounds. It comprises root mats of *Eucalyptus gomphocephala* (Tuart) supported by groundwater fed streams and pools that occur in the caves. The root mats support a highly diverse and distinctive assemblage of cave fauna including the critically endangered cave shrimp *Hurleya* sp. (WAM C23193; Crystal Cave Crangonyctoid). A key characteristic is a habitat of pools or permanently damp areas in cave habitats in the Yanchep area. Comprises a distinctive suite of cave fauna.	E	CE	Unlikely to occur. Nearest record 11.3 km	Unlikely, incorrect habitat and distribution. Nearest record 30.4 km	Unlikely to occur. No close records or suitable habitat.	Possible to occur. Nearest record 5.6 km	Unlikely, incorrect habitat and distribution. Nearest record 21.2 km.
***Banksia attenuata* woodlands over species rich dense shrublands (floristic community type 20a as originally described in Gibson et al. (1994))**	E	EN	Present	Possible to occur. Nearest record 600 m	Present	Unlikely to occur. Nearest record 12.1 km	Possible, nearest record 2.2km.

NREP Swan Coastal Plain Flora, Vegetation and Fauna Assessment

D R A F T

Community Name[1]	Cons. Code[2]		Likelihood				
	EPBC Act	BC Act / DBCA	Neerabup Terminal and NBT Group	Northern Terminal	NT-NOR to HBK 132kV Line	Pinjar Terminal	WGA-MUL PBY 81
The community has been recorded from sands near Koondoola and Banksia Grove, and at the base of the Darling Scarp largely between Wannamal and Maddington. This community is generally very species rich. It is usually dominated by *Banksia attenuata* (slender Banksia), occasionally with *Eucalyptus marginata* (Jarrah), with *Bossiaea eriocarpa* (Common Brown Pea), *Conostephium pendulum* (Pearl Flower*), Hibbertia huegelii, Hibbertia hypericoides* (Yellow Buttercups), *Petrophile linearis* (Pixie Mops), *Scaevola repens, Stirlingia latifolia* (Blueboy), *Mesomelaena pseudostygia* and *Alexgeorgea nitens* being common in the understorey. The community is also known as "floristic community type 20a" as originally described in Gibson N., Keighery B.J., Keighery G.J., Burbidge A.H. and Lyons M.N. (1994).							
SCP 22 *Banksia ilicifolia* woodlands (a component of the Endangered Banksia Woodlands of the Swan Coastal Plain EPBC listed TEC) Low lying sites generally consisting of *Banksia ilicifolia – B. attenuata* woodlands, but *Melaleuca preissiana* woodlands and scrubs are also recorded. Occurs on Bassendean and Spearwood systems in the central Swan Coastal Plain north of Rockingham. Typically, has very open understorey, and sites are likely to be seasonally waterlogged.	E	P3	Possible, nearest record 0.5 km	Possible, nearest record 2.2 km	Possible, nearest record 0.5 km	Possible, nearest record, 1.3 km	Possible, nearest record 5.4 km
Banksia Woodlands of the Swan Coastal Plain ecological community Canopy is most commonly dominated or co-dominated by *Banksia attenuata* and/or *B. menziesii*. Other Banksia species that can dominate in the	E	P3	Present	Present	Present	Present	Present

NREP Swan Coastal Plain Flora, Vegetation and Fauna Assessment

D R A F T

Community Name[1]	Cons. Code[2]		Likelihood				
	EPBC Act	BC Act / DBCA	Neerabup Terminal and NBT Group	Northern Terminal	NT-NOR to HBK 132kV Line	Pinjar Terminal	WGA-MUL PBY 81
community are *B. prionotes* or *B. ilicifolia*. It typically occurs on well drained, low nutrient soils on sandplain landforms, particularly deep Bassendean, and Spearwood sands and occasionally on Quindalup sands; it is also common on sandy colluvium and aeolian sands of the Ridge Hill Shelf, Whicher Scarp and Dandaragan Plateau and can occur in other less common scenarios.							
***Callitris preissii* (or *Melaleuca lanceolata*) forests and woodlands, Swan Coastal Plain (floristic community type 30 a as originally described in Gibson et al. (1994))** The community is located on calcareous sandy soils of the Quindalup Dunes generally occurring between Craigie and Point Peron, and on the Swan River in Peppermint Grove. The community also occurs on Garden Island and Rottnest Island. Typical and common native taxa in the community are: *Callitris preissii* (Rottnest Island pine), *Melaleuca lanceolata* (Rottnest Teatree), *Spyridium globulosum* (Basket Bush), *Acanthocarpus preissii, Rhagodia baccata* (Berry Saltbush), *Austrostipa flavescens* and *Trachymene pilosa* (Native Parsnip). The community is also known as 'floristic community type 30a' as originally described in Gibson N., Keighery B.J., Keighery G.J., Burbidge A.H. and Lyons M.N. (1994).		VU	Possible, nearest record 3.0 km	Unlikely, incorrect distribution. Nearest record 12.0 km	Unlikely, no close record, incorrect habitat.	Unlikely, incorrect habitat and distribution. Nearest record 24.7 km	Present
Central Northern Darling Scarp Granite Shrubland Community Shrublands and heath on deeper loams and red earths on fragmented granite/quartzite. Heath species typically consist of the taller shrubs *Xanthorrhoea acanthostachya* and *Allocasuarina*		P4	Unlikely to occur. Nearest record 16.2 km	Unlikely, incorrect distribution. Nearest record 15.0 km	Unlikely to occur. No close record, no suitable habitat.		Unlikely, incorrect habitat and distribution. Nearest record 21.5 km

NREP Swan Coastal Plain Flora, Vegetation and Fauna Assessment

D R A F T

Community Name[1]	Cons. Code[2]		Likelihood				
	EPBC Act	BC Act / DBCA	Neerabup Terminal and NBT Group	Northern Terminal	NT-NOR to HBK 132kV Line	Pinjar Terminal	WGA-MUL PBY 81
humilis over smaller proteaceous and myrtaceous shrubs, namely *Melaleuca* aff. *scabra, Baeckea camphorosmae* and to a lesser extent, the proteaceous *shrubs Dryandra armata, Hakea incrassata* and *Hakea undulata*. Located in central region of the Northern Darling Scarp near Perth.							
Coastal shrublands on shallow sands, southern Swan Coastal Plain ('floristic community type 29a') Mostly heaths on shallow sands over limestone close to the coast. No single dominant but important species include *Spyridium globulosum*, *Rhagodia baccata*, and *Olearia axillaris.*		P3	Possible, nearest record 3.9 km.	Unlikely, incorrect distribution. Nearest record 11.1 km	Possible, close record, potential habitat.	Unlikely incorrect distribution. Nearest record 20.0 km.	Possible, nearest record 265 m.
Communities of Tumulus Springs (Organic Mound Springs, Swan Coastal Plain) The community occurs in Tumulus Springs (Organic Mound Springs) on the Swan Coastal Plain. The habitat of the mound springs is characterised by continuous discharge of groundwater in raised areas of peat. The peat and surrounds provide a stable, permanently moist series of microhabitats, with a high level of heterogeneity of invertebrate fauna assemblages between sites. Groups commonly represented include Ostracoda, Nematoda, Cladocera, Copepoda, Oligochaeta, Tardigrada, Turbellaria and Insecta. Typical and common native vascular plant species associated with the Tumulus Springs are the trees *Banksia littoralis* (Swamp Banksia), *Melaleuca preissiana* (Moonah) and *Eucalyptus rudis* (Flooded Gum), and the shrubs *Taxandria linearifolia* (Swamp Peppermint), *Pteridium*	E	CE	Possible, nearest record 5.4 km	Possible, nearest record 3.5 km	Unlikely, no suitable habitat.	Unlikely, incorrect habitat and distribution. Nearest record 25.0 km	Unlikely, incorrect habitat and distribution. Nearest record 9.9 km

NREP Swan Coastal Plain Flora, Vegetation and Fauna Assessment

D R A F T

Community Name[1]	Cons. Code[2]		Likelihood				
	EPBC Act	BC Act / DBCA	Neerabup Terminal and NBT Group	Northern Terminal	NT-NOR to HBK 132kV Line	Pinjar Terminal	WGA-MUL PBY 81
esculentum (Bracken), *Astartea scoparia* (Common Astartea) and *Cyclosorus interruptus* (Swamp Shield-fern).							
***Corymbia calophylla - Kingia australis* woodlands on heavy soils, Swan Coastal Plain (floristic community type 3a as originally described in Gibson et al. (1994))** The community has been recorded from heavy soils of the eastern side of the southern Swan Coastal Plain largely between Capel and Chittering. Typical native taxa in the community are: the tree *Corymbia calophylla* (Marri); the shrubs *Banksia dallanneyi* (Couch Honeypot), *Philotheca spicata* (Pepper and Salt), *Kingia australis* (Kingia) and *Xanthorrhoea preissii* (Balga); and the herbs, rushes and sedges *Cyathochaeta avenacea, Dampiera linearis* (Common Dampiera), *Haemodorum laxum, Desmocladus fasciculatus, Mesomelaena tetragona* (Semaphore Sedge) and *Morelotia octandra*. The community is also known as "floristic community type 3a" as originally described in Gibson N., Keighery B.J., Keighery G.J., Burbidge A.H. and Lyons M.N. (1994).	E	CE	Unlikely to occur. Nearest record 16.9 km	Unlikely, incorrect distribution. Nearest record 14.2 km	Unlikely to occur.	Unlikely, incorrect habitat and distribution. Nearest record 38.8 km	Unlikely, incorrect habitat and distribution. Nearest record 21.8 km
***Corymbia calophylla - Xanthorrhoea preissii* woodlands and shrublands, Swan Coastal Plain (floristic community type 3c as originally described in in Gibson et al. (1994))** The community occurs on heavy soils of the eastern side of the southern Swan Coastal Plain, generally between Bullsbrook and Stratham. The community is usually dominated *by Corymbia calophylla* (Marri) and *Xanthorrhoea preissii* (Balga). It also occasionally	E	CE	Unlikely to occur. Nearest record 14.1 km	Unlikely, incorrect distribution. Nearest record 10.3 km	Unlikely to occur.	Unlikely, incorrect habitat and distribution. Nearest record 28.4 km	Unlikely, incorrect habitat and distribution. Nearest record 18.6 km

NREP Swan Coastal Plain Flora, Vegetation and Fauna Assessment

D R A F T

Community Name[1]	Cons. Code[2]		Likelihood				
	EPBC Act	BC Act / DBCA	Neerabup Terminal and NBT Group	Northern Terminal	NT-NOR to HBK 132kV Line	Pinjar Terminal	WGA-MUL PBY 81
includes *Eucalyptus wandoo* (Wandoo). The more common shrubs include *Gompholobium marginatum*, *Hypocalymma angustifolium* (White Myrtle) and *Banksia dallanneyi* (Couch Honeypot), with herbs, grasses and sedges including *Burchardia congesta, Cyathochaeta avenacea, Neurachne alopecuroidea* (Foxtail mulga grass), Caesia micrantha (Pale Grass-lily), *Mesomelaena tetragona* (Semaphore Sedge), *Morelotia octandra, Desmocladus flexuosus, Opercularia vaginata* (Dog Weed), *Sowerbaea laxiflora* (Purple Tassels), *Lepidosperma* spp. and *Drosera menziesii* (Pink Rainbow) also common.							
Herb rich shrublands in clay pans (floristic community type 8 as originally described in Gibson et al. (1994)) The community has been recorded between Bullsbrook and Ludlow and occurs in low lying flats with a clay impeding layer that facilitates seasonal inundation. The vegetation can be dominated by *Viminaria juncea* (Swishbush), *Melaleuca viminea* (Mohan), *Melaleuca lateritia* (Robin Redbreast Bush) or *Melaleuca osullivanii* but also occasionally by *Eucalyptus wandoo* (Wandoo). Commonly occurring species include *Hypocalymma angustifolium* (White Myrtle), *Acacia lasiocarpa* var. *bracteolata* (Long Peduncle Form) and *Verticordia huegelii* (Variegated Featherflower), and aquatic annuals.	CE	VU	Unlikely to occur. Nearest record 13.4 km	Unlikely, incorrect distribution. Nearest record 15.8 km	Unlikely to occur. No suitable habitat.	Unlikely, incorrect habitat and distribution. Nearest record 28.2 km	Unlikely, incorrect habitat and distribution. Nearest record 19.1 km
Low lying *Banksia attenuata* woodlands or shrublands (‘**floristic community type 21c**’)	E	P3	Possible, nearest record 0.7 km	Possible, nearest record 2.0 km	Likely, close record.	Possible, nearest record 1.1 km	Possible, nearest record 5.4 km

NREP Swan Coastal Plain Flora, Vegetation and Fauna Assessment

D R A F T

Community Name[1]	Cons. Code[2]		Likelihood				
	EPBC Act	BC Act / DBCA	Neerabup Terminal and NBT Group	Northern Terminal	NT-NOR to HBK 132kV Line	Pinjar Terminal	WGA-MUL PBY 81
(a component of the Endangered Banksia Woodlands of the Swan Coastal Plain EPBC listed TEC) This type occurs sporadically between Gingin and Bunbury, and is largely restricted to the Bassendean system. The type tends to occupy lower lying wetter sites and is variously dominated by Melaleuca preissiana, Banksia attenuata, B. menziesii, Regelia ciliata, Eucalyptus marginata or Corymbia calophylla. Structurally, this community type may be either a woodland or occasionally shrubland.							
***Melaleuca huegelii - Melaleuca systena* shrublands on limestone ridges (floristic community type 26a as originally described in Gibson et al. (1994))** The community is found on skeletal soils on limestone ridge slopes and ridge tops between Yanchep north of Perth, and south of Perth near Lake Clifton. The community commonly comprises species-rich thickets, heaths and scrubs dominated by *Melaleuca huegelii* (Chenille Honeymyrtle), *Melaleuca systena* (Coastal Honeymyrtle) and *Banksia sessilis* (Parrot Bush), commonly over *Grevillea preissii* (Spider Net Grevillea), *Spyridium globulosum* (Basket Bush), and *Acacia lasiocarpa* (Pajang). A suite of herbs commonly occurs under the shrub layer.	E	EN	Possible, nearest record 3.7 km	Unlikely, incorrect distribution. Nearest record 22.4 km	Possible, records in close proximity.	Unlikely, incorrect distribution. Nearest record 6.7 km.	Unlikely, incorrect habitat and distribution. Nearest record 13.9 km
Northern Spearwood shrublands and woodlands Northern Spearwood shrublands and woodlands. Other communities identified on limestone by Gibson et al. (1994) are 'species poor mallees and shrublands on limestone (floristic community type 27), FCT24 northern Spearwood shrublands and woodlands, and Southern Eucalyptus gomphocephala – Agonis flexuosa woodlands (floristic community type		P3	Possible to occur, nearest record 3.8 km	Unlikely, incorrect distribution. Nearest record 11.3 km	Possible to occur, close records, may be suitable habitat.	Unlikely, incorrect distribution. Nearest record 6.5 km	Possible, nearest record 800 m

D R A F T

Community Name[1]	Cons. Code[2]		Likelihood				
	EPBC Act	BC Act / DBCA	Neerabup Terminal and NBT Group	Northern Terminal	NT-NOR to HBK 132kV Line	Pinjar Terminal	WGA-MUL PBY 81
25). Each of these is indicated as floristically distinct through statistical analyses							
Shrublands and woodlands of the eastern side of the Swan Coastal Plain (floristic community type 20c as originally described in in Gibson et al. (1994)) The community occurs mainly on the transitional soils of the Ridge Hill Shelf, on the Swan Coastal Plain adjacent to the Darling Scarp, but also extends marginally onto the alluvial clays deposited on the eastern fringe of the Swan Coastal Plain. It has been recorded between Stratton and Maddington. It generally comprises a shrubland or woodland of *Banksia attenuata* (Slender Banksia) and *Banksia menziesii* (Firewood Banksia), sometimes with *Allocasuarina fraseriana* (Sheoak), over a shrub layer that can include the species *Adenanthos cygnorum* (Common Woollybush), *Hibbertia huegelii*, *Scaevola repens* var. *repens* (Fan Flower), *Allocasuarina humilis* (Dwarf Sheoak), *Bossiaea eriocarpa* (Common Brown Pea), *Hibbertia hypericoides* (Yellow Buttercups) and *Stirlingia latifolia* (Blueboy). A suite of herbs including *Conostylis aurea* (Golden Conostylis), *Trachymene pilosa* (Native Parsnip), *Lomandra hermaphrodita*, *Burchardia congesta* (Milkmaids) and *Patersonia occidentalis* (Purple Flag), and the sedges *Mesomelaena pseudostygia* (Semaphore Sedge) and *Lyginia barbata* usually occur in the community.	E	CE	Unlikely to occur. Nearest record 16.3 km	Unlikely, incorrect habitat and distribution. Nearest record 13.0 km	Unlikely to occur. Unsuitable habitat and no close record.	Unlikely, incorrect habitat and distribution. Nearest record 38.7 km	Unlikely, incorrect habitat and distribution. Nearest record 21.1 km
Shrublands and woodlands on Muchea Limestone of the Swan Coastal Plain The community occurs on the heavy soils of the eastern side of the Swan Coastal Plain and has been recorded between Beermullah and Wokalup. Known patches include wetland and well-drained habitats, in a variety of landforms. It is defined on the basis of	E	EN	Unlikely to occur. Nearest record 8.5 km	Unlikely, incorrect habitat and distribution. Nearest record 11.4 km	Unlikely to occur. Incorrect habitat.	Unlikely, incorrect habitat and distribution. Nearest record 24.9 km	Unlikely, incorrect habitat and distribution. Nearest record 14.3 km

NREP Swan Coastal Plain Flora, Vegetation and Fauna Assessment

D R A F T

Community Name[1]	Cons. Code[2]		Likelihood				
	EPBC Act	BC Act / DBCA	Neerabup Terminal and NBT Group	Northern Terminal	NT-NOR to HBK 132kV Line	Pinjar Terminal	WGA-MUL PBY 81
substrates with a limestone influence. Many of the species are commonly associated with the limestone soils that occur on the coast, and do not generally occur further inland. Typical and common native species in areas of best developed limestone are: the tree *Casuarina obesa* (Swamp Sheoak); the Mallees *Eucalyptus decipiens* (Redheart) and *Eucalyptus foecunda* (Narrow-Leaved Red Mallee); the shrubs *Melaleuca huegelii* (Chenille Honey-Myrtle*), Alyogyne huegelii* (Lilac Hibiscus), *Grevillea curviloba* (threatened), and *Grevillea evanescens* (priority 1), *Melaleuca systena* (Narrow-Leaved Paperbark); and the herb *Thysanotus arenarius* (Fringed Lily). Where the limestone substrate is less well developed and limestone may occur as nodules or chunks, the flora assemblages can be influenced by other characteristics of the substrate, such as clay content, with the presence of calcicoles such as *Thysanotus arenarius, Gahnia trifida* (Coast Saw-Sedge), *Eremophila glabra* (Tar Bush) and *Melaleuca brevifolia* (Mallee Honey-Myrtle), providing evidence of the limestone influence. *Melaleuca huegelii* shrublands, *Eucalyptus decipiens mallee, Casuarina obesa* woodlands and *Melaleuca brevifolia, Melaleuca systena* or *Melaleuca viminea* shrublands have been recorded on Muchea Limestone							
Shrublands on calcareous silts of the Swan Coastal Plain (floristic community type 18 as originally described in in Gibson et al. (1994)) The community is recorded from between Yalgorup National Park and Bunbury. It is species-rich, consists of open low shrubs with a rich annual flora and is known from calcareous silt flats. A suckering form of *Acacia saligna* (Orange Wattle), Melaleuca *viminea* (Mohan), *Melaleuca teretifolia* (Banbar), *Hakea varia*		VU	Unlikely to occur. Incorrect habitat and record distant.	Unlikely, incorrect habitat and distribution. Nearest record 15.4 km	Unlikely to occur. Nearest record 10.9 km	Unlikely, incorrect habitat and distribution. Nearest record 24.2 km	Unlikely, incorrect habitat and distribution. Nearest record 16.8 km

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D R A F T

Community Name[1]	Cons. Code[2]		Likelihood				
	EPBC Act	BC Act / DBCA	Neerabup Terminal and NBT Group	Northern Terminal	NT-NOR to HBK 132kV Line	Pinjar Terminal	WGA-MUL PBY 81
(Variable-Leaved Hakea), *Xanthorrhoea preissii* (Balga) and *Leptomeria ellytes* are common in the shrub layer, with sedges including *Lepidosperma longitudinale* (Pithy Sword-Sedge) and *Gahnia trifida* (Coast Saw-Sedge), and a suite of herbs including *Meionectes tenuifolia* (priority 3) are also common. The community is also known as 'floristic community type 18' as originally described in Gibson N., Keighery B.J., Keighery G.J., Burbidge A.H. and Lyons M.N. (1994)							
Shrublands on dry clay flats (floristic community type 10a as originally described in Gibson et al. (1994)) The community occurs on clay flats with thin skeletal soils and has been recorded largely between Wattle Grove and Sabina River. It comprises rapidly drying clay flats. Typical and common shrubs include *Hakea sulcata* (Furrowed Hakea), *Verticordia densiflora* (Compacted Featherflower), *Hakea varia* (Variable-Leaved Hakea), *Pericalymma ellipticum* (Swamp Teatree) and *Viminaria juncea* (Swishbush). *Aphelia cyperoides* (Hairy Aphelia), *Centrolepis aristata* (Pointed Centrolepis), *Drosera gigantea* (Giant Sundew) and *Drosera menziesii* (Pink Rainbow) also commonly occur. The community is also known as "floristic community type 10a" as originally described in Gibson N., Keighery B.J., Keighery G.J., Burbidge A.H. and Lyons M.N. (1994)	CR	EN	Unlikely to occur	Unlikely, incorrect habitat and distribution. Nearest record 25.0 km	Unlikely to occur	Unlikely, incorrect habitat and distribution. Nearest record 6.7 km	Unlikely, incorrect habitat and distribution. Nearest record 17.7 km
Southern *Eucalyptus gomphocephala-Agonis flexuosa* woodlands - Floristic community type 25 (can be a component of the Endangered Banksia Woodlands of the Swan Coastal Plain EPBC listed TEC, or the Tuart woodlands and forests of the Swan Coastal Plain EPBC listed TEC)		P3	Possible, nearest record 4.9 km	Unlikely, incorrect habitat and distribution. Nearest record 15.5 km	Unlikely to occur.	Unlikely, incorrect habitat and distribution. Nearest record 18.8 km	Possible, nearest record 5.4 km.

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D R A F T

Community Name[1]	Cons. Code[2]		Likelihood				
	EPBC Act	BC Act / DBCA	Neerabup Terminal and NBT Group	Northern Terminal	NT-NOR to HBK 132kV Line	Pinjar Terminal	WGA-MUL PBY 81
Woodlands of *Eucalyptus gomphocephala - Agonis flexuosa* south of Woodman Point. Recorded from the Karrakatta, Cottesloe and Vasse units. Dominants other than Tuart were occasionally recorded, including *Corymbia calophylla* at Paganoni block and Eucalyptus decipiens at Kemerton. Banksias found in this community include *Banksia attenuata*, *B. grandis* and *B. littoralis*. Tuart formed the overstorey nearby however.							
Southern wet shrublands, Swan Coastal Plain (floristic community type 2 as originally described in Gibson et al. (1994)) The community typically comprises shrublands or open woodlands. It occurs on seasonally inundated sandy clay soils that are restricted to small remnants on the eastern side of the Swan Coastal Plain. It has been recorded from Forrestfield to Chapman Hill. The community has moderate species richness with the occurrence of species reflecting the wetter nature of the sites. Typical and common native taxa in the community are the shrubs *Kingia australis* (Kingia*), Pericalymma ellipticum* (Swamp Teatree), *Hakea ceratophylla* (Horned Leaf Hakea), *Calothamnus lateralis, Hypocalymma angustifolium* (White Myrtle), *Eutaxia virgata, Stirlingia latifolia* (Blueboy), *Banksia dallanneyi* (Couch Honeypot) and herbs, rushes and sedges including *Dampiera linearis* (Common Dampiera), *Comesperma virgatum* (Milkwort), *Stylidium brunonianum* (Pink Fountain Triggerplant), *Thysanotus multiflorus* (Many-Flowered Fringe Lily) and *Mesomelaena tetragona* (Semaphore Sedge). The community also contains priority flora including *Isopogon formosus* subsp. *dasylepis* (priority 3) and *Grevillea brachystylis* subsp. *brachystylis* (priority 3).		EN	Possible, nearest record 6.6 km	Possible, nearest record 1.7 km.	Unlikely to occur, incorrect habitat.	Unlikely, incorrect habitat and distribution. Nearest record 32.4 km	Unlikely, incorrect habitat and distribution. Nearest record 10.1 km

NREP Swan Coastal Plain Flora, Vegetation and Fauna Assessment

D R A F T

Community Name[1]	Cons. Code[2]		Likelihood				
	EPBC Act	BC Act / DBCA	Neerabup Terminal and NBT Group	Northern Terminal	NT-NOR to HBK 132kV Line	Pinjar Terminal	WGA-MUL PBY 81
Subtropical and Temperate Coastal Saltmarsh (synonymous with the Subtropical and Temperate Coastal Saltmarsh EPBC-listed TEC). Consists of the assemblage of plants, animals and micro-organisms associated` with saltmarsh in coastal regions of sub-tropical and temperate Australia (south of 23°S latitude). It occurs on the coastal margin, along estuaries and coastal embayments and on low wave energy coast in places with at least some tidal connection, including rarely inundated supratidal areas, intermittently opened or closed lagoons, and groundwater tidal influences. The community occurs on sandy or muddy substrate and may include coastal clay pans and similar habitats. It consists of dense to patchy areas of characteristic coastal saltmarsh plant species that include salt- tolerant herbs, succulent shrubs or grasses, and may also include bare sediment as part of the mosaic. It can occur where the proportional cover by tree canopy such as mangroves, Melaleucas or Casuarinas or seagrass is not greater than 50%. The description, area and condition thresholds that apply to the EPBC-listed TEC of the same name, also apply to this Priority ecological community.	V	P3	Unlikely to occur. Nearest record 14.1 km	Unlikely, incorrect distribution. Nearest record 7.8 km	Unlikely to occur.	Unlikely, incorrect distribution. Nearest record 39.9 km	Unlikely, incorrect distribution. Nearest record 16.2 km
Swan Coastal Plain *Banksia attenuata - Banksia menziesii* woodlands (floristic type 23 b) (a component of the Endangered Banksia Woodlands of the Swan Coastal Plain EPBC listed TEC) These woodlands occur in the Bassendean system, from Melaleuca Park to Gingin. Occurs	E	P3	Possible to occur, nearest record 750 m	Possible, nearest record 1.8 km.	Known to occur.	Possible, nearest record 2.6 km	Unlikely, nearest record 6.2 km

NREP Swan Coastal Plain Flora, Vegetation and Fauna Assessment

D R A F T

Community Name[1]	Cons. Code[2]		Likelihood				
	EPBC Act	BC Act / DBCA	Neerabup Terminal and NBT Group	Northern Terminal	NT-NOR to HBK 132kV Line	Pinjar Terminal	WGA-MUL PBY 81
in reasonably extensive Banksia woodlands north of Perth.							
Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain The Tuart (*Eucalyptus gomphocephala)* Woodlands and Forests of the Swan Coastal Plain are a nationally significant ecological community. The ecological community was listed as critically endangered on 4 July 2019 under national environmental law (the Environment Protection and Biodiversity Conservation Act 1999 or EPBC Act). This nationally protected ecological community is comprised of woodlands or forests within which the presence of Tuart (*Eucalyptus gomphocephala*) trees in the uppermost canopy are the primary defining feature. The community also often contains other native trees such as Peppermint, Bull Banksia, Candlestick Banksia or Jarrah, with a substantial diversity of understorey plants. Primarily occurs on the Swan Coastal Plain in Western Australia between Jurien in the north and Busselton in the South, including some remnants in the Perth metropolitan area. The ecological community is mainly found on the calcareous soils of the Spearwood and Quindalup sand dune systems on the western part of the plain.	CE	P3	Present	Possible, nearest record 5.3 km.	Unlikely to occur.	Possible, nearest record 3.7 km	Present

1. Community descriptions derived from DBCA (2023a; 2023b) unless otherwise stated
2. EPBC: E Endangered, CE Critically Endangered; BC: VU Vulnerable, CR Critically Endangered

Appendix B

Flora Desktop Assessment

Northern Terminal Flora Desktop Assessment

Taxon	Habitat[1]	Cons. Code EPBC	Cons. Code WA	Distance WAHERB (Km)	Distance TPFL (Km)	Date WAHERB	Date TPFL	PMST	Likelihood Assessment					Total Score	Likelihood	Post-survey likelihood	Comments
									Recorded in the survey area	Known occurrence nearby (5km)	Recent Record (Last 20 years)	Known occurrence within the LGA	Potential presence of suitable habitat within the Survey Area (0,1,2)				
Acacia benthamii	Typically on limestone breakaways.		P2	6.09	16.79	2013	2000		0	0	1	1	0	2	Negligible	Negligible	No suitable habitat present. No records in the vicinity.
Acacia oncinophylla subsp. *oncinophylla*	Granitic soils.		P3	12.88		1980			0	0	0	1	0	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Adenanthos cygnorum subsp. *chamaephyton*	Grey sand, lateritic gravel.		P3	32.49	32.49	1981	1981		0	0	0	0	1	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Anigozanthos humilis subsp. *chrysanthus*	Grey or yellow sand, clay, gravel, laterite		P4	3.28		2014			0	1	1	1	1	4	Moderate	Low	No habitat identified during survey.
Austrostipa mundula	In sand over limestone.		P3	15.63		1900			0	0	0	0	1	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Baeckea sp. Limestone (N. Gibson & M.N. Lyons 1425)	Grey sand, yellow sand with limestone outcropping, hills.		P1	12.09	12.22	2021	2021		0	0	1	0	0	1	Negligible	Negligible	No suitable habitat present. No records in the vicinity.
Bolboschoenus fluviatilis	Littoral zone, floodplain. Wet grey sand, silt, mud.		P1	5.53		2008			0	0	1	0	2	3	Moderate	Low	No habitat or individuals identified during survey.
Byblis gigantea	Sandy-peat swamps. Seasonally wet areas.		P3	9.34		1901			0	0	0	1	2	3	Moderate	Low	No habitat identified during survey.
Caladenia huegelii	Grey or brown sand, clay loam.	CE	CR	3.81	2.18	2000	2017	Known	0	1	1	1	2	5	High	Low	No habitat identified during survey. No individuals identified.
Calandrinia sp. Bayswater (C. Andrews s.n. 11/1902)	No information available		P1	5.43		1900			0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Calectasia elegans	between Pinjar and Bullsbrook on deep, grey, quartz sand in habitats that have experienced infrequent fires. Recorded growing in *Banksia menziesii* and *B. attenuata* woodland (Barrett, R and Barret, M, 2015).		P1	13.28	13.93	2008	2021		0	0	1	1	2	4	Moderate	Low	No habitat identified during survey.
Carex tereticaulis	Black peaty sand.		P3	7.59	7.67	1999	1999		0	0	0	1	2	3	Moderate	Low	No habitat identified during survey.
isopogon autumnalis	Sandy soils, often in Banksia woodlands		P3	6.24		1991			0	0	0	1	1	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Cyanicula ixioides subsp. *ixioides*	Laterite, gravel.		P4	14.84		1900			0	0	0	1	0	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Cyathochaeta teretifolia	Seasonally wet drainage lines and margins of permanent water sources, flat ground. Grey sand with clay, poor drainage (WA Herbarium 2023).		P3	3.71	2.85	2008	2002		0	1	1	1	2	5	High	Low	No habitat identified during survey. No individuals identified.
Dampiera triloba	Loamy sand.		P3	6.24		2009			0	0	1	0	2	3	Moderate	Low	No habitat identified during survey.
Darwinia pimelioides	Loam, sandy loam. Granite outcrops.		P4	9.44		1987			0	0	0	1	2	3	Moderate	Low	No habitat identified during survey.
Diuris drummondii	Low-lying depressions, swamps.	V	VU	8.52		1900		Likely	0	0	0	1	2	3	Moderate	Low	No habitat identified during survey.
Drosera patens	Sandy soils. Margins of winter-wet depressions, swamps and lakes.		P1	2.15		2020			0	1	1	0	2	4	High	Low	No habitat identified during survey. No individuals identified.
Drosera x sidjamesii	Peaty sand. Along lake margins, close to winter high-water line.		P1	2.15		2020			0	1	1	0	2	4	High	Low	No habitat identified during survey. No individuals identified.
Eleocharis keigheryi	Clay, sandy loam. Emergent in freshwater: creeks, claypans.	V	VU	16.05	17.21	2007	2007	Known	0	0	1	1	1	3	Low	Negligible	No suitable habitat present. No records in the vicinity.
Eryngium pinnatifidum subsp. *Palustre* (G.J. Keighery 13459)	In a winter wet claypan, water to 20 cm deep. Grey-brown clay		P3	12.83		1995			0	0	0	1	1	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Eucalyptus argutifolia	Shallow soils over limestone. Slopes or gullies of limestone ridges, outcrops.	V	VU	22.23	24.52	2006	2018	May	0	0	1	0	0	1	Negligible	Negligible	No suitable habitat present. No records in the vicinity.
Eucalyptus foecunda subsp. *foecunda*	Limestone/ limestone outcrops in heath and sandy soils in coastal areas. Sometimes on fixed dunes and slopes of hills (DCCEEW, 2023).		P4	12.69		2010			0	0	1	0	0	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Grevillea curviloba	Grey sand, sandy loam. Winter-wet heath.	E	EN	12.97		2019			0	0	1	1	2	4	Moderate	Low	No habitat identified during survey.
Grevillea sp. Ocean Reef (D. Pike Joon 4)	Broard sand dune, grey-brown dry sand. Limestone boulders (WA Herbarium, 2023).		P1	18.05		2013			0	0	1	0	0	1	Negligible	Negligible	No suitable habitat present. No records in the vicinity.
Haemodorum loratum	Grey or yellow sand, gravel.		P3	14.95	15.14	1981	1981		0	0	0	1	2	3	Moderate	Low	No habitat identified during survey.
Hydrocotyle lemnoides	Swamps		P4	9.34	15.75	1906	1990		0	0	0	1	1	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Hydrocotyle striata	Winter wet creekline, springs. Light leaf litter on dark brown sandy humic loam, clay (WA Herbarium, 2023).		P1	4.18		2016			0	1	1	1	1	4	Moderate	Low	No habitat identified during survey.

Taxon	Habitat[1]	Cons. Code EPBC	Cons. Code WA	Distance WAHERB (Km)	Distance TPFL (Km)	Date WAHERB	Date TPFL	PMST	Likelihood Assessment					Total Score	Likelihood	Post-survey likelihood	Comments
									Recorded in the survey area	Known occurrence nearby (5km)	Recent Record (Last 20 years)	Known occurrence within the LGA	Potential presence of suitable habitat within the Survey Area (0,1,2)				
Hypolaena robusta	Dune crest. White sand, sandplains (WA Herbarium, 2023).		P4	11.67		1999			0	0	0	1	1	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Isopogon autumnalis	Sandy soils, often in Banksia woodlands		P3	6.24		1991			0	0	0	1	2	3	Moderate	Low	No habitat identified during survey.
Jacksonia sericea	Calcareous and sandy soils		P4	0.70	6.80	2020	1990		0	1	1	1	2	5	High	Low	No habitat identified during survey. No individuals identified.
Lasiopetalum glutinosum subsp. *glutinosum*	Open woodland dominated by *Eucalyptus marginata, Corymbia calophylla, Banksia menziesii* and *B. attenuata* and in open, low scrub over heath, on steep slopes of lateritic gravel, clay or sandy loam near granite outcrops and creeklines (Shepherd and Wilkins, 2015).		P3	10.55		1900			0	0	0	1	1	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Leucopogon maritimus	Occurs in deep, calcareous sands, on the mid to upper slopes of dunes or in shallow sand over limestone, but avoiding the thicker vegetation of the swales, grows in low heathland communities		P1	16.49		1966			0	0	0	0	1	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Levenhookia preissii	Grey or black, peaty sand. Swamps.		P1	6.24		1951			0	0	0	1	2	3	Moderate	Low	No habitat identified during survey.
Marianthus paralius	Coastal heath in areas of white sand and brown loam, on coastal limestone cliffs	E	CR	16.02	20.33	2021	2018	Known	0	0	1	0	0	1	Negligible	Negligible	No suitable habitat present. No records in the vicinity.
Meionectes tenuifolia	Granite flats, shallow soils at margins, inundated. Grey clay, reserve and wetland (Mainroads, 2015).		P3	7.59	14.13	2007	1995		0	0	1	1	0	2	Negligible	Negligible	No suitable habitat present. No records in the vicinity.
Melaleuca sp. Wanneroo (G.J. Keighery 16705)	Restricted to limestone ridges within locality of Nowergup. Plants occur on upper slopes of rugged limestone ridges or where a high proportion of limestone outcropping occurs. Soils are shallow grey to mossy black sands, depeding on the amount of limestone 'caprock' (TSSC 2019)	E	EN	24.27	24.27	2019	2019		0	0	1	0	0	1	Negligible	Negligible	No suitable habitat present. No records in the vicinity.
Millotia tenuifolia var. *laevis*	Granite or laterite soils.		P2	4.91		2018			0	1	1	1	0	3	Negligible	Negligible	No suitable habitat present. No records in the vicinity.
Myriophyllum echinatum	Grey-black sandy clay. Winter-wet flats.		P3	9.84		1900			0	0	0	1	2	3	Moderate	Low	No habitat identified during survey.
Netrostylis sp. Chandala (G.J. Keighery 17055)	Dampland with thick leaf litter over dark grey sand.		P2	4.47		2013			0	1	1	1	2	5	High	Low	No habitat identified during survey. No individuals identified.
Persoonia sulcata	Lateritic or granitic soils.		P4	16.11		1980			0	0	0	1	0	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Phlebocarya pilosissima subsp. *pilosissima*	White or grey sand, lateritic gravel.		P3	13.99		1999			0	0	0	1	1	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Pimelea calcicola	Sand. Coastal limestone ridges.		P3	13.30		1990			0	0	0	0	1	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Pithocarpa corymbulosa	Gravelly or sandy loam. Amongst granite outcrops.		P3	26.73		1963			0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Poranthera moorokatta	Very gently inclined plain, white silica sand in open spaces between shurbs, not in shaded areas or in areas of high litter cover (WA Herbarium, 2023)		P2	3.88		2018			0	1	1	1	2	5	High	Low	No habitat identified during survey. No individuals identified.
Sarcozona bicarinata	White sand.		P3	19.60	20.25	1997	1992		0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Schoenus capillifolius	Brown mud. Claypans.		P3	12.49	17.04	2012	1990		0	0	1	1	1	3	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Schoenus griffinianus	White sand.		P4	17.30		1993			0	0	0	1	2	3	Moderate	Low	No habitat identified during survey.
Schoenus natans	Winter-wet depressions.		P4	17.20		2004			0	0	1	1	2	4	Moderate	Low	No habitat identified during survey.
Schoenus sp. Waroona (G.J. Keighery 12235)	Clay or sandy clay. Winter-wet flats.		P3	12.49		1988			0	0	0	1	2	3	Moderate	Low	No habitat identified during survey.
Stachystemon exilis	On grey sand, seasonally damp.		P1	3.88		2018			0	1	1	1	2	5	High	Low	No habitat identified during survey. No individuals identified.
Stenanthemum sublineare	Littered white sand. Coastal plain.		P2	21.17		2005			0	0	1	1	1	3	Low	Negligible	No suitable habitat present. No records in the vicinity.
Stylidium longitubum	Sandy clay, clay, seasonal wetlands		P4	10.55	4.48	2012	2005		0	1	1	1	2	5	High	Low	No habitat identified during survey. No individuals identified.
Stylidium maritimum	Sand over limestone. Dune slopes and flats. Coastal heath and shrubland, open Banksia woodland.		P3	29.20		2009			0	0	1	0	2	3	Moderate	Low	No habitat identified during survey.
Stylidium paludicola	Peaty sand over clay. Winter wet habitats. Marri and Melaleuca woodland, Melaleuca shrubland.		P3	6.24		2006			0	0	1	1	2	4	Moderate	Low	No habitat identified during survey.

Taxon	Habitat[1]	Cons. Code EPBC	Cons. Code WA	Distance WAHERB (Km)	Distance TPFL (Km)	Date WAHERB	Date TPFL	PMST	Likelihood Assessment					Total Score	Likelihood	Post-survey likelihood	Comments
									Recorded in the survey area	Known occurrence nearby (5km)	Recent Record (Last 20 years)	Known occurrence within the LGA	Potential presence of suitable habitat within the Survey Area (0,1,2)				
Stylidium trudgenii	Grey sand, dark grey to black sandy peat. Margins of winter-wet swamps, depressions.		P3	12.21		2000			0	0	0	1	2	3	Moderate	Low	No habitat identified during survey.
Styphelia filifolia	Sandy soils of the coastal plain (with one known occurrence from the northern Darling Scarp), usually in Banksia or Jarrah woodland and in low-lying situations (Hislop & Puente--Lelièvre, 2017).		P3	7.67		2007			0	0	1	1	2	4	Moderate	Low	No habitat identified during survey.
Tetratheca pilifera	Gravelly soils.		P3	6.27		2020			0	0	1	1	0	2	Negligible	Negligible	No suitable habitat present. No records in the vicinity.
Thelymitra variegata	Sandy clay, sand, laterite.		P2	14.07		1900			0	0	0	0	1	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Thysanotus glaucus	White, grey or yellow sand, sandy gravel.		P4	11.73		1990			0	0	0	1	2	3	Moderate	Low	No habitat identified during survey.
Thysanotus sp. Badgingarra (E.A. Griffin 2511)	Grey sand with lateritic gravel.		P2	11.35		1991			0	0	0	1	1	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Tripterococcus sp. Brachylobus (A.S. George 14234)	Grey, black or peaty sand. Winter - wet flats		P4	24.24	24.24	1994	1994		0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Trithuria occidentalis	Known from one population near Ellenbrook (DEWHA, 2008). It grows in partly submerged water on edge of shallow, winter-wet claypan in very open shrubland of *Melaleuca lateritia* and annual herbs (DEWHA, 2008).	E	EN	10.55	17.23	2012	2018	Likely	0	0	1	1	1	3	Low	Negligible	No suitable habitat present. No records in the vicinity.
Verticordia lindleyi subsp. *lindleyi*	Sand, sandy clay. Winter-wet depressions.		P4	3.76		2006			0	1	1	1	2	5	High	Low	No habitat identified during survey. No individuals identified.
Drosera occidentalis	Sandy & clayey soils. Swamps & wet depressions.		P4		1.55		1986		0	1	0	1	2	4	Moderate	Low	No habitat identified during survey.
Grevillea curviloba subsp. *curviloba*	Grey sand. Winter-wet heath.	E			13.73		2019	Known	0	0	1	1	2	4	Moderate	Low	No habitat identified during survey.
Hibbertia helianthemoides	Clayey sand over sandstone or loam over quartzite. Hills and scree slopes.		P4		30.79		2002		0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Hibbertia leptotheca	Limestone ridges. Ranges from Yalgorup to Lancelin		P3		20.27		1990		0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Darwinia foetida	Grey-white sand on swampy, seasonally wet sites. Found alongside water pit/well (sump land). Recorded at three locations near town of Muchea.	E	CE					Known	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Synaphea sp. Fairbridge Farm (D.Papenfus 696)	Grey, clayey sand with lateritic pebbles. In low woodland, near winter-wet flats with weedy grasses (DCCEEW, 2023).	CE	CR					Known	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Grevillea thelemanniana	Sand, sandy clay. Winter-wet low-lying flats.	CE	CR					Known	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Ptilotus pyramidatus	Seasonally inundated flat (floodplain). Pale grey, muddy-sand to sandy-mud alluvium (DCCEEW, 2023)	CE	CR					Known	0	0	0	0	1	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Synaphea sp. Pinjarra Plain (A.S.George 17182)	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.	E	EN					May	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Drakaea elastica	White or grey sand. Low-lying situations adjoining winter-wet swamps.	E	CR					Likely	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Diuris purdiei	Grey-black sand, moist. Winter-wet swamps.		P4					Known	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Calytrix breviseta subsp. *breviseta*	Sandy clay. Swampy flats.	CE	CR					Known	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Thelymitra stellata	Red, brown, yellow, or grey sandy loams, clay or gravel over laterite or gravel.	E	EN					Known	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Grevillea curviloba subsp. *incurva*	Sand, sandy loam. Winter-wet heath.	E						Known	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Darwinia apiculata	Lateritic soils.	E	EN					Known	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Lepidosperma rostratum	Peaty sand, clay.	E	EN					Known	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Grevillea christineae	Clay loam, sandy clay, often moist.	E	EN					Known	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.

Taxon	Habitat[1]	Cons. Code EPBC	Cons. Code WA	Distance WAHERB (Km)	Distance TPFL (Km)	Date WAHERB	Date TPFL	PMST	Likelihood Assessment					Total Score	Likelihood	Post-survey likelihood	Comments
									Recorded in the survey area	Known occurrence nearby (5km)	Recent Record (Last 20 years)	Known occurrence within the LGA	Potential presence of suitable habitat within the Survey Area (0,1,2)				
Eremophila glabra subsp. *chlorella*	Sandy clay. Winter-wet depressions.	E	EN					Known	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Eucalyptus x balanites	Sandy soils with lateritic gravel.	E	CR					May	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Banksia mimica	White or grey sand over laterite, sandy loam.	V	VU					Known	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Andersonia gracilis	This species is known from the Badgingarra, Dandaragan and Kenwick areas where it is found on seasonally damp, black sandy clay flats near or on the margins of swamps, often on duplex soils supporting low open heath vegetation with species such as *Calothamnus hirsutus, Verticordia densiflora* and *Kunzea recurva* over sedges (DEC, 2006).	E	EN					Known	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Diplolaena andrewsii	Loam, clay. Granite outcrops & hillsides.	E	EN					Known	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Thelymitra dedmaniarum	Granite	E	EN					Likely	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Macarthuria keigheryi	White or grey sand.	E	EN					Known	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Austrostipa bronweniae	Flat low-lying calcareous winter wet habitat type on the extensively cleared Swan Coastal Plain (TSSC, 2018).	E	EN					Known	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Chamelaucium lullfitzii	White/yellow sand supporting open low woodland with *Eucalyptus todtiana* (Pricklybark), *Banksia attenuata* (Coast Banksia), and *Hibbertia* sp. (DCCEEW, 2023).	E	VU					May	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Caleana dixonii	Deep sand in open areas beneath dense tall shrubland with scattered emergent banksias, or in shallow sand over laterite in heathland (DCCEEW, 2023).	E	VU					May	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Anigozanthos viridis subsp. *terraspectans*	Grey sand, clay loam. Winter-wet depressions.	V	VU					Likely	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Acacia anomala	Grows over laterite in shallow sand, loam, clay or gravel that is brown, yellow or grey. Grows on ridges, slopes and low plains, entagled amongst other low shrubs in dense vegetation, and in low open woodland or forest dominated by *Eucalyptus marginata, E. wandoo, E. accedens and Corymbia calophylla.* Occurs on western slopes of Darling Ranges, near Chittering south to Pickering Brook	V	VU					Known	0	0	0	0	1	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Grevillea flexuosa	Red-brown sand with laterite & gravel, sand over granite. Ridgetop plateau & associated breakaways.	V	VU					May	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Diuris micrantha	Brown loamy clay. Winter-wet swamps, in shallow water.	V	VU					Likely	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Conospermum undulatum	Grey or yellow-orange clayey sand.	V	VU					Known	0	0	0	0	1	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Anthocercis gracilis	Sandy or loamy soils. Granite outcrops.	V	VU					Known	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Acacia aphylla	Sand, loam, clay loam. Granite outcrops, hills.	V	VU					Known	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Drakaea micrantha	White-grey sand.	V	VU					Likely	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.

Appendix B - Flora Desktop Assesment

Padbury to Wangarra Flora Desktop Assessment

Taxon	Habitat[1]	Cons. Code EPBC	Cons. Code WA	Distance WAHERB (Km)	Distance TPFL (Km)	Date WAHERB	Date TPFL	PMST	Likelihood Assessment					Total Score	Likelihood	Post-survey Likelihood	Comments
									Recorded in the survey area	Known occurrence nearby (5km)	Recent Record (Last 20 years)	Known occurrence within the LGA	Potential presence of suitable habitat within the Survey Area (0,1,2)				
Acacia benthamii	Typically on limestone breakaways.		P2	0.97	8.98	2013	2000		0	1	1	1	2	5	High	Low	No habitat identified during survey. No individuals identified during survey.
Acacia oncinophylla subsp. *oncinophylla*	Granitic soils.		P3	18.08		1980			0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Adenanthos cygnorum subsp. *chamaephyton*	Grey sand, lateritic gravel.		P3	25.46	25.46	1981	1981		0	0	0	1	0	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Anigozanthos humilis subsp. *chrysanthus*	Grey or yellow sand, clay, gravel, laterite		P4	8.70		2014			0	0	1	0	0	1	Negligible	Negligible	No suitable habitat present. No records in the vicinity.
Austrostipa mundula	In sand over limestone.		P3	4.87		1900			0	1	0	1	1	3	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Baeckea sp. *Limestone* (N. Gibson & M.N. Lyons 1425)	Grey sand, yellow sand with limestone outcropping, hills.		P1	3.65	3.63	2021	2021		0	1	1	1	2	5	High	Low	No habitat identified during survey. No individuals identified during survey.
Bolboschoenus fluviatilis	Littoral zone, floodplain. Wet grey sand, silt, mud (WA Herbarium, 2023).		P1	14.26		2008			0	0	1	0	1	2	Low	Negligible	No suitable habitat present. No records in the vicinity.
Byblis gigantea	Sandy-peat swamps. Seasonally wet areas.		P3	18.22		1901			0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Caladenia huegelii	Grey or brown sand, clay loam.	CE	CR	4.16	9.35	2000	2017	Likely	0	1	1	1	2	5	High	Low	No habitat identified during survey. No individuals identified during survey.
Calandrinia sp. *Bayswater* (C. Andrews s.n. 11/1902)	No information available		P1	14.08		1900			0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Calectasia elegans	between Pinjar and Bullsbrook on deep, grey, quartz sand in habitats that have experienced infrequent fires. Recorded growing in *Banksia menziesi*i and *B. attenuata* woodland (Barrett, R and Barret, M, 2015).		P1	12.76	13.40	2008	2021		0	0	1	1	1	3	Moderate	Low	No habitat identified during survey. No individuals identified during survey.
Carex tereticaulis	Black peaty sand.		P3	16.37	16.41	1999	1999		0	0	0	0	1	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Conostylis bracteata	Sand, limestone. Consolidated sand dunes.		P3	2.07	2.53	1997	1997		0	1	0	1	2	4	Moderate	Low	No habitat identified during survey. No individuals identified during survey.
Cyanicula ixioides subsp. *ixioides*	Laterite, gravel.		P4	18.39		1900			0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Cyathochaeta teretifolia	Seasonally wet drainage lines and margins of permanent water sources, flat ground. Grey sand with clay, poor drainage (WA Herbarium, 2023).		P3	4.16	4.65	2008	2002		0	1	1	1	1	4	Moderate	Low	No habitat identified during survey. No individuals identified during survey.
Dampiera triloba	Loamy sand (WA Herbarium, 2023).		P3	4.13		2009			0	1	1	1	2	5	High	Low	No habitat identified during survey. No individuals identified during survey.
Darwinia pimelioides	Loam, sandy loam. Granite outcrops.		P4	16.97		1987			0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Diuris drummondii	Low-lying depressions, swamps.	V	VU	17.46		1900		May	0	0	0	0	1	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Drosera patens	Sandy soils. Margins of winter-wet depressions, swamps and lakes.		P1	4.01		2020			0	1	1	1	2	5	High	Low	No habitat identified during survey. No individuals identified during survey.
Drosera x sidjamesii	Peaty sand. Along lake margins, close to winter high-water line.		P1	4.67		2020			0	1	1	1	1	4	Moderate	Low	No habitat identified during survey. No individuals identified during survey.
Eleocharis keigheryi	Clay, sandy loam. Emergent in freshwater: creeks, claypans.	V	VU	18.81	20.61	2007	2007	May	0	0	1	0	1	2	Low	Negligible	No suitable habitat identified suring survey. No recent records.
Eryngium pinnatifidum s ubsp. *Palustre* (G.J. Keighery 13459)	In a winter wet claypan, water to 20 cm deep. Grey-brown clay		P3	14.87		1995			0	0	0	0	1	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Eucalyptus argutifolia	Shallow soils over limestone. Slopes or gullies of limestone ridges, outcrops.	V	VU	11.24	15.98	2006	2018	May	0	0	1	1	2	4	Moderate	Low	No habitat identified during survey. No individuals identified during survey.
Eucalyptus foecunda subsp. *foecunda*	Limestone/ limestone outcrops in heath and sandy soils in coastal areas. Sometimes on fixed dunes and slopes of hills (DCCEEW, 2023).		P4	3.63		2010			0	1	1	1	2	5	High	Low	No habitat identified during survey. No individuals identified during survey.
Grevillea curviloba	Grey sand, sandy loam. Winter-wet heath.	E	EN	12.94		2019			0	0	1	0	2	3	Moderate	Low	No habitat identified during survey. No individuals identified during survey.

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Taxon	Habitat[1]	Cons. Code EPBC	Cons. Code WA	Distance WAHERB (Km)	Distance TPFL (Km)	Date WAHERB	Date TPFL	PMST	Likelihood Assessment					Total Score	Likelihood	Post-survey Likelihood	Comments
									Recorded in the survey area	Known occurrence nearby (5km)	Recent Record (Last 20 years)	Known occurrence within the LGA	Potential presence of suitable habitat within the Survey Area (0,1,2)				
Grevillea sp. Ocean Reef (D. Pike Joon 4)	Broard sand dune, grey-brown dry sand. Limestone boulders (WA Herbarium, 2023).		P1	5.66		2013			0	0	1	1	2	4	Moderate	Low	No habitat identified during survey. No individuals identified during survey.
Haemodorum loratum	Grey or yellow sand, gravel.		P3	17.30	17.48	1981	1981		0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Hydrocotyle lemnoides	Swamps		P4	18.22	18.84	1906	1990		0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Hydrocotyle striata	Winter wet creekline, springs. Light leaf litter on dark brown sandy humic loam, clay.		P1	11.16		2016			0	0	1	0	2	3	Moderate	Low	No habitat identified during survey. No individuals identified during survey.
Hypolaena robusta	Dune crest. White sand, sandplains.		P4	13.59		1999			0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Isopogon autumnalis	Sandy soils, often in Banksia woodlands		P3	14.11		1991			0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Jacksonia sericea	Calcareous and sandy soils		P4	2.36	0.98	2020	1990		0	1	1	1	2	5	High	Low	No habitat identified during survey. No individuals identified during survey.
Lasiopetalum glutinosum subsp. *glutinosum*	Open woodland dominated by *Eucalyptus marginata, Corymbia calophylla, Banksia menziesii* and *B. attenuata* and in open, low scrub over heath, on steep slopes of lateritic gravel, clay or sandy loam near granite outcrops and creeklines (Shepherd and Wilkins, 2015).		P3	19.06		1900			0	0	0	0	2	2	Low	Negligible	No suitable habitat identified suring survey. No recent records.
Leucopogon maritimus	Occurs in deep, calcareous sands, on the mid to upper slopes of dunes or in shallow sand over limestone, but avoiding the thicker vegetation of the swales, grows in low heathland communities		P1	3.93		1966			0	1	0	1	2	4	Moderate	Low	No habitat identified during survey. No individuals identified during survey.
Levenhookia preissii	Grey or black, peaty sand. Swamps.		P1	14.11		1951			0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Marianthus paralius	Coastal heath in areas of white sand and brown loam, on coastal limestone cliffs	E	CR	5.06	8.22	2021	2018	Known	0	0	1	1	1	3	Moderate	Low	No habitat identified during survey. No individuals identified during survey.
Meionectes tenuifolia	Granite flats, shallow soils at margins, inundated. Grey clay, reserve and wetland (Mainroads, 2015).		P3	16.37	16.96	2007	1995		0	0	1	0	2	3	Moderate	Low	No habitat identified during survey. No individuals identified during survey.
Melaleuca sp. *Wanneroo* (G.J. Keighery 16705)	Restricted to limestone ridges within locality of Nowergup. Plants occur on upper slopes of rugged limestone ridges or where a high proportion of limestone outcropping occurs. Soils are shallow grey to mossy black sands, depeding on the amount of limestone 'caprock' (TSSC 2019)	E	EN	15.23	15.23	2019	2019		0	0	1	1	2	4	Moderate	Low	No habitat identified during survey. No individuals identified during survey.
Millotia tenuifolia var. *laevis*	Granite or laterite soils.		P2	6.76		2018			0	0	1	0	0	1	Negligible	Negligible	No suitable habitat present. No records in the vicinity.
Myriophyllum echinatum	Grey-black sandy clay. Winter-wet flats.		P3	18.72		1900			0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Netrostylis sp. *Chandala* (G.J. Keighery 17055)	Dampland with thick leaf litter over dark grey sand.		P2	11.69		2013			0	0	1	0	2	3	Moderate	Low	No habitat identified during survey. No individuals identified during survey.
Persoonia sulcata	Lateritic or granitic soils.		P4	19.94		1980			0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Phlebocarya pilosissima subsp. *pilosissima*	White or grey sand, lateritic gravel.		P3	15.04		1999			0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Pimelea calcicola	Sand. Coastal limestone ridges.		P3	3.87		1990			0	1	0	1	2	4	Moderate	Low	No habitat identified during survey. No individuals identified during survey.
Pithocarpa corymbulosa	Gravelly or sandy loam. Amongst granite outcrops.		P3	19.84		1963			0	0	0	1	0	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Poranthera moorokatta	Very gently inclined plain, white silica sand in open spaces between shurbs, not in shaded areas or in areas of high litter cover.		P2	9.08		2018			0	0	1	1	1	3	Moderate	Low	No habitat identified during survey. No individuals identified during survey.
Sarcozona bicarinata	White sand.		P3	7.82	8.15	1997	1992		0	0	0	1	2	3	Moderate	Low	No habitat identified during survey. No individuals identified during survey.
Schoenus capillifolius	Brown mud. Claypans.		P3	16.57	20.35	2012	1990		0	0	1	0	0	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Schoenus griffinianus	White sand.		P4	13.76		1993			0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No records in the vicinity.
Schoenus natans	Winter-wet depressions.		P4	20.57		2004			0	0	1	0	2	3	Moderate	Low	No habitat identified during survey. No individuals identified during survey.

Appendix B - Flora Desktop Assesment

Taxon	Habitat[1]	Cons. Code EPBC	Cons. Code WA	Distance WAHERB (Km)	Distance TPFL (Km)	Date WAHERB	Date TPFL	PMST	Likelihood Assessment					Total Score	Likelihood	Post-survey Likelihood	Comments
									Recorded in the survey area	Known occurrence nearby (5km)	Recent Record (Last 20 years)	Known occurrence within the LGA	Potential presence of suitable habitat within the Survey Area (0,1,2)				
Schoenus sp. Waroona (G.J. Keighery 12235)	Clay or sandy clay. Winter-wet flats.		P3	16.57		1988			0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Stachystemon exilis	On grey sand, seasonally damp (WA Herbarium, 2023)		P1	9.08		2018			0	0	1	0	2	3	Moderate	Low	No habitat identified during survey. No individuals identified during survey.
Stenanthemum sublineare	Littered white sand. Coastal plain.		P2	14.69		2005			0	0	1	1	2	4	Moderate	Low	No habitat identified during survey. No individuals identified during survey.
Stylidium longitubum	Sandy clay, clay, seasonal wetlands		P4	16.28	11.86	2012	2005		0	0	1	1	2	4	Moderate	Low	No habitat identified during survey. No individuals identified during survey.
Stylidium maritimum	Sand over limestone. Dune slopes and flats. Coastal heath and shrubland, open Banksia woodland.		P3	20.59		2009			0	0	1	1	2	4	Moderate	Low	No habitat identified during survey. No individuals identified during survey.
Stylidium paludicola	Peaty sand over clay. Winter wet habitats. Marri and Melaleuca woodland, Melaleuca shrubland.		P3	5.06		2006			0	0	1	1	2	4	Moderate	Low	No habitat identified during survey. No individuals identified during survey.
Stylidium trudgenii	Grey sand, dark grey to black sandy peat. Margins of winter-wet swamps, depressions.		P3	13.59		2000			0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Styphelia filifolia	Sandy soils of the coastal plain (with one known occurrence from the northern Darling Scarp), usually in Banksia or Jarrah woodland and in low-lying situations (Hislop & Puente--Lelièvre, 2017).		P3	4.13		2007			0	1	1	1	2	5	High	Low	No habitat identified during survey. No individuals identified during survey.
Tetratheca pilifera	Gravelly soils.		P3	13.20		2020			0	0	1	0	0	1	Negligible	Negligible	No suitable habitat present. No records in the vicinity.
Thelymitra variegata	Sandy clay, sand, laterite.		P2	5.55		1900			0	0	0	1	0	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Thysanotus glaucus	White, grey or yellow sand, sandy gravel.		P4	19.64		1990			0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Thysanotus sp. Badgingarra (E.A. Griffin 2511)	Grey sand with lateritic gravel.		P2	17.92		1991			0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Tripterococcus sp. Brachylobus (A.S. George 14234)	Grey, black or peaty sand. Winter - wet flats		P4	17.21	17.21	1994	1994		0	0	0	1	2	3	Moderate	Low	No habitat identified during survey. No individuals identified during survey.
Trithuria occidentalis	Known from one population near Ellenbrook. It grows in partly submerged water on edge of shallow, winter-wet claypan in very open shrubland of Melaleuca lateritia and annual herbs (DEWHA, 2008).	E	EN	16.57	20.59	2012	2018	Likely	0	0	1	0	1	2	Low	Negligible	No suitable habitat present. No records in the vicinity.
Verticordia lindleyi subsp. *lindleyi*	Sand, sandy clay. Winter-wet depressions.		P4	9.32		2006			0	0	1	0	2	3	Moderate	Low	No habitat identified during survey. No individuals identified during survey.
Drosera occidentalis	Sandy & clayey soils. Swamps & wet depressions.		P4		10.20		1986		0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Grevillea curviloba subsp. *curviloba*	Grey sand. Winter-wet heath.	E			16.60		2019	May	0	0	1	0	2	3	Moderate	Low	No habitat identified during survey. No individuals identified during survey.
Hibbertia helianthemoides	Clayey sand over sandstone or loam over quartzite. Hills and scree slopes.		P4		25.62		2002		0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Hibbertia leptotheca	Limestone ridges. Ranges from Yalgorup to Lancelin		P3		8.18		1990		0	0	0	1	2	3	Moderate	Low	No habitat identified during survey. No individuals identified during survey.
Synaphea sp. Fairbridge Farm (D.Papenfus 696)	Grey, clayey sand with lateritic pebbles. In low woodland, near winter-wet flats with weedy grasses (DCCEEW, 2023).	CE	CR					Likely	0	0	0	0	1	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Andersonia gracilis	This species is known from the Badgingarra, Dandaragan and Kenwick areas where it is found on seasonally damp, black sandy clay flats near or on the margins of swamps, often on duplex soils supporting low open heath vegetation with species such as *Calothamnus hirsutus, Verticordia densiflora* and *Kunzea recurva* over sedges (DEC, 2006).	E	EN					Likely	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Banksia mimica	White or grey sand over laterite, sandy loam.	V	VU					May	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Diuris purdiei	Grey-black sand, moist. Winter-wet swamps.		P4					Likely	0	0	0	0	2	2	Low	Negligible	No suitable habitat identified suring survey. No recent records.
Drakaea elastica	White or grey sand. Low-lying situations adjoining winter-wet swamps.	E	CR					Likely	0	0	0	0	2	2	Low	Negligible	No suitable habitat identified suring survey. No recent records.
Thelymitra stellata	Red, brown, yellow, or grey sandy loams, clay or gravel over laterite or gravel.	E	EN					May	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.

Appendix B - Flora Desktop Assesment

Taxon	Habitat[1]	Cons. Code EPBC	Cons. Code WA	Distance WAHERB (Km)	Distance TPFL (Km)	Date WAHERB	Date TPFL	PMST	Likelihood Assessment					Total Score	Likelihood	Post-survey Likelihood	Comments
									Recorded in the survey area	Known occurrence nearby (5km)	Recent Record (Last 20 years)	Known occurrence within the LGA	Potential presence of suitable habitat within the Survey Area (0,1,2)				
Macarthuria keigheryi	White or grey sand.	E	EN					May	0	0	0	0	2	2	Low	Negligible	No suitable habitat identified suring survey. No recent records.
Thelymitra dedmaniarum	Granite	E	EN					May	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Grevillea curviloba subsp. *incurva*	Sand, sandy loam. Winter-wet heath.	E						May	0	0	0	0	2	2	Low	Negligible	No suitable habitat identified suring survey. No recent records.
Caleana dixonii	Deep sand in open areas beneath dense tall shrubland with scattered emergent banksias, or in shallow sand over laterite in heathland (DCCEEW, 2023).	E	VU					May	0	0	0	0	2	2	Low	Negligible	No suitable habitat identified suring survey. No recent records.
Anigozanthos viridis subsp. *terraspectans*	Grey sand, clay loam. Winter-wet depressions.	V	VU					May	0	0	0	0	2	2	Low	Negligible	No suitable habitat identified suring survey. No recent records.
Drakaea micrantha	White-grey sand.	V	VU					Likely	0	0	0	0	2	2	Low	Negligible	No suitable habitat identified suring survey. No recent records.
Diuris micrantha	Brown loamy clay. Winter-wet swamps, in shallow water.	V	VU					Likely	0	0	0	0	2	2	Low	Negligible	No suitable habitat identified suring survey. No recent records.

Pinjar Terminal Flora Desktop Assessment

Taxon	Habitat[1]	Cons. Code EPBC	Cons. Code WA	Distance WAHERB (KM)	Distance TPFL (KM)	Date WAHERB	Date TPFL	PMST	Likelihood Assessment					Total Score	Likelihood	Post-survey Likelihood	Comments
									Recorded in the survey area	Known occurrence nearby (5km)	Recent Record (Last 20 years)	Known occurrence within the LGA	Potential presence of suitable habitat within the Survey Area (0,1,2)				
Acacia anomala	Grows over laterite in shallow san, loam, clay or gravl that is brown, yellow or grey. Grows on ridges, slopes and low plains. Grows entagled amongst other low shrubs in dense vegetation, and in low open woodland or forest dominated by *Eucalyptus marginata, E. wandoo, E. accedens* and *Corymbia calophylla* . Occurs on western slopes of Darling Ranges, near Chittering south to Pickering Brook	V	VU	13.65	19.95	1900	2007		0	0	1	0	0	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Acacia benthamii	Typically found on limestone breakaways, sand, restricted to Kings Park and Subiaco, Wanneroo and near Yanchep		P2	7.65	14.28	2009	2000		0	0	1	1	2	4	High	Low	Species not recorded, no suitable habitat identified during survey.
Acacia cummingiana	Grey or yellow sand, lateritic gravel. Sandplains, lateritic breakaways		P3	17.89		2012			0	0	1	0	0	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Acacia drummondii subsp. *affinis*	Lateritic gravelly soils, or sand in laterite. Grows in Jarrah, Jarrah-Marri and Wandoo forest and woodland. Occurs from New Norcia S to Bullsbrook East		P3	15.06	16.81	1976	1975		0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Adenanthos cygnorum subsp. *chamaephyton*	Grey sand, lateritic gravel		P3	1.79	1.79	1981	1996		0	1	0	1	1	3	Low	Negligible	No suitable habitat identified suring survey. No recent records.
Andersonia gracilis	where it is found on seasonally damp, black sandy clay flats near or on the margins of swamps, often on duplex soils supporting low open heath vegetation with species such as *Calothamnus hirsutus* , *Verticordia densiflora* and *Kunzea recurva* over sedges (DEC, 2006).	E	VU					Likely	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Anigozanthos humilis subsp. *chrysanthus*	Sand, clay, gravel, laterite		P4	20.21		2016			0	0	1	0	2	3	Moderate	Low	No habitat identified during survey.
Anigozanthos viridis subsp. *terraspectans*	Grey sand, clay loam. Winter-wet depressions.	V	VU					Likely	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Baeckea sp. Limestone (N. Gibson & M.N. Lyons 1425)	Known from North of Perth only within 100km of coast. Found in Banksia woodland on sand over limestone.		P1	7.69	7.73	2017	2020		0	0	1	1	1	3	Moderate	Low	No habitat identified during survey.
Banksia mimica	Grows on flat to gentle slopes in grey and white sand in open woodlands (DEWHA, 2008). It is known to occur on the Whicher Range and Darling Range in Banksia Woodlands (DEWHA, 2008).	E	VU					May	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Caladenia huegelii	This species occurs in mixed woodland of Jarrah, *Banksia attenuata, B. ilicifolia, B. menziesii* with scattered *Allocasuarina fraseriana* and *Corymbia calophylla* over dense shrubs (DEC, 2009). It occurs between north of Perth to Busselton within 20km of the coast. Soils are deep grey-white sand associated with the Bassendean dune system, occassionally the Spearwood system (DEC, 2009).	E	CR					Likely	0	0	0	0	2	2	Low	Negligible	No suitable habitat identified suring survey. No recent records.
Caleana dixonii	Grows in deep sand in open areas beneath dense tall shrubs with scattered Banksias, or in heathland in shallow sand over laterite (DEWHA, 2008b).	E	VU					May	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Caustis gigas	White or grey sand		P2	16.83		2006			0	0	1	0	2	3	Moderate	Low	No habitat identified during survey.
Chamaescilla gibsonii	Clay to sandy clay, winter-wet flast, shallow water-filled clay pans		P3	13.65		1965			0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Chamelaucium lullfitzii	White/yellow sand supporting open low woodland with *Eucalyptus todtiana* , *Banksia attenuata* , and *Hibbertia* sp. (TSSC, 2016).	E	VU	16.15		2010		May	0	0	1	0	2	3	Moderate	Low	No habitat identified during survey.
Conostylis bracteata	Sand, limestone. Consolidated sand dunes.		P3	16.79		2015			0	0	1	0	2	3	Moderate	Low	No habitat identified during survey.
Conostylis pauciflora subsp. *euryrhipis*	White, grey or yellow sand, consolidated dunes		P4	14.76		2016			0	0	1	0	2	3	Moderate	Low	No habitat identified during survey.
Conostylis pauciflora subsp. *pauciflora*	Grey sand, limestone, hillslopes, consolidated dunes		P4	14.99	14.99	2007	2007		0	0	1	1	2	4	High	Low	No habitat identified during survey.
Cyathochaeta teretifolia	Brown, grey sand. Sandy clay. Swamps, creek edges. Jarrah forest, SCP.		P3	8.88	14.26	1995	1994		0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Darwinia foetida	Grey-white sand on swampy, seasonally wet sites. Found alongside water pit/well (sump land). Recorded at three locations near town of Muchea.	E	CR	13.65	14.25	2020	2018	May	0	0	1	0	0	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Diuris drummondii	Found in low-lying depressions in peaty and sandy clay swamps. Plants frequently observed standing in several centimetres of water even during the summer flowering period	V	VU	13.48		1961			0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Diuris micrantha	This species is usually found in cleared fire breaks or open sandy patches that are disturbed. It occurs in infertile grey sands, in Banksia, Jarrah, and Common Sheoak woodland or forest (DEWHA, 2008).	V	EN					Likely	0	0	0	0	2	2	Low	Negligible	No suitable habitat identified suring survey. No recent records.
Diuris purdiei	Grey-black sand, moist. Winter-wet swamps.		P4					May	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.

Taxon	Habitat[1]	Cons. Code EPBC	Cons. Code WA	Distance WAHERB (KM)	Distance TPFL (KM)	Date WAHERB	Date TPFL	PMST	Likelihood Assessment					Total Score	Likelihood	Post-survey Likelihood	Comments
									Recorded in the survey area	Known occurrence nearby (5km)	Recent Record (Last 20 years)	Known occurrence within the LGA	Potential presence of suitable habitat within the Survey Area (0,1,2)				
Drakaea elastica	White or grey sand. Low-lying situations adjoining winter wet swamps.	E	CR					Likely	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Drakaea micrantha	Cleared firebreaks or open sandy patches that have been disturbed. In infertile white-grey sands, in Jarrah and sheoak forest.	V	EN					May	0	0	0	0	2	2	Low	Negligible	No suitable habitat identified suring survey. No recent records.
Drosera occidentalis	Sandy & clayey soils. Swamps & wet depressions.		P4		19.48		1986		0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Drosera sewelliae	Laterite and silica sand soils		P2	17.23		2007			0	0	1	0	2	3	Moderate	Low	No habitat identified during survey.
Eleocharis keigheryi	Clay, sandy loam. Emergent in freshwater: creeks, claypans.	V	VU					Likely	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Eucalyptus argutifolia	Known from between Wanneroo, Lake Clifton and Guilderton. This Mallee grows on slopes or gullies close to the summits of limestone ridges, where soils are shallow, well drained and grey with outcrops of limestone (DEWHA, 2008).	V	VU	9.16	9.10	2017	2021	Known	0	0	1	1	0	2	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Grevillea althoferorum subsp. *fragilis*	Found at the base of the Darling Scarp, growing in greyish-yellow colluvial sand. Forms part of the shrub layer in a *Banksia menziesii* and *B. attenuata* woodland.	E	CR	19.39	19.70	2014	2013		0	0	1	0	0	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Grevillea candolleana	Laterite, lateritic loam. Hillsides.		P2	19.80		2007			0	0	1	0	0	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Grevillea curviloba	Grey sand, sandy loam. Winter-wet heath.	E	CR	12.59	12591.00	2011	2017	Likely	0	0	1	0	1	2	Low	Negligible	No suitable habitat identified suring survey. No recent records.
Grevillea evanescens	Brown Spearwood sand.		P1		13.90		2004		0	0	1	0	0	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Hibbertia helianthemoides	Clayey sand over sandstone or loam over quartzite. Hills and scree slopes.		P4		6.36		2002		0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Hibbertia leptotheca	Limestone ridges. Ranges from Yalgorup to Lancelin		P3	12.65	14.99	2016	2005		0	0	1	1	0	2	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Hypolaena robusta	Dune crest. White sand, sandplains (WAHerb 2023).		P4	16.70		2006			0	0	1	0	2	3	Moderate	Low	No habitat identified during survey.
Isotropis cuneifolia subsp. glabra	Sand, clay loam. Winter-wet flats. Ironstone soils		P3	14.00		1952			0	0	0	0	1	1	Low	Negligible	No suitable habitat identified suring survey. No recent records.
Jacksonia gracillima	Winter wet flats; brown clay, Flat of grey sand (pgv Environmental, 2015)		P3	16.86		2015			0	0	1	0	0	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Jacksonia sericea	Calcareous and sandy soils.		P4	8.57		2010			0	0	1	0	2	3	Moderate	Low	No habitat identified during survey.
Lasiopetalum membranaceum	Sand over limestone.		P3		10.71		1987		0	0	0	1	1	2	Low	Negligible	No suitable habitat identified suring survey. No recent records.
Lepidium pseudotasmanicum	Loam, sand		P4	12.65		1953			0	0	0	0	1	1	Low	Negligible	No suitable habitat identified suring survey. No recent records.
Leucopogon maritimus	Occurs in deep, calcareous sands, on the mid to upper slopes of dunes or in shallow sand over limestone, but avoiding the thicker vegetation of the swales, grows in low heathland communities		P1	12.65		2007			0	0	1	0	2	3	Moderate	Low	No habitat identified during survey.
Leucopogon sp. Yanchep (M. Hislop 1986)	Light grey-yellow sand, brown loam, limestone, laterite, granite. Coastal plain, breakaways, valley slopes, low hills		P3	9.97		2005			0	0	1	0	2	3	Moderate	Low	No habitat identified during survey.
Leucopogon squarrosus subsp. *trigynus*	White/grey sand		P2	9.37		2020			0	0	1	0	2	3	Moderate	Low	No habitat identified during survey.
Macarthuria keigheryi	White or grey sand.	E	EN					May	0	0	0	0	2	2	Low	Negligible	No suitable habitat identified suring survey. No recent records.
Marianthus paralius	Population is low coastal heath on low coastal limestone cliff (TSSC, 2018).	E	EN		16.94		2013		0	0	1	1	0	2	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Melaleuca sp. Wanneroo (G.J. Keighery 16705)	Restricted to limestone ridges within locality of Nowergup. Plants occur on upper slopes of rugged limestone ridges or where a high proportion of limestone outcropping occurs. Soils are shallow grey to mossy black sands, depeding on the amount of limestone 'caprock' (TCCS, 2019).	E	EN	9.02	9.09	2019	2017	Known	0	0	1	1	0	2	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.

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									Recorded in the survey area	Known occurrence nearby (5km)	Recent Record (Last 20 years)	Known occurrence within the LGA	Potential presence of suitable habitat within the Survey Area (0,1,2)				
Millotia tenuifolia var. *laevis*	Granite or laterite soils.		P2	18.33		2015			0	0	1	0	0	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Ornduffia submersa	Submerged. Claypan, wet sandy clay. seasonally inundated wetland (Mattiske, 2019).		P4	14.16		2014			0	0	1	0	0	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Pimelea calcicola	Sand. Coastal limestone ridges.		P3	12.26		1964			0	0	0	0	2	2	Low	Negligible	No suitable habitat identified suring survey. No recent records.
Pithocarpa corymbulosa	Gravelly or sandy loam. Amongst granite outcrops		P3	5.42		1963			0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Platysace ramosissima	Sandy soils.		P3	15.31		1900			0	0	0	0	2	2	Low	Negligible	No suitable habitat identified suring survey. No recent records.
Poranthera moorokatta	it was recorded on white silica sand in open spaces between shrubs, not in shaded areas or in areas of high leaf litter cover (Barret, 2012). In Ellenbrook it was recorded in a shallow dampland on mixed grey white sand with scattered leaf litter (Barret, 2012).		P2	17.47		2014			0	0	1	0	2	3	Moderate	Low	Not identified during two field survey events in ideal detection period. Not known from sand dunes.
Schoenus griffinianus	White sand		P4	17.45		2006			0	0	1	0	2	3	Moderate	Low	No habitat identified during survey.
Sphaerolobium calcicola	White-grey brown sand, sandy clay over limestone, black peaty sandy clay. Tall dunes, winter-wet flats, interdunal swamps, low-lying areas		P3	12.32		1997			0	0	0	0	1	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Stylidium longitubum	Sandy clay, clay, seasonal wetlands.		P4	7.87	7.91	2005	1994		0	0	1	1	0	2	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Stylidium maritimum	Sand over limestone. Dune slopes and flats. Coastal heath and shrubland, open Banksia woodland		P3	7.20	14.25	2017	2004		0	0	1	1	2	4	Moderate	Low	No habitat identified during survey.
Stylidium squamellosum	Brown to red-brown clay loam. Winter-wet habitats and depressions, open woodland, shrubland		P2	19.60		2006			0	0	1	0	0	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Styphelia filifolia	Sandy soils of the coastal plain (with one known occurrence from the northern Darling Scarp), usually in Banksia or Jarrah woodland and in low-lying situations (Hislop & Puente--Lelièvre, 2017).		P3	3.71		2006			0	1	1	0	2	4	High	Low	No habitat identified during survey.
Synaphea grandis	Laterite.		P4	18.35		1971			0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Thelymitra dedmaniarum	This species is known from two populations north east of Perth, where it is confined to open wandoo woodland on red/brown sandy loam associated with dolerite and granite outcropping. The associated vegetation consists of *Eucalyptus wandoo, E. accedens and E. calophylla* , over low scrub of *Acacia pulchella* , *A. saligna, Calothamnus quadrifidus, Melaleuca radula* and *Hakea lissocarpha* (CALM, 1999).	E	CR					May	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Thelymitra stellata	Grows among low heath and scrub in Jarrah and Wandoo woodland, both on ridges and slopes, flats, also on riverbanks and breakaways. Soil types are red, brown, yellow, or grey sandy loams, clay or gravel over laterite or gravel.	E	EN		18.77		2005		0	0	1	0	0	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Tripterococcus sp. Brachylobus (A.S. George 14234)	Grey, black or peaty sand. Winter - wet flats		P4	8.06	8.06	1994	1994		0	0	0	1	0	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Verticordia lindleyi subsp. *lindleyi*	Sand, sandy clay. Winter wet depressions		P4	19.16	20.07	1996	1996		0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Verticordia rutilastra	Sand and lateritic gravel. Hills. Geraldton Sandplains		P3	17.88		2006			0	0	1	0	1	2	Low	Negligible	No suitable habitat identified suring survey. No recent records.
Verticordia serrata var. *linearis*	White sand, gravel. Open woodland.		P3	13.93	16.86	2013	1988		0	0	1	0	1	2	Low	Negligible	No suitable habitat identified suring survey. No recent records.

Appendix B - Flora Desktop Assessment

Neerabup Terminal and East Wanneroo Flora Desktop Assessment

Taxon	Habitat[1]	Cons. Code EPBC	Cons. Code WA	Distance WAHERB (Km)	Distance TPFL (Km)	Date WAHERB	Date TPFL	Max Date	PMST	Likelihood Assessment					Total Score	Likelihood	Post-survey likelihood	Comments
										Recorded in the survey area	Known occurrence nearby (5km)	Recent Record (Last 20 years)	Known occurrence within the LGA	Potential presence of suitable habitat within the Survey Area (0,1,2)				
Acacia benthamii	Typically on limestone breakaways.		P2	2.13	2.32	2009	1975	2009		0	1	1	1	0	3	Negligible	Negligible	No suitable habitat present.
Andersonia gracilis	White/grey sand, sandy clay, gravelly loam. Winter-wet areas, near swamps.	E	EN					1900	Likely	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Anigozanthos humilis subsp. *chrysanthus*	Grey or yellow sand.		P4	2.11		2016		2016		0	1	1	1	2	5	High	Low	No habitat identified during survey. No individuals identified.
Anigozanthos viridis subsp. *terraspectans*	Grey sand, clay loam. Winter-wet depressions.	V	VU					1900	Likely	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Austrostipa mundula	Known from Swan Coastal Plain and South Coast. Little information available, known from Tuart Woodlands.		P3	5.01		1900		1900		0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Baeckea sp. Limestone (N. Gibson & M.N. Lyons 1425)	Known from North of Perth only within 100km of coast. Found in Banksia woodland on sand over limestone.		P1	2.00	7.08	2021	2017	2021		0	1	1	1	2	5	High	Low	No habitat identified during survey.
Banksia mimica	White or grey sand over laterite, sandy loam.	V	VU					1900	May	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Caladenia huegelii	Grey or brown sand, clay loam.	CE	CR	0.21	3.12	2000	1997	2000	Known	0	1	0	1	1	3	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Caleana dixonii	Deep sand in open areas beneath dense tall shrubland with scattered emergent banksias, or in shallow sand over laterite in heathland (DCCEEW, 2023).	E	VU					1900	May	0	0	0	0	1	1	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Calectasia elegans	Between Pinjar and Bullsbrook on deep, grey, quartz sand in habitats that have experienced infrequent fires. Recorded growing in *Banksia menziesii* and *B. attenuata* woodland (Barrett, R and Barret, M, 2015).		P1	1.68	1.04	2008	2018	2018		0	1	1	1	2	5	High	Low	No habitat identified during survey.
Conostylis bracteata	Sand, limestone. Consolidated sand dunes.		P3	4.38	4.73	2015	1997	2015		0	1	1	1	2	5	High	Low	No habitat identified during survey.
Cyathochaeta teretifolia	Brown, grey sand. Sandy clay. Swamps, creek edges. Jarrah forest, SCP.		P3	0.21	0.37	2008	1994	2008		0	1	1	1	2	5	High	Low	No habitat identified during survey.
Dampiera triloba	Loamy sand.		P3	0.19		2009		2009		0	1	1	1	2	5	High	Low	No habitat identified during survey.
Diuris micrantha	Brown loamy clay. Winter-wet swamps, in shallow water.	V	VU					1900	Likely	0	0	0	0	1	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Diuris purdiei	Grey-black sand, moist. Winter-wet swamps.		P4					1900	Likely	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Drakaea elastica	White or grey sand. Low-lying situations adjoining winter wet swamps.	E	CR					1900	Likely	0	0	0	0	1	1	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Drakaea micrantha	cleared firebreaks or open sandy patches that have been disturbed. In infertile white-grey sands, in Jarrah and sheoak forest.	V	E					1900	Likely	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Drosera occidentalis	Sandy & clayey soils. Swamps & wet depressions.		P4		7.11		1986	1986		0	0	0	1	0	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Drosera patens	Sandy soils. Margins of winter-wet depressions, swamps and lakes.		P1	0.07		2020		2020		0	1	1	1	1	4	Moderate	Low	No habitat identified during survey.
Drosera x sidjamesii	Peaty sand. Along lake margins, close to winter high-water line.		P1	0.56		2020		2020		0	1	1	1	0	3	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Eleocharis keigheryi	Clay, sandy loam. Emergent in freshwater: creeks, claypans.	V	VU					1900	Likely	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Eryngium pinnatifidum subsp. *Palustre* (G.J. Keighery 13459)	In a winter wet claypan, water to 20 cm deep. Grey-brown clay		P3	9.05		1995		1995		0	0	0	1	0	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Eucalyptus argutifolia	Known from between Wanneroo, Lake Clifton and Guilderton. This Mallee grows on slopes or gullies close to the summits of limestone ridges, where soils are shallow, well drained and grey with outcrops of limestone (DEWHA, 2008).	V	VU	5.50	5.50	2017	2006	2017	Known	0	0	1	1	0	2	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Eucalyptus foecunda subsp. *foecunda*	Limestone/ limestone outcrops in heath and sandy soils in coastal areas. Sometimes on fixed dunes and slopes of hills (DCCEEW, 2023).		P4	6.85		1991		1991		0	0	0	1	2	3	Moderate	Low	No habitat identified during survey.
Eucalyptus x balanites	Sandy soils with lateritic gravel.	E	CR					1900	May	0	0	0	0	1	1	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Grevillea christineae	Clay loam, sandy clay, often moist.	E	EN					1900	Likely	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Grevillea curviloba	This taxon used to include subsp. incurva and subsp. curviloba. Grey sand, sandy loam. Winter-wet heath.	E	CR	6.88	10842.06	2017	1905	2017	Known	0	0	1	1	1	3	Moderate	Low	No habitat identified during survey.

Appendix B - Flora Desktop Assessment

Taxon	Habitat[1]	Cons. Code EPBC	Cons. Code WA	Distance WAHERB (Km)	Distance TPFL (Km)	Date WAHERB	Date TPFL	Max Date	PMST	Likelihood Assessment					Total Score	Likelihood	Post-survey likelihood	Comments
										Recorded in the survey area	Known occurrence nearby (5km)	Recent Record (Last 20 years)	Known occurrence within the LGA	Potential presence of suitable habitat within the Survey Area (0,1,2)				
Hydrocotyle striata	Winter wet creekline, springs. Light leaf litter on dark brown sandy humic loam, clay.		P1	6.59		2016		2016		0	0	1	1	0	2	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Hypolaena robusta	Dune crest. White sand, sandplains.		P4	7.79		2006		2006		0	0	1	1	2	4	Moderate	Low	No habitat identified during survey.
Jacksonia sericea	Calcareous and sandy soils.		P4	0.19	2.70	2020	1979	2020		0	1	1	1	2	5	High	Known	Identified during survey.
Macarthuria keigheryi	White or grey sand.	E	EN					1900	May	0	0	0	0	1	1	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Marianthus paralius	Population is low coastal heath on low coastal limestone cliff (TSSC, 2018).	E	EN	5.40	10.97	2010	2013	2013	Known	0	0	1	1	0	2	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Melaleuca sp. Wanneroo (G.J. Keighery 16705)	Restricted to limestone ridges within locality of Nowergup. Plants occur on upper slopes of rugged limestone ridges or where a high proportion of limestone outcropping occurs. Soils are shallow grey to mossy black sands, depeding on the amount of limestone 'caprock'	E	EN	5.85	5.84	2019	2008	2019	Known	0	0	1	1	0	2	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Millotia tenuifolia var. laevis	Granite or laterite soils.		P2	1.67		2018		2018		0	1	1	1	0	3	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Netrostylis sp. Chandala (G.J. Keighery 17055)	Dampland with thick leaf litter over dark grey sand.		P2	7.16		2013		2013		0	0	1	1	1	3	Moderate	Low	No habitat identified during survey.
Phlebocarya pilosissima subsp. *pilosissima*	White or grey sand, lateritic gravel.		P3	9.20		1999		1999		0	0	0	1	1	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Pimelea calcicola	Sand. Coastal limestone ridges.		P3	0.82		1990		1990		0	1	0	1	2	4	Moderate	Low	No habitat identified during survey.
Pithocarpa corymbulosa	Gravelly or sandy loam. Amongst granite outcrops.		P3	7.08		1963		1963		0	0	0	1	0	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Poranthera moorokatta	Banksia Woodland (Barret, R. 2012).		P2	1.57		2018		2018		0	1	1	1	2	5	High	Moderate	Potential habitat identified during survey.
Schoenus griffinianus	White sand.		P4	5.34		2006		2006		0	0	1	1	2	4	Moderate	Low	No habitat identified during survey.
Stachystemon exilis	On grey sand, seasonally damp (WAHerb 2023)		P1	4.31		2018		2018		0	1	1	1	1	4	Moderate	Low	No habitat identified during survey.
Stenanthemum sublineare	Littered white sand. Coastal plain.		P2	2.02		2005		2005		0	1	1	1	2	5	High	Low	No habitat identified during survey.
Stylidium longitubum	Sandy clay, clay, seasonal wetlands		P4	4.70	4.60	2005	1992	2005		0	1	1	1	1	4	Moderate	Low	No habitat identified during survey.
Stylidium maritimum	Sand over limestone. Dune slopes and flats. Coastal heath and shrubland, open Banksia woodland		P3	9.79	16.37	2017	2004	2017		0	0	1	1	2	4	Moderate	Low	No habitat identified during survey.
Stylidium paludicola	Peaty sand over clay. Winter wet habitats. Marri and Melaleuca woodland, Melaleuca shrubland.		P3	5.40		2006		2006		0	0	1	1	1	3	Moderate	Low	No habitat identified during survey.
Stylidium trudgenii	Grey sand, dark grey to black sandy peat. Margins of winter-wet swamps, depressions.		P3	7.75		2000		2000		0	0	0	1	0	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Styphelia filifolia	Sandy soils of the coastal plain, usually in banksia or Jarrah woodland and low lying situations (Hislop, M, Puente-Lelievre, C, 2017).		P3	0.00		2007		2007		1	1	1	1	2	6	Known	Low	Record location on a cleared road side location, adjacent to a pine plantation. Record over 17 years old.
Synaphea sp. Fairbridge Farm (D.Papenfus 696)	Grey, clayey sand with lateritic pebbles. In low woodland, near winter-wet flats with weedy grasses (DCCEEW, 2023).	CE	CR					1900	Likely	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Tetratheca pilifera	Gravelly soils.		P3	8.33		2020		2020		0	0	1	1	0	2	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Thelymitra dedmaniarum	Granite	E	EN					1900	May	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Thelymitra stellata	Sand, gravel, lateritic loam.	E	EN		22.38		2005	2005	Likely	0	0	1	0	0	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Thelymitra variegata	Sandy clay, sand, laterite.		P2	3.95		1900		1900		0	1	0	1	0	2	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Tripterococcus sp. Brachylobus (A.S. George 14234)	Grey, black or peaty sand. Winter - wet flats		P4	4.51	4.51	1994	1994	1994		0	1	0	1	0	2	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Trithuria occidentalis	Known from one population near Ellenbrook.. It grows in partly submerged water on edge of shallow, winter-wet claypan in very open shrubland of *Melaleuca lateritia* and annual herbs (DEWHA, 2008).	E	EN	11.05		1982		1982	Likely	0	0	0	1	0	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Verticordia lindleyi subsp. *lindleyi*	Sand, sandy clay. Winter-wet depressions.		P4	4.57	25.29	2006	1996	2006		0	1	1	1	2	5	High	Low	No habitat identified during survey.

