WESTERN
ENVIRONMENTAL

Winthrop Avenue
Shared Path Upgrade

Native Vegetation Clearing Permit Report

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Winthrop Avenue
Shared Path Upgrade

Native Vegetation Clearing Permit Report

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City of Perth

Prepared by
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In accordance with the scope of services, WEPL has conducted environmental field monitoring and/or testing in the preparation of this report. The nature and extent of monitoring and/or testing conducted is described in this report.

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

Executive Summary

The City of Perth commissioned Western Environmental Pty Ltd (WEPL) to undertake a targeted flora, vegetation and Black Cockatoo assessment within a section of the proposed Shared Path Upgrade along Winthrop Avenue (the Proposal). The Proposal is located adjacent to the Kings Park Bush Forever Site (Site 317). The purpose of the biological assessments was to delineate key flora and fauna values and identify potential environmental sensitivities and values that may be impacted by the Proposal.

Flora and Vegetation

The desktop assessment identified 92 flora taxa of conservation significance recorded within 10 km of the Survey Area. One Priority 4 flora species was considered to have a 'High' likelihood of occurrence within the Survey Area: *Jacksonia sericea*. This species was recorded from 44 locations within the Survey Area. No other Commonwealth or State listed Threatened Flora or State Priority flora are expected to occur.

Several Orchid species of local significance are known to occur within the Survey Area. These species were removed by the Botanic Parks and Gardens Authority and have been translocated to storage or other bushland in Kings Park.

One Declared Pest was recorded within the Survey Area: Bridal creeper (**Asparagus asparagoides*).

Two vegetation types had previously been mapped within the Survey Area by McChensey, (2017) and Biota (2020). The presence of these units was confirmed during the field survey, and include:

- DBm: Mixed *Eucalyptus* - *Allocasuarina* – *Banksia* Woodland on grey-phase (often deeply bleached) coarse-textured Karrakatta sands.
- DBg: Mixed *Eucalyptus* - *Allocasuarina* – *Banksia* Woodland on grey-phase medium-textured Karrakatta sands at relatively low elevation.

Two Commonwealth listed Threatened Ecological Communities (TECs) have previously been mapped over the Survey Area, and vegetation within the Survey Area was representative of one of these communities:

- Banksia Woodlands of the Swan Coastal Plain TEC.

Black Cockatoo Assessment

Carnaby's Black-Cockatoo (*Calyptorhynchus latirostris*), and Forest Red-tailed Black-Cockatoo (*C. banksii naso*) are known to utilise Kings Park for foraging and roosting purposes. Carnaby's Black-Cockatoos are consistently recorded within Kings Park, including two known roost locations and several nearby roosts at Floreat, Nedlands and Como (Peck et al. 2019). No known roosts for Forest Red-tailed Black-Cockatoo occur within Kings Park, however, several significant roosts occur within 12 km, including at Floreat, Yokine and Morely (Peck et al. 2019).

Fifteen habitat trees (Marri and Jarrah with DBH >500 mm) were recorded within the Survey Area. However, none were observed from the ground to support hollows.

Vegetation within the Survey Area was assessed as being of 'Very High' quality foraging habitat for both Carnaby's Black-Cockatoos and Forest Red-tailed Black-Cockatoos as assessed against the Commonwealth Foraging Habitat Scoring Tool (DAWE, 2022).

0.1 ha of 'Very High' quality Black Cockatoo foraging habitat is proposed to be impacted. This includes one *Corymbia calophylla* (Marri) with DBH >500 mm.

Summary of Proposed Impact

The Proposal will impact 0.1 ha of native vegetation. This vegetation comprises the following values:

- 0.1 ha of native vegetation in Degraded condition
- 0.1 ha Banksia Woodland TEC
- One *Corymbia calophylla* (Marri) potential breeding habitat (>500 mm DBH)
- 0.1 ha 'Very High' quality Black Cockatoo foraging habitat
- 15 Priority 4 flora individuals of *Jacksonia sericea*

In addition, 0.01 ha of vegetation is proposed to be cleared within the Kings Park Bush Forever Site.

Assessment Against Clearing Principles

The proposed clearing associated with the impact area has been assessed against the 10 clearing principles. The project is not at variance with six of the clearing principles and is unlikely to be at variance with four.