Appendix B - Flora Desktop Assessment

NT-NOR to HBK 132kv Line Flora Desktop Assessment

Taxon	Habitat[1]	Cons. Code EPBC	Cons. Code WA	Distance WAHERB (Km)	Distance TPFL (Km)	Date WAHERB	Date TPFL	PMST	Likelihood Assessment					Total Score	Likelihood	Post-survey likelihood	Comments
									Recorded in the survey area	Known occurrence nearby (5km)	Recent Record (Last 20 years)	Known occurrence within the LGA	Potential presence of suitable habitat within the Survey Area (0.1.2)				
Acacia benthamii	Typically on limestone breakaways.		P2	3.76	16.58	2013	2000		0	1	1	1	0	3	Moderate	Low	No suitable habitat present. No records in the vicinity.
Acacia oncinophylla subsp. *oncinophylla*	Granitic soils.		P3	5.11		1980			0	0	0	1	0	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Adenanthos cygnorum subsp. *chamaephyton*	Grey sand, lateritic gravel.		P3	29.32	29.32	1981	1981		0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Anigozanthos humilis subsp. *chrysanthus*	Grey or yellow sand.		P4	3.15		2014			0	1	1	1	2	5	High	Low	Species not recorded, no suitable habitat identified during survey.
Austrostipa mundula	Exposed limestone areas. Areas of low heath (Esperance Wildflower Society (N.D.).		P3	18.10		1900			0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Baeckea sp. Limestone (N. Gibson & M.N. Lyons 1425)	Grey sand, yellow sand with limestone outcropping. On hills (GHD, 2017).		P1	15.01	17.41	2021	2021		0	0	1	0	0	1	Negligible	Negligible	No suitable habitat present. No records in the vicinity.
Bolboschoenus fluviatilis	Coastal to lowland in saltmarshes and other shallow poorly drained saline areas, also found along some freshwater rivers and lakes (New Zealand Plant Conservation Network, 2023). Grey wet sand, on river bank.		P1	7.51		2008			0	0	1	0	1	2	Low	Negligible	No record within the vicinity, no habitat recorded within survey area.
Byblis gigantea	Sandy-peat swamps. Seasonally wet areas.		P3	7.90		1901			0	0	0	1	2	3	Moderate	Low	Species not recorded, no suitable habitat identified during survey.
Caladenia huegelii	Grey or brown sand, clay loam.	CE	CR	7.35	3.08	2000	2017	Known	0	1	1	1	1	4	Moderate	Low	Species not recorded, no suitable habitat identified during survey.
Calandrinia sp. Bayswater (C. Andrews s.n. 11/1902)	Unavailable.		P1	8.95		1900			0	0	0	0	2	2	Low	Negligible	No recent records recorded within the vicinity. Not identified during survey.
Calectasia elegans	between Pinjar and Bullsbrook on deep, grey, quartz sand in habitats that have experienced infrequent fires. Recorded growing in *Banksia menziesii* and *B. attenuata* woodland (Barrett, R and Barret, M, 2015).		P1	6.66	7.12	2008	2021		0	0	1	1	2	4	Moderate	Low	Species not recorded, no suitable habitat identified during survey.
Carex tereticaulis	Black peaty sand.		P3	6.12	6.00	1999	1999		0	0	0	1	1	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Conostylis bracteata	Sand, limestone. Consolidated sand dunes.		P3	17.01	17.40	1997	1997		0	0	0	0	1	1	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Cyanicula ixioides subsp. *ixioides*	Laterite, gravel.		P4	6.03		1900			0	0	0	1	0	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Cyathochaeta teretifolia	Grey sand, sandy clay. Swamps, creek edges.		P3	3.01	3.01	2008	2002		0	1	1	1	1	4	Moderate	Low	Species not recorded, no suitable habitat identified during survey.
Dampiera triloba	Loamy sand (WA Herbarium, 2023).		P3	7.80		2009			0	0	1	0	2	3	Moderate	Low	Species not recorded, no suitable habitat identified during survey.
Darwinia pimelioides	Loam, sandy loam. Granite outcrops.		P4	3.85		1987			0	1	0	1	1	3	Low	Negligible	No suitable habitat present. No records in the vicinity.
Diuris drummondii	Low-lying depressions, swamps.	V	VU	7.97		1900		Likely	0	0	0	1	2	3	Moderate	Low	Species not recorded, no suitable habitat identified during survey.
Drosera patens	Sandy soils. Margins of winter-wet depressions, swamps and lakes.		P1	6.39		2020			0	0	1	0	2	3	Moderate	Low	Species not recorded, no suitable habitat identified during survey.
Drosera x sidjamesii	Peaty sand. Along lake margins, close to winter high-water line.		P1	6.39		2020			0	0	1	0	2	3	Moderate	Low	Species not recorded, no suitable habitat identified during survey.
Eleocharis keigheryi	Clay, sandy loam. Emergent in freshwater: creeks, claypans.	V	VU	7.19	8.41	2007	2007	Known	0	0	1	1	1	3	Moderate	Low	Species not recorded, no suitable habitat identified during survey.
Eryngium pinnatifidum subsp. *Palustre* (G.J. Keighery 13459)	In a winter wet claypan, water to 20 cm deep. Grey-brown clay (pgv, Environmental, 2019).		P3	4.38		1995			0	1	0	1	1	3	Low	Negligible	No suitable habitat present. No records in the vicinity.
Eucalyptus argutifolia	On slopes or gullies near the coast and shallow soils over limestone. Slopes or gullies of limestone ridges, outcrops.	V	VU	23.36	23.38	2006	2018	May	0	0	1	0	0	1	Negligible	Negligible	No suitable habitat present. No records in the vicinity.
Eucalyptus foecunda subsp. *foecunda*	Limestone heath and limestone soils in coastal areas (DCCEEW, 2023).		P4	19.24		2010			0	0	1	0	0	1	Negligible	Negligible	No suitable habitat present. No records in the vicinity.
Grevillea curviloba	Grey sand, sandy loam. Winter-wet heath.	E		4.92		2019			0	1	1	1	1	4	Moderate	Low	Species not recorded, no suitable habitat identified during survey.
Grevillea sp. Ocean Reef (D. Pike Joon 4)	Broard sand dune, grey-brown dry sand. Limestone boulders (WA Herbarium, 2023).		P1	21.58		2013			0	0	1	0	1	2	Low	Negligible	No suitable habitat present. No records in the vicinity.
Haemodorum loratum	Grey or yellow sand, gravel.		P3	6.16	6.36	1981	1981		0	0	0	1	1	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Hydrocotyle lemnoides	Swamps.		P4	7.33	6.88	1906	1990		0	0	0	1	1	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Hydrocotyle striata	Clay and/or springs.		P1	2.26		2016			0	1	1	1	2	5	High	Low	Species not recorded, no suitable habitat identified during survey.

Appendix B - Flora Desktop Assessment

Taxon	Habitat[1]	Cons. Code EPBC	Cons. Code WA	Distance WAHERB (Km)	Distance TPFL (Km)	Date WAHERB	Date TPFL	PMST	Likelihood Assessment					Total Score	Likelihood	Post-survey likelihood	Comments
									Recorded in the survey area	Known occurrence nearby (5km)	Recent Record (Last 20 years)	Known occurrence within the LGA	Potential presence of suitable habitat within the Survey Area (0.1.2)				
Hypolaena robusta	White sand. Sandplains.		P4	3.60		1999			0	1	0	1	2	4	Moderate	Low	Species not recorded, no suitable habitat identified during survey.
Isopogon autumnalis	Sandy soils, often in Banksia woodlands		P3	5.50		1991			0	0	0	1	2	3	Moderate	Low	Species not recorded, no suitable habitat identified during survey.
Jacksonia sericea	Calcareous & sandy soils.		P4	6.40	13.47	2020	1990		0	0	1	1	2	4	Moderate	Low	Species not recorded, no suitable habitat identified during survey.
Lasiopetalum glutinosum subsp. *glutinosum*	Typically found on the Darling Scarp in the Jarrah Forest or open woodland dominated by Jarrah, Marri and banksia in open, low scrub over heath, on steep slopes of lateritic gravel, clay or sandy loam near granite outcrops or creeklines (Shepard, K & Wilkins, C, 2015).		P3	7.03		1900			0	0	0	1	1	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Leucopogon maritimus	On near-coastal Quindalup dunes in low healthland and deep, calcareous sands, on the mid to upper slopes of dunes or in shallow sand over limestone, but avoiding the thicker vegetation of the swales (Hislop, M, 2011).		P1	21.02		1966			0	0	0	0	1	1	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Levenhookia preissii	Grey or black, peaty sand. Swamps.		P1	7.90		1951			0	0	0	1	1	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Marianthus paralius	White sand over limestone. Low coastal cliffs.	E	EN	18.53	23.13	2021	2018	Known	0	0	1	0	1	2	Low	Negligible	No suitable habitat present. No records in the vicinity.
Meionectes tenuifolia	Granite flats, shallow soil at margins, inundated. Grey clay (Mainroads, 2015).		P3	4.23	5.27	2007	1995		0	1	1	1	0	3	Moderate	Low	No suitable habitat present.Not recorded during the survey.
Melaleuca sp. Wanneroo (G.J. Keighery 16705)	Dense patches Melaleuca species, predominantly *M. systena* , when growing on very shallow soils over limestone 'caprock' on ridges (TSSC, 2019).	E	EN	23.56	23.56	2019	2019		0	0	1	0	0	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Millotia tenuifolia var. *laevis*	Granite or laterite soils.		P2	5.63		2018			0	0	1	1	0	2	Negligible	Negligible	No suitable habitat present. No records in the vicinity.
Myriophyllum echinatum	Clay. Winter-wet flats.		P3	8.18		1900			0	0	0	1	2	3	Moderate	Low	Species not recorded, no suitable habitat identified during survey.
Netrostylis sp. Chandala (G.J. Keighery 17055)	Dampland with thick leaf litter over dark grey sand (WA Herbarium, 2023).		P2	2.29		2013			0	1	1	1	1	4	Moderate	Low	Species not recorded, no suitable habitat identified during survey.
Persoonia sulcata	Lateritic or granitic soils.		P4	7.42		1980			0	0	0	1	0	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Phlebocarya pilosissima subsp. *pilosissima*	White or grey sand, lateritic gravel.		P3	5.97		1999			0	0	0	1	1	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Pimelea calcicola	Sand. Coastal limestone ridges.		P3	11.46		1990			0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Pithocarpa corymbulosa	Gravelly or sandy loam. Amongst granite outcrops.		P3	23.77		1963			0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Poranthera moorokatta	Two populations: Kings Park in Banksia woodland, on white silica sand in open spaces(no litter or shade) and in Ellenbrook in a shallow dampland on mixed grey and white sand with scattered leaf litter (Barrett, R, 2012).		P2	3.82		2018			0	1	1	1	1	4	Moderate	Low	Species not recorded, no suitable habitat identified during survey.
Sarcozona bicarinata	White sand.		P3	22.09	23.05	1997	1992		0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Schoenus capillifolius	Brown mud. Claypans.		P3	3.80	8.22	2012	1990		0	1	1	1	1	4	Moderate	Low	Species not recorded, no suitable habitat identified during survey.
Schoenus griffinianus	White sand.		P4	12.13		1993			0	0	0	1	2	3	Moderate	Low	Species not recorded, no suitable habitat identified during survey.
Schoenus natans	Winter-wet depressions.		P4	8.39		2004			0	0	1	1	2	4	Moderate	Low	Species not recorded, no suitable habitat identified during survey.
Schoenus sp. Waroona (G.J. Keighery 12235)	Clay or sandy clay. Winter-wet flats.		P3	3.80		1988			0	1	0	1	2	4	Moderate	Low	Species not recorded, no suitable habitat identified during survey.
Stachystemon exilis	Open, low-lying Banksia woodland (Hislop, M & Davies, R, 2020).		P1	1.17		2018			0	1	1	1	1	4	Moderate	Low	Species not recorded, no suitable habitat identified during survey.
Stenanthemum sublineare	Littered white sand. Coastal plain.		P2	17.20		2005			0	0	1	1	1	3	Moderate	Low	Species not recorded, no suitable habitat identified during survey.
Stylidium longitubum	Sandy clay, clay. Seasonal wetlands.		P4	3.80	2.37	2012	2005		0	1	1	1	2	5	High	Low	Species not recorded, no suitable habitat identified during survey.
Stylidium maritimum	Sand over limestone. Dune slopes and flats. Coastal heath and shrubland, open Banksia woodland.		P3	27.54		2009			0	0	1	0	1	2	Low	Negligible	No suitable habitat present. No records in the vicinity.
Stylidium paludicola	Peaty sand over clay. Winter wet habitats. Marri and Melaleuca woodland, Melaleuca shrubland.		P3	6.59		2006			0	0	1	1	1	3	Moderate	Low	Species not recorded, no suitable habitat identified during survey.
Stylidium trudgenii	Grey sand, dark grey to black sandy peat. Margins of winter-wet swamps, depressions.		P3	4.42		2000			0	1	0	1	2	4	Moderate	Low	Species not recorded, no suitable habitat identified during survey.

Appendix B - Flora Desktop Assessment

Taxon	Habitat[1]	Cons. Code EPBC	Cons. Code WA	Distance WAHERB (Km)	Distance TPFL (Km)	Date WAHERB	Date TPFL	PMST	Likelihood Assessment					Total Score	Likelihood	Post-survey likelihood	Comments
									Recorded in the survey area	Known occurrence nearby (5km)	Recent Record (Last 20 years)	Known occurrence within the LGA	Potential presence of suitable habitat within the Survey Area (0,1,2)				
Styphelia filifolia	Sandy soils of the coastal plain, usually in banksia or Jarrah woodland and low lying situations (Hislop, M, Puente-Lelievre, C, 2017).		P3	7.97		2007			0	0	1	1	2	4	Moderate	Low	Species not recorded, no suitable habitat identified during survey.
Tetratheca pilifera	Gravelly soils.		P3	0.83		2020			0	1	1	1	1	4	Moderate	Low	No gravels documented onsite
Thelymitra variegata	Sandy clay, sand, laterite.		P2	15.60		1900			0	0	0	0	1	1	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Thysanotus glaucus	White, grey or yellow sand, sandy gravel.		P4	6.61		1990			0	0	0	1	1	2	Low	Negligible	No suitable habitat present. No records in the vicinity.
Thysanotus sp. Badgingarra (E.A. Griffin 2511)	Grey sand with lateritic gravel.		P2	4.57		1991			0	1	0	1	1	3	Low	Negligible	No suitable habitat present. No records in the vicinity.
Tripterococcus sp. Brachylobus (A.S. George 14234)	Seasonal Wetland, flat ground, black fine peaty clay loam sand, poor drainage, wet during winter/spring (WA Herbarium, 2023).		P4	21.72	21.72	1994	1994		0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No records in the vicinity.
Trithuria occidentalis	From one confirmed location in Ellenbrook. On the edge, partly submerged within a shallow, winter wet claypan in very open *Melaleuca lateritia* (DEC, 2012).	E	EN	3.79	8.43	2012	2018	Likely	0	1	1	1	1	4	Moderate	Low	Species not recorded, no suitable habitat identified during survey.
Verticordia lindleyi subsp. *lindleyi*	Sand, sandy clay. Winter-wet depressions.		P4	1.89		2006			0	1	1	1	1	4	Moderate	Low	Species not recorded, no suitable habitat identified during survey.
Drosera occidentalis	Wetlands between Perth and Pinjarra (Alexander, G, 1989).		P4		4.68		1986		0	1	0	1	1	3	Low	Negligible	Species not recorded, no suitable habitat identified during survey.
Grevillea curviloba subsp. *curviloba*	Grey sand. Winter-wet heath.	E			4.88		2019	Known	0	1	1	1	1	4	Moderate	Low	Species not recorded, no suitable habitat identified during survey.
Hibbertia helianthemoides	Clayey sand over sandstone or loam over quartzite. Hills and scree slopes.		P4		25.53		2002		0	0	0	0	1	1	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Hibbertia leptotheca	Grey sand, limestone, small cliff (TPFL, 2023).		P3		23.06		1990		0	0	0	0	1	1	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Grevillea thelemanniana	Sand, sandy clay. Winter-wet low-lying flats.	CE	CR					Known	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Darwinia foetida	grey-white sand on swampy, seasonally wet, winter-wet or wet clay sites. Plants are found alongside sump land (DCCEEW, 2023).	CR	EN					Known	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Synaphea sp. Fairbridge Farm (D.Papenfus 696)	Sandy with lateritic pebbles. Near winter-wet flats, in low woodland with weedy grasses.	CR	CE					Known	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Ptilotus pyramidatus	Seasonally inundated flat (floodplain) with pale grey, muddy-sand to sandy-mud alluvium (DCCEEW, 2023).	CR	CE					Known	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Andersonia gracilis	White/grey sand, sandy clay, gravelly loam. Winter-wet areas, near swamps.	E	EN					Known	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Banksia mimica	White or grey sand over laterite, sandy loam.	V	VU					Known	0	0	0	0	1	1	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Darwinia apiculata	Lateritic soils.	E	EN					Known	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Thelymitra stellata	Sand, gravel, lateritic loam.	E	EN					Known	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Eucalyptus x balanites	Sandy soils with lateritic gravel.	E	CE					May	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Eremophila glabra subsp. *chlorella*	Sandy clay. Winter-wet depressions.	E	EN					Known	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Calytrix breviseta subsp. *breviseta*	Sandy clay. Swampy flats.	CE	CR					Known	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Grevillea curviloba subsp. *incurva*	Sand, sandy loam. Winter-wet heath.	E						Known	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Conospermum densiflorum subsp. *unicephalatum*	Clay soils. Low-lying areas.	E	EN					May	0	0	0	0	1	1	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Eucalyptus leprophloia	White or grey sand over laterite. Valley slopes.	E	EN					May	0	0	0	0	1	1	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Grevillea corrugata	Gravelly loam. Roadsides.	E	EN					Likely	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Diplolaena andrewsii	Loam, clay. Granite outcrops & hillsides.	E	EN					Known	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Macarthuria keigheryi	White or grey sand.	E	EN					Known	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Thelymitra dedmaniarum	Granite.	E	EN					Known	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Grevillea althoferorum	Grey sand with gravel.	E						Likely	0	0	0	0	1	1	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Synaphea sp. Pinjarra Plain (A.S.George 17182)	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.	E	EN					May	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Diuris purdiei	Grey-black sand, moist. Winter-wet swamps.		P4					Known	0	0	0	0	1	1	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Drakaea elastica	White or grey sand. Low-lying situations adjoining winter-wet swamps.	E	CE					Likely	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Grevillea christineae	Clay loam, sandy clay, often moist.	E	EN					Known	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.

Appendix B - Flora Desktop Assessment

Taxon	Habitat[1]	Cons. Code EPBC	Cons. Code WA	Distance WAHERB (Km)	Distance TPFL (Km)	Date WAHERB	Date TPFL	PMST	Likelihood Assessment					Total Score	Likelihood	Post-survey likelihood	Comments
									Recorded in the survey area	Known occurrence nearby (5km)	Recent Record (Last 20 years)	Known occurrence within the LGA	Potential presence of suitable habitat within the Survey Area (0,1,2)				
Lepidosperma rostratum	Peaty sand, clay.	E	EN					Known	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Austrostipa bronweniae	Swan Coastal Plain in flat low-lying calcareous winter wet grey-brown sandy loam or dark brown loam over clay TSSC, 2018).	E	EN					Known	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Chamelaucium lullfitzii	white/yellow sand supporting open low woodland within coatal Banksia woodlan and a species-rich scrub understorey (DCCEEW, 2023).	E	VU					May	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Caleana dixonii	Deep sand in open areas beneath dense tall shrubland with scattered emergent banksias, or in shallow sand over laterite in heathland (DCCEEW, 2023).	E	VU					May	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Acacia anomala	Lateritic soils. Slopes.	V	VU					Known	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Acacia aphylla	Sand, loam, clay loam. Granite outcrops, hills.	V	VU					Known	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Diuris micrantha	Brown loamy clay. Winter-wet swamps, in shallow water.	V	VU					Likely	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Drakaea micrantha	Often infertile white-grey sand. On cleared fire breaks or on disturbed open-sandy patches.	V	EN					Likely	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Anthocercis gracilis	Sandy or loamy soils. Granite outcrops.	V	VU					Known	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Grevillea flexuosa	Red-brown sand with laterite & gravel, sand over granite. Ridgetop plateau & associated breakaways.	V	VU					Likely	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Conospermum undulatum	Grey or yellow-orange clayey sand.	V	VU					Known	0	0	0	0	1	1	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Anigozanthos viridis subsp. *terraspectans*	Grey sand, clay loam. Winter-wet depressions.	V	VU					Likely	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.

Northern Terminal Flora Desktop Assessment

Taxon	Habitat[1]	Cons. Code EPBC	Cons. Code WA	Distance WAHERB (Km)	Distance TPFL (Km)	Date WAHERB	Date TPFL	PMST	Likelihood Assessment					Total Score	Likelihood	Post-survey likelihood	Comments
									Recorded in the survey area	Known occurrence nearby (5km)	Recent Record (Last 20 years)	Known occurrence within the LGA	Potential presence of suitable habitat within the Survey Area (0,1,2)				
Acacia benthamii	Typically on limestone breakaways.		P2	6.09	16.79	2013	2000		0	0	1	1	0	2	Negligible	Negligible	No suitable habitat present. No records in the vicinity.
Acacia oncinophylla subsp. *oncinophylla*	Granitic soils.		P3	12.88		1980			0	0	0	1	0	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Adenanthos cygnorum subsp. *chamaephyton*	Grey sand, lateritic gravel.		P3	32.49	32.49	1981	1981		0	0	0	0	1	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Anigozanthos humilis subsp. *chrysanthus*	Grey or yellow sand, clay, gravel, laterite		P4	3.28		2014			0	1	1	1	1	4	Moderate	Low	No habitat identified during survey.
Austrostipa mundula	In sand over limestone.		P3	15.63		1900			0	0	0	0	1	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Baeckea sp. Limestone (N. Gibson & M.N. Lyons 1425)	Grey sand, yellow sand with limestone outcropping, hills.		P1	12.09	12.22	2021	2021		0	0	1	0	0	1	Negligible	Negligible	No suitable habitat present. No records in the vicinity.
Bolboschoenus fluviatilis	Littoral zone, floodplain. Wet grey sand, silt, mud.		P1	5.53		2008			0	0	1	0	2	3	Moderate	Low	No habitat or individuals identified during survey.
Byblis gigantea	Sandy-peat swamps. Seasonally wet areas.		P3	9.34		1901			0	0	0	1	2	3	Moderate	Low	No habitat identified during survey.
Caladenia huegelii	Grey or brown sand, clay loam.	CE	CR	3.81	2.18	2000	2017	Known	0	1	1	1	2	5	High	Low	No habitat identified during survey. No individuals identified.
Calandrinia sp. Bayswater (C. Andrews s.n. 11/1902)	No information available		P1	5.43		1900			0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Calectasia elegans	between Pinjar and Bullsbrook on deep, grey, quartz sand in habitats that have experienced infrequent fires. Recorded growing in *Banksia menziesii* and *B. attenuata* woodland (Barrett, R and Barret, M, 2015).		P1	13.28	13.93	2008	2021		0	0	1	1	2	4	Moderate	Low	No habitat identified during survey.
Carex tereticaulis	Black peaty sand.		P3	7.59	7.67	1999	1999		0	0	0	1	2	3	Moderate	Low	No habitat identified during survey.
isopogon autumnalis	Sandy soils, often in Banksia woodlands		P3	6.24		1991			0	0	0	1	1	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Cyanicula ixioides subsp. *ixioides*	Laterite, gravel.		P4	14.84		1900			0	0	0	1	0	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Cyathochaeta teretifolia	Seasonally wet drainage lines and margins of permanent water sources, flat ground. Grey sand with clay, poor drainage (WA Herbarium 2023).		P3	3.71	2.85	2008	2002		0	1	1	1	2	5	High	Low	No habitat identified during survey. No individuals identified.
Dampiera triloba	Loamy sand.		P3	6.24		2009			0	0	1	0	2	3	Moderate	Low	No habitat identified during survey.
Darwinia pimelioides	Loam, sandy loam. Granite outcrops.		P4	9.44		1987			0	0	0	1	2	3	Moderate	Low	No habitat identified during survey.
Diuris drummondii	Low-lying depressions, swamps.	V	VU	8.52		1900		Likely	0	0	0	1	2	3	Moderate	Low	No habitat identified during survey.
Drosera patens	Sandy soils. Margins of winter-wet depressions, swamps and lakes.		P1	2.15		2020			0	1	1	0	2	4	High	Low	No habitat identified during survey. No individuals identified.
Drosera x sidjamesii	Peaty sand. Along lake margins, close to winter high-water line.		P1	2.15		2020			0	1	1	0	2	4	High	Low	No habitat identified during survey. No individuals identified.
Eleocharis keigheryi	Clay, sandy loam. Emergent in freshwater: creeks, claypans.	V	VU	16.05	17.21	2007	2007	Known	0	0	1	1	1	3	Low	Negligible	No suitable habitat present. No records in the vicinity.
Eryngium pinnatifidum subsp. *Palustre* (G.J. Keighery 13459)	In a winter wet claypan, water to 20 cm deep. Grey-brown clay		P3	12.83		1995			0	0	0	1	1	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Eucalyptus argutifolia	Shallow soils over limestone. Slopes or gullies of limestone ridges, outcrops.	V	VU	22.23	24.52	2006	2018	May	0	0	1	0	0	1	Negligible	Negligible	No suitable habitat present. No records in the vicinity.
Eucalyptus foecunda subsp. *foecunda*	Limestone/ limestone outcrops in heath and sandy soils in coastal areas. Sometimes on fixed dunes and slopes of hills (DCCEEW, 2023).		P4	12.69		2010			0	0	1	0	0	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Grevillea curviloba	Grey sand, sandy loam. Winter-wet heath.	E	EN	12.97		2019			0	0	1	1	2	4	Moderate	Low	No habitat identified during survey.
Grevillea sp. Ocean Reef (D. Pike Joon 4)	Broard sand dune, grey-brown dry sand. Limestone boulders (WA Herbarium, 2023).		P1	18.05		2013			0	0	1	0	0	1	Negligible	Negligible	No suitable habitat present. No records in the vicinity.
Haemodorum loratum	Grey or yellow sand, gravel.		P3	14.95	15.14	1981	1981		0	0	0	1	2	3	Moderate	Low	No habitat identified during survey.
Hydrocotyle lemnoides	Swamps		P4	9.34	15.75	1906	1990		0	0	0	1	1	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Hydrocotyle striata	Winter wet creekline, springs. Light leaf litter on dark brown sandy humic loam, clay (WA Herbarium, 2023).		P1	4.18		2016			0	1	1	1	1	4	Moderate	Low	No habitat identified during survey.

Taxon	Habitat[1]	Cons. Code EPBC	Cons. Code WA	Distance WAHERB (Km)	Distance TPFL (Km)	Date WAHERB	Date TPFL	PMST	Likelihood Assessment					Total Score	Likelihood	Post-survey likelihood	Comments
									Recorded in the survey area	Known occurrence nearby (5km)	Recent Record (Last 20 years)	Known occurrence within the LGA	Potential presence of suitable habitat within the Survey Area (0,1,2)				
Hypolaena robusta	Dune crest. White sand, sandplains (WA Herbarium, 2023).		P4	11.67		1999			0	0	0	1	1	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Isopogon autumnalis	Sandy soils, often in Banksia woodlands		P3	6.24		1991			0	0	0	1	2	3	Moderate	Low	No habitat identified during survey.
Jacksonia sericea	Calcareous and sandy soils		P4	0.70	6.80	2020	1990		0	1	1	1	2	5	High	Low	No habitat identified during survey. No individuals identified.
Lasiopetalum glutinosum subsp. *glutinosum*	Open woodland dominated by *Eucalyptus marginata, Corymbia calophylla, Banksia menziesii* and *B. attenuata* and in open, low scrub over heath, on steep slopes of lateritic gravel, clay or sandy loam near granite outcrops and creeklines (Shepherd and Wilkins, 2015).		P3	10.55		1900			0	0	0	1	1	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Leucopogon maritimus	Occurs in deep, calcareous sands, on the mid to upper slopes of dunes or in shallow sand over limestone, but avoiding the thicker vegetation of the swales, grows in low heathland communities		P1	16.49		1966			0	0	0	0	1	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Levenhookia preissii	Grey or black, peaty sand. Swamps.		P1	6.24		1951			0	0	0	1	2	3	Moderate	Low	No habitat identified during survey.
Marianthus paralius	Coastal heath in areas of white sand and brown loam, on coastal limestone cliffs	E	CR	16.02	20.33	2021	2018	Known	0	0	1	0	0	1	Negligible	Negligible	No suitable habitat present. No records in the vicinity.
Meionectes tenuifolia	Granite flats, shallow soils at margins, inundated. Grey clay, reserve and wetland (Mainroads, 2015).		P3	7.59	14.13	2007	1995		0	0	1	1	0	2	Negligible	Negligible	No suitable habitat present. No records in the vicinity.
Melaleuca sp. Wanneroo (G.J. Keighery 16705)	Restricted to limestone ridges within locality of Nowergup. Plants occur on upper slopes of rugged limestone ridges or where a high proportion of limestone outcropping occurs. Soils are shallow grey to mossy black sands, depeding on the amount of limestone 'caprock' (TSSC 2019)	E	EN	24.27	24.27	2019	2019		0	0	1	0	0	1	Negligible	Negligible	No suitable habitat present. No records in the vicinity.
Millotia tenuifolia var. *laevis*	Granite or laterite soils.		P2	4.91		2018			0	1	1	1	0	3	Negligible	Negligible	No suitable habitat present. No records in the vicinity.
Myriophyllum echinatum	Grey-black sandy clay. Winter-wet flats.		P3	9.84		1900			0	0	0	1	2	3	Moderate	Low	No habitat identified during survey.
Netrostylis sp. Chandala (G.J. Keighery 17055)	Dampland with thick leaf litter over dark grey sand.		P2	4.47		2013			0	1	1	1	2	5	High	Low	No habitat identified during survey. No individuals identified.
Persoonia sulcata	Lateritic or granitic soils.		P4	16.11		1980			0	0	0	1	0	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Phlebocarya pilosissima subsp. *pilosissima*	White or grey sand, lateritic gravel.		P3	13.99		1999			0	0	0	1	1	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Pimelea calcicola	Sand. Coastal limestone ridges.		P3	13.30		1990			0	0	0	0	1	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Pithocarpa corymbulosa	Gravelly or sandy loam. Amongst granite outcrops.		P3	26.73		1963			0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Poranthera moorokatta	Very gently inclined plain, white silica sand in open spaces between shurbs, not in shaded areas or in areas of high litter cover (WA Herbarium, 2023)		P2	3.88		2018			0	1	1	1	2	5	High	Low	No habitat identified during survey. No individuals identified.
Sarcozona bicarinata	White sand.		P3	19.60	20.25	1997	1992		0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Schoenus capillifolius	Brown mud. Claypans.		P3	12.49	17.04	2012	1990		0	0	1	1	1	3	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Schoenus griffinianus	White sand.		P4	17.30		1993			0	0	0	1	2	3	Moderate	Low	No habitat identified during survey.
Schoenus natans	Winter-wet depressions.		P4	17.20		2004			0	0	1	1	2	4	Moderate	Low	No habitat identified during survey.
Schoenus sp. Waroona (G.J. Keighery 12235)	Clay or sandy clay. Winter-wet flats.		P3	12.49		1988			0	0	0	1	2	3	Moderate	Low	No habitat identified during survey.
Stachystemon exilis	On grey sand, seasonally damp.		P1	3.88		2018			0	1	1	1	2	5	High	Low	No habitat identified during survey. No individuals identified.
Stenanthemum sublineare	Littered white sand. Coastal plain.		P2	21.17		2005			0	0	1	1	1	3	Low	Negligible	No suitable habitat present. No records in the vicinity.
Stylidium longitubum	Sandy clay, clay, seasonal wetlands		P4	10.55	4.48	2012	2005		0	1	1	1	2	5	High	Low	No habitat identified during survey. No individuals identified.
Stylidium maritimum	Sand over limestone. Dune slopes and flats. Coastal heath and shrubland, open Banksia woodland.		P3	29.20		2009			0	0	1	0	2	3	Moderate	Low	No habitat identified during survey.
Stylidium paludicola	Peaty sand over clay. Winter wet habitats. Marri and Melaleuca woodland, Melaleuca shrubland.		P3	6.24		2006			0	0	1	1	2	4	Moderate	Low	No habitat identified during survey.
Stylidium trudgenii	Grey sand, dark grey to black sandy peat. Margins of winter-wet swamps, depressions.		P3	12.21		2000			0	0	0	1	2	3	Moderate	Low	No habitat identified during survey.

Taxon	Habitat[1]	Cons. Code EPBC	Cons. Code WA	Distance WAHERB (Km)	Distance TPFL (Km)	Date WAHERB	Date TPFL	PMST	Likelihood Assessment					Total Score	Likelihood	Post-survey likelihood	Comments
									Recorded in the survey area	Known occurrence nearby (5km)	Recent Record (Last 20 years)	Known occurrence within the LGA	Potential presence of suitable habitat within the Survey Area (0,1,2)				
Styphelia filifolia	Sandy soils of the coastal plain (with one known occurrence from the northern Darling Scarp), usually in Banksia or Jarrah woodland and in low-lying situations (Hislop & Puente--Lelièvre, 2017).		P3	7.67		2007			0	0	1	1	2	4	Moderate	Low	No habitat identified during survey.
Tetratheca pilifera	Gravelly soils.		P3	6.27		2020			0	0	1	1	0	2	Negligible	Negligible	No suitable habitat present. No records in the vicinity.
Thelymitra variegata	Sandy clay, sand, laterite.		P2	14.07		1900			0	0	0	0	1	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Thysanotus glaucus	White, grey or yellow sand, sandy gravel.		P4	11.73		1990			0	0	0	1	2	3	Moderate	Low	No habitat identified during survey.
Thysanotus sp. Badgingarra (E.A. Griffin 2511)	Grey sand with lateritic gravel.		P2	11.35		1991			0	0	0	1	1	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Tripterococcus sp. Brachylobus (A.S. George 14234)	Grey, black or peaty sand. Winter - wet flats		P4	24.24	24.24	1994	1994		0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Trithuria occidentalis	Known from one population near Ellenbrook (DEWHA, 2008). It grows in partly submerged water on edge of shallow, winter-wet claypan in very open shrubland of *Melaleuca lateritia* and annual herbs (DEWHA, 2008).	E	EN	10.55	17.23	2012	2018	Likely	0	0	1	1	1	3	Low	Negligible	No suitable habitat present. No records in the vicinity.
Verticordia lindleyi subsp. *lindleyi*	Sand, sandy clay. Winter-wet depressions.		P4	3.76		2006			0	1	1	1	2	5	High	Low	No habitat identified during survey. No individuals identified.
Drosera occidentalis	Sandy & clayey soils. Swamps & wet depressions.		P4		1.55		1986		0	1	0	1	2	4	Moderate	Low	No habitat identified during survey.
Grevillea curviloba subsp. *curviloba*	Grey sand. Winter-wet heath.	E			13.73		2019	Known	0	0	1	1	2	4	Moderate	Low	No habitat identified during survey.
Hibbertia helianthemoides	Clayey sand over sandstone or loam over quartzite. Hills and scree slopes.		P4		30.79		2002		0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Hibbertia leptotheca	Limestone ridges. Ranges from Yalgorup to Lancelin		P3		20.27		1990		0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Darwinia foetida	Grey-white sand on swampy, seasonally wet sites. Found alongside water pit/well (sump land). Recorded at three locations near town of Muchea.	E	CE					Known	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Synaphea sp. Fairbridge Farm (D.Papenfus 696)	Grey, clayey sand with lateritic pebbles. In low woodland, near winter-wet flats with weedy grasses (DCCEEW, 2023).	CE	CR					Known	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Grevillea thelemanniana	Sand, sandy clay. Winter-wet low-lying flats.	CE	CR					Known	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Ptilotus pyramidatus	Seasonally inundated flat (floodplain). Pale grey, muddy-sand to sandy-mud alluvium (DCCEEW, 2023)	CE	CR					Known	0	0	0	0	1	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Synaphea sp. Pinjarra Plain (A.S.George 17182)	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.	E	EN					May	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Drakaea elastica	White or grey sand. Low-lying situations adjoining winter-wet swamps.	E	CR					Likely	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Diuris purdiei	Grey-black sand, moist. Winter-wet swamps.		P4					Known	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Calytrix breviseta subsp. *breviseta*	Sandy clay. Swampy flats.	CE	CR					Known	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Thelymitra stellata	Red, brown, yellow, or grey sandy loams, clay or gravel over laterite or gravel.	E	EN					Known	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Grevillea curviloba subsp. *incurva*	Sand, sandy loam. Winter-wet heath.	E						Known	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Darwinia apiculata	Lateritic soils.	E	EN					Known	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Lepidosperma rostratum	Peaty sand, clay.	E	EN					Known	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Grevillea christineae	Clay loam, sandy clay, often moist.	E	EN					Known	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Eremophila glabra subsp. *chlorella*	Sandy clay. Winter-wet depressions.	E	EN					Known	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.

Taxon	Habitat[1]	Cons. Code EPBC	Cons. Code WA	Distance WAHERB (Km)	Distance TPFL (Km)	Date WAHERB	Date TPFL	PMST	Likelihood Assessment					Total Score	Likelihood	Post-survey likelihood	Comments
									Recorded in the survey area	Known occurrence nearby (5km)	Recent Record (Last 20 years)	Known occurrence within the LGA	Potential presence of suitable habitat within the Survey Area (0,1,2)				
Eucalyptus x balanites	Sandy soils with lateritic gravel.	E	CR					May	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Banksia mimica	White or grey sand over laterite, sandy loam.	V	VU					Known	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Andersonia gracilis	This species is known from the Badgingarra, Dandaragan and Kenwick areas where it is found on seasonally damp, black sandy clay flats near or on the margins of swamps, often on duplex soils supporting low open heath vegetation with species such as *Calothamnus hirsutus, Verticordia densiflora* and *Kunzea recurva* over sedges (DEC, 2006).	E	EN					Known	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Diploloaena andrewsii	Loam, clay. Granite outcrops & hillsides.	E	EN					Known	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Thelymitra dedmaniarum	Granite	E	EN					Likely	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Macarthuria keigheryi	White or grey sand.	E	EN					Known	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Austrostipa bronweniae	Flat low-lying calcareous winter wet habitat type on the extensively cleared Swan Coastal Plain (TSSC, 2018).	E	EN					Known	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Chamelaucium lullfitzii	White/yellow sand supporting open low woodland with *Eucalyptus todtiana* (Pricklybark), *Banksia attenuata* (Coast Banksia), and *Hibbertia* sp. (DCCEEW, 2023).	E	VU					May	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Caleana dixonii	Deep sand in open areas beneath dense tall shrubland with scattered emergent banksias, or in shallow sand over laterite in heathland (DCCEEW, 2023).	E	VU					May	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Anigozanthos viridis subsp. *terraspectans*	Grey sand, clay loam. Winter-wet depressions.	V	VU					Likely	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.
Acacia anomala	Grows over laterite in shallow sand, loam, clay or gravel that is brown, yellow or grey. Grows on ridges, slopes and low plains, entagled amongst other low shrubs in dense vegetation, and in low open woodland or forest dominated by *Eucalyptus marginata, E. wandoo, E. accedens and Corymbia calophylla.* Occurs on western slopes of Darling Ranges, near Chittering south to Pickering Brook	V	VU					Known	0	0	0	0	1	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Grevillea flexuosa	Red-brown sand with laterite & gravel, sand over granite. Ridgetop plateau & associated breakaways.	V	VU					May	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Diuris micrantha	Brown loamy clay. Winter-wet swamps, in shallow water.	V	VU					Likely	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Conospermum undulatum	Grey or yellow-orange clayey sand.	V	VU					Known	0	0	0	0	1	1	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Anthocercis gracilis	Sandy or loamy soils. Granite outcrops.	V	VU					Known	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Acacia aphylla	Sand, loam, clay loam. Granite outcrops, hills.	V	VU					Known	0	0	0	0	0	0	Negligible	Negligible	No suitable habitat present. No recent records in the vicinity.
Drakaea micrantha	White-grey sand.	V	VU					Likely	0	0	0	0	2	2	Low	Negligible	No suitable habitat present. No recent records in the vicinity.

Appendix C

Fauna Desktop Assessment

Appendix C - Fauna Desktop Assessment

Padbury-Wangara Fauna Likelihood Assessment

Type	Taxon	Common Name	Habitat	Cons. Code WA	Cons. Code EPBC	Date (DBCA)	Records (DBCA)	Distance (km) [DBCA]	PMST	Recorded in Survey Area	Known from Vicinity (<20km)	Recent Record (Last 20 years)	Potential presence of suitable habitat within the Survey Area (0,1,2)	Total Score	Likelihood	Post-survey likelihood	Comments
Bird	*Actitis hypoleucos*	Common Sandpiper	Wide range of coastal wetlands, around muddy margins or rocky shores, some inland wetlands and rarely on mudflats (DCCEEW, 2023)	IA	MI & MA	1991	2	10.36		0	1	0	1	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Apus pacificus*	Fork-tailed Swift	Over inland plains, sometimes boave foothills or in coastal areas (DCCEEW, 2023).	IA	MI & MA	2014	17	6.85		0	1	1	0	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Arenaria interpres*	Ruddy Turnstone	Coastal regions with exposed rock coast lines or coral reefs (DCCEEW, 2023).	IA	V & MI & MA	1991	4	30.29		0	0	0	0	0	Negligible	Negligible	Marine species, no coastal habitat. No waterbodies identified in survey area.
Insect	*Australotomurus morbidus*	Cemetary springtail, Guildford springtail	Undisturbed native grasslands and heathland at low and high elevations (P. Greenslade & R. Jordana, 2014).	P3		1993	6	11.02		0	1	0	1	2	Low	Low	No suitable habitat identified.
Invertebrate	*Austroconops mcmillani*	A biting midge	Larvae live in small aquatic habitats.	P2		2011	8	33.88		0	0	1	0	1	Negligible	Negligible	No surface water identified.
Invertebrate	*Austrosaga spinifer*	Cricket	Banksia heath and low woodlands (South Metro Connect, 2011). Known records exist in Neerabup National Park (DEC, 2012b).	P2		1982	2	15.04		0	1	0	1	2	Low	Low	Limited recent records in proximity.
Mammal	*Bettongia lesueur graii*	Boodie, Burrowing Bettong	open eucalypt or acacia woodland with a grass and shrub understorey to sandridge desert with spinifex hummocks and sparse shrubs (DCCEEW, 2023).	EX	Ex	N/A	2	24.32		0	0	0	1	1	Low	Low	Species considered extinct.
Mammal	*Bettongia penicillata ogilbyi*	Woylie	Dry sclerophyllous forest with a dense understory (ALA, 2023).	EN	CE	2018	98	11.15	Known	0	1	1	1	3	Moderate	Low	No surface water identified.
Bird	*Botaurus poiciloptilus*	Australasian Bittern	Freshwater wetlands and, rarely, estuaries or tidal wetlands, favouring tall dense vegetation (TSSC, 2019).	EN	E	2003	20	6.49	Known	0	1	1	1	3	Moderate	Low	Limited habitat identified.
Bird	*Cacatua pastinator pastinator*	Muir's Corella	Large or dead eucalypts and paperbark in forested areas or lone trees in paddocks along roadsides (DEC, 2008)	CD		N/A	7	18.55		0	1	0	1	2	Low	Low	Limited recent records in proximity.
Bird	*Calidris acuminata*	Sharp-tailed Sandpiper	Occurs along muddy edges of shallow fresh or brackish wetlands with inundated or emergent sedges, grass, saltmarsh or other low vegetation (DCCEEW, 2023).	IA	V & MI & MA	2012	9	6.49		0	1	1	1	3	Moderate	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Calidris alba*	Sanderling	Restricted to the coast, mostly on open sandy beaches exposed to open sea-swell, exposed sandbars and spits, and shingle banks (DCCEEW, 2023).	IA	MI & MA	1980	3	18.32		0	1	0	0	1	Negligible	Negligible	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Calidris canutus*	Red Knot	Intertidal mudflats, sandflats and sandy beaches of sheltered coasts (DCCEEW, 2023).	EN & IA	V & MI & MA	2002	8	18.32		0	1	0	0	1	Negligible	Negligible	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Calidris ferruginea*	Curlew Sandpiper	Intertidal mudflats in sheltered coastal areas and inland around ephemeral and permanent lakes, dams, waterholes and bore drains with bare edges of mud and sand (DCCEEW, 2023).	CR & IA	CE & MI & MA	2005	31	6.49		0	1	1	1	3	Moderate	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Calidris melanotos*	Pectoral Sandpiper	Occupies shallow, fresh waters often containing low grass or other small herbs, swamp margins, flooded pastures and saltmarshes (Pizzey & Knight, 2007;DCCEEW, 2023).	IA	MI & MA	1992	2	20.83		0	0	0	1	1	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Calidris ruficollis*	Red-necked Stint	Coastal sheltered areas and exposed or ocean beaches, sometimes on stony or rocky shores, reefs or shoals (DCCEEW, 2023).	IA	MI & MA	2011	96	4.52		0	1	1	0	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Calidris subminuta*	Long-toed Stint	Freshwater wetlands (DCCEEW, 2023).	IA	MI & MA	1992	4	6.49		0	1	0	1	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Calidris tenuirostris*	Great Knot	Sheltered coastal habitats with large intertidal mudflats or sandflats (DCCEEW, 2023).	CR & IA	V & MI & MA	2005	12	18.32		0	1	1	0	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Calonectris leucomelas*	Streaked Shearwater	Common and widespread around much of the northern coast of Australia, rarely ventures inland (Pizzey & Knight, 2007)	IA	MI & MA	2010	1	12.07		0	1	1	0	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Calyptorhynchus banksii naso*	Forest Red-tailed Black Cockatoo	Inhabits dense Eucalyptus marginata (Jarrah), E. diversicolor (Karri) and Corymbia calophylla (Marri) forests (TSSC, 2009).	VU	V	2020	363	1.20	Known	0	1	1	2	4	High	Known	Identified suring survey.
Bird	*Charadrius leschenaultii*	Greater Sand Plover, Large Sand Plover	Beaches, tidal mudflats, reefs, dunes and is seldom observed far inland (Pizzey & Knight, 2007).	VU & IA	V & MI & MA	2011	2	6.72		0	1	1	0	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Charadrius mongolus*	Lesser Sand Plover	Open intertidal flats of sheltered bays, lagoons or estuaries (Pizzey & Knight, 2007).	EN & IA	E & MI & MA	1999	1	24.21		0	0	0	0	0	Negligible	Negligible	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Chlidonias leucopterus*	White-winged Black Tern, White-winged Tern	Fresh, brackish or saline, and coastal or subcoastal wetlands. They rarely occur on inland wetlands in Australia (DCCEEW, 2023).	IA	MI & MA	1990	1	6.49		0	1	0	1	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Reptile	*Ctenotus gemmula*	Jewelled Ctenotus	Endemic to Western Australia. In the Perth region it is uncommon and restricted to the Swan Coastal Plain. It inhabits low vegetation in Banksia woodland, sheltering in leaf litter under trees, shrubs and abandoned stick-ant nests (Bush et al., 2010).	P3		1999	1	27.49		0	0	0	0	0	Negligible	Negligible	Limited recent records in proximity.

Appendix C - Fauna Desktop Assessment

Type	Taxon	Common Name	Habitat	Cons. Code WA	Cons. Code EPBC	Date (DBCA)	Records (DBCA)	Distance (km) [DBCA]	PMST	Recorded in Survey Area	Known from Vicinity (<20km)	Recent Record (Last 20 years)	Potential presence of suitable habitat within the Survey Area (0,1,2)	Total Score	Likelihood	Post-survey likelihood	Comments
Bird	*Dasyornis longirostris*	Western Bristlebird	Restricted to a coastal strip of southern Western Australia from Two Peoples Bay to near East Mount Barren in the eastern end of Fitzgerald River National Park, with a large gap further west of the National Park (Gillfillan et al., 2007).	EN	E	0	1	19.74		0	1	0	0	1	Negligible	Negligible	Limited habitat present.
Mammal	*Dasyurus geoffroii*	Western Quoll, Chuditch	Currently restricted to south-west Western Australia, in areas dominated by sclerophyll forest or drier woodland, heath and mallee shrubland (Van Dyck & Strahan, 2008).	VU	V	2022	58	4.33	Known	0	1	1	1	3	Moderate	Low	Limited habitat present.
Reptile	*Delma concinna major*	Javelin Lizard	Heaths on dunes and sand-plains along mid- to lower west coast. Subspecies dwells in dense matrix of low vegetation and associated leaf litter in Shark Bay.	P1		2015	1	38.54		0	0	1	0	1	Negligible	Negligible	No habitat present.
Bird	*Elanus scriptus*	Letter-winged kite	Open country and grasslands throughout arid and semi-arid regionsWill disperse to high rainfall and coastal regions when food is abundent (BirdLife, 2021).	P4		1980	1	18.32		0	1	0	1	2	Low	Low	Limited habitat present.
Invertebrate	*Euoplos inornatus*	Australian armored trapdoor spiders	Most records are from the Darling Scarp and jarrah forest (Invertebrate Solutions, 2018).	P3		1998	1	22.12		0	0	0	0	0	Negligible	Negligible	Limited recent records in close proximity.
Bird	*Falco hypoleucos*	Grey Falcon	Timered lowland plains, including acacia shrublands)particularly with tree-lined watercourses), tussock grassland and open woodland (TSSC, 2020).	VU	V	1929	1	19.95		0	1	0	1	2	Low	Low	No watercourses present.
Bird	*Falco peregrinus*	Peregrine Falcon	Rainforests, arid zones and coastal to alpine areas (BirdLife, 2021).	OS		2014	109	0.54		0	1	1	1	3	Moderate	Moderate	Likely a fly over species.
Fish	*Galaxiella nigrostriata*	Black-stripe Minnow	Acidic ephemeral bodies of water in peat flats located in the south west corner of Western Australia. The major populations occur from Augusta to Albany and near Bunbury and Gingin (Morgan et al, 2011). Generally prefer sandy, moist soil when ephemeral pools dry out.	EN		2009	3	20.77	Known	0	0	1	0	1	Negligible	Negligible	No surface water identified.
Bird	*Glareola maldivarum*	Oriental Pratincole	Open plains, floodplains or short grassland (including farmland), often occurring near terrestrial wetlands, and occurring along the coast. The species does not breed in Australia (DCCEEW, 2023).	IA	MI & MA	1981	1	12.06		0	1	0	1	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Invertebrate	*Hesperocolletes douglasi*	Rottnest Bee	Extant population known in Pinjar. Only been two individuals ever found (TSSC, 2019).	CR	CE	2015	2	27.45	May	0	0	1	0	1	Negligible	Negligible	Limited recent records in close proximity.
Mammal	*Hydromys chrysogaster*	Water Rat	Tnear permanent bodies of fresh or brackish water (Van Dyck & Strahan, 2008).	P4		2019	52	1.08		0	1	1	0	2	Low	Low	No surface water identified.
Bird	*Hydroprogne caspia*	Caspian Tern	The Caspian Tern is found in sheltered coastal embayments and those with sandy or muddy margins (DCCEEW, 2023).	IA	MI & MA	1994	8	16.47		0	1	0	1	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Invertebrate	*Hylaeus globuliferus*	Native Bee	Habitats containing flowers from *Adenanthos cygnorum* and also *Banksia attenuata* (Western Wildlife, 2009).	P3		1996	19	13.26		0	1	0	1	2	Low	Low	Limited suitable habitat present.
Invertebrate	*Idiosoma sigillatum*	Swan Coastal Plain shield-backed trapdoor spider	Remnant habitats in Banksia woodland and heathland on sandy soils (Rix et al., 2018).	P3		2019	124	0.24		0	1	1	2	4	High	Moderate	Banksia woodland present.
Mammal	*Isoodon fusciventer*	Quenda, Southern Brown Bandicoot	Forest, woodland, heath and shrub communities, with sandy soils and dense heathy vegetation (Van Dyck & Strahan, 2008).	P4		2021	1588	0.04		0	1	1	2	4	High	Known	Identified during survey.
Bird	*Ixobrychus flavicollis australis (south*	Black Bittern (Southwest subpopulation)	Terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation includng flooded grassland, forest, woodland, rainforest and mangroves (NSW Government, 2018).	P2		1987	2	5.98		0	1	0	1	2	Low	Low	No surface water identified.
Invertebrate	*Leioproctus contrarius*	a short-tongued bee	Western Australia, associated with *Goodenia* sp. and *Lechenaultia* sp. (South Metro Connect, 2011).	P3		1982	6	14.91		0	1	0	1	2	Low	Low	Limited suitable habitat present.
Invertebrate	*Leioproctus douglasiellus*	a short-tongued bee	Known from Kenwick wetlands, Cannington and Forestdale Lake and near Lithgow in the Blue Mountains of NSW (ALA, 2019). Has an association with Goodenia filiformis and Anthotium junciforme (South Metro Connect, 2011).	EN		1954	4	27.00	Known	0	0	0	1	1	Low	Low	No surface water identified.
Bird	*Leipoa ocellata*	Malleefowl	Semi-arid to arid zone in shrublands and low woodlands dominated by mallee and associated habitats such as such as Broombush (Melaleuca uncinata) and Scrub Pine (Callitris verrucosa) (Benshemesh, 2007).	VU	V	1981	46	21.88	Likely	0	0	0	0	0	Negligible	Negligible	No habitat present.
Bird	*Limosa lapponica*	Bar-tailed Godwit	Widespread around the coast of Western Australia from Eyre to Derby (DotE, 2015).	IA (& VU or CR at subsp. level)	MI (& V or CE at subsp. level)	2004	18	9.35		0	1	1	0	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Limosa lapponica menzbieri*	Northern Siberian Bar-tailed Godwit	Coastal habitat, including large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It has also been recorded in coastal sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats (Higgins & Davies, 1996).	CR	CE				Known	0	0	0	1	1	Low	Low	No surface water identified.
Bird	*Limosa limosa*	Black-tailed Godwit	Coastal habitat including sheltered bays, estuaries and lagoons with large intertidal mudflats or sandflats (DCCEEW, 2023)	IA	MI & MA	2011	4	6.49		0	1	1	0	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Mammal	*Macroderma gigas*	Ghost Bat	Northern Australia, inhabiting arid Pilbara to tropical savanna woodlands and rainforests rainforest, monsoon and vine thicket, open woodlands and arid areas and reside in caves, rock crevices and disused mine adits (DoE 2016).	VU	V				May	0	0	0	0	0	Negligible	Negligible	No habitat present.
Bird	*Macronectes giganteus*	Southern Giant-Petrel	The Southern Giant-Petrel occurs over subantarctic waters in summer near its breeding islands in the Atlantic and Indian Oceans, in subantarctic to southern subtropical waters on the Argentinean continental shelf and off New Zealand and the cold eastern boundary current off South America. In winter, it is common off South America, South Africa, Australia and New Zealand. It occurs in both pelagic and inshore waters. It is attracted to land at sewage outfalls and scavenges ashore (Marchant & Higgins 1990).		E & MI & MA	2009	1	6.19		0	1	1	0	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Mammal	*Macrotis lagotis*	Bilby	Arid to semi-arid woodlands and hummock grasslands in the north of Australia, restricted to the Gibson, Little Sandy and Great Sandy Deserts, and parts of the Pilbara, Dampierland, Central Kimberley and Ord-Victoria Plains bioregions in Western Asutralia (Bradley et al. 2015).	VU	V	1974	4	19.41		0	1	0	1	2	Low	Low	Limited habitat present.
Mammal	*Myrmecobius fasciatus*	Numbat	Mulga woodland, spinifex sandplains and Eucalypt forests and woodlands. In WA, their habitat is generally woodland dominated by Eucalyptus species, with abundant hollow logs and branches (DBCA, 2021)	EN	E	1974	1	4.33		0	1	0	1	2	Low	Low	Limited habitat present.
Reptile	*Neelaps calonotos*	Black-striped Snake	Confined to the Swan Coastal Plain between Mandurah and Lancelin, sheltering in upper layers of loose soil beneath leaf litter in Eucalyptus/Banksia woodlands, typically at the base of trees and shrubs (Bush et al., 2010).	P3		2017	97	0.61		0	1	1	2	4	High	Moderate	Banksia and Eucalyptus woodland present.

Appendix C - Fauna Desktop Assessment

Type	Taxon	Common Name	Habitat	Cons. Code WA	Cons. Code EPBC	Date (DBCA)	Records (DBCA)	Distance (km) [DBCA]	PMST	Recorded in Survey Area	Known from Vicinity (<20km)	Recent Record (Last 20 years)	Potential presence of suitable habitat within the Survey Area (0,1,2)	Total Score	Likelihood	Post-survey likelihood	Comments
Bird	*Ninox connivens connivens (southwe*	(Barking Owl (southwest subpop.))	Open eucalyptus woodlands and the edges of forests, often adjacent to farmland. Likely to use the interior of forested habitat and prefer woodlands and forests with a high density of large trees and particularly sites with hollows (Davis et al., 2022).	P2		1902	1	14.71		0	1	0	1	2	Low	Low	Limited habitat present.
Mammal	*Notamacropus eugenii derbianus*	Tammar Wallaby	South-western Western Australia and five offshore islands, in dense low vegetation, open grassy areas, coastal scrub, heath, dry sclerophyll forest, and thickets in mallee and woodland (DCCEEW, 2023).	P4		2017	18	14.28		0	1	1	1	3	Moderate	Low	Limited habitat present.
Mammal	*Notamacropus irma*	Western Brush Wallaby	Open forest or woodland, particularly favouring open, seasonally wet flats with low grasses and open scrubby thickets (DCCEEW, 2023).	P4		2018	35	7.33		0	1	1	1	3	Moderate	Low	Limited habitat present.
Bird	*Numenius madagascariensis*	Eastern Curlew	Intertidal mudflats. The southern most important international site in Western Australia is Eighty Mile Beach (Bamford et al., 2008).	CR & IA	CE& MI & MA	1959	2	23.05		0	0	0	0	0	Negligible	Negligible	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Numenius phaeopus*	Whimbrel	Along the Australian coast, inhabiting estuaries, mangroves, tidal flats, flooded paddocks, and bare grasslands (Pizzey & Knight, 2007)	IA	MI & MA	1978	2	32.74		0	0	0	0	0	Negligible	Negligible	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Oxyura australis*	Blue-billed duck	Deep water in large permanent wetlands and swamps with aquatic vegetation (Marchant & Higgins, 1990).	P4		2013	866	0.93		0	1	1	0	2	Low	Negligible	No surface water identified.
Bird	*Pachyptila turtur subantarctica*	Fairy Prion (Southern)	Subtropical waters, circumpolar. Burrows in cervices or hollows beneath Colobanthus muscoides with peaty soil (TSSC, 2015).	VU					Known	0	0	0	0	0	Negligible	Negligible	No surface water identified.
Mammal	*Petrogale lateralis lateralis*	Black-footed Rock-wallaby	Wide variety of rock types, requiring sufficient cave and crevice development (DPaW 2015).	EN		2004	8	24.32	Known	0	0	1	0	1	Negligible	Negligible	No caves or rock crevices identified.
Mammal	*Phascogale tapoatafa wambenger*	Southern Brush-tailed Phascogale	Largely restricted to Jarrah dominated forests (*Eucalyptus marginata*) (DCCEEW, 2023).	CD		2018	6	4.33		0	1	1	1	3	Moderate	Low	Limited habitat present.
Bird	*Plegadis falcinellus*	Glossy Ibis	Well vegetated wetlands, wet pastures, floodwaters, brackish wetlands and mudflats (Pizzey & Knight, 2007).	IA	MI & MA	2013	200	0.64		0	1	1	1	3	Moderate	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Pluvialis squatarola*	Grey Plover	Coastal, marine shores, inlets, estuaries and lagoons with large tidal mudflats or sandflats, sandy beachesand rocky coasts. It is occasionally found inland (Birdlife Australia, 2021).		MI & MA	2007	90	12.06		0	1	1	0	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Reptile	*Pseudemydura umbrina*	Western Swamp Tortoise	Small geographic range, recorded from scattered localities in a narrow strip (3–5 km wide) of the Swan Coastal Plain, roughly parallel with the Darling Range (Burbidge & Kuchling, 2004). Currently, the Ellen Brook Nature Reserve population is the only viable, naturally occurring population in the wild. The Twin Swamps Nature Reserve and Mogumber Nature Reserve populations are maintained with translocated individuals (TSSC 2004).	CR	CE	2019	222	19.10	Known	0	1	1	0	2	Low	Low	No surface water identified.
Mammal	*Pseudocheirus occidentalis*	Western Ringtail Possum	Peppermint (*Agonis flexuosa*) forest and woodland and Tuart (*Eucalyptus gomphocephala*) with a peppermint mid-story. Inland, the species is found in Jarrah (*Eucalyptus marginata*), Wandoo (*Eucalyptus wandoo)* and Marri (*Corymbia calophylla*) forest (Van Dyck & Strahan, 2008).	CR	CE	1958	1	23.06	Likely	0	0	0	0	0	Negligible	Negligible	No suitable habitat identified.
Bird	*Rostratula australis*	Australian Painted Snipe	Shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans (DCCEEW, 2023).	EN	E	2012	3	15.28		0	1	1	1	3	Moderate	Low	No surface water identified.
Mammal	*Setonix brachyurus*	Quokka	Jarrah forest south-east of Perth, extending south through southern Jarrah, Marri and Karri forests onward to the south coast. It is now thought to be absent from the Swan Coastal Plain. Rottnest Island (DCCEEW, 2023).	VU	V				Likely	0	0	0	0	0	Negligible	Negligible	Not within known range.
Bird	*Sternula nereis nereis*	Fairy Tern	It is most common in Western Australia, found on coastal beaches, inshore and offshore islands, sheltered inlets, sewage farms, harbours, estuaries and lagoons, favouring both fresh and saline wetlands and near-coastal terrestial wetlands, including lakes and salt-ponds. (BirdLife Australia, 2021)	VU	V	2013	5	24.22	Known	0	0	1	0	1	Negligible	Negligible	No surface water identified.
Invertebrate	*Synemon gratiosa*	Graceful Sun Moth	1. Coastal heathland on Quindalup dunes where it is restricted to secondary sand dunes due to the abundance of the host plant Lomandra maritima, the prefered habitat (denser population). 2. Banksia woodland on Spearwood and Bassendean dunes, where the second known host plant L. hermaphrodita is widespread. Throughout the Swan Coastal Plain, extending into the Geraldton Sandplains (DEC, 2011).	P4		2019	741	0.65		0	1	1	1	3	Moderate	Low	No suitable habitat identified,
Bird	*Thalassarche carteri*	Indian Yellow-nosed Albatross	Subtropical and warmer subantarctic waters, foraging mostly in the southern Indian Ocean, particually off the coast of southern Western Australia, as far north as Shark Bay (Marchant & Higgins, 1990) (Weimerskirch et al., 1986).	VU	V & MI & MA	1968	1	11.61		0	1	0	0	1	Negligible	Negligible	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Thalasseus bergii*	Crested Tern	A strictly coastal species. Occasional records in the arid interior of Australia (BirdLife Australia, 2022).	IA	MI & MA	2016	393	4.34		0	1	1	0	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Thinornis rubricollis*	Hooded Plover	West of the Nullarbor Plain. Additionally recorded on ocean beaches and salt lakes,sometimes hundreds of kilometres from the coast (Birdlife, 2019).		V	1995	2	22.11		0	0	0	0	0	Negligible	Negligible	No surface water identified.
Bird	*Tringa glareola*	Wood Sandpiper	Common in Northern Australia, a casual visitor to southern parts, occuping wetland margins, saltmarshes and sewage ponds (Pizzey & Knight, 2007).	IA	MI & MA	2008	29	6.49		0	1	1	0	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Tringa nebularia*	Common Greenshank	Inland wetlands and sheltered coastal habitats In shallows around the edges of water often among pneumatophores of mangroves or other sparse, emergent or fringing vegetation, such as sedges or saltmarsh (DCCEEW, 2023).	IA	MA & MA	2013	124	2.92		0	1	1	0	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Tringa stagnatilis*	Marsh Sandpiper	Wetlands of varying salinity including fresh, sewage ponds and estuaries (Pizzey & Knight, 2007).	IA		2011	5	6.49		0	1	1	0	2	Low	Low	No surface water identified.
Bird	*Tyto novaehollandiae novaehollandi*	Masked Owl (Southern Subspecies)	Forests, open woodlands, farmlands with large trees, paperbark woodlands and caves (Fulton, 2017)	P3		2000	3	19.81		0	1	0	1	2	Low	Low	Limited recent records in close proximity.
Invertebrate	*Westralunio carteri*	Carter's Freshwater Mussel	Freshwaters of south-west Western Australia, greatest in abundance in slower flowing waters with stable, soft sediments and low salinity (>3 g /L is lethal) (Klunzinger et al., 2012).	VU	V	2020	36	12.88	Known	0	1	1	0	2	Low	Low	No surface water identified.
Bird	*Zanda baudinii*	Baudin's Cockatoo	Temperate forest and woodland dominated by Eucalyptus marginata (jarrah), Corymbia calophylla (marri) and E. diversicolor (karri) (TSSC, 2018).	EN	E	2015	136	7.51	Known	0	1	1	2	4	High	Moderate	Habitat present.

Appendix C - Fauna Desktop Assessment

Type	Taxon	Common Name	Habitat	Cons. Code WA	Cons. Code EPBC	Date (DBCA)	Records (DBCA)	Distance (km) [DBCA]	PMST	Recorded in Survey Area	Known from Vicinity (<20km)	Recent Record (Last 20 years)	Potential presence of suitable habitat within the Survey Area (0,1,2)	Total Score	Likelihood	Post-survey likelihood	Comments
Bird	*Zanda latirostris*	Carnaby's Cockatoo	Uncleared or remnant native eucalypt woodlands containing salmon gum and wandoo, and in shrubland or kwongan heathland dominated by hakea, dryandra, banksia and grevillea species. It also occurs in remnant patches of native vegetation on land otherwise cleared for agriculture. Forages seasonally in pine plantations (DCCEEW, 2023)	EN	E	2020	9264	0.08	Known	0	1	1	2	4	High	Known	Identified during survey.

Pinjar Terminal Fauna Desktop Assessment

Type	Taxon	Common Name	Habitat	Cons. Code WA	Cons. Code EPBC	Date (DBCA)	Records (DBCA)	Distance (km) [DBCA]	PMST	Recorded in Survey Area	Known from Vicinity (<20km)	Recent Record (Last 20 years)	Potential presence of suitable habitat within the Survey Area (0,1,2)	Total Score	Likelihood	Post-survey likelihood	Comments
Bird	*Actitis hypoleucos*	Common Sandpiper	Wide range of coastal wetlands, around muddy margins or rocky shores, some inland wetlands and rarely on mudflats (DCCEEW, 2023)	IA	MI & MA	1991	2	41.15		0	0	0	1	1	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Apus pacificus*	Fork-tailed Swift	Over inland plains, sometimes boave foothills or in coastal areas (DCCEEW, 2023).	IA	MI & MA	2014	17	7.71		0	1	1	0	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Arenaria interpres*	Ruddy Turnstone	Coastal regions with exposed rock coast lines or coral reefs (DCCEEW, 2023).	IA	V & MI & MA	1991	4	14.03		0	1	0	0	1	Negligible	Negligible	Marine species, no coastal habitat. No waterbodies identified in survey area.
Insect	*Australotomurus morbidus*	Cemetary springtail, Guildford springtail	Undisturbed native grasslands and heathland at low and high elevations (P. Greenslade & R. Jordana, 2014).	P3		1993	6	41.00		0	0	0	0	0	Negligible	Negligible	Limited suitable habitat identified.
Invertebrate	*Austroconops mcmillani*	A biting midge	Larvae live in small aquatic habitats.	P2		2011	8	14.34		0	1	1	0	2	Low	Low	No surface waterbodies identified.
Invertebrate	*Austrosaga spinifer*	Cricket	Banksia heath and low woodlands (South Metro Connect, 2011). Known records exist in Neerabup National Park (DEC, 2012b).	P2		1982	2	16.84		0	1	0	1	2	Low	Low	Limited recent records in close proximity.
Mammal	*Bettongia lesueur graii*	Boodie, Burrowing Bettong	open eucalypt or acacia woodland with a grass and shrub understorey to sandridge desert with spinifex hummocks and sparse shrubs (DCCEEW, 2023).	EX	Ex	N/A	2	9.09		0	1	0	1	2	Low	Low	Species considered extinct.
Mammal	*Bettongia penicillata ogilbyi*	Woylie	Dry sclerophyllous forest with a dense understory (ALA, 2023).	EN	CE	2018	98	9.09	Known	0	1	1	1	3	Moderate	Negligible	Records from conservation reserve.
Bird	*Botaurus poiciloptilus*	Australasian Bittern	Freshwater wetlands and, rarely, estuaries or tidal wetlands, favouring tall dense vegetation (TSSC, 2019).	EN	E	2003	20	7.71	Known	0	1	1	1	3	Moderate	Low	No surface waterbodies identified.
Bird	*Cacatua pastinator pastinator*	Muir's Corella	Large or dead eucalypts and paperbark in forested areas or lone trees in paddocks along roadsides (DEC, 2008)	CD		N/A	7	46.41		0	0	0	1	1	Low	Low	Limited recent records in close proximity.
Bird	*Calidris acuminata*	Sharp-tailed Sandpiper	Occurs along muddy edges of shallow fresh or brackish wetlands with inundated or emergent sedges, grass, saltmarsh or other low vegetation (DCCEEW, 2023).	IA	V & MI & MA	2012	9	14.03		0	1	1	1	3	Moderate	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Calidris alba*	Sanderling	Restricted to the coast, mostly on open sandy beaches exposed to open sea-swell, exposed sandbars and spits, and shingle banks (DCCEEW, 2023).	IA	MI & MA	1980	3	46.77		0	0	0	0	0	Negligible	Negligible	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Calidris canutus*	Red Knot	Intertidal mudflats, sandflats and sandy beaches of sheltered coasts (DCCEEW, 2023).	EN & IA	V & MI & MA	2002	8	14.03		0	1	0	0	1	Negligible	Negligible	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Calidris ferruginea*	Curlew Sandpiper	Intertidal mudflats in sheltered coastal areas and inland around ephemeral and permanent lakes, dams, waterholes and bore drains with bare edges of mud and sand (DCCEEW, 2023).	CR & IA	CE & MI & MA	2005	31	7.71		0	1	1	0	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Calidris melanotos*	Pectoral Sandpiper	Occupies shallow, fresh waters often containing low grass or other small herbs, swamp margins, flooded pastures and saltmarshes (Pizzey & Knight, 2007;DCCEEW, 2023).	IA	MI & MA	1992	2	16.62		0	1	0	1	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Calidris ruficollis*	Red-necked Stint	Coastal sheltered areas and exposed or ocean beaches, sometimes on stony or rocky shores, reefs or shoals (DCCEEW, 2023).	IA	MI & MA	2011	96	7.71		0	1	1	0	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Calidris subminuta*	Long-toed Stint	Freshwater wetlands (DCCEEW, 2023).	IA	MI & MA	1992	4	14.03		0	1	0	1	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Calidris tenuirostris*	Great Knot	Sheltered coastal habitats with large intertidal mudflats or sandflats (DCCEEW, 2023).	CR & IA	V & MI & MA	2005	12	14.03		0	1	1	0	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Calonectris leucomelas*	Streaked Shearwater	Common and widespread around much of the northern coast of Australia, rarely ventures inland (Pizzey & Knight, 2007)	IA	MI & MA	2010	1	25.67		0	0	1	0	1	Negligible	Negligible	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Calyptorhynchus banksii naso*	Forest Red-tailed Black Cockatoo	Inhabits dense Eucalyptus marginata (Jarrah), E. diversicolor (Karri) and Corymbia calophylla (Marri) forests (TSSC, 2009).	VU	V	2020	363	16.93	Known	0	1	1	2	4	High	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Charadrius leschenaultii*	Greater Sand Plover, Large Sand Plover	Beaches, tidal mudflats, reefs, dunes and is seldom observed far inland (Pizzey & Knight, 2007).	VU & IA	V & MI & MA	2011	2	23.50		0	0	1	0	1	Negligible	Negligible	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Charadrius mongolus*	Lesser Sand Plover	Open intertidal flats of sheltered bays, lagoons or estuaries (Pizzey & Knight, 2007).	EN & IA	E & MI & MA	1999	1	54.90		0	0	0	0	0	Negligible	Negligible	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Chlidonias leucopterus*	White-winged Black Tern, White-winged Tern	Fresh, brackish or saline, and coastal or subcoastal wetlands. They rarely occur on inland wetlands in Australia (DCCEEW, 2023).	IA	MI & MA	1990	1	37.65		0	0	0	1	1	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Reptile	*Ctenotus gemmula*	Jewelled Ctenotus	Endemic to Western Australia. In the Perth region it is uncommon and restricted to the Swan Coastal Plain. It inhabits low vegetation in Banksia woodland, sheltering in leaf litter under trees, shrubs and abandoned stick-ant nests (Bush et al., 2010).	P3		1999	4	27.49		0	0	0	0	0	Negligible	Low	Limited suitable habitat identified. Limited recent records in close proximity.
Bird	*Dasyornis longirostris*	Western Bristlebird	Restricted to a coastal strip of southern Western Australia from Two Peoples Bay to near East Mount Barren in the eastern end of Fitzgerald River National Park, with a large gap further west of the National Park (Gilfillan et al., 2007).	EN	E	N/A	1	50.06		0	0	0	0	0	Negligible	Negligible	No coastal habitat present. Limited recent records in close proximity.
Mammal	*Dasyurus geoffroii*	Western Quoll, Chuditch	Currently restricted to south-west Western Australia, in areas dominated by sclerophyll forest or drier woodland, heath and mallee shrubland (Van Dyck & Strahan, 2008).	VU	V	2022	58	9.09	Known	0	1	1	1	3	Moderate	Moderate	Marginal suitable habitat may be present.
Reptile	*Delma concinna major*	Javelin Lizard	Heaths on dunes and sand-plains along mid- to lower west coast. Subspecies dwells in dense matrix of low vegetation and associated leaf litter in Shark Bay.	P1		2015	1	14.16		0	1	1	0	2	Low	Low	No coastal habitat present. Limited recent records in close proximity.
Bird	*Elanus scriptus*	Letter-winged kite	Open country and grasslands throughout arid and semi-arid regionsWill disperse to high rainfall and coastal regions when food is abundent (BirdLife, 2021).	P4		1980	1	46.77		0	0	0	0	0	Negligible	Negligible	No coastal habitat present. Limited recent records in close proximity.
Invertebrate	*Euoplos inornatus*	Australian armored trapdoor spiders	Most records are from the Darling Scarp and jarrah forest (Invertebrate Solutions, 2018).	P3		1998	1	52.77		0	0	0	0	0	Negligible	Negligible	No coastal habitat present. Limited recent records in close proximity.

Type	Taxon	Common Name	Habitat	Cons. Code WA	Cons. Code EPBC	Date (DBCA)	Records (DBCA)	Distance (km) [DBCA]	PMST	Recorded in Survey Area	Known from Vicinity (<20km)	Recent Record (Last 20 years)	Potential presence of suitable habitat within the Survey Area (0,1,2)	Total Score	Likelihood	Post-survey likelihood	Comments
Bird	*Falco hypoleucos*	Grey Falcon	Timered lowland plains, including acacia shrublands)particularly with tree-lined watercourses), tussock grassland and open woodland (TSSC, 2020).	VU	V	1929	1	50.15		0	0	0	1	1	Low	Low	No coastal habitat present. Limited recent records in close proximity.
Bird	*Falco peregrinus*	Peregrine Falcon	Rainforests, arid zones and coastal to alpine areas (BirdLife, 2021).	OS		2014	109	7.71		0	1	1	1	3	Moderate	Low	No coastal habitat present. Limited recent records in close proximity.
Fish	*Galaxiella nigrostriata*	Black-stripe Minnow	Acidic ephemeral bodies of water in peat flats located in the south west corner of Western Australia. The major populations occur from Augusta to Albany and near Bunbury and Gingin (Morgan et al, 2011). Generally prefer sandy, moist soil when ephemeral pools dry out.	EN		2009	3	16.70	Known	0	1	1	0	2	Low	Low	No surface waterbodies identified.
Bird	*Glareola maldivarum*	Oriental Pratincole	Open plains, floodplains or short grassland (including farmland), often occurring near terrestrial wetlands, and occurring along the coast. The species does not breed in Australia (DCCEEW, 2023).	IA	MI & MA	1981	1	26.03		0	0	0	1	1	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Invertebrate	*Hesperocolletes douglasi*	Rottnest Bee	Extant population known in Pinjar. Only been two individuals ever found (TSSC, 2019).	CR	CE	2015	2	2.47	May	0	1	1	0	2	Low	Low	Limited recent records in close proximity.
Invertebrate	*Hurleya sp. (WAM C23193)*	Crystal Cave crangonyctoid, cave shrimp	Only known from Yanchep Aquatic Root Mat Community	CR		1997	2	13.37		0	1	0	0	1	Negligible	Negligible	No suitable habitat identifed.
Mammal	*Hydromys chrysogaster*	Water Rat	Near permanent bodies of fresh or brackish water (Van Dyck & Strahan, 2008).	P4		2019	52	14.66		0	1	1	0	2	Low	Low	No suitable habitat identifed.
Bird	*Hydroprogne caspia*	Caspian Tern	The Caspian Tern is found in sheltered coastal embayments and those with sandy or muddy margins (DCCEEW, 2023).	IA	MI & MA	1994	8	14.03		0	1	0	1	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Invertebrate	*Hylaeus globuliferus*	Native Bee	Habitats containing flowers from *Adenanthos cygnorum* and also *Banksia attenuata* (Western Wildlife, 2009).	P3		1996	19	15.81		0	1	0	0	1	Low	Low	Suitable habitat identified (*Adenanthos cygnorum* and also *Banksia attenuata*)
Invertebrate	*Idiosoma sigillatum*	Swan Coastal Plain shield-backed trapdoor spider	Remnant habitats in Banksia woodland and heathland on sandy soils (Rix et al., 2018).	P3		2019	124	14.46		0	1	1	2	4	High	High	Suitable habitat identified.
Mammal	*Isoodon fusciventer*	Quenda, Southern Brown Bandicoot	Forest, woodland, heath and shrub communities, with sandy soils and dense heathy vegetation (Van Dyck & Strahan, 2008).	P4		2021	1588	9.09		0	1	1	2	4	High	Known	Identified during survey.
Bird	*Ixobrychus flavicollis australis* (southwest subpop.)	Black Bittern (Southwest subpopulation)	Terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation includng flooded grassland, forest, woodland, rainforest and mangroves (NSW Government, 2018).	P2		1987	2	24.23		0	0	0	1	1	Low	Low	No surface water identified.
Invertebrate	*Leioproctus contrarius*	a short-tongued bee	Western Australia, associated with *Goodenia s*p. and *Lechenaultia* sp. (South Metro Connect, 2011).	P3		1982	6	15.18		0	1	0	0	1	Negligible	Negligible	
Invertebrate	*Leioproctus douglasiellus*	a short-tongued bee	Known from Kenwick wetlands, Cannington and Forestdale Lake and near Lithgow in the Blue Mountains of NSW (ALA, 2019). Has an association with Goodenia filiformis and Anthotium junciforme (South Metro Connect, 2011).	EN		1954	4	25.25	Known	0	0	0	0	0	Negligible	Negligible	No surface water identifed.
Bird	*Leipoa ocellata*	Malleefowl	Semi-arid to arid zone in shrublands and low woodlands dominated by mallee and associated habitats such as such as Broombush (*Melaleuca uncinata*) and Scrub Pine (*Callitris verrucosa*) (Benshemesh, 2007).	VU	V	1981	46	52.45	Likely	0	0	0	0	0	Negligible	Negligible	Limited suitable habitat identified. Limited recent records in close proximity.
Bird	*Limosa lapponica*	Bar-tailed Godwit	Widespread around the coast of Western Australia from Eyre to Derby (DotE, 2015).	IA (& VU or CR at subsp. level)	Mi (& V or CE at subsp. level)	2004	18	7.71		0	1	1	0	2	Low	Low	Limited suitable habitat identified.
Bird	*Limosa lapponica menzbieri*	Northern Siberian Bar-tailed Godwit	Coastal habitat, including large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It has also been recorded in coastal sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats (Higgins & Davies, 1996).	CR	CE				Known	0	0	0	0	0	Negligible	Negligible	No coastal habitat identified. No surface water identified.
Bird	*Limosa limosa*	Black-tailed Godwit	Coastal habitat including sheltered bays, estuaries and lagoons with large intertidal mudflats or sandflats (DCCEEW, 2023)	IA	E & MI & MA	2011	4	22.76		0	0	1	0	1	Negligible	Negligible	Marine species, no coastal habitat. No waterbodies identified in survey area.
Mammal	*Macroderma gigas*	Ghost Bat	Northern Australia, inhabiting arid Pilbara to tropical savanna woodlands and rainforests rainforest, monsoon and vine thicket, open woodlands and arid areas and reside in caves, rock crevices and disused mine adits (DoE 2016).	VU	V				May	0	0	0	0	0	Negligible	Negligible	No suitable habitat identified.
Mammal	*Myrmecobius fasciatus*	Numbat	Mulga woodland, spinifex sandplains and Eucalypt forests and woodlands. In WA, their habitat is generally woodland dominated by Eucalyptus species, with abundant hollow logs and branches (DBCA, 2021)	EN	E	1974	1	34.76		0	0	0	1	1	Low	Low	Limited suitable habitat identified. Limited recent records in close proximity.
Reptile	*Neelaps calonotos*	Black-striped Snake	Confined to the Swan Coastal Plain between Mandurah and Lancelin, sheltering in upper layers of loose soil beneath leaf litter in Eucalyptus/Banksia woodlands, typically at the base of trees and shrubs (Bush et al., 2010).	P3		2017	97	12.37		0	1	1	2	4	High	High	Suitable habitat identified.
Bird	*Ninox connivens connivens (southwest subpop.)*	(Barking Owl (southwest subpop.))	Open eucalyptus woodlands and the edges of forests, often adjacent to farmland. Likely to use the interior of forested habitat and prefer woodlands and forests with a high density of large trees and particularly sites with hollows (Davis et al., 2022).	P2		1902	1	45.54		0	0	0	0	0	Negligible	Negligible	Limited suitable habitat identified. Limited recent records in close proximity.
Mammal	*Notamacropus eugenii derbianus*	Tammar Wallaby	South-western Western Australia and five offshore islands, in dense low vegetation, open grassy areas, coastal scrub, heath, dry sclerophyll forest, and thickets in mallee and woodland (DCCEEW, 2023).	P4		2017	18	34.16		0	0	1	0	1	Negligible	Negligible	Limited recent records in close proximity.
Mammal	*Notamacropus irma*	Western Brush Wallaby	Open forest or woodland, particularly favouring open, seasonally wet flats with low grasses and open scrubby thickets (DCCEEW, 2023).	P4		2018	35	13.53		0	1	1	1	3	Moderate	Moderate	No wetland systems identifed.
Bird	*Numenius madagascariensis*	Eastern Curlew	Intertidal mudflats. The southern most important international site in Western Australia is Eighty Mile Beach (Bamford et al., 2008).	CR & IA	CE& MI & MA	1959	2	53.37		0	0	0	0	0	Negligible	Negligible	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Numenius phaeopus*	Whimbrel	Along the Australian coast, inhabiting estuaries, mangroves, tidal flats, flooded paddocks, and bare grasslands (Pizzey & Knight, 2007)	IA	MI & MA	1978	2	54.17		0	0	0	1	1	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Oxyura australis*	Blue-billed duck	Deep water in large permanent wetlands and swamps with aquatic vegetation (Marchant & Higgins, 1990).	P4		2013	866	7.71		0	1	1	0	2	Low	Low	No wetlands identified.
Bird	*Pachyptila turtur subantarctica*	Fairy Prion (Southern)	Subtropical waters, circumpolar. Burrows in cervices or hollows beneath *Colobanthus muscoides* with peaty soil (TSSC, 2015).	VU					Known	0	0	0	0	0	Negligible	Negligible	No surface water identified.

Type	Taxon	Common Name	Habitat	Cons. Code WA	Cons. Code EPBC	Date (DBCA)	Records (DBCA)	Distance (km) [DBCA]	PMST	Recorded in Survey Area	Known from Vicinity (<20km)	Recent Record (Last 20 years)	Potential presence of suitable habitat within the Survey Area (0,1,2)	Total Score	Likelihood	Post-survey likelihood	Comments
Mammal	*Petrogale lateralis lateralis*	Black-footed Rock-wallaby	Wide variety of rock types, requiring sufficient cave and crevice development (DPaW 2015).	EN		2004	8	9.09	Known	0	1	1	0	2	Low	Low	No crevices or rock crevices identified.
Mammal	*Phascogale tapoatafa wambenger*	Southern Brush-tailed Phascogale	Largely restricted to Jarrah dominated forests (*Eucalyptus marginata*) (DCCEEW, 2023).	CD		2018	6	34.76		0	0	1	0	1	Negligible	Negligible	Limited recent records in close proximity.
Bird	*Plegadis falcinellus*	Glossy Ibis	Well vegetated wetlands, wet pastures, floodwaters, brackish wetlands and mudflats (Pizzey & Knight, 2007).	IA	MI & MA	2013	200	7.71		0	1	1	0	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Pluvialis squatarola*	Grey Plover	Coastal, marine shores, inlets, estuaries and lagoons with large tidal mudflats or sandflats, sandy beachesand rocky coasts. It is occasionally found inland (Birdlife Australia, 2021).		MI & MA	2007	90	14.03		0	1	1	0	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Reptile	*Pseudemydura umbrina*	Western Swamp Tortoise	Small geographic range, recorded from scattered localities in a narrow strip (3–5 km wide) of the Swan Coastal Plain, roughly parallel with the Darling Range (Burbidge & Kuchling, 2004). Currently, the Ellen Brook Nature Reserve population is the only viable, naturally occurring population in the wild. The Twin Swamps Nature Reserve and Mogumber Nature Reserve populations are maintained with translocated individuals (TSSC 2004).	CR	CE	2019	222	26.51	Known	0	0	1	0	1	Negligible	Negligible	No surface water identified.
Mammal	*Pseudocheirus occidentalis*	Western Ringtail Possum	Peppermint (*Agonis flexuosa*) forest and woodland and Tuart (Eucalyptus gomphocephala) with a peppermint mid-story. Inland, the species is found in Jarrah (*Eucalyptus marginata*), Wandoo (*Eucalyptus wandoo*) and Marri (*Corymbia calophylla*) forest (Van Dyck & Strahan, 2008).	CR	CE	1958	1	46.78	Likely	0	0	0	0	0	Negligible	Negligible	No suitable habitat identifed.
Bird	*Rostratula australis*	Australian Painted Snipe	Shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans (DCCEEW, 2023).	EN	E & MA	2012	3	24.74		0	0	1	0	1	Negligible	Negligible	Marine species, no coastal habitat. No waterbodies identified in survey area.
Mammal	*Setonix brachyurus*	Quokka	Jarrah forest south-east of Perth, extending south through southern Jarrah, Marri and Karri forests onward to the south coast. It is now thought to be absent from the Swan Coastal Plain. Rottnest Island (DCCEEW, 2023).	VU	V				Likely	0	0	0	0	0	Negligible	Negligible	Limited recent records in close proximity.
Bird	*Sternula nereis nereis*	Fairy Tern	It is most common in Western Australia, found on coastal beaches, inshore and offshore islands, sheltered inlets, sewage farms, harbours, estuaries and lagoons, favouring both fresh and saline wetlands and near-coastal terrestial wetlands, including lakes and salt-ponds. (BirdLife Australia, 2021)	VU	V	2013	5	14.03	Known	0	1	1	0	2	Low	Low	No coastal habitat
Invertebrate	*Synemon gratiosa*	Graceful Sun Moth	1. Coastal heathland on Quindalup dunes where it is restricted to secondary sand dunes due to the abundance of the host plant Lomandra maritima, the prefered habitat (denser population). 2. Banksia woodland on Spearwood and Bassendean dunes, where the second known host plant L. hermaphrodita is widespread. Throughout the Swan Coastal Plain, extending into the Geraldton Sandplains (DEC, 2011).	P4		2019	741	14.17		0	1	1	1	3	Moderate	Moderate	Suitable habitat identified.
Bird	*Thalasseus bergii*	Crested Tern	A strictly coastal species. Occasional records in the arid interior of Australia (BirdLife Australia, 2022).	IA	MI & MA	2016	393	19.10		0	1	1	0	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Thinornis rubricollis*	Hooded Plover	West of the Nullarbor Plain. Additionally recorded on ocean beaches and salt lakes,sometimes hundreds of kilometres from the coast (Birdlife, 2019).		V	1995	2	53.34		0	0	0	0	0	Negligible	Negligible	Limited recent records in close proximity.
Bird	*Tringa glareola*	Wood Sandpiper	Common in Northern Australia, a casual visitor to southern parts, occuping wetland margins, saltmarshes and sewage ponds (Pizzey & Knight, 2007).	IA	MI & MA	2008	29	16.62		0	1	1	0	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Tringa nebularia*	Common Greenshank	Inland wetlands and sheltered coastal habitats In shallows around the edges of water often among pneumatophores of mangroves or other sparse, emergent or fringing vegetation, such as sedges or saltmarsh (DCCEEW, 2023).	IA	MI & MA	2013	124	7.71		0	1	1	0	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Tringa stagnatilis*	Marsh Sandpiper	Wetlands of varying salinity including fresh, sewage ponds and estuaries (Pizzey & Knight, 2007).	IA		2011	5	23.80		0	0	1	0	1	Negligible	Negligible	No surface water identified.
Bird	*Tyto novaehollandiae novaehollandiae*	Masked Owl (Southern Subspecies)	Forests, open woodlands, farmlands with large trees, paperbark woodlands and caves (Fulton, 2017)	P3		2000	3	50.31		0	0	0	1	1	Low	Low	No wetlands habitat identified
Invertebrate	*Westralunio carteri*	Carter's Freshwater Mussel	Freshwaters of south-west Western Australia, greatest in abundance in slower flowing waters with stable, soft sediments and low salinity (>3 g /L is lethal) (Klunzinger et al., 2012).	VU	V	2020	36	9.09	Known	0	1	1	1	3	Moderate	Negligible	No surface water identified.
Bird	*Zanda baudinii*	Baudin's Cockatoo	Temperate forest and woodland dominated by Eucalyptus marginata (jarrah), Corymbia calophylla (marri) and E. diversicolor (karri) (TSSC, 2018).	EN	E	2015	136	20.79	Known	0	0	1	2	3	High	Low	Suitable habitat identified, out of range.
Bird	*Zanda latirostris*	Carnaby's Cockatoo	Uncleared or remnant native eucalypt woodlands containing salmon gum and wandoo, and in shrubland or kwongan heathland dominated by hakea, dryandra, banksia and grevillea species. It also occurs in remnant patches of native vegetation on land otherwise cleared for agriculture. Forages seasonally in pine plantations (DCCEEW, 2023)	EN	E	2020	9264	0.12	Known	0	1	1	2	4	High	High	Suitable habitat identified.

Appendix C - Fauna Desktop Assessment

Type	Taxon	Common Name	Habitat	Cons. Code WA	Cons. Code EPBC	Date (DBCA)	Records (DBCA)	Distance (km) [DBCA]	PMST	Recorded in Survey Area	Known from Vicinity (<20km)	Recent Record (Last 20 years)	Potential presence of suitable habitat within the Survey Area (0,1,2)	Total Score	Likelihood	Post-Survey Likelihood	Comments
Bird	*Apus pacificus*	Fork-tailed Swift	Over inland plains, sometimes above foothills or in coastal areas (DCCEEW, 2023).	IA	MI & MA	2009	6	3.33		0	1	1	0	2	Low	Negligible	Marine species, no coastal habitat
Bird	*Arenaria interpres*	Ruddy Turnstone	Coastal regions with exposed rock coast lines or coral reefs (DCCEEW, 2023).	IA	V & MI & MA					0	0	0	0	0	Negligible	Negligible	Marine species, no coastal habitat
Invertebrate	*Austrosaga spinifer*	Cricket	Banksia heath and low woodlands (South Metro Connect, 2011). Known records exist in Neerabup National Park (DEC, 2012b).	P2		1982	2	7.55		0	1	0	1	2	Low	Low	Limited recent records in proximity.
Mammal	*Bettongia lesueur graii*	Boodie, Burrowing Bettong	open eucalypt or acacia woodland with a grass and shrub understorey to sandridge desert with spinifex hummocks and sparse shrubs (DCCEEW, 2023).	EX	EX	N/A	1	11.98		0	1	0	1	2	Negligible	Negligible	Extinct species
Mammal	*Bettongia penicillata ogilbyi*	Woylie	Dry sclerophyllous forest with a dense understory (ALA, 2023).	EN	CE	N/A	96	7.98	Known	0	1	0	1	2	Low	Low	No suitable habtat identified in survey area.
Bird	*Botaurus poiciloptilus*	Australasian Bittern	Freshwater wetlands and, rarely, estuaries or tidal wetlands, favouring tall dense vegetation (TSSC, 2019).	EN	E	2003	14	1.02	Known	0	1	1	1	3	Moderate	Low	No waterbodies identified in survey area.
Bird	*Calidris acuminata*	Sharp-tailed Sandpiper	Occurs along muddy edges of shallow fresh or brackish wetlands with inundated or emergent sedges, grass, saltmarsh or other low vegetation (DCCEEW, 2023).	IA	V & MI & MA	2012	5	9.64		0	1	1	1	3	Moderate	Low	No waterbodies identified in survey area.
Bird	*Calidris canutus*	Red Knot	Intertidal mudflats, sandflats and sandy beaches of sheltered coasts (DCCEEW, 2023).	EN & IA	V & MI & MA	1978	1	16.47	Likely	0	1	0	0	1	Negligible	Negligible	No waterbodies identified in survey area.
Bird	*Calidris ferruginea*	Curlew Sandpiper	Intertidal mudflats in sheltered coastal areas and inland around ephemeral and permanent lakes, dams, waterholes and bore drains with bare edges of mud and sand (DCCEEW, 2023).	CR & IA	CE & MI & MA	2003	17	4.95	Known	0	1	1	0	2	Low	Negligible	No waterbodies identified in survey area.
Bird	*Calidris ruficollis*	Red-necked Stint	Coastal sheltered areas and exposed or ocean beaches, sometimes on stony or rocky shores, reefs or shoals (DCCEEW, 2023).	IA	MI & MA	2011	27	0.03		0	1	1	0	2	Low	Negligible	No waterbodies identified in survey area.
Bird	*Calidris subminuta*	Long-toed Stint	Freshwater wetlands (DCCEEW, 2023).	IA	MI & MA	1991	1	9.64		0	1	0	1	2	Low	Low	No waterbodies identified in survey area.
Bird	*Calidris tenuirostris*	Great Knot	Sheltered coastal habitats with large intertidal mudflats or sandflats (DCCEEW, 2023).	CR & IA	V & MI & MA	1978	1	16.47		0	1	0	0	1	Negligible	Negligible	Marine species, no coastal habitat
Bird	*Calonectris leucomelas*	Streaked Shearwater	Common and widespread around much of the northern coast of Australia, rarely ventures inland (Pizzey & Knight, 2007)	IA	MI & MA	2010	1	4.81		0	1	1	0	2	Low	Low	Marine species, no coastal habitat
Bird	*Calyptorhynchus banksii naso*	Forest Red-tailed Black Cockatoo	Inhabits dense *Eucalyptus marginata* (Jarrah), *E. diversicolo* r (Karri) and *Corymbia calophylla* (Marri) forests (TSSC, 2009).	VU	V	2020	71	0.20	Known	0	1	1	2	4	High	Known	Identified during field survey.
Bird	*Charadrius leschenaultii*	Greater Sand Plover, Large Sand Plover	Beaches, tidal mudflats, reefs, dunes and is seldom observed far inland (Pizzey & Knight, 2007).	VU & IA	V & MI & MA	2011	1	6.08	Likely	0	1	1	0	2	Low	Low	Marine species, no coastal habitat
Reptile	*Ctenotus gemmula* (Swan Coastal Plain population)	Jewelled Sanplain Ctenotus, Jewelled South-West Ctenotus	Diurnal open forest, open heath, open scrub, oviparous (Clayton, Wombrey, Mason, Cheter and Wells, 2006).	P3		1999	2	12.67		0	1	0	0	1	Negligible	Negligible	Limited recent records in proximity.
Mammal	*Dasyurus geoffroii*	Western Quoll, Chuditch	Currently restricted to south-west Western Australia, in areas dominated by sclerophyll forest or drier woodland, heath and mallee shrubland (Van Dyck & Strahan, 2008).	VU	V	2017	10	5.04	Known	0	1	1	0	2	Low	Negligible	Limited recent records in proximity.
Bird	*Falco peregrinus*	Peregrine Falcon	Rainforests, arid zones and coastal to alpine areas (BirdLife, 2021).	OS		2013	68	0.01		1	1	1	0	3	#N/A	Negligible	Limited recent records in proximity. No suitable habtat identified in survey area.
Fish	*Galaxiella nigrostriata*	Black-stripe Minnow	Acidic ephemeral bodies of water in peat flats located in the south west corner of Western Australia. The major populations occur from Augusta to Albany and near Bunbury and Gingin (Morgan et al, 2011). Generally prefer sandy, moist soil when ephemeral pools dry out.	EN	E	0	1	14.26	Known	0	1	0	0	1	Negligible	Negligible	No waterbodies identified in survey area.
Bird	*Glareola maldivarum*	Oriental Pratincole	Open plains, floodplains or short grassland (including farmland), often occurring near terrestrial wetlands, and occurring along the coast. The species does not breed in Australia (DCCEEW, 2023).	IA	MI & MA	1981	1	4.95		0	1	0	1	2	Low	Low	Limited suitable habitat, no coastal habitat.
Invertebrate	*Hesperocolletes douglasi*	Rottnest Bee	Extant population known in Pinjar. Only been two individuals ever found (TSSC, 2019).	CR	CE	2015	1	12.43	Known	0	1	1	0	2	Low	Low	Limited data available.
Mammal	*Hydromys chrysogaster*	Water Rat	Near permanent bodies of fresh or brackish water (Van Dyck & Strahan, 2008).	P4		2019	24	3.24		0	1	1	0	2	Low	Negligible	No waterbodies identified in survey area.
Bird	*Hydroprogne caspia*	Caspian Tern	The Caspian Tern is found in sheltered coastal embayments and those with sandy or muddy margins (DCCEEW, 2023).	IA	MI & MA	1992	3	16.61		0	1	0	1	2	Low	Low	Marine species, no coastal habitat
Invertebrate	*Hylaeus globuliferus*	Native Bee	Habitats containing flowers from *Adenanthos cygnorum* and also *Banksia attenuata* (Western Wildlife, 2009).	P3		1996	10	2.71		0	1	0	1	2	Low	Moderate	*Adenanthos cygnorum* and *Banksia attenuata* both identified during survey. Limited recent records in proximity.
Invertebrate	*Idiosoma sigillatum*	Swan Coastal Plain shield-backed trapdoor spider	Remnant habitats in Banksia woodland and heathland on sandy soils (Rix et al., 2018).	P3		2019	70	0.16		0	1	1	2	4	High	Moderate	Limited recent records in proximity. No burrows identified, habitat still present.
Mammal	*Isoodon fusciventer*	Quenda, Southern Brown Bandicoot	Forest, woodland, heath and shrub communities, with sandy soils and dense heathy vegetation (Van Dyck & Strahan, 2008).	P4		2020	629	0.01		1	1	1	2	5	Known	Known	Identified during field survey.
Bird	*Ixobrychus dubius*	Australian Little Bittern (Black-backed Bittern)	Wetlands and permananet fresh water bodies, including subtropical/tropical mangroves, bogs, marshes and arable land (BirdLife, 2024).	P4		2001	5	1.20		0	1	0	0	1	Negligible	Negligible	Limited recent records in proximity.
Bird	*Ixobrychus flavicollis australis (southwest subpop.)*	Black Bittern (Southwest subpopulation)	Terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation includng flooded grassland, forest, woodland, rainforest and mangroves (NSW Government, 2018).	P2		1987	2	5.51		0	1	0	1	2	Low	Low	No waterbodies identified in survey area.
Invertebrate	*Leioproctus contrarius*	a short-tongued bee	Western Australia, associated with *Goodenia* sp. and *Lechenaultia* sp. (South Metro Connect, 2011).	P3		1982	3	0.06		0	1	0	0	1	Negligible	Moderate	Limited recent records in proximity. Limited habitat within survey area, *Lechenaultia* sp.
Bird	*Leipoa ocellata*	Malleefowl	Semi-arid to arid zone in shrublands and low woodlands dominated by mallee and associated habitats such as such as Broombush (*Melaleuca uncinata*) and Scrub Pine (*Callitris verrucosa*) (Benshemesh, 2007).	VU	V				Likely	0	0	0	0	0	Negligible	Negligible	Limited recent records in proximity. No suitable habitat identified.
Bird	*Limosa lapponica*	Bar-tailed Godwit	Widespread around the coast of Western Australia from Eyre to Derby (DotE, 2015).	IA (& VU or CR at subsp. level)	Mi (& V or CE at subsp. level)	1999	9	4.95		0	1	0	1	2	Low	Low	Limited recent records in proximity.

Appendix C - Fauna Desktop Assessment

Type	Taxon	Common Name	Habitat	Cons. Code WA	Cons. Code EPBC	Date (DBCA)	Records (DBCA)	Distance (km) [DBCA]	PMST	Recorded in Survey Area	Known from Vicinity (<20km)	Recent Record (Last 20 years)	Potential presence of suitable habitat within the Survey Area (0,1,2)	Total Score	Likelihood	Post-Survey Likelihood	Comments
Bird	*Limosa lapponica menzbieri*	Northern Siberian Bar-tailed Godwit	Coastal habitat, including large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It has also been recorded in coastal sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats (Higgins & Davies, 1996).	CR	E				Known	0	0	0	0	0	Negligible	Negligible	No waterbodies identified in survey area.
Bird	*Limosa limosa*	Black-tailed Godwit	Coastal habitat including sheltered bays, estuaries and lagoons with large intertidal mudflats or sandflats (DCCEEW, 2023)	IA	E & MI & MA	2011	3	6.91		0	1	1	0	2	Low	Low	No waterbodies identified in survey area.
Mammal	*Macroderma gigas*	Ghost Bat	Northern Australia, inhabiting arid Pilbara to tropical savanna woodlands and rainforests rainforest, monsoon and vine thicket, open woodlands and arid areas and reside in caves, rock crevices and disused mine adits (DoE 2016).	VU	V				May	0	0	0	0	0	Negligible	Negligible	No caves or rock crevices identified in survey area.
Bird	*Macronectes giganteus*	Southern Giant-Petrel	The Southern Giant-Petrel occurs over subantarctic waters in summer near its breeding islands in the Atlantic and Indian Oceans, in subantarctic to southern subtropical waters on the Argentinean continental shelf and off New Zealand and the cold eastern boundary current off South America. In winter, it is common off South America, South Africa, Australia and New Zealand. It occurs in both pelagic and inshore waters. It is attracted to land at sewage outfalls and scavenges ashore (Marchant & Higgins 1990).		E & MI & MA	2009	1	10.60	May	0	1	1	0	2	Low	Negligible	Marine species, no coastal habitat
Mammal	*Macrotis lagotis*	Bilby	Arid to semi-arid woodlands and hummock grasslands in the north of Australia, restricted to the Gibson, Little Sandy and Great Sandy Deserts, and parts of the Pilbara, Dampierland, Central Kimberley and Ord-Victoria Plains bioregions in Western Asutralia (Bradley et al. 2015).	VU	V	1974	2	13.05		0	1	0	0	1	Negligible	Negligible	Limited recent records in proximity. No suitable habitat identified.
Mammal	*Myrmecobius fasciatus*	Numbat	Mulga woodland, spinifex sandplains and Eucalypt forests and woodlands. In WA, their habitat is generally woodland dominated by Eucalyptus species, with abundant hollow logs and branches (DBCA, 2021)	EN	E	1974	1	5.77		0	1	0	1	2	Low	Low	Limited recent records in proximity.
Reptile	*Neelaps calonotos*	Black-striped Snake	Confined to the Swan Coastal Plain between Mandurah and Lancelin, sheltering in upper layers of loose soil beneath leaf litter in Eucalyptus/Banksia woodlands, typically at the base of trees and shrubs (Bush et al., 2010).	P3		2017	67	0.08		0	1	1	2	4	High	Moderate	Limited recent records in proximity. Not identified during survey.Banksia woodland suitable habitat still present.
Mammal	*Notamacropus irma*	Western Brush Wallaby	Open forest or woodland, particularly favouring open, seasonally wet flats with low grasses and open scrubby thickets (DCCEEW, 2023).	P4		2018	19	1.61		0	1	1	2	4	Moderate	Low	Limited recent records in proximity. No suitable habitat identified.
Bird	*Numenius madagascariensis*	Eastern Curlew	Intertidal mudflats. The southern most important international site in Western Australia is Eighty Mile Beach (Bamford et al., 2008).	CR & IA	CE & MI & MA				May	0	0	0	0	0	Negligible	Negligible	Marine species, no coastal habitat
Bird	*Oxyura australis*	Blue-billed duck	Deep water in large permanent wetlands and swamps with aquatic vegetation (Marchant & Higgins, 1990).	P4		2013	565	0.31		0	1	1	0	2	Low	Negligible	Limited recent records in proximity. No waterbodies identified during survey.
Bird	*Pachyptila turtur subantarctica*	Fairy Prion (Southern)	Subtropical waters, circumpolar. Burrows in cervices or hollows beneath *Colobanthus muscoides* with peaty soil (TSSC, 2015).	VU	V				Likely	0	0	0	0	0	Negligible	Negligible	No marine or surface waterbodies.
Mammal	*Petrogale lateralis lateralis*	Black-footed Rock-wallaby	Wide variety of rock types, requiring sufficient cave and crevice development (DPaW 2015).	EN	E	N/A	1	11.98		0	1	0	0	1	Negligible	Negligible	No caves or crevices identified within survey area.
Mammal	*Phascogale tapoatafa wambenger*	Southern Brush-tailed Phascogale	Largely restricted to Jarrah dominated forests (*Eucalyptus marginata*) (DCCEEW, 2023).	CD		1974	1	5.77		0	1	0	0	1	Negligible	Negligible	No suitable habtat identified in survey area.
Bird	*Phoebetria fusca*	Sooty Albatross	On vegetated cliffs and steep slopes that are sheltered from prevailing winds, often amongst tussock grass and has sometimes been observed foraging in inshore waters in southern Australia.	EN & IA	V & MI & MA				May	0	0	0	0	0	Negligible	Negligible	No suitable habtat identified in survey area.
Bird	*Plegadis falcinellus*	Glossy Ibis	Well vegetated wetlands, wet pastures, floodwaters, brackish wetlands and mudflats (Pizzey & Knight, 2007).	IA	MI & MA	2013	190	0.94		0	1	1	0	2	Low	Negligible	No waterbodies identified in survey area.
Bird	*Pluvialis squatarola*	Grey Plover	Coastal, marine shores, inlets, estuaries and lagoons with large tidal mudflats or sandflats, sandy beachesand rocky coasts. It is occasionally found inland (Birdlife Australia, 2021).		V & MI & MA	1981	18	4.95		0	1	0	0	1	Negligible	Negligible	No waterbodies identified in survey area. Marine species, no coastal habitat.
Bird	*Procellaria aequinoctialis*	White-chinned peteral	Marine Habitat only. No breeding habitat in Australia (Commonwealth of Australia, 2018).	VU	MI & MA	2000	1	8.30		0	1	0	0	1	Negligible	Negligible	Marine species, no coastal habitat
Reptile	*Pseudemydura umbrina*	Western Swamp Tortoise	Small geographic range, recorded from scattered localities in a narrow strip (3–5 km wide) of the Swan Coastal Plain, roughly parallel with the Darling Range (Burbidge & Kuchling, 2004). Currently, the Ellen Brook Nature Reserve population is the only viable, naturally occurring population in the wild. The Twin Swamps Nature Reserve and Mogumber Nature Reserve populations are maintained with translocated individuals (TSSC 2004).	CR	E	2019	110	12.18		0	1	1	0	2	Low	Negligible	No waterbodies identified in survey area.
Mammal	*Pseudocheirus occidentalis*	Western Ringtail Possum	Peppermint (*Agonis flexuosa*) forest and woodland and Tuart (*Eucalyptus gomphocephala)* with a peppermint mid-story. Inland, the species is found in Jarrah (*Eucalyptus marginata*), Wandoo (*Eucalyptus wandoo*) and Marri (*Corymbia calophylla*) forest (Van Dyck & Strahan, 2008).	CR	CE	1958	1	18.47	Likely	0	1	0	0	1	Negligible	Negligible	Outside known range. No suitable habitat present.
Bird	*Rostratula australis*	Australian Painted Snipe	Shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans (DCCEEW, 2023).	EN	E & MA	2012	2	17.09	Known	0	1	1	0	2	Low	Negligible	No waterbodies identified in survey area.
Bird	*Sternula nereis nereis*	Fairy Tern	It is most common in Western Australia, found on coastal beaches, inshore and offshore islands, sheltered inlets, sewage farms, harbours, estuaries and lagoons, favouring both fresh and saline wetlands and near-coastal terrestial wetlands, including lakes and salt-ponds. (BirdLife Australia, 2021)	VU	V				Known	0	0	0	0	0	Negligible	Negligible	No waterbodies identified in survey area.
Invertebrate	*Synemon gratiosa*	Graceful Sun Moth	1. Coastal heathland on Quindalup dunes where it is restricted to secondary sand dunes due to the abundance of the host plant *Lomandra maritima,* the prefered habitat (denser population). 2. *Banksia woodland* on Spearwood and Bassendean dunes, where the second known host plant *L. hermaphrodita* is widespread. Throughout the Swan Coastal Plain, extending into the Geraldton Sandplains (DEC, 2011).	P4		2019	397	0.17		0	1	1	2	4	Moderate	Moderate	Suitable habitat present. *L. hermaphrodita* potentially present within banksia woodland.
Bird	*Thalassarche carteri*	Indian Yellow-nosed Albatross	Subtropical and warmer subantarctic waters, foraging mostly in the southern Indian Ocean, particually off the coast of southern Western Australia, as far north as Shark Bay (Marchant & Higgins, 1990) (Weimerskirch et al., 1986).	EN	V & MI & MA	1968	1	15.44	Likely	0	1	0	0	1	Negligible	Negligible	Marine species, no coastal habitat
Bird	*Thalasseus bergii*	Crested Tern	A strictly coastal species. Occasional records in the arid interior of Australia (BirdLife Australia, 2022).	IA	MI & MA	2016	210	4.95		0	1	1	0	2	Low	Negligible	Marine species, no coastal habitat

Appendix C - Fauna Desktop Assessment

Type	Taxon	Common Name	Habitat	Cons. Code WA	Cons. Code EPBC	Date (DBCA)	Records (DBCA)	Distance (km) [DBCA]	PMST	Recorded in Survey Area	Known from Vicinity (<20km)	Recent Record (Last 20 years)	Potential presence of suitable habitat within the Survey Area (0,1,2)	Total Score	Likelihood	Post-Survey Likelihood	Comments
Bird	*Thinornis cucullatus (ru*	Hooded Plover	West of the Nullarbor Plain. Additionally recorded on ocean beaches and salt lakes,sometimes hundreds of kilometres from the coast (Birdlife, 2019).		MA					0	0	0	0	0	Negligible	Negligible	Marine species, no coastal habitat
Bird	*Tringa glareola*	Wood Sandpiper	Common in Northern Australia, a casual visitor to southern parts, occuping wetland margins, saltmarshes and sewage ponds (Pizzey & Knight, 2007).	IA	MI & MA	2008	23	0.89		0	1	1	1	3	Moderate	Low	No waterbodies identified in survey area.
Bird	*Tringa nebularia*	Common Greenshank	Inland wetlands and sheltered coastal habitats In shallows around the edges of water often among pneumatophores of mangroves or other sparse, emergent or fringing vegetation, such as sedges or saltmarsh (DCCEEW, 2023).	IA	E & MI & MA	2013	72	0.95		0	1	1	0	2	Low	Negligible	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Tringa stagnatilis*	Marsh Sandpiper	Wetlands of varying salinity including fresh, sewage ponds and estuaries (Pizzey & Knight, 2007).	IA	MI & MA	2011	5	1.02		0	1	1	0	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Invertebrate	*Westralunio carteri*	Carter's Freshwater Mussel	Freshwaters of south-west Western Australia, greatest in abundance in slower flowing waters with stable, soft sediments and low salinity (>3 g /L is lethal) (Klunzinger et al., 2012).	VU	V		16	7.80	May	0	1	0	1	2	Low	Negligible	No waterbodies identified in survey area.
Bird	*Zanda baudinii*	Baudin's Cockatoo	Temperate forest and woodland dominated by *Eucalyptus marginata* (jarrah), *Corymbia calophylla* (marri) and *E. diversicolor* (karri) (TSSC, 2018).	EN	E	2012	15	1.29	Likely	0	1	1	1	3	Moderate	Moderate	Suitable habitat identified suring durvey area. Current distriburion patterns result in a moderate likelihood.
Bird	*Zanda latirostris*	Carnaby's Cockatoo	Uncleared or remnant native eucalypt woodlands containing salmon gum and wandoo, and in shrubland or kwongan heathland dominated by hakea, dryandra, banksia and grevillea species. It also occurs in remnant patches of native vegetation on land otherwise cleared for agriculture. Forages seasonally in pine plantations (DCCEEW, 2023)	EN	E	2020	3009	0.01	Known	1	1	1	2	5	Known	Known	Identified during field survey.

NT-NOR to HBK 132kV Fauna Desktop Assessment

Type	Taxon	Common Name	Habitat	Cons. Code WA	Cons. Code EPBC	Date (DBCA)	Records (DBCA)	Distance (km) [DBCA]	PMST	Recorded in Survey Area	Known from Vicinity (<20km)	Recent Record (Last 20 years)	Potential presence of suitable habitat within the Survey Area (0,1,2)	Total Score	Likelihood	Post-survey Likelihood	Comments
Bird	*Actitis hypoleucos*	Common Sandpiper	Wide range of coastal wetlands, around muddy margins or rocky shores, some inland wetlands and rarely on mudflats (DCCEEW, 2023)	IA	MI & MA	1991	2	18.05		0	1	0	0	1	Negligible	Negligible	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Apus pacificus*	Fork-tailed Swift	Over inland plains, sometimes boave foothills or in coastal areas (DCCEEW, 2023).	IA	MI & MA	2014	17	13.51		0	1	1	0	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Arenaria interpres*	Ruddy Turnstone	Coastal regions with exposed rock coast lines or coral reefs (DCCEEW, 2023).	IA	MI & MA	1991	4	17.70		0	1	0	0	1	Negligible	Negligible	Marine species, no coastal habitat. No waterbodies identified in survey area.
Insect	*Australotomurus morbidus*	Cemetary springtail, Guildford springtail	Undisturbed native grasslands and heathland at low and high elevations (P. Greenslade & R. Jordana, 2014).	P3		1993	6	11.15		0	1	0	0	1	Negligible	Negligible	No suitable habitat identified.
Invertebrate	*Austroconops mcmillani*	A biting midge	Larvae live in small aquatic habitats.	P2	N/A	2011	8	44.48		0	0	1	0	1	Negligible	Negligible	No surface water identified.
Invertebrate	*Austrosaga spinifer*	Cricket	Banksia heath and low woodlands (South Metro Connect, 2011). Known records exist in Neerabup National Park (DEC, 2012b).	P2		1982	2	27.22		0	0	0	1	1	Low	Low	Limited recent records in proximity.
Mammal	*Bettongia lesueur graii*	Boodie, Burrowing Bettong	open eucalypt or acacia woodland with a grass and shrub understorey to sandridge desert with spinifex hummocks and sparse shrubs (DCCEEW, 2023).	EX	Ex	0	2	32.93		0	0	0	1	1	Low	Low	Limited recent records in proximity.
Mammal	*Bettongia penicillata ogilbyi*	Woylie	Dry sclerophyllous forest with a dense understory (ALA, 2023).	EN	CE	2018	98	1.11	Known	0	1	1	1	3	Moderate	Low	Limited recent records in proximity.
Bird	*Botaurus poiciloptilus*	Australasian Bittern	Freshwater wetlands and, rarely, estuaries or tidal wetlands, favouring tall dense vegetation (TSSC, 2019).	EN	E	2003	20	12.34	Known	0	1	1	0	2	Low	Low	No surface water identified.
Bird	*Cacatua pastinator pastinator*	Muir's Corella	Large or dead eucalypts and paperbark in forested areas or lone trees in paddocks along roadsides (DEC, 2008)	CD		0	7	9.42		0	1	0	1	2	Low	Low	Limited suitable habitat identified.
Bird	*Calidris acuminata*	Sharp-tailed Sandpiper	Occurs along muddy edges of shallow fresh or brackish wetlands with inundated or emergent sedges, grass, saltmarsh or other low vegetation (DCCEEW, 2023).	IA	V & MI & MA	2012	9	12.34		0	1	1	0	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Calidris alba*	Sanderling	Restricted to the coast, mostly on open sandy beaches exposed to open sea-swell, exposed sandbars and spits, and shingle banks (DCCEEW, 2023).	IA	MI & MA	1980	3	12.34		0	1	0	0	1	Negligible	Negligible	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Calidris canutus*	Red Knot	Intertidal mudflats, sandflats and sandy beaches of sheltered coasts (DCCEEW, 2023).	EN & IA	V & MI & MA	2002	8	12.34		0	1	0	0	1	Negligible	Negligible	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Calidris ferruginea*	Curlew Sandpiper	Intertidal mudflats in sheltered coastal areas and inland around ephemeral and permanent lakes, dams, waterholes and bore drains with bare edges of mud and sand (DCCEEW, 2023).	CR & IA	CE & MI & MA	2005	31	7.37		0	1	1	0	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Calidris melanotos*	Pectoral Sandpiper	Occupies shallow, fresh waters often containing low grass or other small herbs, swamp margins, flooded pastures and saltmarshes (Pizzey & Knight, 2007;DCCEEW, 2023).	IA	MI & MA	1992	2	15.51		0	1	0	1	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Calidris ruficollis*	Red-necked Stint	Coastal sheltered areas and exposed or ocean beaches, sometimes on stony or rocky shores, reefs or shoals (DCCEEW, 2023).	IA	MI & MA	2011	96	7.37		0	1	1	0	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Calidris subminuta*	Long-toed Stint	Freshwater wetlands (DCCEEW, 2023).	IA	MI & MA	1992	4	19.92		0	1	0	1	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Calidris tenuirostris*	Great Knot	Sheltered coastal habitats with large intertidal mudflats or sandflats (DCCEEW, 2023).	CR & IA	V & MI & MA	2005	12	12.34		0	1	1	0	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Calonectris leucomelas*	Streaked Shearwater	Common and widespread around much of the northern coast of Australia, rarely ventures inland (Pizzey & Knight, 2007)	IA	MI & MA	2010	1	7.74		0	1	1	0	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Calyptorhynchus banksii naso*	Forest Red-tailed Black Cockatoo	Inhabits dense Eucalyptus marginata (Jarrah), E. diversicolor (Karri) and Corymbia calophylla (Marri) forests (TSSC, 2009).	VU	V	2020	363	2.00	Known	0	1	1	2	4	High	Known	Identified during survey.
Bird	*Charadrius leschenaultii*	Greater Sand Plover, Large Sand Plover	Beaches, tidal mudflats, reefs, dunes and is seldom observed far inland (Pizzey & Knight, 2007).	VU & IA	V & MI & MA	2011	2	20.66		0	0	1	0	1	Negligible	Negligible	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Charadrius mongolus*	Lesser Sand Plover	Open intertidal flats of sheltered bays, lagoons or estuaries (Pizzey & Knight, 2007).	EN & IA	E & MI & MA	1999	1	25.58		0	0	0	0	0	Negligible	Negligible	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Chlidonias leucopterus*	White-winged Black Tern, White-winged Tern	Fresh, brackish or saline, and coastal or subcoastal wetlands. They rarely occur on inland wetlands in Australia (DCCEEW, 2023).	IA	MI & MA	1990	1	19.92		0	1	0	1	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Reptile	*Ctenotus gemmula*	Jewelled Ctenotus	Endemic to Western Australia. In the Perth region it is uncommon and restricted to the Swan Coastal Plain. It inhabits low vegetation in Banksia woodland, sheltering in leaf litter under trees, shrubs and abandoned stick-ant nests (Bush et al., 2010).	P3		1999	1	29.92		0	0	0	0	0	Negligible	Negligible	Limited recent records in proximity.
Bird	*Dasyornis longirostris*	Western Bristlebird	Restricted to a coastal strip of southern Western Australia from Two Peoples Bay to near East Mount Barren in the eastern end of Fitzgerald River National Park, with a large gap further west of the National Park (Gillfillan et al., 2007).	EN	E	0	1	19.33		0	1	0	0	1	Negligible	Negligible	No coastal habitat identified.

Type	Taxon	Common Name	Habitat	Cons. Code WA	Cons. Code EPBC	Date (DBCA)	Records (DBCA)	Distance (km) [DBCA]	PMST	Recorded in Survey Area	Known from Vicinity (<20km)	Recent Record (Last 20 years)	Potential presence of suitable habitat within the Survey Area (0,1,2)	Total Score	Likelihood	Post-survey Likelihood	Comments
Mammal	*Dasyurus geoffroii*	Western Quoll, Chuditch	Currently restricted to south-west Western Australia, in areas dominated by sclerophyll forest or drier woodland, heath and mallee shrubland (Van Dyck & Strahan, 2008).	VU	V	2022	58	3.58	Known	0	1	1	1	3	Moderate	Low	Limited suitable habitat identified.
Reptile	*Delma concinna major*	Javelin Lizard	Heaths on dunes and sand-plains along mid- to lower west coast. Subspecies dwells in dense matrix of low vegetation and associated leaf litter in Shark Bay.	P1		2015	1	47.26		0	0	1	0	1	Negligible	Negligible	Limited suitable habitat identified.
Bird	*Elanus scriptus*	Letter-winged kite	Open country and grasslands throughout arid and semi-arid regionsWill disperse to high rainfall and coastal regions when food is abundent (BirdLife, 2021).	P4		1980	1	12.34		0	1	0	0	1	Negligible	Negligible	Limited suitable habitat identified.
Invertebrate	*Euoplos inornatus*	Australian armored trapdoor spiders	Most records are from the Darling Scarp and jarrah forest (Invertebrate Solutions, 2018).	P3		1998	1	23.61		0	0	0	0	0	Negligible	Negligible	Limited suitable habitat identified.
Bird	*Falco hypoleucos*	Grey Falcon	Timered lowland plains, including acacia shrublands)particularly with tree-lined watercourses), tussock grassland and open woodland (TSSC, 2020).	VU	V	1929	1	18.81		0	1	0	1	2	Low	Low	No surface water identified.
Bird	*Falco peregrinus*	Peregrine Falcon	Rainforests, arid zones and coastal to alpine areas (BirdLife, 2021).	OS		2014	109	1.43		0	1	1	1	3	Moderate	Moderate	Potential suitable habitat identified.
Fish	*Galaxiella nigrostriata*	Black-stripe Minnow	Acidic ephemeral bodies of water in peat flats located in the south west corner of Western Australia. The major populations occur from Augusta to Albany and near Bunbury and Gingin (Morgan et al, 2011). Generally prefer sandy, moist soil when ephemeral pools dry out.	EN		2009	3	5.86	Known	0	1	1	0	2	Low	Low	No surface water identified.
Bird	*Glareola maldivarum*	Oriental Pratincole	Open plains, floodplains or short grassland (including farmland), often occurring near terrestrial wetlands, and occurring along the coast. The species does not breed in Australia (DCCEEW, 2023).	IA	MI & MA	1981	1	7.37		0	1	0	1	2	Low	Low	No surface water identified.
Invertebrate	*Hesperocolletes douglasi*	Rottnest Bee	Extant population known in Pinjar. Only been two individuals ever found (TSSC, 2019).	CR	CE	2015	2	31.64	May	0	0	1	0	1	Negligible	Negligible	Limited recent records in proximity.
Invertebrate	*Hurleya sp. (WAM C23193)*	Crystal Cave crangonyctoid, cave shrimp	Only known from Yanchep Aquatic Root Mat Community	CR		1997	2	43.29		0	0	0	0	0	Negligible	Negligible	No surface water identified.
Mammal	*Hydromys chrysogaster*	Water Rat	Tnear permanent bodies of fresh or brackish water (Van Dyck & Strahan, 2008).	P4		2019	52	2.93		0	1	1	0	2	Low	Low	No surface water identified.
Bird	*Hydroprogne caspia*	Caspian Tern	The Caspian Tern is found in sheltered coastal embayments and those with sandy or muddy margins (DCCEEW, 2023).	IA	MI & MA	1994	8	9.89		0	1	0	1	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Invertebrate	*Hylaeus globuliferus*	Native Bee	Habitats containing flowers from *Adenanthos cygnorum* and also *Banksia attenuata* (Western Wildlife, 2009).	P3		1996	19	15.42		0	1	0	0	1	Negligible	Negligible	No suitable habitat identified. No associated species identified.
Invertebrate	*Idiosoma sigillatum*	Swan Coastal Plain shield-backed trapdoor spider	Remnant habitats in Banksia woodland and heathland on sandy soils (Rix et al., 2018).	P3		2019	124	8.34		0	1	1	1	3	Moderate	Low	No suitable habitat identfied.
Mammal	*Isoodon fusciventer*	Quenda, Southern Brown Bandicoot	Forest, woodland, heath and shrub communities, with sandy soils and dense heathy vegetation (Van Dyck & Strahan, 2008).	P4		2021	1588	0.06		0	1	1	2	4	High	Known	Identified during survey.
Bird	*Ixobrychus flavicollis australis (southwest subpop.)*	Black Bittern (Southwest subpopulation)	Terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation includng flooded grassland, forest, woodland, rainforest and mangroves (NSW Government, 2018).	P2		1987	2	9.27		0	1	0	1	2	Low	Low	No surface water identified.
Invertebrate	*Leioproctus contrarius*	a short-tongued bee	Western Australia, associated with *Goodenia* sp. and *Lechenaultia* sp. (South Metro Connect, 2011).	P3		1982	6	18.56		0	1	0	0	1	Negligible	Negligible	Limited recent records in proximity.
Invertebrate	*Leioproctus douglasiellus*	a short-tongued bee	Known from Kenwick wetlands, Cannington and Forestdale Lake and near Lithgow in the Blue Mountains of NSW (ALA, 2019). Has an association with *Goodenia filiformis* and *Anthotium junciforme* (South Metro Connect, 2011).	EN		1954	4	17.51	Known	0	1	0	0	1	Negligible	Negligible	Limited recent records in proximity.
Bird	*Leipoa ocellata*	Malleefowl	Semi-arid to arid zone in shrublands and low woodlands dominated by mallee and associated habitats such as such as Broombush (*Melaleuca uncinata*) and Scrub Pine (*Callitris verrucosa*) (Benshemesh, 2007).	VU	V	1981	46	22.93	Likely	0	0	0	0	0	Negligible	Negligible	No suitable habitat identified. No associated species identified.
Bird	*Limosa lapponica*	Bar-tailed Godwit	Widespread around the coast of Western Australia from Eyre to Derby (DotE, 2015).	IA (& VU or CR at subsp. level)	Mi (& V or CE at subsp. level)	2004	18	7.37		0	1	1	0	2	Low	Low	Limited recent records in proximity.
Bird	*Limosa lapponica menzbieri*	Northern Siberian Bar-tailed Godwit	Coastal habitat, including large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It has also been recorded in coastal sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats (Higgins & Davies, 1996).	CR	CE				Known	0	0	0	0	0	Negligible	Negligible	No surface water identified.
Bird	*Limosa limosa*	Black-tailed Godwit	Coastal habitat including sheltered bays, estuaries and lagoons with large intertidal mudflats or sandflats (DCCEEW, 2023)	IA	MI & MA	2011	4	12.34		0	1	1	0	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Mammal	*Macroderma gigas*	Ghost Bat	Northern Australia, inhabiting arid Pilbara to tropical savanna woodlands and rainforests rainforest, monsoon and vine thicket, open woodlands and arid areas and reside in caves, rock crevices and disused mine adits (DoE 2016).	VU	V				May	0	0	0	0	0	Negligible	Negligible	No rock crevices or caves identified.
Bird	*Macronectes giganteus*	Southern Giant-Petrel	The Southern Giant-Petrel occurs over subantarctic waters in summer near its breeding islands in the Atlantic and Indian Oceans, in subantarctic to southern subtropical waters on the Argentinean continental shelf and off New Zealand and the cold eastern boundary current off South America. In winter, it is common off South America, South Africa, Australia and New Zealand. It occurs in both pelagic and inshore waters. It is attracted to land at sewage outfalls and scavenges ashore (Marchant & Higgins 1990).		E & MI & MA	2009	1	23.31		0	0	1	0	1	Negligible	Negligible	Marine species, no coastal habitat. No waterbodies identified in survey area.
Mammal	*Myrmecobius fasciatus*	Numbat	Mulga woodland, spinifex sandplains and Eucalypt forests and woodlands. In WA, their habitat is generally woodland dominated by Eucalyptus species, with abundant hollow logs and branches (DBCA, 2021)	EN	E	1974	1	14.07		0	1	0	1	2	Low	Low	Limited recent records in proximity.No suitable habitat identified.
Reptile	*Neelaps calonotos*	Black-striped Snake	Confined to the Swan Coastal Plain between Mandurah and Lancelin, sheltering in upper layers of loose soil beneath leaf litter in Eucalyptus/Banksia woodlands, typically at the base of trees and shrubs (Bush et al., 2010).	P3		2017	97	2.88		0	1	1	1	3	Moderate	Low	Limited suitable habitat identified.

Type	Taxon	Common Name	Habitat	Cons. Code WA	Cons. Code EPBC	Date (DBCA)	Records (DBCA)	Distance (km) [DBCA]	PMST	Recorded in Survey Area	Known from Vicinity (<20km)	Recent Record (Last 20 years)	Potential presence of suitable habitat within the Survey Area (0,1,2)	Total Score	Likelihood	Post-survey Likelihood	Comments
Bird	*Ninox connivens connivens (southwest subpop.)*	(Barking Owl (southwest subpop.))	Open eucalyptus woodlands and the edges of forests, often adjacent to farmland. Likely to use the interior of forested habitat and prefer woodlands and forests with a high density of large trees and particularly sites with hollows (Davis et al., 2022).	P2		1902	1	21.00		0	0	0	0	0	Negligible	Negligible	Limited recent records in proximity.
Mammal	*Notamacropus eugenii derbianus*	Tammar Wallaby	South-western Western Australia and five offshore islands, in dense low vegetation, open grassy areas, coastal scrub, heath, dry sclerophyll forest, and thickets in mallee and woodland (DCCEEW, 2023).	P4		2017	18	1.46		0	1	1	0	2	Low	Low	Limited suitable hbaitat identified.
Mammal	*Notamacropus irma*	Western Brush Wallaby	Open forest or woodland, particularly favouring open, seasonally wet flats with low grasses and open scrubby thickets (DCCEEW, 2023).	P4		2018	35	2.10		0	1	1	1	3	Moderate	Low	No seasonal wetflats identified.
Bird	*Numenius madagascariensis*	Eastern Curlew	Intertidal mudflats. The southern most important international site in Western Australia is Eighty Mile Beach (Bamford et al., 2008).	CR & IA	CE & MI & MA	1959	2	21.89		0	0	0	0	0	Negligible	Negligible	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Numenius phaeopus*	Whimbrel	Along the Australian coast, inhabiting estuaries, mangroves, tidal flats, flooded paddocks, and bare grasslands (Pizzey & Knight, 2007)	IA	MI & MA	1978	2	17.70		0	1	0	1	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Oxyura australis*	Blue-billed duck	Deep water in large permanent wetlands and swamps with aquatic vegetation (Marchant & Higgins, 1990).	P4		2013	866	4.18		0	1	1	0	2	Low	Low	No surface water identified.
Bird	*Pachyptila turtur subantarctica*	Fairy Prion (Southern)	Subtropical waters, circumpolar. Burrows in cervices or hollows beneath *Colobanthus muscoides* with peaty soil (TSSC, 2015).	VU					Known	0	0	0	0	0	Negligible	Negligible	Associated species and suitable habitat not identified.
Mammal	*Petrogale lateralis lateralis*	Black-footed Rock-wallaby	Wide variety of rock types, requiring sufficient cave and crevice development (DPaW 2015).	EN		2004	8	15.93	Known	0	1	1	0	2	Low	Low	No rock caves or crevices identifed.
Mammal	*Phascogale tapoatafa wambenger*	Southern Brush-tailed Phascogale	Largely restricted to Jarrah dominated forests (Eucalyptus marginata) (DCCEEW, 2023).	CD		2018	6	14.07		0	1	1	0	2	Low	Low	No jarrah forest identified.
Bird	*Plegadis falcinellus*	Glossy Ibis	Well vegetated wetlands, wet pastures, floodwaters, brackish wetlands and mudflats (Pizzey & Knight, 2007).	IA	MI & MA	2013	200	0.54		0	1	1	0	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Pluvialis squatarola*	Grey Plover	Coastal, marine shores, inlets, estuaries and lagoons with large tidal mudflats or sandflats, sandy beachesand rocky coasts. It is occasionally found inland (Birdlife Australia, 2021).		MI & MA	2007	90	7.37		0	1	1	0	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Reptile	*Pseudemydura umbrina*	Western Swamp Tortoise	Small geographic range, recorded from scattered localities in a narrow strip (3–5 km wide) of the Swan Coastal Plain, roughly parallel with the Darling Range (Burbidge & Kuchling, 2004). Currently, the Ellen Brook Nature Reserve population is the only viable, naturally occurring population in the wild. The Twin Swamps Nature Reserve and Mogumber Nature Reserve populations are maintained with translocated individuals (TSSC 2004).	CR	CE	2019	222	7.45	Known	0	1	1	0	2	Low	Low	Not within known range. No surface water.
Mammal	*Pseudocheirus occidentalis*	Western Ringtail Possum	Peppermint (*Agonis flexuosa*) forest and woodland and Tuart (*Eucalyptus gomphocephala*) with a peppermint mid-story. Inland, the species is found in Jarrah (*Eucalyptus marginata*) , Wandoo (*Eucalyptus wandoo*) and Marri *(Corymbia calophylla*) forest (Van Dyck & Strahan, 2008).	CR	CE	1958	1	9.20	Likely	0	1	0	0	1	Negligible	Negligible	Not within current known range. No suitable habitat identified.
Bird	*Rostratula australis*	Australian Painted Snipe	Shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans (DCCEEW, 2023).	EN	E	2012	3	16.99		0	1	1	0	2	Low	Low	No surface water identified.
Mammal	*Setonix brachyurus*	Quokka	Jarrah forest south-east of Perth, extending south through southern Jarrah, Marri and Karri forests onward to the south coast. It is now thought to be absent from the Swan Coastal Plain. Rottnest Island (DCCEEW, 2023).	VU	V				Likely	0	0	0	0	0	Negligible	Negligible	Not within known range. No surface water identified.
Bird	*Sternula nereis nereis*	Fairy Tern	It is most common in Western Australia, found on coastal beaches, inshore and offshore islands, sheltered inlets, sewage farms, harbours, estuaries and lagoons, favouring both fresh and saline wetlands and near-coastal terrestial wetlands, including lakes and salt-ponds. (BirdLife Australia, 2021)	VU	V	2013	5	25.60	Known	0	0	1	1	2	Low	Low	No coastal habitat identified.
Invertebrate	*Synemon gratiosa*	Graceful Sun Moth	1. Coastal heathland on Quindalup dunes where it is restricted to secondary sand dunes due to the abundance of the host plant Lomandra maritima, the prefered habitat (denser population). 2. Banksia woodland on Spearwood and Bassendean dunes, where the second known host plant L. hermaphrodita is widespread. Throughout the Swan Coastal Plain, extending into the Geraldton Sandplains (DEC, 2011).	P4		2019	741	0.50		0	1	1	1	3	Moderate	Low	No suitable habitat identified.
Bird	*Thalasseus bergii*	Crested Tern	A strictly coastal species. Occasional records in the arid interior of Australia (BirdLife Australia, 2022).	IA	MI & MA	2016	393	6.71		0	1	1	0	2	Low	Low	Marine species, no coastal habitat identified.
Bird	*Thinornis rubricollis*	Hooded Plover	West of the Nullarbor Plain. Additionally recorded on ocean beaches and salt lakes,sometimes hundreds of kilometres from the coast (Birdlife, 2019).		V	1995	2	26.25		0	0	0	0	0	Negligible	Negligible	No surface water identified.
Bird	*Tringa glareola*	Wood Sandpiper	Common in Northern Australia, a casual visitor to southern parts, occuping wetland margins, saltmarshes and sewage ponds (Pizzey & Knight, 2007).	IA	MI & MA	2008	29	7.37		0	1	1	0	2	Low	Low	No surface water identified.
Bird	*Tringa nebularia*	Common Greenshank	Inland wetlands and sheltered coastal habitats In shallows around the edges of water often among pneumatophores of mangroves or other sparse, emergent or fringing vegetation, such as sedges or saltmarsh (DCCEEW, 2023).	IA	MI & MA	2013	124	7.37		0	1	1	0	2	Low	Low	No surface water identified.
Bird	*Tringa stagnatilis*	Marsh Sandpiper	Wetlands of varying salinity including fresh, sewage ponds and estuaries (Pizzey & Knight, 2007).	IA		2011	5	12.34		0	1	1	0	2	Low	Low	No surface water identified.
Bird	*Tyto novaehollandiae novaehollandiae*	Masked Owl (Southern Subspecies)	Forests, open woodlands, farmlands with large trees, paperbark woodlands and caves (Fulton, 2017)	P3		2000	3	20.74		0	0	0	1	1	Low	Low	Limited recent records in proximity.
Invertebrate	*Westralunio carteri*	Carter's Freshwater Mussel	Freshwaters of south-west Western Australia, greatest in abundance in slower flowing waters with stable, soft sediments and low salinity (>3 g /L is lethal) (Klunzinger et al., 2012).	VU	V	2020	36	2.34	Known	0	1	1	0	2	Low	Negligible	No surface water identified.
Bird	*Zanda baudinii*	Baudin's Cockatoo	Temperate forest and woodland dominated by *Eucalyptus marginata* (jarrah), *Corymbia calophylla* (marri) and *E. diversicolor* (karri) (TSSC, 2018).	EN	E	2015	136	0.70	Known	0	1	1	2	4	High	High	Suitable habitat identified

Type	Taxon	Common Name	Habitat	Cons. Code WA	Cons. Code EPBC	Date (DBCA)	Records (DBCA)	Distance (km) [DBCA]	PMST	Recorded in Survey Area	Known from Vicinity (<20km)	Recent Record (Last 20 years)	Potential presence of suitable habitat within the Survey Area (0,1,2)	Total Score	Likelihood	Post-survey Likelihood	Comments
Bird	*Zanda latirostris*	Carnaby's Cockatoo	Uncleared or remnant native eucalypt woodlands containing salmon gum and wandoo, and in shrubland or kwongan heathland dominated by hakea, dryandra, banksia and grevillea species. It also occurs in remnant patches of native vegetation on land otherwise cleared for agriculture. Forages seasonally in pine plantations (DCCEEW, 2023)	EN	E	2020	9264	0.29	Known	0	1	1	2	4	High	Known	Identified during survey.

Type	Taxon	Common Name	Habitat	Cons. Code WA	Cons. Code EPBC	Date (DBCA)	Records (DBCA)	Distance (km) [DBCA]	PMST	Recorded in Survey Area	Known from Vicinity (<20km)	Recent Record (Last 20 years)	Potential presence of suitable habitat within the Survey Area (0,1,2)	Total Score	Likelihood	Post-survey likelihood	Comment
Bird	*Actitis hypoleucos*	Common Sandpiper	Wide range of coastal wetlands, around muddy margins or rocky shores, some inland wetlands and rarely on mudflats (DCCEEW, 2023)	IA	MI & MA	1991	2	9.42		0	1	0	1	2	Low	Low	Marine species, no coastal habitat
Bird	*Apus pacificus*	Fork-tailed Swift	Over inland plains, sometimes boave foothills or in coastal areas (DCCEEW, 2023).	IA	MI & MA	2014	17	9.94		0	1	1	0	2	Low	Low	Marine species, no coastal habitat
Bird	*Arenaria interpres*	Ruddy Turnstone	Coastal regions with exposed rock coast lines or coral reefs (DCCEEW, 2023).	IA	V & MI & MA	1991	4	22.71		0	0	0	0	0	Negligible	Negligible	Marine species, no coastal habitat
Insect	*Australotomurus morbidus*	Cemetary springtail, Guildford springtail	Undisturbed native grasslands and heathland at low and high elevations (P. Greenslade & R. Jordana, 2014).	P3		1993	6	4.48		0	1	0	0	1	Negligible	Negligible	Limited recent records, limited suitable habitat identified.
Invertebrate	*Austroconops mcmillani*	A biting midge	Larvae live in small aquatic habitats.	P2		2011	8	45.75		0	0	1	0	1	Negligible	Negligible	No waterbodies identified in survey area.
Invertebrate	*Austrosaga spinifer*	Cricket	Banksia heath and low woodlands (South Metro Connect, 2011). Known records exist in Neerabup National Park (DEC, 2012b).	P2		1982	2	26.86		0	0	0	1	1	Low	Low	Limited recent records in proximity.
Mammal	*Bettongia lesueur graii*	Boodie, Burrowing Bettong	open eucalypt or acacia woodland with a grass and shrub understorey to sandridge desert with spinifex hummocks and sparse shrubs (DCCEEW, 2023).	EX	Ex	N/A	2	34.74		0	0	0	1	1	Low	Low	Extinct species
Mammal	*Bettongia penicillata ogilbyi*	Woylie	Dry sclerophyllous forest with a dense understory (ALA, 2023).	EN	CE	2018	98	1.01	Known	0	1	1	1	3	Moderate	Low	No suitable habtat identified in survey area.
Bird	*Botaurus poiciloptilus*	Australasian Bittern	Freshwater wetlands and, rarely, estuaries or tidal wetlands, favouring tall dense vegetation (TSSC, 2019).	EN	E	2003	20	8.35	Known	0	1	1	0	2	Low	Low	No waterbodies identified in survey area.
Bird	*Cacatua pastinator pastinator*	Muir's Corella	Large or dead eucalypts and paperbark in forested areas or lone trees in paddocks along roadsides (DEC, 2008)	CD		0	7	10.04		0	1	0	1	2	Low	Low	Limited suitable habitat identified.
Bird	*Calidris acuminata*	Sharp-tailed Sandpiper	Occurs along muddy edges of shallow fresh or brackish wetlands with inundated or emergent sedges, grass, saltmarsh or other low vegetation (DCCEEW, 2023).	IA	V & MI & MA	2012	9	8.35		0	1	1	0	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Calidris alba*	Sanderling	Restricted to the coast, mostly on open sandy beaches exposed to open sea-swell, exposed sandbars and spits, and shingle banks (DCCEEW, 2023).	IA	MI & MA	1980	3	8.35		0	1	0	0	1	Negligible	Negligible	Marine species, no coastal habitat
Bird	*Calidris canutus*	Red Knot	Intertidal mudflats, sandflats and sandy beaches of sheltered coasts (DCCEEW, 2023).	EN & IA	V & MA & MI	2002	8	8.35		0	1	0	0	1	Negligible	Negligible	No waterbodies identified in survey area.
Bird	*Calidris ferruginea*	Curlew Sandpiper	Intertidal mudflats in sheltered coastal areas and inland around ephemeral and permanent lakes, dams, waterholes and bore drains with bare edges of mud and sand (DCCEEW, 2023).	CR & IA	CE & MI & MA	2005	31	8.35		0	1	1	0	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Calidris melanotos*	Pectoral Sandpiper	Occupies shallow, fresh waters often containing low grass or other small herbs, swamp margins, flooded pastures and saltmarshes (Pizzey & Knight, 2007;DCCEEW, 2023).	IA	MI & MA	1992	2	11.35		0	1	0	1	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Calidris ruficollis*	Red-necked Stint	Coastal sheltered areas and exposed or ocean beaches, sometimes on stony or rocky shores, reefs or shoals (DCCEEW, 2023).	IA	MI & MA	2011	96	8.06		0	1	1	0	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Calidris subminuta*	Long-toed Stint	Freshwater wetlands (DCCEEW, 2023).	IA	MI & MA	1992	4	11.77		0	1	0	1	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Calidris tenuirostris*	Great Knot	Sheltered coastal habitats with large intertidal mudflats or sandflats (DCCEEW, 2023).	CR & IA	V & MI & MA	2005	12	8.35		0	1	1	0	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Calonectris leucomelas*	Streaked Shearwater	Common and widespread around much of the northern coast of Australia, rarely ventures inland (Pizzey & Knight, 2007)	IA	MI & MA	2010	1	13.77		0	1	1	0	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Calyptorhynchus banksii naso*	Forest Red-tailed Black Cockatoo	Inhabits dense Eucalyptus marginata (Jarrah), E. diversicolor (Karri) and Corymbia calophylla (Marri) forests (TSSC, 2009).	VU	V	2020	363	2.26	Known	0	1	1	2	4	High	Known	Sighted during survey.
Bird	*Charadrius leschenaultii*	Greater Sand Plover, Large Sand Plover	Beaches, tidal mudflats, reefs, dunes and is seldom observed far inland (Pizzey & Knight, 2007).	VU & IA	V & MI & MA	2011	2	18.45		0	1	1	0	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Charadrius mongolus*	Lesser Sand Plover	Open intertidal flats of sheltered bays, lagoons or estuaries (Pizzey & Knight, 2007).	EN & IA	E & MI & MA	1999	1	18.63		0	1	0	0	1	Negligible	Negligible	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Chlidonias leucopterus*	White-winged Black Tern, White-winged Tern	Fresh, brackish or saline, and coastal or subcoastal wetlands. They rarely occur on inland wetlands in Australia (DCCEEW, 2023).	IA	MI & MA	1990	1	11.77		0	1	0	1	2	Low	Low	Marine species, no coastal habitat. No waterbodies identified in survey area.
Reptile	*Ctenotus gemmula*	Jewelled South-west Ctenotus	Endemic to Western Australia. In the Perth region it is uncommon and restricted to the Swan Coastal Plain. It inhabits low vegetation in Banksia woodland, sheltering in leaf litter under trees, shrubs and abandoned stick-ant nests (Bush et al., 2010).	P3		1999	4	17.79		0	1	0	0	1	Negligible	Negligible	Limited recent records in proximity.
Bird	*Dasyornis longirostris*	Western Bristlebird	Restricted to a coastal strip of southern Western Australia from Two Peoples Bay to near East Mount Barren in the eastern end of Fitzgerald River National Park, with a large gap further west of the National Park (Gillfillan et al., 2007).	EN	E	N/A	1	12.68		0	1	0	0	1	Negligible	Negligible	Limited recent records.
Mammal	*Dasyurus geoffroii*	Western Quoll, Chuditch	Currently restricted to south-west Western Australia, in areas dominated by sclerophyll forest or drier woodland, heath and mallee shrubland (Van Dyck & Strahan, 2008).	VU	V	2022	58	6.58	Known	0	1	1	1	3	Moderate	Low	Limited records in proximity.Limited suitable habitat identified.
Reptile	*Delma concinna major*	Javelin Lizard	Heaths on dunes and sand-plains along mid- to lower west coast. Subspecies dwells in dense matrix of low vegetation and associated leaf litter in Shark Bay.	P1		2015	1	49.54		0	0	1	0	1	Negligible	Negligible	Limited recent records in proximity.Limited suitable habitat identified.
Bird	*Elanus scriptus*	Letter-winged kite	Open country and grasslands throughout arid and semi-arid regionsWill disperse to high rainfall and coastal regions when food is abundent (BirdLife, 2021).	P4		1980	1	8.35		0	1	0	0	1	Negligible	Negligible	Limited recent records. Limited suitable habitat identified.

Type	Taxon	Common Name	Habitat	Cons. Code WA	Cons. Code EPBC	Date (DBCA)	Records (DBCA)	Distance (km) [DBCA]	PMST	Recorded in Survey Area	Known from Vicinity (<20km)	Recent Record (Last 20 years)	Potential presence of suitable habitat within the Survey Area (0,1,2)	Total Score	Likelihood	Post-survey likelihood	Comment
Invertebrate	*Euoplos inornatus*	Australian armored trapdoor spiders	Most records are from the Darling Scarp and jarrah forest (Invertebrate Solutions, 2018).	P3		1998	1	16.50		0	1	0	0	1	Negligible	Negligible	No suitable habitat identified.
Bird	*Falco hypoleucos*	Grey Falcon	Timered lowland plains, including acacia shrublands)particularly with tree-lined watercourses), tussock grassland and open woodland (TSSC, 2020).	VU	V	1929	1	12.48		0	1	0	1	2	Low	Low	Limited suitable habitat identified.
Bird	*Falco peregrinus*	Peregrine Falcon	Rainforests, arid zones and coastal to alpine areas (BirdLife, 2021).	OS		2014	109	3.03		0	1	1	1	3	Moderate	Moderate	Potential suitable habitat identified.
Fish	*Galaxiella nigrostriata*	Black-stripe Minnow	Acidic ephemeral bodies of water in peat flats located in the south west corner of Western Australia. The major populations occur from Augusta to Albany and near Bunbury and Gingin (Morgan et al, 2011). Generally prefer sandy, moist soil when ephemeral pools dry out.	EN	E	2009	3	16.10	Known	0	1	1	0	2	Negligible	Negligible	No waterbodies identified in survey area.
Bird	*Glareola maldivarum*	Oriental Pratincole	Open plains, floodplains or short grassland (including farmland), often occurring near terrestrial wetlands, and occurring along the coast. The species does not breed in Australia (DCCEEW, 2023).	IA	MI & MA	1981	1	13.49		0	1	0	1	2	Low	Low	Marine species, no coastal habitat
Invertebrate	*Hesperocolletes douglasi*	Rottnest Bee	Extant population known in Pinjar. Only been two individuals ever found (TSSC, 2019).	CR	CE	2015	2	35.54	May	0	0	1	0	1	Negligible	Negligible	Limited recent records. Limited suitable habitat identified.
Invertebrate	*Hurleya sp. (WAM C23193)*	Crystal Cave crangonyctoid, cave shrimp	Only known from Yanchep Aquatic Root Mat Community	CR		1997	2	44.78		0	0	0	0	0	Negligible	Negligible	No suitable habitat identified.
Mammal	*Hydromys chrysogaster*	Water Rat	Tnear permanent bodies of fresh or brackish water (Van Dyck & Strahan, 2008).	P4		2019	52	6.58		0	1	1	0	2	Low	Low	No waterbodies identified in survey area.
Bird	*Hydroprogne caspia*	Caspian Tern	The Caspian Tern is found in sheltered coastal embayments and those with sandy or muddy margins (DCCEEW, 2023).	IA	MI & MA	1994	8	9.21		0	1	0	1	2	Low	Low	Marine species, no coastal habitat
Invertebrate	*Hylaeus globuliferus*	Native Bee	Habitats containing flowers from *Adenanthos cygnorum* and also *Banksia attenuata* (Western Wildlife, 2009).	P3		1996	19	7.30		0	1	0	1	2	Low	Moderate	*Adenanthos cygnorum* identified.
Invertebrate	*Idiosoma sigillatum*	Swan Coastal Plain shield-backed trapdoor spider	Remnant habitats in Banksia woodland and heathland on sandy soils (Rix et al., 2018).	P3		2019	124	1.66		0	1	1	1	3	Moderate	Low	Limited recent records. Limited suitable habitat identified.
Mammal	*Isoodon fusciventer*	Quenda, Southern Brown Bandicoot	Forest, woodland, heath and shrub communities, with sandy soils and dense heathy vegetation (Van Dyck & Strahan, 2008).	P4		2021	1589	1.96		0	1	1	1	3	Moderate	Known	Sighted during survey.
Bird	*Ixobrychus minutus*	Australian Little Bittern	Dense low swamp vegetation and on floating water plants in the south-west of Western Australia (Pizzey & Knight, 2007).	P4		2012	8	10.36		0	1	1	0	2	Low	Low	No waterbodies identified in survey area.
Bird	*Ixobrychus flavicollis australis (southwest subpop.)*	Black Bittern (Southwest subpopulation)	Terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation includng flooded grassland, forest, woodland, rainforest and mangroves (NSW Government, 2018).	P2		1987	2	10.09		0	1	0	1	2	Low	Low	No waterbodies identified in survey area.
Invertebrate	*Leioproctus contrarius*	a short-tongued bee	Western Australia, associated with *Goodenia* sp. and *Lechenaultia* sp. (South Metro Connect, 2011).	P3		1982	6	22.52		0	0	0	0	0	Negligible	Negligible	No suitable habitat identified.
Invertebrate	*Leioproctus douglasiellus*	a short-tongued bee	Known from Kenwick wetlands, Cannington and Forestdale Lake and near Lithgow in the Blue Mountains of NSW (ALA, 2019). Has an association with Goodenia filiformis and Anthotium junciforme (South Metro Connect, 2011).	EN		1954	4	27.24	Known	0	0	0	0	0	Negligible	Negligible	No waterbodies identified in survey area.
Bird	*Leipoa ocellata*	Malleefowl	Semi-arid to arid zone in shrublands and low woodlands dominated by mallee and associated habitats such as such as Broombush (*Melaleuca uncinata*) and Scrub Pine (*Callitris verrucosa*) (Benshemesh, 2007).	VU	V	1981	46	15.93	Likely	0	1	0	0	1	Negligible	Negligible	Limited recent records in proximity.
Bird	*Limosa lapponica*	Bar-tailed Godwit	Widespread around the coast of Western Australia from Eyre to Derby (DotE, 2015).	IA (& VU or CR at subsp. level)	Mi (& V or CE at subsp. level)	2004	18	8.35		0	1	1	0	2	Low	Low	Limited suitable habitat identified.
Bird	*Limosa lapponica menzbieri*	Northern Siberian Bar-tailed Godwit	Coastal habitat, including large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It has also been recorded in coastal sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats (Higgins & Davies, 1996).	CR	CE				Known	0	0	0	0	0	Negligible	Negligible	Limited recent records in proximity.
Bird	*Limosa limosa*	Black-tailed Godwit	Coastal habitat including sheltered bays, estuaries and lagoons with large intertidal mudflats or sandflats (DCCEEW, 2023)	IA	E & MI & MA	2011	4	8.35		0	1	1	0	2	Low	Low	Marine species, no coastal habitat
Mammal	*Macroderma gigas*	Ghost Bat	Northern Australia, inhabiting arid Pilbara to tropical savanna woodlands and rainforests rainforest, monsoon and vine thicket, open woodlands and arid areas and reside in caves, rock crevices and disused mine adits (DoE 2016).	VU	V				May	0	0	0	0	0	Negligible	Negligible	No caves or rock crevices identified.
Mammal	*Macrotis lagotis*	Bilby	Arid to semi-arid woodlands and hummock grasslands in the north of Australia, restricted to the Gibson, Little Sandy and Great Sandy Deserts, and parts of the Pilbara, Dampierland, Central Kimberley and Ord-Victoria Plains bioregions in Western Asutralia (Bradley et al. 2015).	VU	V	1974	4	13.79		0	1	0	0	1	Negligible	Negligible	Limited recent records in proximity. Limited suitable habitat identified.
Mammal	*Myrmecobius fasciatus*	Numbat	Mulga woodland, spinifex sandplains and Eucalypt forests and woodlands. In WA, their habitat is generally woodland dominated by Eucalyptus species, with abundant hollow logs and branches (DBCA, 2021)	EN	E	1974	1	6.58		0	1	0	1	2	Low	Low	Limited suitable habitat identified.
Reptile	*Neelaps calonotos*	Black-striped Snake	Confined to the Swan Coastal Plain between Mandurah and Lancelin, sheltering in upper layers of loose soil beneath leaf litter in Eucalyptus/Banksia woodlands, typically at the base of trees and shrubs (Bush et al., 2010).	P3		2017	97	3.36		0	1	1	1	3	Moderate	Low	Limited suitable habitat identified.
Bird	*Ninox connivens connivens (southwest subpop.)*	(Barking Owl (southwest subpop.))	Open eucalyptus woodlands and the edges of forests, often adjacent to farmland. Likely to use the interior of forested habitat and prefer woodlands and forests with a high density of large trees and particularly sites with hollows (Davis et al., 2022).	P2		1902	1	12.54		0	1	0	0	1	Negligible	Negligible	Limited recent records in proximity. Limited suitable habitat identified.
Mammal	*Notamacropus eugenii derbianus*	Tammar Wallaby	South-western Western Australia and five offshore islands, in dense low vegetation, open grassy areas, coastal scrub, heath, dry sclerophyll forest, and thickets in mallee and woodland (DCCEEW, 2023).	P4		2017	18	6.41		0	1	1	0	2	Low	Low	Limited suitable habitat identified.

Type	Taxon	Common Name	Habitat	Cons. Code WA	Cons. Code EPBC	Date (DBCA)	Records (DBCA)	Distance (km) [DBCA]	PMST	Recorded in Survey Area	Known from Vicinity (<20km)	Recent Record (Last 20 years)	Potential presence of suitable habitat within the Survey Area (0,1,2)	Total Score	Likelihood	Post-survey likelihood	Comment
Mammal	*Notamacropus irma*	Western Brush Wallaby	Open forest or woodland, particularly favouring open, seasonally wet flats with low grasses and open scrubby thickets (DCCEEW, 2023).	P4		2018	35	2.27		0	1	1	1	3	Moderate	Negligible	Limited suitable habitat identified.
Bird	*Numenius madagascariensis*	Eastern Curlew	Intertidal mudflats. The southern most important international site in Western Australia is Eighty Mile Beach (Bamford et al., 2008).	CR & IA	CE & MI & MA	1959	2	15.80		0	1	0	0	1	Negligible	Negligible	No waterbodies identified in survey area.
Bird	*Numenius phaeopus*	Whimbrel	Along the Australian coast, inhabiting estuaries, mangroves, tidal flats, flooded paddocks, and bare grasslands (Pizzey & Knight, 2007)	IA	MI & MA	1978	2	22.71		0	0	0	1	1	Low	Low	No waterbodies identified in survey area.
Bird	*Oxyura australis*	Blue-billed duck	Deep water in large permanent wetlands and swamps with aquatic vegetation (Marchant & Higgins, 1990).	P4		2013	866	1.40		0	1	1	0	2	Low	Low	No waterbodies identified in survey area.
Bird	*Pachyptila turtur subantarctica*	Fairy Prion (Southern)	Subtropical waters, circumpolar. Burrows in cervices or hollows beneath Colobanthus muscoides with peaty soil (TSSC, 2015).	VU	V				Known	0	0	0	0	0	Negligible	Negligible	No coastal habitat identified.
Mammal	*Petrogale lateralis lateralis*	Black-footed Rock-wallaby	Wide variety of rock types, requiring sufficient cave and crevice development (DPaW 2015).	EN	E	2004	8	26.30	Known	0	0	1	0	1	Negligible	Negligible	No rock types identified.
Mammal	*Phascogale tapoatafa wambenger*	Southern Brush-tailed Phascogale	Largely restricted to Jarrah dominated forests (*Eucalyptus marginata*) (DCCEEW, 2023).	CD		2018	6	6.58		0	1	1	0	2	Low	Low	Limited suitable habitat identified.
Bird	*Plegadis falcinellus*	Glossy Ibis	Well vegetated wetlands, wet pastures, floodwaters, brackish wetlands and mudflats (Pizzey & Knight, 2007).	IA	MI & MA	2013	200	9.44		0	1	1	0	2	Low	Low	No waterbodies identified in survey area.
Bird	*Pluvialis squatarola*	Grey Plover	Coastal, marine shores, inlets, estuaries and lagoons with large tidal mudflats or sandflats, sandy beachesand rocky coasts. It is occasionally found inland (Birdlife Australia, 2021).		V & MI & MA	2007	90	8.35		0	1	1	0	2	Low	Low	No waterbodies identified in survey area.
Reptile	*Pseudemydura umbrina*	Western Swamp Tortoise	Small geographic range, recorded from scattered localities in a narrow strip (3–5 km wide) of the Swan Coastal Plain, roughly parallel with the Darling Range (Burbidge & Kuchling, 2004). Currently, the Ellen Brook Nature Reserve population is the only viable, naturally occurring population in the wild. The Twin Swamps Nature Reserve and Mogumber Nature Reserve populations are maintained with translocated individuals (TSSC 2004).	CR	CE	2019	222	13.44	Known	0	1	1	0	2	Low	Low	No waterbodies identified in survey area.
Mammal	*Pseudocheirus occidentalis*	Western Ringtail Possum	Peppermint (*Agonis flexuosa*) forest and woodland and Tuart (*Eucalyptus gomphocephala*) with a peppermint mid-story. Inland, the species is found in Jarrah (*Eucalyptus marginata)*, Wandoo (*Eucalyptus wandoo*) and Marri (*Corymbia calophylla*) forest (Van Dyck & Strahan, 2008).	CR	CE	1958	1	12.88	Likely	0	1	0	0	1	Negligible	Negligible	No suitable habitat identifed.
Bird	*Rostratula australis*	Australian Painted Snipe	Shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans (DCCEEW, 2023).	EN	E & MA	2012	3	11.79		0	1	1	1	3	Moderate	Negligible	No waterbodies identified in survey area.
Mammal	*Setonix brachyurus*	Quokka	Jarrah forest south-east of Perth, extending south through southern Jarrah, Marri and Karri forests onward to the south coast. It is now thought to be absent from the Swan Coastal Plain. Rottnest Island (DCCEEW, 2023).	VU	V				Likely	0	0	0	0	0	Negligible	Negligible	Thought to be absent from the swan coastal plain.
Bird	*Sternula nereis nereis*	Fairy Tern	It is most common in Western Australia, found on coastal beaches, inshore and offshore islands, sheltered inlets, sewage farms, harbours, estuaries and lagoons, favouring both fresh and saline wetlands and near-coastal terrestial wetlands, including lakes and salt-ponds. (BirdLife Australia, 2021)	VU	V	2013	5	18.65	Known	0	1	1	1	3	Moderate	Negligible	No coastal habitat identified.
Invertebrate	*Synemon gratiosa*	Graceful Sun Moth	1. Coastal heathland on Quindalup dunes where it is restricted to secondary sand dunes due to the abundance of the host plant Lomandra maritima, the prefered habitat (denser population). 2. Banksia woodland on Spearwood and Bassendean dunes, where the second known host plant L. hermaphrodita is widespread. Throughout the Swan Coastal Plain, extending into the Geraldton Sandplains (DEC, 2011).	P4		2019	741	2.90		0	1	1	1	3	Moderate	Negligible	Limited suitable habitat identified.
Bird	*Thalasseus bergii*	Crested Tern	A strictly coastal species. Occasional records in the arid interior of Australia (BirdLife Australia, 2022).	IA	MI & MA	2016	393	8.35		0	1	1	0	2	Low	Low	Marine species, no coastal habitat.
Bird	*Thinornis rubricollis*	Hooded Plover	West of the Nullarbor Plain. Additionally recorded on ocean beaches and salt lakes,sometimes hundreds of kilometres from the coast (Birdlife, 2019).		MA	1995	2	19.90		0	1	0	0	1	Negligible	Negligible	Marine species, no coastal habitat. No waterbodies identified in survey area.
Bird	*Tringa glareola*	Wood Sandpiper	Common in Northern Australia, a casual visitor to southern parts, occuping wetland margins, saltmarshes and sewage ponds (Pizzey & Knight, 2007).	IA	MI & MA	2008	29	9.21		0	1	1	1	3	Moderate	Negligible	No waterbodies identified in survey area.
Bird	*Tringa nebularia*	Common Greenshank	Inland wetlands and sheltered coastal habitats In shallows around the edges of water often among pneumatophores of mangroves or other sparse, emergent or fringing vegetation, such as sedges or saltmarsh (DCCEEW, 2023).	IA	E & MI & MA	2013	124	8.35		0	1	1	1	3	Moderate	Negligible	No waterbodies identified in survey area.
Bird	*Tringa stagnatilis*	Marsh Sandpiper	Wetlands of varying salinity including fresh, sewage ponds and estuaries (Pizzey & Knight, 2007).	IA	MI & MA	2011	5	8.35		0	1	1	1	3	Moderate	Negligible	No waterbodies identified in survey area.
Bird	*Tyto novaehollandiae novaehollandiae*	Masked Owl (Southern Subspecies)	Forests, open woodlands, farmlands with large trees, paperbark woodlands and caves (Fulton, 2017)	P3		2000	3	13.62		0	1	0	1	2	Low	Low	Limited suitable habitat identified.
Invertebrate	*Westralunio carteri*	Carter's Freshwater Mussel	Freshwaters of south-west Western Australia, greatest in abundance in slower flowing waters with stable, soft sediments and low salinity (>3 g /L is lethal) (Klunzinger et al., 2012).	VU	V	2020	36	4.91	Known	0	1	1	0	2	Negligible	Negligible	No surface water identified.
Bird	*Zanda baudinii*	Baudin's Cockatoo	Temperate forest and woodland dominated by *Eucalyptus marginata* (jarrah), *Corymbia calophylla* (marri) and *E. diversicolor* (karri) (TSSC, 2018).	EN	E	2015	136	0.64	Known	0	1	1	1	3	Moderate	Moderate	Suitable habitat identified suring durvey area. Current distriburion patterns result in a moderate likelihood.
Bird	*Zanda latirostris*	Carnaby's Cockatoo	Uncleared or remnant native eucalypt woodlands containing salmon gum and wandoo, and in shrubland or kwongan heathland dominated by hakea, dryandra, banksia and grevillea species. It also occurs in remnant patches of native vegetation on land otherwise cleared for agriculture. Forages seasonally in pine plantations (DCCEEW, 2023)	EN	E	2020	9264	0.65	Known	0	1	1	2	4	High	high	Suitable habitat identified suring durvey area. Current distriburion patterns result in a moderate likelihood.

Appendix D

Species x Survey Area x Community Matrix

Appendix C - Species x Survey Area x Community Matrix

Client Name: Western Power
Project Number: 60713462
Project Name: NREP SCP

Family		Taxon	Padbury-Wangara				Pinjar Terminal	Neerabup Terminal and East Wanneroo											4T-NOR TO HBK 132kV	Northern Terminal		Oppo
			BaAbAb	BaAlTe	CpMsLo	EqHcPp	BaAcCc	BaAcDf	BaAhDf	BaRcGf	BmAcPo	BmEpLi	CcXpDf	EgGlCe	EmHhDf	MpHaDb	MpHaEc	MpXpDb	PpAcCe	CcMpXp	CcXpEc	ErAcCc	
Aizoaceae																						
	*	*Carpobrotus edulis*							X	X	X			X		X			X			X	
Amaranthaceae																						
		Ptilotus manglesii													X							
Anarthriaceae																						
		Lyginia imberbis					X	X	X	X	X	X	X								X	
Apiaceae																						
		Platysace filiformis															X					
		Xanthosia huegelii					X															
Araliaceae																						
		Trachymene pilosa					X	X				X						X				X	
Asparagaceae																						
		Acanthocarpus preissii			X							X										
	* DP	*Asparagus asparagoides*									X											
		Laxmannia squarrosa							X		X	X										X
		Lomandra ?micrantha						X				X										
		Lomandra caespitosa																				
		Lomandra indet (sterile)					X															
		Lomandra micrantha							X			X	X		X							
		Lomandra nigricans										X	X									
		Lomandra sericea					X															
		Sowerbaea laxiflora						X														
		Thysanotus arbuscula						X														
		Thysanotus thyrsoideus					X															
		Thysanotus manglesianus					X		X			X										
		Thysanotus multiflorus																X				
Asphodelaceae																						
	*	*Trachyandra divaricata*			X																	
Asteraceae																						
	*	*Asteraceae sp.*							X													X
	*	*Gazania linearis*	X		X																	
		Hyalosperma cotula							X			X			X							
	*	*Hypochaeris glabra*		X										X								X
	*	*Lactuca serriola*				X																
		Lagenophora huegelii						X														
	*	*Leontodon rhagadioloides*			X																	
	*	*Monoculus monstrosus*																			X	
		Oleana axillaris										X										
		Podolepis gracilis						X														
		Podotheca gnaphalioides							X													
	*	*Sonchus asper*	X			X			X													
	*	*Sonchus oleraceus*		X		X											X		X			
	*	*Urospermum picroides*																				X
	*	*Ursinia anthemoides*						X	X		X	X	X		X	X						X
Boryaceae																						
		Borya sphaerocephala					X															
Brassicaceae																						
	*	*Lobularia maritima*			X																	
Campanulaceae																						
		Lobelia tenuior						X														
	*	*Wahlenbergia capensis*										X							X			X	
Caryophyllaceae																						
	*	*Petrorhagia dubia*							X													
Casuarinaceae																						
		Allocasuarina humilis					X		X			X										
		Allocasuarina fraseriana										X										
Chaetospora curvifolia																						
		Chaetospora curvifolia							X													
Chenopodiaceae																						
		Rhagodia baccata			X																	
Colchicaceae																						
		Burchardia congesta					X	X	X		X	X	X		X							
Crassulaceae																						
		Crassula colorata																				X
Cupressaceae																						
		Callitris preissii	X		X																	
		Callitris pyramidalis																				X
Cyperaceae																						
		Ficinia nodosa								X				X								
		Lepidosperma pubisquameum																				
		Lepidosperma sp. sterile						X				X										
		Lepidosperma calcicola							X			X										
		Lepidosperma leptostachyum										X										
		Mesomelaena pseudostygia					X		X			X		X	X				X			
		Morelotia octandra													X							
		Schoenus subtrasicularis																				X

Appendix C - Species x Survey Area x Community Matrix

Client Name: Western Power
Project Number: 60713462
Project Name: NREP SCP

Family		Taxon	Padbury-Wangara				Pinjar Terminal	Neerabup Terminal and East Wanneroo											4T-NOR TO HBK 132kV	Northern Terminal		Oppo
			BaAbAb	BaAlTe	CpMsLo	EqHcPp	BaAcCc	BaAcDf	BaAhDf	BaRcGt	BmAcPo	BmEpLi	CcXpDf	EgGlCe	EmHhDf	MpHaDb	MpHaEc	MpXpDb	PpAcCe	CcMpXp	CcXpEc	ErAcCc	
Dasypogonaceae																							
		Calectasia sp.							X														
		Dasypogon bromeliifolius											X			X		X	X			X	
Dilleniaceae																							
		Hibbertia hypericoides subsp. *hypericoides*		X			X		X			X			X				X				
		Hibbertia cuneiformis				X																	
		Hibbertia huegelii							X			X			X								
		Hibbertia subvaginata					X					X	X		X	X							
		Hibbertia hypericoides						X															
Droseraceae																							
		Drosera erythrorhiza					X					X											
		Drosera macrantha					X					X											
Ericaceae																							
		Conostephium pendulum					X		X			X									X		
		Leucopogon pulchellus					X					X	X										
		Styphelia propinqua																	X				
		Styphelia conostephioides										X										X	
		Styphelia pallida										X											
Euphorbiaceae																							
	*	*Euphorbia terracina*	X	X		X								X								X	
		Monotaxis grandiflora var. *grandiflora*													X								
	*	*Ricinus communis*																				X	
Fabaceae																							
		Acacia applanata											X										
		Acacia blakelyi	X																				
		Acacia huegelii						X															X
	*	*Acacia iteaphylla*																				X	
		Acacia lasiocarpa												X									
		Acacia lasiocarpa var. *lasiocarpa*		X																			
		Acacia lasiocarpa var. *sedifolia*			X																		
	*	*Acacia longifolia* subsp. *longifolia*														X							
		Acacia pulchella					X			X	X	X		X								X	
		Acacia saligna				X																X	
		Acacia sessilis							X			X											
		Acacia pulchella					X																
		Bossiaea eriocarpa					X		X		X	X	X		X								
		Daviesia divaricata subsp. *divaricata*		X					X						X				X			X	
		Daviesia triflora							X			X										X	
		Gastrolobium ebracteolatum																				X	
		Gastrolobium linearifolium								X	X			X					X				
		Gompholobium tomentosum					X	X	X	X		X		X	X	X		X				X	
		Hardenbergia comptoniana			X					X									X				
		Hovea trisperma					X					X			X								
		Jacksonia floribunda					X				X	X	X		X				X				
		Jacksonia sericea							X														
		Jacksonia sternbergiana							X						X							X	
		Jacksonia furcellata								X							X	X				X	
		Kennedia prostrata												X	X							X	
	*	*Lupinus angustifolius*																					
	*	*Lupinus cosentinii*	X																				
	*	*Medicago polymorpha*												X									
	*	*Ornithopus pinnatus*								X				X					X				
	*	*Trifolium arvense*																	X				
	*	*Trifolium campestre*																				X	
	*	*Vicia sativa* subsp. *nigra*				X													X			X	
Gentianaceae																							
		Centaurium tenuiflorum												X									
Geraniaceae																							
	*	*Pelargonium capitatum*	X	X			X							X			X		X			X	
Goodeniaceae																							
		Dampiera linearis					X				X	X	X		X								
		Lechenaultia floribunda					X		X												X		
		Scaevola repens					X		X			X			X				X				
		Scaevola canescens					X																
Haemodoraceae																							
		Anigozanthos humilis																					X
		Anigozanthos manglesii													X								
		Conostylis aurea							X			X			X								
		Conostylis candicans					X																
		Conostylis candicans subsp. candicans					X							X								X	
		Conostylis setigera		X			X					X											
		Conostylis teretifolia					X																
		Conostylis candicans subsp. calci cola			X																		
		Conostylis juncea												X									
		Haemodorum laxum										X			X								
		Haemodorum spicatum							X			X							X		X		
		Phlebocarya ciliata					X			X												X	
Haloragaceae																							
		Gonocarpus pithyoides									X												
Hemerocallidaceae																							
		Arnocrinum preissii							X														
		Corynotheca micrantha						X	X			X							X				
		Dianella revoluta				X		X	X			X				X	X		X		X	X	
		Tricoryne elatior		X			X																
		Tricoryne tenella																				X	
Iridaceae																							
	*	*Gladiolus caryophyllaceus*					X	X	X		X	X			X	X	X		X			X	
		Patersonia occidentalis					X	X	X		X	X		X	X			X	X		X	X	
	*	*Romulea rosea*																		X			
Lamiaceae																							
		Hemiandra pungens									X												
	*	*Lavandula stoechas*																				X	
Lauraceae																							
		Cassytha flava					X																
		Cassytha racemosa forma *racemosa*																				X	
Loganiaceae																							
		Phyllangium divergens										X											
		Phyllangium paradoxum															X						
Loranthaceae																							
		Nuytsia floribunda						X													X		
Macarthuriaceae																							
		Macarthuria australis							X														
Meliaceae																							
	*	*Melia azedarach*																				X	

Appendix C - Species x Survey Area x Community Matrix

Client Name: Western Power
Project Number: 60713462
Project Name: NREP SCP

Family		Taxon	Padbury-Wangara				Pinjar Terminal	Neerabup Terminal and East Wanneroo												4T-NOR TO HBK 132kV	Northern Terminal		Oppo
			BaAbAb	BaAlTe	CpMsLo	EgHcPp	BaAcCc	BaAcDf	BaAhDf	BaRcGl	BmAcPo	BmEpLi	CcXpDf	EgGlCe	EmHhDf	MpHaDb	MpHaEc	MpXpDb	PpAcCe	CcMpXp	CcXpEc	ErAcCc	
Myrtaceae																							
		Agonis flexuosa																					
		Astartea scoparia												X									
		Beaufortia elegans					X											X					
		Callistemon phoeniceus																					
		Calothamnus hirsutus												X									
		Calothamnus sanguineus										X		X									
		Calytrix angulata										X	X										
		Calytrix fraxescens					X		X														
		Calytrix fraseri																				X	
	*	*Chamelaucium uncinatum*																				X	
		Corymbia calophylla				X							X							X	X		
		Eremaea pauciflora var. pauciflora							X			X		X									
		Eremaea purpurea										X		X									
		Eucalyptus camaldulensis																					X
		Eucalyptus marginata											X		X				X				
		Eucalyptus rudis								X				X								X	
		Eucalyptus todtiana							X														
		Eucalyptus gomphocephala				X								X									
	*	*Gaudium laevigatum*																				X	
		Hypocalymma angustifolium							X			X			X	X	X						
		Hypocalymma robustum						X			X											X	
		Kunzea glabrescens					X			X				X		X	X						
		Melaleuca huegelii	X			X																	
	*	*Melaleuca nesophila*				X																	
		Melaleuca preissiana														X		X				X	
		Melaleuca rhaphiophylla																					X
		Melaleuca systena										X											
		Melaleuca teretifolia												X									
		Melaleuca parviceps										X											
		Melaleuca preissiana															X						
		Melaleuca seriata			X		X		X														
		Melaleuca systena												X									
		Pericalymma ellipticum var. floridum																				X	
		Regelia ciliata								X	X			X									
		Regelia inops								X				X								X	
		Scholtzia involucrata					X					X										X	
		Siloxerus humifusus																				X	
		Taxandria linearifolia															X					X	
		Verticordia densiflora																				X	
		Verticordia nitens					X																
Oleaceae																							
	*	*Olea europaea*												X									
Onagraceae																							
	*	*Oenothera laciniata*												X									
	*	*Oenothera drummondii*			X																		
Orchidaceae																							
		Caladenia flava						X															
	*	*Disa bracteata*								X				X									
		Microtis media						X															
		Thelymitra benthamiana					X	X															
Orobanchaceae																							
	*	*Orobanche minor*															X						
Papaveraceae																							
	*	*Fumaria capreolata*				X											X						
Pinaceae																							
	*	*Pinus pinaster*												X		X			X				
Poaceae																							
		Amphipogon turbinatus							X			X			X								
		Austrostipa flavescens	X																				
		Austrostipa compressa							X			X											
	*	*Avena barbata*	X	X		X			X									X	X	X			
	*	*Briza maxima*				X	X	X	X		X	X	X	X	X	X		X	X	X		X	
	*	*Bromus diandrus*	X	X	X	X													X	X			
	*	*Cynodon dactylon*			X																		
	*	*Ehrharta longiflora*																	X	X			
	*	*Ehrharta calycina*	X		X	X		X	X		X	X	X	X	X	X	X	X	X	X	X	X	
	*	*Eragrostis curvula*																				X	
	*	*Lagurus ovatus*			X																		
	*	*Lolium rigidum*		X																X			
	*	*Melinis repens*												X									
		Microlaena stipoides															X						
	*	*Pentameris airoides*							X			X	X		X						X	X	
	*	*Pentameris pallida*									X					X			X			X	
		Poa porphyroclados				X								X									
		Rytidosperma occidentale							X			X	X		X								
	*	*Vulpia myuros*												X									
Polygalaceae																							
		Comesperma calymega										X											
Primulaceae																							
	*	*Lysimachia arvensis*				X																	
Proteaceae																							
		Adenanthos cygnorum subsp. cygnorum					X	X			X								X			X	
		Banksia attenuata	X	X			X	X	X	X	X	X	X	X	X				X				
		Banksia dallanneyi																X					
		Banksia grandis		X										X									
		Banksia menziesii					X	X	X	X	X	X			X								
		Conospermum stoechadis subsp. sclerophyllum					X												X				
		Grevillea leucopteris										X											
		Grevillea preissii	X																				
		Petrophile linearis					X		X		X	X	X						X		X		
		Stirlingia latifolia					X		X		X	X			X							X	
Restionaceae																							
		Alexgeorgea nitens									X								X				
		Desmocladus fasciculatus											X					X					
		Desmocladus flexuosus					X	X	X			X	X		X								
Restionaceae																							
		Hypolaena exsulca															X						
Rubiaceae																							
		Opercularia vaginata																				X	
		Opercularia hispidula																X					
Rubiaceae																							
	*	*Galium murale*		X																			
Rutaceae																							
		Cyanothamnus ramosus										X											
		Philotheca spicata					X																
Santalaceae																							
		Exocarpos sparteus												X									
Solanaceae																							
	*	*Nicotiana glauca*																				X	
Stylidaceae																							
		Levenhookia pusilla			X																		
		Stylidium araeophyllum										X			X								
		Stylidium brunonianum					X					X											
		Stylidium crossocephalum										X											X
		Stylidium cygnorum					X					X											
		Stylidium repens					X	X	X			X											
Thymelaeaceae																							
		Pimelea ferruginea							X														
Xanthorrhoeaceae																							
		Xanthorrhoea preissii		X			X					X	X	X	X	X		X	X	X	X		
Zamiaceae																							
		Macrozamia fraseri						X				X							X			X	
		Macrozamia riedlei							X														

Appendix E

Flora Site Data

Appendix C – Flora Site Data – Northern Terminal

Site No: CHQ01	**Date**: 16/10/2023	**Longitude**: 115.89167	**Latitude**: -31.8524548

Type: Quadrat
Soil Types: Grey sand
Topography: Flat
Surface: 5 bare, 15 litter
Outcrops: None
Litter: 10 fine, 5 coarse
Vegetation Condition: Good
Condition Notes: Disturbed site, previously cleared
Soil Condition: Dry
Fire: 10+

Vegetation Type: ErAcCa: *Eucalyptus rudis, Melaleuca preissiana* and *Callitris pyramidalis* open woodland over *Adenanthos cygnorum* subsp. *cygnorum, Jacksonia furcellata, Taxandria linearifolia* closed shrubland over *Conostylis candicans* subsp. *candicans, Phlebocarya ciliata and Tricoryne tenella* sparse forbland

Weed	Taxon	Height (cm)	Foliage (%)
	Adenanthos cygnorum subsp. *cygnorum*	370	60
*	*Briza maxima*	30	0.1
*	*Carpobrotus edulis*	20	0.2
	Conostylis candicans subsp. *candicans*	40	0.8
	Crassula colorata	5	0.1

Weed	Taxon	Height (cm)	Foliage (%)
	Daviesia triflora	100	1
*	*Ehrharta calycina*	90	1
	Styphelia conostephioides	30	0.5
*	*Gaudium laevigatum*	350	12
*	*Gladiolus caryophyllaceus*	50	0.1
*	*Hypochaeris glabra*	20	0.1
	Jacksonia furcellata	110	0.5
	Kennedia prostrata	5	0.1
*	*Urospermum picroides*	5	0.1
	Macrozamia fraseri	200	3
*	*Pentameris airoides*	25	0.1
*	*Pelargonium capitatum*	60	0.5
	Scholtzia involucrata	50	1
*	*Asteraceae sp.*	10	0.1
	Stirlingia latifolia	150	0.2
*	*Wahlenbergia capensis*	10	0.1
	Trachymene pilosa	10	0.1
*	*Trifolium campestre*	25	0.1
*	*Ursinia anthemoides*	35	0.1
*	*Vicia sativa* subsp. *nigra*	na	0.1

Appendix C – Flora Site Data – Northern Terminal

Site No: CHQ02	**Date**: 16/10/2023	**Longitude**: 115.88929142	**Latitude**: -31.85100798

Type: Quadrat
Soil Types: Grey white sand
Topography: Flat
Surface: bare ground 25%, litter 50%
Outcrops: None
Litter: fine litter 20%, coarse litter 30%
Vegetation Condition: Very Good
Condition Notes: Weedy grasses, rubbish nearby
Soil Condition: Dry
Fire: 10+ years

Vegetation Type: CcXpEc: *Corymbia calophylla* and *Nuytsia floribunda* open woodland over *Xanthorrhoea preissii, Conostephium pendulum* and *Petrophile linearis* sparse shrubland over **Ehrharta calycina* and **Pentameris airoides* open grassland.

Weed	Taxon	Height (cm)	Foliage (%)
	Dianella revoluta	70	0.2
*	*Monoculus monstrosus*	20	0.1
*	*Ehrharta calycina*	140	45
	Haemodorum spicatum	140	0.2
	Lechenaultia floribunda	30	0.1
	Lyginia imberbis	70	2

Weed	Taxon	Height (cm)	Foliage (%)
	Corymbia calophylla	1500	25
	Nuytsia floribunda	900	15
	Patersonia occidentalis	80	1
*	*Pentameris airoides*	25	25
	Petrophile linearis	35	0.5
	Conostephium pendulum	70	1
	Xanthorrhoea preissii	200	5

Appendix C – Flora Site Data – Northern Terminal

Site No: CHQ03	**Date**: 16/10/2023	**Longitude**: 115.88959	**Latitude**: -31.8521689

Type: Quadrat
Soil Types: Grey sand
Topography: Flat
Surface: Bare 2%
Outcrops: None
Litter: Coarse 1%, Fine 5%
Vegetation Condition: Excellent
Condition Notes: Dense native vegetation
Soil Condition: Dry
Fire: 10+ years

Vegetation Type: ErAcCc: *Eucalyptus rudis, Melaleuca preissiana* and *Callitris pyramidalis* open woodland over *Adenanthos cygnorum* subsp. *cygnorum*, *Jacksonia furcellata*, *Taxandria linearifolia* closed shrubland over *Conostylis candicans* subsp. *candicans, Phlebocarya ciliata* and *Tricoryne tenella* sparse forbland

Weed	Taxon	Height (cm)	Foliage (%)
	Adenanthos cygnorum subsp. *cygnorum*	250	2
	Regelia inops	150	0.1
	Cassytha racemosa forma racemosa	na	3
	Dasypogon bromeliifolius	70	0.5

Weed	Taxon	Height (cm)	Foliage (%)
	Dianella revoluta	50	0.1
*	*Ehrharta calycina*	170	2
	Gastrolobium ebracteolatum	70	0.1
	Gompholobium tomentosum	100	0.1
	Hypocalymma robustum	160	60
	Phlebocarya ciliata	60	4
	Melaleuca preissiana	700	10
	Opercularia vaginata	40	0.2
	Patersonia occidentalis	80	0.5
*	*Pentameris airoides*	20	0.1
	Pericalymma ellipticum var. *floridum*	90	0.1
	Acacia pulchella	40	0.1
	Taxandria linearifolia	180	10
*	*Ursinia anthemoides*	25	0.1
	Tricoryne tenella	50	1

Appendix C – Flora Site Data – WGA-MUL

Site No: CHQ05	**Date**: 17/10/2023	**Longitude**: 115.7803591	**Latitude**: -31.79803933

Type: Quadrat
Soil Types: Brown loamy sand
Topography: Gentle slope
Surface: -
Outcrops: None
Litter: 60 coarse, 10 fine, 5 bare
Vegetation Condition: Good
Condition Notes:
Soil Condition: Damp
Fire: 10+ years

Vegetation Type: EgHcPp: *Eucalyptus gomphocephala, Corymbia calophylla* and *Melaleuca huegelii* open forest over *Hibbertia cuneiformis* and *Acacia saligna* sparse shrubland over *Poa porphyroclados*, **Ehrharta calycina* and **Avena barbata* grassland.