Advice

The clearing that is proposed outside of the Kings Park Bush Forever Site contains values of conservation significance, however, the size of the area being cleared and its location, being on the fringe of the vegetated area, limits the significance of this clearing. The potential for an exemption from the requirement for a Clearing Permit should be considered in discussion with DWER and Kings Park Botanical Authority. Two potential exemptions are considered to be applicable.

Clearing Permit exemptions do not apply within Environmentally Sensitive Areas. Where the clearing is proposed to occur within the Kings Park Bush Forever Site, the potential for an exemption to be applied to this activity should be discussed with DWER and Kings Park Botanical Authority.

Acronyms and Abbreviations

Abbreviation	Full Title
°C	Degree Celsius
BAM Act	*Biosecurity and Agriculture Management Act 2007*
BC Act	*Biodiversity Conservation Act 2016*
CR	Critically Endangered
DBCA	Department of Biodiversity, Conservation and Attractions
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DEWHA	Department of the Environment, Water Heritage and the Arts
DotEE	Department of the Energy and Environment
DSEWPaC	Department of Sustainability Environment Water Population and Communities
DWER	Department of Water and Environmental Regulation
EIA	Environmental Impact Assessment
EN	Endangered
EP Act	*Environmental Protection Act 1986*
EPA	Environmental Protection Authority
EPBC Act	*Environment Protection Biodiversity and Conservation Act 1999*
ESA	Environmentally Sensitive Area
GPS	Global Positioning System
ha	Hectare
IBRA	Interim Biogeographic Regionalisation for Australia
IUCN	International Union for Conservation of Nature
km	Kilometres
m	Metres
MNES	Matters of National Environmental Significance
NVIS	National Vegetation Information System
P	Priority
PEC	Priority Ecological Community
PF	Priority Flora
PMST	Protected Matters Search Tool
T	Threatened
TEC	Threatened Ecological Community
TPFL	Threatened and Priority Flora Database
TPFRF	Threatened and Priority Flora Report Forms
VU	Vulnerable

Abbreviation	Full Title
WA	Western Australia
WAH	Western Australian Herbarium
WC Act	*Wildlife Conservation Act 1950*
WEPL	Western Environmental Pty Ltd

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1. Introduction

1.1 Project Background and Location

The City of Perth's 2018 Transport Strategy identified the need to develop a high-quality shared path along Winthrop Avenue between University Hall and Aberdare Road (Figure 1). The State Government has also identified this pathway as a primary route, which represents a key "missing link" in Perth's long-term cycling network.

The proposed Shared Path occurs adjacent to Winthrop Avenue, along in the western section of Kings Park within the City of Perth. The route is split into three sections, as described by WSP (2020):

- University Hall to Poole Avenue: involves clearing and upgrade of the existing concrete path to 'primary route' standard.
- Poole Avenue to Monash Avenue: involves clearing and construction of a new 3.2 m concrete shared path.
- Monash Avenue to Aberdare Road: involves clearing and upgrade of the existing concrete path to 'primary route' standard.

Key design elements have been proposed to reduce potential impacts to native vegetation, resulting from the proposed Shared Path, including:

- Construction of a concrete path, as opposed to an asphalt path, which requires less ground disturbance and therefore less tree root disturbance.
- Shifting the Kings Park kerb line into the existing Winthrop Avenue, along the Poole Avenue to Monash Avenue Section. This will move construction away from existing vegetation and minimise impacts on trees.

Despite these design amendments, it was recognised that the proposal was likely to impact native vegetation. To support construction, the City of Perth required an assessment of biological values within and surrounding the proposed Shared Path clearing area (see Figure 1).

1.2 Objectives

The City of Perth commissioned Western Environmental Pty Ltd (WEPL) to undertake a flora, vegetation and Black-Cockatoo assessment along the length of the proposed Shared Pathway. The purpose of the assessment was to delineate key biological values within the proposed route to support a Native Vegetation Clearing Permit, or provide advice on the need for a Permit.