Weed	Taxon	Height (cm)	Foliage (%)
	Acacia saligna	80	0.5
*	*Avena barbata*	40	5
*	*Briza maxima*	20	0.5
*	*Bromus diandrus*	40	0.5
	Dianella revoluta	40	0.2

Weed	Taxon	Height (cm)	Foliage (%)
*	*Ehrharta calycina*	100	10
*	*Euphorbia terracina*	80	1.5
*	*Fumaria capreolata*	na	2
	Hibbertia cuneiformis	190	5
*	*Lactuca serriola*	30	0.5
*	*Lysimachia arvensis*	15	1
	Corymbia calophylla	800	2
*	*Melaleuca nesophila*	300	1.5
	Melaleuca huegelii	400	3
*	*Sonchus asper*	35	1
*	*Sonchus oleraceus*	30	0.5
	Poa porphyroclados	120	15
	Eucalyptus gomphocephala	1600	30
*	*Vicia sativa* subsp. *nigra*	na	0.1

Appendix C – Flora Site Data – Pinjar Terminal

Site No: CHQ06	**Date**: 18/10/2023	**Longitude**: 115.8216580	**Latitude**: -31.5653747

Type: Quadrat
Soil Types: White-grey sand
Topography: Flat
Surface: -
Outcrops: None
Litter: bare 2%, coarse 40%, 10% fine
Vegetation Condition: Excellent
Condition Notes: Minimal weeds
Soil Condition: Dry
Fire: 10+ years

Vegetation Type: BaAcCc: *Banksia attenuata* and *Banksia menziesii* woodland over *Adenanthos cygnorum* subsp. *cygnorum*, *Xanthorrhoea preissii, Kunzea glabrescens* open shrubland over *Conostylis candicans, Patersonia occidentalis* and *Lomandra sericea* forbland.

Weed	Taxon	Height (cm)	Foliage (%)
	Acacia pulchella	25	0.5
	Adenanthos cygnorum subsp. *cygnorum*	10	0.1
	Allocasuarina humilis	160	8
	Banksia attenuata	1000	40
	Banksia menziesii	850	10

Weed	Taxon	Height (cm)	Foliage (%)
	Beaufortia elegans	100	5
	Bossiaea eriocarpa	35	2
	Burchardia congesta	50	0.1
	Calytrix flavescens	30	2
	Cassytha flava	na	0.5
	Conostephium pendulum	30	1
	Conostylis teretifolia	5	0.1
	Conostylis candicans	26	1.5
	Dampiera linearis	15	0.1
	Desmocladus flexuosus	10	0.2
	Drosera erythrorhiza	2	0.1
	Drosera macrantha	na	0.1
*	*Gladiolus caryophyllaceus*	50	0.1
	Gompholobium tomentosum	30	1
	Hibbertia hypericoides	40	0.5
	Hibbertia hypericoides	100	6
	Hibbertia subvaginata	30	0.2
	Hovea trisperma	70	0.1
	Jacksonia floribunda	90	1.5
	Leucopogon pulchellus	25	0.2
	Lomandra indet (sterile)	15	0.1
	Lomandra sericea	40	0.5
	Lyginia imberbis	70	0.1
	Melaleuca seriata	80	15
	Mesomelaena pseudostygia	60	10
	Patersonia occidentalis	80	10
	Philotheca spicata	50	0.5
	Phlebocarya ciliata	40	0.2
	Scaevola canescens	10	0.2
	Stirlingia latifolia	110	1.5
	Stylidium cygnorum	5	0.5
	Thelymitra benthamiana	35	0.1
	Trachymene pilosa	5	0.1
	Tricoryne elatior	70	0.1
	Xanthorrhoea preissii	180	15
	Xanthosia huegelii	5	0.1

Appendix C – Flora Site Data – Pinjar Terminal

Site No: CHQ07	**Date**: 18/10/2023	**Longitude**: 115.8238332	**Latitude**: -31.55889882

Type: Quadrat
Soil Types: White-grey sand
Topography: Flat
Surface: -
Outcrops: None
Litter: bare 2%, coarse 40%, 10% fine
Vegetation Condition: Excellent
Condition Notes: Minimal weeds
Soil Condition: Dry
Fire: 10+

Vegetation Type: BaAcCc: *Banksia attenuata* and *Banksia menziesii* woodland over *Adenanthos cygnorum* subsp. *cygnorum*, *Xanthorrhoea preissii, Kunzea glabrescens* open shrubland over *Conostylis candicans, Patersonia occidentalis* and *Lomandra sericea* forbland.

Weed	Taxon	Height (cm)	Foliage (%)
	Cassytha flava	na	0.5
	Conostylis candicans	25	2
	Lomandra sericea	35	0.5
	Patersonia occidentalis	30	0.5
	Thysanotus manglesianus	na	0.3

Weed	Taxon	Height (cm)	Foliage (%)
	Desmocladus flexuosus	10	0.2
	Phlebocarya ciliata	40	0.2
	Stylidium brunonianum	40	0.2
	Tricoryne elatior	50	0.2
	Burchardia congesta	40	0.1
	Conostylis teretifolia	5	0.1
	Drosera erythrorhiza	1	0.1
	Drosera macrantha	na	0.1
*	*Gladiolus caryophyllaceus*	30	0.1
	Stylidium repens	5	0.1
	Thysanotus thyrsoideus	30	0.1
	Xanthosia huegelii	10	0.1
	Borya sphaerocephala	5	0.1
	Mesomelaena pseudostygia	60	35
	Xanthorrhoea preissii	170	5
	Scholtzia involucrata	110	3
	Kunzea glabrescens	300	1.5
	Adenanthos cygnorum subsp. *cygnorum*	250	1
	Bossiaea eriocarpa	35	1
	Melaleuca seriata	60	1
	Petrophile linearis	35	1
	Stirlingia latifolia	100	1
	Verticordia nitens	140	0.6
	Conospermum stoechadis subsp. *sclerophyllum*	60	0.5
	Conostephium pendulum	35	0.5
	Hibbertia hypericoides	30	0.5
	Jacksonia floribunda	100	0.5
	Acacia pulchella	35	0.3
	Calytrix flavescens	35	0.2
	Gompholobium tomentosum	25	0.2
	Hibbertia hypericoides subsp. *hypericoides*	20	0.2
	Hovea trisperma	60	0.2
	Banksia attenuata	700	30
	Banksia menziesii	500	4

Appendix C – Flora Site Data – Neerabup Terminal and NBT Group

Site No: CHQ08	**Date**: 19/10/2023	**Longitude**: 115.8232144	**Latitude**: -31.6814714

Type: Quadrat
Soil Types: White-grey sand
Topography: Flat
Surface: -
Outcrops: None
Litter: bare 5%, coarse 20%, 15% fine
Vegetation Condition: Very Good
Condition Notes: Weeds
Soil Condition: Dry
Fire: 10+

Vegetation Type: EgGlCe: *Eucalyptus gomphocephala, Eucalyptus rudis* and *Banksia grandis* open woodland over *Gastrolobium liearifolium, Kunzea glabrescens* and *Xanthorrhoea preissi* over **Carpobrotus edulis,*Disa bracteata* and **Euphorbia terracina* sparse forbland

Weed	Taxon	Height (cm)	Foliage (%)
*	*Ornithopus pinnatus*	na	1
	Poa porphyroclados	80	0.5
*	*Briza maxima*	5	0.2
*	*Ehrharta calycina*	130	0.2
*	*Carpobrotus edulis*	15	5

Weed	Taxon	Height (cm)	Foliage (%)
*	*Disa bracteata*	25	0.1
*	*Hypochaeris glabra*	2	0.1
	Ficinia nodosa	90	1
	Gastrolobium linearifolium	50	6
	Regelia ciliata	200	5
	Kennedia prostrata	10	5
	Acacia pulchella	110	3
	Eremaea purpurea	150	2
	Kunzea glabrescens	300	2
	Calothamnus hirsutus	50	0.5
	Eremaea pauciflora var. *pauciflora*	30	0.5
	Regelia inops	100	0.5
	Eucalyptus gomphocephala	1500	10
*	*Pinus pinaster*	120	0.5

Appendix C – Flora Site Data – Neerabup Terminal and NBT Group

Site No: CHQ09	**Date**: 20/10/2023	**Longitude**: 115.85197822	**Latitude**: -31.72570105

Type: Quadrat
Soil Types: Grey sand
Topography: Slight slope
Surface: -
Outcrops: None
Litter: 4% bare, 20% coarse, 30% fine
Vegetation Condition: Very Good
Condition Notes: Weeds
Soil Condition: Damp
Fire: 10+ years

Vegetation Type: MpHaEc: *Melaleuca preissiana* woodlands over *Hypocalymma angustifolium*, *Kunzea glabrescens* and *Jacksonia furcellata* shrubland over **Ehrharta calycina* and *Microlaena stipoides* grassland.

Weed	Taxon	Height (cm)	Foliage (%)
	Dianella revoluta	40	0.2
	Kunzea glabrescens	300	1
*	*Ehrharta calycina*	110	20
	Microlaena stipoides	40	5
	Platysace filiformis	na	0.1

Weed	Taxon	Height (cm)	Foliage (%)
*	*Fumaria capreolata*	na	0.3
*	*Gladiolus caryophyllaceus*	80	0.1
	Hypocalymma angustifolium	100	10
	Hypolaena exsulca	30	0.5
	Jacksonia furcellata	150	0.5
	Melaleuca preissiana	700	60
*	*Orobanche minor*	20	0.1
*	*Pelargonium capitatum*	30	0.2
*	*Sonchus oleraceus*	10	0.1
	Taxandria linearifolia	130	4
	Phyllangium paradoxum	10	0.1

Appendix C – Flora Site Data – Neerabup Terminal and NBT Group

Site No: CHQ10	**Date**: 20/10/2023	**Longitude**: 115.85097632	**Latitude**: -31.74821830

Type: Quadrat
Soil Types: Grey sand
Topography: Gently sloping
Surface: -
Outcrops: None
Litter: 5 bare, 20 coarse, 10 fine
Vegetation Condition: Excellent
Condition Notes: Weeds
Soil Condition: Dry
Fire: 10+ years

Vegetation Type: BaAcDf: *Banksia attenuata, Banksia menziesii* and *Nuytsia floribunda* open woodland over *Adenanthos cygnorum* subsp. *cygnorum, Macrozamia fraseri* and *Gompholobium tomentosum* open shrubland over *Desmocladus flexuosus, Patersonia occidentalis* and *Corynotheca micrantha* forbland

Weed	Taxon	Height (cm)	Foliage (%)
	Acacia huegelii	35	0.8
	Adenanthos cygnorum subsp. *cygnorum*	400	25
	Banksia attenuata	800	40

Weed	Taxon	Height (cm)	Foliage (%)
	Banksia menziesii	700	15
*	*Briza maxima*	40	3
	Burchardia congesta	50	1
	Caladenia flava	5	0.1
	Lomandra ?micrantha	40	0.1
	Desmocladus flexuosus	25	50
	Dianella revoluta	40	0.3
*	*Ehrharta calycina*	130	2
	Thysanotus arbuscula	50	0.1
*	*Gladiolus caryophyllaceus*	60	0.5
	Gompholobium tomentosum	35	0.5
	Hibbertia hypericoides	30	0.5
	Hypocalymma robustum	60	0.2
	Lobelia tenuior	40	0.2
	Lepidosperma sp. sterile	25	0.1
	Lyginia imberbis	70	1
	Macrozamia fraseri	220	1.5
	Microtis media	25	0.1
	Lagenophora huegelii	30	0.2
	Nuytsia floribunda	600	1
	Patersonia occidentalis	70	2.5
	Podolepis gracilis	25	0.1
	Sowerbaea laxiflora	50	0.2
	Corynotheca micrantha	60	1.1
	Stylidium repens	15	0.5
	Thelymitra benthamiana	30	0.1
	Trachymene pilosa	10	0.5
*	*Ursinia anthemoides*	20	0.8

Appendix C – Flora Site Data – Neerabup/NBT Group

Site No: CHQ11	**Date**: 20/10/2023	**Longitude**: 115.84867	**Latitude**: -31.7193940667

Type: Quadrat
Soil Types: White sand
Topography: Gently undulating
Surface: -
Outcrops: None
Litter: 6% bare, 5% coarse, 35% fine
Vegetation Condition: Excellent
Condition Notes: Weeds, grazing
Soil Condition: Dry
Fire: 10+

Vegetation Type: BmEpLi: *Banksia menziesii, Banksia attenuata, Allocasuarina fraseriana* low open woodland over *Eremaea purpurea*, *Hibbertia hypercoides* and *Macrozamia fraseri* open shrubland over *Lyginia imerbis, Lepidosperma leptostachyum* and *Mesomelaena pseudostygia* sedgeland.

Weed	Taxon	Height (cm)	Foliage (%)
	Acacia pulchella	30	0.1
	Allocasuarina fraseriana	800	5
	Allocasuarina humilis	110	1
	Austrostipa compressa	40	0.1
	Banksia attenuata	650	3

Weed	Taxon	Height (cm)	Foliage (%)
	Banksia menziesii	750	12
*	*Briza maxima*	20	0.1
	Burchardia congesta	60	0.1
	Cyanothamnus ramosus	25	0.1
	Conostephium pendulum	25	0
	Dianella revoluta	30	0.2
*	*Ehrharta calycina*	150	0.5
	Eremaea purpurea	150	5
	Gompholobium tomentosum	25	0.3
	Haemodorum spicatum	100	0.2
	Jacksonia floribunda	150	1
	Hibbertia hypericoides	90	2
	Hibbertia subvaginata	25	0.2
	Styphelia conostephioides	25	0.3
	Lyginia imberbis	70	7
	Macrozamia fraseri	200	1.5
*	*Lomandra nigricans*	48	0.1
*	*Pentameris airoides*	15	1.5
	Petrophile linearis	35	1
	Scholtzia involucrata	30	0.2
	Bossiaea eriocarpa	30	0.1
	Stirlingia latifolia	90	0.3
*	*Ursinia anthemoides*	25	0.1
*	*Wahlenbergia capensis*	30	0.1
	Lepidosperma sp. *sterile*	40	0.1

Appendix C – Flora Site Data – Neerabup/NBT Group

Site No: CHQ12	**Date**: 20/10/2023	**Longitude**: 115.8636807	**Latitude**: -31.7388921

Type: Quadrat
Soil Types: Grey white sand
Topography: Gently undulating
Surface: -
Outcrops: None
Litter: 5% bare, 10% coarse, 10% fine
Vegetation Condition: Excellent
Condition Notes: Low weeds, no tracks
Soil Condition: Dry
Fire: 10+ years

Vegetation Type: BmEpLi: *Banksia menziesii, Banksia attenuata, Allocasuarina fraseriana* low open woodland over *Eremaea purpurea, Hibbertia hypercoides* and *Macrozamia fraseri* open shrubland over *Lyginia imerbis, Lepidosperma leptostachyum* and *Mesomelaena pseudostygia* sedgeland.

Weed	Taxon	Height (cm)	Foliage (%)
	Acacia pulchella	60	1
	Amphipogon turbinatus	60	1.5
	Austrostipa compressa	80	0.1
	Banksia attenuata	700	10
	Banksia menziesii	500	5

Weed	Taxon	Height (cm)	Foliage (%)
	Comesperma calymega	50	0.2
	Grevillea leucopteris	60	0.5
	Bossiaea eriocarpa	35	0.5
*	*Briza maxima*	25	0.5
	Burchardia congesta	90	0.2
	Calytrix angulata	50	1
	Conostephium pendulum	45	3
	Conostylis setigera	40	2
	Lyginia imerbis	10	5
	Dampiera linearis	15	0.5
	Desmocladus flexuosus	10	0.5
	Drosera erythrorhiza	1	0.2
	Drosera macrantha	na	0.5
	Eremaea purpurea	110	10
	Rytidosperma occidentale	100	0.2
	Olearia axillaris	30	0.2
*	*Gladiolus caryophyllaceus*	100	0.5
	Gompholobium tomentosum	30	1
	Haemodorum spicatum	130	0.1
	Jacksonia floribunda	150	1
	Hibbertia huegelii	40	0.5
	Hibbertia hypercoides	80	2
	Hibbertia hypericoides subsp. *hypericoides*	30	1
	Daviesia triflora	70	0.5
	Hibbertia subvaginata	25	0.5
	Hovea trisperma	30	1
	Laxmannia squarrosa	10	0.2
	Lepidosperma leptostachyum	40	0.2
	Leucopogon pulchellus	30	0.2
	Lomandra ?micrantha	20	0.3
	Lyginia imerbis	30	1
	Stylidium crossocephalum	25	0.1
	Melaleuca parviceps	40	0.2
	Mesomelaena pseudostygia	90	0.2
	Patersonia occidentalis	60	1.5
	Petrophile linearis	25	1
	Stylidium brunonianum	40	0.1

Weed	Taxon	Height (cm)	Foliage (%)
	Scholtzia involucrata	50	5
	Acanthocarpus preissii	25	0.1
	Corynotheca micrantha	50	0.2
	Stirlingia latifolia	120	3
	Stylidium araeophyllum	20	0.1
	Stylidium repens	10	1
	Styphelia pallida	5	0.5
	Thysanotus manglesianus	na	0.5
	Hyalosperma cotula	10	0.5
	Trachymene pilosa	15	0.2
*	*Ursinia anthemoides*	20	0.5

Appendix C – Flora Site Data- Neerabup/NBT Group

Site No: CHQ13	**Date**: 6/11/2023	**Longitude**: 115.86355885	**Latitude**: -31.7531997

Type: Quadrat
Soil Types: White sand
Topography: Gently undulating
Surface: -
Outcrops: None
Litter: bare 5%, coarse 10%, fine 10%
Vegetation Condition: Excellent
Condition Notes:
Soil Condition: Dry
Fire: 10+ years

Vegetation Type: BmEpLi: *Banksia menziesii, Banksia attenuata, Allocasuarina fraseriana* low open woodland over *Eremaea purpurea, Hibbertia hypercoides* and *Macrozamia fraseri* open shrubland over *Lyginia imerbis, Lepidosperma leptostachyum* and *Mesomelaena pseudostygia* sedgeland.

- Neerabup/NBT GroupWeed	Taxon	Height (cm)	Foliage (%)
	Acacia pulchella	110	10
	Rytidosperma occidentale	100	0.5
	Banksia attenuata	800	6
	Banksia menziesii	700	3
	Bossiaea eriocarpa	30	1

- Neerabup/NBT GroupWeed	Taxon	Height (cm)	Foliage (%)
*	*Briza maxima*	25	0.2
	Burchardia congesta	40	0.2
	Calothamnus sanguineus	110	2
	Calytrix angulata	30	1
	Comesperma calymega	40	0.1
	Conostephium pendulum	50	1.5
	Conostylis aurea	30	1
	Amphipogon turbinatus	20	0.2
	Dampiera linearis	20	0.2
	Desmocladus flexuosus	10	5
*	*Ehrharta calycina*	120	0.2
	Eremaea pauciflora var. *pauciflora*	90	10
*	*Gladiolus caryophyllaceus*	90	0.2
	Gompholobium tomentosum	30	0.5
	Acacia sessilis	50	0.5
	Haemodorum laxum	100	0.3
	Jacksonia floribunda	130	1
	Hibbertia hueglii	50	1.5
	Hibbertia hypericoides	50	1
	Hibbertia subvaginata	30	0.2
	Hypocalymma angustifolium	100	1
	Laxmannia squarrosa	10	0.1
	Lepidosperma calcicola	25	0.5
	Leucopogon pulchellus	40	1
	Lomandra micrantha	25	0.5
	Lyginia imerbis	50	2
	Melaleuca systena	100	0.5
	Mesomelaena pseudostygia	60	10
	Patersonia occidentalis	60	2.5
*	*Pentameris airoides*	20	0.1
	Petrophile linearis	40	1.5
	Phyllangium divergens	3	0.1
	Scaevola repens	10	1
	Stirlingia latifolia	40	0.5
	Stylidium brunonianum	60	0.3
	Thysanotus manglesianus	na	0.1
	Stylidium cygnorum	10	0.5

- Neerabup/NBT GroupWeed	Taxon	Height (cm)	Foliage (%)
*	*Ursinia anthemoides*	25	0.5
	Hyalosperma cotula	4	0.1
	Xanthorrhoea preissii	120	1.5

Appendix C – Flora Site Data – Neerabup/NBT Group

Site No: CHQ14	**Date**: 6/11/2023	**Longitude**: 115.87847848	**Latitude**: -31.7829674

Type: Quadrat
Soil Types: White sand
Topography: Flat
Surface: -
Outcrops: None
Litter: bare 5, coarse 15, fine 10
Vegetation Condition: Excellent
Condition Notes: bare 5, coarse 15, fine 10
Soil Condition: Dry
Fire: 10+ years

Vegetation Type: BaAhDf: *Banksia attenuata, Banksia menziesii* and *Eucalyptus todtiana* low open woodland over *Allocasuarina humilis, Calytrix flavescens* and *Eremaea pauciflora* var. *pauciflora* low shrubland over *Desmocladus flexuosus, Patersonia occidentalis* and **Ursinia anthemoides* forbland

Weed	Taxon	Height (cm)	Foliage (%)
	Allocasuarina humilis	150	7
	Amphipogon turbinatus	70	1
	Rytidosperma occidentale	110	0.5
	Banksia attenuata	600	4
	Banksia menziesii	500	3.5

Weed	Taxon	Height (cm)	Foliage (%)
	Bossiaea eriocarpa	30	1
*	*Briza maxima*	25	0.2
	Burchardia congesta	90	0.5
	Conostephium pendulum	50	1.5
	Conostylis aurea	30	1
	Chaetospora curvifolia	25	1
	Pimelea ferruginea	35	0.5
	Desmocladus flexuosus	10	25
*	*Ehrharta calycina*	100	0.5
	Eremaea pauciflora var. *pauciflora*	140	3.5
	Eucalyptus todtiana	250	2
	Arnocrinum preissii	80	0.5
*	*Gladiolus caryophyllaceus*	100	0.2
	Gompholobium tomentosum	25	0.5
	Acacia sessilis	30	0.5
	Haemodorum spicatum	120	0.2
	Hibbertia hueglii	30	0.5
	Hibbertia hypericoides	40	1
	Lepidosperma calcicola	30	2
	Lyginia imerbis	70	12
	Mesomelaena pseudostygia	60	8
	Patersonia occidentalis	70	10
*	*Pentameris airoides*	25	5
*	*Petrorhagia dubia*	40	0.1
	Petrophile linearis	30	1
	Melaleuca seriata	100	1.5
	Scaevola repens	10	1.5
	Daviesia triflora	70	0.5
	Stylidium repens	5	0.5
	Thysanotus manglesianus	na	0.1
	Calectasia sp.	30	1
*	*Ursinia anthemoides*	20	5
	Hyalosperma cotula	5	0.5
	Calytrix flavescens	50	5
*	*Asteraceae sp.*	60	0.2

Appendix C – Flora Site Data – Neerabup/NBT Group

Site No: CHQ15	**Date**: 8/11/2023	**Longitude**: 115.8719680	**Latitude**: -31.79398398

Type: Quadrat
Soil Types: White sand
Topography: Flat
Surface: -
Outcrops: None
Litter: bare 2, coarse 10, fine 10
Vegetation Condition: Very Good
Condition Notes: weeds
Soil Condition: Dry
Fire: 10+ years

Vegetation Type: BaAhDf: *Banksia attenuata, Banksia menziesii* and *Eucalyptus todtiana* low open woodland over *Allocasuarina humilis, Calytrix flavescens* and *Eremaea pauciflora* var. *pauciflora* low shrubland over *Desmocladus flexuosus, Patersonia occidentalis* and **Ursinia anthemoides* forbland

Weed/Cons. Status	Taxon	Height (cm)	Foliage (%)
	Austrostipa compressa	25	0.1
*	*Avena barbata*	90	0.1
	Banksia attenuata	800	15
	Bossiaea eriocarpa	30	0.2
*	*Briza maxima*	25	0.2

Weed/Cons. Status	Taxon	Height (cm)	Foliage (%)
	Burchardia congesta	50	0.5
*	*Carpobrotus edulis*	10	0.5
	Conostephium pendulum	35	0.2
	Conostylis aurea	35	1.5
	Daviesia divaricata subsp. *divaricata*	90	0.8
	Desmocladus flexuosus	15	60
	Dianella revoluta	90	0.8
*	*Ehrharta calycina*	120	3
	Gompholobium tomentosum	40	2
	Haemodorum spicatum	110	1
	Corynotheca micrantha	40	1.5
	Hibbertia hypericoides	40	0.5
	Hypocalymma angustifolium	45	0.5
P4	*Jacksonia sericea*	40	0.5
	Jacksonia sternbergiana	200	6
	Laxmannia squarrosa	15	0.5
	Lechenaultia floribunda	30	0.5
	Lomandra micrantha	25	0.3
	Lyginia imberbis	50	4
	Macrozamia riedlei	200	2
	Mesomelaena pseudostygia	50	2.5
	Patersonia occidentalis	70	8
*	*Pentameris airoides*	15	3
	Petrophile linearis	30	2
	Podotheca gnaphalioides	20	3
	Scaevola repens	10	1.5
*	*Sonchus asper*	5	0.1
	Stirlingia latifolia	35	0.5
*	*Ursinia anthemoides*	20	4
	Macarthuria australis	60	7

Appendix C – Flora Site Data

Site No: CHQ16	**Date**:	**Longitude**: 115.8719680	**Latitude**: -31.79398399

Type: Quadrat
Soil Types: White sand
Topography: Flat
Surface: Bare 2%, Litter 20%, Grass 20%
Outcrops: None
Litter: bare 2, coarse 10, fine 10
Vegetation Condition: Good
Condition Notes: Next to road, pathway, weeds
Soil Condition: Dry
Fire: 10+ years

Vegetation Type: BaAlTe: *Banksia attenuata* and *Banksia grandis* woodland over *Acacia lasiocarpa, Davesia divaricata* and *Xanthorrhoea preissii* shrubland over *Tricoryne elatior, *Euphorbia terracina* and **Hypochaeris glabra* sparse forbland

Weed/Cons. Status	Taxon	Height (cm)	Foliage (%)
	Acacia lasiocarpa var. *lasiocarpa*	90	6
*	*Avena barbata*	100	0.1
	Banksia attenuata	700	25
	Banksia grandis	800	5
	Conostylis setigera	40	0.2
	Daviesia divaricata subsp. *divaricata*	120	3
*	*Euphorbia terracina*	60	1.5

Weed/Cons. Status	Taxon	Height (cm)	Foliage (%)
	Hibbertia hypericoides	110	1.5
*	*Hypochaeris glabra*	30	0.5
*	*Lolium rigidum*	80	0.1
*	*Pelargonium capitatum*	50	1
*	*Bromus diandrus*	30	1
*	*Sonchus oleraceus*	40	1
*	*Galium murale*	3	0.1
	Tricoryne elatior	40	2
	Xanthorrhoea preissii	220	4

Appendix C – Flora Site Data – Northern Terminal

Site No: CHR01	**Date**: 16/10/2023	**Longitude**: 115.8896455	**Latitude**: -31.85335375

Type: Relevé
Soil Types: Grey sand
Topography: Flat
Surface: Bare 1%, Sedges/Grasses 60%
Outcrops: None
Litter: Fine: 5%, Coarse: 1%
Vegetation Condition: Good
Condition Notes: Weedy grasses
Soil Condition: Dry
Fire: 10+

Vegetation Type: ErAcCc: *Eucalyptus rudis, Melaleuca preissiana* and *Callitris pyramidalis* open woodland over *Adenanthos cygnorum* subsp. *cygnorum, Jacksonia furcellata*, *Taxandria linearifolia* closed shrubland over *Conostylis candicans* subsp. *candicans, Phlebocarya ciliata* and *Tricoryne tenella* sparse forbland

Weed	Taxon	Height (cm)	Foliage (%)
*	*Briza maxima*	30	0.1
*	*Carpobrotus edulis*	10	0.5
	Crassula colorata	4	0.1
*	*Ehrharta calycina*	130	1.5

Weed	Taxon	Height (cm)	Foliage (%)
	Eucalyptus rudis	1400	25
	Verticordia densiflora	35	0.1
*	*Gaudium laevigatum*	200	1
*	*Gladiolus caryophyllaceus*	45	0.5
	Jacksonia furcellata	200	5
	Siloxerus humifusus	1	0.1
	Taxandria linearifolia	200	15
	Trachymene pilosa	10	0.1
*	*Ursinia anthemoides*	20	0.1
	Schoenus subfascicularis	100	80

Appendix C – Flora Site Data – WGA-MUL

Site No: CHR04	**Date**: 17/10/2023	**Longitude**: 115.8036003	**Latitude**: -31.8022440

Type: Relevé
Soil Types: White-grey sand
Topography: Slope
Surface: -
Outcrops: None
Litter: bare 5, coarse 45, fine 20
Vegetation Condition: Degraded
Condition Notes: bare 5, coarse 45, fine 20
Soil Condition: Dry
Fire: -

Vegetation Type: BaAbAb: *Banksia attenuata* and *Callitris preissii* open woodland over *Acacia blakelyi*, *Melaleuca huefelii* and **Grevillea preissii* shrubland over **Avena barbata*, **Bromus diandrus* and *Austrostipa flavescens* grassland.

Weed	Taxon	Height (cm)	Foliage (%)
*	*Avena barbata*	120	3
	Banksia attenuata	600	45
*	*Bromus diandrus*	80	1
	Callitris preissii	400	1
*	*Ehrharta calycina*	100	0.1

Weed	Taxon	Height (cm)	Foliage (%)
*	*Euphorbia terracina*	80	0.5
*	*Grevillea preissii*	110	2
	Acacia blakelyi	600	30
*	*Lupinus cosentinii*	30	0.1
	Melaleuca huegelii	120	2
*	*Pelargonium capitatum*	30	0.1
*	*Sonchus asper*	30	0.5
	Austrostipa flavescens	110	0.2
*	*Gazania linearis*	10	0.1

Appendix C – Flora Site Data – WGA-MUL

Site No: CHR05	**Date**: 18/10/2023	**Longitude**: 115.7729762	**Latitude**: -31.79981584

Type: Relevé
Soil Types: White sand
Topography: Flat
Surface: -
Outcrops: None
Litter: Minimal
Vegetation Condition: Good
Condition Notes: Weedy grasses
Soil Condition: Dry
Fire: 10+ years

Vegetation Type: CpMsLo: *Callitris preissii* low open woodland over *Melaleuca seriata, Acacia lasiocarpa* var. *sedifolia* and *Rhagodia baccata* sparse shrubland over **Lagurus ovatus*, **Cynodon dactylon* and **Ehrharta calycina* open grassland.

Weed	Taxon	Height (cm)	Foliage (%)
*	*Bromus diandrus*	60	0.5
	Callitris preissii	600	8
	Conostylis candicans subsp. *calcicola*	30	0.2
*	*Cynodon dactylon*	10	5
*	*Ehrharta calycina*	70	1

Weed	Taxon	Height (cm)	Foliage (%)
	Hardenbergia comptoniana	na	0.1
*	*Lagurus ovatus*	30	5
	Levenhookia pusilla	3	0.1
*	*Leontodon rhagadioloides*	15	0.1
*	*Lobularia maritima*	10	0.1
*	*Oenothera drummondii*	25	0.1
	Melaleuca seriata	150	2
	Rhagodia baccata	80	0.2
	Acanthocarpus preissii	80	1
	Acacia lasiocarpa var. *sedifolia*	50	0.1
*	*Trachyandra divaricata*	30	1
*	*Gazania linearis*	20	0.2

Appendix C – Flora Site Data – WGA-MUL

Site No: CHR06	**Date**: 19/10/2023	**Longitude**: 115.8199385	**Latitude**: -31.68318473

Type: Relevé
Soil Types: White sand
Topography: Flat
Surface: -
Outcrops: None
Litter: 10% bare, 20% fine, 10% coarse
Vegetation Condition: Degraded
Condition Notes: Cleared and road adjacent, weeds
Soil Condition: Dry
Fire: 10+

Vegetation Type: EgGlCe: *Eucalyptus gomphocephala*, *Eucalyptus rudis* and *Banksia grandis* open woodland over *Gastrolobium linearifolium*, *Kunzea glabrescens* and *Xanthorrhoea preissi* over **Carpobrotus edulis*, **Disa bracteata* and **Euphorbia terracina* sparse forbland.

Weed	Taxon	Height (cm)	Foliage (%)
*	*Briza maxima*	15	1
*	*Ehrharta calycina*	110	10
*	*Carpobrotus edulis*	10	0.5
*	*Disa bracteata*	20	0.1
*	*Hypochaeris glabra*	2	0.2
*	*Euphorbia terracina*	25	0.8

Weed	Taxon	Height (cm)	Foliage (%)
	Eucalyptus gomphocephala	1800	20
	Xanthorrhoea preissii	130	1.5

Appendix C – Flora Site Data – Neerabup/NBT Group

Site No: CHR07	**Date**: 19/10/2023	**Longitude**: 115.82261289	**Latitude**: -31.68044945

Type: Relevé
Soil Types: - White grey sand
Topography: Undulating
Surface: -
Outcrops: None
Litter: 8% bare, 10% coarse, 5% fine
Vegetation Condition: Excellent
Condition Notes: Weeds, tracks
Soil Condition: Dry
Fire: 10+

Vegetation Type: BaRcGt: *Banksia attenuata, Banksia menziesii* and *Eucalyptus rudis* open woodland over *Regelia ciliata, Kunzea glabrescens* and *Gompholobium tomentosum* dense shrubland over *Ficinia nodosa and Lyginia imerbis* sedgeland

Weed	Taxon	Height (cm)	Foliage (%)
	Acacia pulchella	70	0.5
	Banksia attenuata	500	7
	Banksia menziesii	400	5
	Regelia ciliata	220	15
*	*Carpobrotus edulis*	15	0.5

Weed	Taxon	Height (cm)	Foliage (%)
*	*Disa bracteata*	25	0.1
	Eucalyptus rudis	800	3
	Ficinia nodosa	80	0.5
	Gompholobium tomentosum	70	1.5
	Hardenbergia comptoniana	na	1
	Jacksonia furcellata	300	0.5
	Kunzea glabrescens	300	15
	Gastrolobium linearifolium	30	0.2
	Lyginia imerbis	60	1
	Regelia inops	250	1
*	*Ornithopus pinnatus*	na	0.1
	Phlebocarya ciliata	60	0.5

Appendix C – Flora Site Data – Neerabup/NBT Group

Site No: CHR08	**Date**: 19/10/2023	**Longitude**: 115.833386	**Latitude**: -31.68132765

Type: Relevé
Soil Types: Grey sand
Topography: Slight slope
Surface: -
Outcrops: None
Litter: 15% coarse, 10% fine
Vegetation Condition: Good
Condition Notes: 8% bare, 10% coarse, fine 5%
Soil Condition: Dry
Fire: 10+ years

Vegetation Type: PpAcCe: *Pinus pinaster* tall isolated trees over *Adenanthos cygnorum* var. *cygnorum, Xanthorrhoea preissii* and *Macrozamia fraseri* tall to mid sparse shrubland over **Carpobrotus edulis, *Pelargonium capitatum* and **Ornithopus pinnatus* low sparse forbland.

Weed	Taxon	Height (cm)	Foliage (%)
	Adenanthos cygnorum subsp. *cygnorum*	300	60
*	*Avena barbata*	80	1
*	*Briza maxima*	50	1
*	*Bromus diandrus*	20	2
*	*Carpobrotus edulis*	15	3

Weed	Taxon	Height (cm)	Foliage (%)
	Conospermum stoechadis subsp. *sclerophyllum*	40	0.2
	Dasypogon bromeliifolius	60	0.5
	Daviesia divaricata subsp. divaricata	320	4
*	*Ehrharta calycina*	140	8
*	*Ehrharta longiflora*	20	0.1
	Gastrolobium linearifolium	30	0.3
	Haemodorum spicatum	120	0.1
	Jacksonia floribunda	170	0.5
	Hardenbergia comptoniana	na	1
	Hibbertia hypericoides	90	1
	Macrozamia fraseri	160	1
	Mesomelaena pseudostygia	80	3
*	*Ornithopus pinnatus*	na	20
	Patersonia occidentalis	60	0.5
*	*Pelargonium capitatum*	40	0.1
*	*Pinus pinaster*	800	10
	Scaevola repens	25	0.5
*	*Sonchus oleraceus*	20	0.2
*	*Trifolium arvense*	10	1
*	*Vicia sativa* subsp. *nigra*	na	0.1

Appendix C – Flora Site Data- Neerabup/NBT Group

Site No: CHR09	**Date**: 6/11/2023	**Longitude**: 115.88252475	**Latitude**: -31.794415617

Type: Relevé
Soil Types: Grey sand
Topography: Flat
Surface: -
Outcrops: None
Litter: coarse 10%, fine 10%
Vegetation Condition: Excellent
Condition Notes: Next to track
Soil Condition: Dry
Fire: 10+ years

Vegetation Type: MpXpDb: *Melaleuca preissiana* open woodland over *Xanthorrhoea preissii*, *Banksia dallanneyi* and *Beaufortia elegans* open shrubland over *Dasypogon bromeliifolius*, *Desmocladus fasciculatus* and *Patersonia occidentalis* closed forbland.

Weed	Taxon	Height (cm)	Foliage (%)
*	*Avena barbata*	80	1
*	*Briza maxima*	50	1
*	*Bromus diandrus*	20	2
*	*Carpobrotus edulis*	15	3
	Conospermum stoechadis subsp. *sclerophyllum*	40	0.2

Weed	Taxon	Height (cm)	Foliage (%)
	Dasypogon bromeliifolius	60	0.5
	Daviesia divaricata subsp. *divaricata*	320	4
*	*Ehrharta calycina*	140	8
*	*Ehrharta longiflora*	20	0.1
	Gastrolobium linearifolium	30	0.3
	Haemodorum spicatum	120	0.1
	Jacksonia floribunda	170	0.5
	Hardenbergia comptoniana	na	1
	Hibbertia hypericoides	90	1
	Macrozamia fraseri	160	1

Appendix C – Flora Site Data – Neerabup/NBT Group

Site No: CHR10	**Date**: 6/11/2023	**Longitude**: 115.8826581	**Latitude**: -31.79286852

Type: Relevé
Soil Types: Grey sand
Topography: Flat
Surface: -
Outcrops: None
Litter: bare 2%, coarse 10%, fine 5%
Vegetation Condition: Excellent
Condition Notes: Next to track
Soil Condition: Dry
Fire: 5-10 years

Vegetation Type: CcXpDf: *Corymbia calophylla, Eucalyptus marginata* and *Banksia attenuata* open woodland over *Xanthorrhoea preissii, Jacksonia floribunda* and *Leucopogon pulchellus* shrubland over *Desmocladus flexuosus, Lomandra micrantha* and *Dasypogon bromeliifolius* forbland.

Weed	Taxon	Height (cm)	Foliage (%)
	Mesomelaena pseudostygia	80	3
*	*Ornithopus pinnatus*	na	20
	Patersonia occidentalis	60	0.5
*	*Pelargonium capitatum*	40	0.1
*	*Pinus pinaster*	800	10

Weed	Taxon	Height (cm)	Foliage (%)
	Scaevola repens	25	0.5
*	*Sonchus oleraceus*	20	0.2
*	*Trifolium arvense*	10	1
*	*Vicia sativa* subsp. *nigra*	na	0.1
*	*Wahlenbergia capensis*	40	0.1
	Desmocladus fasciculatus	10	1.5
	Desmocladus flexuosus	15	15
*	*Ehrharta calycina*	100	0.2
	Eucalyptus marginata	1200	8
	Lomandra nigricans	50	0.8
	Jacksonia floribunda	180	5
	Hibbertia subvaginata	10	0.5
	Leucopogon pulchellus	25	1.5
	Lomandra micrantha	25	5
	Lyginia imerbis	40	3
*	*Pentameris airoides*	20	1
	Petrophile linearis	25	0.5
*	*Ursinia anthemoides*	25	1
	Xanthorrhoea preissii	200	15

Appendix C – Flora Site Data – NT-NOR

Site No: CHR11	**Date**: 7/11/2023	**Longitude**: 115.9602401	**Latitude**: -31.79854362

Type: Relevé
Soil Types: Brown grey sand
Topography: Flat
Surface: -
Outcrops: None
Litter: fine 30, coarse 20
Vegetation Condition: Degraded
Condition Notes: fine 30, coarse 20
Soil Condition: Dry
Fire: 10+ years

Vegetation Type: CcMpXp: *Corymbia calophylla* mid open forest to mid closed forest over *Melaleuca preissiana* low isolated trees to low Woodland over *Xanthorrhoea preissii* isolated shrubs to mid open shrubland over *Dielsia stenostachya* rushland with a mixed exotic open grassland

Weed	Taxon	Height (cm)	Foliage (%)
*	*Avena barbata*	60	1
*	*Briza maxima*	20	0.5
*	*Bromus diandrus*	25	10
	Corymbia calophylla	1500	40
*	*Ehrharta calycina*	100	1

Weed	Taxon	Height (cm)	Foliage (%)
*	*Ehrharta longiflora*	30	15
*	*Lolium rigidum*	30	5
*	*Romulea rosea*	15	0.1
	Xanthorrhoea preissii	120	1

Appendix C – Flora Site Data – Northern Terminal

Site No: NSR01	**Date**: 16/10/2023	**Longitude**: 115.8915009	**Latitude**: -31.8503181

Type: Relevé
Soil Types: Yellow and grey sand sand
Topography: Flat
Surface: -
Outcrops: None
Litter: 10% bare ground
Vegetation Condition: Degraded
Condition Notes: weeds, Jasmine tree
Soil Condition: Dry
Fire: 10+ years

Vegetation Type: ErAcCc: *Eucalyptus rudis, Melaleuca preissiana* and *Callitris pyramidalis* open woodland over *Adenanthos cygnorum* subsp. *cygnorum, Jacksonia furcellata*, *Taxandria linearifolia* closed shrubland over *Conostylis candicans* subsp. *candicans, Phlebocarya ciliata and Tricoryne tenella* sparse forbland

Weed	Taxon	Height (cm)	Foliage (%)
	Acacia saligna	250	4
*	*Acacia iteaphylla*	450	10
	Adenanthos cygnorum subsp. *cygnorum*	250	0.5
*	*Carpobrotus edulis*	15	0.1

Weed	Taxon	Height (cm)	Foliage (%)
*	*Ricinus communis*	300	1
	Callitris pyramidalis	350	0.2
*	*Ehrharta calycina*	100	3
	Eucalyptus rudis	600	8
*	*Gaudium laevigatum*	400	2
*	*Melia azedarach*	700	3
*	*Lavandula stoechas*	140	0.2
	Melaleuca preissiana	310	0.5
*	*Pelargonium capitatum*	110	0.1
*	*Euphorbia terracina*	80	1
*	*Nicotiana glauca*	4	1.5

Appendix C – Flora Site Data -Northern Terminal

Site No: NSR02	**Date**: 16/10/2023	**Longitude**: 115.89125112	**Latitude**: -31.8539138500

Type: Relevé
Soil Types: Yellow sand with rocks
Topography: Flat
Surface: -
Outcrops: None
Litter: 20% bare ground
Vegetation Condition: Good
Condition Notes: rubbish
Soil Condition: Dry
Fire: 10+ years

Vegetation Type: ErAcCc: *Eucalyptus rudis, Melaleuca preissiana* and *Callitris pyramidalis* open woodland over *Adenanthos cygnorum* subsp. *cygnorum, Jacksonia furcellata*, *Taxandria linearifolia* closed shrubland over *Conostylis candicans* subsp. *candicans, Phlebocarya ciliata and Tricoryne tenella* sparse forbland

Weed	Taxon	Height (cm)	Foliage (%)
*	*Acacia iteaphylla*	2	1
	Adenanthos cygnorum subsp. *cygnorum*	380	2
	Briza maxima	20	1
*	*Carpobrotus edulis*	10	0.1
	Daviesia divaricata subsp. *divaricata*	40	0.1

Weed	Taxon	Height (cm)	Foliage (%)
*	*Ehrharta calycina*	110	1.5
	Eucalyptus rudis	500	0.5
*	*Euphorbia terracina*	40	0.5
*	*Gladiolus caryophyllaceus*	70	0.5
*	*Gaudium laevigatum*	400	40
	Jacksonia sternbergiana	40	1
	Jacksonia furcellata	240	2
	Kennedia prostrata	10	0.1
	Laxmannia squarrosa	10	0.1
	Chamelaucium uncinatum	60	0.1
*	*Ursinia anthemoides*	20	0.1
	Acacia saligna	180	0.2

Appendix C – Flora Site Data – Northern Terminal

Site No: NSR03	**Date**: 16/10/2023	**Longitude**: 115.8893314	**Latitude**: -31.85235652

Type: Relevé
Soil Types: White grey sand
Topography: Flat
Surface: -
Outcrops: None
Litter: 5% bare ground
Vegetation Condition: Good
Condition Notes: Rubbish present
Soil Condition: Dry
Fire: 10+ years

Vegetation Type: ErAcCc: *Eucalyptus rudis, Melaleuca preissiana* and *Callitris pyramidalis* open woodland over *Adenanthos cygnorum* subsp. *cygnorum, Jacksonia furcellata*, *Taxandria linearifolia* closed shrubland over *Conostylis candicans* subsp. *candicans, Phlebocarya ciliata and Tricoryne tenella* sparse forbland

Weed	Taxon	Height (cm)	Foliage (%)
	Adenanthos cygnorum subsp. *cygnorum*	400	5
*	*Eragrostis curvula*	130	0.1
*	*Ehrharta calycina*	150	0.1
*	*Gladiolus caryophyllaceus*	70	0.1
	Melaleuca preissiana	400	2

Weed	Taxon	Height (cm)	Foliage (%)
*	*Pentameris pallida*	15	0.1
	Calytrix fraseri	2	5
	Hypocalymma robustum	150	5
*	*Ursinia anthemoides*	30	0.2

Appendix C – Flora Site Data – Northern Terminal

Site No: NSR04	**Date**: 16/10/2023	**Longitude**: 115.89029442	**Latitude**: -31.8525205

Type: Relevé
Soil Types: Yellow grey sand
Topography: Flat
Surface: -
Outcrops: None
Litter: 40% bare ground, 5% leaf litter/sticks
Vegetation Condition: Degraded
Condition Notes: weeds
Soil Condition: -Dry
Fire: 10+ years

Vegetation Type: ErAcCc: *Eucalyptus rudis, Melaleuca preissiana* and *Callitris pyramidalis* open woodland over *Adenanthos cygnorum* subsp. *cygnorum, Jacksonia furcellata*, *Taxandria linearifolia* closed shrubland over *Conostylis candicans* subsp. *candicans, Phlebocarya ciliata and Tricoryne tenella* sparse forbland

Weed	Taxon	Height (cm)	Foliage (%)
	Adenanthos cygnorum subsp. *cygnorum*	420	12
*	*Carpobrotus edulis*	15	0.1
	Conostylis candicans subsp. *candicans*	40	0.1
*	*Ehrharta calycina*	140	0.8
*	*Gladiolus caryophyllaceus*	40	0.1

Weed	Taxon	Height (cm)	Foliage (%)
*	*Gaudium laevigatum*	400	1
*	*Pelargonium capitatum*	50	0.5
*	*Pentameris pallida*	30	0.1
	Calytrix fraseri	110	0.1

Appendix C – Flora Site Data – Pinjar Terminal

Site No: NSR05	**Date**: 18/10/2023	**Longitude**: 115.813306	**Latitude**: -31.554779

Type: Relevé
Soil Types: White grey sand
Topography: Gently undulating
Surface: -
Outcrops: None
Litter: 3% bare ground
Vegetation Condition: Excellent
Condition Notes: dusty, beneath powerlines, flat
Soil Condition: Dry
Fire: 10+ years

Vegetation Type: BaAcCc: *Banksia attenuata* and *Banksia menziesii* woodland over *Adenanthos cygnorum* subsp. *cygnorum*, *Xanthorrhoea preissii*, *Kunzea glabrescens* open shrubland over *Conostylis candicans, Patersonia occidentalis* and *Lomandra sericea* forbland.

Weed	Taxon	Height (cm)	Foliage (%)
	Briza maxima	20	0.2
	Patersonia occidentalis	50	0.8
	Conostylis candicans subsp. *candicans*	30	0.5
	Lechenaultia floribunda	40	0.5
	Dampiera linearis	20	0.2

Weed	Taxon	Height (cm)	Foliage (%)
	Burchardia congesta	40	0.2
	Conostylis setigera	5	0.1
*	*Gladiolus caryophyllaceus*	50	0.1
	Tricoryne elatior	40	0.1
	Mesomelaena pseudostygia	60	0.2
	Hibbertia hypericoides	110	35
	Adenanthos cygnorum subsp. *cygnorum*	320	12
	Conospermum stoechadis subsp. *sclerophyllum*	170	5
	Kunzea glabrescens	200	2
	Verticordia nitens	170	0.2
	Scaevola repens	10	0.1
*	*Pelargonium capitatum*	10	0.1
	Petrophile linearis	30	0.1
	Stirlingia latifolia	120	0.1
	Xanthorrhoea preissii	40	0.1
	Banksia attenuata	350	7

Appendix C – Flora Site Data – Neerabup/NBT Group

Site No: NSR06	**Date**: 19/10/2023	**Longitude**: 115.82165262	**Latitude**: -31.68042934

Type: Relevé
Soil Types: Grey white sand
Topography: Flat, slope toward SW
Surface: -
Outcrops: None
Litter:. >5% bare ground, 20% coarse leaf litter
Vegetation Condition: Very Good
Condition Notes: rubbish, borders pine plantation.
Soil Condition: Dry
Fire: 10+ years

Vegetation Type: EgGlCe: *Eucalyptus gomphocephala, Eucalyptus rudis* and *Banksia grandis* open woodland over *Gastrolobium liearifolium, Kunzea glabrescens* and *Xanthorrhoea preissi* over **Carpobrotus edulis,*Disa bracteata* and **Euphorbia terracina* sparse forbland

Weed	Taxon	Height (cm)	Foliage (%)
	Banksia attenuata	210	0.8
	Banksia grandis	380	2
	Calothamnus sanguineus	80	4
*	*Carpobrotus edulis*	5	0.1
	Conostylis candicans subsp. *candicans*	20	0.1

Weed	Taxon	Height (cm)	Foliage (%)
	Conostylis juncea	15	0.1
*	*Ehrharta calycina*	100	0.1
	Eucalyptus rudis	1500	15
	Eucalyptus gomphocephala	1100	3
*	*Euphorbia terracina*	40	0.3
	Exocarpos sparteus	110	0.5
	Kunzea glabrescens	150	0.6
*	*Vulpia myuros*	30	0.1
	Melaleuca teretifolia	210	1
	Centaurium tenuiflorum	10	0.1
	Melaleuca systena	100	2
*	*Melinis repens*	60	0.1
	Mesomelaena pseudostygia	120	0.5
	Acacia lasiocarpa	40	0.1
	Patersonia occidentalis	50	0.2
*	*Pelargonium capitatum*	60	0.5
*	*Medicago polymorpha*	10	0.1
	Astartea scoparia	150	0.2
*	*Oenothera laciniata*	10	0.1
*	*Olea europaea*	65	0.1
	Gompholobium tomentosum	50	0.2

Appendix C – Flora Site Data – Neerabup/NBT Group

Site No: NSR07	**Date**: 19/10/2023	**Longitude**: 115.83176891	**Latitude**: -31.681813

Type: Relevé
Soil Types: Grey white sand
Topography: On a slope SW
Surface: -
Outcrops: None
Litter: Ground cover mainly grasses
Vegetation Condition: Very Good
Condition Notes: 10+
Soil Condition: Dry
Fire: 10+ years

Vegetation Type: PpAcCe*: Pinus pinaster* tall isolated trees over *Adenanthos cygnorum* var. *cygnorum, Xanthorrhoea preissii* and *Macrozamia fraseri* tall to mid sparse shrubland over **Carpobrotus edulis, *Pelargonium capitatum* and **Ornithopus pinnatus* low sparse forbland.

Weed	Taxon	Height (cm)	Foliage (%)
	Banksia attenuata	150	0.8
	Briza maxima	10	0.1
*	*Carpobrotus edulis*	40	0.1
	Dasypogon bromeliifolius	50	0.2
	Dianella revoluta	150	0.1

Weed	Taxon	Height (cm)	Foliage (%)
*	*Ehrharta calycina*	150	2
	Eucalyptus marginata	1000	12
	Alexgeorgea nitens	10	0.3
*	*Gladiolus caryophyllaceus*	40	0.15
	Hibbertia hypericoides	30	0.1
	Macrozamia fraseri	110	0.1
	Mesomelaena pseudostygia	70	0.2
*	*Pelargonium capitatum*	60	0.1
*	*Pentameris pallida*	20	0.8
	Petrophile linearis	30	0.1
*	*Pinus pinaster*	22	50
	Styphelia propinqua	100	0.5
	Corynotheca micrantha	40	0.2
	Xanthorrhoea preissii	200	3

Appendix C – Flora Site Data – Neerabup/NBT Group

Site No: NSR08	**Date**: 19/10/2023	**Longitude**: 115.851231	**Latitude**: -31.701221

Type: Relevé
Soil Types: White grey Sand
Topography: Flat
Surface: -
Outcrops: None
Litter: 10% bare ground, sticks branches and leaf litter
Vegetation Condition: Very Good
Condition Notes: Weeds, clearing
Soil Condition: Dry
Fire: 10+ years

Vegetation Type: BmAcPo: *Banksia menziesii* and *Banksia attenuata* low open woodland over *Adenanthos cygnorum* subsp. *cygnorum, Regelia ciliata* and *Acacia pulchella* open shrubland over *Patersonia occidentalis, *Carpobrotus edulis* and *Dampiera linearis* forbland.

Weed	Taxon	Height (cm)	Foliage (%)
	Acacia pulchella	60	0.3
	Adenanthos cygnorum subsp. *cygnorum*	350	20
	Banksia attenuata	6	4
	Banksia menziesii	4	5

Weed	Taxon	Height (cm)	Foliage (%)
*	*Briza maxima*	70	0.1
	Burchardia congesta	40	0.1
	Hemiandra pungens	10	0.2
*	*Carpobrotus edulis*	10	0.3
	Lyginia imerbis	10	0.1
*	*Ehrharta calycina*	100	0.1
*	*Asparagus asparagoides*	10	0.1
	Alexgeorgea nitens	10	0.1
*	*Gladiolus caryophyllaceus*	40	0.2
	Gastrolobium linearifolium	40	0.2
	Gonocarpus pithyoides	30	0.1
	Laxmannia squarrosa	10	0.1
	Patersonia occidentalis	60	0.4
*	*Pentameris pallida*	10	0.1
	Petrophile linearis	30	0.2
	Regelia ciliata	190	2
	Hypocalymma robustum	90	0.2
	Jacksonia floribunda	180	0.3
	Dampiera linearis	15	0.1
	Bossiaea eriocarpa	15	0.1
	Stirlingia latifolia	160	0.2
*	*Ursinia anthemoides*	20	0.3

Appendix C – Flora Site Data – Neerabup/NBT Group

Site No: NSR09	**Date**: 20/10/2023	**Longitude**: 115.8504780	**Latitude**: -31.714886448

Type: Relevé
Soil Types: White grey Sand
Topography: Sloped
Surface: -
Outcrops: None
Litter: >5% bare ground
Vegetation Condition: Good
Condition Notes: Good to very good condition
Soil Condition: Dry
Fire: 10+ years

Vegetation Type: MpHaDb: *Melaleuca preissiana* and **Pinus pinaster* woodlands over *Hypocalymma angustifolium, Kunzea glabrescens* and *Acacia longifolia* subsp. *longifolia* shrubland over *Dasypogon bromeliifolius, Dianella revoluta* and **Carpobrotus edulis* forbland.

Weed	Taxon	Height (cm)	Foliage (%)
*	*Acacia longifolia* subsp. *longifolia*	240	1.5
*	*Briza maxima*	60	0.1
*	*Carpobrotus edulis*	20	0.1
	Dasypogon bromeliifolius	60	0.2
	Dianella revoluta	20	0.1

Weed	Taxon	Height (cm)	Foliage (%)
*	*Ehrharta calycina*	140	0.5
*	*Gladiolus caryophyllaceus*	80	0.3
	Gompholobium tomentosum	80	0.4
	Hypocalymma angustifolium	11	25
	Kunzea glabrescens	90	12
	Melaleuca preissiana	1100	8
*	*Pentameris pallida*	10	0.1
*	*Pinus pinaster*	15	5
*	*Ursinia anthemoides*	10	0.1
	Xanthorrhoea preissii	200	0.5
	Hibbertia subvaginata	40	0.2

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Appendix B Terrestrial Fauna and Black Cockatoo Habitat Assessment (Eco Logical Australia, 2020)

Native Vegetation Clearing Permit Application Supporting Document

CEL North – Henley BrookWestern Power

SLR Project No.: 675.073051.00001

17 September 2025

Terrestrial Fauna and Black Cockatoo Assessment: Morley to Ellenbrook Line

Public Transport Authority

MEL-MNO-ELA-EN-RPT-0012

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Template 2.8.1

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Abbreviations

Abbreviation	Description
BC Act	*Biodiversity Conservation Act 2016*
BoM	Bureau of Meteorology
DAWE	Department of Agriculture, Water and the Environment
DBCA	Department of Biodiversity, Conservation and Attractions
DBH	Diameter at Breast Height
DoEE	Department of the Environment and Energy
ELA	Eco Logical Australia
EPA	Environmental Protection Authority
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
ESA	Environmentally Sensitive Area
FVC	Focused Vision Consulting
ha	Hectare
km	Kilometre
MEL	Morley to Ellenbrook Line
mm	Millimetre
P	Priority
PEC	Priority Ecological Community
PMST	Protected Matters Search Tool
PTA	Public Transport Authority
SEWPaC	Department of Sustainability, Environment, Water, Population and Communities
TEC	Threatened Ecological Community
WAM	Western Australian Museum

Executive summary

The Morley-Ellenbrook Line (MEL), a component of the State government's METRONET program to increase the size of Perth's railway network, will connect the existing Midland line to Perth's northeast suburbs, terminating in Ellenbrook. A route commencing at Bayswater Station on the Midland Line and terminating at Ellenbrook has been identified as the proposed Development Envelope (the Study Area) and is approximately 706 hectares (ha) in size. The Study Area is split into two parts: Part 1 Bayswater to Malaga and Part 2 Malaga to Ellenbrook. A number of ecological investigations have historically been undertaken across the Study Area; however, a recent constraints analysis identified portions of the Study Area where gaps in data existed including lack of survey effort, gaps in habitat mapping, discrepancies or inconsistencies in data and/or where there were a number of environmental constraints which required a more comprehensive understanding.

ELA were subsequently commissioned by PTA to undertake an in-depth assessment of the terrestrial fauna and black cockatoo habitat values of the Study Area. The assessment included a desktop assessment and literature review including updated database searches, a Level 1 fauna survey and black cockatoo habitat assessment (foraging, breeding and roosting habitat) in areas not previously surveyed, a second site visit to confirm (ground-truth) or remap fauna/black cockatoo habitat values and consolidating all previous and current survey reports, data and mapping into one comprehensive report. The terrestrial fauna and black cockatoo habitat assessment was undertaken in accordance with all relevant guidance to provide a comprehensive and consolidated report and mapping layer addressing the terrestrial vertebrate fauna and black cockatoo habitat values of the entire Study Area.

A total of 16 broad fauna habitat types were mapped over the entire Study Area during previous and current surveys. Ten broad fauna habitat types occur in Part 1 of the Study Area and 15 broad fauna habitat types occur in Part 2 of the Study Area. The fauna habitats vary greatly in condition, ranging from vegetation in Completely Degraded condition to intact native vegetation in Very Good or Excellent condition. A number of fauna habitats recorded within Part 2 of the Study Area are considered to provide potential habitat for a number of conservation significant fauna, and the *Banksia* Woodland habitat present within Part 2 of the Study Area is considered to be significant as it represents the *Banksia* Woodlands of the Swan Coastal Plain Threatened Ecological Community (listed as Endangered under the *Environmental Protection and Biodiversity Conservation Act 1999* and as Priority 3 by Department of Biodiversity, Conservation and Attractions.

A total of 129 fauna species have been recorded in the entire Study Area during previous and current surveys, including 10 Mammals (3 native and 7 introduced); 91 birds (88 native and 3 introduced); 21 reptiles (all native); and seven amphibians (all native frogs). This includes four conservation significant fauna species including Carnaby's Cockatoo, Forest Red-tailed Black Cockatoo, Quenda and the Rainbow Bee-eater. Carnaby's Cockatoo, Forest Red-tailed Black Cockatoo and the Rainbow Bee-eater were recorded within Part 1 of the Study Area, whereas all four species were recorded within Part 2 of the Study Area.

A further six conservation significant terrestrial fauna species were identified from the desktop assessment as likely or with the potential to occur including Baudin's Cockatoo (Part 2), Western Brush

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Wallaby (Part 2), Water Rat (Part 2), Black-striped Snake (Part 2), Jewelled Sandplain Ctenotus (Part 2) and Peregrine Falcon (Part 1 and Part 2).

A total of 146.2 ha of suitable foraging habitat for black cockatoos occurs within the Study Area. The majority of this occurs in Part 2 of the Study Area which contains a total of 137.3 ha of suitable foraging habitat comprising 29.8 ha of high quality, 32.6 ha of moderate quality and 74.9 ha of low-quality foraging habitat. Part 1 of the Study Area contains a total of 8.9 ha of suitable foraging habitat comprising 0.7 ha of high quality, 2.7 ha of moderate quality and 5.5 ha of low-quality foraging habitat.

A total of 850 potential black cockatoo breeding trees occur within the Study Area. Potential breeding trees comprise of suitable species such as Tuart, Flooded Gum, Blackbutt and Marri as well as a number of non-native Eucalyptus species such as *E. camaldulensis* and other planted Eucalypts. A total of 145 potential breeding trees occur in Part 1 of the Study Area (four with hollows potentially suitable for nesting black cockatoos) and 705 potential breeding trees in Part 2 of the Study Area (44 with hollows potentially suitable for nesting black cockatoos).

Approximately 60.3 ha of suitable roosting habitat occurs within the Study Area. This includes 10.0 ha of suitable roosting habitat in Part 1 and 50.3 ha of suitable roosting habitat in Part 2 of the Study Area.

The assessment determined that both Carnaby's and Forest Red-tailed Black Cockatoos are utilising the Study Area for foraging; however, there has been no evidence of breeding or roosting recorded within the Study Area to date. Baudin's Cockatoo could potentially utilise the Study Area for foraging on an occasional basis; however, it is unlikely to utilise the Study Area for breeding or roosting as this species generally roosts and breeds in the Jarrah Forrest and Warren bioregions of Western Australia.

To conclude, a full suite of data relating to the terrestrial vertebrate fauna and threatened black cockatoo values has been successfully mapped for Part 1 and Part 2 of the Study Area. The assessment has been undertaken in accordance with all relevant guidance, providing a high level of knowledge relating to fauna and black cockatoo values for the Project. Further targeted or fauna trapping surveys are not considered necessary given the number of surveys undertaken for the Project over the years', the extent of knowledge of the fauna assemblage in the Study Area including conservation significant fauna values, and compliance with all relevant legislation and guidance.

1. Introduction

1.1 Project background

The Public Transport Authority of Western Australia (PTA) is proposing to develop the Morley-Ellenbrook Line (MEL) Project as part of Western Australian Government's METRONET program aimed at increasing the size of Perth's railway network. The MEL Project is a 21-kilometre (km) railway that will connect the existing Midland line in Bayswater to Ellenbrook in Perth's north-eastern suburbs, approximately 22 km northeast of the Perth central business district (CBD). The MEL Project will include new stations at Morley, Noranda, Malaga, Whiteman Park and Ellenbrook, and provision for a potential future station at Bennett Springs.

Although the MEL Study Area has not yet been finalised, a route commencing at Bayswater Station on the Midland Line and terminating at Ellenbrook has been identified as the proposed Development Envelope (the Study Area; **Figure 1-1**). The route follows the centre median of Tonkin Highway, heading north through the Reid Highway interchange, before leaving the median in Malaga between Marshall Road and Hepburn Avenue (**Figure 1-1**). From Malaga, the Study Area turns east across the southern part of Whiteman Park, before heading north along the eastern side of Whiteman Park along Drumpellier Drive (formally New Lord Street). After crossing Gnangara Road, the Study Area follows an existing reservation into the centre of Ellenbrook, terminating near The Promenade (**Figure 1-1**).

The Study Area is approximately 706 hectares (ha) in size and is split into two parts: Part 1 (Bayswater to Malaga; 205.1 ha; **Figure 1-1**) and Part 2 (Malaga to Ellenbrook; 500.9 ha; **Figure 1-1**). This report details the objectives, environmental background and methodology of the assessment for the entire Study Area; however, the results and discussion have been split into Parts 1 and 2.

A number of ecological investigations have historically been undertaken across the Study Area including Level 1 and Level 2 fauna surveys and habitat assessments for Threatened black cockatoo species (refer to Section 2); however, a gap analysis recently undertaken by Eco Logical Australia (ELA) identified: a number of areas within the Study Area where surveys had not been undertaken; where discrepancies or inconsistencies in data existed; and/or where there were a number of environmental constraints which required a more comprehensive understanding (ELA 2019). Given that the MEL project will require environmental approvals under the State's *Environmental Protection Act 1986* (EP Act) and *Biodiversity Conservation Act 2016* (BC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), a number of additional technical studies were deemed to be required, including for terrestrial fauna and Threatened black cockatoos listed under both the EPBC Act and BC Act (ELA 2019).

ELA were subsequently commissioned by PTA to undertake additional work to address the above-mentioned gaps in order to support the environmental approvals process. This included a comprehensive assessment of terrestrial fauna and black cockatoo values across the entire Study Area, including:

- An assessment to determine adequacy of previous surveys in meeting technical guidance in terms of scope, currency and quality;

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- Additional terrestrial fauna and black cockatoo surveys to address spatial gaps in the existing survey coverage; and
- A consolidated report detailing the terrestrial fauna and black cockatoo values of the entire Study Area which could be used for a baseline for future environmental impact assessment and approvals work.

1.2 Purpose and objectives

The overall purpose of the terrestrial fauna and black cockatoo assessment was to ensure that terrestrial fauna and black cockatoo habitat values were mapped for the entire Study Area, in accordance with relevant guidance. This assessment included consolidating all previous and current survey reports, data and mapping into one comprehensive report addressing terrestrial vertebrate fauna, with an additional focus on black cockatoos.

The specific objectives of the terrestrial fauna and black cockatoo assessment were to:

1. Undertake a Level 1 terrestrial fauna and black cockatoo habitat assessment survey of areas within the Study Area that had not been previously surveyed in order to address any gaps in data.
2. Consolidate data and provide a contiguous terrestrial fauna and black cockatoo habitat spatial dataset covering the full extent of the Study Area.
3. Ground-truth (confirm) previously mapped fauna values across the Study Area to confirm that the mapping remains current in order to facilitate the compilation of all of the datasets and to ensure compliance with relevant guidance.
4. Ground-truth (confirm) black cockatoo roosting, foraging and/or breeding habitat that was previously mapped within the Study Area (if and where required – note that if previous surveys were deemed sufficient then previously mapped habitat would not require ground-truthing) to:
    a. Confirm if previously mapped values were still present and update the mapped boundaries;
    b. Ensure previous mapping was undertaken in accordance with relevant guidance;
    c. Assist with consolidating data from different consultants; and
    d. Address any gaps in data.
5. Identify known breeding (unlikely) and black cockatoo roosting sites in proximity (up to a maximum of 7 km away; Department of the Environment and Energy [DoEE] 2017; Environmental Protection Authority [EPA] 2019) to the Study Area and map areas of higher value foraging habitat within the Study Area that may serve as feeding areas for black cockatoos using these sites.
6. Provide a consolidated, comprehensive report detailing the terrestrial fauna and black cockatoo values of the entire Study Area that may be used as a baseline for future environmental impact assessment and approvals.

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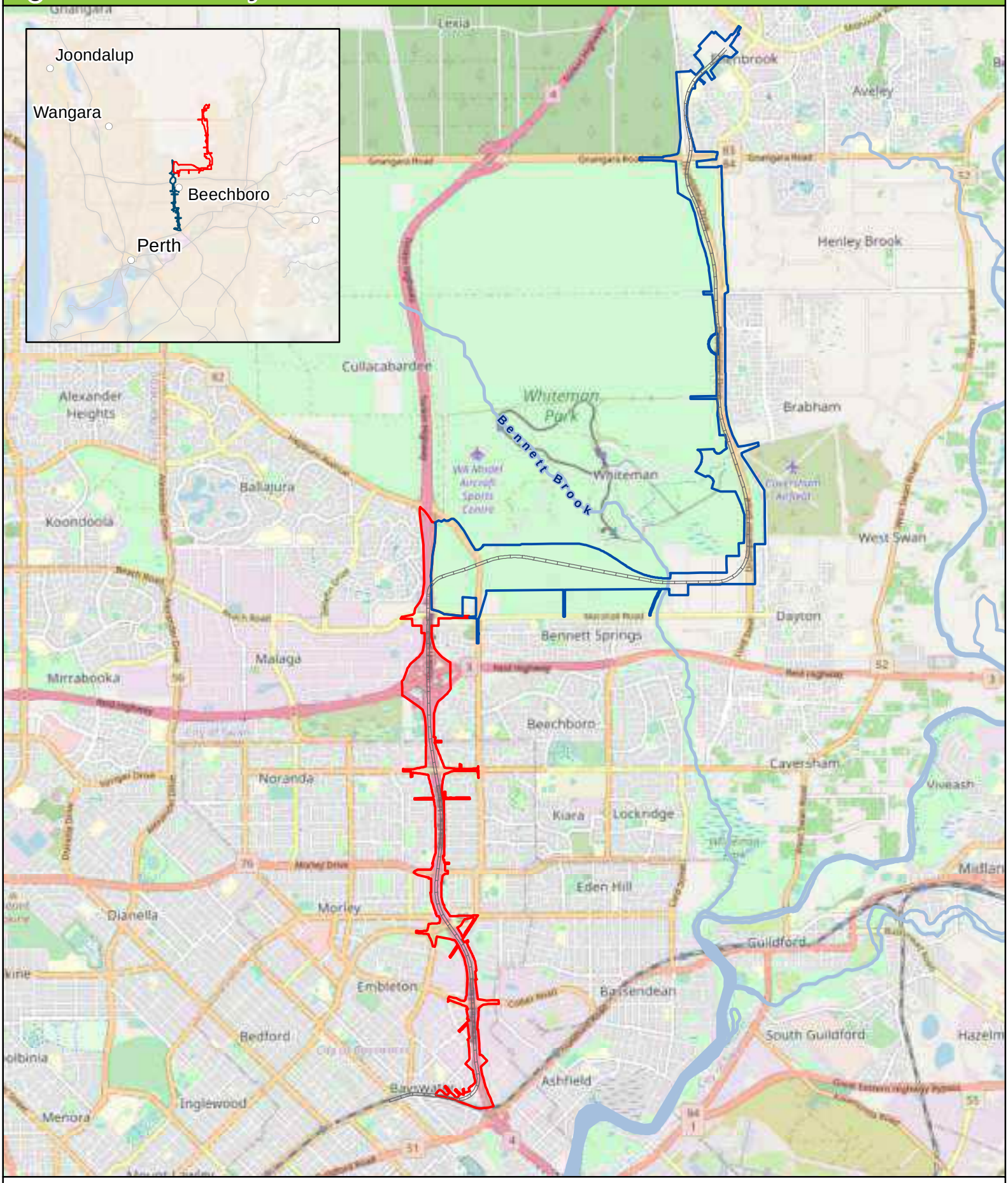
Figure 1-1: The Morley- Ellenbrook Line



Legend

- Part 1 Study Area - Bayswater to Malaga
- Part 2 Study Area - Malaga to Ellenbrook
- Proposed railway
- Reserve

0 0.5 1 2
Kilometres
Datum/Projection:
GDA 1994 MGA Zone 50

N

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Prepared by: GM Date: 29/04/2020

2. Previous environmental studies

Fourteen (14) environmental studies relating to terrestrial vertebrate fauna and/or black cockatoos have recently or historically been completed in and around the Study Area (**Table 2-1**). Some studies have been completed specifically for the MEL project, while others have been completed for nearby projects that intersect the Study Area.

Seven terrestrial fauna surveys have been undertaken in areas intersecting the Study Area (Focused Vision 2019; Terrestrial Ecosystems 2018; AECOM 2016; Coffey 2014, 2015; GHD 2014 and 360 Environmental 2014; **Table 2-1**; **Figure 2-1**, **Figure 2-2** and **Figure 2-3**). The surveys varied between desktop assessments, level 1 and level 2 surveys and were all undertaken in accordance with the EPA's Technical Guidance for terrestrial fauna, current at the time of survey (e.g. EPA 2016a, 2016b), as well as relevant Commonwealths guidelines including:

- Survey guidelines for Australia's threatened birds: Guidelines for detecting birds listed as threatened under the EPBC Act (Commonwealth of Australia 2010);
- Survey guidelines for Australia's threatened mammals: Guidelines for detecting reptiles listed as threatened under the EPBC Act (Department of Sustainability, Environment, Water, Populations and Communities [SEWPaC] 2011a); and
- Survey guidelines for Australia's threatened reptiles: Guidelines for detecting reptiles listed as threatened under the EPBC Act (SEWPaC 2011b).

Nine surveys assessing black cockatoo habitat values have been undertaken in areas intersecting, or adjacent to, the Study Area (Focused Vision 2019; Terrestrial Ecosystems 2018; AECOM 2016; Coffey 2014, 2015; GHD 2014, 2019a, 2019b; and PGV Environmental 2014b; **Table 2-1** and **Figure 2-1, Figure 2-2** and **Figure 2-3**). These surveys assessed potential foraging and breeding habitat, and in some cases roosting habitat, for all three species of Threatened black cockatoo including:

- *Calyptorhynchus latirostris* (Carnaby's Cockatoo);
- *Calyptorhynchus banksia naso* (Forest Red-tailed Black Cockatoo); and
- *Calyptorhynchus baudinii* (Baudin's Cockatoo).

In addition to the above-mentioned terrestrial fauna and black cockatoo surveys, a number of other targeted surveys have been undertaken that relate to terrestrial fauna (**Table 2-1**): a wetland bird survey was undertaken by Terrestrial Ecosystems in 2019; a wetland values survey undertaken by WRM in 2019; and Kangaroo Population Monitoring Surveys were undertaken by PGV Environmental in 2014 and again by Bamford et. al. in 2019.

An additional 11 desktop assessments or other documents with terrestrial fauna and/or black cockatoo information relevant to the Project are also available (**Table 2-1**).

An assessment of compliance with relevant guidance for each survey is provided in **Table 2-1**. The survey effort required for Level 1 or Level 2 fauna surveys is not specified within the EPA Technical Guidance (EPA 2016a, b); however, in ELA's professional opinion, the survey effort and methods undertaken for the majority of the vertebrate fauna surveys undertaken across the Study Area was considered adequate for the impact assessment process (**Table 2-1**). Whilst all fauna surveys were undertaken in accordance

with the relevant guidance, some of the black cockatoo assessments were either not undertaken in accordance with the EPBC Act referral guidelines for three threatened black cockatoo species (SEWPaC 2012) or additional information was not provided at the time (i.e. assessing the quality of foraging habitat).

Table 2-1: Previous environmental studies

Report and author	Summary	Timing	Compliant with relevant guidance or guidelines/limitations
The Western Grey Kangaroo *Macropus fuliginosus* In Whiteman Park. Advice on management with respect to the Morley Ellenbrook Rail Link Bamford 2020	Advice paper on how to manage interactions between the Western Grey Kangaroo Population within Whiteman Park and the proposed Morley to Ellenbrook Rail Link Project. Information included an assessment of the current kangaroo situation in Whiteman Park, movement of kangaroos between Whiteman Park and the surrounds, discussion on the potential impacts to the kangaroo population and identify potential risks, discussion on management options and recommendations for further work.	February 2020	N/A
Wetland birds in the Whiteman Park area Terrestrial Ecosystems 2019	Waterbird survey and habitat assessment undertaken in spring 2018 and spring 2019 within Whiteman Park wetland areas. All of the wetland bird species recorded during the surveys were considered common on the Swan Coastal Plain, many of which occur in and around most of the larger wetlands and lakes in the greater Perth metropolitan area. None of these species recorded were considered migratory (i.e. breed in the northern hemisphere and spend the northern hemisphere winter in Western Australia or elsewhere in the southern hemisphere).	November 2018 and 2019	Yes
Biological Survey Report - Tonkin Gap Focused Vision Consulting (FVC) 2019	An assessment of the key flora, vegetation, fauna, soil, groundwater and surface water (wetland) values of the proposed 'Tonkin Gap', between Guildford Road and Great Eastern Highway, plus a desktop assessment of the same values within a study area incorporating a 5-km buffer. The field assessment comprised a single-phase detailed flora and vegetation assessment and a fauna habitat assessment, plus a targeted black cockatoo habitat survey. A follow-up, detailed tree hollow inspection was carried out, to ascertain the breeding hollow status of 14 trees initially observed to contain hollows. Four fauna habitats of varying condition were mapped during the survey, including habitat suitable for black cockatoos and Quenda. Most of the fauna habitats provide foraging potential for black cockatoos although the quality of foraging habitat was mostly considered low to moderate, moderate at best. No known roosting sites occur within the Study Area, although suitable roosting habitat was recorded. A total of 124 potential breeding trees for black cockatoos were recorded during the survey.	November 2019	Yes
Morley-Ellenbrook Line Wetland Values Desktop Assessment Spring 2019	A desktop assessment and site visit of mapped wetlands within, and adjacent to the proposed MEL project area. Of the 24 wetlands assessed, five were considered of sufficiently high	Oct/Nov 2019	Yes

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Report and author	Summary	Timing	Compliant with relevant guidance or guidelines/limitations
Wetland Resource Management (WRM) 2019	ecological/conservation value and to be at risk from direct/indirect impacts from the MEL project.		
Morley-Ellenbrook Line Stage 1 – Vegetation and Black Cockatoo Habitat Assessment. GHD 2019a, b	Vegetation and black cockatoo habitat survey for the Tonkin Highway Section of the Morley-Ellenbrook Line (Part 1). Survey methods included a rapid vegetation assessment, and assessment of foraging, breeding and roosting habitat for black cockatoos. Eighty-eight (88) potential breeding trees were recorded. No hollows suitable for black cockatoo use were observed from the ground-based assessment. Foraging evidence was recorded under one Marri tree. Small areas of low, moderate and high-quality foraging habitat were recorded.	October 2019	Yes
The Western Grey Kangaroo *Macropus fuliginosus* In Whiteman Park. Bamford et al. 2019	A discussion paper on options for management of the Western Grey Kangaroo in Whiteman Park (a modified environment). Report provides an overview of the kangaroo population in and around Whiteman Park, impacts of Kangaroos on the Park and options for population control.	February 2019	N/A
Level 1 Fauna Risk Assessment and Black-Cockatoo Habitat Assessment for the alternative Ellenbrook Rail Line Alignments of Metronet Terrestrial Ecosystems 2018	A Level 1 fauna risk assessment to identify threatened or priority vertebrate fauna likely to be in the project area, describe the available fauna habitats, undertake a targeted survey of black-cockatoo habitats and complete an assessment of potential impacts on black cockatoos. Seven broad fauna habitats were mapped within the project area which included habitat for the Jewelled South-west Skink (Priority [P] 3), the Black-striped snake (P3) and the Quenda (P4). Only potential breeding trees with a suitable hollow and DBH over 500 mm were mapped during the survey, of which 10 were recorded. Foraging habitat for black cockatoos was recorded and assigned a quality rating in accordance with the draft referral guidelines for black cockatoos (DoEE 2017).	November 2017	No - Potential breeding trees for black cockatoos were not mapped in accordance with EPBC Referral Guideline (SEWPaC 2012). Only potential breeding trees with a suitable hollow were mapped. Areas were resurveyed by ELA in February 2020 in accordance with referral guideline (refer to Section 4.2.3).
Ellenbrook Bus Rapid Transit Biological Assessment AECOM 2016	A biological assessment of flora, vegetation and fauna values of the study area. Included a Level 1 fauna assessment and a Black Cockatoo habitat assessment. The Threatened Forest Red-tailed Black Cockatoo and the Migratory Rainbow Bee-eater were recorded during the field survey, and Carnaby's and Baudin's Black Cockatoo as well as the Quenda were considered likely to occur. Eight fauna habitats were mapped and suitable foraging habitat	October 2015	Yes; however, black cockatoo foraging habitat was not assessed for quality. ELA assessed foraging habitat quality using desktop analysis

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Report and author	Summary	Timing	Compliant with relevant guidance or guidelines/limitations
	for black cockatoos was recorded within the Study Area. A total of 291 potential breeding trees for black cockatoos were recorded.		and a subsequent site visit (refer to Section 4.2.3).
Level 2 Targeted Fauna Assessment Perth–Darwin National Highway Coffey 2015a	A Level 2 fauna assessment undertaken as part of Main Roads Perth to Darwin National Highway (NorthLink) project to identify and assess ecological values and significance, including a fauna movement survey and a Black Cockatoo habitat assessment. Four natural fauna habitats and three secondary habitats were recorded during the survey. A total of 253.5 ha of quality Black Cockatoo foraging habitat, 76.7 ha of Eucalypt/Corymbia Woodland and Wetland habitat classified as roosting habitat, 162.8 ha of breeding habitat and 1,061 trees with a DBH over 500 mm were recorded in the study area.	September 2014	Yes
Public Transport Authority Forrestfield Airport Link Environmental investigation GHD 2014	An environmental investigation for the proposed Forrestfield Airport Link (FAL) and associated infrastructure including a Level 1 fauna assessment and a Black Cockatoo habitat assessment. Up to 19.5 ha of foraging habitat and 125 potential breeding habitat trees were recorded throughout the Study Area and potential night roosting habitat mapped along Poison Gully Creek. Suitable habitat for the Quenda was also recorded. Other conservation significant fauna considered likely to occur included the Perth-lined Skink (woodland habitat) and the Water Rat (riparian woodland habitat along the Swan River and Poison Gully Creek).	November 2012 and September 2013	Yes
Memorandum: Tonkin Grade Separations – Flora, Vegetation and Fauna Habitat Mapping Gaps Analysis Coffey 2014	A review of previous studies undertaken by 360 Environmental (2014) which was commissioned by Main Roads Western Australia and included a flora, vegetation and fauna assessment of the Tonkin Grade Separations project. A site investigation was undertaken to address gaps and identify the flora, vegetation and fauna values within this area to support project approval applications. The study area had very limited habitat value and was considered unlikely to support any conservation significant fauna. No habitat for black cockatoos was recorded within the study area.	August 2014	Yes
Lot 800 Youle-Dean Road, Brabham – Kangaroo Population and Management PGV Environmental 2014a	A baseline kangaroo survey to outline approximate number of kangaroos present on site and the potential management options for the kangaroos prior to development. It should be noted that the study area in this assessment is located within Brabham which occurs to the east and is outside the current Study Area.	May 2014	N/A

Report and author	Summary	Timing	Compliant with relevant guidance or guidelines/limitations
Brabham LSP 3 Area – Black Cockatoo Habitat Assessment PGV Environmental 2014b	A desktop assessment and site visit to assess black cockatoo foraging, breeding and roosting habitat in order to undertake a Significant Impact Test, including an assessment of the impacts of a proposed residential development on Matters of National Environmental Significance (MNES), the significance of the action, and whether referral of the project under the EPBC Act was recommended. Foraging habitat was recorded throughout the site in addition to foraging evidence in the form of chewed Marri nuts. A total of 65 potential breeding trees were recorded on site, including seven trees with hollows suitable for nesting black cockatoos. No roosting was recorded on site. It should be noted that the study area in this assessment is located within Brabham which occurs to the east and is outside the current Study Area.	March 2014	Yes
Flora, Vegetation and Fauna Survey: Tonkin Grade Separations 360 Environmental 2014a	A flora, vegetation and fauna assessment for Tonkin Grade Separations project for Main Roads. The survey included a Level 1 fauna assessment and an assessment of any conservation significant fauna that may occur. Five broad fauna habitats were recorded during the survey, some of which contained suitable foraging habitat for black cockatoos; however, further information was not provided (note that a targeted black cockatoo habitat assessment was not part of the scope for this assessment). Forest Red-tailed Black Cockatoos were recorded during the survey.	Sept-Oct 2013	Yes
Desktop assessments			
Youle-Dean Road Upgrade and Realignment, Brabham –Environmental Assessment PGV Environmental 2018	Desktop review of previous surveys for widening a road reserve and clearing of native vegetation.	2018	N/A
Bennett Springs East Structure Plan RPS 2017	Desktop review of the remaining habitat within Bennett Springs East including database searches.	2017	N/A
Perth-Darwin National Highway (Swan Valley Section) Condition Environmental Management Plan Fauna – Construction Coffey 2017a	Management Plan for the Perth-Darwin National Highway (Swan Valley section). Desktop review of level 2 fauna survey (Coffey 2015a) and database searches.	2017	N/A

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Report and author	Summary	Timing	Compliant with relevant guidance or guidelines/limitations
Perth-Darwin National Highway (Swan Valley Section) Infrastructure Plan Coffey 2017b	Pre-construction Infrastructure Plan for the Perth-Darwin National Highway (Swan Valley section). Desktop review of fauna underpasses, bridges and fencing for habitat connectivity.	2017	N/A
Ellenbrook Bus Rapid Transit Environmental Impact Assessment and Environmental Management Plan Aurecon 2016	Desktop review of existing information including a recent biological survey by AECOM (2016).	2016	N/A
Public Environmental Review: Perth-Darwin National Highway (Swan Valley Section) Coffey 2015b	Public Environmental Review for the Perth-Darwin National Highway (Swan Valley section). Desktop review of previous surveys and database searches.	2015	N/A
Lot 800 Youle-Dean Road, Brabham – Environmental Gap Analysis PGV Environmental 2014c	Desktop review of previous surveys and database searches. Gap analysis undertaken to determine information required.	2017	N/A
Environmental Assessment and Management Strategy Whiteman Edge LSP 1C Emerge Associates 2014	Desktop review to consider the environmental values and attributes of the development sites.	2017	N/A
Tonkin Highway Expansion between Reid Highway and Guildford Road – Preliminary Environmental Impact Assessment 360 Environmental 2013b	Preliminary Environmental Impact Assessment Report for the expansion of Tonkin Highway between Guildford Road and Reid Highway. Desktop review of previous surveys and database searches.	2013	N/A
Environmental Assessment Lots 346 & 347 Woollcott Avenue Brabham Aurora Environmental 2013	Desktop review to consider the potential environmental impacts associated with the development site.	2014	N/A

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Report and author	Summary	Timing	Compliant with relevant guidance or guidelines/limitations
Roads and Wildlife: A Review of Purpose-Built Fauna Underpasses Bamford Consulting Ecologists 2011	Desktop review of the effectiveness of purpose-built fauna underpasses for to the construction of a new section of road (Keane Road).	2018	N/A

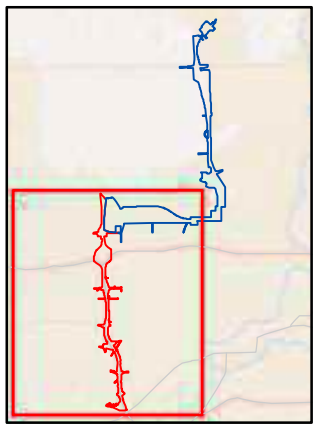
Figure 2.1: Previous surveys and black cockatoo habitat assessments in Part 1 of the Study Area

Legend

- Part 1 Study Area - Bayswater to Malaga
- Part 2 Study Area - Malaga to Ellenbrook

Previous Surveys

- 360 Environmental (2014)
- Coffey (2014)
- Focused Vision (2019)
- GHD (2019)
- Terrestrial Ecosystems (2018)



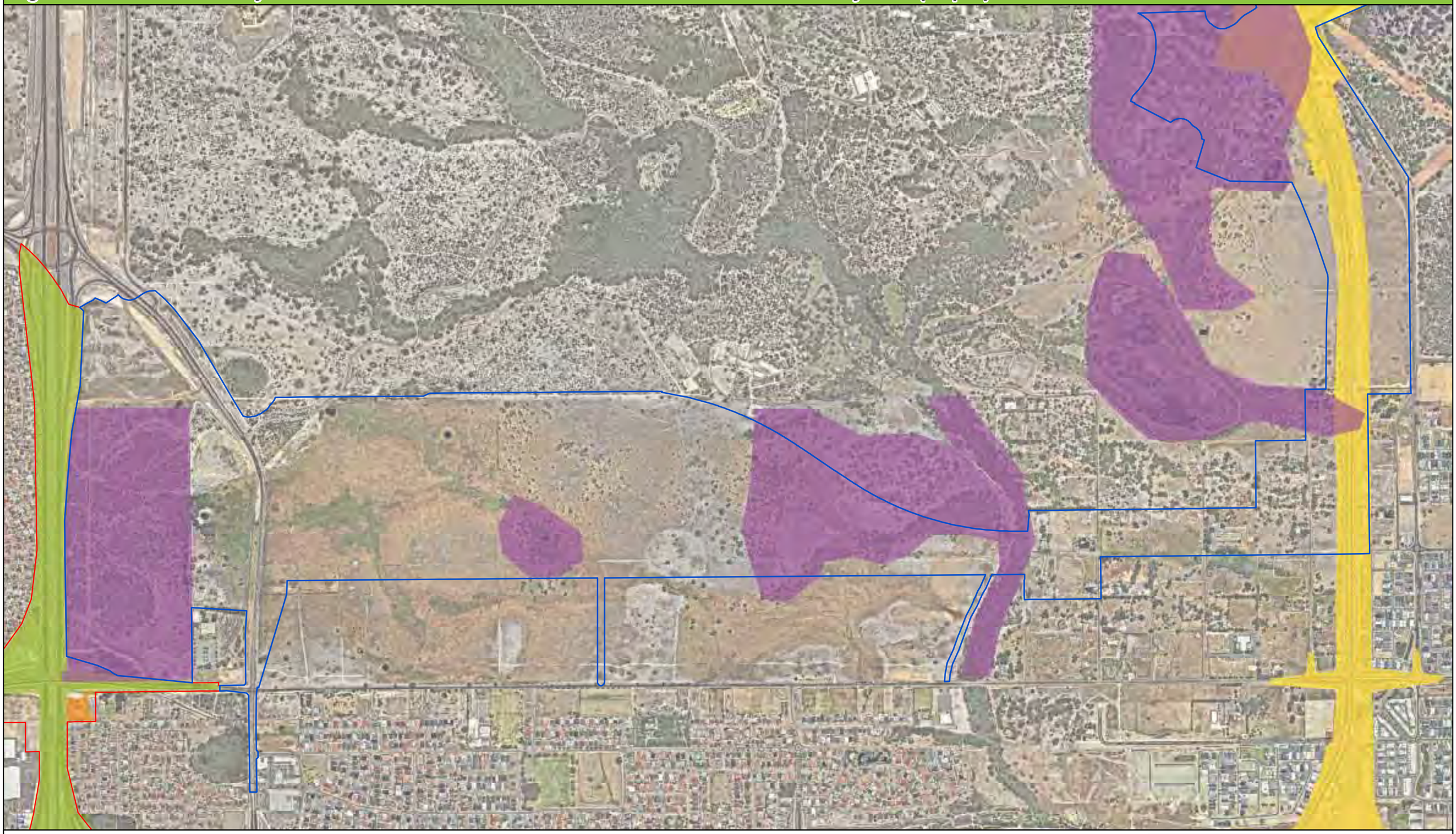
0 0.25 0.5 1
Kilometers
Datum/Projection:
GDA 1994 MGA Zone 56

N

www.ecoaus.com.au

Prepared by: GM Date:29/04/2020

Figure 2.2: Previous surveys and black cockatoo habitat assessments in Part 2 of the Study Area (Map A)

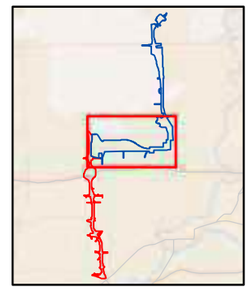


Legend

- Part 1 Study Area - Bayswater to Malaga
- Part 2 Study Area - Malaga to Ellenbrook

Previous Surveys

- AECOM (2016)
- Coffey (2014)
- GHD (2019)
- Terrestrial Ecosystems (2018)



0 125 250 500

Metres

Datum/Projection:
GDA 1994 MGA Zone 56

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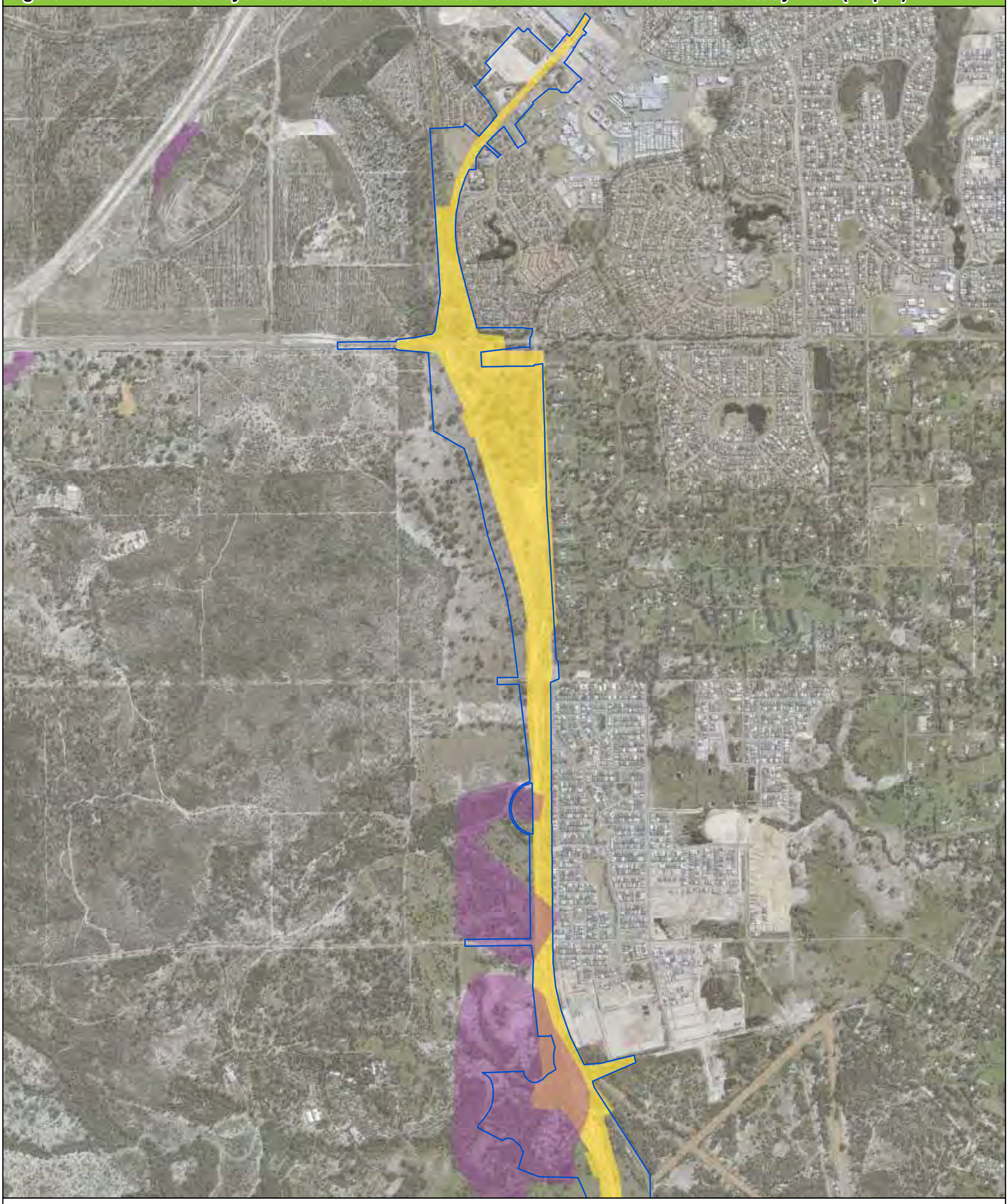
Prepared by: GM Date: 29/04/2020

Figure 2.3: Previous surveys and black cockatoo habitat assessments in Part 2 of the Study Area (Map B)

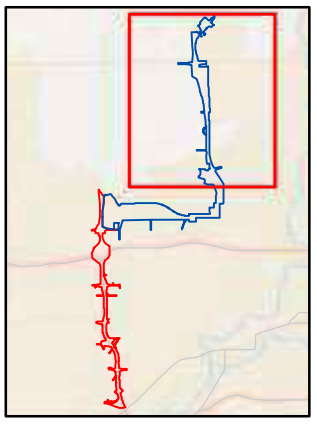


Legend

- Part 2 Study Area - Malaga to Ellenbrook

Previous Surveys

- AECOM (2016)
- Terrestrial Ecosystems (2018)



0 0.25 0.5 1

Kilometers

Datum/Projection:
GDA 1994 MGA Zone 50

N

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Prepared by: GM Date:28/04/2020

3. Biophysical environment

3.1 Bioregion

The Interim Biogeographical Regionalisation for Australia (IBRA) Version 7 recognises 89 geographically distinct bioregions based on common climate, geology, landform, native vegetation and species information. The 89 bioregions are further refined into 419 subregions which are more localised and homogenous geomorphological units in each bioregion (Department of Agriculture, Water and the Environment [DAWE] 2020a).

The Study Area is located within the Swan Coastal Plain bioregion as defined by IBRA. The Swan Coastal Plain bioregion has been further subdivided into two subregions: Dandaragan Plateau (SWA1) and Perth (SWA2). The Study Area occurs within the Perth subregion (SWA2), which is described as a low-lying coastal plain, mainly covered with woodlands dominated by Banksia (*Banksia* spp.) or Tuart (*Eucalyptus gomphocephala*) on sandy soils, *Casuarina obesa* on outwash plains, and paperbark (*Melaleuca* spp.) in swampy areas (Mitchell et al. 2002). In the east, the plain rises to duricrusted Mesozoic sediments dominated by Jarrah woodlands.

The Perth subregion is composed of colluvial and Aeolian sands, alluvial river flats and coastal limestone, overlain with Heath and/or Tuart (*Eucalyptus gomphocephala*) woodlands on limestone, Banksia (*Banksia* spp.) and Jarrah (*Eucalyptus marginata*)-Banksia (*Banksia* spp.) woodlands on Quaternary marine dunes of various ages, and Marri (*Corymbia calophylla*) on colluvials and alluvials (Mitchell et al. 2002). The subregion also includes a complex series of seasonal wetlands and is approximately 1,333,901 ha in size (Coffey 2015a).

3.2 Climate

The Swan Coastal Plain experiences a warm, Mediterranean climate with hot dry summers and mild wet winters (Mitchell *et al*. 2002). Based on climate data from the nearby Bureau of Meteorology (BoM) Whiteman Park weather station (station number 9263; climate data 2004 – current; located approximately 900 metres (m) west of the eastern section of Part 2 of the Study Area) the region receives an annual average rainfall of 731 mm, with highest rainfall totals occurring between June and August (**Table 3-1**).

Total rainfall in the three months preceding the November field survey was slightly lower than that the expected mean; 206.6 mm August-October 2019, compared to the long-term average of 247.9 mm over the same period (**Table 3-1**; BoM 2020)**.** Total rainfall in the three months preceding the February field survey was lower than the expected mean; 32.2 mm rainfall received between November 2019 and January 2020 compared to a long-term average of 62 mm over the same period (**Table 3-1**; BoM 2020).

Mean monthly minimum temperatures from the closest weather station at Millendon (Swan Valley; 9281) range from 7.4°C in August to 19.8 C in February, while mean monthly maximum temperatures range from 19.2 C in July to 34.6°C in December (BoM 2020).

Table 3-1: Rainfall and temperature data recorded in the 12-month period preceding the November 2019 and February 2020 Level 1 fauna and black cockatoo field surveys, compared to the long-term average*

Month	2019										2020		Total (mm)
	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	
Rainfall													
Total monthly rainfall 2019-2020 (mm)	4.0	37.4	18.4	198.2	105.0	140.6	33.8	32.2	26.2	4.0	2.0	32.8	634.6
Mean monthly rainfall 2004-current (mm)	17.6	38.5	85.2	127.5	135.0	130.8	86.4	30.7	25.5	14.5	22.0	17.3	731
Temperatures													
Mean monthly minimum temperature	17.0	12.5	7.7	8.9	7.8	7.4	8.5	10.3	13.6	16.9	15.8	19.8	-
Mean monthly maximum temperature	31.6	26.4	22.8	19.4	19.2	20.0	23.2	25.1	30.3	34.6	32.3	30.0	-

* Source: BoM 2020

3.3 Landforms, geology and soils

The majority of the Study Area is located within the Bassendean dune system which is generally flat low relief with broad swales or moderately flat sand sheets between the dunes. The highest dune of up to 80 metres (m) occurs in Gnangara, approximately 8 km north west of Part 2 of Study Area.

Bassendean Sands are described as basal conglomerate overlain by dune quartz sand with heavy mineral concentrations (Geological Survey of WA and Geoscience Australia 2008). A small portion of the Study Area within Whiteman Park is underlain by Lake deposits 38492, which comes from lacustrine sediment, described as lacustrine or residual mud, clay, silt and sand commonly gypsiferous and/or saline; playa, claypan and swamp deposits; peat; peaty sand and clay; halitic and gypsiferous evaporites. A small area around Bennett Brook is located on the Guildford formation, which is described as alluvial sand and clay with shallow-marine and estuarine lenses and local basal conglomerate (Geological Survey of WA and Geoscience Australia 2008).

3.4 Broad-scale vegetation mapping

The Study Area is located within the Drummond Botanical subdistrict within the Swan Coastal Plain subregion, which is mainly comprised of Banksia low woodland on leached sands with Melaleuca swamps on poorly drained areas and woodland of *Eucalyptus gomphocephala* (Tuart), *Eucalyptus marginata* (Jarrah) and *Corymbia calophylla* (Marri) on less leached soils (Beard 1990).

The Perth region was mapped by Beard (1979) at a 1:250,000 scale. Shepherd et al. (2002) have since updated Beard's mapping to reflect the National Vegetation Information System (NVIS) standards.

There are four broad-scale vegetation associations within the Study Area (**Table 3-2**; Beard 1979; Shepherd et al. 2002).

Table 3-2: Broad-scale vegetation associations within the Study Area

Vegetation association	Description
949	Low woodland, Banksia spp.
1001	Medium very sparse woodland; Jarrah, with low woodlands; Banksia and Casuarina (*Casuarina obesa*).
1009	Medium woodland; Marri and river gum.
1018	Mosaic: Medium forest; Jarrah-Marri / Low woodland; Banksia /Low forest; Teatree / Low woodland (*Casuarina obesa*).

Heddle et al. (1980) originally mapped regional vegetation as vegetation complexes based on major geomorphic units on the Swan Coastal Plain. This vegetation complex mapping has recently been revised by Webb et al. (2016). Three vegetation complexes occur across the Study Area (**Table 3-3**). The extent of vegetation complexes remaining within Swan Coastal Plain and City of Swan are provided in **Table 3-4**. Although vegetation complexes Bassendean Complex – Central and South and Southern River have below 30% of their Pre-European extents remaining within the Swan Coastal Plain region, neither is below the 10% retention target for intensely developed areas (Government of Western Australian 2019; ELA 2019).

Table 3-3: Vegetation complexes within the Study Area

Vegetation complex	Description
Bassendean Complex – Central and South	Vegetation ranges from woodland of *Eucalyptus marginata* (Jarrah), *Allocasuarina fraseriana* (She oak) and Banksia species to low woodland of Melaleuca species, and sedgelands on the moister sites. This area includes the transition of *Eucalyptus marginata* (Jarrah) to *Eucalyptus todtiana* (Prickly bark) in the vicinity of Perth
Bassendean Complex - North	Vegetation ranges from low open forest and low open woodland of Banksia species and *Eucalyptus todtiana* (Prickly bark) to low woodland of Melaleuca species and sedgelands which occupy wetter sites.
Southern River Complex	Open woodland of *Corymbia calophylla* (Marri), *Eucalyptus marginata* (Jarrah) and Banksia species with fringing woodland of *Eucalyptus rudis* (Flooded Gum), *Melaleuca rhaphiophylla* (Swamp Paperbark) along creek beds

Source: Heddle et al. (1980) revised by Webb et al (2016); ELA 2019.

Table 3-4: Extent of vegetation complexes within the Swan Coastal Plain and City of Swan

Vegetation Complex	Scale	Pre-European extent (ha)	Current extent remaining (ha)	% pre-European extent remaining	% of current extent in secure tenure
Bassendean Complex – Central and South	Swan Coastal Plain	87,476.26	23,508.66	26.87%	1.86%
	City of Swan	4,676.35	1,470.94	31.45%	-

Vegetation Complex	Scale	Pre-European extent (ha)	Current extent remaining (ha)	% pre-European extent remaining	% of current extent in secure tenure
Bassendean Complex - North	Swan Coastal Plain	79,057.35	56,659.67	71.67%	25.93%
	City of Swan	14,216.86	7,286.43	51.25%	-
Southern River Complex	Swan Coastal Plain	58,781.48	10,832.18	18.43%	1.18%
	City of Swan	8,627.35	1,424.15	16.51%	-

Source: Government of Western Australia (2019a and b); ELA 2019.

3.5 Areas of conservation significance

3.5.1 Environmentally Sensitive Areas (ESAs)

Environmentally Sensitive Areas (ESAs) are defined in the *Environmental Protection (Environmentally Sensitive Areas) Notice 2005* under s51B of the State *Environmental Protection Act 1986* (EP Act). ESAs include areas declared as World Heritage, included on the Register of the National Estate, defined wetlands, Bush Forever sites, vegetation containing rare (Threatened) flora and Threatened Ecological Communities (TECs).

There are a number of ESA's within, or in close proximity to (i.e. within 100 m), the Study Area including five TECs and five Bush Forever Sites. These are described in further detail below.

3.5.2 Threatened and Priority Ecological Communities

The Commonwealth EPBC Act and the State's BC Act provide for the statutory listing of TECs, either by the Australian Governments Environmental Minister or the Environment Minister of WA. TEC's are also defined as ESA's.

Priority Ecological Communities (PECs) are those biological communities that are recognised by the Environment Minister of WA to be of significance, but which do not meet the criteria for a TEC or ESA. There are five categories of PECs, none of which are currently protected under State or Commonwealth legislation.

Nine TECs or PECs (or their buffers) have previously been identified within 3 km of the Study Area (ELA 2019; **Table 3-5**). The five TECs listed under the EPBC Act also represent ESAs.

One TEC is known to occur within two locations in Part 2 of the Study Area (RPS 2019; **Figure 3-1**):

- *Banksia Woodlands of the Swan Coastal Plain TEC* – listed as Endangered under the EPBC Act and as Priority [P] 3 by Department of Biodiversity, Conservation and Attractions (DBCA).

The Banksia Woodlands of the Swan Coastal Plain TEC contains valuable habitat features for terrestrial native fauna, including conservation significant species such as *Ctenotus gemmula* (Jewelled Sandplain Ctenotus), *Neelaps calonotus* (Black-striped Snake), *Isoodon fusciventer* (Quenda), *Dasyurus geoffroii* (Chuditch) and threatened black cockatoos (DoEE 2016).

Table 3-5: Conservation significant ecological communities within 3 km of the Study Area

Community name	Conservation status*	
	EPBC Act	BC Act/DBCA
Communities of Tumulus Springs (Organic Mound Springs, Swan Coastal Plain)	EN	CR
Banksia Woodlands of the Swan Coastal Plain ecological community	EN	P3
Subtropical and Temperate Coastal Saltmarsh	VU	P3
Shrublands and woodlands on Muchea Limestone on the Swan Coastal Plain	EN	EN
SCP02 - Southern wet shrubland, Swan Coastal Plain TEC	-	EN
SCP20a - *Banksia attenuata* woodlands over species rich dense shrublands TEC (a component of the Banksia Woodlands of the Swan Coastal Plain TEC)	EN	EN
SCP22 - *Banksia ilicifolia* woodlands PEC	-	P2
SCP23b - Swan Coastal Plain *Banksia attenuata – Banksia menziesii* woodlands PEC	-	P3
SCP21c - Low lying *Banksia attenuata* woodlands or shrublands PEC	-	P3

* Threatened Ecological Communities listed under the EBPC Act and/or the BC Act, or listed as a Priority Ecological Community by DBCA.

3.5.3 Bush Forever

Bush Forever (Government of Western Australia 2000) is a non-statutory policy under the Western Australian Planning Commission's (WAPC) policy framework that identifies regionally significant bushland to be protected and managed on the Swan Coastal Plain and substantially meets the Western Australian Government's commitments in the Urban Bushland Strategy (Government of Western Australia 1995) and the Commonwealth's National Strategy for the Conservation of Australia's Biodiversity. The Bush Forever project developed and implemented a plan to protect 51,000 ha of regionally significant vegetation within the Swan Coastal Plain portion of the Perth metropolitan area. This occurred through the identification of 287 Bush Forever sites representing a minimum (where possible) of 10% of each of the 26 vegetation complexes identified in the Bush Forever survey area (Government of Western Australia 2000).

The Bush Forever strategy aims to protect the unique biodiversity values of the Swan Coastal Plain, including necessary habitat for native fauna, including 12 species of threatened fauna and at least 28 migratory shorebirds (Government of Western Australia 2000).

There are eight Bush Forever sites located within one kilometre of the Study Area (ELA 2019). Five of these sites occur either within, or directly adjacent to, the Study Area (**Table 3-6; Figure 3-1** and **Figure 3-2**).

Table 3-6: Bush Forever sites within the Study Area*

Site no.	Site name	Location
200	Caversham Airbase Bushland, West Swan/Whiteman	Directly adjoins Part 2 of the Study Area east of Lord Street and Drumpellier Drive. Does not occur within the Study Area itself.

Site no.	Site name	Location
304	Whiteman Park, Whiteman/West Swan	Occurs inside Part 2 of the Study Area: west of Drumpellier Drive and north of Marshall Road.
305	Bennett Brook Reserve	Adjoins Part 2 of the Study Area at Bennett Brook to the south of Whiteman Park.
307	Lightning Swamp and adjacent bushland, Noranda	Adjoins Part 1 of the Study Area, southwest of the Reid Highway Interchange.
480	Victoria Road Bushland, Malaga/Beechboro	This Bush Forever Site was previously cleared for the Reid Highway Interchange. A small portion of the Bush Forever Site still occurs in the small patch of bushland just to the north east of the Reid Highway Interchange, in Part 1 of the Study Area.

* source: ELA 2019 and Government of Western Australia 2000.

3.5.4 Whiteman Park

Whiteman Park is a large (~4,000 ha) reserve, located approximately 20 km north of Perth (**Figure 3-1;** Western Australian Planning Commission 2017). Part 2 of the Study Area intersects approximately 217 ha of Whiteman Park including the Marshall Road Paddocks, Bennett Brook Reserve, Horse Swamp and Drumpellier Drive (formally Lord Street). Whiteman Park is managed by the Department of Planning, Lands and Heritage on behalf of the Western Australian Planning Commission and includes extensive areas of remnant bushland as well as developed areas and farmland. Whiteman Park is designated as 'Parks and Recreation' under the Metropolitan Region Scheme with almost half the reserve being reserved for nature conservation purposes. The southern and eastern sections of the reserve are farmland used mostly for cattle grazing which also form a buffer between the reserve and surrounding urban development. The reserve is occupied by a wide range of flora and fauna, including a number of conservation significant fauna species such as *Bettongia penicillata* (Woylie) which is listed as Endangered under the EPBC Act and Critically Endangered under the BC Act (Western Australian Planning Commission 2017).

3.6 Remnant vegetation and ecological linkages

The Study Area intersects three ecological linkage corridors as defined by the Regional Ecological Linkage Network Plan which forms part of the Local Government Biodiversity Planning Guidelines for the Perth Metropolitan Region (Western Australian Local Government Association [WALGA] 2004). The Regional Ecological Linkage Network Plan's aim is to link protected regionally significance natural areas through the retention of local natural areas in the best condition, so they can act as linkage corridors to enable the dispersal of spatially separated populations of flora and fauna (WALGA 2004).

The three ecological linkage corridors intersected by the Study Area include (**Figure 3-1** and **Figure 3-2**; ELA 2019):

- An east-west corridor following the Reid Highway road reserve. This linkage connects to Bennett Brook at its eastern end and is reliant upon vegetation within the road reserve, which has been increasingly cleared for road upgrades and projects. Part 1 of the Study Area intersects this linkage at Reid Highway in an area which is severely fragmented from the Reid Highway and associated connecting roads and interchange.

- A north-south corridor connecting Gnangara-Moore River State Forest, Whiteman Park and remnant vegetation along Bennett Brook. The linkage is relatively unbroken, although southern parts are being increasingly fragmented as they are surrounded by urbanisation. Part 2 of the Study Area intersects this linkage at Bennett Brook in the Whiteman Park South section. This section of the linkage is already fragmented by surrounding urbanisation, Marshall Road and a number of other minor tracks, roads and high fencing.
- Another east-west corridor connecting Whiteman Park to vegetation on the eastern side of Lord Street, such as the former Caversham airbase, and ultimately to Ellenbrook. This linkage is being increasingly affected by urban development. Part 2 of the Study Area intersects this linkage around Youle-Dean Road. This section is already fragmented from a number of roads including the old Lord Street and the new Drumpellier Drive and associated fencing.

3.7 Regional black cockatoo values

Black Cockatoos generally forage between 6-12 km from breeding or roosting sites, with foraging habitat within 7 km of a known breeding site considered critical to support breeding (EPA 2019). As such, suitable foraging, breeding and roosting habitat within 7 km of the Study Area has been assessed for regional context (SEWPaC 2012).

Potential foraging, breeding and roosting habitat for all three species of black cockatoo occurs in proximity (within 7 km) to the Study Area as well as throughout the wider region. DBCA have previously mapped areas of foraging habitat for Carnaby's Cockatoo on the Swan Coastal Plain (DBCA 2019a; **Figure 3-3**); however, these areas have not been assessed for quality or had the extent of their boundaries mapped, and therefore, an accurate estimate of area (ha) cannot be provided. It is likely that these areas also provide suitable foraging habitat for both Baudin's and Forest Red-tailed Black Cockatoos; however, the full extent and quality of foraging habitat available for these species is unknown.

High-quality foraging habitat for Carnaby's Cockatoo occurs throughout the Gnangara-Pinjar Pine Plantations, directly to the west and north of Part 2 of the Study Area. Carnaby's Cockatoo have recently adapted to feeding on pines (mostly *Pinus pinaster*) which provide a higher calorific content when compared to native foraging species such as Banksia seeds (EPA 2019). The Gnangara-Pinjar Pine Plantation extends over 7 km from the northern extent of Part 2 of the Study Area to north of Yanchep (EPA 2019).

Other suitable foraging habitat for black cockatoos within 7 km of Part 2 of the Study Area also occurs within remnant native vegetation throughout Whiteman Park, within Bush Forever Sites 22, 300, 304, 200, 399, 195, 198, 480, 305, 192, and is sporadically distributed throughout the West Swan and Henley Brook suburbs as well as the wider Perth Metropolitan Area (**Figure 3-3**). Suitable foraging habitat within 7 km of Part 1 of the Study Area occurs within Lighting Swamp, Orchid Park, Bush Forever Site 386 next to Perth Airport, as well as within isolated patches of vegetation within smaller sporting or recreational reserves throughout the wider Perth Metropolitan Area (DBCA 2019; Glossop et. al. 2011; GHD 2014; **Figure 3-3**).

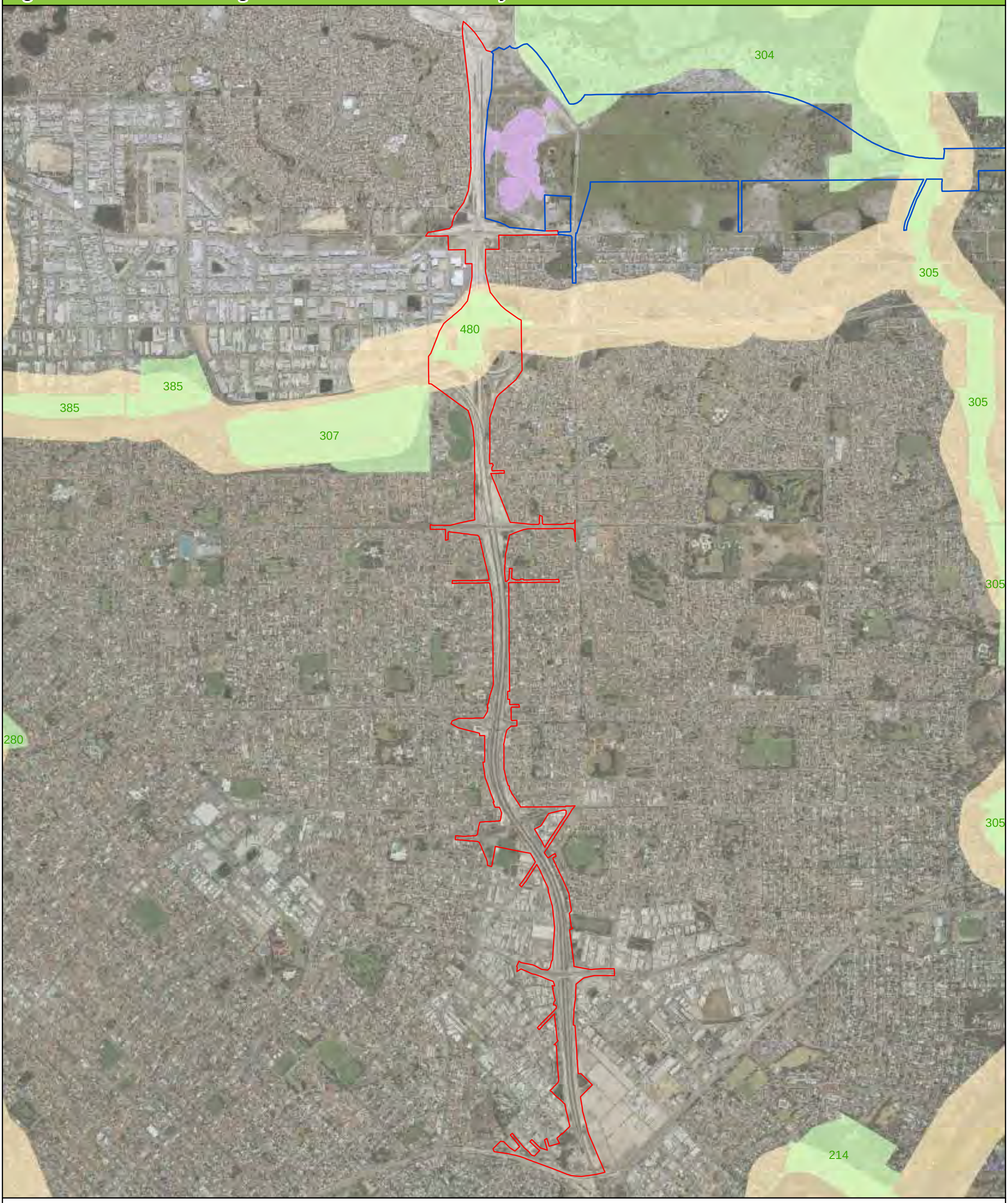
There are very few records of Carnaby's or Forest Red-tailed Black Cockatoos breeding on the Swan Coastal Plain, particularly around the Perth Metropolitan area, and there are no records of Baudin's Cockatoo breeding in this area (Terrestrial Ecosystems 2018). There is a DBCA buffer for a known

breeding site approximately 6 km east of Part 2 of the Study Area, east of Middle Swan towards the Darling Scarp (DBCA 2019b; **Figure 3-3**); however, no further information is known (i.e. species or location). Carnaby's Cockatoo has recently been recorded breeding at Joondalup Health Campus, with the closest known breeding site located approximately 18 km north west of Part 2 of the Study Area. This species has been breeding in natural hollows as well as artificial hollows at this location (Roberts 2016). In addition, Forest Red-tailed Black Cockatoos have been recorded breeding in artificial hollows at Murdoch University, located approximately 18 km south west of Part 1 of the Study Area (Terrestrial Ecosystems 2018; Murdoch University 2015). The majority of breeding sites for both species occur in the Avon-Wheatbelt region to the north east or south in the Jarrah Forrest and Warren bioregions of WA (EPA 2019).

Known roost sites for Carnaby's and Forest Red-tailed Black Cockatoos occur within 7 km of the Study Area. These sites include a confirmed Carnaby's Cockatoo roost site within the Pine Plantations just north of Ellenbrook (~380 m north west of Part 2), multiple known roost sites in and around Gnangara, confirmed roost sites for both Carnaby's and Forest Red-tails within Whiteman Park (~730 m west of Part 2), multiple known roost sites in Koondoola Regional Bushland (~4 km north west of Part 1); and in in Private Property at Henley Brook (~340 m east of Part 2; Birdlife 2011 and 2019; Murdoch University 2016; **Figure 3-3**).

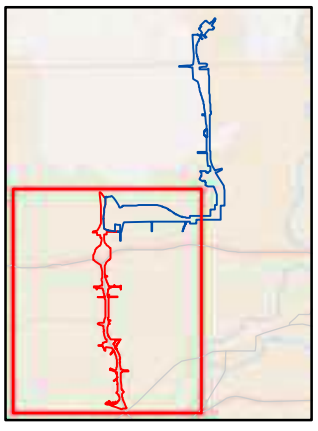
Baudin's Cockatoo is unlikely to roost in the Perth Metropolitan Area. Whilst this species may occasionally be seen foraging in the area, they are likely to return to the hills to roost (Terrestrial Ecosystems 2018).

Figure 3.1: Conservation significant areas within the Study Area and immediate surrounds - Part 1



Legend

- Part 1 Study Area - Bayswater to Malaga
- Part 2 Study Area - Malaga to Ellenbrook
- Bush Forever Areas (DPLH 2016)
- Banksia Woodlands of the Swan Coastal Plain Threatened Ecological Community
- Ecological Linkages (DEC 2009)



0 0.25 0.5 1
Kilometers
Datum/Projection:
GDA 1994 MGA Zone 56

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Prepared by: GM Date: 29/04/2020

Figure 3.2: Conservation significant areas within the Study Area and immediate surrounds - Part 2

192
195
304
198
304
200
305
480
305

Legend

- Part 1 Study Area - Bayswater to Malaga
- Part 2 Study Area - Malaga to Ellenbrook
- Existing Whiteman Park Boundary
- Banksia Woodlands of the Swan Coastal Plain Threatened Ecological Community
- Bush Forever Areas (DPLH 2016)
- Ecological Linkages (DEC 2009)

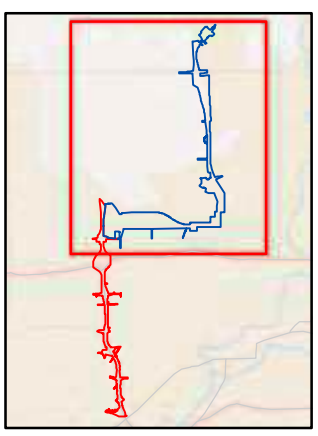

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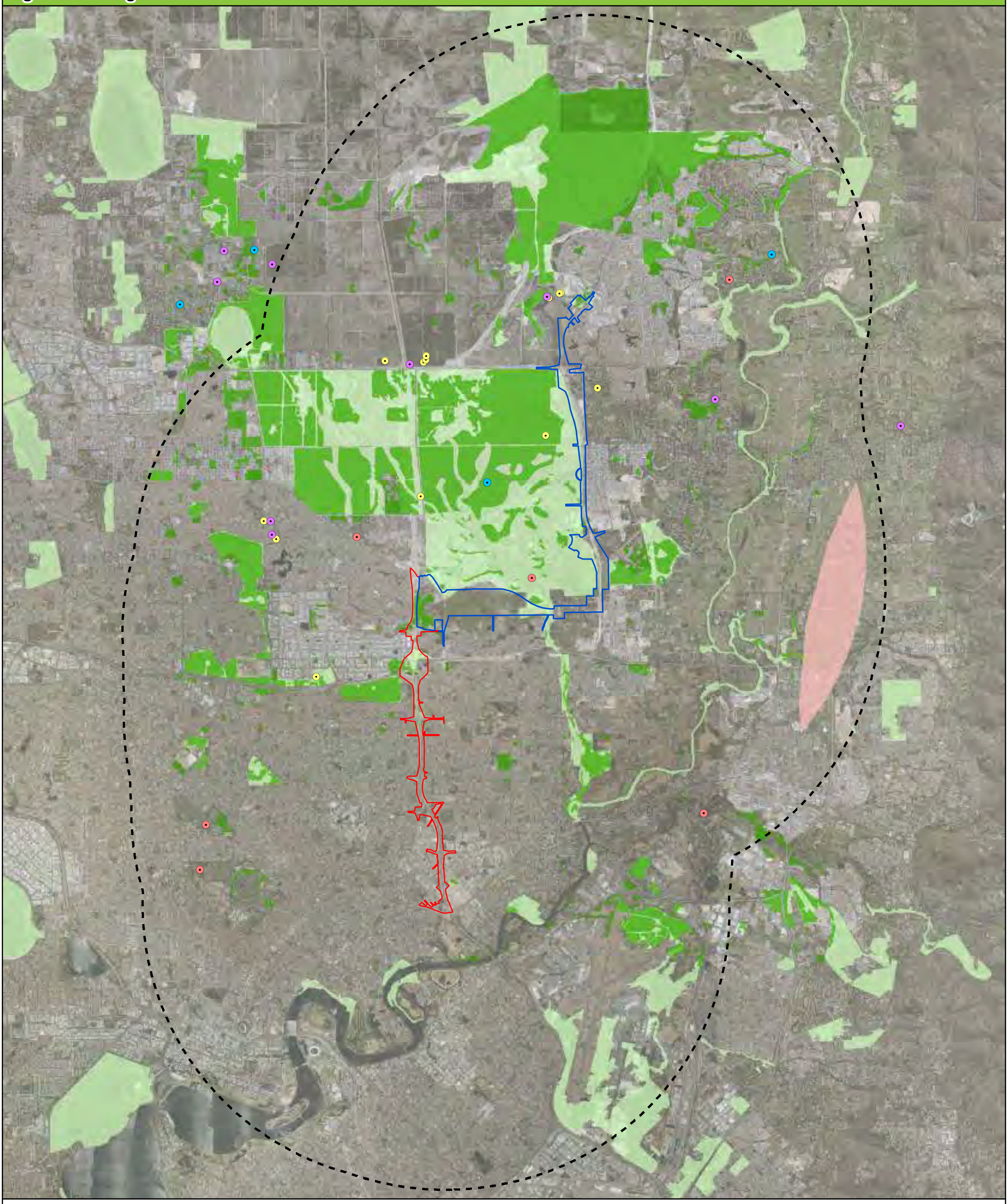
Figure 3.3: Regional Black Cockatoo habitat values



Legend

- Part 1 Study Area - Bayswater to Malaga
- Part 2 Study Area - Malaga to Ellenbrook
- 7km Buffer

Murdoch University (2019)

- Potential Carnaby's Black Cockatoo Roost

Birdlife (2011; 2019 Roost Data)

- Confirmed Forest Red-Tailed Roost
- Confirmed Carnaby's Black Cockatoo Roost
- Confirmed Joint Roost

- Known Breeding Location Buffer (DBCA 2019)
- Potential Black Cockatoo Foraging Habitat (note: requires investigation; DBCA 2019)
- Bush Forever Sites (DPLH 2016)

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Kilometers
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4. Methodology

4.1 Desktop review and likelihood of occurrence

A desktop assessment was undertaken to gather background information on the Study Area at a regional and local scale and to identify all conservation significant fauna potentially occurring within the Study Area. As part of the desktop assessment, the following databases and sources of information were searched and/or reviewed:

- The Australian Government EPBC Act Protected Matters Search Tool (PMST) for Threatened species and communities listed under the EPBC Act (Department of the Environment and Energy 2019a);
- DBCA and WA Museum's NatureMap database (DBCA 2007 – 2019);
- A formal DBCA Threatened Fauna and Species Specific (*Calyptorhynchus*) database search (DBCA 2019)
- A review of the existing survey reports provided in **Table 2-1** in Section 2.

A 20 km buffer around the Study Area was applied for the PMST and NatureMap database searches, and a 7 km buffer applied to the formal DBCA Threatened species and species-specific database searches. These buffers are considered suitable based on fauna assemblages expected to occur within the Study Area. It should be noted that the buffers for the DBCA database searches (i.e. 7 km) are selected by DBCA on a case-by-case basis and are therefore not always consistent with other searches undertaken in the area.

A likelihood of occurrence assessment for conservation significant fauna species (including Threatened and Priority fauna species) identified as possibly occurring from the database searches and previous surveys was undertaken based on the criteria outlined in Appendix B. It should be noted that the database searches returned a number of pelagic and oceanic species, as well as a number of species listed as marine under the EPBC Act. Due to the lack of, and distance away from, marine habitat within the Study Area, oceanic and pelagic species were not considered further, and marine listed species were only considered where they had an additional conservation status (e.g. Endangered).

The likelihood of occurrence assessment for each conservation significant fauna species was initially undertaken prior to the survey and was further refined following the findings of the desktop assessment and subsequent site visits.

4.2 Field survey

The field survey comprised of two components:

- An initial site visit to survey areas of the Study Area that had not previously been surveyed; and
- A second site visit to ground-truth (confirm) areas of the Study Area that had previously been surveyed by other consultants' but where discrepancies or mistakes in data/mapping were identified during the desktop review process.

A Level 1 fauna survey and assessment of foraging, breeding and roosting habitat for black cockatoos was undertaken in accordance with the EPA guidance (EPA 2016a, b) and EPBC Act Referral Guideline

for threatened black cockatoo species (SEWPaC 2012) during both surveys. The methodology was the same for both surveys and is described in further detail below.

4.2.1 Survey team and timing

The survey team's relevant qualifications and experience are provided in **Table 4-1** below. No scientific licences were required for the survey.

The initial survey was undertaken from 12-15 November 2019 by Nicki Thompson (Environmental Scientist/Zoologist), Jeni Morris (Ecologist) and Briana Wingfield (Ecologist; **Table 4-1**). The second, ground-truthing survey was undertaken from 18-21 February 2020 by Jeni Morris and Daniel Marsh (Ecologist; **Table 4-1**). The survey team comprised of a team of ecologists/scientists, all with experience undertaking biological surveys on the Swan Coastal Plain. Nicki and Jeni have over five years' experience in conducting black cockatoo habitat assessments in accordance with the EPBC Act Referral Guideline for threatened black cockatoo species (referral guideline; SEWPaC 2012).

Table 4-1: Survey team

Name	Qualification	Relevant experience
Nicki Thompson	BSc. (Hons) Zoology and Marine Biology	Nicki has over 12 years' experience undertaking fauna surveys across various subregions within WA, and six years' experience conducting black cockatoo habitat assessments across the south west of WA. Examples of fauna surveys and black cockatoo projects that Nicki has worked on include LandCorp Neerabup, City of Wanneroo Neerabup, Bernard Seebar Shenton Park, LandCorp Kemerton, City of Wanneroo Warwick Open Space, Department of Education Butler Reserve, Shire of Kalamunda Ray Owen Reserve, City of Armadale Settlers Common and Forrestfield Complex Reserves, Department of Defence Lancelin and Bindoon Training Areas, and Wungong Recreational Complex.
Jeni Morris	BSc. (Hons) Conservation and Wildlife Biology	Jeni has over five years' experience undertaking fauna, flora and vegetation, and black cockatoo habitat assessments on the Swan Coastal Plain. Jeni has worked on a number of similar projects including LandCorp Kemerton, City of Wanneroo Warwick Open Space, City of Armadale Settlers Common and Forrestfield Complex, Shire of Kalamunda Ray Owen Reserve, City of Joondalup Hepburn Heights, and Department of Defence Bindoon Training Area.
Briana Wingfield	BSc. (Hons) Environmental Science and Conservation and Wildlife Biology	Briana has eight years' experience undertaking level 1, level 2 and targeted fauna surveys in the Pilbara, Goldfields and south-west region of WA. Briana also recently assisted Bamford Consulting with a Level 2 fauna trapping survey in the south-west near Bunbury. Briana has also co-authored a published scientific paper on '*Successional changes in feeding activity by threatened black cockatoos in revegetated mine sites*' (Doherty et. al. 2016).
Daniel Marsh	BSc. (Hons) Environmental Science	Daniel has over eight years' experience conducting biological surveys throughout Western Australia. This includes baseline vegetation studies (reconnaissance and detailed surveys), threatened and priority flora surveys, rehabilitation and vegetation monitoring, targeted species surveys and more recently, black cockatoo habitat assessments.

4.2.2 Level 1 fauna survey

The survey design was aligned with methodology outlined in the EPAs Technical Guidance documents – *Terrestrial Fauna Surveys* (EPA 2016a) and *Sampling Methods for Terrestrial Vertebrate Fauna* (EPA 2016b).

During both the initial survey and follow up ground-truthing survey (collectively referred to as 'the survey' herein), the field team walked transects through the Study Area and undertook the following tasks (**Figure 4-1**, **Figure 4-2** and **Figure 4-3**):

- Described and delineated fauna habitats including:
  - Mapping fauna habitat boundaries;
  - Describing the habitat including floristic species present and suitability for conservation significant fauna; and
  - Taking a photograph of each habitat.
- Recorded opportunistic sightings of any fauna, including any signs of evidence such as calls, scats, tracks, burrows/dens, diggings, feathers, chewed cones etc. Where direct sightings or signs of conservation significant fauna were recorded, the following data was collected:
  - GPS location(s);
  - Estimated number of individuals observed, or estimated age of evidence observed;
  - Photos of individuals (where possible) and/or secondary evidence with a scale bar;
  - Measurements of tracks and groupings (length and width);
  - Habitat condition and signs of disturbance;
  - Time since fire;
  - Associated habitat type / landscape element; and
  - Time and date observed photo and notes (i.e. Quenda digging, BC foraging or direct sighting flying, foraging etc).

During the survey, direct observations of active fauna such as reptiles and birds, including bird calls, were recorded, as well as indirect evidence of species presence such as tracks, diggings, burrows, scats and any other signs of fauna activity. The survey also included a targeted assessment of habitat suitability and searching for signs of conservation significant species and Bush Forever regionally significant species including:

- *Bettongia penicillata* (Woylie);
- Quenda;
- Carnaby's Black Cockatoo;
- Forest Red-tailed Black Cockatoo;
- Baudin's Black Cockatoo;
- Chuditch;
- Black-striped Snake;
- Jewelled Sandplain Ctenotus; and
- Red-winged Fairy Wren.

4.2.3 Black cockatoo habitat assessment

An assessment of potential foraging, breeding and roosting habitat was undertaken in accordance with the referral guidelines for three species of threatened black cockatoo including Carnaby's Cockatoo,

Forest Red-tailed Black Cockatoo, and Baudin's Cockatoo (SEWPaC 2012). The survey focussed on assessing habitat values for all three species of black cockatoo given that the Study Area occurs within the modelled distribution of all three species (SEWPaC 2012).

The assessment including surveying all vegetation and tree species known to represent potential foraging, breeding and/or roosting habitat within the Study Area, as defined below in **Table 4-2**. Evidence of foraging (i.e. chewed Marri nuts, Pine or Banksia cones) and breeding (e.g. chewed hollow marks) were also searched for to identify if the vegetation within the Study Area has previously been or is currently being used by black cockatoos for feeding and/or breeding. Roosting habitat was only assessed in terms of providing suitable roosting habitat, as evidence of roosting can be difficult to confirm other than undertaking multiple night roosting surveys.

Table 4-2: Black cockatoo habitat definitions

Habitat	Description
Foraging habitat	Vegetation that provides food source plants for black cockatoos including Eucalypt woodlands and forest, particularly Jarrah and Marri; native shrubland and kwongan heathland/woodland dominated by proteaceous plant species such as *Banksia* spp., *Hakea* spp. and *Grevillea* spp. Pine plantations, fruit orchards and Cape Lilac also provide suitable foraging for black cockatoos. The specific foraging requirements differ slightly between the three species as described in SEWPaC 2012. However, given that all three species of black cockatoo show a preference for common foraging plants recorded (i.e. Marri, Jarrah and *Allocasaurina* spp.), the quality of foraging habitat for all species throughout the Study Area is considered uniform and has not been separated according to black cockatoo species.
Potential roosting habitat	Suitable tall tree species (as listed in SEWPaC 2012 or by Groom 2011) within or near to riparian environments or other natural or artificial water sources and usually within 6 km of foraging habitat (EPA 2019). It should be noted that it is not possible to confirm the use of roosting habitat outside the period during which black cockatoos are known to occupy the Swan Coastal Plain (typically January to July; EPA 2019). The field survey therefore only identified habitat that could potentially be used for roosting; that is, suitable tall trees within proximity to a suitable water source (<2km).
Known roosting site	A group or larger scattering of trees, where there are records or recent evidence of night roosting.
Potential breeding habitat	Any suitable species of tree (as listed in SEWPaC 2012 or by Groom 2011) with a Diameter at Breast Height (DBH) equal to or greater than 500 mm for Jarrah or Marri, and 300 mm for Wandoo or Salmon Gum.
Known breeding site	Any existing tree in which breeding has been recorded or indirect evidence has been observed (i.e., chewed or scratched hollows).
Suitable nest hollow	Any hollow that has an opening large enough to be suitable for use by black cockatoos (note that ELA have taken a precautionary approach and identified hollows with an entrance diameter over 10 cm that would accommodate Forest Red-tail Black Cockatoo which has a range of 12-41 cm). It should be noted that hollow entrance diameter requirements for each species of black cockatoo are as follows: • Carnaby's Cockatoo – approximately 27 cm (23-30cm; EPA 2019); • Baudin's Cockatoo – approximately 30 (30-40 cm; DEC 2008); and • Forest Red-tailed Black Cockatoo – approximately 30 cm (12–41 cm; DEC 2008).

4.2.3.1 Foraging habitat

Foraging habitat for all three species of black cockatoo was mapped and assessed for quality based on foraging plant species present, extent and density of foraging species, number of feeding strata available (i.e. understorey, mid-storey and/or canopy) and signs of use (defined in **Table 4-3**). It should be noted

that quality of foraging habitat is assessed as it pertains specifically to the value of the habitat to black cockatoos, rather than assessing overall condition as is standard for most other ecological habitat quality surveys (SEWPaC 2012). As with vegetation condition, foraging quality is usually not uniform throughout an entire vegetation association or fauna habitat and, as such, these variations have been accounted for within the assessment. Where habitat quality falls between two scores, a conservative approach was taken and the higher of the two scores has been used (i.e. low to moderate has been assigned as moderate).

To provide additional context in the assessment of foraging habitat quality, foraging habitat was also assessed using the DoEE's foraging habitat quality scoring tool (DoEE 2017; Appendix H). It should be noted that the DoEE foraging quality scoring tool was developed to primarily assist with the EPBC Act Environmental Offsets Policy. The scoring tool is currently still in draft form and is a fairly rudimentary way to assess quality. As such, it has only been used to provide supplementary information and is not the primary methodology used to assess quality.

Table 4-3: Definition of black cockatoo foraging habitat quality

Foraging habitat quality	Justification
High	• Presence of suitable foraging plant species*, including non-native food sources, for black cockatoos at a high density (i.e. foliage cover of suitable species >60%) and presence of preferred food sources at several strata; or • Moderate quality foraging habitat but with evidence of use (i.e. chewed nuts, cones, seeds or flowers).
Moderate	• Presence of suitable foraging plant species, including non-native food sources, for black cockatoos at a low to moderate density (i.e. foliage cover of suitable species 20-40%); and/or • Preferred foraging plant species present at one or two strata (i.e. canopy and mid-storey); or • Lower quality foraging habitat but with evidence of use (i.e. chewed nuts, cones, seeds or flowers).
Low	• Suitable foraging species present but at a low density (i.e. foliage cover of preferred species 10-20%) and presence of food sources at only one stratum (i.e. understorey). • Lack of primary foraging plant species but other suitable foraging species present at a low density.
Nil	• No suitable foraging species present; • Cleared areas.

* Based on the list of suitable foraging plants collated from the following sources: Groom 2011, Johnstone et al. 2011, SEWPaC 2012, Heydenrych 2012 and Lee et al. 2013.

4.2.3.2 Potential breeding and roosting habitat

The Study Area occurs within the known breeding range of all three species of black cockatoo (DoEE 2017). Large trees within the Study Area were assessed for their suitability to provide potential breeding and/or roosting habitat for all three species of black cockatoo. Potential breeding trees are defined as trees of suitable species with a diameter at breast height (DBH) greater than 500 millimetres (mm; > 300 mm for salmon gum and wandoo; SEWPaC 2012; **Table 4-2**). Trees with a DBH greater than 500 mm (or >300 mm for salmon gum and wandoo) are large enough to form hollows which can provide suitable nesting habitat for black cockatoos or which have the potential to develop suitable nesting hollows within 50 years (SEWPaC 2012; EPA 2019). All potential breeding trees with a DBH of 500 mm or greater

encountered within the Study Area were recorded and mapped (note that Salmon Gum and Wandoo are not present in the Study Area and so DBH of 500 mm was used to assess trees). Each suitable breeding tree was also visually assessed from the ground for the presence of hollows. Where hollows were observed, they were assessed for their suitability in providing appropriate nesting habitat for each species of black cockatoo (i.e. opening dimension >10 cm; **Table 4-2**) and any signs of use (i.e. chew marks, individuals inspecting hollows, feathers) either visually or using binoculars. It should be noted that there are other factors that may affect the suitability of a nest hollow for black cockatoos including angle and depth. These other factors were not assessed during this survey. Given that the SEWPaC guidelines (2012), and the more recent draft revised guidelines (DoEE 2017), both state that '*measurements of the diameter at breast height of trees in the patch of woodland/forest must be made to determine whether the habitat meets the definition of 'breeding habitat*', as assessment of DBH size alone determined whether habitat represents potential breeding habitat. Hollow suitability was assessed to determine whether birds are utilising the hollows for breeding and also to provide additional context.

Potential breeding trees may also provide suitable roosting habitat (i.e. tall trees that provide a roost or rest area for the birds; **Table 4-2**; EPA 2019); however, any tall tree (i.e. over 6 m), with or without a large DBH, was assessed for its ability to provide suitable roosting habitat.

4.2.4 Taxonomy and nomenclature

Nomenclature used for the vertebrate fauna species within this report follows the Western Australian Museum (WAM) Checklist of the Vertebrates of Western Australia (WAM 2019). Where common names were not stated for certain species, the following references were also consulted:

- Amphibians and reptiles: Bush et al. (2010);
- Reptiles: Wilson and Swan (2013);
- Birds: Simpson and Day (2010); and
- Mammals: Menkhorst and Knight (2011).

4.2.5 Survey limitations

The EPA technical guide for terrestrial fauna surveys (EPA 2016a) recommends including a discussion of the constraints and limitations of the survey methods used. An assessment of potential constraints and limitations of this survey and combined previous surveys are summarised in **Table 4-4** below. One minor constraint regarding access was identified.

Table 4-4: Survey limitations

Constraint	Limitations
Sources of information	**Not a constraint:** The Swan Coastal Plain has been extensively surveyed, with increasing survey work occurring due to ongoing urban development across the Perth metropolitan area. Numerous fauna surveys and black cockatoo habitat assessments have been undertaken in the wider area. Database searches provided adequate information about Threatened and Priority fauna. The information which was available was adequate and as such sources of information were not considered a major limitation.
Scope of work	**Not a constraint:** The survey requirements for a Level 1 fauna survey in accordance with the EPA *Technical Guidance: Terrestrial fauna surveys* (EPA 2016a) was adequately met

Constraint	Limitations
	as the survey included a desktop study, site visit and review/compilation of all previous survey reports to map fauna habitats and assemblages across the entire Study Area (refer to Section 4.2.2). The survey requirement for a black cockatoo habitat assessment in accordance with SEWPaC referral guidelines (SEWPaC 2012) were also adequately met (refer to Section 4.2.3). Any gaps or potential limitations identified in previous surveys were adequately addressed during this assessment during site visits and the follow up ground-truthing survey.
Completeness of survey	**Not a constraint:** The combination of previous surveys undertaken for the MEL project as well as the current survey have resulted in a complete fauna and black cockatoo habitat dataset being mapped for the entire Study Area that complies with all relevant guidelines. The entire Study Area has been surveyed to the satisfaction of the scope as per the relevant guidelines. The current survey filled in any gap areas or areas that were had not previously been surveyed due to changes in Study Area boundaries or accessibility issues, in accordance with all relevant guidelines. Areas that could not be accessed (i.e. private property) were surveyed from the fence-line and so black cockatoo habitat values, fauna habitats and fauna assemblage were still recorded in these areas (see accessibility below).
Intensity of survey	**Not a constraint**: The survey effort is considered adequate for the scope of works and in accordance with the relevant guidance. Given that the Swan Coastal Plain has been well surveyed, a Level 2 fauna survey was not considered necessary. A Level 1 survey was sufficient to determine the fauna habitats present and likelihood of any potential conservation significant fauna that may occur.
Timing, weather, season, cycle	**Not a constraint:** The Study Area is located in the Swan Coastal Plain bioregion of Western Australia. Recommended survey timing for fauna surveys in this region is in spring (September – November; EPA 2016a). The initial field survey was undertaken in mid-November. The timing was appropriate for conducting this level of survey. The follow up, ground-truthing survey was undertaken in February; however, the main purpose of this follow up survey was to re-map fauna habitats and black cockatoo habitat, rather than recording fauna assemblages (although records were taken opportunistically). The timing of the ground-truthing survey is therefore not a constraint, despite being undertaken outside the recommended time of year. Black cockatoo habitat assessments can be undertaken any time of year (SEWPaC 2012); however, black cockatoos tend to be present in higher numbers on the Swan Coastal Plain between January to July (EPA 2019). The follow-up survey was undertaken in February and so the chances of detecting black cockatoos was maximised. The initial survey was undertaken in November to coincide with the recommended timing of a Level 1 fauna survey. Whilst this timing is outside the peak period for black cockatoos, both Carnaby's and Forest Red-tailed Black Cockatoos were directly observed during the survey, in addition to numerous records of foraging evidence. The survey timing is therefore not considered to be a constraint.
Disturbances	**Not a constraint:** Disturbances were prevalent across the Study Area and included the presence of weeds, rubbish dumping, grazing by cattle and rabbits, clearing and recent fires. These disturbances did not negatively impact the ability to meet objectives outlined in the scope of works.
Resources	**Not a constraint:** The personnel that conducted the field survey were all suitably qualified to identify specimens having previously undertaken numerous fauna and black cockatoo surveys on the Swan Coastal Plain (refer to Section 4.2.1).
Accessibility	**Minor constraint:** There were accessibility issues around some of the private lots around Bennett Springs. Where property could not be accessed, the Level 1 fauna survey and

Constraint	Limitations
	black cockatoo habitat assessment was conducted from the fence line/roadside. Whilst most data would be successfully captured from the fence line, signs of use would have been difficult to observe. This was only an issue around two private properties at Bennett Springs and only represents a minor constraint.

The black cockatoo habitat assessment was undertaken in accordance with the EPBC Act referral guideline (SEWPaC 2012). There were no limitations to this component of the survey as summarised in **Table 4-5**.

Table 4-5: Summary of survey compliance with black cockatoo referral guidelines

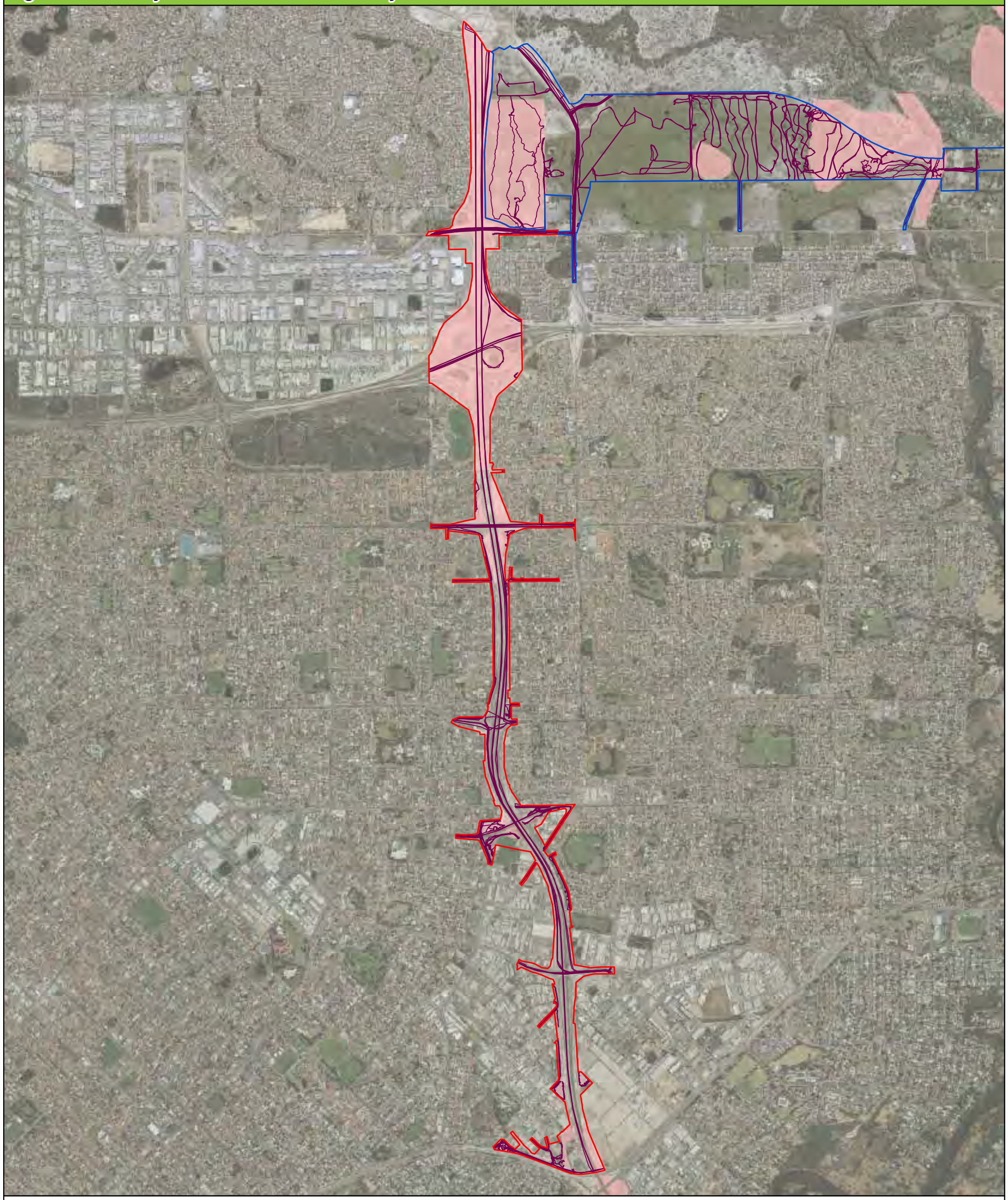
Referral guideline recommendation	Compliant	Justification
Surveys should be done by a suitably qualified person with experience in vegetation or cockatoo surveys, depending on the type of survey being undertaken.	Yes	The survey was undertaken by three ecologists, two of whom have over three years' experience conducting habitat assessments for black cockatoos (refer to Section 4.2.1).
Survey should maximise the chance of detecting the species' habitat and/or signs of use.	Yes	The initial survey was undertaken in November 2019 and the ground-truthing survey undertaken in February 2020. November and February are both times of the year when black cockatoos frequent the Swan Coastal Plain (EPA 2019). Direct sightings of black cockatoos as well as evidence in the form of foraging evidence and feathers were observed during the survey, indicating that the survey did succeed in maximising species detection.
Survey should determine the context of the site within the broader landscape—for example, the amount and quality of habitat nearby and in the local region (for example, within 10 km).	Yes	The context of the habitats available within the Study Area have been considered at a broader level and are discussed further in Section 3 and Section 7.
Survey should account for uncertainty and error (false presence and absences).	N/A	This recommendation refers to individual bird counts where presence/absence data is collected and is not applicable to this type of habitat assessment.
Survey should include collation of existing data on known locations of breeding and feeding birds and night roost locations.	Yes	Data has been obtained from a DBCA Threatened Fauna and Species-Specific (*Calyptorhynchus*) database search (DBCA 2019a) and data obtained from Birdlife Australia showing previous records including known roosting and breeding sites (Birdlife 2019). In addition, a detailed desktop review incorporating previous surveys, online DBCA data, the Great Cocky Count and numerous other sources of information have been reviewed and are described further in this report.
Survey should assess the extent, type and quality of the vegetation present, including the presence and extent of plants known to be used by the black cockatoos.	Yes	Foraging habitat was delineated and mapped in the field and a list of vegetation present has been complied (refer to Section 5.3 and Section 6.2).
In potential breeding habitat, measurements of the diameter at breast height of trees in the patch of	Yes	Potential breeding trees are defined as trees of suitable species with a DBH over 500 mm. Trees were

Referral guideline recommendation	Compliant	Justification
woodland/forest must be made to determine whether the habitat meets the definition of 'breeding habitat'.		measured for DBH in the field, and where the DBH was over 500 mm these trees were recorded and signs of use/hollows were observed (refer to Section 4.2.3).
Search for signs of use by black cockatoos (e.g. suitable nest hollows, feeding signs or feeding debris, and sighting records).	Yes	The field survey involved walking transects through areas searching for signs of use. In addition, where hollows were observed, chew marks and other signs of use were searched for using binoculars. Foraging evidence in the form of chewed Marri nuts, Banksia and pinecones, and feathers were observed at a number of locations, as well as direct observations of birds foraging.
Signs of use should be identified by a person with at least three years' experience surveying for black cockatoos.	Yes	Two of the ecologists involved in the field surveys have over 3 years' experience in conducting black cockatoo habitat assessments (refer to Section 4.2.1).

4.3 Data consolidation

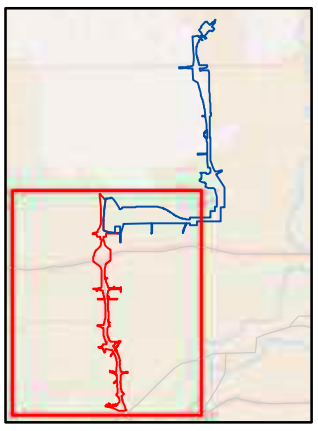
Data from previous surveys as well as the current survey was consolidated to provide a single, comprehensive mapping layer for the entire Study Area. Given that historically there have been numerous surveys undertaken by different consultants, the data had to be collated and refined in order to provide an up-to-date and accurate description of the fauna and black cockatoo values of the Study Area. All previously collected data was provided to ELA by PTA. ELA combined the data, and where required refined and updated the fauna habitat mapping based on up-to-date aerial imagery and on ground field surveys. Where gaps in data or inconsistencies in data existed, these values were ground-truthed (validated or confirmed) by ELA during the follow-up ground-truthing survey undertaken in February 2020. It should be noted that some areas of the Study Area have been cleared or modified since the timing of the previous surveys undertaken (i.e. before 2017). As such, some of the fauna habitats mapped in previous years are either no longer present or are highly modified. Whilst ELA have tried to adhere to the naming conventions used by previous consultants, in some instances the naming has been changed or combined to more accurately reflect the current status of the fauna habitats that occur over the Study Area. The combined survey results and fauna values for the entire Study Area are provided in Section 6.

Figure 4.1: Survey effort in Part 1 of the Study Area



Legend

- Part 1 Study Area - Bayswater to Malaga
- Part 2 Study Area - Malaga to Ellenbrook
- Indicative Survey Effort
- Previously surveyed by other consultants



0 0.25 0.5 1

Kilometers

Datum/Projection:
GDA 1994 MGA Zone 56

N

ecological AUSTRALIA

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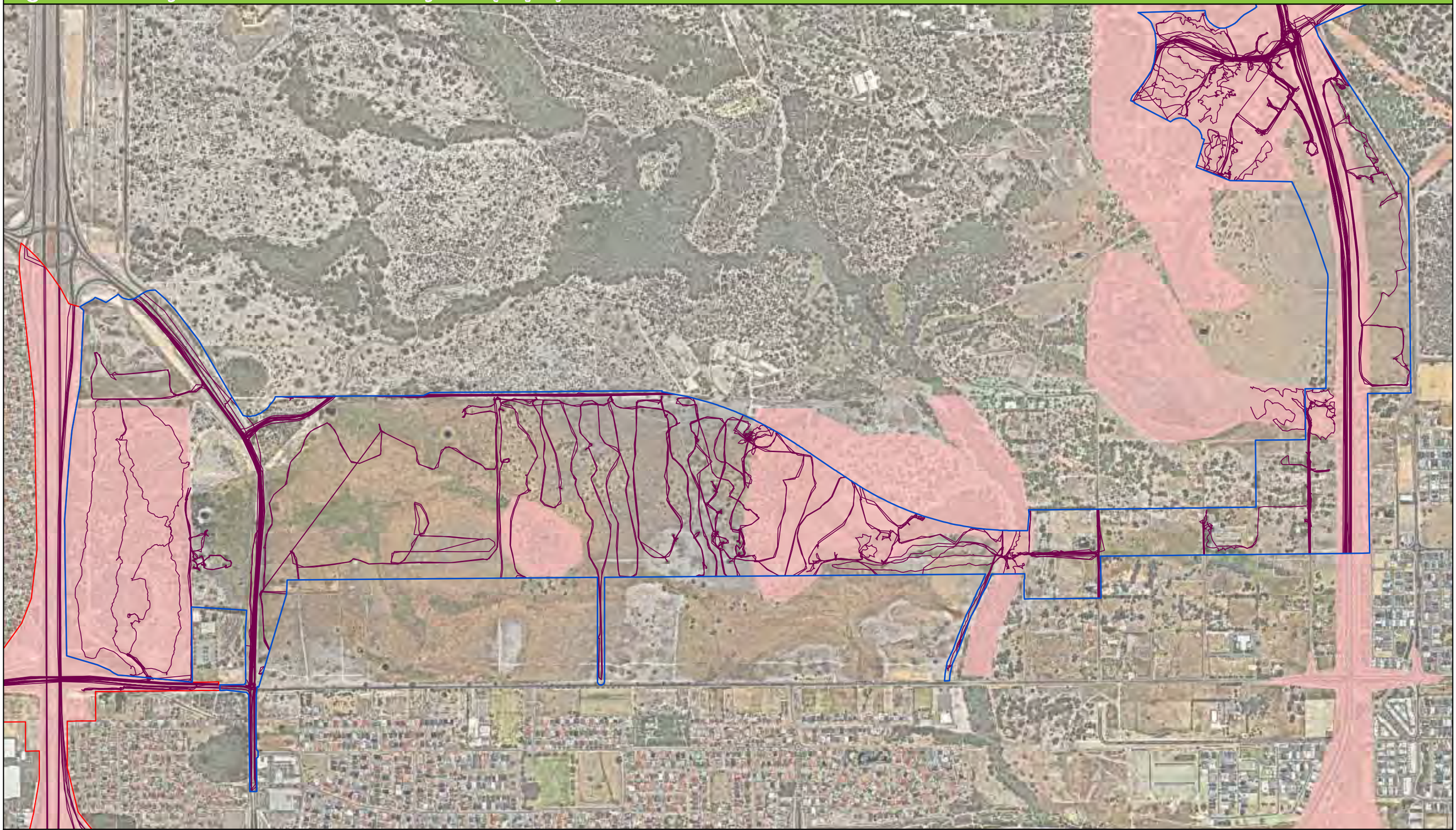
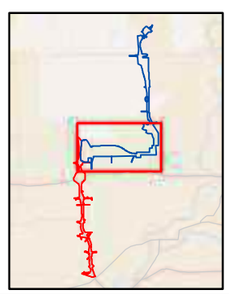
Prepared by: GM Date:29/04/2020

Figure 4.2: Survey effort in Part 2 of the Study Area (Map A)



Legend

- Part 1 Study Area - Bayswater to Malaga
- Part 2 Study Area - Malaga to Ellenbrook
- Indicative Survey Effort
- Previously surveyed by other consultants



0 125 250 500

Metres

Datum/Projection:
GDA 1994 MGA Zone 56

N

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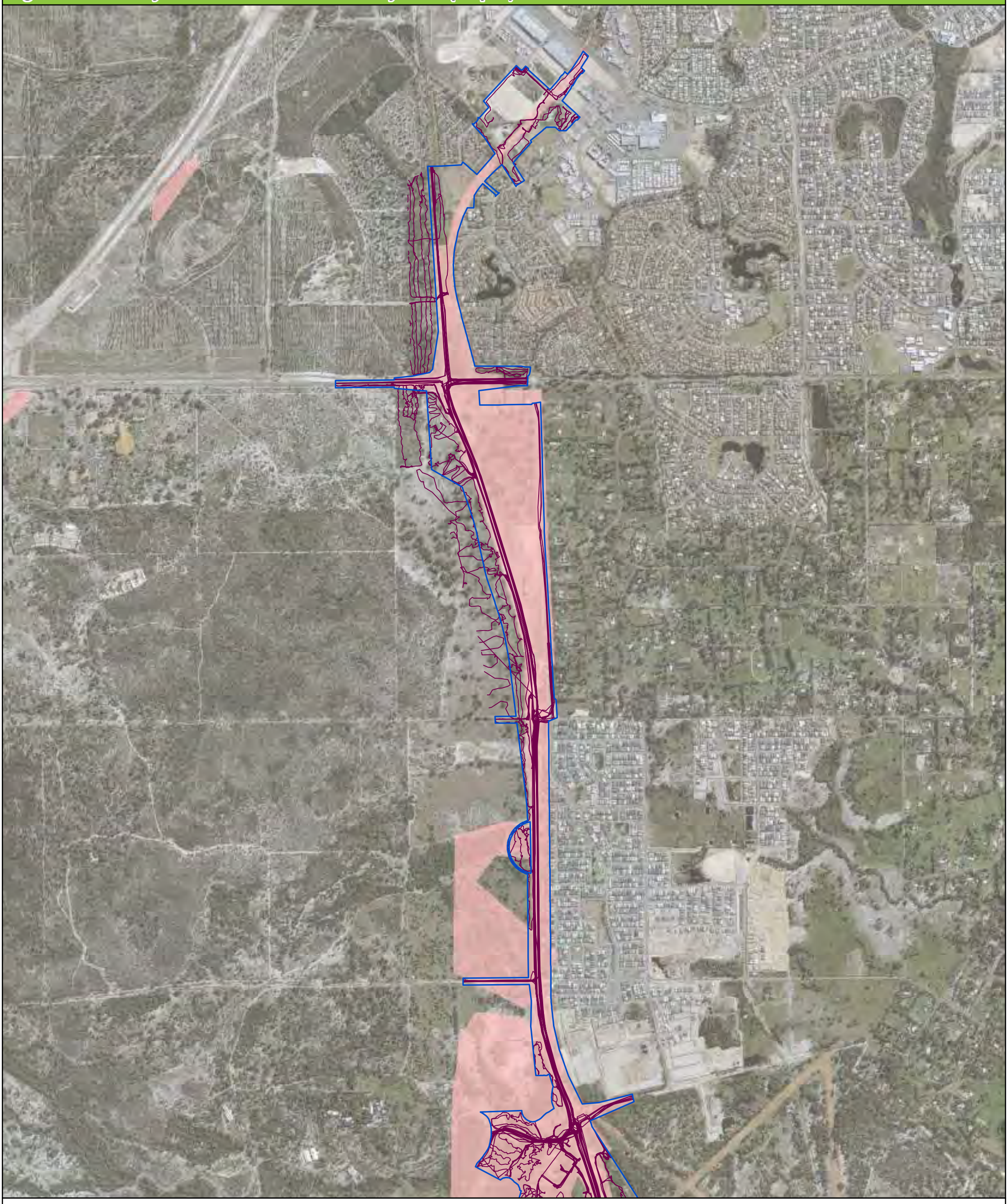
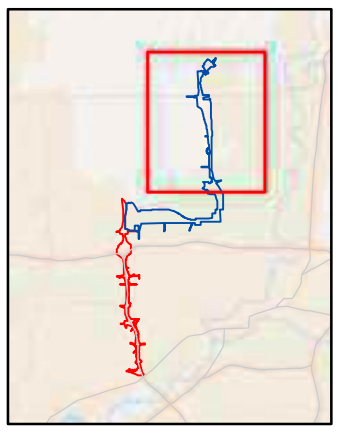
Prepared by: GM Date: 29/04/2020

Figure 4.3: Survey effort in Part 2 of the Study Area (Map B)



Legend

- Part 2 Study Area - Malaga to Ellenbrook
- Indicative Survey Effort
- Previously surveyed by other consultants



0 150 300 600

Metres

Datum/Projection:
GDA 1994 MGA Zone 56

N

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Prepared by: GM Date:29/04/2020

5. Results

The following section outlines the results of the current survey (both the initial survey and follow-up ground-truthing survey). The desktop review results include results for the entire Study Area whereas the survey results include the results of the current survey only (i.e. the unsurveyed sections of the Study Area only). The combined terrestrial fauna and black cockatoo results and values (i.e. combined results from the current and previous surveys) covering the entire Study Area have been consolidated and are provided in Section 6.

5.1 Desktop review and likelihood of occurrence assessment

A total of 24 fauna species of conservation significance were identified as possibly occurring within the Study Area based on database searches and previous surveys (Appendix C). It should be noted that shorebirds, oceanic and/or pelagic species identified in the database searches have been excluded from this assessment given the distance from, and lack of, marine habitat within the Study Area (Appendix B and Appendix D). In addition, species that are considered locally extinct and aquatic species have also been excluded (i.e. *Setonix brachyurus* [Quokka], *Macrotis lagotis* [Bilby] and *Galaxiella nigrostriatal* [Black-striped Minnow]).

Of the 24 conservation significant species identified from the database searches and desktop review, 11 species have either been recorded or have the potential to occur within the Study Area (**Table 5-1** and Appendix D). This is based on nearby species records, species' ecology, habitat preferences, and availability of suitable habitat. The remaining 13 conservation significant fauna species were considered unlikely to occur (Appendix D).

The 11 species of conservation significance recorded or having the potential to occur within the Study Area are summarised below in **Table 5-1** and are discussed in terms of the respective parts of the Study Area below. More detailed information on the likelihood of occurrence assessment is provided in Appendix D. Species profiles for recorded and potentially occurring species are provided in Section 6.1.3.

Table 5-1: Summary of conservation significant fauna likelihood of occurrence within Part 1 and Part 2 of the Study Area

Species	Common name	Conservation status*		Likelihood of occurrence	
		EPBC Act	BC Act /DBCA	Part 1	Part 2
Calyptorhynchus latirostris	Carnaby's Cockatoo	EN	EN (S2)	Recorded	Recorded
Calyptorhynchus baudinii	Baudin's Cockatoo	EN	VU (S3)	Unlikely	Potential (vagrant)
Calyptorhynchus banksii naso	Forest Red-tailed Black Cockatoo	VU	VU (S3)	Recorded	Recorded
Merops ornatus	Rainbow Bee-eater	Marine	-	Potential	Recorded
Macropus irma	Western Brush Wallaby	-	P4	Unlikely	Potential
Isoodon fusciventer	Quenda	-	P4	Unlikely	Recorded
Hydromys chrysogaster	Water Rat, Rakali	-	P4	Unlikely	Potential
Neelaps calonotos	Black-striped Snake	-	P3	Unlikely	Potential

Species	Common name	Conservation status*		Likelihood of occurrence	
		EPBC Act	BC Act /DBCA	Part 1	Part 2
Ctenotus gemmula	Jewelled Sandplain Ctenotus	-	P3	Unlikely	Potential
Falco peregrinus	*Peregrine Falcon*	-	OS (S5)	Potential (vagrant)	Potential (vagrant)
Malurus elegans	Red-winged Fairy Wren	Not listed	Not listed	Unlikely	Potential

* Definition of conservation status codes are provided in Appendix A.

5.1.1 Part 1 Bayswater to Malaga

Two species of conservation significance have previously been recorded in Part 1 of the Study Area including (**Table 5-1**; Appendix D):

- Carnaby's Cockatoo – listed as Endangered under the EPBC Act and as Endangered under Schedule 2 of the BC Act; and
- Forest Red-tailed Black Cockatoo – listed as Vulnerable under the EPBC Act and Schedule 3 of the BC Act.

Carnaby's Cockatoo has previously been recorded in Part 1 of the Study Area by GHD (2014) and DBCA (2019). The species was directly observed flying over the Study Area by GHD in 2014, whereas the DBCA database show records of Carnaby's Cockatoo foraging within the Mixed *Eucalyptus*/*Corymbia* woodland habitat adjacent to Wotton Reserve, as well as a number of recent and historical records of the species within and in close proximity to Part 1 of the Study Area (DBCA 2019). This indicates that the species is utilising Part 1 of the Study Area, at least for foraging.

The Forest Red-tailed Black Cockatoo has also previously been recorded in Part 1 of the Study Area during the GHD survey in 2014, as well as the 360 Environmental survey in 2013 (GHD 2014; 360 Environmental 2013). This species was also recorded foraging in Part 1 of the Study Area during the current survey (refer to Sections 5.2.2 and 5.2.3). In addition, there are numerous records of foraging evidence in the form of chewed Marri nuts located throughout Part 1 of the Study Area, indicating that the species is utilising the habitats present within Part 1 of the Study Area for foraging.

Two additional conservation significant species have the potential to occur in Part 1 of the Study Area, given the proximity of nearby records and availability of suitable habitat (**Table 5-1**; Appendix D):

- *Merops ornatus* (Rainbow Bee-eater) - listed as marine under the EPBC Act; and
- *Falco peregrinus* (Peregrine Falcon) – listed as Other Specially (OS) Protected Fauna under Schedule 5 of the BC Act.

Species profiles for the above-mentioned conservation significant fauna are provided in Section 6.1.3.

5.1.2 Part 2 Malaga to Ellenbrook

Four species of conservation significance have previously been recorded in Part 2 of the Study Area including (**Table 5-1**; Appendix D):

- Carnaby's Cockatoo;
- Forest Red-tailed Black Cockatoo;
- Rainbow Bee-eater;
- Quenda – listed as a Priority (P) 4 species by DBCA.

Carnaby's Cockatoo has previously been recorded in numerous locations across Part 2 of the Study Area, either through direct observations or indirect recordings of evidence (Terrestrial Ecosystems 2018; Coffey 2015a). There are an additional nine records of the species in Part 2 of the Study Area, as well as numerous records within 1 km of Part 2 of the Study Area from the DBCA database (DBCA 2019). This species was also recorded during the current survey from direct sightings as well as numerous records of foraging evidence in the form of chewed Marri nuts, Pine cones and Banksia cones indicating that the species is utilising Part 2 of the Study Area for foraging (refer to Sections 5.2.2 and 5.2.3).

The Forest Red-tailed Black Cockatoo has previously been recorded within Part 2 of the Study Area during a number of previous surveys (Terrestrial Ecosystems 2018; AECOM 2016; and Coffey 2015a). This species was also recorded during the current survey from direct sightings as well as numerous records of foraging evidence in the form of chewed Marri nuts, indicating that the species is utilising the Marri trees present within Part 2 of the Study Area for foraging (refer to Sections 5.2.2 and 5.2.3).

The Rainbow Bee-eater has previously been recorded in Part 2 of the Study Area (AECOM 2016). This species was also recorded during the current survey where it was observed nesting and foraging, indicating that the Study Area provides suitable breeding and foraging habitat for this species (refer to Section 6.1.3).

Quenda have previously been recorded within 200 m of Part 2 of the Study Area during previous surveys (AECOM 2016; WRM 2019). There is one Quenda record from inside Part 2 of the Study Area, adjacent to Bush Forever Site 200 (DBCA 2019). In addition, potential Quenda diggings were observed during the current survey (refer to Section 5.2.3 and Section 6.1.3).

A further six conservation significant fauna species have the potential to occur in Part 2 of the Study Area based on proximity of nearby records and availability of suitable habitat including (**Table 5-1**; Appendix D):

- Baudin's Cockatoo (vagrant) – listed as Endangered under the EPBC Act and as Endangered under Schedule 2 of the BC Act;
- *Macropus irma* (Western Brush Wallaby) – listed as a Priority (P) 4 species by DBCA;
- *Hydromys chrysogaster* (Water Rat, Rakali) – listed as a P4 species by DBCA;
- Black-striped Snake – listed as a P3 species by DBCA;
- Jewelled Sandplain Ctenotus – listed as a P3 species by DBCA; and
- Peregrine Falcon – listed as OS under Schedule 5 of the BC Act.

In addition to the above listed species, *Malurus elegens* (Red-winged Fairy Wren), which is not listed under either the EPBC or BC Act but is considered as regionally significant under Bush Forever

(Government of Western Australia 2000), is considered to potentially occur in Part 2 of the Study Area given the availability of suitable habitat (i.e. woodlands and forests).

Species profiles for the above-mentioned conservation significant fauna are provided in Section 6.1.3.

5.2 Level 1 fauna survey

5.2.1 Fauna habitats

A total of 15 broad fauna habitat types were mapped within the Study Area during the survey including (Appendix F; refer to Section 6.1.1):

- *Banksia* Woodland;
- Mixed *Banksia*/*Eucalyptus*/*Corymbia Woodland*
- Mixed *Eucalyptus*/*Corymbia* Woodland;
- Flooded Gum Woodland;
- Paperbark Woodland;
- Wetland/Watercourse
- Shrubland;
- Pine Plantation;
- Scattered Trees/Shrubs;
- Paddock with *Eucalyptus*/*Corymbia*;
- Paddock with Melaleuca;
- Constructed Wetland/Drainage;
- Modified Vegetation;
- Parkland Cleared; and
- Cleared Paddocks.

The habitats recorded varied in condition from Completely Degraded to Very Good. The fauna habitats mapped were consistent with previously mapped fauna habitats, many of which have been heavily impacted from prior clearing, urban development, weeds, grazing and rubbish (360 Environmental 2014; Coffey 2014; GDH 2014; AECOM 2016; Terrestrial Ecosystems 2018; Focussed Vision 2019).

Fauna habitats across the entire Study Area have been consolidated and are described in further detail in Section 6.1.1. Fauna habitat figures are provided in Section 6.1.

5.2.2 Fauna species

A total of 46 fauna species were recorded during the survey, either through direct observation or from indirect signs of evidence (e.g. foraging evidence, tracks, scats, dens/burrows). This comprised 35 birds (32 native and three non-native), six mammals (two native and four introduced) and five reptiles (all native; Appendix E). Photos of fauna recorded during the survey are provided in Appendix G.

A full description of the fauna assemblages over the entire Study Area is provided in Section 6.1.2.

5.2.2.1 Part 1 Bayswater to Malaga

Fauna species recorded in Part 1 of the Study Area mostly comprised of birds and one non-native mammal *Felis catus* (Cat). No native mammals or reptiles were recorded in Part 1 during the survey.

One conservation significant bird species was recorded during the survey – the Forest Red-tailed Black Cockatoo (refer to Section 5.2.3).

5.2.2.2 Part 2 Malaga to Ellenbrook

The fauna assemblage of Part 2 of the Study Area was much more diverse than Part 1. Native mammals, birds and reptiles were recorded in this part of the Study Area during the current survey including four conservation significant species (refer to Section 5.2.3). This is likely due to the higher number of fauna habitats and greater connectivity present within Part 2 of the Study Area.

5.2.3 Conservation significant fauna

A total of four species of conservation significant fauna were recorded during the survey including (Appendix E):

- Carnaby's Black Cockatoo;
- Forest Red-tailed Black Cockatoo;
- Quenda;
- Rainbow Bee-eater.

A further seven conservation significant terrestrial fauna species were identified from the desktop assessment as either likely or have the potential to occur within the Study Area (refer to Section 5.1).

All conservation significant fauna recorded, likely or with potential to occur in the Study Area are described in further detail in Section 6.1.3 and Appendix D. Maps showing conservation significant fauna locations are provided in in Section 6.1.

5.2.3.1 Part 1 Bayswater to Malaga

Two Forest Red-tailed Black Cockatoos were observed resting in the 'Scattered trees/shrubs' habitat within Part 1 of the Study Area during the survey (refer to Section 5.3). Foraging evidence in the form of chewed Marri nuts was also observed in this same location, as well as in the Mixed *Banksia/Eucalyptus/Corymbia* Woodland habitat just south of the Reid Highway Interchange (refer to Section 5.3). No other conservation significant fauna species were recorded in Part 1 of the Study Area during the survey.

5.2.3.2 Part 2 Malaga to Ellenbrook

Both Carnaby's Cockatoo and Forest Red-tailed Black Cockatoos were observed flying over the Study Area and foraging in the Paddocks with *Eucalyptus/Corymbia* habitat in Part 2 of the Study Area during the survey. Foraging evidence from both species in the form of chewed Marri nuts, chewed Pine cones and chewed Banksia infructescences was also observed throughout Part 2 of the Study Area and mainly occurred in the *Banksia* Woodland, Pine Plantation, Mixed *Eucalyptus*/*Corymbia* Woodland and Paddocks with *Eucalyptus*/*Corymbia* fauna habitats (refer to Section 5.3).

In addition, two potential Quenda diggings were recorded during the survey. One was located in the *Banksia* Woodland habitat south west of Gnangara Road, located outside but within 100 m of the Study Area, and the other one was located in the Flooded Gum Woodland habitat just north of Bennett Springs.

The Rainbow Bee-eater was also observed in two locations in Part 2 of the Study Area. The species was observed nesting in a sandy embankment in the Modified Vegetation habitat in Ellenbrook, and also observed foraging in the Paddock with *Eucalyptus*/*Corymbia* habitat west of Drumpellier Drive.

5.2.4 Introduced fauna

Five introduced species were recorded within the Study Area during the survey including the domestic Cat, *Canis lupis* (Dog), *Bos taurus* (European cattle), *Oryctolagus cuniculus* (European Rabbit), *Vulpes vulpes* (Fox) and **Trichoglossus moluccanus* (Rainbow Lorikeet) (Appendix E). The Rainbow Lorikeet, Cat, Fox and Rabbit are all listed as Declared Pests under the *Biosecurity and Agriculture Management Act 2007* (BAM Act).

5.3 Black cockatoo habitat assessment

5.3.1 Foraging habitat

Suitable foraging habitat for all three species of black cockatoo was recorded throughout the Study Area during the survey and was mostly associated with the following fauna habitats (refer to Section 6.2):

- *Banksia* woodland;
- Mixed *Banksia*/ and Mixed *Eucalyptus*/*Corymbia* woodlands;
- Pine plantation;
- Scattered trees / shrubs; and
- Paddock with *Eucalyptus/Corymbia*.

The *Banksia* Woodland and Pine Plantation habitats provide suitable foraging habitat for Carnaby's Cockatoo, and to a lesser extent Baudin's Black Cockatoo, whereas the other fauna habitats provide suitable foraging habitat for all three species of black cockatoo. Common foraging species recorded during the survey included *Allocasuarina fraseriana*, *Banksia attenuata*, *Banksia menziesii*, *Corymbia calophylla*, *Eucalyptus camaldulensis*, *Eucalyptus rudis*, *Pinus* spp. and *Xanthorrhoea preissii*. Preferred foraging plant species for black cockatoos recorded during the current survey as well as in previous surveys have been combined to provide one complete dataset (Focused Vision 2019; Terrestrial Ecosystems 2018; AECOM 2016; Coffey 2014; 2015, GHD 2014; 2019, and 360 Environmental 2014). A full list of preferred foraging species for black cockatoos present across the entire Study Area is provided in Section 6.2.1.

Foraging habitat recorded during the survey, as well as foraging habitat previously mapped, was assessed for quality based on the criteria set out in Section 4.2.3. These results have been consolidated with previous mapping and are described in further detail in Section 6.2.1.

Both Forest Red-tailed Black Cockatoo and Carnaby's Cockatoo were directly observed foraging within the Study Area during the survey (**Plate 1**; refer to Section 6.2). Forest Red-tailed Black Cockatoos were directly observed foraging in the 'Scattered trees/shrubs' habitat in the central portion of Part 1 of the Study Area and in the Marri trees present within the northern section of Part 2 of the Study Area (refer to Section 6.2). Carnaby's Cockatoos were also observed foraging in the Marri trees in the north eastern section of Part 2 of the Study Area during the survey (refer to Section 6.2).

Foraging evidence in the form of chewed Marri nuts (**Plate 1**), and chewed pine cones and Banksia infructescences (likely used by Carnaby's Black Cockatoo [**Plate 2**]) were recorded at 88 locations throughout the Study Area in both Parts 1 and 2 (refer to Section 6.2; Appendix I).

Plate 1: Chewed Marri nuts* and a Forest Red-tailed Black Cockatoo recorded within the Study Area
* Green Marri nuts (fresh evidence), brown gumnuts (recent evidence <1 year), grey gumnuts (old evidence >2 years).

Plate 2: Chewed pinecones (left) and chewed Banksia infructescence (right)

5.3.2 Potential breeding and roosting habitat

A total of 787 potential breeding trees were recorded during the current survey (Appendix J). This included 96 potential breeding trees in Part 1 of the Study Area, 544 potential breeding trees in Part 2 of the Study Area and an additional 167 potential breeding trees mapped in areas outside the Study Area (refer to Section 6.2). Of the 787 potential breeding trees recorded during the current survey, 39 had hollows suitable for nesting black cockatoos. Twenty-seven suitable hollows were present within Part 2 of the Study Area and 12 suitable hollows were present in areas outside the Study Area. There were no suitable hollows recorded in Part 1 of the Study Area during the survey. No evidence of black cockatoos breeding (i.e. chew marks around hollows or individual birds inspecting hollows) was observed in any of the hollows during the survey.

Potential breeding trees comprised mostly of Marri and Flooded Gum; however, some Jarrah, Tuarts and a number of introduced Eucalypt species with DBH over 500 mm were also recorded (Appendix J).

Most of the potential breeding trees recorded also provide suitable roosting habitat for all three species of black cockatoo. In addition, a number of tree species that are suitable for roosting but not for breeding were also recorded throughout the Study Area and include the Pine Plantations (*Pinus* spp.) and introduced/planted Eucalyptus species such as *Eucalyptus citriodora* (Lemon Scented Gum; Groom 2011; Johnstone et al. 2011; Appendix J).

Potential breeding and roosting habitat has been consolidated for the entire Study Area and is described in further detail in Section 6.2.1. It should be noted that clearing has occurred since the time of survey, particularly around Whiteman Park. The combined data in Section 6.2.1 has accounted for clearing and removed any cleared trees from the dataset.

6. Combined terrestrial fauna and black cockatoo values

The following section outlines the terrestrial fauna and black cockatoo values of the entire Study Area and includes the consolidated results of historic studies as well as the current survey.

6.1 Terrestrial fauna

6.1.1 Fauna habitats

Fauna habitat mapping has been compiled for the entire Study Area. Approximately 297.0 ha (42%) of the Study Area is already cleared or comprises existing infrastructure. The remaining 409.1 ha (58.%) contains native and non-native vegetation that has been mapped into 16 broad fauna habitat types (Appendix F; **Table 6-1; Figure 6-1, Figure 6-2, Figure 6-3, Figure 6-4** and **Figure 6-5**).

The fauna habitats vary greatly in condition, ranging from vegetation in Completely Degraded condition to intact native vegetation in Very Good or Excellent condition. The majority of the fauna habitats that occur within the Study Area are highly degraded and fragmented from surrounding urbanisation and have a high level of impact from clearing, weeds, grazing, dumped rubbish, dieback/disease and/or feral fauna; however, a number of habitats are of higher value as they provide refuge for a range of fauna in an otherwise highly fragmented landscape. The fauna habitats and the respective sections of the Study Area are described in further detail below.