The scope of works included:

- Review of design documents (WSP 2020).
- Liaison with City of Perth and designers/contractors.
- Liaison with Department of Water and Environmental Regulation (DWER) and Botanic Parks and Gardens Authority (BPGA), as required (including response to queries).
- Completion of a flora, vegetation and Black-Cockatoo assessment, comprising a desktop review and a reconnaissance/ targeted field survey consistent with the EPA's *Flora and Vegetation Technical Guidance*.
- Identification and assessment of biological values within the proposed route to support a Native Vegetation Clearing Permit.
- Assessment of Black Cockatoo Habitat in accordance with Commonwealth referral guidelines for Threatened Black Cockatoos (DCCEEW, 2022).
- Assessment of identified biological values against the clearing principles for Native Vegetation under Schedule 5 of the *Environmental Protection Act 1986*.
- Preparation of a supporting technical report including results of the desktop and field surveys as well as assessment against the clearing principles.
- Preparation of a geospatial data package prepared in accordance with Index of Biodiversity Surveys for Assessments (IBSA) requirements.
- Preparation of a Native Vegetation Clearing Permit application form (if/as required).

Figure 1: Survey Area Location

N

0 20 40 60 80 100 m

PROJECT/REPORT NAME	Winthrop Avenue Shared Path Upgrade
SCALE	1:1,500
SHEET SIZE	A3 COLOUR
CLIENT	City of Perth
COORDINATE REFERENCE SYSTEM	GDA2020 / MGA zone 50
PROJECT NUMBER	A22.078
VERSION	0
DATA SOURCE	LANDGATE AERIAL IMAGERY 12/2021
DRAWN BY / REVIEWED BY	CR / CG
DATE	19/1/2023

Legend

- Survey Area
- Proposed Shared Path

No	Description	Drawn	Approved	Date
A	Original issue	CR	CG	19/1/2023

NOTES:

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

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1.3 Legislation and Guidance

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

- Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- Western Australian *Environmental Protection Act 1986* (EP Act).
- Western Australian *Biodiversity Conservation Act 2016* (BC Act).
- Western Australian Biodiversity Conservation Regulations 2018.
- Commonwealth Department of the Environment (DotE). (2013). *Matters of National Environmental Significance. Significant Impact Guidelines 1.1 - Environment Protection and Biodiversity Conservation Act 1999.*
- Commonwealth Department of Sustainability, Environment, Water, Populations and Communities (DSEWPaC). (2018). *Approved Conservation Advice (incorporating listing advice) for the Tuart (Eucalyptus gomphocephala) woodlands and forests of the Swan Coastal Plain ecological community*
- Commonwealth Department of the Environment and Energy (DotEE) (2016) *Approved Conservation Advice (incorporating listing advice) for the Banksia Woodlands of the Swan Coastal Plain ecological community*
- Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW, 2022). *Referral guidelines for 3 Threatened Black Cockatoo species*
- WA EPA. (2020). *Technical Guidance – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment*. Known herein as the 'Fauna Technical Guidance'.
- WA EPA. (2016). *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment.* Known herein as the 'Flora and Vegetation Technical Guidance'.
- WA EPA. (2021). *Statement of Environmental Principles, Factors and Objectives.*

Brief descriptions of relevant Commonwealth and State legislation is provided in Appendix A. While definitions and criteria for Commonwealth ad State conservation codes is provided in Appendix B.

2. Existing Environment

2.1 Interim Biogeographic Regionalisation for Australia

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

2.2 Geology and Soil

The Survey Area is located within the Spearwood Dunes system, and features soils of the Karrakatta Soil Association:

- "The Spearwood Dune System forms a belt 3 to 15 km wide, west of the Bassendean Dune System. The dunes are large-scale, convex, asymmetric, topographically irregular ridges that reach heights of 95 m in places. The Spearwood dunes are younger than the Bassendean dunes but are still late Quaternary (Pleistocene) in age. The shape of the dunes suggests that they were formed as large-scale, bare, dune sheets that advanced over the land surface" (Gozzard 2007).

The Atlas of Australian Soils mapped one soil type within the Survey Area (Northcote et al. 1960):

- "Coastal dune formations backed by the low-lying deposits of inlets and estuaries: chief soils are calcareous sands (Uc1.11) on the dunes. Associated are various (Uc), (Um), (Uf), (Ug), and acid peat (O) soils in the swale behind the coastal dunes, similar to unit Kf10."