Table 6-1: Fauna habitat types

Habitat types	Part 1 (ha)	Part 2 (ha)	Total (ha)
Banksia Woodland	0	26.1	26.1
Mixed Eucalyptus/Corymbia Woodland	0.5	14.1	14.6
Mixed Banksia/Eucalyptus/Corymbia Woodland	1.5	3.5	5
Flooded Gum Woodland	0	5.6	5.6
Paperbark Woodland	0.24	13.1	13.34
Wetland/water course (open water areas)	0.7	1.8	2.5
Shrubland	0.2	4.9	5.1
Pine Plantation	0	3.3	3.3
Scattered trees/shrubs	3.2	4.0	7.2
Paddock with Eucalyptus/Corymbia	0	164.7	164.7
Paddock with Melaleuca	0	16.1	16.1
Constructed wetland/drainage	2.6	0.9	3.5
Modified vegetation	3.6	18.1	21.7
Parkland cleared	1.3	12.7	14

Habitat types	Part 1 (ha)	Part 2 (ha)	Total (ha)
Cleared Paddock	0	97.7	97.7
Revegetation	8.7	0	8.7
Total area of fauna habitat	**22.54**	**386.6**	**409.14**
Infrastructure/Cleared	182.6	114.4	297.0
Total area	**205.1**	**501.0**	**706.1**

6.1.1.1 Part 1 Bayswater to Malaga

The majority of Part 1 of the Study Area is cleared or comprises of existing infrastructure (~182.6 ha; 89%; **Table 6-1**). Ten broad fauna habitat types occur in the remaining 22.5 ha of Part 1 of the Study Area (**Table 6-1**; **Figure 6-1** and **Figure 6-2**; Appendix F). The fauna habitats within Part 1 of the Study Area are mostly degraded and have a high level of disturbance from weeds, dumped rubbish and existing infrastructure (roads, railway lines and powerlines). The remnants of Mixed *Banksia/Eucalyptus/Corymbia* and Mixed *Eucalyptus/Corymbia* Woodland, Scattered trees/shrubs and Shrubland habitats consist of small linear, fragmentated patches along the Tonkin Highway road reserve. The environmental value of such remnants has been previously impacted due to pressure from road infrastructure and surrounding development; however, they may still provide refuge for a variety of terrestrial fauna in an otherwise highly urbanised landscape, as well as providing suitable foraging, potential breeding and/or suitable roosting habitat for black cockatoos (refer to Section 6.2; Appendix F). None of the fauna habitats in Part 1 of the Study Area provide suitable habitat for other conservation significant fauna.

6.1.1.2 Part 2 Malaga to Ellenbrook

Approximately 23% (~114.4 ha) of Part 2 of the Study Area is already cleared or comprises existing infrastructure. The remaining 77% (386.6 ha) comprises 15 broad fauna habitats (**Table 6-1**; **Figure 6-3**, **Figure 6-4** and **Figure 6-5**). Remnant vegetation within the broad fauna habitats mapped in Part 2 of the Study Area ranged from Completely Degraded to Excellent. Habitats present throughout the southern and central sections of Part 2 of the Study Area are relatively well connected, with ecological linkages present throughout Whiteman Park and to the north and west of the Study Area, whereas fauna habitats in the northern section of Part 2 of the Study Area, in and around Ellenbrook, occur in small patches and are highly fragmented by roads or surrounding urbanisation (**Figure 6-3**, **Figure 6-4** and **Figure 6-5**).

Most of the fauna habitats in Part 2 are impacted to varying extents from clearing, weeds, rubbish and feral fauna; however, many are still likely to support a relatively high diversity of fauna species given the high level of connectivity and wide range of habitats present.

Several fauna habitats recorded within Part 2 of the Study Area potentially support conservation significant fauna such as Quenda, Black-stripe Snake and the Water Rat including the *Banksia* Woodland, Mixed *Eucalyptus/Corymbia* Woodland, Flooded Gum Woodland, and the Wetland and Watercourse habitats. The *Banksia* Woodland and Mixed *Eucalyptus/Corymbi*a Woodland habitats also provide suitable foraging and potential breeding and roosting habitat for black cockatoos. In addition, the

Paddock with *Eucalyptus/Corymbia* and Pine Plantation habitats provide high quality foraging, potential breeding and roosting habitat for black cockatoos, but are unlikely to support any other conservation significant fauna (refer to Section 5.3; Appendix F).

A number of areas present within Part 2 of the Study Area represent significant fauna habitat including two areas of *Banksia* Woodland; one situated south west of the Gnangara Road intersection and the other, to the west of Beechboro Road North (**Figure 6-3** and **Figure 6-5**). These two areas represent the Banksia Woodlands of the Swan Coastal Plain TEC (refer to Section 3.5) and also provide suitable habitat for Quenda, as well as potential habitat for the Black-striped Snake and Jewelled Sandplain Ctenotus. The Banksia Woodlands TEC also provides preferred foraging habitat for Carnaby's (and to a lesser extent Baudin's) Cockatoo.

A number of other broad fauna habitats in Part 2 of the Study Area also provide foraging, potential breeding and/or roosting habitat for black cockatoos (refer to Section 6.2) but are not considered to be significant in terms of supporting other conservation significant fauna.

6.1.2 Fauna species

Database searches show that approximately 520 fauna species could possibly occur within 5 km of the Study Area (Appendix C). This includes:

- 30 mammals (23 native and seven introduced);
- 221 birds (207 native and 14 introduced);
- 62 reptiles (all native); and
- 14 amphibians (all native).

The diversity of the fauna assemblages expected to occur within the area is relatively high, particularly considering the highly urbanised nature of the Study Area and immediate surrounds. The high diversity is likely due to the wide database search area (i.e. 10 km for Naturemap), the high number of fauna habitats present within the Study Area (i.e. 16 broad fauna habitats mapped within the Study Area, with more likely to occur in the immediate surroundings), as well as the recent higher levels of survey effort associated with ongoing environmental impact assessments in the Perth metropolitan area (GHD 2014).

Combined surveys have recorded a fraction of the fauna species expected to occur, with a total of 129 fauna species recorded (Appendix E). Recorded species include:

- 10 Mammals (3 native and 7 introduced);
- 91 birds (88 native and 3 introduced);
- 21 reptiles (all native); and
- Seven amphibians (all native frogs).

Most of the surveys undertaken to date comprised Level 1 fauna surveys, where a lower number of recordings would be expected. One level 2 fauna survey was undertaken by Coffey in 2015 as part of the Main Roads NorthLink Project, which recorded over twice the amount (97) of fauna species recorded in the Level 1 fauna surveys (~42 species recorded) undertaken for this Project. However, this survey covered a much larger area (~987 ha) and so a larger number of fauna records would be expected. The number of fauna recorded during previous and current surveys (123 species) shows that the diversity of

the fauna assemblage of the Study Area is relatively high, particularly considering the highly urbanised nature of the Study Area and surrounds and when compared to nearby fauna surveys undertaken in areas of similar size (~400-500 ha) where the number of fauna species recorded was ~69 (i.e. Neerabup Lot 701 Flynn Drive; ELA 2012). This demonstrates that the survey effort to date has been successful at capturing the fauna assemblage of the Study Area.

A brief description of the recorded fauna assemblage is provided below.

6.1.2.1 Mammals

A total of 10 mammals have been recorded in the Study Area to date (Appendix E). This includes three native species and seven introduced. Native mammal species recorded include *Trichosurus vulpecula* (Common Brush-tail Possum), Quenda and Western Grey Kangaroo. All of the native mammal species occur in Part 2 of the Study Area. Common Brush-tail Possums may occasionally occur in Part 1 of the Study Area; however, there is no habitat in this section of the Study Area for the Quenda or Western Grey Kangaroo.

Seven introduced species are known to occur within the Study Area (Appendix E). Of these, three species are listed as Declared Pests under the BAM Act: Cat, Fox and Rabbit.

6.1.2.2 Birds

A total of 91 birds have been recorded in the Study Area to date (Appendix E). This includes 88 native species and three introduced species. Bird species were the most frequently recorded fauna during all the surveys which is unsurprising given that birds are highly adapted to living in urban environments and often the most conspicuous species to observe during fauna surveys.

Four conservation significant bird species have previously been recorded within, or in close proximity (i.e. within 200 m) to, the Study Area including Carnaby's Cockatoo, Forest Red-tailed Black Cockatoo, Rainbow Bee-eater and Glossy Ibis. The Glossy Ibis is considered unlikely to occur in the actual Study Area due to a lack of suitable habitat (Terrestrial Ecosystems 2019; Appendix D). The remaining conservation significant birds are discussed further in Section 6.1.3.

Introduced species of birds are native to Australia but not native to the Perth region and can cause issues for native bird species by competing for hollows and food. Introduced bird species recorded include: **Spilopelia senegalensis* (Laughing Dove), **Dacelo novaeguineae* (Laughing Kookaburra) and the Rainbow Lorikeet which is listed as a Declared Pest under the BAM Act.

6.1.2.3 Reptiles

A total of 21 native reptiles have been recorded in the Study Area to date (Appendix E). Many of the reptile species identified were recorded during the Level 2 fauna trapping survey undertaken by Coffey in 2015. This survey covered a much wider area which included bushland areas outside the Study Area and as such, this number of species may not be a true representation to the actual reptile assemblage occurring in the Study Area.

Fauna habitats within Part 1 of the Study Area are likely to provide refuge for a number of reptile species, many of which are also common inhabitants of gardens and back yards. Part 2 of the Study Area is likely to have a higher reptile fauna assemblage, given the higher connectivity between habitats and wider range of habitats available.

6.1.2.4 Amphibians

A total of seven native frogs have been recorded in proximity to the Study Area to date (Appendix E). Frogs are highly adapted to urban environments where they take advantage of garden ponds and parkland lakes. The frog assemblage of Part 2 of the Study Area is likely to be high given the amount of watercourse and wetland habitats. *Banksia* Woodland habitats in both Part 1 and Part 2 of the Study Area may also provide suitable habitat for burrowing, ground-dwelling species such as *Myobatrachus gouldii* (Turtle Frog) which was recorded in Banksia Woodland habitat, outside but in proximity to, the Part 2 of the Study Area during fauna surveys undertaken by Coffey (2015a; Appendix E).

6.1.3 Conservation significant fauna

A total of four conservation significant fauna species have been recorded within the Study Area to date including Carnaby's Black Cockatoo, Forest Red-tailed Black Cockatoo, Quenda and the Rainbow Bee-eater (**Figure 6-1**, **Figure 6-2**, **Figure 6-3**, **Figure 6-4** and **Figure 6-5**). A further seven conservation significant species are considered to potentially occur within the Study Area including:

- Baudin's Cockatoo (Part 1 and Part 2);
- Western Brush Wallaby (Part 2 only);
- Water Rat, Rakali (Part 2 only);
- Black-striped Snake (Part 2 only);
- Jewelled Sandplain Ctenotus (Part 2);
- Red-winged Fairy Wren (Part 2 only); and
- Peregrine Falcon (Part 1 and Part 2).

All conservation significant fauna species recorded or considered likely or with potential to occur are described in further detail below.

6.1.3.1 Conservation significant fauna profiles of species recorded

CARNABY'S COCKATOO

Carnaby's Cockatoo is currently listed as Endangered under the EPBC Act and as Endangered under Schedule 2 of the BC Act. This species was recorded during the initial survey in Part 2 of the Study Area and has previously been recorded in Part 1 of the Study Area (GHD 2016). There are also numerous DBCA records of this species within and in close proximity to Part 1 and Part 2 of the Study Area (DBCA 2019).

Carnaby's Cockatoo is endemic to, and widespread throughout the south west of WA where it occurs from the Wheatbelt across to the south west, including the Swan Coastal Plain and the southern coast. Its range extends from Cape Arid in the south east, to Kalbarri in the north and inland to Hatter Hill, Gibb Rock, Narembeen, Noongar, Wongan Hills, Nugadong, near Perenjori, Wilroy and Nabawa (SEWPaC 2012). The total extent of occurrence for the entire species is estimated to be between 180 000 km² and 364 200 km² (DPaW 2013).

The species was previously thought to represent one population; however, it is now considered that clearing in the southern Wheatbelt has resulted in two genetically distinct subpopulations – a western and eastern subpopulation (EPA 2019). The individuals that occur around the Study Area represent the western subpopulation. The western subpopulation of Carnaby's Cockatoo breeds in the Avon-

Wheatbelt, Geraldton Sandplains and Jarrah Forest IBRA bioregions, and migrates to the Swan Coastal Plain during the non-breeding season, between January and June (EPA 2019). Due to extensive habitat loss, the distribution of the species has contracted significantly, resulting in a westward shift in the breeding distribution. As a result, Carnaby's Cockatoo now also breed through the Jarrah Forest region. Preferred breeding trees within the Jarrah Forrest region and Swan Coastal Plain include Tuart, Flooded Gum, *E. occidentalis* and Marri. There are only a few known occurrences of the species breeding within the Swan Coastal Plain. One example is the recently recorded breeding of the species at Joondalup Health Campus, approximately 18 km west of Part 2 of the Study Area, where chicks have successfully fledged from nests made in natural hollows as well as artificial hollows (Roberts 2016). In addition, known breeding sites have also been recorded in urbanised areas at Baldivis and Mandurah, although both these locations are over 40 km from the Study Area (Birdlife 2018). Whilst potential breeding habitat has been recorded within the Study Area (refer to 6.2.1), no evidence of breeding has been recorded to date, and the closest known breeding site is located approximately 18 km west of Part 2 of the Study Area at Joondalup Campus (Roberts 2016).

The species feeds on native shrubland vegetation, particularly flowers, seeds and nectar of proteaceous plants (e.g. Banksia, Hakea, Dryandra and Grevillea species), Marri and *Callistemon* spp., and has recently adapted to feeding on pine cones (mostly *Pinus pinaster*) which now forms a major part of their diet (DoEE 2017; EPA 2019; SEWPaC 2012). The species is also known to feed on canola crops, almonds, insects and insect larvae (DoEE 2017). The breeding success of Carnaby's Cockatoo is strongly influenced by the availability of food in proximity to breeding sites (EPA 2019). Breeding sites that have foraging habitat within 1-2 km generally have the highest fledgling success rate; however, birds will forage up to a maximum of 12 km from a breeding site (SEWPaC 2012). Whilst foraging habitat, including higher quality habitat, has been recorded within the Study Area (refer to Section 6.2.1), given that the only known breeding site occurs over 12 km from the Study Area, none of the foraging habitat available within the Study Area is likely to support breeding.

Carnaby's Cockatoo roost in tall trees (including pine plantations), particularly those close to a water source (including artificial water sources; DoEE 2017). Known roost sites do occur in proximity to Part 2 of the Study Area in the Gnangara-Pinjar Pine Plantation to the west of Part 2 of the Study Area and Pine Plantations just north of Ellenbrook (~350 m north west), in Private Property at Henley Brook (~340 m east) and within Whiteman Park (~730 m west; Birdlife 2019; Murdoch University 2016). There are also a number of confirmed roosting sites in proximity to Part 1 of the Study Area including just west of lightning Swamp Reserve (~2.2 km west) and in Yokine (~5.2 km west). There are no known roost sites within the Study Area itself (Birdlife 2019).

FOREST RED-TAILED BLACK COCKATOO

The Forest Red-tailed Black Cockatoo is currently listed as Vulnerable under the EPBC Act and Vulnerable under Schedule 3 of the BC Act. This species was recorded in both Part 1 and Part 2 of the Study Area during the current surveys and previous surveys (Terrestrial Ecosystems 2018; GHD 2019 and 2016; AECOM 2016; FVC 2019; Coffey 2015a; 360 2013a). There are also numerous DBCA records of this species within, and in close proximity to, Part 1 and Part 2 of the Study Area (DBCA 2019).

The Forest Red-tailed Black Cockatoo has a traditional range within the Jarrah Forest and Warren bioregions of the south-west where it occurs from Gingin in the north to Albany in the south and west

to Cape Leeuwin and Bunbury (SEWPaC 2012). The species is largely sedentary, with the total extent of occurrence estimated to be 61 000 km² (DAWE 2020b).

The Forest Red-tail feeds predominately on Jarrah and Marri but has recently altered its foraging behaviour to exploit the fruit of Cape Lilac which occurs throughout the Perth Metropolitan Area. As a result, the species range has expanded, and it is now a common visitor to the Swan Coastal Plain region of WA (EPA 2019). The species mainly forages on Jarrah, Marri, Blackbutt, *Allocasaurina* spp. and *Persoonia longifolia* (Snottygobble), as well as introduced eucalypts. The species can be found foraging in woodland and forest habitats, as well as along the roadside (DoEE 2017).

The Forest Red-tailed Black Cockatoo generally nests in Marri, Tuart and/or *E. diversicolor* (Karri) in large forests in the south west of WA. The species has previously been recorded breeding around the outskirts of urban areas (e.g. Baldivis and Armadale) where it generally nests in Marri, Tuart or artificial hollows. Whilst potential breeding habitat has been recorded within the Study Area (refer to Section 6.2.1), no evidence of breeding has been recorded to date, and the closest known breeding site is located approximately 18 km south west of Part 1 of the Study Area at Murdoch University (Terrestrial Ecosystems 2018; Murdoch University 2015).

Similar to Carnaby's Cockatoo, the Forest Red-tailed Black Cockatoo will roost in any tall tree; however, a preference is shown for tall Jarrah, Marri, Blackbutt, Tuart and introduced eucalyptus trees on the edges of woodlands or forests (DoEE 2017). Suitable roosting habitat for Forest Red-tailed Black Cockatoos occurs throughout the Study Area (refer to Section 6.2.1), and known roost sites occur within Whiteman Park, ~730 m west of Part 2 of the Study Area (Birdlife 2019; Murdoch University 2016). There are no known roost sites within the Study Area itself.

QUENDA

The Quenda is listed as Priority 4 fauna by DBCA. Quenda are widely but patchily distributed through south-western WA, from around Guilderton to east of Esperance and inland to Hyden. This species prefers low, dense vegetation such as heath and swampy habitat and is often associated with forests, woodland, shrubland and riparian areas where it feeds on invertebrates, fungi, plant material and occasionally smaller vertebrates (DEC 2012c).

Potential Quenda diggings were recorded inside, and in close proximity to (i.e. within 100 m) Part 2 of the Study Area during the initial and follow-up survey, as well as during AECOMs previous survey (2016). Quenda were also directly observed during WRMs recent wetland survey at Orchid Park, located outside the Study Area (WRM 2019). There is one DBCA record of the Quenda inside Part 2 of the Study Area, adjacent to Bush Forever Site 200, and numerous records throughout Whiteman Park (DBCA 2019). Whilst the species was also previously recorded in an area of revegetation adjacent to Part 1 of the Study Area by GHD in 2014, this location is outside the Study Area. There is no suitable habitat within Part 1 of the Study Area and so Quenda are unlikely to occur there.

RAINBOW BEE-EATER

The Rainbow Bee-eater is listed as Marine under the EPBC Act. The Rainbow Bee-eater is widely distributed across most of mainland Australia where it occurs mainly in open forests and woodlands, shrublands, and in various cleared or semi-cleared habitats, including farmland and areas of human habitation (DAWE 2020b).

The Rainbow Bee-eater was recorded during the initial and follow-up survey where it was observed nesting within a sandy embankment within Part 2 of the Study Area. It was also recorded by AECOM in 2016 in Part 2 of the Study Area. This species is also considered to potentially occur within Part 1 of the Study Area.

6.1.3.2 Conservation significant fauna profiles of potentially occurring species

BAUDIN'S COCKATOO

Baudin's Cockatoo is listed as Endangered under the EPBC Act and Endangered under Schedule 3 of the BC Act. This species has not been recorded in the Study Area but has the potential to occur due to availability of suitable habitat and occurrence of nearby records (DBCA 2019). However, there are only a few scattered records of the species occurring in proximity to the Study Area, with two records in Whiteman Park (~600 m west and 1.6 km north of Part 2 of the Study Area) and one record approximately 600 m west of Part 1 of the Study Area (DBCA 2019).

Baudin's Cockatoo current distribution ranges from Albany extending north to Gidgegannup, east to Mount Helena, Wandering, Quindanning, Kojonup, Frankland and King River and to the eastern margin of the Swan Coastal Plain including West Midland, Byford, North Dandalup, Yarloop, Wokalup and Bunbury (DEC 2008). The species is generally found around the Perth region from March to May and August to October as the birds move between breeding and non-breeding habitat. The species' extent of occurrence is estimated to be ~70 000 km² (DAWE 2020b).

The species' generally breeds within Jarrah, Marri and Karri forests within the far south west of WA between October to January but may also breed in partially cleared woodland or isolated trees. Preferred nesting trees including Karri, Marri, Jarrah, Tuart and Wandoo. The species' range expands during the non-breeding season (from February) as flocks forage more widely, congregating on the central and northern parts of the Darling plateau, as far as Mundaring and Gidgegannup (DAWE 2020b). Some flocks have also been reported to move on to the southern Swan Coastal Plain and south coast during the non-breeding season (DAWE 2020b). Whilst potential breeding habitat for Baudin's Cockatoo has been recorded within the Study Area, no evidence of breeding has been recorded to date, and there are no known breeding sites within the Perth Metropolitan Area.

The species' feeds primarily on the seeds of Marri and Jarrah, particularly during the breeding season, but will also feed on native proteaceous plant species during the non-breeding season. The species is also known to feed on insects and insect larvae, the pith of kangaroo paw, tips of *Pinus* spp., and seeds of apples and pears (DoEE 2017). Baudin's Cockatoo forages at all strata levels from the canopy to the ground, often feeding in the understorey of banksias and in orchards (both in trees and on dropped or fallen fruit on the ground; DAWE 2020b). Suitable foraging habitat for this species has been recorded in the Study Area and is described in further detail in Section 6.2.1.

Similar to Carnaby's Cockatoo, Baudin's Cockatoo will roost in any tall tree, particularly Jarrah, Flooded gum, Blackbutt, Tuart, Lemon Scented Gum and introduced Eucalypts, in proximity to a suitable water source, including artificial water sources (DoEE 2017). Suitable roosting habitat for Baudin's Cockatoo occurs throughout the Study Area; however, there are no known roost sites within the Study Area. There are a number of 'white-tailed black cockatoo' roost sites in proximity to the Study Area, including one approximately 560 m north west of Part 2 of the Study Area in Ellenbrook, one approximately 2.6

km west of the Study Area in Whiteman Park and one 350 m west of the Study Area on Gnangara Road (Birdlife 2019; DBCA 2019). These roosts may include both Carnaby's and/or Baudin's Cockatoo and have been classed as 'white-tailed black cockatoo' roosts as the observer could not identify the individuals to species level (Birdlife 2019). However, it is likely that these roosts are Carnaby's as whilst Baudin's may potentially forage in the Study Area, they are likely to return to the hills to roost (Terrestrial Ecosystems 2018). There are no known Baudin's roost sites in proximity to Part 1 of the Study Area.

Whilst this species has the potential to occur in the Study Area, it is likely to be on an occasional basis or as an infrequent visitor (vagrant) to forage.

BLACK-STRIPED SNAKE

The Black-striped Snake is listed as Priority 3 by DBCA. It has a restricted distribution along the coastal strip between Mandurah and Lancelin; however, there have been recent records of this species further north near Dongara and Eneabba suggesting it has a broader distribution (Bush et al. 2010). This species occurs on dunes and sandplains vegetated with heaths and eucalypt/banksia woodlands where it feeds mainly on smaller skinks (Wilson and Swan 2003).

The species has not been recorded within the Study Area but has previously been recorded in and around Ellenbrook and around Bennett Springs, in proximity to Part 2 of the Study Area (DBCA 2019; Terrestrial Ecosystems 2018). The Black-striped Snake could potentially utilise the Banksia Woodland fauna habitats located in Part 2 of the Study Area. The habitats in Part 1 are considered unsuitable for the Black-stripe Snake and so it is unlikely to occur there.

JEWELLED SANDPLAIN CTENOTUS

The Swan Coastal Plain sub-population of the Jewelled Sandplain Ctenotus is listed as Priority 3 by DBCA. It is currently only known from three geographic populations: one is on the sandplain north of Perth; one on the sandplain around the greater metropolitan area; and the largest geographic distribution is along the south coast of Western Australia (Terrestrial Ecosystems 2018).

Little is known about this species. The species is known to utilise Banksia Woodlands (Coffey 2015) and may potentially utilise the Banksia woodland habitats available within Part 2 of the Study Area; however, this species is it is unlikely to be present within Part 1 of the Study Area where this habitat type is degraded and isolated.

WESTERN BRUSH WALLABY

The Western Brush Wallaby is listed as Priority 4 by DBCA. The species is distributed across the south-west of WA from north of Kalbarri to Cape Arid, where it prefers open forest or woodland, particularly favouring open, seasonally wet flats with low grasses and open scrubby thickets (DBCA 2020).

The Western Brush Wallaby is known to occur in Whiteman Park, with the closest record being approximately 1.7 km west of Part 2 of the Study Area. Given the proximity of the record and availability of forest and woodland habitats and seasonally wet flats, it is considered to potentially occur within Part 2 of the Study Area, but unlikely to occur in Part 1. If it is present in Part 2, it is more likely to utilise the extensive habitat in and around Whiteman Park rather than those habitats within the Study Area.

WATER RAT, RAKALI

The Water Rat is listed as Priority 4 by DBCA. The species has not been recorded within the Study Area to date and is unlikely to occur in Part 1 of the Study Area; however, given the availability of suitable habitat it is considered to potentially occur within Part 2 of the Study Area.

The species is distributed throughout most of the south west of WA. It is also found in other Australian States and Territories. The species lives in burrows on the banks of wetlands, rivers, creeks, lakes and along the coast. Intact riparian vegetation and associated bank stability are considered critical to their survival; however, the species is also known to nest in artificial habitats such as pipes and moored boats (DWER 2020). The species feeds on a variety of aquatic animals including fish, crustaceans, shellfish, small birds, eggs, mammals, frogs, reptiles.

Habitat suitable for the Water Rat occurs at Bennett Brook (which partially occurs within the Study Area) and at Horse Swamp, which occurs in proximity to the Study Area (WRM 2019). The species has historically been recorded within Bennett Brook, south and east of the Study Area (DBCA 2019) but has not been recorded within the Study Area itself. Given the presence of suitable habitat within Bennett Brook, it may potentially occur; however, it is likely to utilise habitats in the wider Whiteman Park area rather than the degraded habitats present within the Study Area.

PEREGRINE FALCON

The Peregrine Falcon is listed as Other Specially Protected Fauna under Schedule 7 of the BC Act. Whilst it occurs within most habitats across Australia, it is relatively uncommon. This species feeds on small birds and mammals and nests in coastal and inland cliffs or open woodlands near water.

There are numerous records of this species around Whiteman Park, but no records within the Study Area itself (DBCA 2019). The species could potentially occur within the Study Area on an occasional or transitionary basis but is unlikely to solely rely on any of the habitats available within the Study Area.

RED-WINGED FAIRY WREN

The Red-winged Fairy Wren is not listed under with the EPBC or BC Act, but is considered as regionally significant under Bush Forever (Government of Western Australia 2000). This species is endemic to the south west of WA where it occurs between Moore River north of Perth, south to Margaret River, and east to Albany. It generally inhabits the understorey of Karri and Jarrah forests and requires good understorey cover to protect it from predators.

This species has not been recorded during any of the surveys undertaken for the Project; however, it is likely to occur in and around Whiteman Park where it has previously been recorded. This species may potentially occur within Part 2 of the Study Area but is unlikely to occur in Part 1 given the highly fragmented nature of the remaining habitats in this section of the Study Area.

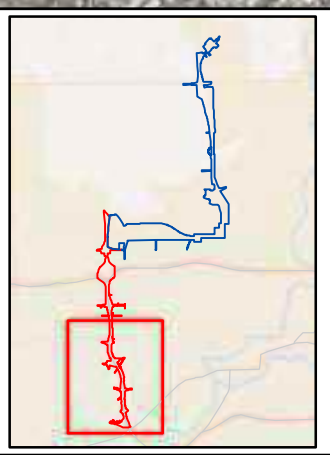
Figure 6.1: Fauna habitats and records of conservation significant fauna within Part 1 of the Study Area (Map A)

Legend

- Part 1 Study Area - Bayswater to Malaga
- Forest Red-tailed Black Cockatoo sighting (ELA 2020)
- Infrastructure/Cleared

Fauna Habitat

- Constructed wetland/drainage
- Mixed Banksia/Eucalyptus/Corymbia Woodland
- Mixed Eucalyptus/Corymbia Woodland
- Modified vegetation
- Paperbark Woodland
- Parkland cleared
- Revegetation
- Scattered trees/shrubs
- Wetland/water course (open water areas)



0 150 300 600

Metres

Datum/Projection:
GDA 1994 MGA Zone 56

N

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Prepared by: GM Date:29/04/2020

*Fauna records from ELA 2020 and GHD 2014, 2019 surveys

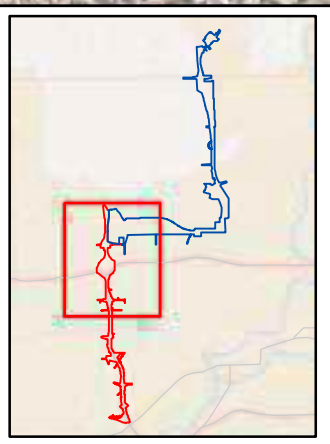
Figure 6.2: Fauna habitats and records of conservation significant fauna within Part 1 of the Study Area (Map B)

Legend

- Part 1 Study Area - Bayswater to Malaga
- Part 2 Study Area - Malaga to Ellenbrook
- Infrastructure/Cleared

Fauna Habitat

- Mixed Banksia/Eucalyptus/Corymbia Woodland
- Modified vegetation
- Paperbark Woodland
- Revegetation
- Scattered trees/shrubs
- Shrubland



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Metres

Datum/Projection:
GDA 1994 MGA Zone 56

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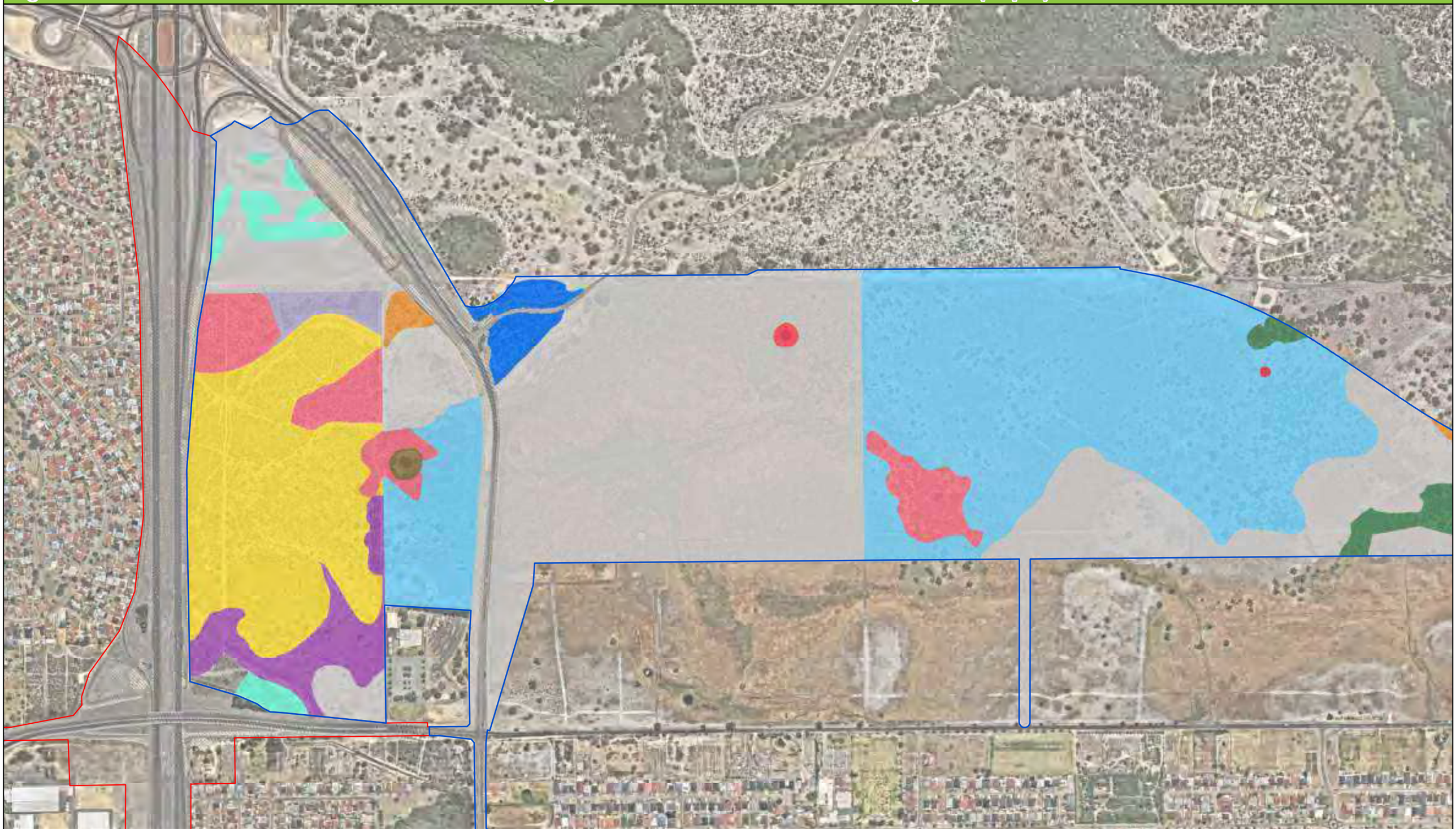
Prepared by: GM Date:29/04/2020

*Fauna records from ELA 2020 and GHD 2014, 2019 surveys

Figure 6 3: Fauna habitats and records of conservation significant fauna within Part 2 of the Study Area (Map A)

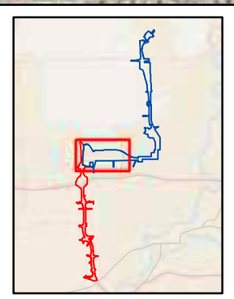


Legend

- Part 1 Study Area - Bayswater to Malaga
- Part 2 Study Area - Malaga to Ellenbrook
- Infrastructure/Cleared

Fauna Habitat

- Banksia Woodland
- Cleared Paddock
- Constructed wetland/drainage
- Mixed Banksia/Eucalyptus/Corymbia Woodland
- Mixed Eucalyptus/Corymbia Woodland
- Modified vegetation
- Paddock with Eucalyptus/Corymbia
- Paddock with Melaleuca
- Paperbark Woodland
- Scattered trees/shrubs
- Shrubland
- Wetland/water course (open water areas)



0 100 200 400

Metres

Datum/Projection:
GDA 1994 MGA Zone 56

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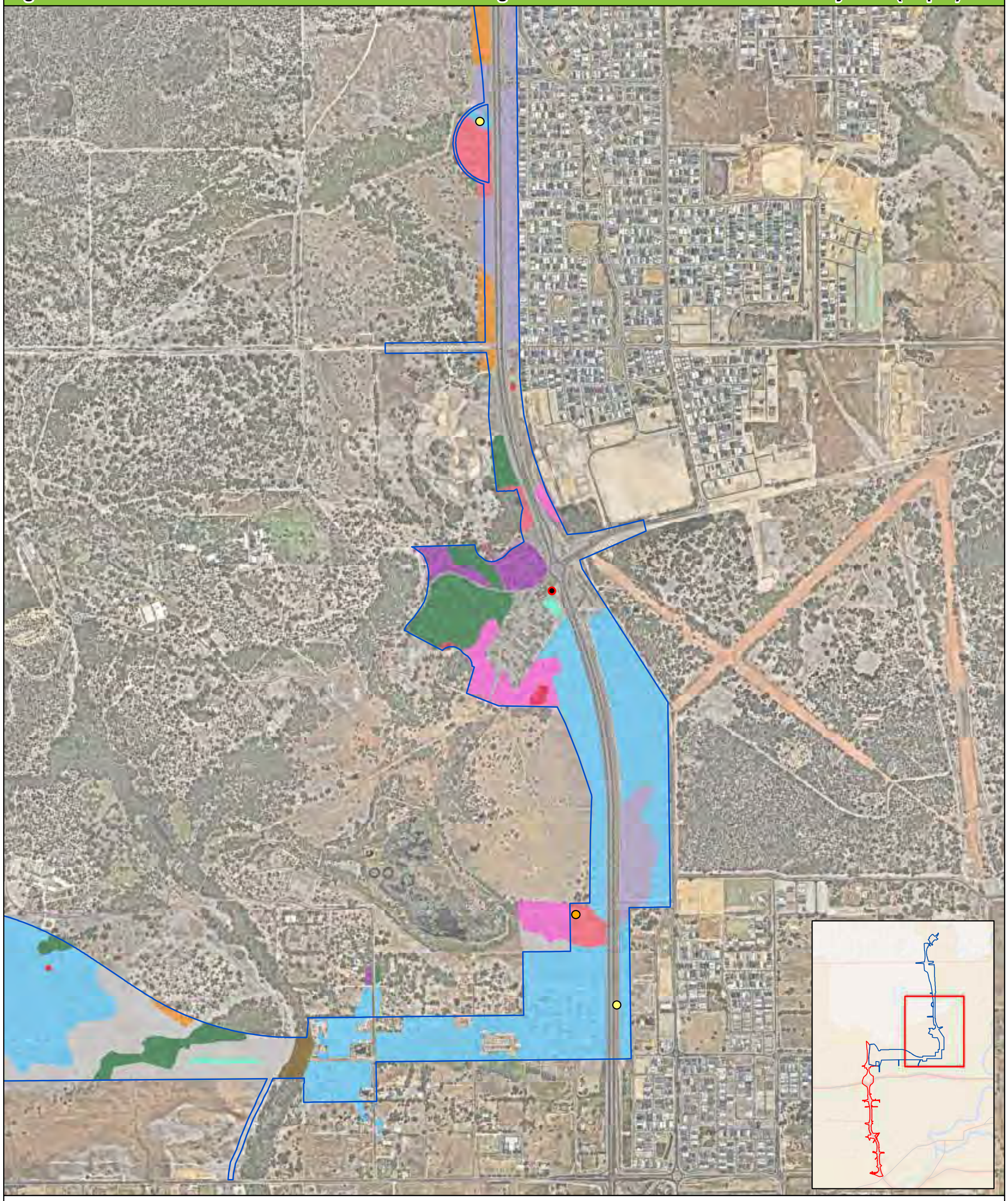
Prepared by: GM Date: 05/03/2020

Figure 6.4: Fauna habitats and records of conservation significant fauna within Part 2 of the Study Area (Map B)



Legend

- Part 2 Study Area - Malaga to Ellenbrook

Conservation Significant Species Records*

- Forest Red-tailed Black Cockatoo
- Quenda (Southern Brown Bandicoot)
- Rainbow Bee-eater

- Infrastructure/Cleared

Fauna Habitat

- Cleared Paddock
- Constructed wetland/drainage
- Flooded Gum Woodland
- Mixed Banksia/Eucalyptus/Corymbia Woodland
- Mixed Eucalyptus/Corymbia Woodland
- Modified vegetation
- Paddock with Eucalyptus/Corymbia
- Paddock with Melaleuca
- Paperbark Woodland
- Scattered trees/shrubs
- Wetland/water course (open water areas)

0 150 300 600

Metres

Datum/Projection:
GDA 1994 MGA Zone 56

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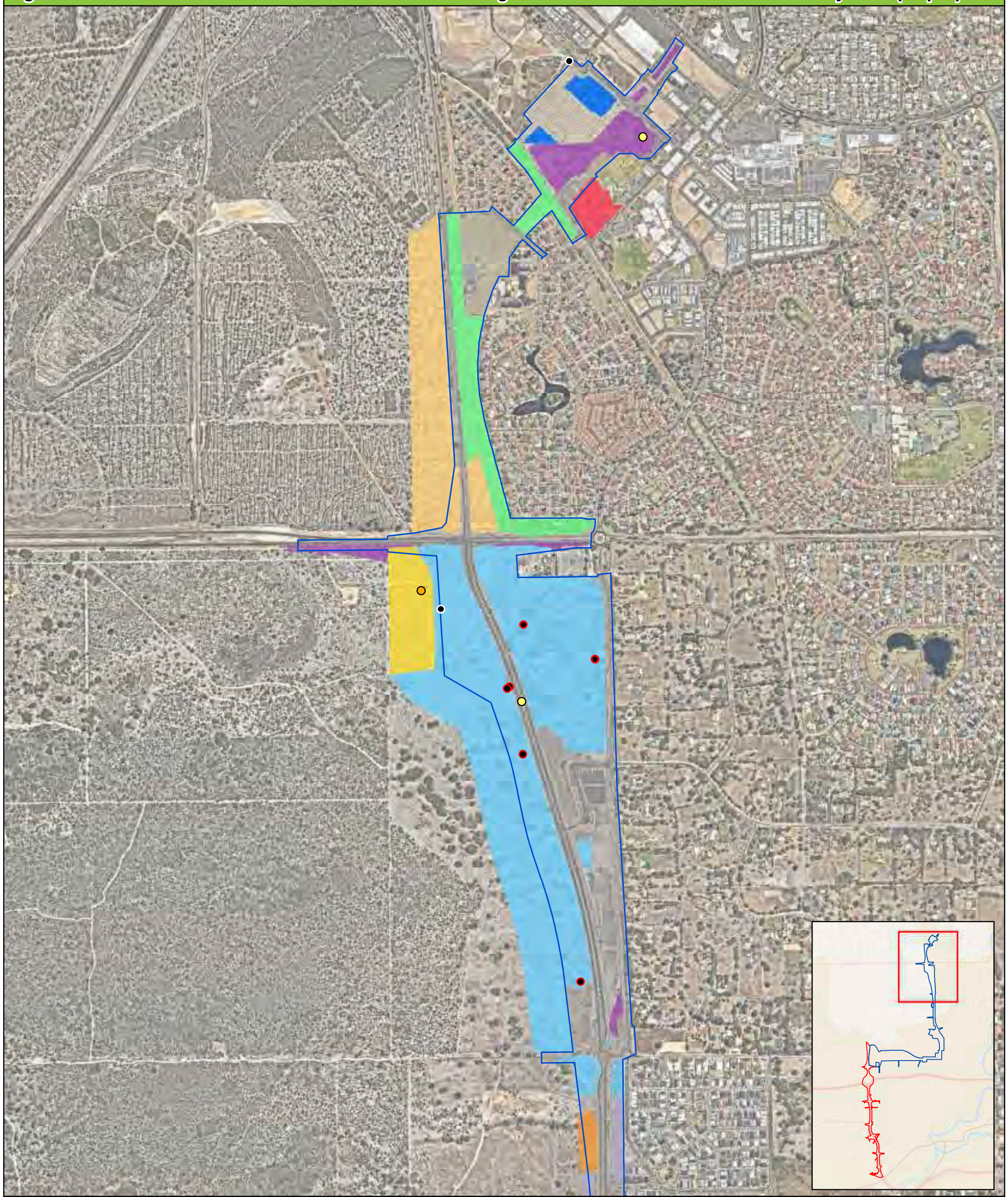
Prepared by: GM Date:29/04/2020

*Fauna records from AECOM 2016 fauna survey

Figure 6.5: Fauna habitats and records of conservation significant fauna within Part 2 of the Study Area (Map C)



*Fauna records from ELA 2020 and AECOM 2016 fauna surveys

6.2 Black Cockatoo habitat

6.2.1 Foraging habitat

There are a total of 19 species of plants that provide preferred foraging resources for black cockatoos within the Study Area (**Table 6-2**). A combined list of preferred foraging species present within the Study Area is provided in **Table 6-2**.

The *Allocasuarina, Eucalyptus camaldulensis*, Marri, Jarrah and occasional Lemon Scented Gum trees provide preferred foraging habitat for all three species of black cockatoo. In addition, the proteaceous species present such as Banksia and Hakea also provide suitable foraging for Carnaby's and Baudin's Cockatoo (**Table 6-2**).

Table 6-2 Black cockatoo suitable foraging species* recorded in the Study Area#

Foraging plant species[1]	Part 1 (Bayswater to Malaga)			Part 2 (Malaga to Ellenbrook)		
	Carnaby's	Baudin's	Forest Red-tail	Carnaby's	Baudin's	Forest Red-tail
Acacia saligna	■					
Allocasuarina fraseriana	■	■	■	■	■	■
Banksia attenuata	■			■		
Banksia ilicifolia				■	■	
Banksia littoralis				■	■	
Banksia menziesii	■			■		
Callistemon spp.	■	■				
Corymbia calophylla	■	■	■	■	■	■
Corymbia citriodora	■	■	■			
Eucalyptus camaldulensis	■	■	■	■	■	■
Eucalyptus gomphocephala	■					
Eucalyptus marginata				■	■	■
Eucalyptus patens				■		
Eucalyptus rudis	■			■		
Eucalyptus todtiana	■					
Hakea varia	■	■				
Jacksonia furcellata				■		
Mesomelaena sp.				■		
Pinus spp.				■	■	
Xanthorrhoea preissii	■	■		■	■	

* Based on the list of suitable foraging plants collated from the following sources: Groom 2011, Johnstone et al. 2011, SEWPaC 2012, Heydenrych 2012 and Lee et al. 2013.
# Red indicates suitable foraging resource for that species of black cockatoo.
1 Foraging plant species recorded during previous and current surveys including GHD 2019, FVC 2019, Terrestrial Ecosystems 2018, AECOM 2016, Coffey 2015a, GHD 2014, and 360 Environmental 2013a.

Foraging habitat present within the Study Area was assessed for quality based on the criteria and methods set out in Section 4.2.3.

The majority of the Study Area does not comprise of any foraging habitat for black cockatoos (~559.7 ha; **Table 6-3**); however, approximately 146.2 ha does provide suitable foraging habitat. This comprises 30.5 ha of high-quality, 35.3 ha of moderate quality and 80.4 ha of low-quality foraging habitat (**Table 6-3**; **Figure 6-6**, **Figure 6-7** and **Figure 6-8**). In addition, over 88 locations with evidence of foraging have been recorded to date (Appendix I).

Table 6-3: Foraging habitat quality within the Study Area

Foraging habitat quality	Area (ha)		Total area (ha)
	Part 1	Part 2	
High quality	0.7	29.8	30.5
Moderate quality	2.7	32.6	35.3
Low quality	5.5	74.9	80.4
Total foraging habitat	**8.9**	**137.3**	**146.2**

The quality of black cockatoo foraging habitat present within the Study Area was also assessed using the DoEE foraging quality tool (DoEE 2017; Appendix H). Based on this method of assessing quality, moderate to high quality foraging habitat for black cockatoos was mainly associated with the Banksia Woodland (Carnaby's and Baudin's), Mixed *Banksia* and Mixed *Eucalyptus*/*Corymbia* Woodland habitats (all three species), Paddocks with *Eucalyptus*/*Corymbia* (all three species), Flooded Gum Woodland (Carnaby's Cockatoo, and where Marri is present also Forest Red-tailed Black Cockatoos and to a lesser extent, Baudin's), and Pine Plantation (Carnaby's Cockatoo, and to a lesser extent Baudin's) fauna habitat types (**Table 6-4**). These habitat types generally comprised of a number of preferred foraging species with good cover and/or had evidence of foraging (i.e. chewed Marri nuts or Banksia cones). Fauna habitats with little to no suitable foraging resources for black cockatoos were not assessed using this method (i.e. Paperbark Woodland, Paddock with Melaleuca, Constructed wetland/drainage, Revegetation and Cleared Paddocks). It should be noted that this way of assessing quality is relatively rudimentary and does not take into consideration the variable condition and density of the foraging species present within each patch of vegetation. The method of assessing quality undertaken by ELA is more refined and considers each individual patch of vegetation rather than assessing the overall broad fauna habitat (Section 4.2.3.1).

Table 6-4: Fauna habitat type and associated foraging quality for each species of black cockatoo*

Fauna habitat type	Carnaby's Cockatoo	Baudin's Cockatoo	Forest Red-tailed Black Cockatoo
Banksia Woodland	Moderate to High	Low to Moderate	Low to Nil

Fauna habitat type	Carnaby's Cockatoo	Baudin's Cockatoo	Forest Red-tailed Black Cockatoo
Mixed Banksia/ Eucalyptus /Corymbia Woodland	Moderate to High	Low to Moderate	Moderate to High
Mixed Eucalyptus /Corymbia Woodland	Moderate to High	Low to Moderate	Moderate to High
Wetland / water course	Low	Low	Low
Flooded Gum Woodland	Low to Moderate	Low to Nil	Low to Moderate
Paddock with Eucalyptus/ Corymbia	Moderate to High	Low to Moderate	Moderate to High
Scattered trees/shrubs	Low	Low	Low
Shrubland	Low to Nil	Low to Nil	Nil
Pine Plantation	High	Moderate	Nil

* note the association between fauna habitat type and foraging habitat quality are general and may actually vary depending on a number of factors such as % cover and/or foraging species present. Score of quality has been given a range to reflect this.

Foraging habitat within each section of the Study Area is discussed in further detail below.

6.2.1.1 Part 1 Bayswater to Malaga

Part 1 of the Study Area contains a total of 8.9 ha of suitable foraging habitat comprising 0.7 ha of high quality, 2.7 ha of moderate quality and 5.5 ha of low-quality foraging habitat (**Table 6-3** and **Figure 6-6**). High and moderate quality foraging habitat within Part 1 of the Study Area was mostly associated with remnant patches of Mixed *Banksia/Eucalyptus/Corymbia* Woodlands and Scattered Trees/Shrubs fauna habitats (**Table 6-4**). Whilst most of the fauna habitats and remnant vegetation within Part 1 of the Study Area is highly degraded, approximately 3.5 ha provides moderate and high-quality foraging habitat for black cockatoos. This is mainly due to the presence of preferred foraging species such as Banksia, Hakea and Marri which generally had good canopy cover (i.e. 40-60%) in addition to the direct sightings and records of foraging evidence. Black cockatoos are utilising these sites for foraging, in particular Forest Red-tailed Black Cockatoos which have been observed on numerous occasions throughout this section of the Study Area.

Based on the DoEE foraging quality tool assessment, the Mixed *Eucalyptus/Corymbia* Woodland, Mixed *Banksia/ Eucalyptus /Corymbia* Woodland and Scattered trees/shrubs habitats were all assessed as high-quality (i.e. with a score of 4 or more), whereas the shrubland habitat was assessed as low (i.e. a score less than 4; Appendix H).

6.2.1.2 Part 2 Malaga to Ellenbrook

Part 2 of the Study Area contains a total of 137.3 ha of suitable foraging habitat comprising 29.8 ha of high quality, 32.6 ha of moderate quality and 74.9 ha of low quality foraging habitat for black cockatoos (**Table 6-3**; **Figure 6-7** and **Figure 6-8**). High and moderate quality foraging habitat within Part 2 of the Study Area was mostly associated with *Banksia* Woodland, Pine Plantation, Mixed *Eucalyptus/Corymbia* Woodland and Paddocks with *Eucalyptus/Corymbia* fauna habitats (**Table 6-4**). Whilst these fauna habitats vary in condition, they do provide a variety of suitable foraging species for black cockatoos. The Banksia Woodland and Pine Plantation habitats in particular provide moderate to high quality foraging for black cockatoos. This is mainly due to the presence of preferred foraging species such as *Banksia, Hakea*, Marri and Pine in addition to the direct sightings and records of foraging evidence which

indicates that both Forest Red-tailed Black Cockatoos and Carnaby's Cockatoo are utilising these habitats for foraging. In addition, whilst the Paddocks with *Eucalyptus/Corymbia* habitat was generally highly degraded, the stands of Marri trees present within this habitat type provide high quality foraging for both Carnaby's and Forest Red-tailed Black Cockatoos, given the canopy cover of the trees and numerous locations of foraging evidence recorded throughout this habitat type.

Based on the DoEE foraging quality tool assessment, the *Banksia* Woodland, Mixed *Eucalyptus/Corymbia* woodland, Mixed *Banksia/ Eucalyptus /Corymbia* Woodland, and Pine Plantation habitats in Part 2 of the Study Area were all assessed as high-quality (i.e. with a score of 4 or more), whereas the Scattered trees/shrubs habitats habitat was assessed as low (i.e. a score less than 4; Appendix H).

6.2.2 Potential breeding and roosting habitat

The combined survey data shows that a total of 850 potential breeding trees have been recorded within the Study Area during previous and current surveys. This includes 145 potential breeding trees in Part 1 of the Study Area and 705 potential breeding trees in Part 2 of the Study Area (**Table 6-5**; **Figure 6-9**, **Figure 6-10** and **Figure 6-11**). A total of 48 trees had hollows which were considered potentially suitable for nesting black cockatoos (i.e. over 10 cm diameter). This includes four potential hollows in Part 1 and 44 potential hollows in Part 2 of the Study Area (current survey, AECOM 2016, Terrestrial Ecosystems 2018 and GHD 2019).

An additional 167 potential breeding trees were recorded in areas outside Part 2 of the Study Area (**Figure 6-9**, **Figure 6-10** and **Figure 6-11;** Appendix J). Of these, 20 contained hollows suitable for breeding black cockatoos (i.e. over 10 cm).

Potential breeding trees comprised of suitable species such as Tuart, Flooded Gum, Blackbutt and Marri as well as a number of non-native Eucalyptus species such as *E. camaldulensis* and other planted Eucalypts.

Table 6-5: Summary of the potential breeding trees within the Study Area*

Breeding tree species	Part 1		Part 2	
	Hollows*	No hollows	Hollows*	No hollows
Marri	4	40	12	402
Tuart	0	14	0	2
Jarrah	0	0	1	18
Flooded Gum	0	10	3	131
Eucalyptus camaldulensis	0	13	0	53
Dead Stag	0	0	25	32
Eucalyptus sp. planted/non-native	0	64	2	13
Blackbutt	0	0	1	10
Total	**4**	**141**	**44**	**661**

* Potential breeding tree data has been compiled from the following sources (including the current survey): AECOM 2016, Coffey 2015a, GHD 2014 and 2019, FVC 2019, Terrestrial Ecosystems 2018. Suitable breeding and/or roosting tree species taken from the following sources: Groom 2011, Johnstone et al. 2011 and SEWPaC 2012. It should be noted that hollows deemed unsuitable for black cockatoo use (i.e. <10cm entrance diameter) have been assigned as trees with no hollow.

Many of the potential breeding trees recorded also represent suitable roosting habitat (i.e. groups of tall trees of Marri, Tuart, Jarrah and Flooded Gum; note that single trees or dead stags were excluded from the roosting tree data). In addition, a number of other suitable roosting trees were recorded including *Pinus* spp. and *Eucalyptus citriodora* (Lemon Scented Gum). The majority of roosting trees species present within the Study Area are suitable for Carnaby's Cockatoo; however, Marri, Tuart and Jarrah are also suitable roosting for Baudin's and Forest Red-tailed Black Cockatoos (**Table 6-6**).

Roosting habitat has been assessed as an area (ha) rather than a count of trees. This is largely due to the presence of the Pine Plantation habitat which comprise a large number of trees which have not been individually counted. Based on this assessment, there is a total of 60.3 ha of suitable roosting habitat within the Study Area (**Table 6-7**; **Figure 6-12**, **Figure 6-13** and **Figure 6-14**). Of this, 10.0 ha occurs in Part 1 and 50.3 ha occurs in Part 2 of the Study Area (**Table 6-7**; **Figure 6-12**, **Figure 6-13** and **Figure 6-14**). A further 17.4 ha of suitable roosting habitat was recorded in areas outside the Study Area during the recent survey.

Table 6-6: Suitable roosting tree species within the Study Area*

Roosting tree species[1]	Part 1 (Bayswater to Malaga)			Part 2 (Malaga to Ellenbrook)		
	Carnaby's	Baudin's	Forest Red-tail	Carnaby's	Baudin's	Forest Red-tail
Corymbia calophylla	■	■	■	■	■	■
Corymbia citriodora	■	■		■	■	
Eucalyptus camaldulensis	■			■		
Eucalyptus gomphocephala	■		■	■		■
Eucalyptus marginata				■		■
Eucalyptus patens				■		
Eucalyptus rudis	■			■		
Pinus spp.				■		

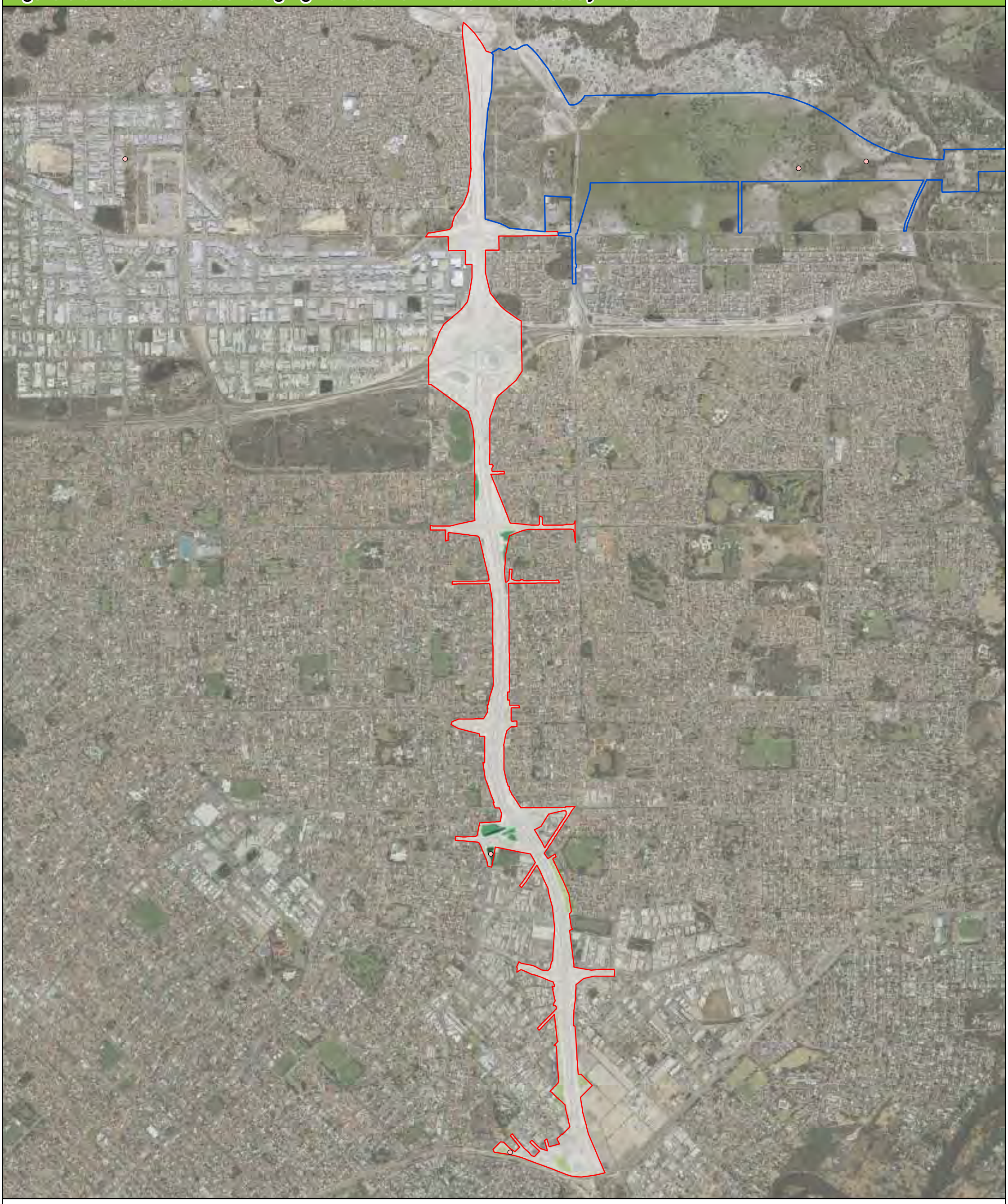
* red indicates suitable roosting tree species for that species of black cockatoo.
[1] based on the list of suitable roosting trees collated from the following sources: Groom 2011, Johnstone et al. 2011, SEWPaC 2012, Heydenrych 2012 and Lee et al. 2013.

Table 6-7: Roosting habitat within the Study Area

Roosting habitat	Area of roosting habitat (ha)		Total area of roosting habitat within Study Area (ha)
	Part 1	Part 2	
Roosting habitat	10.0	50.3	60.3

* Potential roosting habitat data has been compiled from the following sources (including the current survey): GHD 2019, FVC 2019, AECOM 2016, Coffey 2015a and GHD 2014.

Figure 6.6: Black cockatoo foraging habitat within Part 1 of the Study Area

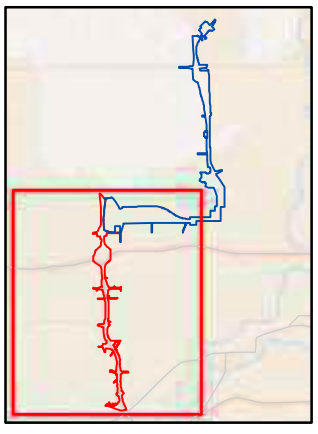


Legend

- Study Area Part 1 - Bayswater to Malaga
- Study Area Part 2 - Malaga to Ellenbrook
- Evidence of Black Cockatoo Foraging (ELA 2020)

Foraging Quality

- High
- Moderate
- Low
- Nil



0 0.25 0.5 1
Kilometers
Datum/Projection:
GDA 1994 MGA Zone 56

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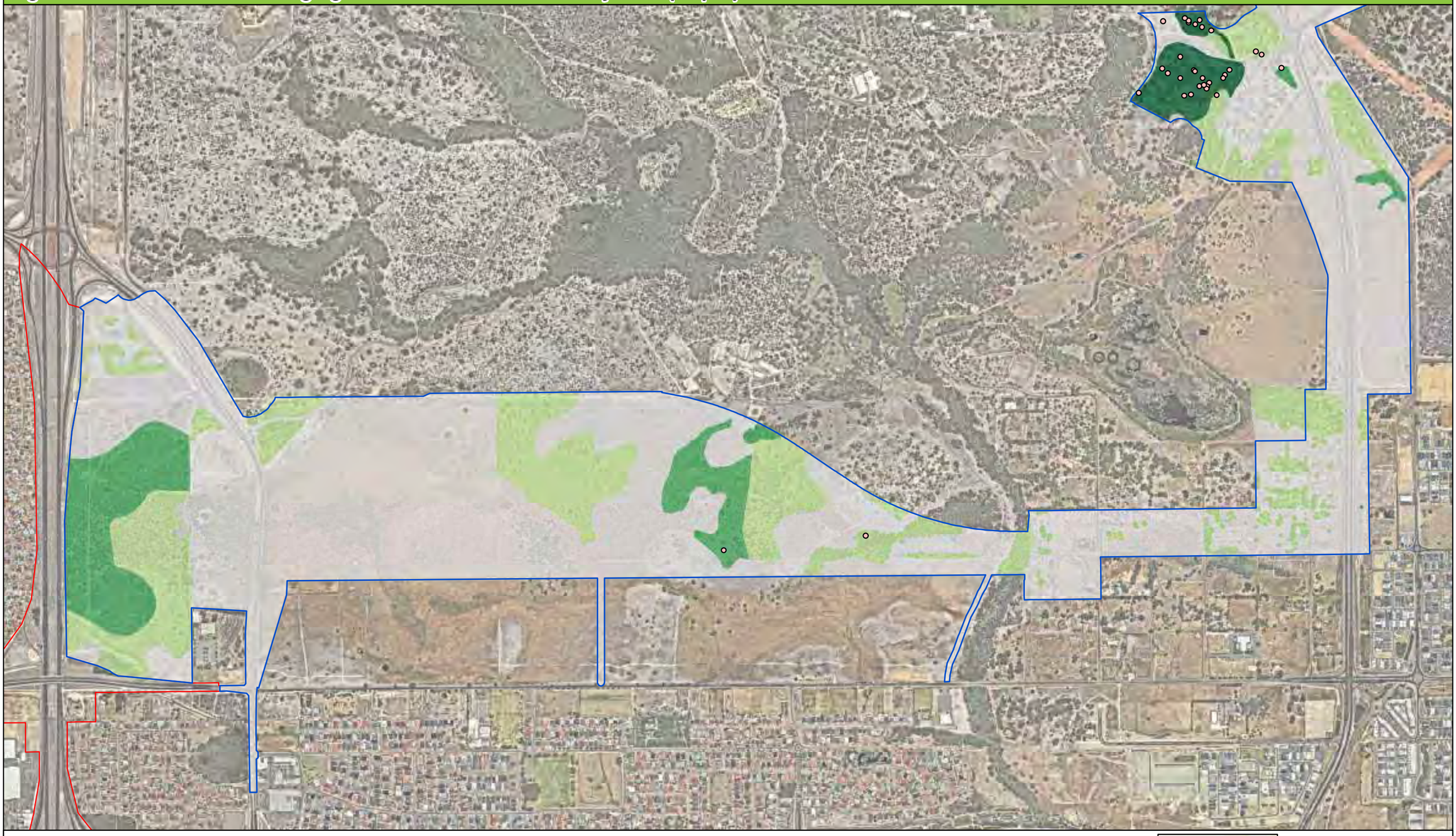
Figure 6.7: Black cockatoo foraging habitat in Part 2 of the Study Area (Map A)

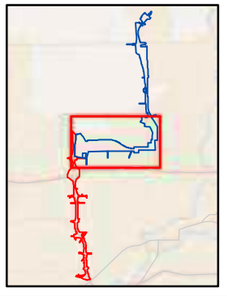


Legend

- Part 1 Study Area - Bayswater to Malaga
- Part 2 Study Area - Malaga to Ellenbrook

Foraging Quality

- High
- Moderate
- Low
- Nil



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Metres

Datum/Projection:
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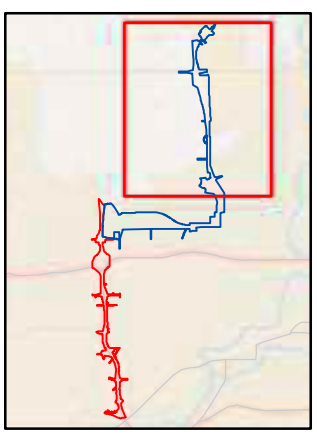
Figure 6.8: Black cockatoo foraging habitat within Part 2 of the Study Area (Map B)

Legend

- Study Area Part 2 - Malaga to Ellenbrook
- Evidence of Black Cockatoo Foraging (ELA 2020)

Foraging Quality

- High
- Moderate
- Low
- Nil



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Kilometers

Datum/Projection:
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Figure 6.9: Potential breeding habitat within Part 1 of the Study Area

Legend

- Part 1 Study Area - Bayswater to Malaga
- Part 2 Study Area - Malaga to Ellenbrook
- Tree with Hollow
- Tree without Hollow

Species

- *Corymbia calophylla*
- *Corymbia citriodora*
- *Eucalyptus camaldulensis*
- *Eucalyptus gomphocephala*
- *Eucalyptus marginata*
- *Eucalyptus patens*
- *Eucalyptus rudis*
- *Eucalyptus todtiana*
- *Eucalyptus* sp. (planted/non-native)
- Dead Stag

0 0.25 0.5 1
Kilometers
Datum/Projection:
GDA 1994 MGA Zone 56

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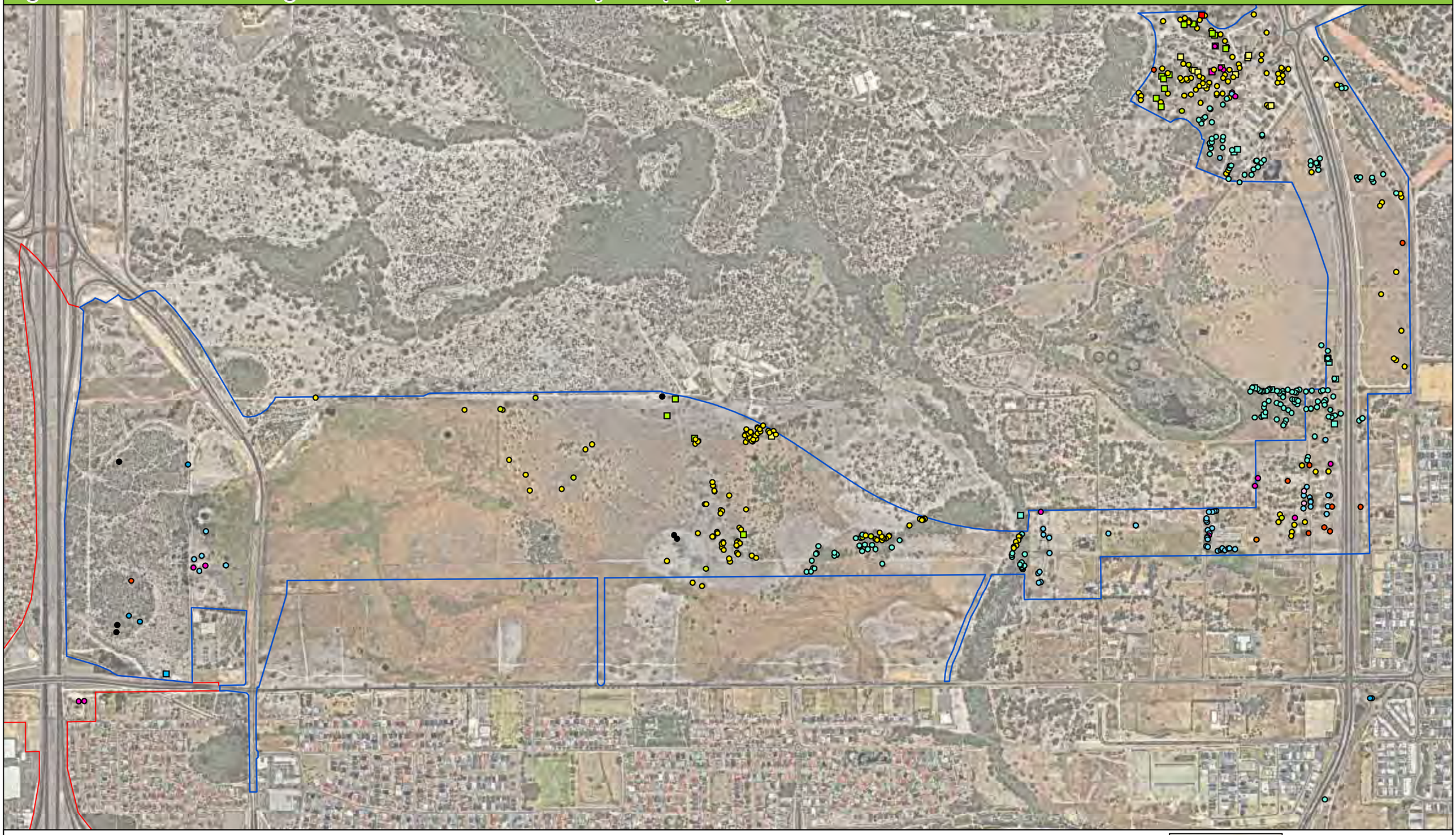
Prepared by: GM Date:29/04/2020

*ELA 2020, GHD 2019, FVC 2019, Terrestrial Ecosystems 2018, AECOM 2016, Coffey 2015a, GHD 2014, 360 Environmental 2013a

Figure 6.10: Potential breeding habitat within Part 2 of the Study Area (Map A)



Legend

- Part 1 Study Area - Bayswater to Malaga
- Part 2 Study Area - Malaga to Ellenbrook
- Tree with Hollow
- Tree without Hollow

Species

- *Corymbia calophylla*
- *Corymbia citriodora*
- *Eucalyptus camaldulensis*
- *Eucalyptus gomphocephala*
- *Eucalyptus marginata*
- *Eucalyptus patens*
- *Eucalyptus rudis*
- *Eucalyptus todtiana*
- *Eucalyptus* sp. (planted/non-native)
- Dead Stag

0 125 250 500
Metres
Datum/Projection:
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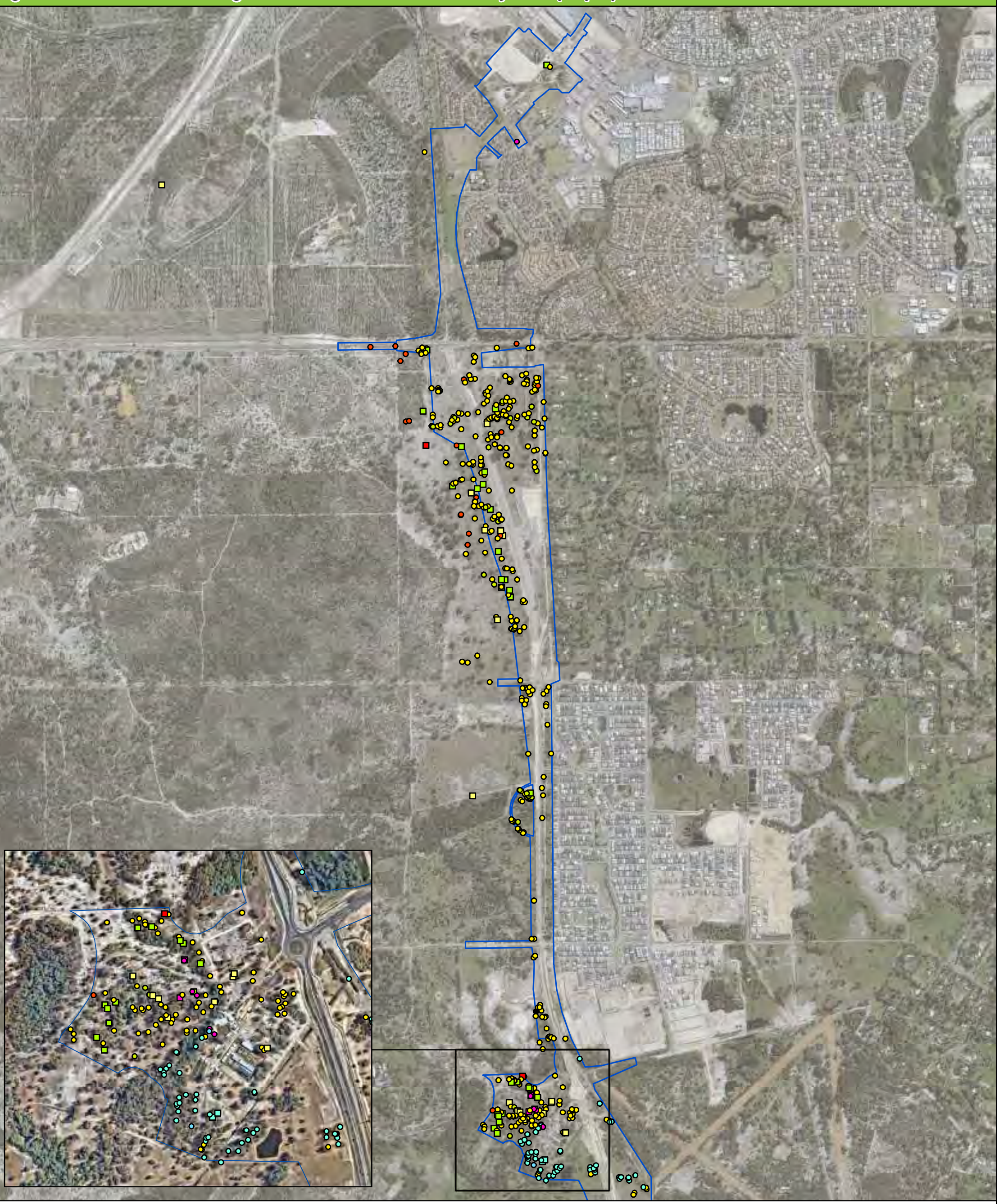
*ELA 2020, GHD 2019, FVC 2019, Terrestrial Ecosystems 2018, AECOM 2016, Coffey 2015a, GHD 2014, 360 Environmental 2013a

Figure 6.11: Potential breeding habitat within Part 2 of the Study Area (Map B)



Legend

- Part 2 Study Area - Malaga to Ellenbrook
- Tree with Hollow
- Tree without Hollow

Species

- *Corymbia calophylla*
- *Corymbia citriodora*
- *Eucalyptus camaldulensis*
- *Eucalyptus gomphocephala*
- *Eucalyptus marginata*
- *Eucalyptus patens*
- *Eucalyptus rudis*
- *Eucalyptus todtiana*
- Eucalyptus sp. (planted/non-native)
- Dead Stag

0 0.25 0.5 1
Kilometers
Datum/Projection:
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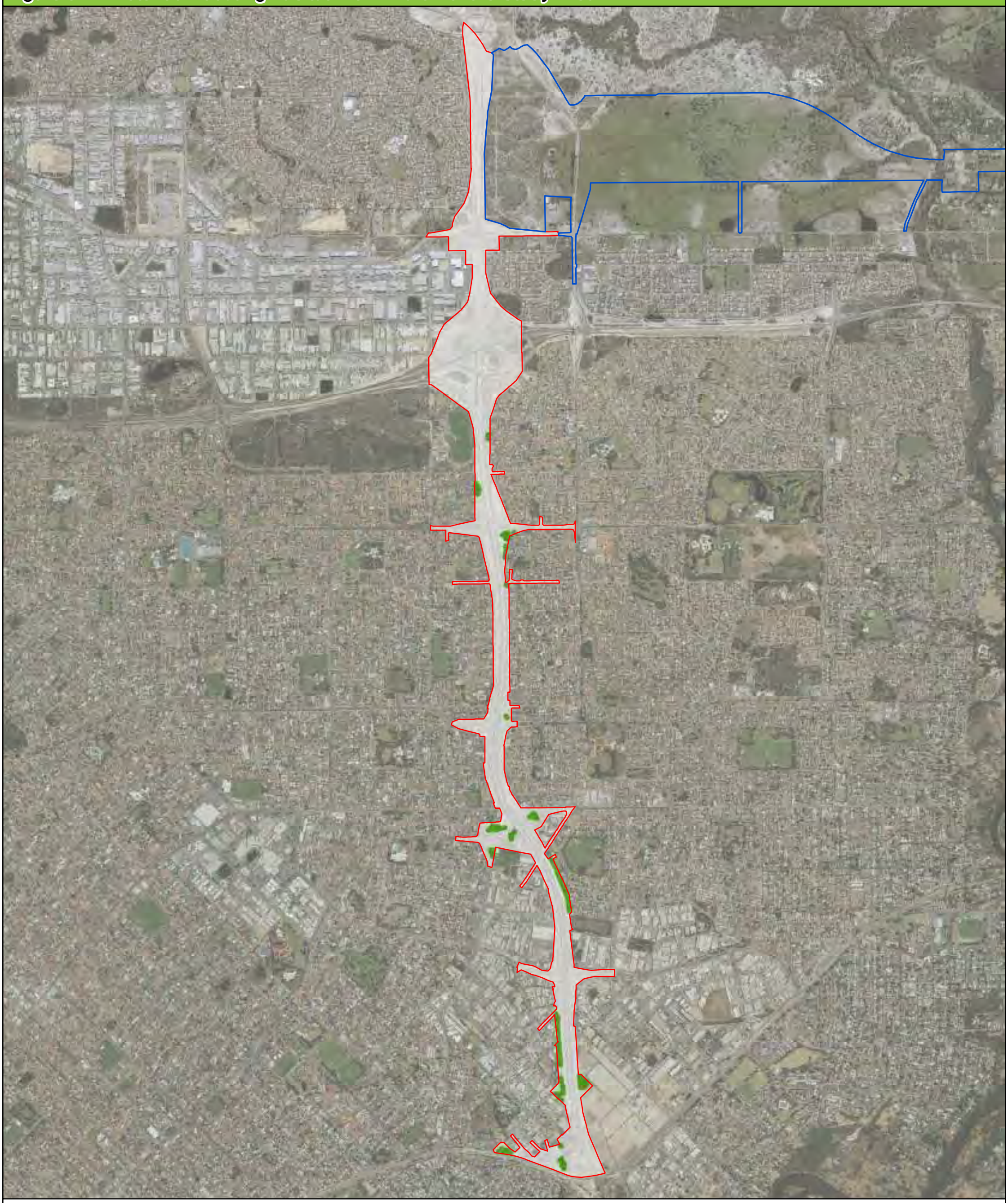
*ELA 2020, GHD 2019, FVC 2019, Terrestrial Ecosystems 2018, AECOM 2016, Coffey 2015a, GHD 2014, 360 Environmental 2013a

Figure 6.12: Potential roosting habitat within Part 1 of the Study Area



Legend

- Part 1 Study Area - Bayswater to Malaga
- Part 2 Study Area - Malaga to Ellenbrook

Potential Roosting Habitat

- Roosting
- Non Roosting

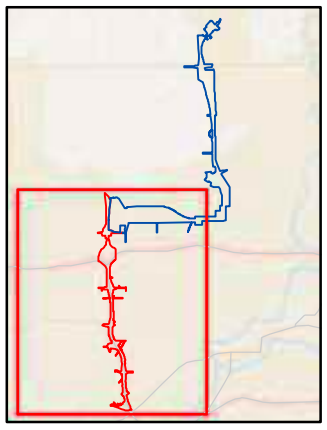


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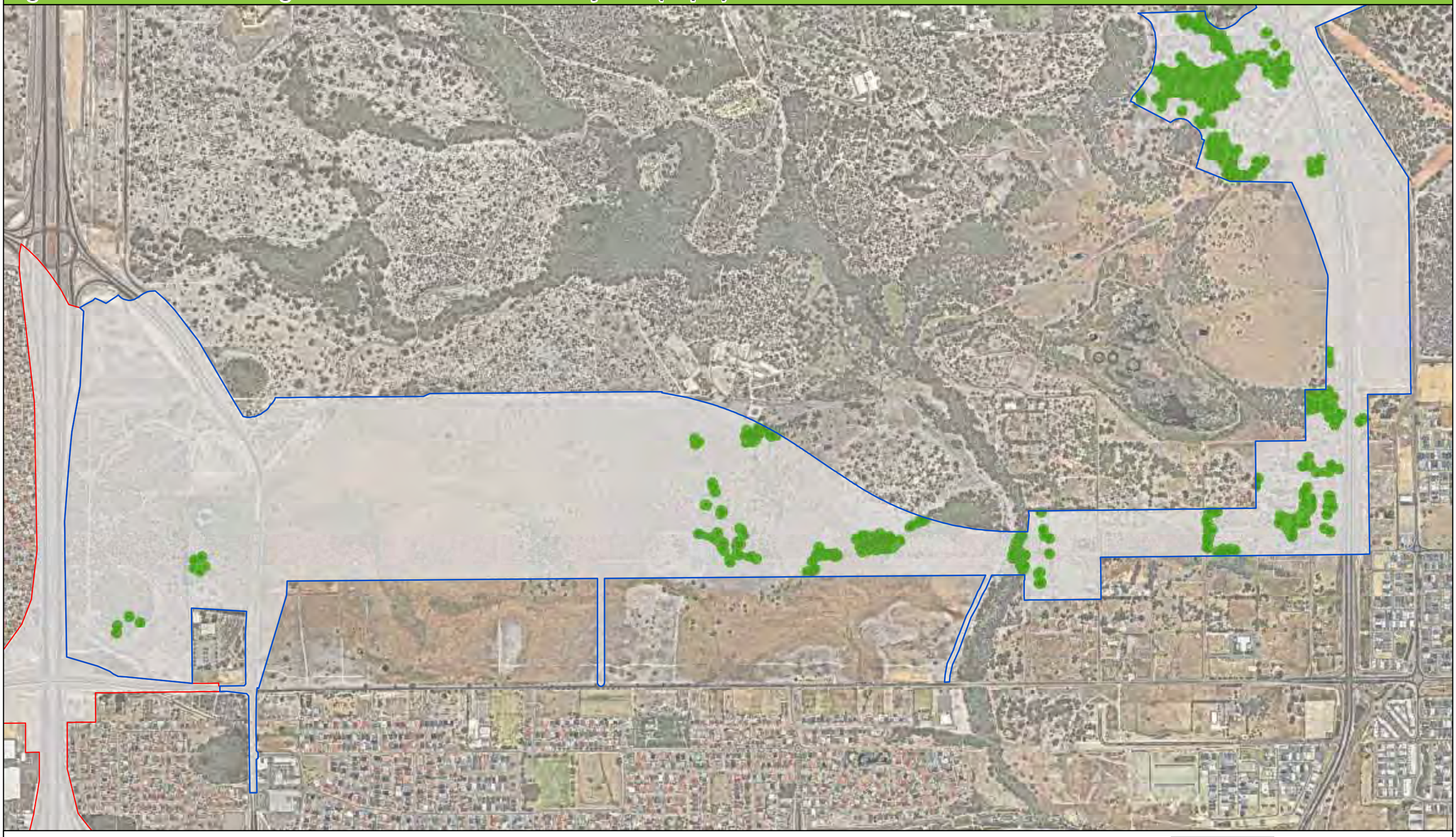
Figure 6.13: Potential roosting habitat within Part 2 of the Study Area (Map A)

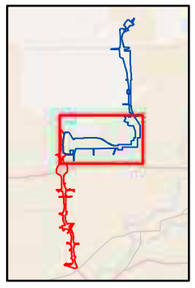


Legend

- Part 1 Study Area - Bayswater to Malaga
- Part 2 Study Area - Malaga to Ellenbrook

Potential Roosting Habitat

- Roosting
- Non Roosting



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Metres

Datum/Projection:
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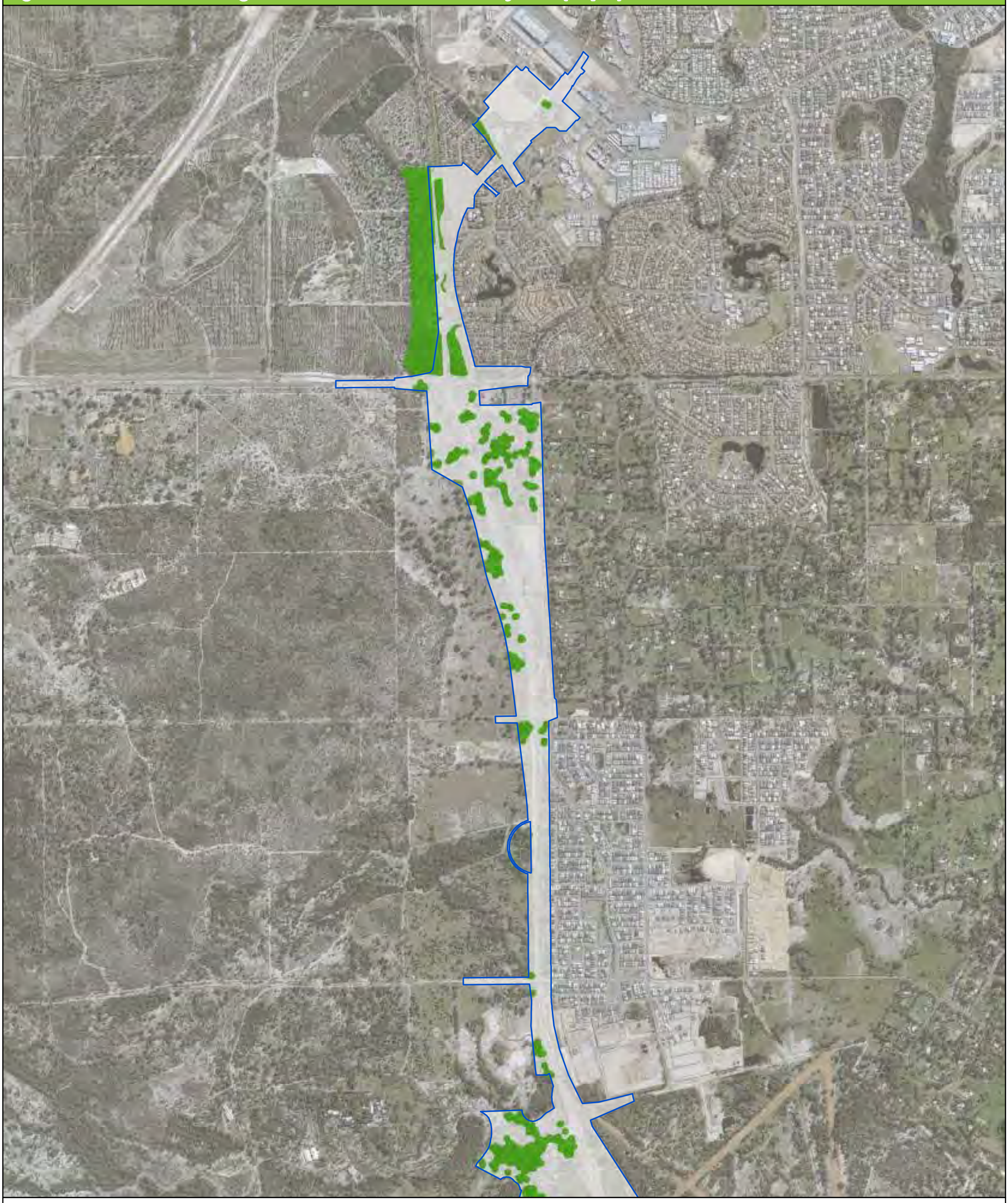
Figure 6.14: Potential roosting habitat within Part 2 of the Study Area (Map B)

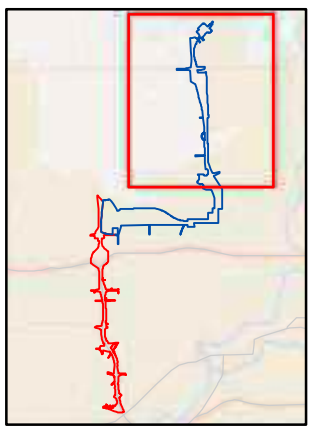


Legend

Part 2 Study Area - Malaga to Ellenbrook

Potential Roosting Habitat

- Roosting
- Non Roosting



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7. Discussion

The terrestrial fauna and black cockatoo habitat assessment has been undertaken in accordance with all relevant guidance to provide a comprehensive and consolidated report and mapping layer for the entire Study Area. There was one minor constraint encountered during the assessment due to accessibility issues onto two private properties at Bennett Springs; however, this constraint was considered minor and the broad fauna habitat types and potential black cockatoo habitat values in these areas were successfully mapped. Otherwise, there were no constraints or limitations to the assessment.

7.1 Terrestrial fauna

A total of 16 broad fauna habitat types are present within the Study Area, of which 10 occur in Part 1 and 15 occur in Part 2. The fauna habitats vary greatly in condition, ranging from vegetation in Completely Degraded condition to intact native vegetation in Very Good or Excellent condition.

A total of 129 terrestrial vertebrate fauna species have been recorded within the Study Area during previous and current surveys. This includes 10 Mammals (3 native and 7 introduced), 91 birds (88 native and 3 introduced), 21 reptiles (all native) and seven amphibians (all native frogs). This represents a fraction of the fauna species expected to occur (~520 species; 24%); however, the high number of fauna species expected to occur is likely due to the wide database search buffer (e.g. 5-10 km) and includes species that would not occur (i.e. pelagic, oceanic or wholly aquatic species). The number of fauna recorded during previous and current surveys (123 species) is relatively high, particularly considering the highly urbanised nature of the Study Area and surrounds and when compared to nearby fauna surveys undertaken in areas of similar size (i.e. ~69 species recorded at Neerabup Lot 701 Flynn Drive; ELA 2012) thus demonstrating that the survey effort to date has been successful at capturing the fauna assemblage of the Study Area.

Each part of the Study Area is discussed in further detail below.

7.1.1 Part 1 Bayswater to Malaga

The majority of Part 1 of the Study Area is already cleared or comprises existing infrastructure (~182.6 ha; 89%). A total of 10 broad fauna habitats were mapped within the 22.5 ha of vegetation remaining within Part 1 of the Study Area. Fauna habitats in Part 1 of the Study Area contain a mixture of natural and man-made habitats and generally comprise of highly degraded, small patches of remnant or planted vegetation, often situated along the roadside. Despite the location and degraded condition, these habitats may provide refuge for a variety of terrestrial fauna in an otherwise highly fragmented landscape. None of the fauna habitats in Part 1 of the Study Area are considered significant as they do not provide habitat for conservation significant fauna; however, some of the habitats do provide suitable foraging, potential breeding and/or suitable roosting habitat for black cockatoos.

A total of two conservation significant fauna species were recorded in Part 1 of the Study Area including Carnaby's Cockatoo and Forest Red-tailed Black Cockatoo. Quenda were previously recorded in an area of revegetation adjacent to Part 1 of the Study Area by GHD in 2014; however, this location is outside the Study Area. There is no suitable habitat for Quenda in Part 1 of the Study Area. A further three

conservation significant fauna could potentially occur in Part 1 of the Study Area including Baudin's Cockatoo, Peregrine Falcon and Rainbow Bee-eater.

None of the conservation significant fauna recorded or considered to potentially occur are restricted to, or wholly dependent upon, habitats that occur within Part 1 of the Study Area.

7.1.2 Part 2 Malaga to Ellenbrook

Approximately 23% (~114.4 ha) of Part 2 of the Study Area is already cleared or comprises existing infrastructure whereas the remaining 77% (386.6 ha) comprises 15 broad fauna habitats. Remnant vegetation within the broad fauna habitats mapped in Part 2 of the Study Area was generally more intact than similar habitats mapped in Part 1. Whilst the habitats present in Part 2 were also impacted from, dumped rubbish, weeds and feral fauna, they generally had a higher level of ecological connectivity, particularly in and around Whiteman Park (to the north west and west of the Study Area). Fauna habitats in the northern section of Part 2 of the Study Area, in and around Ellenbrook, occur in small patches and are highly fragmented by roads or surrounding urbanisation. These habitats have little to no ecological linkages but still provide resources for a variety of fauna. For example, a Black-shouldered Kite and the Rainbow Bee-eater were both observed nesting in this section, despite the lack of ecological connectivity and highly fragmented nature of the habitat present.

A number of fauna habitats recorded within Part 2 of the Study Area potentially support conservation significant fauna such as Quenda, Black-stripe Snake and the Water Rat including the Banksia Woodland, Mixed Eucalyptus/Corymbia Woodland, Flooded Gum Woodland, and the Wetland/watercourse habitats.

The Banksia Woodland habitat present within Part 2 of the Study Area is considered to be significant as it represents the Banksia Woodlands of the Swan Coastal Plain TEC and is likely to provide suitable habitat for a number of conservation significant fauna. Banksia Woodland habitat within Part 1 of the Study Area is not considered to be significant as it is unlikely to support conservation significant fauna or represent the TEC due to high levels of degradation; however, it is still considered to provide suitable foraging habitat for Carnaby's, and to a lesser extent Baudin's, Cockatoo.

The fauna assemblage of Part 2 of the Study Area is much more diverse than Part 1 with more native mammals, birds and reptiles being recorded, including conservation significant fauna species. This is likely due to the higher number of fauna habitats and greater ecological connectivity between habitats present within Part 2 of the Study Area, Whiteman Park and the wider surrounds.

A total of four conservation significant fauna species have been recorded within Part 2 of the Study Area including Carnaby's Cockatoo, Forest Red-tailed Black Cockatoo, Quenda and Rainbow Bee-eater. A further eight conservation significant species are considered to potentially occur. None of the conservation significant fauna recorded or considered to potentially occur are restricted to habitats that occur within Part 2 of the Study Area.

Two potential Quenda diggings were recorded within, or in close proximity (i.e. within 100 m) to, Part 2 of the Study Area. These habitats extend beyond the Study Area boundary. As such, Quenda are not restricted to any of the habitats within Part 2 of the Study Area. No other conservation significant fauna recorded or potentially occurring within Part 2 of the Study Area are solely reliant on any of the fauna

habitats present and all the fauna habitats, except the Banksia Woodland TEC west of Beechboro Road, extend beyond the boundaries of the Study Area.

7.2 Black Cockatoos

The majority of the Study Area is either cleared or comprises vegetation that provides little to no foraging habitat for black cockatoos (~559.8 ha; 79.3%). However, approximately 146.2 ha (20.7%) of the Study Area provides foraging habitat for black cockatoos. In addition, there are a high number of potential breeding trees (~850 trees) and roosting habitat (~60.3 ha) available throughout both Parts 1 and 2 of the Study Area.

At least 19 species of plants that provide preferred foraging resources for black cockatoos occur within the Study Area. The *Allocasuarina*, *Eucalyptus camaldulensis*, Marri, and Jarrah trees provide preferred foraging habitat for all three species of black cockatoo. In addition, the proteaceous species such as Banksia and Hakea, and the *Pinus* spp. also provide suitable foraging for Carnaby's and Baudin's Cockatoo.

Carnaby's Cockatoo and Forest Red-tailed Black Cockatoo are utilising both Part 1 and Part 2 of the Study Area for foraging; however, there has been no evidence of breeding or roosting recorded within the Study Area to date. Baudin's Cockatoo could potentially utilise the Study Area for foraging on an occasional basis (there have only been a few records of this species occurring in proximity to the Study Area); however, it is unlikely to utilise the Study Area for breeding or roosting as this species generally roosts and breeds in the Jarrah Forrest and Warren bioregions of WA (SEWPaC 2012; DoEE 2017; Terrestrial Ecosystems 2018).

7.2.1 Part 1 Bayswater to Malaga

Part 1 of the Study Area contains 13 of the 19 suitable black cockatoo foraging species recorded across the entire Study Area. A total of 3.5 ha of moderate and high-quality foraging habitat for black cockatoos is available within Part 1 of the Study Area and was generally associated with the Mixed *Banksia*/ and Mixed *Eucalyptus*/*Corymbia* Woodland habitats and the Scattered Trees/Shrubs fauna habitats. Most of these fauna habitats consist of small linear, fragmentated patches along the Tonkin Highway road reserve which are highly degraded; however, they do contain preferred foraging species for black cockatoos such as Banksia, Hakea and/or Marri, which generally had good canopy cover (i.e. 40-60%) and some of which, also had records of foraging evidence such as direct sightings or chewed Banksia cones/Marri nuts. Given that the closest known breeding site occurs over 18 km away, and that the majority of breeding occurs outside the Perth Metropolitan Area, the foraging habitats available within Part 1 of the Study Area are unlikely to support breeding. Suitable foraging habitat also occurs within 7 km of Part 1 of the Study Area, within Lighting Swamp, Orchid Park, Bush Forever Site 386 next to Perth Airport, as well as within isolated patches of vegetation within smaller sporting or recreational reserves throughout the wider Perth Metropolitan Area. The moderate to high quality habitat available within Part 1 of the Study Area, along with the foraging habitats available within the wider area, are likely to provide ecological linkages and stepping stones that enable black cockatoos to move through the landscape and which are likely to provide important foraging habitat during the non-breeding season (EPA 2019); however, given the small patch size and highly fragmented nature of the moderate to high quality foraging habitat available within Part 1 of the Study Area, any potential impacts to these areas are unlikely to be significant to black cockatoos.

Part 1 of the Study Area also contains potential breeding habitat for black cockatoos which includes 145 potential breeding trees, four of which had hollows potentially suitable for nesting (i.e. with an entrance diameter over 10 cm); however, no evidence of breeding has been recorded within Part 1 of the Study Area during any of the previous or current surveys. Given that no evidence of breeding has been recorded to date, the lack of documented breeding on the Swan Coastal Plain and more specifically, in the Perth Metropolitan Area in general, it is considered unlikely that any of the black cockatoo species are currently utilising Part 1 of the Study Area for breeding.

A total of 10.0 ha of suitable roosting habitat also occurs within Part 1 of the Study Area. In addition, there are known roost sites approximately 4 km north west of Part 1 of the Study Area in Koondoola Regional Bushland (Birdlife 2019); however, there are no known roost sites within the Study Area, and no evidence of roosting within Part 1 of the Study Area has been recorded to date.

7.2.2 Part 2 Malaga to Ellenbrook

There is a total of 62.4ha of moderate to high quality foraging habitat for black cockatoos in Part 2 of the Study Area, most of which was associated with the *Banksia* Woodland, Mixed *Banksia* and Mixed *Eucalyptus*/*Corymbia* Woodlands, Pine Plantation, and Paddocks with *Eucalyptus*/*Corymbia* fauna habitats. These habitats generally contained a variety of preferred foraging species, had good canopy cover or density and/or contained numerous records of foraging evidence. In addition, suitable foraging habitat occurs within 7 km of Part 2 of the Study Area including the Gnangara-Pinjar Pine Plantations directly to the west and north of Part 2 of the Study Area, as well as within remnant native vegetation throughout Whiteman Park, within Bush Forever Sites 22, 300, 304, 200, 399, 195, 198, 480, 305, 192, and in smaller reserves and parks throughout the wider Perth Metropolitan Area. These areas of foraging habitat, together with the moderate to high quality foraging habitat within Part 2 of the Study Area, are likely to provide ecological linkages and stepping stones that enable black cockatoos to move through the landscape (EPA 2019). There is one known breeding site buffer within 6 km of these habitats (DBCA 2019b); however, given that the majority of breeding occurs outside the Perth Metropolitan Area, the foraging habitats available within Part 2 of the Study Area are unlikely to support breeding. The moderate to high quality foraging habitat available within Part 2 of the Study Area is however, likely to provide important foraging habitat during the non-breeding season (EPA 2019).

The *Banksia* Woodland habitat contains proteaceous species which provide preferred foraging for Carnaby's Cockatoo (and to a lesser extent, Baudin's). This habitat type does not generally provide preferred foraging for Forest Red-tailed Black Cockatoo. *Banksia* Woodland habitats in Part 2 of the Study Area were in generally intact and in good condition, were large in patch size and contained a variety of preferred foraging species with a good canopy cover/density. As such, the *Banksia* Woodland habitats in Part 2 of the Study Area were designated as high-quality foraging habitat for black cockatoos.

The Mixed *Banksia*/ and mixed *Eucalyptus*/*Corymbia* Woodland habitats comprised a mixture of preferred foraging species for all three species of black cockatoo including Banksias and/or Marri, Jarrah, Tuart, Flooded Gum, Blackbutt and *Allocasuarina*. In Part 2 of the Study Area, these habitat types also contained scattered Pines which provide a high-quality foraging resource for Carnaby's Cockatoo. The Mixed Banksia/ and mixed Eucalyptus/Corymbia Woodland habitats contain foraging resources for all three species of black cockatoo, as well as potential breeding and/or roosting habitat and were generally

considered to represent moderate or high-quality habitat, depending upon condition, density and presence of foraging evidence.

The Pine Plantation habitat in Part 2 of the Study Area and immediate surrounds are of importance to Carnaby's Cockatoo as they provide high quality foraging habitat for the species which has recently adapted to feeding on pinecones (EPA 2019). Pine plantations also provide suitable roosting habitat for this species and known roost sites do occur within the Gnangara-Pinjar Pine Plantation to the north west of the Study Area.

The Paddocks with *Eucalyptus*/*Corymbia* habitat within Part 2 of the Study Area was highly degraded and provides little value to fauna in general; however, the large, mature stands of Marri trees present throughout this habitat type do provide quality foraging habitat for black cockatoos. In addition, evidence of use was recorded at multiple locations throughout this habitat type, and as such, the Marri trees represent high quality foraging habitat for all three species of black cockatoo. Paddock trees are well known to provide high-quality foraging habitat for black cockatoos, particularly where they occur in proximity to breeding (DoEE 2019b).

Combining all previous and current survey data has resulted in a total of 705 potential breeding trees being recorded within Part 2 of the Study Area. Of these, 44 trees contain hollows potentially suitable for nesting black cockatoos (i.e. with an entrance over 10 cm diameter); however, no evidence of breeding was recorded during previous or current surveys. Given that no evidence of breeding has been recorded to date, the lack of documented breeding on the Swan Coastal Plain and more specifically, in the Perth Metropolitan Area in general, it is considered unlikely that any of the black cockatoo species are currently utilising Part 2 of the Study Area for breeding. There given the recent shift in black cockatoo breeding ranges, the potential breeding trees within Part 2 of the Study Area may provide suitable breeding habitat, at least for Carnaby's Cockatoo and Forest Red-tailed Black Cockatoo, in the future (Coffey 2015; EPA 2019).

The majority of the potential breeding trees within Part 2 of the Study Area, as well as the Pine Plantation habitat, provide suitable roosting habitat for black cockatoos. Known (confirmed) roost sites do occur in close proximity (i.e. less than 1 km) to Part 2 of the Study Area; for example, there are two known Carnaby's Cockatoo roost sites approximately 340-370 m to the west and north west of Part 2 of the Study Area, and a known Forest Red-tailed Black Cockatoo roost site ~730 m west of Part 2 of the Study Area in Whiteman Park (Birdlife 2019; Murdoch University 2016). However, there are no known roost sites within Part 2 of the Study Area itself (Birdlife 2019).

7.2.3 Habitat critical to the survival of the species

Identified breeding and nearby feeding habitat (i.e. within 12 km of a breeding site), former breeding habitat that has hollows intact and vegetation that provides habitat for feeding, watering and regular night roosting for Carnaby's Cockatoo is defined as 'habitat critical to the survival' of the species (DPaW 2013). This includes all areas of breeding habitat including known nesting trees, and foraging areas that support breeding. Based on this definition, the moderate and high-quality foraging habitats and potential breeding/roosting habitats within the Study Area are likely to represent 'habitat critical to the survival of the species' as they contain vegetation that provides habitat for feeding, watering and (potentially) regular night roosting. However, the foraging habitat within the Study Area is unlikely to

support breeding given that birds will only forage up to a maximum of 12 km from a breeding site and the closest breeding site is >18 km away (SEWPaC 2012; Roberts 2016).

Habitat critical to the survival of the Forest Red-tailed Black Cockatoo and Baudin's Cockatoo comprises all Marri, Karri and Jarrah forests, woodlands and remnants in the south west of WA receiving more than 600 mm of average rainfall per year (DEC 2008). Habitat critical to the survival of the species is specifically defined as (DEC 2008):

- Areas currently occupied by the cockatoos;
- Areas not currently occupied due to recent fire but capable of supporting cockatoo populations when sufficiently recovered;
- Areas of natural vegetation in which the cockatoos' nest, feed and roost;
- Areas of natural vegetation through which cockatoos can move from one occupied area to another; and
- Areas of suitable vegetation within the recorded range in which undiscovered cockatoo populations may exist.

The moderate to high quality foraging habitats and potential breeding and roosting habitats within the Study Area are likely to represent 'habitat critical to the survival of the species' as defined by DEC (2008) as the habitats represent: areas currently occupied by the cockatoos, areas of natural vegetation in which the cockatoos feed and (potentially) roost, and areas of natural vegetation through which cockatoos can move from one occupied area to another.

Under the EPBC Act, an Action is considered likely to have a significant impact on black cockatoos if there will be any loss of nesting or breeding habitat or any loss of very high to high quality foraging habitat. Actions that are likely to result in a significant impact require referral to the Australian Government (SEWPaC 2012; DoEE 2017).

Although some of the black cockatoo habitat present within the Study Area represents habitat critical to the survival of the species, black cockatoos are highly nomadic in nature and are unlikely to solely depend on any of the habitats present. Suitable foraging, breeding and roosting habitat occurs in the wider region, particularly throughout Whiteman Park to the west, connecting through to habitat in the Gnangara Pine Plantation to the north west. Suitable habitat also occurs throughout Bush Forever Sites, Parks and Reserves in the wider Perth Metropolitan Area; however, these habitats are often highly fragmented and patchy, and being increasingly impacted from pressures associated with surrounding urbanisation. Maintaining connecting corridors of vegetation between foraging resources, breeding habitat and night roosting sites is essential to enable black cockatoos to access resources across their range, and it is therefore important to implement measures to mitigate and manage impacts that are likely to cause further loss, fragmentation and degradation of black cockatoo habitat (DoEE 2017). In addition, the Swan Coastal Plain is considered a critical foraging area for Carnaby's Cockatoo during the non-breeding season, and therefore adopting mitigation measures to reduce impacts to this type of habitat in the region is necessary for the ongoing viability of foraging habitat for this species.

7.3 Fauna linkage and movement

The historic clearing and spread of urbanisation within the Perth IBRA subregion has increased the significance of some remaining areas of intact native vegetation. Conservation areas of significance and ecological linkages do occur in and around the Study Area and are important for the long-term protection of fauna habitat. Ensuring the linkages between these patches of native vegetation are maintained will allow for the movement of fauna (and flora) between areas of refugial habitat and assist in reducing genetic isolation or the risk of local extinction (ELA 2019; WALGA 2004).

7.3.1 Part 1 Bayswater to Malaga

Part 1 intersects one ecological linkage corridor (the east-west corridor following the Reid Highway road reserve refer to Section 3.6); however, this linkage has been severely fragmented by the Reid Highway Interchange and associated works and as such, the Project is unlikely to impact this ecological linkage any further.

7.3.2 Part 2 Malaga to Ellenbrook

Part 2 of the Study Area intersects two ecological linkage corridors and will therefore result in further fragmentation of these corridors. These linkages are already somewhat fragmented by major and minor roads, high fencing and surrounding urbanisation (refer to Section 3.6); however, further fragmentation will still likely have implications for the fauna assemblage of the area. Implications for fauna may include a reduction in habitat/foraging areas, isolating populations, displacing individual animals, increasing pressure on surrounding habitats which may or may not have the carrying capacity required to accommodate displaced animals, reducing population viability and increasing risk of mortality through vehicle/rail strike (Bamford and Shepherd 2019). This may be a particular issue in and around the Marshall Road Paddocks which are part of Whiteman Park and provide abundant foraging for *Macropus Fuliginosus* (Western Grey Kangaroo; Bamford 2020b).

In order to reduce the effects of habitat fragmentation and assist with maintaining the two ecological linkage corridors that are intersected by the Study Area, a number of management options should be considered including fauna crossings, feral fauna control, domestic animal management, access and fire management, rehabilitation and weed control (Bamford and Shepherd 2019; Bamford 2020a, b). Management options should consider the general fauna assemblage of the area in addition to conservation significant fauna species which are known to occur or which could potentially occur, in this case Carnaby's Cockatoo, Forest Red-tailed Black Cockatoo, Baudin's Cockatoo, Western Brush Wallaby, Quenda, Water Rat, Rainbow Bee-eater, Black-striped Snake and the Jewelled Sandplain Ctenotus.

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8. Conclusion

8.1.1 Part 1 Bayswater to Malaga

Ten broad fauna habitat types have been mapped within Part 1 of the Study Area. None of the fauna habitats are significant or provide suitable habitat for any conservation significant fauna (except for black cockatoos). Most of the fauna habitats present are restricted to Part 1 of the Study Area and are highly degraded, isolated and fragmented. Despite this, some of the habitats present still provide some moderate value for terrestrial fauna, mainly avifauna and reptiles.

The diversity of the fauna assemblage that occurs within Part 1 of the Study Area is relatively high, particularly considering the highly urbanised nature of the Study Area and immediate surrounds. Part 1 of the Study Area provides habitat for two known conservation significant fauna species: Carnaby's Cockatoo and Forest Red-tailed Black Cockatoo; and a further three conservation significant fauna could potentially occur: Baudin's Cockatoo, Peregrine Falcon and Rainbow Bee-eater. None of the conservation significant fauna species present or with potential to occur are restricted to, or wholly dependent on, any of the habitats available within Part 1 of the Study Area. In terms of black cockatoo habitat, Part 1 of the Study Area provides suitable foraging, potential breeding and roosting habitat, primarily for Carnaby's and Forest Red-tailed Black Cockatoos. Both species are currently utilising some areas of Part 1 of the Study Area for foraging; however, no evidence of breeding or known roosting has been recorded within the Study Area to date.

Given the highly degraded and isolated nature of the fauna habitats present within Part 1 of the Study Area, any further disturbance would be unlikely to have any significant impact on terrestrial fauna or conservation significant fauna in general. The Project is unlikely to result in fragmentation of any of the broad fauna habitats given that they are already highly fragmented and isolated. Consideration should be given to those fauna habitats that provide moderate to high quality foraging habitat for black cockatoos where possible; however, given that these areas are of small patch size and are already highly fragmented, any potential impacts to these areas are unlikely to be significant.

8.1.2 Part 2 Malaga to Ellenbrook

A total of 15 broad fauna habitat types occur in Part 2 of the Study Area, which provides habitat for a high diversity of fauna. The fauna habitats present within Part 2 of the Study Area also provide habitat for a number of conservation significant fauna known to occur in the region including Carnaby's Cockatoo, Forest Red-tailed Black Cockatoo, Quenda and Rainbow Bee-eater, and a further seven species which could potentially occur including: Baudin's Cockatoo, Black-striped Snake, Jewelled Sandplain Ctenotus, Western Brush Wallaby, Water Rat, Peregrine Falcon and the Red-winged Fairy Wren. None of these species are likely to be restricted to habitats within the Study Area, given that most the habitats extend beyond the boundaries of Part 2 of the Study Area. The *Banksia* Woodland habitat within Part 2 of the Study Area is significant as it represents the *Banksia* Woodlands of the Swan Coastal Plain TEC. There is a patch of this habitat type located west of Beechboro Road North which is restricted to Part 2 of the Study Area. Given that it is restricted and may provide suitable habitat for conservation significant fauna, consideration should be given to avoiding and/or minimising direct impacts to this area where possible.

The project will result in fragmentation to some fauna habitats present in the southern section of Part 2 of the Study Area; however, most of those habitats are already impacted by existing roads and surrounding urbanisation and have been subject to prolonged degradation.

Consideration should be given to management options that reduce impacts to the general fauna assemblage, as well as known and potentially occurring conservation significant fauna within Part 2 of the Study Area.

8.1.3 Overall

To conclude, a full suite of data relating to the terrestrial vertebrate fauna and threatened black cockatoo values has been successfully mapped for Part 1 and Part 2 of the Study Area. The assessment has been undertaken in accordance with all relevant guidance, providing a high level of knowledge relating to fauna and black cockatoo values for the Project. Further targeted or fauna trapping surveys are not considered necessary given the number of surveys undertaken for the Project over the years', the extent of knowledge of the fauna assemblage in the Study Area including conservation significant fauna values, and compliance with all relevant legislation and guidance.

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Appendix A Framework for conservation listed flora and fauna in Western Australia

CATEGORIES OF THREATENED SPECIES UNDER THE *ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999* (EPBC ACT)

Threatened fauna and flora may be listed in any one of the following categories as defined in Section 179 of the EPBC Act. Species listed as 'conservation dependent' and 'extinct' are not Matters of National Environmental Significance and therefore do not trigger the EPBC Act.

Category	Definition
Extinct (EX)	There is no reasonable doubt that the last member of the species has died.
Extinct in the Wild (EW)	Taxa known to survive only in captivity or as a naturalised population well outside its past range; or taxa 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.
Critically Endangered (CE)	Taxa considered to be facing an extremely high risk of extinction in the wild.
Endangered (EN)	Taxa considered to be facing a very high risk of extinction in the wild.
Vulnerable (VU)	Taxa considered to be facing a high risk of extinction in the wild.
Near Threatened (NT)	Taxa has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.
Least Concern (LC)	Taxa has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.
Data Deficient (DD)	There is inadequate information to make a direct, or indirect, assessment of taxa's risk extinction based on its distribution and/or population status.
Not Evaluated (NE)	Taxa has not yet been evaluated against the criteria.
Migratory (M)	Not an IUCN category.
	Species are defined as migratory if they are listed in an international agreement approved by the Commonwealth Environment Minister, including: • the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animal) for which Australia is a range state; • the agreement between the Government of Australian and the Government of the People's Republic of China for the Protection of Migratory Birds and their environment (CAMBA); • the agreement between the Government of Japan and the Government of Australia for the Protection of Migratory Birds and Birds in Danger of Extinction and their Environment (JAMBA); or • the agreement between Australia and the Republic of Korea to develop a bilateral migratory bird agreement similar to the JAMBA and CAMBA in respect to migratory bird conservation and provides a basis for collaboration on the protection of migratory shorebirds and their habitat (ROKAMBA).

CONSERVATION CODES FOR WESTERN AUSTRALIA FLORA AND FAUNA

Threatened, Extinct and Specially Protected fauna or flora are species 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.

Threatened species (T)
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.

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 IUCN Red List categories and criteria as detailed below.

Schedule	Code	Description
Schedule 1 Critically Endangered species	S1 (CR)	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 under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for critically endangered fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for critically endangered flora.
Schedule 2 Endangered species	S2 (EN)	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.
Schedule 3 Vulnerable species	S3 (VU)	Threatened species considered to be facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines. Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for

Schedule	Code	Description
		vulnerable fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for vulnerable flora.
Schedule 4 Presumed extinct species	S4 (EX)	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.
Schedule 5 Migratory species birds protected under an international agreement	S5 (MI)	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.
Schedule 6 Conservation dependent fauna	S6 (CD)	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.
Schedule 7 Other specially protected fauna	S7 (OS)	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.

Priority species (P)

Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened flora or fauna.

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.

Category	Code	Definition
Priority 1	P1	*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.
Priority 2	P2	*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.
Priority 3	P3	*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.
Priority 4	P4	*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.

Appendix B Likelihood of occurrence criteria

Likelihood	Criteria
Recorded	The species has previously been recorded within study area from DBCA database search results and/or from previous surveys of the study area, and/or the species has been confirmed through a current vouchered specimen at WA Herbarium.
Likely	The species has not previously been recorded from within the study area. However, (to qualify requires one or more criteria to be met): • the species has been recorded in close proximity to the study area, and occurs in similar habitat to that which occurs within the study area; • core habitat and suitable landforms for the species occurs within the study area either year-round or seasonally. In relation to fauna species, this could be that a host plant is seasonally present on site, or habitat features such as caves are present that may be used during particular times during its life cycle e.g. for breeding. In relation to both flora and fauna species, it may be there are seasonal wetlands present; and • there is a medium to high probability that a species uses the study area.
Potential	The species has not previously been recorded from within the study area. However, (one or more criteria requires to be met): • targeted surveys may locate the species based on records occurring in proximity to the study area and suitable habitat occurring in the study area; • the study area has been assessed as having potentially suitable habitat through habitat modelling; • the species is known to be cryptic and may not have been detected despite extensive surveys; • the species is highly mobile and has an extensive foraging range so may not have been detected during previous surveys; The species has been recorded in the study area by a previous consultant survey or there is historic evidence of species occurrence within the study area. However, (one or more criteria requires to be met): • Doubt remains over taxonomic identification, or the majority of habitat does not appear suitable (although presence cannot be ruled out due to factors such as species ecology or distribution); and/or • Coordinates are doubtful.
Potential (vagrant)	Species has the potential to occur on a vagrant, or transient, basis only in that: • It may occasionally occur within the site; • It may occasionally fly or forage over the site (aerial species only); • It is unlikely to utilise the site for foraging, breeding or nesting; and • It is unlikely to utilise the site on an ongoing or permanent basis.
Unlikely	One or more of the following criteria requires to be met: • The species has been recorded locally through DBCA database searches. However, it has not been recorded within the study area and; o it is unlikely to occur due to the site lacking critical habitat, having at best marginally suitable habitat, and/or being severely degraded; and/or o it is unlikely to occur due to few historic record/s and no other current collections in the local area. • The species has been recorded within the bioregion based on literature review but has not been recorded locally or within the study area through DBCA database searches.

Likelihood	Criteria
	• The species has not been recorded in the study area despite adequate survey efforts, such as a standardised methodology or targeted searching within potentially suitable habitat.
Does not occur	**One or more criteria required to be met:** • The species is not known to occur within the IBRA bioregion based on current literature and distribution. • The conspicuous species has not been recorded in the study area despite adequate survey efforts at an appropriate time of year to detect the species within potentially suitable habitat. • The study area lacks important habitat for a species that has highly selective habitat requirements. • The species has been historically recorded within study area or locally; however, it is considered locally extinct due to significant habitat changes such as land clearing and/or introduced predators.

Appendix C Naturemap and PMST database search results

NatureMap Species Report

Created By Guest user on 16/12/2019

Kingdom	Animalia
Current Names Only	Yes
Core Datasets Only	Yes
Method	'By Circle'
Centre	115° 56' 24" E,31° 51' 00" S
Buffer	10km
Group By	Conservation Status

Conservation Status	Species	Records
Non-conservation taxon	483	30126
Other specially protected fauna	3	32
Priority 2	1	1
Priority 3	4	75
Priority 4	6	277
Protected under international agreement	9	134
Rare or likely to become extinct	14	1997
TOTAL	**520**	**32642**

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Rare or likely to become extinct					
1.	24506	*Anous tenuirostris subsp. melanops (Australian Lesser Noddy)*		T	
2.	25452	*Bettongia penicillata (Woylie, Brush-tailed Bettong)*		T	
3.	24162	*Bettongia penicillata subsp. ogilbyi (Woylie, Brush-tailed Bettong)*		T	
4.	24345	*Botaurus poiciloptilus (Australasian Bittern)*		T	
5.	24731	*Calyptorhynchus banksii subsp. naso (Forest Red-tailed Black Cockatoo)*		T	
6.	24733	*Calyptorhynchus baudinii (Baudin's Cockatoo, White-tailed Long-billed Black Cockatoo)*		T	
7.	24734	*Calyptorhynchus latirostris (Carnaby's Cockatoo, White-tailed Short-billed Black Cockatoo)*		T	
8.	48400	*Calyptorhynchus sp. (white-tailed black cockatoo)*		T	
9.	24092	*Dasyurus geoffroii (Chuditch, Western Quoll)*		T	
10.	24168	*Macrotis lagotis (Bilby, Dalgyte, Ninu)*		T	
11.	24146	*Myrmecobius fasciatus (Numbat, Walpurti)*		T	
12.	25345	*Pseudemydura umbrina (Western Swamp Tortoise, Western Swamp Turtle)*		T	
13.	24166	*Pseudocheirus occidentalis (Western Ringtail Possum, ngwayir)*		T	
14.	34113	*Westralunio carteri (Carter's Freshwater Mussel)*		T	
Protected under international agreement					
15.	41323	*Actitis hypoleucos (Common Sandpiper)*		IA	
16.	25554	*Apus pacificus (Fork-tailed Swift, Pacific Swift)*		IA	
17.	24788	*Calidris ruficollis (Red-necked Stint)*		IA	
18.	48587	*Hydroprogne caspia (Caspian Tern)*		IA	
19.	48591	*Pandion cristatus (Osprey, Eastern Osprey)*		IA	
20.	24843	*Plegadis falcinellus (Glossy Ibis)*		IA	
21.	48597	*Thalasseus bergii (Crested Tern)*		IA	
22.	24806	*Tringa glareola (Wood Sandpiper)*		IA	
23.	24808	*Tringa nebularia (Common Greenshank, greenshank)*		IA	
Other specially protected fauna					
24.	24724	*Cacatua pastinator subsp. pastinator (Muir's Corella, Muir's Corella (Western Corella SW WA))*		S	
25.	25624	*Falco peregrinus (Peregrine Falcon)*		S	
26.	24475	*Falco peregrinus subsp. macropus (Australian Peregrine Falcon)*		S	
Priority 2					
27.	24347	*Ixobrychus flavicollis subsp. australis (Black Bittern (southwest subpop.), Australian Black Bittern)*		P2	
Priority 3					
28.	48574	*Australotomurus morbidus (cemetery springtail, Guildford springtail)*		P3	
29.	34030	*Geotria australis (Pouched Lamprey)*		P3	

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
30.	48935	*Idiosoma sigillatum (Swan Coastal Plain shield-backed trapdoor spider)*		P3	
31.	25249	*Neelaps calonotos (Black-striped Snake, black-striped burrowing snake)*		P3	
Priority 4					
32.	24189	*Falsistrellus mackenziei (Western False Pipistrelle, Western Falsistrelle)*		P4	
33.	24215	*Hydromys chrysogaster (Water-rat, Rakali)*		P4	
34.	48588	*Isoodon fusciventer (Quenda, southwestern brown bandicoot)*		P4	
35.	48022	*Notamacropus irma (Western Brush Wallaby)*		P4	
36.	24328	*Oxyura australis (Blue-billed Duck)*		P4	
37.	33992	*Synemon gratiosa (Graceful Sunmoth)*		P4	
Non-conservation taxon					
38.		*? ?*			
39.	24559	*Acanthagenys rufogularis (Spiny-cheeked Honeyeater)*			
40.		*Acanthaluteres brownii*			
41.	24260	*Acanthiza apicalis (Broad-tailed Thornbill, Inland Thornbill)*			
42.	24261	*Acanthiza chrysorrhoa (Yellow-rumped Thornbill)*			
43.	24262	*Acanthiza inornata (Western Thornbill)*			
44.	24560	*Acanthorhynchus superciliosus (Western Spinebill)*			
45.		*Acariformes sp.*			
46.	25535	*Accipiter cirrocephalus (Collared Sparrowhawk)*			
47.	24281	*Accipiter cirrocephalus subsp. cirrocephalus (Collared Sparrowhawk)*			
48.	25536	*Accipiter fasciatus (Brown Goshawk)*			
49.	24283	*Accipiter fasciatus subsp. didimus (Brown Goshawk)*			
50.	24282	*Accipiter fasciatus subsp. fasciatus (Brown Goshawk)*			
51.		*Acentrogobius bifrenatus*			
52.	25751	*Acridotheres tristis (Common Myna)*	Y		
53.	42368	*Acritoscincus trilineatus (Western Three-lined Skink)*			
54.	25755	*Acrocephalus australis (Australian Reed Warbler)*			
55.		*Akamptogonus novarae*			
56.		*Aldrichetta forsteri*			
57.		*Allothereua maculata*			
58.		*Amblyomma triguttatum*			
59.		*Amniataba caudavittata*			
60.		*Aname mainae*			
61.		*Aname tepperi*			
62.	24310	*Anas castanea (Chestnut Teal)*			
63.	24311	*Anas clypeata (Northern Shoveler)*			Y
64.	24312	*Anas gracilis (Grey Teal)*			
65.	24313	*Anas platyrhynchos (Mallard)*			
66.		*Anas platyrhynchos subsp. domesticus*			
67.	24315	*Anas rhynchotis (Australasian Shoveler)*			
68.	24316	*Anas superciliosa (Pacific Black Duck)*			
69.	47414	*Anhinga novaehollandiae (Australasian Darter)*			
70.		*Anoplocapros lenticularis*			
71.		*Anser anser*			
72.	25241	*Antaresia stimsoni subsp. stimsoni (Stimson's Python)*			
73.	24561	*Anthochaera carunculata (Red Wattlebird)*			
74.	24562	*Anthochaera lunulata (Western Little Wattlebird)*			
75.	25670	*Anthus australis (Australian Pipit)*			
76.		*Apogon victoriae*			
77.	24990	*Aprasia pulchella (Granite Worm-lizard)*			
78.	24991	*Aprasia repens (Sand-plain Worm-lizard)*			
79.	24285	*Aquila audax (Wedge-tailed Eagle)*			
80.		*Aracana aurita*			
81.		*Arachnura higginsi*			
82.		*Araneus senicaudatus*			
83.	25558	*Ardea ibis (Cattle Egret)*			
84.	25559	*Ardea intermedia (Intermediate Egret)*			
85.	41324	*Ardea modesta (great egret, white egret)*			
86.	24340	*Ardea novaehollandiae (White-faced Heron)*			
87.	24341	*Ardea pacifica (White-necked Heron)*			
88.		*Argiope protensa*			
89.		*Argiope trifasciata*			
90.	25566	*Artamus cinereus (Black-faced Woodswallow)*			
91.	24353	*Artamus cyanopterus (Dusky Woodswallow)*			
92.		*Artoria linnaei*			
93.		*Artoriopsis eccentrica*			
94.		*Artoriopsis expolita*			
95.		*Atherinosoma wallacei*			
96.		*Austracantha minax*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
97.		*Austrogomphus (Zephyrogomphus) lateralis*			
98.	24318	*Aythya australis (Hardhead)*			
99.		*Backobourkia brounii*			
100.		*Backobourkia heroine*			
101.		*Badumna insignis*			
102.		*Ballarra longipalpus*			
103.		*Barnardius zonarius*			
104.	24319	*Biziura lobata (Musk Duck)*			
105.		*Bostockia porosa*			
106.	42380	*Brachyurophis fasciolatus subsp. fasciolatus (Narrow-banded Shovel-nosed Snake)*			
107.	42381	*Brachyurophis semifasciatus (Southern Shovel-nosed Snake)*			
108.	24359	*Burhinus grallarius (Bush Stone-curlew)*			
109.	25713	*Cacatua galerita (Sulphur-crested Cockatoo)*			
110.	24721	*Cacatua galerita subsp. galerita (Sulphur-crested Cockatoo)*	Y		
111.	24722	*Cacatua leadbeateri (Major Mitchell's Cockatoo)*			
112.	25714	*Cacatua pastinator (Western Long-billed Corella)*			
113.	24723	*Cacatua pastinator subsp. butleri (Butler's Corella)*			
114.	25715	*Cacatua roseicapilla (Galah)*			
115.	25716	*Cacatua sanguinea (Little Corella)*			
116.	24727	*Cacatua sanguinea subsp. westralensis (Little Corella)*			
117.		*Cacatua sulphurea subsp. galerita*			Y
118.	24729	*Cacatua tenuirostris (Eastern Long-billed Corella)*	Y		
119.	25598	*Cacomantis flabelliformis (Fan-tailed Cuckoo)*			
120.	42307	*Cacomantis pallidus (Pallid Cuckoo)*			
121.	25717	*Calyptorhynchus banksii (Red-tailed Black-Cockatoo)*			
122.		*Carassius auratus*			
123.		*Carcharhinus leucas*			
124.	25625	*Carduelis carduelis (Goldfinch, European Goldfinch)*	Y		
125.	24480	*Carduelis carduelis subsp. britannica (Goldfinch)*	Y		
126.		*Celaenia excavata*			
127.		*Ceratopogonidae sp.*			
128.	24086	*Cercartetus concinnus (Western Pygmy-possum, Mundarda)*			
129.		*Cercophonius granulosus*			
130.		*Cercophonius sulcatus*			
131.	24186	*Chalinolobus gouldii (Gould's Wattled Bat)*			
132.	24377	*Charadrius ruficapillus (Red-capped Plover)*			
133.		*Cheilodactylus gibbosus*			
134.		*Chelmonops curiosus*			
135.	43380	*Chelodina colliei (South-western Snake-necked Turtle)*			
136.	24321	*Chenonetta jubata (Australian Wood Duck, Wood Duck)*			
137.	47909	*Cheramoeca leucosterna (White-backed Swallow)*			
138.	33939	*Cherax cainii (Marron)*			
139.		*Cherax destructor*			
140.		*Cherax quinquecarinatus*			
141.		*Cherax sp.*			
142.	24980	*Christinus marmoratus (Marbled Gecko)*			
143.		*Chroicocephalus novaehollandiae*			
144.	24431	*Chrysococcyx basalis (Horsfield's Bronze Cuckoo)*			
145.	24432	*Chrysococcyx lucidus subsp. plagosus (Shining Bronze Cuckoo)*			
146.	24288	*Circus approximans (Swamp Harrier)*			
147.		*Cladocera (unident.)*			
148.	24774	*Cladorhynchus leucocephalus (Banded Stilt)*			
149.		*Clinohelea sp. 1 (SAP)*			
150.		*Cnidoglanis macrocephalus*			
151.	25675	*Colluricincla harmonica (Grey Shrike-thrush)*			
152.	24399	*Columba livia (Domestic Pigeon)*	Y		
153.		*Copidognathus cooki*			Y
154.	25568	*Coracina novaehollandiae (Black-faced Cuckoo-shrike)*			
155.		*Coris auricularis*			
156.		*Corixidae sp.*			
157.		*Cormocephalus aurantiipes*			
158.	24416	*Corvus bennetti (Little Crow)*			
159.	25592	*Corvus coronoides (Australian Raven)*			
160.	24420	*Cracticus nigrogularis (Pied Butcherbird)*			
161.	25595	*Cracticus tibicen (Australian Magpie)*			
162.	24422	*Cracticus tibicen subsp. dorsalis (White-backed Magpie)*			
163.	25596	*Cracticus torquatus (Grey Butcherbird)*			
164.	25398	*Crinia georgiana (Quacking Frog)*			
165.	25399	*Crinia glauerti (Clicking Frog)*			
166.	25400	*Crinia insignifera (Squelching Froglet)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
167.	25401	*Crinia pseudinsignifera (Bleating Froglet)*			
168.		*Crustulina bicruciata*			
169.	30893	*Cryptoblepharus buchananii*			
170.	25020	*Cryptoblepharus plagiocephalus*			
171.	30899	*Ctenophorus adelaidensis (Southern Heath Dragon, Western Heath Dragon)*			
172.	25027	*Ctenotus australis*			
173.	25039	*Ctenotus fallens*			
174.	25040	*Ctenotus gemmula (Jewelled South-west Ctenotus (Swan Coastal Plain subpop P3), skink)*			
175.	25047	*Ctenotus impar*			
176.	25049	*Ctenotus labillardieri*			
177.		*Cyanorhamphus auriceps*			Y
178.		*Cyclosa trilobata*			
179.	24322	*Cygnus atratus (Black Swan)*			
180.	24323	*Cygnus olor (Mute Swan)*	Y		
181.	30901	*Dacelo novaeguineae (Laughing Kookaburra)*	Y		
182.	30902	*Dacelo novaeguineae subsp. novaeguineae (Laughing Kookaburra)*	Y		
183.	25673	*Daphoenositta chrysoptera (Varied Sittella)*			
184.	24606	*Daphoenositta chrysoptera subsp. pileata (Varied Sittella, Black-capped Sitella)*			
185.	25766	*Delma fraseri (Fraser's Legless Lizard)*			
186.	24999	*Delma grayii*			
187.	25296	*Demansia psammophis subsp. reticulata (Yellow-faced Whipsnake)*			
188.	24325	*Dendrocygna eytoni (Plumed Whistling Duck)*			
189.	25607	*Dicaeum hirundinaceum (Mistletoebird)*			
190.		*Dingosa serrata*			
191.		*Diodon nicthemerus*			
192.	24939	*Diplodactylus polyophthalmus*			
193.		*Dytiscidae sp.*			
194.	25251	*Echiopsis curta (Bardick)*			
195.		*Ecnomina F group*			
196.	25096	*Egernia kingii (King's Skink)*			
197.	25100	*Egernia napoleonis*			
198.		*Egretta garzetta*			
199.		*Egretta novaehollandiae*			
200.		*Elanus axillaris*			
201.	24290	*Elanus caeruleus subsp. axillaris (Australian Black-shouldered Kite)*			
202.	25250	*Elapognathus coronatus (Crowned Snake)*			
203.	47937	*Elseyornis melanops (Black-fronted Dotterel)*			
204.		*Engraulis australis*			
205.		*Enoplosus armatus*			
206.		*Eodelena convexa*			
207.		*Eolophus roseicapillus*			
208.		*Epinephelides armatus*			
209.	24567	*Epthianura albifrons (White-fronted Chat)*			
210.	24258	*Equus caballus (Horse)*	Y		
211.		*Erigone prominens*			
212.		*Eriophora biapicata*			
213.		*Ero aphana*			
214.		*Erythracarus decoris*			
215.	24379	*Erythrogonys cinctus (Red-kneed Dotterel)*			
216.		*Ethmostigmus rubripes*			
217.	24368	*Eurostopodus argus (Spotted Nightjar)*			
218.	25621	*Falco berigora (Brown Falcon)*			
219.	24471	*Falco berigora subsp. berigora (Brown Falcon)*			
220.	25622	*Falco cenchroides (Australian Kestrel, Nankeen Kestrel)*			
221.	24472	*Falco cenchroides subsp. cenchroides (Australian Kestrel, Nankeen Kestrel)*			
222.	25623	*Falco longipennis (Australian Hobby)*			
223.	24474	*Falco longipennis subsp. longipennis (Australian Hobby)*			
224.		*Favonigobius sp.*			
225.	24041	*Felis catus (Cat)*	Y		
226.	25727	*Fulica atra (Eurasian Coot)*			
227.	24761	*Fulica atra subsp. australis (Eurasian Coot)*			
228.	34028	*Galaxias occidentalis (Western Minnow)*			
229.	25729	*Gallinula tenebrosa (Dusky Moorhen)*			
230.	24763	*Gallinula tenebrosa subsp. tenebrosa (Dusky Moorhen)*			
231.	25730	*Gallirallus philippensis (Buff-banded Rail)*			
232.		*Gallus gallus*			
233.	42314	*Gavicalis virescens (Singing Honeyeater)*			
234.	24959	*Gehyra variegata*			
235.	24401	*Geopelia cuneata (Diamond Dove)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
236.		*Gerres subfasciatus*			
237.	25530	*Gerygone fusca (Western Gerygone)*			
238.		*Glossiphoniidae sp.*			
239.	30918	*Glossopsitta concinna (Musk Lorikeet)*	Y		
240.	47962	*Glyciphila melanops (Tawny-crowned Honeyeater)*			
241.		*Gonorynchus greyi*			
242.		*Gracula religiosa*			
243.	24443	*Grallina cyanoleuca (Magpie-lark)*			
244.	24293	*Haliaeetus leucogaster (White-bellied Sea-Eagle)*			
245.	24295	*Haliastur sphenurus (Whistling Kite)*			
246.	24689	*Halobaena caerulea (Blue Petrel)*			
247.	24296	*Hamirostra isura (Square-tailed Kite)*			
248.		*Harpacticoida sp*			
249.	25408	*Heleioporus albopunctatus (Western Spotted Frog)*			
250.	25409	*Heleioporus barycragus (Hooting Frog)*			
251.	25410	*Heleioporus eyrei (Moaning Frog)*			
252.	25412	*Heleioporus psammophilus (Sand Frog)*			
253.		*Hemicloea sublimbata*			
254.		*Hemicordulia tau*			
255.		*Hemicorduliidae sp.*			
256.	25115	*Hemiergis initialis subsp. initialis*			
257.	25119	*Hemiergis quadrilineata*			
258.	47965	*Hieraaetus morphnoides (Little Eagle)*			
259.	25734	*Himantopus himantopus (Black-winged Stilt)*			
260.	24491	*Hirundo neoxena (Welcome Swallow)*			
261.		*Hogna crispipes*			
262.		*Hogna immansueta*			
263.		*Hogna kuyani*			
264.		*Holconia westralia*			
265.		*Holocnemus pluchei*			
266.		*Hypoblemum sp.*			Y
267.		*Idiommata blackwalli*			
268.		*Isometroides vescus*			
269.		*Isopeda leishmanni*			
270.		*Isopedella cana*			
271.		*Isopedella tindalei*			
272.		*Lampona cylindrata*			
273.	24511	*Larus novaehollandiae subsp. novaehollandiae (Silver Gull)*			
274.		*Latrodectus hasselti*			
275.		*Latrodectus hasseltii*			
276.		*Lepidoptera sp.*			
277.		*Leptoceridae sp.*			
278.	25131	*Lerista distinguenda*			
279.	25133	*Lerista elegans*			
280.	25148	*Lerista lineopunctulata*			
281.	25165	*Lerista praepedita*			
282.	25005	*Lialis burtonis*			
283.		*Libellulidae sp.*			
284.	25659	*Lichenostomus leucotis (White-eared Honeyeater)*			
285.	25661	*Lichmera indistincta (Brown Honeyeater)*			
286.	24582	*Lichmera indistincta subsp. indistincta (Brown Honeyeater)*			
287.		*Limnochares australica*			
288.	25415	*Limnodynastes dorsalis (Western Banjo Frog)*			
289.	42413	*Lissolepis luctuosa (Western Swamp Skink)*			
290.	25378	*Litoria adelaidensis (Slender Tree Frog)*			
291.	25388	*Litoria moorei (Motorbike Frog)*			
292.		*Lophoictinia isura*			
293.		*Lycosa gilberta*			
294.		*Lycosa godeffroyi*			
295.		*Lymnaeidae sp.*			
296.	24132	*Macropus fuliginosus (Western Grey Kangaroo)*			
297.	24135	*Macropus robustus subsp. erubescens (Euro, Biggada)*			
298.	24326	*Malacorhynchus membranaceus (Pink-eared Duck)*			
299.	25651	*Malurus lamberti (Variegated Fairy-wren)*			
300.	25652	*Malurus leucopterus (White-winged Fairy-wren)*			
301.	25654	*Malurus splendens (Splendid Fairy-wren)*			
302.	24552	*Malurus splendens subsp. splendens (Splendid Fairy-wren)*			
303.	24583	*Manorina flavigula (Yellow-throated Miner)*			
304.		*Maratus pavonis*			
305.		*Maratus spicatus*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
306.		*Masasteron mas*			
307.		*Masasteron tuart*			
308.	25758	*Megalurus gramineus (Little Grassbird)*			
309.	47997	*Melanodryas cucullata (Hooded Robin)*			
310.	25663	*Melithreptus brevirostris (Brown-headed Honeyeater)*			
311.	24586	*Melithreptus brevirostris subsp. leucogenys (Brown-headed Honeyeater)*			
312.	25184	*Menetia greyii*			
313.	24598	*Merops ornatus (Rainbow Bee-eater)*			
314.		*Microcanthus strigatus*			
315.		*Microcarbo melanoleucos*			
316.	25693	*Microeca fascinans (Jacky Winter)*			
317.		*Microvelia sp.*			
318.		*Missulena granulosa*			
319.		*Missulena occatoria*			
320.		*Mituliodon tarantulinus*			
321.		*Molycria vokes*			
322.		*Monacanthus chinensis*			
323.		*Monohelea sp. 4 (SAP)*			
324.	25240	*Morelia spilota subsp. imbricata (Carpet Python)*			
325.	25191	*Morethia lineoocellata*			
326.	25192	*Morethia obscura*			
327.		*Mugil cephalus*			
328.	24223	*Mus musculus (House Mouse)*	Y		
329.		*Myandra bicincta*			
330.	25610	*Myiagra inquieta (Restless Flycatcher)*			
331.	25420	*Myobatrachus gouldii (Turtle Frog)*			
332.		*Nannoperca vittata*			
333.		*Neatypus obliquus*			
334.	25248	*Neelaps bimaculatus (Black-naped Snake)*			
335.		*Nematoda sp.*			
336.	25426	*Neobatrachus pelobatoides (Humming Frog)*			
337.	24738	*Neophema elegans (Elegant Parrot)*			
338.		*Nephila edulis*			
339.		*Nicodamus mainae*			
340.	25747	*Ninox connivens (Barking Owl)*			
341.	25252	*Notechis scutatus (Tiger Snake)*			
342.		*Notiasemus glauerti*			
343.		*Notolabrus parilus*			
344.	25564	*Nycticorax caledonicus (Rufous Night Heron)*			
345.	24194	*Nyctophilus geoffroyi (Lesser Long-eared Bat)*			
346.		*Ocrisiona leucocomis*			
347.	24407	*Ocyphaps lophotes (Crested Pigeon)*			
348.		*Oecobius navus*			
349.		*Oligochaeta sp.*			
350.		*Ommatoiulus moreleti*			
351.		*Ommatoiulus moreletii*			
352.		*Oniscidae sp.*			
353.		*Opopaea sp.*			Y
354.		*Orthocladiinae SO3 sp. A (SAP)*			
355.		*Orthocladiinae sp.*			
356.	24085	*Oryctolagus cuniculus (Rabbit)*	Y		
357.		*Ostracoda (unident.)*			
358.	34016	*Ovis aries (Sheep)*			
359.		*Oxyethira sp.*			
360.		*Ozarchaea westraliensis*			
361.	25680	*Pachycephala rufiventris (Rufous Whistler)*			
362.	24693	*Pachyptila desolata (Antarctic Prion)*			
363.		*Papillogobius punctatus*			
364.		*Paracyclops sp.*			
365.		*Paralampona marangaroo*			
366.		*Paralimnophyes pullulus (V42)*			
367.		*Paraplectanoides crassipes*			
368.	25253	*Parasuta gouldii*			
369.	25255	*Parasuta nigriceps*			
370.	25681	*Pardalotus punctatus (Spotted Pardalote)*			
371.	24625	*Pardalotus punctatus subsp. punctatus (Spotted Pardalote)*			
372.	25682	*Pardalotus striatus (Striated Pardalote)*			
373.		*Parma microlepis*			
374.	25687	*Passer domesticus (House Sparrow)*	Y		
375.		*Pediana occidentalis*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
376.	24648	*Pelecanus conspicillatus (Australian Pelican)*			
377.		*Pempheris klunzingeri*			
378.	48060	*Petrochelidon ariel (Fairy Martin)*			
379.	48061	*Petrochelidon nigricans (Tree Martin)*			
380.	48066	*Petroica boodang (Scarlet Robin)*			
381.	24659	*Petroica goodenovii (Red-capped Robin)*			
382.	25697	*Phalacrocorax carbo (Great Cormorant)*			
383.	25698	*Phalacrocorax melanoleucos (Little Pied Cormorant)*			
384.	24667	*Phalacrocorax sulcirostris (Little Black Cormorant)*			
385.	25699	*Phalacrocorax varius (Pied Cormorant)*			
386.	24668	*Phalacrocorax varius subsp. hypoleucos (Pied Cormorant)*			
387.	24409	*Phaps chalcoptera (Common Bronzewing)*			
388.	25587	*Phaps elegans (Brush Bronzewing)*			
389.		*Phenasteron longiconductor*			
390.		*Phenasteron machinosum*			
391.		*Pholcus phalangioides*			
392.		*Phryganoporus candidus*			
393.	48071	*Phylidonyris niger (White-cheeked Honeyeater)*			
394.	24596	*Phylidonyris novaehollandiae (New Holland Honeyeater)*			
395.		*Physidae sp.*			
396.		*Planorbidae sp.*			
397.	24841	*Platalea flavipes (Yellow-billed Spoonbill)*			
398.	24842	*Platalea regia (Royal Spoonbill)*			
399.		*Platax teira*			
400.		*Platycephalus indicus*			
401.	25720	*Platycercus icterotis (Western Rosella)*			
402.	24747	*Platycercus spurius (Red-capped Parrot)*			
403.	25721	*Platycercus zonarius (Australian Ringneck, Ring-necked Parrot)*			
404.	25007	*Pletholax gracilis subsp. gracilis (Keeled Legless Lizard)*			
405.		*Plotosus unicolor*			Y
406.	25703	*Podargus strigoides (Tawny Frogmouth)*			
407.	24679	*Podargus strigoides subsp. brachypterus (Tawny Frogmouth)*			
408.	25704	*Podiceps cristatus (Great Crested Grebe)*			
409.	24680	*Podiceps cristatus subsp. australis (Great Crested Grebe)*			
410.	25510	*Pogona minor (Dwarf Bearded Dragon)*			
411.	24907	*Pogona minor subsp. minor (Dwarf Bearded Dragon)*			
412.	24681	*Poliocephalus poliocephalus (Hoary-headed Grebe)*			
413.	25731	*Porphyrio porphyrio (Purple Swamphen)*			
414.	24767	*Porphyrio porphyrio subsp. bellus (Purple Swamphen)*			
415.	24769	*Porzana fluminea (Australian Spotted Crake)*			
416.	25732	*Porzana pusilla (Baillon's Crake)*			
417.	24771	*Porzana tabuensis (Spotless Crake)*			
418.		*Prionosternum nitidiceps*			
419.		*Prionosternum scutatum*			
420.		*Procladius paludicola*			
421.	25261	*Pseudechis australis (Mulga Snake)*			
422.		*Pseudocaranx dentex*			
423.	24230	*Pseudomys albocinereus (Ash-grey Mouse)*			
424.	25511	*Pseudonaja affinis (Dugite)*			
425.	25259	*Pseudonaja affinis subsp. affinis (Dugite)*			
426.	42416	*Pseudonaja mengdeni (Western Brown Snake)*			
427.	25263	*Pseudonaja modesta (Ringed Brown Snake)*			
428.	25433	*Pseudophryne guentheri (Crawling Toadlet)*			
429.	24703	*Pterodroma lessonii (White-headed Petrel)*			
430.	42344	*Purnella albifrons (White-fronted Honeyeater)*			
431.		*Purpureicephalus spurius*			
432.	25008	*Pygopus lepidopodus (Common Scaly Foot)*			
433.	24243	*Rattus fuscipes (Western Bush Rat)*			
434.	24245	*Rattus rattus (Black Rat)*	Y		
435.		*Raveniella cirrata*			
436.		*Raveniella peckorum*			
437.	24776	*Recurvirostra novaehollandiae (Red-necked Avocet)*			
438.		*Rhabdosargus sarba*			
439.	48096	*Rhipidura albiscapa (Grey Fantail)*			
440.	25614	*Rhipidura leucophrys (Willie Wagtail)*			
441.		*Richardsonianidae sp.*			
442.		*Rotifera sp.*			
443.		*Scirtidae sp.*			
444.		*Scobinichthys granulatus*			
445.		*Scolopendra laeta*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
446.		*Scorpis aequipinnis*			
447.		*Scorpis georgianus*			
448.		*Scytodes thoracica*			
449.	25534	*Sericornis frontalis (White-browed Scrubwren)*			
450.		*Serinus canarius*			
451.		*Servaea melaina*			
452.	25266	*Simoselaps bertholdi (Jan's Banded Snake)*			
453.		*Smeringopus natalensis*			
454.		*Smeringopus natalensis?*			Y
455.	30948	*Smicrornis brevirostris (Weebill)*			
456.	24645	*Stagonopleura oculata (Red-eared Firetail)*			
457.		*Steatoda capensis*			
458.		*Steatoda grossa*			
459.	24525	*Sterna fuscata subsp. nubilosa (Sooty Tern)*			
460.		*Sternopriscus sp.*			
461.	24329	*Stictonetta naevosa (Freckled Duck)*			
462.	25597	*Strepera versicolor (Grey Currawong)*			
463.	25589	*Streptopelia chinensis (Spotted Turtle-Dove)*	Y		
464.	30951	*Streptopelia chinensis subsp. tigrina (Spotted Turtle-Dove)*	Y		
465.	25590	*Streptopelia senegalensis (Laughing Turtle-Dove)*	Y		
466.	24942	*Strophurus spinigerus subsp. spinigerus*			
467.		*Supunna funerea*			
468.		*Supunna picta*			
469.	24259	*Sus scrofa (Pig)*	Y		
470.		*Synothele durokoppin*			
471.		*Synothele mullaloo*			
472.		*Tabanidae sp.*			
473.	25705	*Tachybaptus novaehollandiae (Australasian Grebe, Black-throated Grebe)*			
474.	24682	*Tachybaptus novaehollandiae subsp. novaehollandiae (Australasian Grebe, Black-throated Grebe)*			
475.	24207	*Tachyglossus aculeatus (Short-beaked Echidna)*			
476.	24331	*Tadorna tadornoides (Australian Shelduck, Mountain Duck)*			
477.		*Talitridae sp.*			
478.		*Tanypodinae sp.*			
479.		*Tanytarsus barbitarsis*			
480.	24167	*Tarsipes rostratus (Honey Possum, Noolbenger)*			
481.		*Tasmanicosa leuckartii*			
482.		*Tetragnatha luteocincta*			Y
483.		*Thereuopoda lesueurii*			
484.		*Threpterius maculosus*			
485.	24845	*Threskiornis spinicollis (Straw-necked Ibis)*			
486.	25203	*Tiliqua occipitalis (Western Bluetongue)*			
487.	25519	*Tiliqua rugosa*			
488.	25204	*Tiliqua rugosa subsp. aspera*			
489.	25207	*Tiliqua rugosa subsp. rugosa*			
490.		*Tilodon sexfasciatum*			
491.	25549	*Todiramphus sanctus (Sacred Kingfisher)*			
492.	24309	*Todiramphus sanctus subsp. sanctus (Sacred Kingfisher)*			
493.	48141	*Tribonyx ventralis (Black-tailed Native-hen)*			
494.		*Trichoglossus chlorolepidotus*			
495.	25723	*Trichoglossus haematodus (Rainbow Lorikeet)*			
496.	24755	*Trichoglossus haematodus subsp. moluccanus (Rainbow Lorikeet)*	Y		
497.	24754	*Trichoglossus haematodus subsp. rubritorquis (Red-collared Lorikeet)*			
498.	25521	*Trichosurus vulpecula (Common Brushtail Possum)*			
499.	24158	*Trichosurus vulpecula subsp. vulpecula (Common Brushtail Possum)*			
500.		*Tridentiger trigonocephalus*			
501.		*Trygonoptera ovalis*			
502.	48147	*Turnix varius (Painted Button-quail)*			
503.	24852	*Tyto alba subsp. delicatula (Barn Owl)*			
504.	24983	*Underwoodisaurus milii (Barking Gecko)*			
505.		*Urocampus carinirostris*			
506.		*Urodacus armatus*			
507.		*Urodacus hartmeyeri*			
508.		*Urodacus novaehollandiae*			
509.		*Urodacus planimanus*			
510.	24386	*Vanellus tricolor (Banded Lapwing)*			
511.	25218	*Varanus gouldii (Bungarra or Sand Monitor)*			
512.	25225	*Varanus rosenbergi (Heath Monitor)*			
513.	25526	*Varanus tristis (Racehorse Monitor)*			
514.		*Venator immansueta*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
515.		*Venatrix pullastra*			
516.	24206	*Vespadelus regulus (Southern Forest Bat)*			
517.	24040	*Vulpes vulpes (Red Fox)*	Y		
518.		*Westrarchaea spinosa*			
519.	25765	*Zosterops lateralis (Grey-breasted White-eye, Silvereye)*			
520.		*unknown unknown*			Y

Conservation Codes
T - Rare or likely to become extinct
X - Presumed extinct
IA - Protected under international agreement
S - Other specially protected fauna
1 - Priority 1
2 - Priority 2
3 - Priority 3
4 - Priority 4
5 - Priority 5

[1] For NatureMap's purposes, species flagged as endemic are those whose records are wholely contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.

Australian Government
Department of the Environment and Energy

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

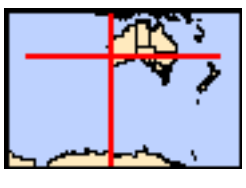
Report created: 02/12/19 14:14:25

Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements

This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

Coordinates
Buffer: 20.0Km



Summary

Matters of National Environmental Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	9
Listed Threatened Species:	76
Listed Migratory Species:	51

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Land:	10
Commonwealth Heritage Places:	5
Listed Marine Species:	60
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

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

State and Territory Reserves:	50
Regional Forest Agreements:	1
Invasive Species:	46
Nationally Important Wetlands:	8
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities [Resource Information]

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

Name	Status	Type of Presence
Assemblages of plants and invertebrate animals of tumulus (organic mound) springs of the Swan Coastal Plain	Endangered	Community known to occur within area
Banksia Woodlands of the Swan Coastal Plain ecological community	Endangered	Community likely to occur within area
Clay Pans of the Swan Coastal Plain	Critically Endangered	Community likely to occur within area
Corymbia calophylla - Kingia australis woodlands on heavy soils of the Swan Coastal Plain	Endangered	Community known to occur within area
Corymbia calophylla - Xanthorrhoea preissii woodlands and shrublands of the Swan Coastal Plain	Endangered	Community known to occur within area
Shrublands and Woodlands of the eastern Swan Coastal Plain	Endangered	Community known to occur within area
Shrublands and Woodlands on Muchea Limestone of the Swan Coastal Plain	Endangered	Community known to occur within area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area
Tuart (Eucalyptus gomphocephala) Woodlands and Forests of the Swan Coastal Plain ecological community	Critically Endangered	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anous tenuirostris melanops Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area
Calyptorhynchus banksii naso Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat known to occur within area

Name	Status	Type of Presence
Calyptorhynchus baudinii Baudin's Cockatoo, Long-billed Black-Cockatoo [769]	Endangered	Roosting known to occur within area
Calyptorhynchus latirostris Carnaby's Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Breeding known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Roosting known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat likely to occur within area
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat likely to occur within area
Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat likely to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat known to occur within area
Thalassarche cauta cauta Shy Albatross [82345]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta steadi White-capped Albatross [82344]	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
[Thalassarche impavida](#) Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
[Thalassarche melanophris](#) Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Fish		
[Galaxiella nigrostriata](#) Blackstriped Dwarf Galaxias, Black-stripe Minnow [88677]	Endangered	Species or species habitat known to occur within area
Insects		
[Hesperocolletes douglasi](#) Douglas' Broad-headed Bee, Rottnest Bee [66734]	Critically Endangered	Species or species habitat may occur within area
[Leioproctus douglasiellus](#) a short-tongued bee [66756]	Critically Endangered	Species or species habitat known to occur within area
Mammals		
[Bettongia penicillata ogilbyi](#) Woylie [66844]	Endangered	Species or species habitat known to occur within area
[Dasyurus geoffroii](#) Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat known to occur within area
[Neophoca cinerea](#) Australian Sea-lion, Australian Sea Lion [22]	Vulnerable	Species or species habitat known to occur within area
[Petrogale lateralis lateralis](#) Black-flanked Rock-wallaby, Moororong, Black-footed Rock Wallaby [66647]	Endangered	Translocated population known to occur within area
[Pseudocheirus occidentalis](#) Western Ringtail Possum, Ngwayir, Womp, Woder, Ngoor, Ngoolangit [25911]	Critically Endangered	Species or species habitat likely to occur within area
[Setonix brachyurus](#) Quokka [229]	Vulnerable	Species or species habitat likely to occur within area
Other		
[Westralunio carteri](#) Carter's Freshwater Mussel, Freshwater Mussel [86266]	Vulnerable	Species or species habitat known to occur within area
Plants		
[Acacia anomala](#) Grass Wattle, Chittering Grass Wattle [8153]	Vulnerable	Species or species habitat known to occur within area
[Acacia aphylla](#) Leafless Rock Wattle [13553]	Vulnerable	Species or species habitat known to occur within area
[Andersonia gracilis](#) Slender Andersonia [14470]	Endangered	Species or species habitat known to occur within area
[Anigozanthos viridis subsp. terraspectans](#) Dwarf Green Kangaroo Paw [3435]	Vulnerable	Species or species habitat likely to occur within area
[Anthocercis gracilis](#) Slender Tailflower [11103]	Vulnerable	Species or species habitat known to occur within area

Name	Status	Type of Presence
Austrostipa bronwenae [87808]	Endangered	Species or species habitat known to occur within area
Banksia mimica Summer Honeypot [82765]	Endangered	Species or species habitat likely to occur within area
Caladenia huegelii King Spider-orchid, Grand Spider-orchid, Rusty Spider-orchid [7309]	Endangered	Species or species habitat known to occur within area
Calytrix breviseta subsp. breviseta Swamp Starflower [23879]	Endangered	Species or species habitat known to occur within area
Chamelaucium sp. Gingin (N.G.Marchant 6) Gingin Wax [88881]	Endangered	Species or species habitat may occur within area
Conospermum undulatum Wavy-leaved Smokebush [24435]	Vulnerable	Species or species habitat likely to occur within area
Darwinia apiculata Scarp Darwinia [8763]	Endangered	Species or species habitat known to occur within area
Darwinia foetida Muchea Bell [83190]	Critically Endangered	Species or species habitat likely to occur within area
Diplolaena andrewsii [6601]	Endangered	Species or species habitat known to occur within area
Diuris drummondii Tall Donkey Orchid [4365]	Vulnerable	Species or species habitat likely to occur within area
Diuris micrantha Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat likely to occur within area
Diuris purdiei Purdie's Donkey-orchid [12950]	Endangered	Species or species habitat known to occur within area
Drakaea elastica Glossy-leafed Hammer Orchid, Glossy-leaved Hammer Orchid, Warty Hammer Orchid [16753]	Endangered	Species or species habitat likely to occur within area
Drakaea micrantha Dwarf Hammer-orchid [56755]	Vulnerable	Species or species habitat likely to occur within area
Eleocharis keigheryi Keighery's Eleocharis [64893]	Vulnerable	Species or species habitat known to occur within area
Eremophila glabra subsp. chlorella [84927]	Endangered	Species or species habitat known to occur within area
Eucalyptus x balanites Cadda Road Mallee, Cadda Mallee [87816]	Endangered	Species or species habitat may occur within area
Grevillea christineae Christine's Grevillea [64520]	Endangered	Species or species habitat known to occur within area

Name	Status	Type of Presence
Grevillea curviloba subsp. curviloba Curved-leaf Grevillea [64908]	Endangered	Species or species habitat known to occur within area
Grevillea curviloba subsp. incurva Narrow curved-leaf Grevillea [64909]	Endangered	Species or species habitat known to occur within area
Grevillea thelemanniana Spider Net Grevillea [32835]	Critically Endangered	Species or species habitat known to occur within area
Lasiopetalum pterocarpum Wing-fruited Lasiopetalum [64922]	Endangered	Species or species habitat may occur within area
Lepidosperma rostratum Beaked Lepidosperma [14152]	Endangered	Species or species habitat likely to occur within area
Macarthuria keigheryi Keighery's Macarthuria [64930]	Endangered	Species or species habitat likely to occur within area
Ptilotus pyramidatus Pyramid Mulla-mulla [18216]	Critically Endangered	Species or species habitat known to occur within area
Synaphea sp. Fairbridge Farm (D. Papenfus 696) Selena's Synaphea [82881]	Critically Endangered	Species or species habitat known to occur within area
Thelymitra dedmaniarum Cinnamon Sun Orchid [65105]	Endangered	Species or species habitat likely to occur within area
Thelymitra stellata Star Sun-orchid [7060]	Endangered	Species or species habitat known to occur within area
Trithuria occidentalis Swan Hydatella [42224]	Endangered	Species or species habitat likely to occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Pseudemydura umbrina Western Swamp Tortoise [1760]	Critically Endangered	Translocated population known to occur within area

Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur

Name	Threatened	Type of Presence within area
[Apus pacificus](#) Fork-tailed Swift [678]		Species or species habitat likely to occur within area
[Diomedea amsterdamensis](#) Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area
[Diomedea epomophora](#) Southern Royal Albatross [89221]	Vulnerable	Species or species habitat likely to occur within area
[Diomedea exulans](#) Wandering Albatross [89223]	Vulnerable	Species or species habitat likely to occur within area
[Diomedea sanfordi](#) Northern Royal Albatross [64456]	Endangered	Species or species habitat likely to occur within area
[Macronectes giganteus](#) Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
[Macronectes halli](#) Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
[Sterna dougallii](#) Roseate Tern [817]		Foraging, feeding or related behaviour likely to occur within area
[Thalassarche cauta](#) Shy Albatross [89224]	Vulnerable*	Species or species habitat likely to occur within area
[Thalassarche impavida](#) Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
[Thalassarche melanophris](#) Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
[Thalassarche steadi](#) White-capped Albatross [64462]	Vulnerable*	Species or species habitat likely to occur within area
Migratory Marine Species		
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
[Lamna nasus](#) Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area
[Manta alfredi](#) Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		Species or species habitat may occur within area
[Manta birostris](#) Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray		Species or species habitat may occur within

Name	Threatened	Type of Presence
[84995]		area
Natator depressus		
Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Migratory Terrestrial Species		
Motacilla cinerea		
Grey Wagtail [642]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos		
Common Sandpiper [59309]		Species or species habitat known to occur within area
Arenaria interpres		
Ruddy Turnstone [872]		Roosting known to occur within area
Calidris acuminata		
Sharp-tailed Sandpiper [874]		Roosting known to occur within area
Calidris alba		
Sanderling [875]		Roosting known to occur within area
Calidris canutus		
Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos		
Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Calidris ruficollis		
Red-necked Stint [860]		Roosting known to occur within area
Calidris subminuta		
Long-toed Stint [861]		Species or species habitat known to occur within area
Calidris tenuirostris		
Great Knot [862]	Critically Endangered	Roosting known to occur within area
Charadrius bicinctus		
Double-banded Plover [895]		Roosting known to occur within area
Charadrius leschenaultii		
Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Roosting known to occur within area
Charadrius mongolus		
Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Gallinago megala		
Swinhoe's Snipe [864]		Roosting likely to occur within area
Gallinago stenura		
Pin-tailed Snipe [841]		Roosting likely to occur within area
Limosa lapponica		
Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa		
Black-tailed Godwit [845]		Roosting known to occur within area
Numenius madagascariensis		
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area

Name	Threatened	Type of Presence
Numenius minutus		
Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area
Numenius phaeopus		
Whimbrel [849]		Roosting known to occur within area
Pandion haliaetus		
Osprey [952]		Breeding known to occur within area
Phalaropus lobatus		
Red-necked Phalarope [838]		Roosting known to occur within area
Pluvialis fulva		
Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola		
Grey Plover [865]		Roosting known to occur within area
Tringa brevipes		
Grey-tailed Tattler [851]		Roosting known to occur within area
Tringa glareola		
Wood Sandpiper [829]		Species or species habitat known to occur within area
Tringa nebularia		
Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis		
Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area
Tringa totanus		
Common Redshank, Redshank [835]		Roosting known to occur within area
Xenus cinereus		
Terek Sandpiper [59300]		Roosting known to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

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

Name
Commonwealth Land -
Defence - AIRTC CANNINGTON
Defence - BUSHMEAD RIFLE RANGE
Defence - BUSHMEAD TRAINING AREA
Defence - HOLDFAST BARRACKS
Defence - IRWIN BARRACKS - KARRAKATTA
Defence - PALMER BARRACKS - SOUTH GUILDFORD
Defence - PEARCE - AP19 HF RECEIVER STATION BULLSBROOK
Defence - RAAF CAVERSHAM
Defence - SWAN BARRACKS

Commonwealth Heritage Places [Resource Information]

Name	State	Status
Historic		
Army Magazine Buildings Irwin Barracks	WA	Listed place
Inglewood Post Office	WA	Listed place
Perth General Post Office	WA	Listed place
South Perth Post Office	WA	Listed place
Victoria Park Post Office	WA	Listed place

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area
Anous tenuirostris melanops Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Breeding known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Arenaria interpres Ruddy Turnstone [872]		Roosting known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Roosting known to occur within area
Calidris alba Sanderling [875]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area
Calidris subminuta Long-toed Stint [861]		Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Roosting known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Charadrius ruficapillus Red-capped Plover [881]		Roosting known to occur within area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area

Name	Threatened	Type of Presence
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat likely to occur within area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Heteroscelus brevipes Grey-tailed Tattler [59311]		Roosting known to occur within area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Roosting known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat likely to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Phalaropus lobatus Red-necked Phalarope [838]		Roosting known to occur within area

Name	Threatened	Type of Presence
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]		Roosting known to occur within area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Roosting known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat known to occur within area
Sterna dougallii Roseate Tern [817]		Foraging, feeding or related behaviour likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Vulnerable*	Species or species habitat likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Species or species habitat likely to occur within area
Thinornis rubricollis Hooded Plover [59510]		Species or species habitat known to occur within area
Tringa glareola Wood Sandpiper [829]		Species or species habitat known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area
Tringa totanus Common Redshank, Redshank [835]		Roosting known to occur within area
Xenus cinereus Terek Sandpiper [59300]		Roosting known to occur within area
Mammals		
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Vulnerable	Species or species habitat known to occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area

Name	Threatened	Type of Presence
Natator depressus		
Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Beelu	WA
Bold Park	WA
Canning River	WA
Dundas Road	WA
Ellen Brook	WA
Gooseberry Hill	WA
Greenmount	WA
Helena River	WA
Jandabup	WA
John Forrest	WA
Kalamunda	WA
Kenwick Wetlands	WA
Kings Park	WA
Lake Joondalup	WA
Lesmurdie Falls	WA
Matilda Bay Reserve	WA
Milyu	WA
NTWA Bushland covenant (0074)	WA
NTWA Bushland covenant (0157)	WA
Perth Zoo	WA
Swan River	WA
Talbot Road	WA
Twin Swamps	WA
Unnamed WA1919/893	WA
Unnamed WA23076	WA
Unnamed WA24657	WA
Unnamed WA29815	WA
Unnamed WA31906	WA
Unnamed WA33618	WA
Unnamed WA36440	WA
Unnamed WA37997	WA
Unnamed WA44853	WA
Unnamed WA45106	WA
Unnamed WA45772	WA
Unnamed WA45773	WA
Unnamed WA46756	WA
Unnamed WA46875	WA
Unnamed WA46919	WA
Unnamed WA46920	WA
Unnamed WA46926	WA
Unnamed WA49079	WA
Unnamed WA49300	WA
Unnamed WA49362	WA
Unnamed WA49363	WA
Unnamed WA50067	WA
Unnamed WA50069	WA
Unnamed WA50514	WA

Name	State
Unnamed WA52237	WA
Walyunga	WA
Woodvale	WA

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included.

Name	State
South West WA RFA	Western Australia

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Capra hircus Goat [2]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Funambulus pennantii Northern Palm Squirrel, Five-striped Palm Squirrel [129]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus aethiopicus Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425]		Species or species habitat likely to occur within area
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Asparagus declinatus Bridal Veil, Bridal Veil Creeper, Pale Berry Asparagus Fern, Asparagus Fern, South African Creeper [66908]		Species or species habitat likely to occur within area
Asparagus plumosus Climbing Asparagus-fern [48993]		Species or species habitat likely to occur within area
Brachiaria mutica Para Grass [5879]		Species or species habitat may occur within area
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Genista linifolia Flax-leaved Broom, Mediterranean Broom, Flax Broom [2800]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Olea europaea Olive, Common Olive [9160]		Species or species habitat may occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Tamarix aphylla Athel Pine, Athel Tree, Tamarisk, Athel Tamarisk, Athel Tamarix, Desert Tamarisk, Flowering Cypress, Salt Cedar [16018]		Species or species habitat likely to occur within area
Reptiles		
Hemidactylus frenatus Asian House Gecko [1708]		Species or species habitat likely to occur within area

Nationally Important Wetlands	[Resource Information]
Name	State
Brixton Street Swamps	WA
Ellen Brook Swamps System	WA
Herdsman Lake	WA
Joondalup Lake	WA
Palmer Barracks, Guildford	WA
Perth Airport Woodland Swamps	WA
RAAF Caversham	WA

Name	State
Swan-Canning Estuary	WA

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

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

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

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

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

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

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

Coordinates

-31.8502 115.93449

Acknowledgements

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

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

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

Please feel free to provide feedback via the Contact Us page.

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Appendix D Conservation significant fauna likelihood of occurrence

Species	Conservation status*		Distribution and habitat	Likelihood of occurrence within the Study Area[3]
	EPBC Act	BC Act		
Birds				
Carnaby's Cockatoo (*Calyptorhynchus latirostris*)	EN	EN (S2)	Carnaby's Cockatoo is endemic to southwest WA with populations extending from the Murchison River to Esperance, and inland to Coorow, Kellerberrin and Lake Cronin (DoEE 2019, SEWPAC 2012). Foraging habitat for this species includes native shrubland, kwongan heathland and woodland dominated by proteaceous plant species including Banksia, Hakea and Grevillea, Eucalypt and Corymbia woodlands and pine plantations (SEWPAC 2012).	**Recorded** Carnaby's Cockatoo was observed foraging during the current survey in Part 2 of the Study Area, near Ellenbrook, and has previously been observed foraging and flying over the Study Area in various locations including Part 1 and Part 2 of the Study Area (Terrestrial Ecosystems 2018, Coffey 2015a; DBCA 2019). The species has been observed within Wotton Reserve in Part 1 of the Study Area, as well as a number of other locations either within the Study Area or in close proximity (i.e. 50% of individual fauna records provided from the DBCA database search were Carnaby's Cockatoo; DBCA 2019b). Suitable foraging and potential breeding and roosting habitat occur within both Parts 1 and 2 of the Study Area.
Baudin's Cockatoo (*Calyptorhynchus baudinii*)	EN	VU (S3)	Baudin's Cockatoo is found in southwest WA with populations extending from Albany northward to Gidgegannup and Mundaring (east of Perth), and inland to the Stirling Ranges and near Kojonup (DoEE 2019, SEWPAC 2012). Baudin's Cockatoo foraging habitat includes Eucalyptus and/or Corymbia woodlands and forests and proteaceous woodland and heath (SEWPAC 2012).	**Unlikely – Part 1** **Potential (vagrant) – Part 2** There are a few records of Baudin's Cockatoo in proximity to Parts 1 and 2 of the Study Area, but no records within the Study Area itself. The species may infrequently be seen foraging in proximity to Part 2 of the Study Area but would typically return to the hills to roost at night. They are highly unlikely to breed, roost or depend upon any habitats within the Study Area. They are unlikely to occur in Part 1 of the Study Area given the lack of records and highly fragmented nature of the vegetation available.
Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*)	VU	VU (S3)	The Forest Red-tailed Black Cockatoo is found in southwest WA with populations extending north to Perth and east to Wundowie, Mount Helena, Christmas Tree Well, North Bannister, Mount Saddleback, Rocky Gully and the upper King River (SEWPAC 2012). Forest Red-tailed Black Cockatoo foraging habitat includes	**Recorded** Forest Red-tailed Black Cockatoo were recorded foraging within the Study Area during the current survey in both Part 1 and Part 2 of the Study Area and have been observed on numerous occasions during previous fauna surveys (Terrestrial Ecosystems 2018, AECOM 2016, Coffey 2015a). There are also

Species	Conservation status*		Distribution and habitat	Likelihood of occurrence within the Study Area[3]
	EPBC Act	BC Act		
			Jarrah and Marri woodlands and forests, but the species will also feed on she-oak and introduced Cape Lilac.	numerous records of the species in proximity to the Study Area (DBCA 2019b). Suitable habitat for the species occurs within the Paddocks with Eucalyptus/Corymbia and Mixed Eucalyptus/Corymbia Woodland habitats.
Australian Painted Snipe (*Rostratula benghalensis australis*)	EN	EN (S2)	The Australian Painted Snipe has been recorded at wetlands in all states of Australia, however it is most common in eastern Australia (DoEE 2019). This species generally inhabits shallow terrestrial freshwater wetlands, including temporary and permanent lakes, swamps and claypans, sometimes utilising areas that are lined with trees, or that have some scattered fallen or washed-up timber (DoEE 2019).	**Unlikely** Australian Painted Snipe are most common in Eastern Australia and are rarely recorded in Western Australia. The species is considered unlikely to occur anywhere in the Study Area.
Fork-tailed Swift (*Apus pacificus*)	Mi	Mi (S5)	The Fork-tailed Swift is a non-breeding visitor to all states and territories of Australia. In Western Australia there are widespread but scattered records of the Fork-tailed Swift along much of the coastline, with some sparsely scattered inland records, especially in the Wheatbelt (DAWE 2020b). They are almost exclusively aerial, and are most commonly found over inland plains, but sometimes above foothills or in coastal areas (DAWE 2020b).	**Unlikely** This species is predominantly an aerial species and does not rely on terrestrial habitats. It may occasionally be seen foraging over the Study Area but is unlikely to solely rely on any of the habitats present.
Glossy Ibis (*Plegadis falcinellus*)	Mi	Mi (S5)	The Glossy Ibis is widespread throughout most of the world and is the most widespread species of Ibis. In Australia it is generally located east of the Kimberley in Western Australia and the Eyre Peninsula in South Australia (DAWE 2020b). The species feeds in very shallow water and nests in freshwater or brackish wetlands with tall dense stands of emergent vegetation such as reeds, papyrus or rushes and low trees or bushes. They show a preference for marshes at the margins of lakes and rivers but can also be found at lagoons, flood-plains, wet meadows, swamps,	**Unlikely** The Glossy Ibis was recorded during recent surveys at Horse Swamp (Terrestrial Ecosystems 2019). This location is outside, but within 500 m of, Part 2 of the Study Area. Despite the proximity of this record, this species is considered unlikely to occur as there is no suitable habitat within the Study Area itself (Terrestrial Ecosystems 2019).

Species	Conservation status*		Distribution and habitat	Likelihood of occurrence within the Study Area[3]
	EPBC Act	BC Act		
			reservoirs, sewage ponds, paddies and irrigated farmland.	
Rainbow Bee-eater (*Merops ornatus*)	Marine	-	The Rainbow Bee-eater is widely distributed across most of mainland Australia where it occurs mainly in open forests and woodlands, shrublands, and in various cleared or semi-cleared habitats, including farmland and areas of human habitation (DAWE 2020b).	**Potential in Part 1** **Recorded in Part 2** The Rainbow Bee-eater was recorded during the current survey nesting within a sandy embankment within Part 2 of the Study Area. It is also considered to potentially occur within Part 1.
Curlew Sandpiper (*Calidris ferruginea*)	CR & Mi	Mi (S5)	Curlew Sandpipers generally occur around the coasts but are also quite widespread inland. Records occur in all states during the non-breeding period, and also during the breeding season when many non-breeding birds remain in Australia rather than migrating north. The species generally inhabits intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons (DAWE 2020b).	**Unlikely** There is no suitable habitat for this species within the Study Area, and the species generally occurs further south in WA.
Australasian Bittern (*Botaurus poiciloptilus*)	EN	EN (S2)	The Australasian Bittern population can be divided into two sub-populations, the south-eastern and south-western sub-populations. The south-western sub population in WA likely only occurs on the western coastal plain between Lancelin and Busselton, where it prefers freshwater wetlands with tall dense vegetation (TSSC 2019). .	**Unlikely** The species mainly occurs further south in SW WA. A recent waterbird survey undertaken by RPS (2019) identified that there was a lack of suitable habitat available for many waterbird species within the Study Area. This species is therefore considered unlikely to occur.
Common Greenshank (*Tringa nebularia*)	Mi	Mi (S5)	The Common Greenshank is a wader species that occurs in a variety of coastal and inland wetlands. In WA, it occurs around most of the coast from Cape Arid in the south to Carnarvon in the north-west and has the widest distribution of any shorebird in Australia. The species spends the non-breeding season in Australia but migrates north to breed (DAWE 2020b).	**Unlikely** The species is known to occur nearby at Lake Gnangara (~7 km west). However, a recent waterbird survey undertaken by Terrestrial Ecosystems (2019) identified that there was a lack of suitable habitat available for many waterbird species within the Study Area. This species is therefore considered unlikely to occur.

Species	Conservation status*		Distribution and habitat	Likelihood of occurrence within the Study Area[3]
	EPBC Act	BC Act		
Wood Sandpiper (*Tringa glareola*)	Mi	Mi (S5)	The Wood Sandpiper is a wader species that inhabits inland shallow freshwater wetlands, often with other waders. They prefer ponds and pools with emergent reeds and grass, surrounded by tall plants or dead trees and fallen timber. They tend to occur more so in the north of Australia rather than southern parts (Morcombe 2000).	**Unlikely** There is only one record of this species approximately 3.8 km east of the Study Area. This species was not recorded during the recent waterbird survey undertaken by Terrestrial Ecosystems (2019) and no suitable habitat occurs within the Study Area.
Peregrine Falcon (*Falco peregrinus*)	-	OS (S6)	The Peregrine Falcon occurs across most habitats within Australia but is relatively uncommon. It usually nests in prefers coastal and inland cliffs or open woodlands near water,	**Potential (vagrant)** There are numerous records of this species around Whiteman Park, but no records within the Study Area itself (DBCA 2019b). The species could potentially occur within the Study Area on an occasional or transitionary basis and is unlikely to rely on any of the habitats available within the Study Area.
Red-winged Fairy Wren (*Malurus elegans*)	Not listed	Not listed	The Red-winged Fairy Wren is not listed under with the EPBC or BC Act, but is considered as regionally significant under Bush Forever. This species is endemic to south west WA where it occurs between Moore River north of Perth south to Margaret River, and east to Albany. It generally inhabits the understorey of Karri and Jarrah forests and requires good understorey cover to protect it from predators.	**Unlikely in Part 1** **Potential in Part 2** This species has not been recorded during any of the surveys undertaken for the Project; however, it is likely to occur in and around Whiteman Park where it has previously been recorded. It may potentially occur within Part 2 of the Study Area itself but is unlikely to occur in Part 1.
Mammals				
Western Ringtail Possum (*Pseudocheirus occidentalis*)	CR	CR (S1)	The Western Ringtail Possum occurs in the SW of WA where it inhabits the peppermint woodlands and peppermint/tuart forests on the southern extremity of the Swan Coastal Plain (DPaW 2017).	**Unlikely** The Study Area occurs outside the known distribution of this species.
Woylie (*Bettongia penicillata ogilbyi*)	EN	CR	Woylies prefer patches of dense undergrowth with a continuous canopy that provide refuges against introduced predators. Scattered Woylie populations	**Unlikely** There is a translocated population of Woylie within Whiteman Park (AECOM 2016, DEC 2012a), which occurs within 1km of the Study Area. These individuals occur within a protected zone/fenced area within Whiteman Park.

Species	Conservation status*		Distribution and habitat	Likelihood of occurrence within the Study Area[3]
	EPBC Act	BC Act		
			may be found throughout the jarrah forest in the south-west corner of Western Australia (DEC 2012a).	The species is considered unlikely to occur within the Study Area itself given the lack of suitable habitat and lack of recent (wild) records.
Petrogale lateralis (Black-flanked Rock-wallaby)	EN	EN (S2)	The Black-flanked Rock-wallaby is endemic to Western Australia where it was formerly widespread. The species distribution has greatly declined, and it is now confined to small patches of suitable habitat in central and southern WA (DAWE 2020b).	**Unlikely** A translocated population of Black-flanked Rock-wallaby occurs in Whiteman Park (DoEE 2019a), outside the Study Area. The species is otherwise unlikely to occur within either Part 1 or Part 2 of the Study Area.
Chuditch (*Dasyurus geoffroii*)	VU	VU (S3)	Chuditch currently only occurs in areas dominated by sclerophyll forest or drier woodland, heath and mallee shrubland and require adequate numbers of suitable den and refuge sites and sufficient prey biomass to survive (DEC 2012b). The majority of records are found in the contiguous Jarrah forests of the south west of Western Australia.	**Unlikely** There are no known established populations of Chuditch within the Greater Perth metropolitan area. There is also a lack of suitable habitat for this species within the Study Area itself and so the species is considered unlikely to occur.
Western Brush Wallaby (*Macropus irma*)	-	P4	The Western Brush Wallaby is distributed across the south-west of Western Australia from north of Kalbarri to Cape Arid. This species optimum habitat is open forest or woodland, seasonally wet flats with low grasses and open thickets (DoEE 2019).	**Unlikely in Part 1** **Potential in Part 2** There are numerous records of this species within Whiteman Park with the closest being ~ 4 km north of Part 2 of the Study Area (DBCA 2019b). The species is unlikely to occur in Part 1 of the Study Area but may potentially occur in suitable habitats within Part 2.
Quenda (*Isoodon obesulus subsp. fusciventer*)	–	P4	Quenda are widely but patchily distributed through south-western WA, from around Guilderton to east of Esperance and inland to Hyden. This species prefers low, dense vegetation such as heath and swampy habitat and is often associated with forests, woodland, shrubland and riparian areas (DEC 2012c).	**Unlikely in Part 1** **Recorded in Part 2** A potential Quenda digging was recorded during the current survey and previously during AECOMs survey (2016) in Part 2 of the Study Area. Quenda were also directly observed during WRMs recent wetland survey at Orchid Park, located outside the Study Area (WRM 2019). There is one DBCA record of the Quenda adjacent to Bush Forever Site 200, in Part 2 of the Study Area, and numerous records throughout Whiteman Park (DBCA 2019b).

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Species	Conservation status*		Distribution and habitat	Likelihood of occurrence within the Study Area[3]
	EPBC Act	BC Act		
				Whilst the species was also previously recorded in an area of revegetation adjacent to the Tonkin Highway by GHD in 2014, this location is outside the Study Area. There is no suitable habitat within Part 1 of the Study Area and so the Quenda is unlikely to occur there.
Water Rat (*Hydromys chrysogaster*)	–	P4	The Water Rat is found mainly near permanent bodies of freshwater where it lives in burrows on low banks of rivers, lakes, wetlands, estuaries and even along the coast. Intact riparian vegetation and associated bank stability is critical to their survival (. Suitable habitat occurs within watercourses and riparian vegetation habitats within the Study Area, mainly in Part 2 of the Study Area.	**Unlikely in Part 1** **Potential in Part 2** DBCA (2019) have recorded several individuals surrounding the Study Area; however, the species was not recorded during a recent wetland survey (WRM 2019). Suitable habitat for the species was recorded in and around Part 2 of the Study Area, but there is no suitable habitat for this species in Part 2.
Western False Pipistrelle (*Falsistrellus mackenziei*)		P4	The Western False Pipistrelle occurs mostly in wet sclerophyll forests of Karri, Jarrah and Tuart, and generally occurs in the South West of WA. The majority of records of this species occur south and south east of Mandurah; however, there is one outlier record north of Perth (DBCA 2019b).	**Unlikely** This species inhabits the tall, dense Karri and Jarrah forests of the SW of WA. There is one outlier record of this species approximately 3 km east of Part 2 of the Study Area; however, there is a lack of suitable habitat within the Study Area itself and so this species is considered unlikely to occur.
Reptiles				
Western Swamp Tortoise (*Pseudemydura umbrina*)	CR	CR	The Western Swamp Tortoise is only known from three locations including Ellenbrook Nature Reserve, Twin Swamps Nature Reserve and Mogumber Nature Reserve. None of these areas occur within the Study Area.	**Unlikely** The closest known occurrence of this species is within the Twin Swamps Nature Reserve which is approximately 7 km east of the Ellenbrook section of the Study Area.
Black-striped Snake (*Neelaps calonotus*)	–	P3	The Black-striped Snake occurs only along the Swan Coastal Plain with the bulk of this species' known distribution occurring in the Perth region; however, there have been recent records of this species further north near Dongara and Eneabba suggesting it has a broader distribution (Bush et al. 2010). This species occurs on dunes and sand plains vegetated with	**Unlikely in Part 1** **Potential in Part 2** This species has previously been recorded in and around Ellenbrook and around Bennett Springs near Part 2 of the Study Area (DBCA 2019b; Terrestrial Ecosystems 2018). The Black-striped Snake could potentially utilise the Banksia woodland habitat, most of which occurs outside the Study Area. There is no

Species	Conservation status*		Distribution and habitat	Likelihood of occurrence within the Study Area[3]
	EPBC Act	BC Act		
			heaths and eucalypt/banksia woodlands (Terrestrial Ecosystems 2018).	suitable habitat within Part 1 of the Study Area and so the species is considered unlikely to occur there.
Jewelled Sandplain Ctenotus (*Ctenotus gemmula*)	–	P3	There are three geographic populations for the Jewelled Sandplain Ctenotus: one is on the sand plain north of Perth, one is on the sand plain around the greater metropolitan area and the largest geographic distribution is along the south coast of Western Australia (Terrestrial Ecosystems 2018). The species is generally scarce on the Swan Coastal Plain as it is the northern extent of its range (Bush et al. 2010).	**Unlikely in Part 1** **Potential in Part 2** There are two records of this species approximately 4 km northeast of Part 2 of the Study Area (DBCA 2019b). The Jewelled Sandplain Ctenotus may potentially utilise the Banksia woodland habitats available within Part 2 of the Study Area; however, it is unlikely to be present within Part 1 of the Study Area.

* Conservation significant fauna listing definitions are as follows:

CR = listed as Critically Endangered under the EPBC Act.

EN = listed as Endangered under the EPBC Act.

VU = listed as Vulnerable under the EPBC Act.

Mi = listed as Migratory species under the EPBC Act.

S1 = Schedule 1: Fauna that is rare or is likely to become extinct as critically endangered fauna (CR) under the BC Act.

S2 = Schedule 2: Fauna that is rare or likely to become extinct as endangered fauna (EN) under the BC Act.

S3 = Schedule 3: Fauna that is rare or likely to become extinct as vulnerable fauna (VU) under the BC Act.

S5 = Schedule 5: Migratory birds protected under an international agreement (IA) under the BC Act.

P3 = Priority 3: poorly known species known from several specimens or records but not under imminent threat and need further survey. Listed by DBCA.

P4 = Priority 4: Rare, Near Threatened and other species in need of monitoring but not currently threatened; could become threatened if present circumstances change. Listed by DBCA.

Appendix E Fauna species recorded within the Study Area

Common name	Scientific name	EPBC Act Status	DBCA / BC Act Status	Part 1 and Part 2	Part 2 Malaga to Ellenbrook				Part 1 Bayswater to Malaga		
				This survey	Terrestrial Ecosystems 2019	Terrestrial Ecosystems 2018	AECOM 2016	Coffey 2015a	FVC 2019	GHD 2014	360 2013a, 2014
Birds											
Australasian Grebe	*Tachybaptus novaehollandiae*				X						
Australasian Shoveler	*Spatula rhynchotis*				X						
Australasian Swamphen	*Porphyrio melanotus*				X						
Australian Hobby	*Falco longipennis*							X		X	
Australian Magpie	*Cracticus tibicen*			X			X	X		X	X
Australian Pelican	*Pelecanus conspicillatus*			X							
Australian Pipit	*Anthus novaeseelandiae*							X			
Australian Raven	*Corvus coronoides*							X		X	X
Australian Reed Warbler	*Acrocephalus australis*							X			
Australian Ringneck	*Platycercus zonarius*						X	X		X	X
Australian Shelduck	*Tadorna tadornoides*				X		X	X			
Australian White Ibis	*Threskiornis molucca*				X		X	X		X	
Australian Wood Duck	*Chenonetta jubata*			X	X		X	X		X	
Banded Lapwing	*Vanellus tricolor*			X	X						

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Common name	Scientific name	EPBC Act Status	DBCA / BC Act Status	Part 1 and Part 2	Part 2 Malaga to Ellenbrook				Part 1 Bayswater to Malaga		
				This survey	Terrestrial Ecosystems 2019	Terrestrial Ecosystems 2018	AECOM 2016	Coffey 2015a	FVC 2019	GHD 2014	360 2013a, 2014
Black Cockatoo (species not identified)	*Calyptorhynchus spp.*	EN or VU	EN (S2) or VU (S3)	X						X	
Black-eared Cuckoo	*Chrysococcyx osculans*							X			
Black-faced Cuckoo Shrike	*Coracina novaehollandiae*			X			X	X		X	X
Black-faced Woodswallow	*Artamus cinereus*			X				X		X	
Black-fronted Dotterel	*Elseyornis melanops*				X			X			
Black Shouldered Kite	*Elanus caeruleus*			X				X			
Black Swan	*Cygnus atratus*				X					X	
Black-winged Stilt	*Himantopus*				X		X				
Boobook Owl	*Ninox boobook*							X			
Brown Goshawk	*Accipiter fasciatus*							X			
Brown Honeyeater	*Lichmera indistincta*			X			X	X			
Brown Songlark	*Cincloramphus cruralis*						X				
Carnaby's Black Cockatoo	*Calyptorhynchus latirostris*	EN	EN (S2)	X		X		X		X	
Common Bronzewing	*Phaps chalcopterea*						X	X			
Collared Sparrowhawk	*Accipiter cirrocephalus*									X	
Crested Pigeon	*Ocyphaps lophotes*			X			X	X			

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Common name	Scientific name	EPBC Act Status	DBCA / BC Act Status	Part 1 and Part 2	Part 2 Malaga to Ellenbrook				Part 1 Bayswater to Malaga		
				This survey	Terrestrial Ecosystems 2019	Terrestrial Ecosystems 2018	AECOM 2016	Coffey 2015a	FVC 2019	GHD 2014	360 2013a, 2014
Domestic Pigeon	*Columba livia*							X			
Dusky Moorhen	*Gallinula tenebrosa*				X					X	
Emu	*Dromaius novaehollandiae*							X			
Eurasian Coot	*Fulica atra*				X					X	X
Forest Red-tailed Black Cockatoo	*Calyptorhynchus banksii naso*	VU	VU (S3)	X		X	X	X		X	X
Galah	*Cacatua roseicapilla*			X			X	X			X
Glossy Ibis	*Plegadis falcinellus*	Mi	Mi (S5)		X						
Great Cormorant	*Phalacrocorax carbo*									X	
Great Egret	*Ardea alba*				X						
Grey Butcherbird	*Cracticus torquatus*			X				X			
Grey Fantail	*Rhipidura fuliginosa*						X	X			
Grey Shrike-thrush	*Colluricincla harmonica*							X			
Grey Teal	*Anas gracilis*				X						X
Hardhead	*Aythya australis*				X						
Horsfield's Bronze Cuckoo	*Chrysococcyx basalis*							X			
Laughing Dove	**Spilopelia senegalensis*			X				X		X	X
Laughing Kookaburra	**Dacelo novaeguineae*			X				X		X	
Little Corella	*Cacatua sanguinea*			X			X	X		X	

Common name	Scientific name	EPBC Act Status	DBCA / BC Act Status	Part 1 and Part 2	Part 2 Malaga to Ellenbrook				Part 1 Bayswater to Malaga		
				This survey	Terrestrial Ecosystems 2019	Terrestrial Ecosystems 2018	AECOM 2016	Coffey 2015a	FVC 2019	GHD 2014	360 2013a, 2014
Little Eagle	*Hieraaetus morphnoides*							X			
Little Pied Cormorant	*Microcarbo melanoleucos*				X						
Lorikeet	*Glossopsitta sp*									X	
Magpie-lark	*Grallina cyanoleuca*			X			X	X		X	X
Masked Lapwing	*Vanellus miles*						X				
Nankeen Kestrel	*Falco cenchroides*			X			X	X			
Nankeen Night-heron	*Nycticorax caledonicus*				X						
New Holland Honeyeater	*Phylidonyris novaehollandiae*						X	X		X	X
Pacific Black Duck	*Anas superciliosa*			X	X			X		X	X
Pallid Cuckoo	*Cacomantis pallidus*							X			
Pied Butcherbird	*Cracticus nigrogularis*									X	
Pink-eared Duck	*Malacorhynchus membranaceus*				X						
Rainbow Bee-eater	*Merops ornatus*			X			X				
Rainbow Lorikeet	**Trichoglossus moluccanus*			X			X			X	X
Red Wattlebird	*Anthochaera carunculata*			X			X	X		X	X
Red-capped Parrot	*Platycercus spurius*			X				X			X

Common name	Scientific name	EPBC Act Status	DBCA / BC Act Status	Part 1 and Part 2	Part 2 Malaga to Ellenbrook				Part 1 Bayswater to Malaga		
				This survey	Terrestrial Ecosystems 2019	Terrestrial Ecosystems 2018	AECOM 2016	Coffey 2015a	FVC 2019	GHD 2014	360 2013a, 2014
Red-capped Robin	*Petroica goodenovii*							X			
Red-kneed Dotterel	*Erythrogonys cinctus*							X			
Ring-neck Parrot	*Platycercus zonarius*			X			X			X	
Rufous Songlark	*Cincloramphus mathewsi*						X	X			
Rufous Whistler	*Pachycephala rufiventris*			X			X	X			
Sacred Kingfisher	*Todiramphus sanctus*			X	X		X			X	X
Scarlet Robin	*Petroica boodang*							X			
Silvereye	*Zosterops lateralis*			X				X			
Singing Honeyeater	*Gavicalis virescens*			X				X			
Splendid Fairy Wren	*Malurus splendens*						X	X		X	
Spiny-cheeked Honeyeater	*Acanthagenys rufogularis*									X	
Straw-necked Ibis	*Threskiornis spinicollis*			X	X			X			X
Striated Pardalote	*Pardalotus striatus*						X	X		X	
Sulphur-crested Cockatoo	*Cacatua galerita*									X	
Tree Martin	*Petrochelidon nigricans*							X			
Wedge-tailed Eagle	*Aquila audax*							X		X	
Weebill	*Smicriornis brevirostris*						X	X			
Welcome Swallow	*Hirundo neoxena*			X			X	X			X

Common name	Scientific name	EPBC Act Status	DBCA / BC Act Status	Part 1 and Part 2	Part 2 Malaga to Ellenbrook				Part 1 Bayswater to Malaga		
				This survey	Terrestrial Ecosystems 2019	Terrestrial Ecosystems 2018	AECOM 2016	Coffey 2015a	FVC 2019	GHD 2014	360 2013a, 2014
Western Gerygone	*Gerygone fusca*						X	X			
Western Thornbill	*Acanthiza inornata*							X		X	X
White Cheeked Honeyeater	*Phylidonyris niger*			X				X			
White-browed Scrubwren	*Sericornis frontalis*							X			
White-faced Heron	*Ardea novaehollandiae*			X	X			X			
White-necked Heron	*Ardea pacifica*				X			X			
Willie Wagtail	*Rhipidura leucophrys*			X			X	X		X	X
Yellow-billed Spoonbill	*Platalea flavipes*				X						
Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*			X			X	X			
Reptiles											
Western Three-lined Skink	*Acritoscincus trlineatus*							X			
Bobtail Lizard	*Tiliqua rugosa*			X			X	X			X
Buchanans Snake-eyed Skink	*Cryptoblepharus buchananii*			X			X	X		X	
Perons Snake-eyed Skink	*Cryptoblepharus plagiocephalus*										X
West-coast laterite ctenotus	*Ctenotus fallens*							X			
Dugite	*Pseudonaja affinis subsp. Affinis*			X				X			X
Dusky Morethia	*Morethia obscura*							X		X	

Common name	Scientific name	EPBC Act Status	DBCA / BC Act Status	Part 1 and Part 2	Part 2 Malaga to Ellenbrook				Part 1 Bayswater to Malaga		
				This survey	Terrestrial Ecosystems 2019	Terrestrial Ecosystems 2018	AECOM 2016	Coffey 2015a	FVC 2019	GHD 2014	360 2013a, 2014
Dwarf Bearded Dragon	*Pogona minor*							X			
Fraser's Legless Lizard	*Delma fraseri*							X			
Two-toed Earless Skink	*Hemiergis quadrilineata*							X			
Elegant slider	*Lerista elegans*							X			
Blunt-tailed west-coast slider	*Lerista praepedita*							X			
Common Dwarf Skink	*Menetia greyii*			X			X	X			
Monitor lizard (unknown sp.)	*Varanus sp.*			X							
Goulds Hooded Snake	*Parasuta gouldii*							X			
Racehorse Monitor	*Varanus tristis*							X			
Salmon Bellied Skink	*Egernia napoleonis*							X			
Sand Monitor	*Varanus gouldii*							X			
Sand-plain Worm Lizard	*Aprasia repens*							X			
Tiger Snake	*Notechis scutatus*							X			
Western Heath Dragon	*Ctenophorus adelaidensis*							X			
Mammals											
Black Rat	*Rattus rattus*							X			
Cat	*Felis catus*			X			X	X			
Common Brush-tail Possum	*Trichosurus vulpecula*							X		X	

Common name	Scientific name	EPBC Act Status	DBCA / BC Act Status	Part 1 and Part 2	Part 2 Malaga to Ellenbrook				Part 1 Bayswater to Malaga		
				This survey	Terrestrial Ecosystems 2019	Terrestrial Ecosystems 2018	AECOM 2016	Coffey 2015a	FVC 2019	GHD 2014	360 2013a, 2014
Dog	*Canis lupis*						X	X			
European cattle	*Bos taurus*			X			X	X			
European Rabbit	*Oryctolagus cuniculus*			X			X	X		X	
Fox	*Vulpes vulpes*			X				X			
House Mouse	*Mus musculus*							X			
Southern Brown Bandicoot (Quenda)	*Isoodon fusciventer*		P4	X			X	X		X	
Western Grey Kangaroo	*Macropus fuliginosus melanops*			X			X	X		X	
Amphibians											
Clicking Frog	*Crinia glauerti*							X			
Moaning Frog	*Heleioporus eyrei*							X			
Motorbike Frog	*Litoria moorei*							X			
Quacking Frog	*Crinia georgiana*							X			
Squelching Frog	*Crinia insignifera*							X		X	
Turtle Frog	*Myobatrachus gouldii*							X			
Western Banjo Frog	*Limnodynastes dorsalis*							X			
Total species recorded				**46**	**25**	**2**	**42**	**97**	**0**	**42**	**23**

Appendix F Broad fauna habitats

Habitat types	Fauna habitat description	Conservation significant fauna	Habitat photo
Banksia Woodland	Banksia woodland comprising *Banksia attenuata*, *Banksia menziesii* and *Nuytsia floribunda*. Provides high value to fauna, and moderate to high quality foraging habitat for Black Cockatoos. Patches of Banksia Woodland habitat occur within both Part 1 and Part 2 of the Study Area. Banksia Woodland habitats in Part 1 of the Study Area vary in condition from Completely Degraded to Good and are highly fragmented. None are connected to habitats that extend outside the Study Area. Banksia Woodland habitat in Part 2 of the Study Area was in Good to Very Good condition, with two occurrences also representing the Banksia Woodlands of the Swan Coastal Plain TEC.	Provides moderate to high quality foraging for black cockatoos. May also provide potential breeding and roosting habitat where large trees are present. Provides suitable habitat for a number of conservation significant fauna including Quenda and pontetially for the Black-stripe Snake.	
Mixed Eucalyptus/Corymbia Woodland	Open or closed woodland comprising native Eucalyptus species such as Marri, Jarrah, Tuart, Flooded Gum, and/or *Eucalyptus patens* (Blackbutt), over a mix of native shrubs including *Xanthorrhoea preissii*, *Dasypogon bromeliifolius*, *Nuytsia floribunda*, *Allocasuarina* sp. species over a mix of introduced grasses. In Part 2 of the Study Area, this habitat type may also contain scattered Pines. In Part 1 of the Study Area, this habitat type was generally in Completely Degraded to Good condition, whereas in Part 2 condition was generally higher.	Provides moderate to high quality foraging for black cockatoos and potential breeding and roosting habitat and potential habitat for the Black-stripe Snake. Areas of closed woodland may also provides suitable habitat for Quenda.	

Habitat types	Fauna habitat description	Conservation significant fauna	Habitat photo
Mixed Banksia/Eucalypt/Corymbia Woodland	Mixed open or closed woodlands comprising a mixture of Banksia spp. and Eucalyptus/Corymbia species. *Nuytsia floribunda*, *Allocasaurina* and *She oak* are also present in some patches. In Part 1 of the Study Area, this habitat type was generally in Completely Degraded to Good condition, whereas in Part 2 condition was generally Good.	Provides low to moderate quality foraging for black cockatoos given the highly degraded nature of most patches of this habitat type. Where tall trees are present may also provide potential breeding and roosting habitat for black cockatoos. This habitat type in Part 2 of the Study Area may provide potential habitat for the Black-stripe Snake; however, it is unlikely to provide habitat for any conservation significant fauna species within Part 1 of the Study Area.	*No photo available*
Flooded Gum Woodland	Open or closed tall woodland dominated by Flooded Gum. Often interspersed with Paperbark spp. and other native and non-native species. Provides moderate to high value habitat for a range of fauna species, as well as providing connecting ecological corridors from Part 2 of the Study Area into the wider Whiteman Park area.	Only provides low quality foraging for black cockatoos; however, large Flooded Gum trees may provide potential breeding or roosting habitat for black cockatoos. May potentially provide habitat for conservation significant fauna such as Quenda where adequate understorey is present.	
Paperbark Woodland	Low to mid, open or closed woodland comprising of *Melaleuca preissiana and/or Melaleuca rhaphiophylla* over a mixture of native and introduced species. In Part 1 of the Study Area, this habitat type was generally Degraded, whereas in Part 1 condition ranged from Degraded to Very Good.	Does not provide suitable foraging habitat for black cockatoos. May provide suitable habitat for Quenda, where understorey is present. Provides higher value habitat to fauna in general, particularly in areas where ecological connectivity is greater (i.e. around Whiteman Park).	

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Habitat types	Fauna habitat description	Conservation significant fauna	Habitat photo
Wetland / water course	Natural wetlands, watercourses, swamps and/or creek lines or riverine habitats surrounded by native vegetation such as Paperbark, Flooded Gum, Melaleuca, *Acacia saligna, Kunzea glabrescens, Hypocalymma angustifolium,* and often abundant with weeds. Provides moderate to high value habitat for fauna, particularly for waterbirds (potentially including migratory species), amphibians and other aquatic species, and is an important water source for local fauna.	Provides higher value habitat to fauna, particularly for Quenda (where thick understorey is present) or the Water Rat. May provide low-quality foraging habitat for black cockatoos where foraging species are present. Provides potential breeding and roosting habitat for black cockatoos.	
Shrubland	The shrubland habitat consists of a mixture of native and non-endemic species including *Kunzea glabrescens*, *Acacia* spp., *A. cygnorum*, *Chamelaucium uncinatum*, *Melaleuca huegelii* and *M. nesophila* over weeds. Occasional native and non-native Eucalypt species may also be present. Shrubland habitat occurs within both Part 1 and Part 2 of the Study Area and is generally highly fragmented.	Provides low-quality foraging habitat for black cockatoos, although some potential breeding and/or roosting habitat may occur where there are large trees. Does provide moderate value to fauna in general, but unlikely to support other conservation significant fauna.	
Pine plantation	Pine plantation habitat is generally present north of Gnangara Road in Part 2 of the Study Area. The pine plantations provide an important food source and suitable roosting habitat for black cockatoos, and also provide moderate habitat value to other fauna species. Pine Plantation habitat does not occur in Part 1 of the Study Area.	High quality foraging habitat for black cockatoos and potential roosting habitat. Also provides higher value to fauna in general given the ecological connectivity to areas outside the Study Area; however, does not provide suitable habitat for any other conservation significant fauna.	

Habitat types	Fauna habitat description	Conservation significant fauna	Habitat photo
Scattered trees / shrubs	This habitat type generally comprises highly degraded vegetation and isolated stands of, or individual occurrences of, trees or shrubs, often situated alongside the road or in private property. This habitat includes non-native Eucalyptus species and natives such as *Eucalyptus marginata* (Jarrah), *Corymbia calophylla* (Marri), Banksia spp., Melaleuca spp. and Acacia spp. over weeds. Despite it being degraded it may provide moderate value to fauna, particularly where suitable foraging species for black cockatoos occur.	Does not provide any habitat for conservation significant fauna. May provide some low quality foraging habitat, or potential breeding/roosting habitat where large trees are present.	
Paddock with Eucalyptus/Corymbia	This habitat type comprises of cleared paddocks with stands of, or individual occurrences of, Eucalyptus/Corymbia trees, sometimes interspersed with Melaleucas, Banksias or *Xanthorrhoea preissii*, over introduced grasses. This habitat type, whilst highly degraded, provides high value foraging and potential breeding habitat for black cockatoos. Evidence of black cockatoos foraging was recorded at numerous locations, usually associated with the Marri trees present in this habitat type.	Whilst this habitat type is high degraded, the stands of large, mature Marri trees provide high qualtiy foraging for black cockatoos as well as potential breeding/roosting habitat. Evidence of use was recorded at mulitple locations throughout this habitat type. The highly degraded nature of this habitat type means it is unlikely to support other conservation significant fauna.	

Habitat types	Fauna habitat description	Conservation significant fauna	Habitat photo
Paddock with Melaleuca	This habitat type comprises of cleared paddocks with stands of, or individual occurrences of, Melaleucas, often interspersed with *Xanthorrhoea preissii*.	Does not provide suitable habitat for black cockatoos or any other conservation significant fauna.	
Constructed wetland/drainage	The constructed wetlands habitat includes man-made areas of open water, including farmland dams and artificial drainage, with or without native and/or non-native vegetation. Vegetation present may include *Eucalyptus rudis*, Melaleucas and non-native Eucalypts over introduced species such as *Typha orientalis* and *Juncus* spp. sedges over weeds. This habitat type is generally degraded but may provide some value to fauna in an otherwise fragmented landscape.	Does not provide suitable foraging habitat for black cockatoos or any other conservation significant fauna. May provide some potential breeding habitat for black cockatoos where large Eucalyptus trees are present.	
Modified vegetation	This habitat type comprises vegetation with a significantly altered structure or that occurs sporadically, either in highly degraded or cleared areas or along the roadside. Modified vegetation has a high level of impact from clearing, weeds, feral animals, rubbish and tracks.	May provide some low-quality foraging habitat or potential breeding/roosting trees where large Eucalyptus trees or other suitable species are present. Does not support any other conservation significant fauna.	

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Habitat types	Fauna habitat description	Conservation significant fauna	Habitat photo
Parkland cleared	Cleared parkland with scattered, isolated native and non-native tree species. Tree species include Eucalypts, Corymbia, Pines and other tall native or non-native trees. Although cleared parkland habitats are largely devoid of native vegetation, the tall trees may provide some moderate value habitat for fauna, particularly roosting habitat for black cockatoos or other avifauna.	Provides moderate quality foraging habitat for black cockatoos, and may provide potnetial breeding/roosting habitat where large Pine or Eucalptus trees are present. Does not support any other conservation significant fauna.	
Cleared paddocks	Cleared paddocks comprising of native and introduced grasses, often abundant in weed species and with the occasional, isolated native tree or isolated patch of vegetation. This habitat type is used predominantly for grazing livestock and is a prime foraging area for kangaroos (Bamford 2020). Whilst this habitat is predominantly cleared, it has been included as a broad fauna habitat type as it does provide habitat for kangaroos and other fauna are likely to pass through these areas. Otherwise, this habitat type provides little to no value to fauna.	Does not provide any habitat for conservation significant fauna or black cockatoos.	
Revegetation	Areas of revegetation in the form of planted native trees and shrubs. Most of the revegetation is a result of rehabilitation works from construction of the highway and adjacent road upgrades. In some areas, the revegetated areas may provide important refuge for native fauna, as well as enhancing the surrounding remnant vegetation.	Does not provide any habitat for conservation significant fauna or black cockatoos.	*No photo available.*

* fauna habitats consolidated from combining survey data from the current survey in addition to the following sources: GHD 2019, Focussed Vision Consulting 2018, Terrestrial Ecosystems 2017, AECOM 2016, Coffey 2015a, GHD 2014 and 360 Environmental 2014a.

Appendix G Survey photos

Foraging evidence (Carnaby's Cockatoo)	Foraging evidence (Forest Red-tailed Black Cockatoo)	Forest Red-tailed Black Cockatoos (*Calyptorhynchus banksii naso*; Part 1 of Study Area)
Black-shouldered Kite (*Elanus caeruleus*)	Rainbow Bee-eater (*Merops ornatus*)	Sacred Kingfisher (*Todiramphus sanctus*)
Bobtail Lizard (*Tiliqua rugosa*)	Feral European Honeybee (*Apis mellifera*)	Australian Shelduck (*Tadorna tadornoides*)

Banded Lapwing (*Vanellus tricolor*)	Galah (*Cacatua roseicapilla*)	Crested Pigeon (*Ocyphaps lophotes*)
Potential Quenda digging (Banksia Woodland TEC south of Gnangara Road (Part 2 of the Study Area)	Potential Quenda digging (Flooded Gum Woodland, north east of Bennett Springs).	Western Grey Kangaroos

Appendix H Black cockatoo foraging habitat quality assessment (DoEE 2017)

Scoring tool (starting score)	Criteria	Part 1 – Bayswater to Malaga							
		Banksia Woodland	Mixed Eucalyptus/ Corymbia woodland	Mixed Banksia/ Eucalyptus /Corymbia Woodland	Scattered trees/shrubs	Shrubland	Modified Vegetation	Parkland Cleared
10 (Very high quality)	Foraging habitat that is being managed for black cockatoos such as habitat that is the focus of successful rehabilitation, and/or has some level of protection from clearing, and/or is quality habitat described below with attributes contributing to meet a sore of ≥10.							
7 (High quality)	Native shrubland, kwongan heathland and woodland dominated by proteaceous plant species such as *Banksia* spp. (including *Dryandra* spp.), *Hakea* spp. and *Grevillea* spp., as well as native eucalypt woodland and forest that contains foraging species, including along roadsides. Does not include orchards, canola, or areas under a RFA (**Carnaby's and Baudin's).** Jarrah and Marri woodlands and forest, and edges of karri forests, including wandoo and blackbutt, within the range of the subspecies, including along roadsides. Does not include areas under a RFA (**Forest Red-tailed Black Cockatoo**).	7	7	7				
5 (Quality)	Pine plantation or introduced eucalypts (**Carnaby's and Baudin's**). Introduced eucalypts as well as the introduced Cape lilac (**Forest Red-tailed Black Cockatoo**).							
1 (Low quality)	Individual foraging plants or small stand of foraging plants.				1	1	1	1
Additions	Context adjustor - attributes improving functionality of foraging habitat							
+3	Is within the Swan Coastal Plain (important foraging area; **Carnaby's Cockatoo**). Jarrah and/or Marri show good recruitment (i.e. evidence of young trees; **Forest Red-tail Cockatoo**).	+3	+3	+3	+3	+3	+3	+3
+3	Contains trees with suitable nest hollows.		+3	+3				
+2	Primarily comprises Marri.		+2					
+2	Contains trees with potential to be used for breeding (DBH ≥ 500 mm).		+2	+2	+2		+2	+2
+1	Is known to be a roosting site.							

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Scoring tool (starting score)	Criteria	Part 1 – Bayswater to Malaga						
		Banksia Woodland	Mixed Eucalyptus/ Corymbia woodland	Mixed Banksia/ Eucalyptus /Corymbia Woodland	Scattered trees/shrubs	Shrubland	Modified Vegetation	Parkland Cleared
Subtractions	Context adjustor - attributes reducing functionality of foraging habitat							
-2	No clear evidence of feeding debris.	-2	-2	-2		-2		-2
-2	No other foraging habitat within 6 km.							
-1	Is > 12 km from a known breeding location.	-1	-1	-1	-1	-1	-1	-1
-1	Is > 12 km from a known roosting site.							
-1	Is > 2 km from a watering point.							
-1	Disease present (e.g. *Phytophthora cinnamomi* or Marri canker).							
Total score		**7**	**14**	**12**	**5**	**1**	**5**	**3**

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Scoring tool (starting score)	Criteria	Part 2 – Malaga to Ellenbrook										
		Banksia Woodland	Mixed Banksia/ Eucalyptus /Corymbia Woodland	Mixed Eucalyptus/Corybmbia Woodland	Wetland / water course	Flooded Gum Woodland	Paddock with Eucalyptus/Corymbia	Pine Plantation	Shrubland	Scattered trees/shrubs	Modified Vegetation	Parkland Cleared
10 (Very high quality)	Foraging habitat that is being managed for black cockatoos such as habitat that is the focus of successful rehabilitation, and/or has some level of protection from clearing, and/or is quality habitat described below with attributes contributing to meet a sore of ≥10.											
7 (High quality)	Native shrubland, kwongan heathland and woodland dominated by proteaceous plant species such as *Banksia* spp. (including *Dryandra* spp.), *Hakea* spp. and *Grevillea* spp., as well as native eucalypt woodland and forest that contains foraging species, including along roadsides. Does not include orchards, canola, or areas under a RFA (**Carnaby's and Baudin's**). Jarrah and Marri woodlands and forest, and edges of karri forests, including wandoo and blackbutt, within the range of the subspecies, including along roadsides. Does not include areas under a RFA (**Forest Red-tailed Black Cockatoo**).	7	7	7								
5 (Quality)	Pine plantation or introduced eucalypts (**Carnaby's and Baudin's**). Introduced eucalypts as well as the introduced Cape lilac (**Forest Red-tailed Black Cockatoo**).							5				
1 (Low quality)	Individual foraging plants or small stand of foraging plants.				1	1	1		1	1	1	1
Additions	Context adjustor - attributes improving functionality of foraging habitat											
+3	Is within the Swan Coastal Plain (important foraging area; **Carnaby's Cockatoo**). Jarrah and/or Marri show good recruitment (i.e. evidence of young trees; **Forest Red-tail Cockatoo**).	+3	+3	+3	+3	+3	+3	+3	+3	+3	+3	+3

Scoring tool (starting score)	Criteria	Part 2 – Malaga to Ellenbrook											
		Banksia Woodland	Mixed Banksia/ Eucalyptus /Corymbia Woodland	Mixed Eucalyptus/Corybmbia Woodland	Wetland / water course	Flooded Gum Woodland	Paddock with Eucalyptus/Corymbia	Pine Plantation	Shrubland	Scattered trees/shrubs	Modified Vegetation	Parkland Cleared
+3	Contains trees with suitable nest hollows.		+3	+3		+3	+3					
+2	Primarily comprises Marri and/or Jarrah		+2	+2			+2					
+2	Contains trees with potential to be used for breeding (DBH ≥ 500 mm or ≥ 300 mm DBH for salmon gum and wandoo).		+2	+2	+2	+2	+2					
+1	Is known to be a roosting site.											
Subtractions	Context adjustor - attributes reducing functionality of foraging habitat											
-2	No clear evidence of feeding debris.				-2	-2			-2		-2	
-2	No other foraging habitat within 6 km.											
-1	Is > 12 km from a known breeding location.	-1	-1	-1	-1	-1	-1	-1	-1	-1		
-1	Is > 12 km from a known roosting site.											
-1	Is > 2 km from a watering point.											
-1	Disease present (e.g. *Phytophthora cinnamomi* or Marri canker).											
Total score		**9**	**16**	**16**	**3**	**6**	**10**	**7**	**2**	**3**	**2**	**4**

Appendix I Black cockatoo foraging evidence locations

Description	Easting	Northing	Foraging evidence present
Foraging evidence only	401465	6483213	Yes
Foraging evidence only	401504	6483165	Yes
Foraging evidence only	401575	6483060	Yes
Foraging evidence only	401695	6483234	Yes
Foraging evidence only	401095	6482191	Yes
Foraging evidence only	401098	6482092	Yes
Foraging evidence only	401090	6482564	Yes
Foraging evidence only	401083	6482852	Yes
Foraging evidence only	401071	6482879	Yes
Foraging evidence only	401242	6482843	Yes
Foraging evidence only	401433	6481172	Yes
Potential breeding tree with foraging evidence	401304	6481291	Yes
Potential breeding tree with foraging evidence	401145	6481690	Yes
Potential breeding tree with foraging evidence	401103	6481703	Yes
Foraging evidence only	401057	6481598	Yes
Foraging evidence only	401105	6481559	Yes
Potential breeding tree with foraging evidence	394897	6475558	Yes
Potential breeding tree with foraging evidence	394896	6475568	Yes
Foraging evidence	394891	6475638	Yes
Potential breeding tree with foraging evidence	399948	6475779	Yes
Potential breeding tree with foraging evidence	399947	6475782	Yes
Forest Red-tailed Black Cockatoo	401430	6481183	Yes
Potential breeding tree with foraging evidence	401637	6480160	Yes
Potential breeding tree with foraging evidence	401535	6480729	Yes
Potential breeding tree with foraging evidence	401493	6480796	Yes
Potential breeding tree with foraging evidence	401305	6481319	Yes
Potential breeding tree with foraging evidence	401701	6479689	Yes
Potential breeding tree with foraging evidence	394916	6475543	Yes
Forest Red-tailed Black Cockatoo	397655	6470381	Direct sighting
Foraging evidence only	401129	6482787	Direct sighting
Potential breeding tree with foraging evidence	401178	6481485	Yes
Potential breeding tree with foraging evidence	401226	6481470	Yes
Potential breeding tree with foraging evidence	401222	6481465	Yes
Foraging evidence only	401440	6481190	Yes

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Description	Easting	Northing	Foraging evidence present
Forest Red-tailed Black Cockatoo	401440	6481190	Direct sighting
Potential breeding tree with foraging evidence	401434	6481206	Yes
Potential breeding tree with foraging evidence	401387	6481335	Yes
Potential breeding tree with foraging evidence	401334	6481341	Yes
Potential breeding tree with foraging evidence	401216	6481466	Yes
Potential breeding tree with foraging evidence	401185	6481332	Yes
Potential breeding tree with foraging evidence	401184	6481317	Yes
Potential breeding tree with foraging evidence	401179	6481266	Yes
Potential breeding tree with foraging evidence	401182	6481261	Yes
Potential breeding tree with foraging evidence	401228	6481257	Yes
Potential breeding tree with foraging evidence	401214	6481265	Yes
Potential breeding tree with foraging evidence	401229	6481272	Yes
Potential breeding tree with foraging evidence	401739	6479726	Yes
Foraging evidence only	401741	6479740	Yes
Potential breeding tree with foraging evidence	400003	6475526	Yes
Foraging evidence only	401704	6479090	Yes
Foraging evidence only	401886	6477720	Yes
Foraging evidence only	401820	6477840	Yes
Foraging evidence only	401815	6477880	Yes
Foraging evidence only	401920	6477350	Yes
Foraging evidence only	401804	6477300	Yes
Foraging evidence only	401788	6477280	Yes
Foraging evidence only	401758	6477210	Yes
Foraging evidence only	401782	6477270	Yes
Foraging evidence only	401731	6477250	Yes
Foraging evidence only	401723	6477240	Yes
Foraging evidence only	401721	6477230	Yes
Foraging evidence only	401712	6477250	Yes
Foraging evidence only	401665	6477210	Yes
Foraging evidence only	401739	6477440	Yes
Foraging evidence only	401697	6477480	Yes
Foraging evidence only	401657	6477480	Yes
Foraging evidence only	401643	6477490	Yes
Foraging evidence only	401565	6477480	Yes
Foraging evidence only	397799	6468120	Yes
Foraging evidence only	401377	6480524	Yes

Description	Easting	Northing	Foraging evidence present
Foraging evidence only	399981	6475568	Yes
Foraging evidence only	400492	6475621	Yes
Foraging evidence only	401991	6477306	Yes
Foraging evidence only	401900	6477365	Yes
Foraging evidence only	401627	6477346	Yes
Foraging evidence only	401676	6477298	Yes
Foraging evidence only	401680	6477294	Yes
Foraging evidence only	401707	6477270	Yes
Foraging evidence only	401627	6477270	Yes
Foraging evidence only	401581	6477287	Yes
Foraging evidence only	401561	6477304	Yes
Foraging evidence only	401641	6477206	Yes
Foraging evidence only	401477	6477216	Yes
Foraging evidence only	401696	6477241	Yes
Foraging evidence only	401705	6477454	Yes
Foraging evidence only	401681	6477463	Yes
Foraging evidence only	401657	6477471	Yes

Appendix J Black Cockatoo potential breeding tree data

Common name	Easting	Northing	DBH (cm)	Hollow present	Hollow entrance size (cm)	Author
Outside Study Area						
Stag	401442	6480903	740	Yes	10	ELA
Stag	401128	6481353	680	Yes	20	ELA
Marri	401415	6479123	820	Yes	20	Terrestrial Ecosystems
Marri	397411	6478430	1000	Yes	25	Terrestrial Ecosystems
Jarrah	397510	6479092	1050	Yes	15	Terrestrial Ecosystems
Marri	397534	6480740	890	Yes	20	Terrestrial Ecosystems
Marri	398186	6481320	900	Yes	20	Terrestrial Ecosystems
Marri	398090	6481216	500	Yes	20	Terrestrial Ecosystems
Marri	398090	6481230	1000	Yes	20	Terrestrial Ecosystems
Marri	399615	6482664	1000	Yes	15	Terrestrial Ecosystems
Flooded Gum	401050	6475694	570	Yes	30	Terrestrial Ecosystems
Flooded Gum	401956	6476147	750	Yes	~20-30	ELA
Flooded Gum	401894	6476153	1450	Yes	~30+	ELA
Flooded Gum	401929	6476055	1500	Yes	-	ELA
Stag	401298	6480918	1050	Yes	10- 20	ELA
Jarrah	401145	6481154	750	Yes	5	ELA
Marri	401407	6480879	850	Yes	25	ELA
Marri	401486	6480664	820	Yes	30-50	ELA
Stag	401582	6480377	890	Yes	30	ELA
Marri	401582	6480332	500	Yes	5-10	ELA
Marri	401559	6480143	1100	Yes	20-30	ELA
Stag	401749	6479140	1200	Yes	15-20	ELA
Marri	401644	6478976	605	No		ELA
Marri	395251	6475654	500	No		ELA
Marri	394898	6475433	771	No		ELA
Marri	394893	6475538	541	No		ELA

Common name	Easting	Northing	DBH (cm)	Hollow present	Hollow entrance size (cm)	Author
Marri	394891	6475546	605	No		ELA
Marri	394891	6475551	510	No		ELA
Marri	394897	6475558	997	No		ELA
Marri	394896	6475568	1045	No		ELA
Marri	401137	6482853	520	No		ELA
Marri	401640	6480090	840	No		ELA
Marri	401643	6480091	560	No		ELA
Marri	401452	6480802	1110	No		ELA
Marri	401420	6480955	630	No		ELA
Jarrah	401324	6481153	630	No		ELA
Jarrah	400998	6481642	960	No		ELA
Jarrah	401029	6481291	840	No		ELA
Jarrah	401029	6481291	750	No		ELA
Jarrah	401048	6481294	750	No		ELA
Marri	394916	6475543	740	No		ELA
Marri	394915	6475558	590	No		ELA
Marri	401185	6481332	630	No		ELA
Marri	401184	6481317	780	No		ELA
Marri	401179	6481266	540	No		ELA
Marri	401182	6481261	530	No		ELA
Stag	401186	6481261	580	No		ELA
Marri	401118	6481691	1130	No		ELA
Marri	401120	6481683	500	No		ELA
Jarrah	401027	6481683	560	No		ELA
Tuart	394942	6475321	1100	No		ELA
Marri	394923	6475573	1010	No		ELA
Jarrah	394929	6475642	680	No		ELA
Marri	399903	6475437	760	No		ELA
Marri	399869	6475450	870	No		ELA
Flooded Gum	394909	6475708	729	No		ELA
Flooded Gum	402257	6474248	0	No		DBCA Database
Marri	402034	6474329	0	No		DBCA Database
Flooded Gum	402148	6474669	0	No		DBCA Database

Common name	Easting	Northing	DBH (cm)	Hollow present	Hollow entrance size (cm)	Author
Blackbutt	402317	6475033	0	No		DBCA Database
Blackbutt	402312	6475033	0	No		DBCA Database
Flooded Gum	402135	6476305	0	No		DBCA Database
Marri	401823	6477655	0	No		DBCA Database
Marri	401805	6477693	0	No		DBCA Database
Marri	401855	6477713	0	No		DBCA Database
Marri	401739	6481717	0	No		DBCA Database
Marri	401762	6481720	0	No		DBCA Database
Marri	401740	6479107	510	No		ELA
Marri	401732	6479116	650	No		ELA
Marri	401727	6479130	550	No		ELA
Marri	401720	6479133	550	No		ELA
Marri	401699	6479149	680	No		ELA
Marri	401694	6479098	600	No		ELA
Marri	401704	6479090	550	No		ELA
Marri	401782	6477845	950	No		ELA
Flooded Gum	398388	6468667	700	No		ELA
Eucalyptus sp. planted/non-native	401896	6475799	750	No		ELA
Flooded Gum	402056	6476146	590	No		ELA
Flooded Gum	402046	6476143	610	No		ELA
Flooded Gum	402044	6476134	525	No		ELA
Flooded Gum	402039	6476136	550	No		ELA
Flooded Gum	402031	6476138	615	No		ELA
Flooded Gum	402015	6476146	765	No		ELA
Flooded Gum	401997	6476141	625	No		ELA
Flooded Gum	401995	6476141	510	No		ELA

Common name	Easting	Northing	DBH (cm)	Hollow present	Hollow entrance size (cm)	Author
Flooded Gum	401997	6476132	540	No		ELA
Flooded Gum	401999	6476123	720	No		ELA
Flooded Gum	401998	6476120	595	No		ELA
Flooded Gum	401985	6476132	630	No		ELA
Flooded Gum	401982	6476139	610	No		ELA
Flooded Gum	401976	6476141	615	No		ELA
Flooded Gum	401957	6476148	645	No		ELA
Flooded Gum	401950	6476149	615	No		ELA
Flooded Gum	401946	6476147	620	No		ELA
Flooded Gum	401945	6476146	625	No		ELA
Flooded Gum	401939	6476142	710	No		ELA
Flooded Gum	401927	6476141	730	No		ELA
Flooded Gum	401922	6476140	530	No		ELA
Flooded Gum	401914	6476141	510	No		ELA
Flooded Gum	401913	6476143	765	No		ELA
Flooded Gum	401905	6476148	640	No		ELA
Flooded Gum	401886	6476153	1325	No		ELA
Flooded Gum	401879	6476139	615	No		ELA
Flooded Gum	401894	6476045	560	No		ELA
Flooded Gum	401919	6476047	630	No		ELA
Flooded Gum	401926	6476052	800	No		ELA

Common name	Easting	Northing	DBH (cm)	Hollow present	Hollow entrance size (cm)	Author
Flooded Gum	401935	6476064	740	No		ELA
Flooded Gum	401929	6476083	800	No		ELA
Flooded Gum	401931	6476094	620	No		ELA
Flooded Gum	401946	6476105	810	No		ELA
Flooded Gum	401974	6476098	1050	No		ELA
Flooded Gum	401988	6476093	520	No		ELA
Flooded Gum	402000	6476081	750	No		ELA
Flooded Gum	402016	6476072	610	No		ELA
Flooded Gum	402029	6476062	650	No		ELA
Flooded Gum	402008	6476036	970	No		ELA
Flooded Gum	402003	6476024	760	No		ELA
Flooded Gum	401999	6476018	930	No		ELA
Flooded Gum	401974	6476039	1070	No		ELA
Flooded Gum	402048	6476093	805	No		ELA
Flooded Gum	402039	6476101	615	No		ELA
Flooded Gum	402030	6476111	800	No		ELA
Flooded Gum	402039	6476110	605	No		ELA
Flooded Gum	402046	6476109	645	No		ELA
Flooded Gum	402051	6476105	580	No		ELA
Marri	401515	6479782	550	No		ELA
Marri	401377	6480524	850	No		ELA
Jarrah	401387	6480577	600	No		ELA

Common name	Easting	Northing	DBH (cm)	Hollow present	Hollow entrance size (cm)	Author
Jarrah	401346	6480748	520	No		ELA
Jarrah	401348	6480753	540	No		ELA
Marri	401331	6480859	505	No		ELA
Marri	401304	6480932	615	No		ELA
Marri	401318	6480937	950	No		ELA
Marri	401262	6481054	760	No		ELA
Marri	401358	6481046	500	No		ELA
Marri	401396	6481046	625	No		ELA
Marri	401348	6480955	600	No		ELA
Marri	401355	6480956	950	No		ELA
Jarrah	401436	6480852	700	No		ELA
Marri	401429	6480828	550	No		ELA
Marri	401430	6480827	540	No		ELA
Marri	401425	6480801	900	No		ELA
Marri	401423	6480802	705	No		ELA
Marri	401429	6480730	940	No		ELA
Marri	401492	6480684	650	No		ELA
Jarrah	401394	6480642	550	No		ELA
Marri	401467	6480601	550	No		ELA
Marri	401488	6480531	540	No		ELA
Marri	401480	6480404	660	No		ELA
Stag	401482	6480402	645	No		ELA
Marri	401528	6480378	950	No		ELA
Marri	401583	6480333	515	No		ELA
Stag	401541	6480348	530	No		ELA
Marri	401553	6480158	550	No		ELA
Marri	401443	6479934	600	No		ELA
Marri	401387	6479894	600	No		ELA
Marri	401355	6479899	545	No		ELA
Marri	401750	6479105	510	No		ELA
Stag	401749	6479110	800	No		ELA
Stag	401754	6479114	560	No		ELA
Stag	401757	6479113	515	No		ELA
Stag	401739	6479119	610	No		ELA
Stag	401740	6479122	600	No		ELA

Common name	Easting	Northing	DBH (cm)	Hollow present	Hollow entrance size (cm)	Author
Stag	401745	6479134	840	No		ELA
Stag	401730	6479137	860	No		ELA
Stag	401679	6478970	520	No		ELA
Flooded Gum	401841	6476894	650	No		ELA
Part 1 (Bayswater to Malaga)						
Marri	397534	6473187	600	Yes		GHD
Marri	397553	6473161	1000	Yes		GHD
Marri	397554	6473133	750	Yes		GHD
Marri	397830	6470554	700	Yes		GHD
Tuart	397590	6472756	1260	No		ELA
Marri	397763	6472711	660	No		ELA and GHD
Marri	397784	6472756	630	No		ELA
Eucalyptus sp. planted/non-native	397776	6472778	860	No		ELA
Eucalyptus sp. planted/non-native	397779	6472784	600	No		ELA
Marri	397767	6472421	1530	No		ELA
Marri	397774	6472415	880	No		ELA
Eucalyptus sp. planted/non-native	397774	6471414	600	No		ELA
Marri	397773	6471417	560	No		ELA
Eucalyptus sp. planted/non-native	397771	6471421	580	No		ELA
Eucalyptus sp. planted/non-native	397766	6471426	1260	No		ELA
Eucalyptus sp. planted/non-native	397705	6470591	560	No		ELA
Marri	397739	6470582	620	No		ELA

Common name	Easting	Northing	DBH (cm)	Hollow present	Hollow entrance size (cm)	Author
Marri	397755	6470585	590	No		ELA
Eucalyptus sp. planted/non-native	397695	6470568	900	No		ELA
Eucalyptus sp. planted/non-native	397680	6470573	1270	No		ELA
Eucalyptus sp. planted/non-native	397632	6470565	720	No		ELA
Eucalyptus sp. planted/non-native	397640	6470569	570	No		ELA
Eucalyptus sp. planted/non-native	397662	6470597	920	No		ELA
Marri	397798	6470527	500	No		ELA
Eucalyptus sp. planted/non-native	397944	6470666	570	No		ELA
Eucalyptus sp. planted/non-native	397967	6470688	600	No		ELA and GHD
Eucalyptus sp. planted/non-native	398240	6469988	630	No		ELA
Eucalyptus sp. planted/non-native	398230	6470046	800	No		ELA
Eucalyptus sp. planted/non-native	398217	6470079	500	No		ELA
Eucalyptus sp. planted/non-native	398213	6470110	680	No		ELA

Common name	Easting	Northing	DBH (cm)	Hollow present	Hollow entrance size (cm)	Author
Eucalyptus sp. planted/non-native	398156	6470218	590	No		ELA
Eucalyptus sp. planted/non-native	398129	6470288	680	No		ELA
Eucalyptus sp. planted/non-native	398117	6470311	650	No		ELA
Eucalyptus sp. planted/non-native	398115	6470312	560	No		ELA
Marri	398095	6470346	600	No		ELA
Eucalyptus sp. planted/non-native	398105	6470351	620	No		ELA
Eucalyptus sp. planted/non-native	398153	6469155	540	No		ELA
Eucalyptus sp. planted/non-native	398156	6469147	520	No		ELA
Eucalyptus sp. planted/non-native	398156	6469127	560	No		ELA
Eucalyptus sp. planted/non-native	398164	6469061	660	No		ELA
Eucalyptus sp. planted/non-native	398136	6468569	780	No		ELA
Eucalyptus sp. planted/non-native	398135	6468566	630	No		ELA

Common name	Easting	Northing	DBH (cm)	Hollow present	Hollow entrance size (cm)	Author
Eucalyptus sp. planted/non-native	398148	6468552	550	No		ELA
Eucalyptus sp. planted/non-native	398151	6468546	800	No		ELA
Eucalyptus sp. planted/non-native	398189	6468521	730	No		ELA
Eucalyptus sp. planted/non-native	398198	6468584	530	No		ELA
Eucalyptus sp. planted/non-native	398195	6468627	520	No		ELA
Tuart	397774	6468142	660	No		ELA and GHD
Tuart	397771	6468145	1050	No		ELA and GHD
Tuart	397708	6468135	730	No		ELA
Eucalyptus sp. planted/non-native	397827	6472816	630	No		ELA
Marri	397777	6472809	600	No		ELA
Marri	397781	6472804	850	No		ELA
Eucalyptus sp. planted/non-native	397784	6472783	750	No		ELA
Tuart	397733	6468154	900	No		ELA
Marri	397825	6470548	540	No		Unknown Author
Tuart	397621	6471155	930	No		Unknown Author
Flooded Gum	397628	6473519	640	No		Unknown Author
Flooded Gum	397634	6473519	580	No		Unknown Author
Flooded Gum	397632	6473522	600	No		Unknown Author

Common name	Easting	Northing	DBH (cm)	Hollow present	Hollow entrance size (cm)	Author
Flooded Gum	397632	6473554	580	No		Unknown Author
Flooded Gum	397629	6473553	780	No		Unknown Author
Eucalyptus sp. planted/non-native	397654	6475023	500	No		GHD
Eucalyptus sp. planted/non-native	397674	6475024	500	No		GHD
Marri	397534	6473184	740	No		GHD
Marri	397538	6473164	1100	No		GHD
Marri	397542	6473158	1300	No		GHD
Marri	397553	6473152	1100	No		GHD
Marri	397550	6473145	600	No		GHD
Marri	397563	6473134	500	No		GHD
Marri	397550	6473119	1100	No		GHD
Marri	397546	6473112	600	No		GHD
Marri	397545	6473112	750	No		GHD
Marri	397541	6473112	750	No		GHD
Marri	397547	6473109	500	No		GHD
Marri	397556	6473105	600	No		GHD
Marri	397542	6472985	550	No		ELA and GHD
Marri	397771	6472805	600	No		GHD
Marri	397767	6472798	500	No		GHD
Marri	397759	6472807	800	No		GHD
Marri	397755	6472802	600	No		GHD
Marri	397739	6472794	700	No		GHD
Marri	397750	6472789	600	No		GHD
Marri	397755	6472789	500	No		GHD
Eucalyptus sp. planted/non-native	397763	6472770	600	No		GHD
Marri	397765	6472675	800	No		GHD
Eucalyptus sp.	397760	6472647	500	No		GHD

Common name	Easting	Northing	DBH (cm)	Hollow present	Hollow entrance size (cm)	Author
planted/non-native						
Eucalyptus sp. planted/non-native	397758	6472643	500	No		GHD
Eucalyptus sp. planted/non-native	397757	6472629	700	No		GHD
Eucalyptus sp. planted/non-native	397680	6470593	1000	No		GHD
Marri	397809	6470605	500	No		GHD
Marri	397809	6470529	600	No		GHD
Marri	397809	6470516	700	No		GHD
Marri	397803	6470497	600	No		GHD
Marri	397648	6470415	650	No		GHD
Eucalyptus sp. planted/non-native	397978	6470689	500	No		GHD
Eucalyptus sp. planted/non-native	397998	6470653	600	No		GHD
Eucalyptus sp. planted/non-native	398188	6468028	600	No		GHD
Eucalyptus sp. planted/non-native	398179	6468064	500	No		GHD
Eucalyptus sp. planted/non-native	398175	6468798	600	No		GHD
Eucalyptus sp. planted/non-native	398175	6468788	600	No		GHD
Eucalyptus sp.	398169	6468845	700	No		GHD

Common name	Easting	Northing	DBH (cm)	Hollow present	Hollow entrance size (cm)	Author
planted/non-native						
Eucalyptus sp. planted/non-native	398170	6468883	500	No		GHD
Eucalyptus sp. planted/non-native	398165	6468915	500	No		GHD
Eucalyptus sp. planted/non-native	398164	6468937	500	No		GHD
Eucalyptus sp. planted/non-native	398163	6468948	500	No		GHD
Eucalyptus sp. planted/non-native	398166	6468896	500	No		GHD
Eucalyptus sp. planted/non-native	398181	6468690	500	No		GHD
Eucalyptus sp. planted/non-native	398180	6468661	500	No		GHD
Eucalyptus sp. planted/non-native	398158	6469009	550	No		GHD
Eucalyptus sp. planted/non-native	398143	6469170	550	No		GHD
Marri	397799	6468123	800	No		ELA
Tuart	397783	6468121	650	No		ELA
Tuart	397777	6468142	950	No		ELA
Tuart	397769	6468142	800	No		ELA
Tuart	397764	6468139	800	No		ELA
Eucalyptus sp.	398193	6468028	1500	No		ELA

Common name	Easting	Northing	DBH (cm)	Hollow present	Hollow entrance size (cm)	Author
planted/non-native						
Flooded Gum	398203	6468042	1500	No		ELA
Eucalyptus sp. planted/non-native	398204	6468037	550	No		ELA
Flooded Gum	398203	6468006	700	No		ELA
Eucalyptus sp. planted/non-native	398279	6467980	700	No		ELA
Flooded Gum	398374	6468669	550	No		ELA
Flooded Gum	398322	6468714	600	No		ELA
Eucalyptus sp. planted/non-native	398322	6468688	900	No		ELA
Eucalyptus sp. planted/non-native	398323	6468666	850	No		ELA
Eucalyptus sp. planted/non-native	398324	6468653	950	No		ELA
Tuart	397714	6468131	750	No		ELA
Tuart	397737	6468157	670	No		ELA
Tuart	397740	6468125	695	No		ELA
Tuart	397753	6468129	830	No		ELA
River Red Gum	398172	6468067	845	No		ELA
River Red Gum	398175	6468070	530	No		ELA
River Red Gum	398177	6468071	690	No		ELA
River Red Gum	398187	6468064	755	No		ELA

Common name	Easting	Northing	DBH (cm)	Hollow present	Hollow entrance size (cm)	Author
River Red Gum	398186	6468076	560	No		ELA
River Red Gum	398185	6468080	510	No		ELA
River Red Gum	398179	6468173	1650	No		ELA
River Red Gum	398179	6468180	1160	No		ELA
Flooded Gum	398380	6468645	610	No		ELA
River Red Gum	398375	6468641	750	No		ELA
River Red Gum	398361	6468626	690	No		ELA
River Red Gum	398349	6468617	645	No		ELA
River Red Gum	398328	6468616	525	No		ELA
River Red Gum	398325	6468629	510	No		ELA
Marri	397762	6472708	720	No		ELA
Part 2 (Malaga to Ellenbrook						
Marri	401590	6480631	1911	Yes	15 cm, 25 cm	ELA
Marri	401577	6480660	1156	Yes	35	ELA
Stag	401516	6480784	2134	Yes	15, 30	ELA
Stag	401475	6480929	955	Yes	80	ELA
Stag	401486	6481000	1210	Yes	50-60	ELA
Stag	401351	6481148	618	Yes	80	ELA
Stag	401149	6481707	653	Yes	15	ELA
Stag	399875	6475972	338	Yes	30-40	ELA
Stag	401844	6483359	910	Yes	30	ELA
Stag	401633	6480275	1300	Yes	30	ELA
Stag	401629	6480316	790	Yes	10-30	ELA
Stag	401603	6480377	1220	Yes	30	ELA
Stag	401564	6480540	1250	Yes	40	ELA
Stag	399775	6476053	1990	Yes	30-40	ELA
Marri	401870	6477344	1500	Yes	40	Terrestrial Ecosystems

Common name	Easting	Northing	DBH (cm)	Hollow present	Hollow entrance size (cm)	Author
Flooded Gum	402186	6476185	0	Yes	5	DBCA Database
Flooded Gum	402163	6476245	0	Yes	5	DBCA Database
Flooded Gum	402158	6476260	0	Yes	4	DBCA Database
Flooded Gum	402159	6476258	0	Yes	<5	DBCA Database
Marri	401498	6481279	0	Yes		DBCA Database
Stag	401547	6481366	0	Yes		DBCA Database
Marri	401873	6477352	0	Yes		DBCA Database
Stag	401775	6477307	0	Yes		DBCA Database
Flooded Gum	401820	6477004	650	Yes	10	ELA
Flooded Gum	401833	6477013	1000	Yes	10	ELA
Marri	401825	6477283	600	Yes	10	ELA
Eucalyptus sp. planted/non-native	401741	6477293	900	Yes	15	ELA
Marri	401712	6477245	850	Yes	30	ELA
Jarrah	401704	6477497	700	Yes	30	ELA
Eucalyptus sp. planted/non-native	401752	6477385	1000	Yes	10	ELA
Blackbutt	397969	6475122	1200	Yes	40	ELA
Marri	400153	6475979	520	Yes	10	ELA
Flooded Gum	402182	6476023	800	Yes	10	ELA
Stag	399805	6476114	605	Yes	5	ELA
Stag	400050	6475624	760	Yes	15	ELA
Marri	401953	6477171	870	Yes	20-30	ELA
Marri	401627	6477346	850	Yes	30	ELA
Marri	401676	6477298	650	Yes	10	ELA
Marri	401690	6477291	850	Yes	10-30	ELA
Stag	401585	6477282	800	Yes	30	ELA
Stag	401560	6477276	1350	Yes	40	ELA
Stag	401565	6477267	1230	Yes	30, 40	ELA

Common name	Easting	Northing	DBH (cm)	Hollow present	Hollow entrance size (cm)	Author
Stag	401569	6477232	805	Yes	40	ELA
Stag	401539	6477197	750	Yes	20	ELA
Stag	401558	6477166	1450	Yes	20-30	ELA
Stag	401749	6477425	955	Yes	20	ELA
Stag	401742	6477432	930	Yes	-	ELA
Stag	401673	6477465	830	Yes	10	ELA
Stag	401639	6477463	810	Yes	5	ELA
Stag	401790	6477376	800	Yes	30	ELA
Marri	401728	6479748	850	No		ELA
Marri	401714	6479748	573	No		ELA
Marri	401714	6480101	815	No		ELA
Marri	401689	6480077	803	No		ELA
Marri	401673	6480137	510	No		ELA
Marri	401672	6480141	844	No		ELA
Marri	401706	6480245	1201	No		ELA
Marri	401718	6480246	860	No		ELA
Marri	401709	6480255	503	No		ELA
Marri	401674	6480376	1592	No		ELA
Marri	401650	6480424	618	No		ELA
Marri	401645	6480434	955	No		ELA
Jarrah	401575	6480630	1210	No		ELA
Stag	401563	6480711	564	No		ELA
Marri	401579	6480722	646	No		ELA
Marri	401585	6480725	621	No		ELA
Marri	401567	6480753	503	No		ELA
Marri	401506	6480801	561	No		ELA
Marri	401511	6480892	752	No		ELA
Marri	401485	6480982	573	No		ELA
Marri	401467	6480994	787	No		ELA
Stag	401470	6481039	611	No		ELA
Marri	401463	6481039	659	No		ELA
Marri	401465	6481064	936	No		ELA
Marri	401464	6481082	573	No		ELA
Marri	401350	6481248	580	No		ELA
Marri	401304	6481291	688	No		ELA

Common name	Easting	Northing	DBH (cm)	Hollow present	Hollow entrance size (cm)	Author
Marri	401329	6481303	793	No		ELA
Marri	401149	6481715	646	No		ELA
Marri	401145	6481690	510	No		ELA
Marri	401103	6481703	812	No		ELA
Marri	401711	6478911	500	No		ELA
Marri	401708	6478905	981	No		ELA
Marri	401688	6478923	599	No		ELA
Marri	401682	6478931	669	No		ELA
Marri	401677	6478932	532	No		ELA
Marri	401655	6478972	994	No		ELA
Marri	401652	6478977	541	No		ELA
Marri	401641	6478987	653	No		ELA
Marri	401688	6479156	669	No		ELA
Marri	402352	6476490	790	No		ELA
Marri	402406	6476570	796	No		ELA
Jarrah	402429	6476676	755	No		ELA
Marri	402425	6476841	701	No		ELA
Marri	402421	6476852	971	No		ELA
Marri	402354	6476822	669	No		ELA
Marri	402347	6476809	659	No		ELA
Marri	400097	6475968	541	No		ELA
Marri	399970	6475712	914	No		ELA
Marri	399948	6475779	975	No		ELA
Marri	399947	6475782	990	No		ELA
Eucalyptus sp. planted/non-native	401673	6482913	530	No		ELA
Jarrah	401671	6481742	590	No		ELA
Marri	401692	6479791	0	No		ELA
Stag	401656	6480086	790	No		ELA
Marri	401660	6480093	560	No		ELA
Marri	401663	6480105	810	No		ELA
Marri	401642	6480137	650	No		ELA
Marri	401637	6480160	570	No		ELA
Marri	401625	6480286	530	No		ELA

Common name	Easting	Northing	DBH (cm)	Hollow present	Hollow entrance size (cm)	Author
Marri	401606	6480442	710	No		ELA
Marri	401614	6480439	1060	No		ELA
Marri	401584	6480497	880	No		ELA
Marri	401561	6480616	830	No		ELA
Marri	401517	6480652	1130	No		ELA
Marri	401525	6480658	530	No		ELA
Marri	401535	6480729	1120	No		ELA
Marri	401541	6480740	670	No		ELA
Stag	401483	6480794	830	No		ELA
Marri	401480	6480794	520	No		ELA
Stag	401493	6480796	890	No		ELA
Marri	401416	6481043	530	No		ELA
Marri	401409	6481047	670	No		ELA
Marri	401418	6481058	520	No		ELA
Marri	401305	6481319	610	No		ELA
Stag	401312	6481313	1000	No		ELA
Marri	401132	6481715	1230	No		ELA
Marri	401124	6481721	830	No		ELA
Jarrah	400970	6481730	930	No		ELA
Marri	401726	6479676	740	No		ELA
Marri	401701	6479689	780	No		ELA
Marri	401707	6479747	900	No		ELA
Marri	401734	6479741	790	No		ELA
Marri	401746	6479751	710	No		ELA
Flooded Gum	402206	6477241	570	No		ELA
Flooded Gum	402222	6477233	920	No		ELA
Flooded Gum	402222	6477233	610	No		ELA
Marri	402404	6476253	820	No		ELA
Marri	402397	6476258	640	No		ELA
Marri	400057	6475981	970	No		ELA
Marri	400043	6475642	690	No		ELA
Marri	400033	6475553	840	No		ELA
Marri	399974	6475577	1290	No		ELA

Common name	Easting	Northing	DBH (cm)	Hollow present	Hollow entrance size (cm)	Author
Marri	399978	6475597	1180	No		ELA
Marri	399975	6475708	630	No		ELA
Marri	399942	6475800	780	No		ELA
Stag	399916	6475500	1210	No		ELA
Coastal Blackbutt	399758	6476122	820	No		ELA
Coastal Blackbutt	399813	6475608	710	No		ELA
Marri	399482	6475931	1180	No		ELA
Marri	399396	6475788	620	No		ELA
Marri	399182	6476073	1030	No		ELA
Marri	399207	6475893	680	No		ELA
Marri	399281	6475782	930	No		ELA
Marri	398509	6476117	770	No		ELA
Marri	401178	6481485	1220	No		ELA
Marri	401217	6481484	680	No		ELA
Stag	401219	6481477	980	No		ELA
Marri	401219	6481472	690	No		ELA
Marri	401226	6481470	610	No		ELA
Marri	401222	6481465	700	No		ELA
Marri	401434	6481206	640	No		ELA
Marri	401387	6481335	710	No		ELA
Marri	401350	6481338	830	No		ELA
Marri	401334	6481341	530	No		ELA
Marri	401216	6481466	710	No		ELA
Marri	401228	6481257	500	No		ELA
Marri	401214	6481265	780	No		ELA
Marri	401229	6481272	570	No		ELA
Stag	401288	6481279	800	No		ELA
Marri	401297	6481299	970	No		ELA
Jarrah	400823	6481724	1030	No		ELA
Marri	401738	6479365	890	No		ELA
Marri	401718	6479653	560	No		ELA
Marri	401700	6479674	510	No		ELA
Marri	401748	6479710	520	No		ELA
Marri	401739	6479726	500	No		ELA

Common name	Easting	Northing	DBH (cm)	Hollow present	Hollow entrance size (cm)	Author
Marri	402192	6477245	1110	No		ELA
Flooded Gum	402208	6477233	790	No		ELA
Marri	402436	6476230	800	No		ELA
Marri	402424	6476359	920	No		ELA
Marri	400075	6475979	680	No		ELA
Marri	400082	6475979	700	No		ELA
Marri	400032	6475600	860	No		ELA
Marri	400029	6475596	670	No		ELA
Marri	400039	6475592	1000	No		ELA
Marri	400003	6475526	1160	No		ELA
Marri	399939	6475617	850	No		ELA
Marri	399958	6475628	690	No		ELA
Marri	399969	6475701	790	No		ELA
Marri	399917	6475733	730	No		ELA
Marri	399939	6475812	1110	No		ELA
Marri	399890	6475961	540	No		ELA
Marri	399888	6475960	860	No		ELA
Marri	399888	6475629	1800	No		ELA
Marri	399776	6475528	860	No		ELA
Coastal Blackbutt	399801	6475622	650	No		ELA
Marri	399505	6475949	990	No		ELA
Stag	399439	6475829	650	No		ELA
Stag	399302	6476116	730	No		ELA
Stag	399175	6476077	920	No		ELA
Marri	399266	6475839	810	No		ELA
Marri	399046	6476073	740	No		ELA
Flooded Gum	402405	6476855	0	No		ELA
Flooded Gum	402358	6476923	1592	No		ELA
Flooded Gum	402267	6476908	920	No		ELA
Flooded Gum	402264	6476911	620	No		ELA
Flooded Gum	402268	6476904	690	No		ELA

Common name	Easting	Northing	DBH (cm)	Hollow present	Hollow entrance size (cm)	Author
Flooded Gum	402274	6476911	850	No		ELA
Flooded Gum	402276	6476911	790	No		ELA
Flooded Gum	402323	6476894	1060	No		ELA
Flooded Gum	402317	6476905	920	No		ELA
Flooded Gum	402319	6476911	910	No		ELA
Jarrah	402277	6475724	0	No		DBCA Database
Flooded Gum	402272	6476035	0	No		DBCA Database
Flooded Gum	402282	6476043	0	No		DBCA Database
Flooded Gum	402284	6476044	0	No		DBCA Database
Flooded Gum	402206	6476061	0	No		DBCA Database
Flooded Gum	402183	6476187	0	No		DBCA Database
Flooded Gum	402159	6476258	0	No		DBCA Database
Flooded Gum	402158	6476285	0	No		DBCA Database
Flooded Gum	402097	6476970	0	No		DBCA Database
Flooded Gum	402097	6476955	0	No		DBCA Database
Marri	402101	6476931	0	No		DBCA Database
Flooded Gum	402125	6476938	0	No		DBCA Database
Flooded Gum	402123	6476953	0	No		DBCA Database
Flooded Gum	402121	6476963	0	No		DBCA Database
Flooded Gum	402119	6476963	0	No		DBCA Database
Flooded Gum	402117	6476963	0	No		DBCA Database
Flooded Gum	402130	6476980	0	No		DBCA Database

Common name	Easting	Northing	DBH (cm)	Hollow present	Hollow entrance size (cm)	Author
Flooded Gum	402151	6477339	0	No		DBCA Database
Marri	401892	6477499	0	No		DBCA Database
Marri	401855	6477721	0	No		DBCA Database
Marri	401861	6477726	0	No		DBCA Database
Marri	401870	6477726	0	No		DBCA Database
Marri	401871	6477724	0	No		DBCA Database
Marri	401840	6477842	0	No		DBCA Database
Marri	401835	6477838	0	No		DBCA Database
Marri	401769	6478184	0	No		DBCA Database
Marri	401777	6478194	0	No		DBCA Database
Marri	401773	6478293	0	No		DBCA Database
Marri	401758	6478292	0	No		DBCA Database
Marri	401770	6478515	0	No		DBCA Database
Marri	401953	6477715	0	No		DBCA Database
Flooded Gum	402037	6477598	0	No		DBCA Database
Marri	401820	6478994	0	No		DBCA Database
Marri	401856	6479753	0	No		DBCA Database
Marri	401844	6479729	0	No		DBCA Database
Marri	401826	6479713	0	No		DBCA Database
Marri	401843	6479654	0	No		DBCA Database
Marri	401842	6479641	0	No		DBCA Database
Marri	401850	6479534	0	No		DBCA Database
Marri	401871	6479367	0	No		DBCA Database
Marri	401829	6479232	0	No		DBCA Database
Marri	401818	6479169	0	No		DBCA Database
Marri	401825	6479125	0	No		DBCA Database
Marri	401763	6479735	0	No		DBCA Database
Marri	401832	6481309	0	No		DBCA Database
Marri	401838	6481107	0	No		DBCA Database
Marri	401837	6481111	0	No		DBCA Database
Marri	401828	6481404	0	No		DBCA Database
Marri	401864	6483348	0	No		DBCA Database
Marri	401555	6481719	0	No		DBCA Database
Marri	401424	6481673	0	No		DBCA Database

Common name	Easting	Northing	DBH (cm)	Hollow present	Hollow entrance size (cm)	Author
Marri	401430	6481665	0	No		DBCA Database
Marri	401422	6481638	0	No		DBCA Database
Marri	401429	6481539	0	No		DBCA Database
Marri	401405	6481537	0	No		DBCA Database
Marri	401397	6481560	0	No		DBCA Database
Jarrah	401365	6481535	0	No		DBCA Database
Marri	401372	6481519	0	No		DBCA Database
Marri	401490	6481458	0	No		DBCA Database
Marri	401493	6481450	0	No		DBCA Database
Marri	401507	6481442	0	No		DBCA Database
Marri	401502	6481466	0	No		DBCA Database
Marri	401517	6481488	0	No		DBCA Database
Marri	401777	6481503	0	No		DBCA Database
Marri	401779	6481515	0	No		DBCA Database
Marri	401787	6481524	0	No		DBCA Database
Marri	401795	6481543	0	No		DBCA Database
Marri	401784	6481545	0	No		DBCA Database
Marri	401730	6481533	0	No		DBCA Database
Marri	401731	6481533	0	No		DBCA Database
Marri	401729	6481525	0	No		DBCA Database
Marri	401729	6481507	0	No		DBCA Database
Marri	401713	6481512	0	No		DBCA Database
Marri	401702	6481561	0	No		DBCA Database
Marri	401727	6481569	0	No		DBCA Database
Marri	401631	6481522	0	No		DBCA Database
Marri	401637	6481524	0	No		DBCA Database
Marri	401636	6481532	0	No		DBCA Database
Marri	401632	6481533	0	No		DBCA Database
Marri	401630	6481537	0	No		DBCA Database
Marri	401606	6481556	0	No		DBCA Database
Marri	401449	6481347	0	No		DBCA Database
Marri	401482	6481395	0	No		DBCA Database
Marri	401500	6481411	0	No		DBCA Database
Marri	401498	6481292	0	No		DBCA Database
Marri	401513	6481307	0	No		DBCA Database

Common name	Easting	Northing	DBH (cm)	Hollow present	Hollow entrance size (cm)	Author
Marri	401524	6481310	0	No		DBCA Database
Marri	401512	6481308	0	No		DBCA Database
Marri	401524	6481314	0	No		DBCA Database
Marri	401541	6481317	0	No		DBCA Database
Marri	401542	6481320	0	No		DBCA Database
Marri	401559	6481307	0	No		DBCA Database
Marri	401557	6481314	0	No		DBCA Database
Marri	401567	6481327	0	No		DBCA Database
Marri	401568	6481329	0	No		DBCA Database
Marri	401574	6481333	0	No		DBCA Database
Marri	401559	6481342	0	No		DBCA Database
Marri	401552	6481388	0	No		DBCA Database
Marri	401587	6481398	0	No		DBCA Database
Stag	401589	6481408	0	No		DBCA Database
Marri	401608	6481412	0	No		DBCA Database
Marri	401613	6481430	0	No		DBCA Database
Marri	401653	6481412	0	No		DBCA Database
Marri	401632	6481408	0	No		DBCA Database
Marri	401632	6481376	0	No		DBCA Database
Marri	401626	6481365	0	No		DBCA Database
Marri	401595	6481351	0	No		DBCA Database
Marri	401591	6481331	0	No		DBCA Database
Marri	401608	6481322	0	No		DBCA Database
Marri	401609	6481328	0	No		DBCA Database
Stag	401636	6481312	0	No		DBCA Database
Marri	401627	6481287	0	No		DBCA Database
Marri	401672	6481312	0	No		DBCA Database
Marri	401675	6481322	0	No		DBCA Database
Marri	401643	6481258	0	No		DBCA Database
Jarrah	401582	6481230	0	No		DBCA Database
Marri	401505	6481186	0	No		DBCA Database
Marri	401520	6481220	0	No		DBCA Database
Marri	401523	6481201	0	No		DBCA Database
Marri	401557	6481210	0	No		DBCA Database
Marri	401558	6481200	0	No		DBCA Database

Common name	Easting	Northing	DBH (cm)	Hollow present	Hollow entrance size (cm)	Author
Marri	401615	6481095	0	No		DBCA Database
Marri	401607	6481098	0	No		DBCA Database
Marri	401612	6481138	0	No		DBCA Database
Marri	401611	6481139	0	No		DBCA Database
Marri	401577	6481138	0	No		DBCA Database
Marri	401574	6481142	0	No		DBCA Database
Marri	401545	6481159	0	No		DBCA Database
Marri	401544	6481159	0	No		DBCA Database
Stag	401508	6481143	0	No		DBCA Database
Marri	401623	6481045	0	No		DBCA Database
Marri	401641	6481036	0	No		DBCA Database
Marri	401644	6480893	0	No		DBCA Database
Stag	401786	6481006	0	No		DBCA Database
Marri	401775	6481028	0	No		DBCA Database
Marri	401774	6481055	0	No		DBCA Database
Marri	401787	6481128	0	No		DBCA Database
Marri	401771	6481122	0	No		DBCA Database
Marri	401735	6481147	0	No		DBCA Database
Marri	401775	6481211	0	No		DBCA Database
Marri	401774	6481238	0	No		DBCA Database
Marri	401776	6481239	0	No		DBCA Database
Marri	401792	6481281	0	No		DBCA Database
Stag	401771	6481289	0	No		DBCA Database
Stag	401732	6481317	0	No		DBCA Database
Marri	401716	6481332	0	No		DBCA Database
Marri	401741	6481339	0	No		DBCA Database
Stag	401757	6481378	0	No		DBCA Database
Marri	401760	6481463	0	No		DBCA Database
Marri	401783	6481472	0	No		DBCA Database
Marri	401776	6481477	0	No		DBCA Database
Jarrah	401794	6481498	0	No		DBCA Database
Marri	401918	6477333	0	No		DBCA Database
Marri	401796	6477381	0	No		DBCA Database
Marri	401788	6477402	0	No		DBCA Database
Marri	401939	6477288	0	No		DBCA Database

Common name	Easting	Northing	DBH (cm)	Hollow present	Hollow entrance size (cm)	Author
Marri	401978	6477252	0	No		DBCA Database
Marri	401995	6477255	0	No		DBCA Database
Marri	401989	6477271	0	No		DBCA Database
Marri	401979	6477285	0	No		DBCA Database
Marri	401997	6477279	0	No		DBCA Database
Marri	401993	6477296	0	No		DBCA Database
Marri	401996	6477302	0	No		DBCA Database
Marri	402017	6477302	0	No		DBCA Database
Marri	401817	6481257	0	No		DBCA Database
Marri	401886	6477716	530	No		ELA
Marri	401820	6477840	700	No		ELA
Marri	401815	6477877	550	No		ELA
Marri	401794	6477895	560	No		ELA
Marri	401795	6476925	1100	No		ELA
Marri	401792	6476925	1300	No		ELA
Marri	401800	6476936	510	No		ELA
Flooded Gum	401804	6476945	550	No		ELA
Flooded Gum	401806	6476953	550	No		ELA
Flooded Gum	401810	6476954	550	No		ELA
Flooded Gum	401814	6477010	1300	No		ELA
River Red Gum	401770	6476981	630	No		ELA
Flooded Gum	401779	6477019	550	No		ELA
Flooded Gum	401780	6477045	550	No		ELA
Flooded Gum	401782	6477058	1100	No		ELA
River Red Gum	401923	6477061	750	No		ELA
Flooded Gum	401922	6477065	550	No		ELA
Marri	401940	6477172	800	No		ELA
Marri	401946	6477166	550	No		ELA
Marri	401920	6477354	850	No		ELA

Common name	Easting	Northing	DBH (cm)	Hollow present	Hollow entrance size (cm)	Author
Marri	401838	6477319	600	No		ELA
Marri	401841	6477306	600	No		ELA
Marri	401828	6477285	510	No		ELA
Marri	401804	6477299	750	No		ELA
Marri	401818	6477272	800	No		ELA
Marri	401788	6477281	800	No		ELA
Marri	401798	6477258	750	No		ELA
Eucalyptus sp. planted/non-native	401813	6477218	520	No		ELA
River Red Gum	401812	6477212	550	No		ELA
Eucalyptus sp. planted/non-native	401825	6477204	650	No		ELA
Marri	401803	6477199	600	No		ELA
Flooded Gum	401795	6477196	510	No		ELA
Flooded Gum	401780	6477174	600	No		ELA
Flooded Gum	401741	6477111	550	No		ELA
Flooded Gum	401708	6477121	550	No		ELA
Flooded Gum	401702	6477112	550	No		ELA
Flooded Gum	401703	6477106	550	No		ELA
Flooded Gum	401694	6477119	600	No		ELA
Flooded Gum	401716	6477129	800	No		ELA
Flooded Gum	401735	6477159	520	No		ELA
Flooded Gum	401733	6477161	560	No		ELA
Marri	401700	6477180	650	No		ELA
Marri	401758	6477208	550	No		ELA
Marri	401758	6477213	800	No		ELA

Common name	Easting	Northing	DBH (cm)	Hollow present	Hollow entrance size (cm)	Author
Marri	401779	6477213	550	No		ELA
Marri	401759	6477240	620	No		ELA
Marri	401782	6477270	650	No		ELA
Eucalyptus sp. planted/non-native	401783	6477299	850	No		ELA
Eucalyptus sp. planted/non-native	401772	6477307	850	No		ELA
Marri	401747	6477300	600	No		ELA
Marri	401731	6477252	600	No		ELA
Marri	401723	6477240	550	No		ELA
Marri	401721	6477231	650	No		ELA
Marri	401665	6477210	800	No		ELA
Marri	401739	6477440	750	No		ELA
Marri	401715	6477495	750	No		ELA
Marri	401697	6477479	700	No		ELA
Marri	401657	6477476	600	No		ELA
Marri	401643	6477485	510	No		ELA
Marri	401565	6477475	950	No		ELA
Eucalyptus sp. planted/non-native	401752	6477383	650	No		ELA
Blackbutt	397875	6475309	700	No		ELA
Blackbutt	397836	6475331	550	No		ELA
Jarrah	397844	6475457	650	No		ELA
Blackbutt	398048	6475876	550	No		ELA
Marri	400060	6475958	600	No		ELA
Marri	400069	6475969	700	No		ELA
Marri	400075	6475973	600	No		ELA
Marri	400094	6475979	550	No		ELA
Marri	400102	6475989	500	No		ELA
Marri	400113	6475995	650	No		ELA
Stag	400141	6475998	650	No		ELA
Marri	400160	6475996	600	No		ELA

Common name	Easting	Northing	DBH (cm)	Hollow present	Hollow entrance size (cm)	Author
Marri	400155	6475983	600	No		ELA
Marri	400081	6475961	600	No		ELA
Flooded Gum	400298	6475530	700	No		ELA
Flooded Gum	400303	6475502	700	No		ELA
Flooded Gum	400308	6475501	1200	No		ELA
Flooded Gum	400295	6475491	900	No		ELA
Flooded Gum	400280	6475490	800	No		ELA
Flooded Gum	400388	6475551	850	No		ELA
Flooded Gum	400389	6475552	600	No		ELA
Flooded Gum	400479	6475564	550	No		ELA
Flooded Gum	400500	6475571	1000	No		ELA
Flooded Gum	400489	6475587	720	No		ELA
Flooded Gum	400515	6475586	510	No		ELA
Flooded Gum	400528	6475571	850	No		ELA
Flooded Gum	400615	6475603	550	No		ELA
Flooded Gum	401059	6475498	550	No		ELA
Flooded Gum	401056	6475502	600	No		ELA
Flooded Gum	401055	6475506	600	No		ELA
Flooded Gum	401064	6475512	600	No		ELA
Flooded Gum	401052	6475512	600	No		ELA
Flooded Gum	401054	6475523	600	No		ELA
Flooded Gum	401049	6475516	600	No		ELA

Common name	Easting	Northing	DBH (cm)	Hollow present	Hollow entrance size (cm)	Author
Flooded Gum	401021	6475542	800	No		ELA
Flooded Gum	401020	6475550	1000	No		ELA
Flooded Gum	401021	6475556	550	No		ELA
Flooded Gum	402081	6476076	700	No		ELA
Flooded Gum	402099	6476077	550	No		ELA
Flooded Gum	402081	6476139	650	No		ELA
Flooded Gum	402102	6476143	700	No		ELA
Flooded Gum	402134	6476140	750	No		ELA
Flooded Gum	402140	6476144	900	No		ELA
Flooded Gum	402159	6476144	950	No		ELA
Flooded Gum	402179	6476121	950	No		ELA
Flooded Gum	402150	6476106	650	No		ELA
Flooded Gum	402150	6476109	550	No		ELA
Flooded Gum	402144	6476102	550	No		ELA
Flooded Gum	402123	6476104	600	No		ELA
Flooded Gum	402099	6476079	600	No		ELA
Flooded Gum	402119	6476083	650	No		ELA
Flooded Gum	402147	6476091	750	No		ELA
Flooded Gum	402168	6476073	800	No		ELA
Flooded Gum	402176	6476052	650	No		ELA
Flooded Gum	402185	6476053	750	No		ELA

Common name	Easting	Northing	DBH (cm)	Hollow present	Hollow entrance size (cm)	Author
Flooded Gum	402174	6476046	1050	No		ELA
Flooded Gum	402162	6476049	510	No		ELA
River Red Gum	402151	6475965	1000	No		ELA
Flooded Gum	402112	6475978	2200	No		ELA
Flooded Gum	401055	6475625	700	No		ELA
Eucalyptus sp. planted/non-native	401124	6475706	500	No		ELA
River Red Gum	401132	6475645	350	No		ELA
River Red Gum	401114	6475484	700	No		ELA
River Red Gum	401124	6475453	600	No		ELA
River Red Gum	401368	6475627	1200	No		ELA
River Red Gum	401466	6475657	650	No		ELA
Eucalyptus sp. planted/non-native	401907	6475827	1090	No		ELA
Eucalyptus sp. planted/non-native	402169	6475878	500	No		ELA
Jarrah	402015	6475816	700	No		ELA
Eucalyptus sp. planted/non-native	402040	6475684	510	No		ELA
Marri	402038	6475659	620	No		ELA
Marri	402030	6475634	500	No		ELA
Marri	402028	6475618	600	No		ELA
Marri	401981	6475669	700	No		ELA
Marri	401986	6475696	700	No		ELA

Common name	Easting	Northing	DBH (cm)	Hollow present	Hollow entrance size (cm)	Author
Stag	401993	6475685	750	No		ELA
River Red Gum	402166	6475765	700	No		ELA
River Red Gum	402158	6475725	550	No		ELA
River Red Gum	402161	6475766	650	No		ELA
Jarrah	402174	6475724	700	No		ELA
River Red Gum	402154	6475698	950	No		ELA
Jarrah	402146	6475650	615	No		ELA
Jarrah	402167	6475635	620	No		ELA
River Red Gum	401120	6475489	550	No		ELA
River Red Gum	401134	6475623	720	No		ELA
River Red Gum	401154	6475613	810	No		ELA
River Red Gum	401116	6475451	700	No		ELA
Flooded Gum	402087	6475904	950	No		ELA
Flooded Gum	402085	6475891	850	No		ELA
Marri	402066	6475873	505	No		ELA
Marri	402066	6475873	500	No		ELA
Jarrah	402093	6475874	550	No		ELA
Jarrah	402160	6475851	550	No		ELA
Marri	402161	6475852	675	No		ELA
Marri	402115	6475851	650	No		ELA
River Red Gum	402094	6475757	1100	No		ELA
River Red Gum	402098	6475746	950	No		ELA
River Red Gum	402098	6475742	520	No		ELA
River Red Gum	402097	6475725	700	No		ELA
Jarrah	402090	6475628	620	No		ELA
Marri	402076	6475669	600	No		ELA

Common name	Easting	Northing	DBH (cm)	Hollow present	Hollow entrance size (cm)	Author
River Red Gum	402070	6475718	600	No		ELA
Tuart	402073	6475736	1105	No		ELA
River Red Gum	402072	6475765	750	No		ELA
Tuart	402072	6475781	850	No		ELA
River Red Gum	402083	6475796	675	No		ELA
Flooded Gum	401066	6475553	950	No		ELA
River Red Gum	401154	6475557	720	No		ELA
River Red Gum	401723	6475669	985	No		ELA
River Red Gum	401741	6475646	930	No		ELA
River Red Gum	401726	6475640	1350	No		ELA
River Red Gum	401732	6475628	1500	No		ELA
Eucalyptus sp. planted/non-native	401730	6475621	900	No		ELA
River Red Gum	401725	6475616	1675	No		ELA
River Red Gum	401723	6475613	1300	No		ELA
River Red Gum	401725	6475606	1700	No		ELA
River Red Gum	401720	6475582	950	No		ELA
River Red Gum	401726	6475579	815	No		ELA
River Red Gum	401762	6475564	550	No		ELA
River Red Gum	401772	6475567	1600	No		ELA
River Red Gum	401778	6475571	650	No		ELA
River Red Gum	401779	6475574	650	No		ELA

Common name	Easting	Northing	DBH (cm)	Hollow present	Hollow entrance size (cm)	Author
River Red Gum	401788	6475567	1100	No		ELA
River Red Gum	401799	6475573	950	No		ELA
River Red Gum	401804	6475574	1000	No		ELA
River Red Gum	401824	6475571	750	No		ELA
Lemon scented gum	401901	6475605	900	No		ELA
River Red Gum	401721	6475675	650	No		ELA
River Red Gum	401722	6475682	987	No		ELA
River Red Gum	401758	6475709	1000	No		ELA
River Red Gum	401751	6475708	1400	No		ELA
River Red Gum	401742	6475706	1050	No		ELA
River Red Gum	401730	6475706	900	No		ELA
Marri	401466	6480811	940	No		ELA
Coastal Blackbutt	397790	6475272	610	No		ELA
Coastal Blackbutt	397793	6475298	780	No		ELA
Coastal Blackbutt	397800	6475887	560	No		ELA
River Red Gum	398113	6475636	650	No		ELA
River Red Gum	398070	6475536	1400	No		ELA
River Red Gum	398099	6475547	570	No		ELA
Eucalyptus sp. planted/non-native	398111	6475511	950	No		ELA
River Red Gum	398185	6475512	980	No		ELA

Common name	Easting	Northing	DBH (cm)	Hollow present	Hollow entrance size (cm)	Author
River Red Gum	398090	6475493	800	No		ELA
Eucalyptus sp. planted/non-native	398069	6475504	650	No		ELA
Marri	400000	6475537	880	No		ELA
Marri	399981	6475568	1150	No		ELA
Marri	399973	6475590	700	No		ELA
Marri	399979	6475594	505	No		ELA
Marri	399879	6475967	520	No		ELA
Marri	400000	6475765	850	No		ELA
Marri	400061	6475714	545	No		ELA
Marri	400028	6475583	805	No		ELA
Marri	400026	6475585	840	No		ELA
Marri	400081	6475548	530	No		ELA
Marri	400097	6475539	550	No		ELA
Marri	400062	6476004	865	No		ELA
Marri	400070	6475987	550	No		ELA
Marri	400076	6475993	800	No		ELA
Marri	400077	6475994	690	No		ELA
Marri	400102	6476010	810	No		ELA
Marri	400103	6476010	750	No		ELA
Marri	400104	6476007	680	No		ELA
Marri	400110	6476004	510	No		ELA
Marri	400123	6476016	560	No		ELA
Marri	400146	6475991	685	No		ELA
Marri	400087	6475966	670	No		ELA
Marri	400168	6475984	595	No		ELA
Flooded Gum	400322	6475581	1500	No		ELA
Flooded Gum	400315	6475556	530	No		ELA
Flooded Gum	400313	6475554	590	No		ELA
Flooded Gum	400380	6475547	1200	No		ELA

Common name	Easting	Northing	DBH (cm)	Hollow present	Hollow entrance size (cm)	Author
Flooded Gum	400380	6475559	555	No		ELA
Flooded Gum	400472	6475580	815	No		ELA
Flooded Gum	400472	6475581	530	No		ELA
Flooded Gum	400470	6475584	760	No		ELA
Flooded Gum	400457	6475610	730	No		ELA
Flooded Gum	400475	6475613	1860	No		ELA
Stag	400481	6475615	900	No		ELA
Stag	400480	6475623	670	No		ELA
Flooded Gum	400480	6475623	725	No		ELA
Marri	400492	6475621	520	No		ELA
Stag	400511	6475617	740	No		ELA
Flooded Gum	400552	6475518	750	No		ELA
Flooded Gum	400552	6475518	760	No		ELA
Flooded Gum	400587	6475578	645	No		ELA
Marri	400576	6475620	560	No		ELA
Marri	400576	6475618	615	No		ELA
Marri	400565	6475609	850	No		ELA
Marri	400559	6475609	750	No		ELA
Marri	400552	6475603	645	No		ELA
Marri	400554	6475612	955	No		ELA
Marri	400550	6475617	600	No		ELA
Marri	400543	6475630	985	No		ELA
Marri	400528	6475608	800	No		ELA
Marri	400533	6475603	850	No		ELA
Marri	400650	6475657	985	No		ELA
Marri	400688	6475680	850	No		ELA
Marri	400697	6475681	625	No		ELA
Marri	400703	6475681	610	No		ELA
Marri	400705	6475681	790	No		ELA

Common name	Easting	Northing	DBH (cm)	Hollow present	Hollow entrance size (cm)	Author
Marri	400706	6475680	860	No		ELA
Marri	400699	6475677	525	No		ELA
Marri	400695	6475676	705	No		ELA
Marri	401049	6475616	510	No		ELA
Marri	401045	6475617	530	No		ELA
Marri	401044	6475603	500	No		ELA
Marri	401034	6475598	1095	No		ELA
Marri	401037	6475584	775	No		ELA
Marri	401027	6475580	870	No		ELA
Marri	401027	6475576	665	No		ELA
Stag	401690	6479154	540	No		ELA
Marri	401845	6477773	575	No		ELA
Marri	401808	6477911	1100	No		ELA
Marri	401805	6477897	530	No		ELA
Coastal Blackbutt	401783	6477871	820	No		ELA
Flooded Gum	401800	6476906	1105	No		ELA
Flooded Gum	401859	6476921	1450	No		ELA
Flooded Gum	401883	6476921	850	No		ELA
Flooded Gum	401891	6476941	1300	No		ELA
Flooded Gum	401907	6476949	550	No		ELA
Flooded Gum	401900	6476971	1400	No		ELA
Flooded Gum	401902	6476972	760	No		ELA
Flooded Gum	401920	6476965	865	No		ELA
Flooded Gum	401929	6476974	770	No		ELA
Flooded Gum	401733	6476995	640	No		ELA
Flooded Gum	401738	6477017	505	No		ELA
Flooded Gum	401734	6477030	570	No		ELA

Common name	Easting	Northing	DBH (cm)	Hollow present	Hollow entrance size (cm)	Author
Flooded Gum	401733	6477036	530	No		ELA
Flooded Gum	401740	6477037	520	No		ELA
Flooded Gum	401740	6477051	815	No		ELA
Flooded Gum	401756	6477057	945	No		ELA
Marri	401984	6477268	550	No		ELA
Marri	401991	6477306	600	No		ELA
Marri	401939	6477434	510	No		ELA
Marri	401638	6477321	830	No		ELA
Stag	401657	6477317	710	No		ELA
Stag	401667	6477300	550	No		ELA
Stag	401668	6477300	540	No		ELA
Marri	401707	6477270	570	No		ELA
Marri	401696	6477276	550	No		ELA
Marri	401666	6477269	510	No		ELA
Marri	401652	6477262	745	No		ELA
Marri	401649	6477267	505	No		ELA
Marri	401633	6477262	1020	No		ELA
Marri	401627	6477270	720	No		ELA
Marri	401581	6477287	625	No		ELA
Marri	401561	6477304	505	No		ELA
Jarrah	401532	6477299	500	No		ELA
Marri	401641	6477206	515	No		ELA
Marri	401582	6477213	620	No		ELA
Marri	401477	6477216	520	No		ELA
Marri	401484	6477205	503	No		ELA
Marri	401485	6477205	525	No		ELA
Marri	401485	6477190	805	No		ELA
Marri	401556	6477183	610	No		ELA
Stag	401632	6477151	600	No		ELA
Marri	401683	6477227	590	No		ELA
Marri	401696	6477241	565	No		ELA
Marri	401708	6477250	550	No		ELA
Marri	401772	6477427	515	No		ELA

Common name	Easting	Northing	DBH (cm)	Hollow present	Hollow entrance size (cm)	Author
Marri	401688	6477449	840	No		ELA
Marri	401681	6477463	725	No		ELA
Marri	401672	6477465	510	No		ELA
Stag	401660	6477470	2100	No		ELA
Marri	401657	6477471	500	No		ELA
Marri	401627	6477480	715	No		ELA
Marri	401814	6477346	810	No		ELA

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