2.3 Wetlands and Hydrology

The Survey Area does not intersect any surface wetlands or drainage lines. Further, the Geomorphic Wetlands Swan Coastal Plain (GWSCP) dataset does not identify any wetlands within the Survey Area (DBCA 2021).

No wetlands listed under the Ramsar Convention or Commonwealth Wetlands of National Significance program are present in the region (DBCA, 2022a).

2.4 Pre-European Vegetation

2.4.1 Vegetation Association Mapping

During the 1970s, John Beard and associates conducted a systematic survey of native vegetation, describing the vegetation systems in Western Australia. Beard (1981) mapped the vegetation of the Swan Coastal Plain at 1:1,000,00 scale. This mapping described one broad vegetation unit for the Survey Area:

- Spearwood 6.1: Jarrah (*Eucalyptus marginata*) – Marri (*Corymbia calophylla*) – Wandoo (*E. wandoo*) woodland.

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

2.4.2 Vegetation Complex Mapping

The vegetation complexes of the Swan Coastal Plain have been mapped by Heddle et al. (1980) at a scale of 1:250,000. According to this data, the Survey Area occurs within two vegetation complexes:

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

- Vasse Complex (Mapping Unit 57): Mixture of the closed scrub of *Melaleuca* species fringing woodland of *Eucalyptus rudis* (Flooded Gum) - Melaleuca species and open forest of *Eucalyptus gomphocephala* (Tuart) - *Eucalyptus marginata* (Jarrah) - *Corymbia calophylla* (Marri). Will include areas dominated by *Tecticornia* and *Sarcocornia* species (Samphire) near Mandurah and south of the Capel River.

An extension of the vegetation complex mapping of Heddle et al. (1980) was conducted by Webb et al. (2016), including an update of the vegetation complex extents.

2.4.3 Existing extent of Pre-European Vegetation Association and Vegetation Complex

The pre-European and current extents of the Beard (1981) vegetation association within the Perth (SW02) IBRA subregion, and the Heddle (1980) vegetation complex, are presented in Table 1 (Government of Western Australia, 2019a, Government of Western Australia, 2019b).

Beard's vegetation association (Spearwood 6.1) and Heddle's (1980) vegetation complexes represent comparable areas on the Swan Coastal Plain (Table 1). All units demonstrate extensive clearing of pre-European vegetation in the Perth metropolitan area, with under a quarter and one third of vegetation remaining. 3.87 % of the Karrakatta complex and 13.08 % of the Vasse complex are currently managed for conservation on the Swan Coastal Plain (Table 1). However, within the City of Perth local government area much of the remaining extend of these units is managed, with 99.4% of the Spearwood vegetation association occurring within DBCA managed estates (Government of Western Australia, 2019a, Government of Western Australia, 2019b).

Table 1: Pre-European Vegetation Association and Complex Representation.

Vegetation	Original Extent (ha)	Current Extent (ha)	% Remaining	% Managed for Conservation
Karrakatta Complex – Central and South within the Swan Coastal Plain (Government of Western Australia 2019b)	53,080.99	12,467.20	23.49	3.87
Vasse Complex (Government of Western Australia 2019b)	15,691.63	4,929.02	31.41	13.08

2.5 Conservation Estate, Bush Forever and Environmentally Sensitive Areas

Kings Park is Perth's largest urban bushland remnant with high cultural, conservation and recreational values. As such Kings Park is protected under State legislation and policies (Figure 2), including:

- Kings Park and Botanic Garden is an A-Class Conservation Reserve (R1720), which is managed under the Botanic Gardens and Parks Authority (BGPA) Act and Regulations (DBCA, 2022a).
- Kings Park is listed under the State Government Bush Forever Policy and program (Site 317), which identified 51,200 ha of regionally significant vegetation for protection in the Perth Metropolitan Region (WA Planning Commission, 2000).
- Kings Park is an Environmentally Sensitive Area (ESA) (ID:18665) as declared by the Department of Water and Environmental Regulation (DWER, 2022), due to the presence of and Bush Forever values.

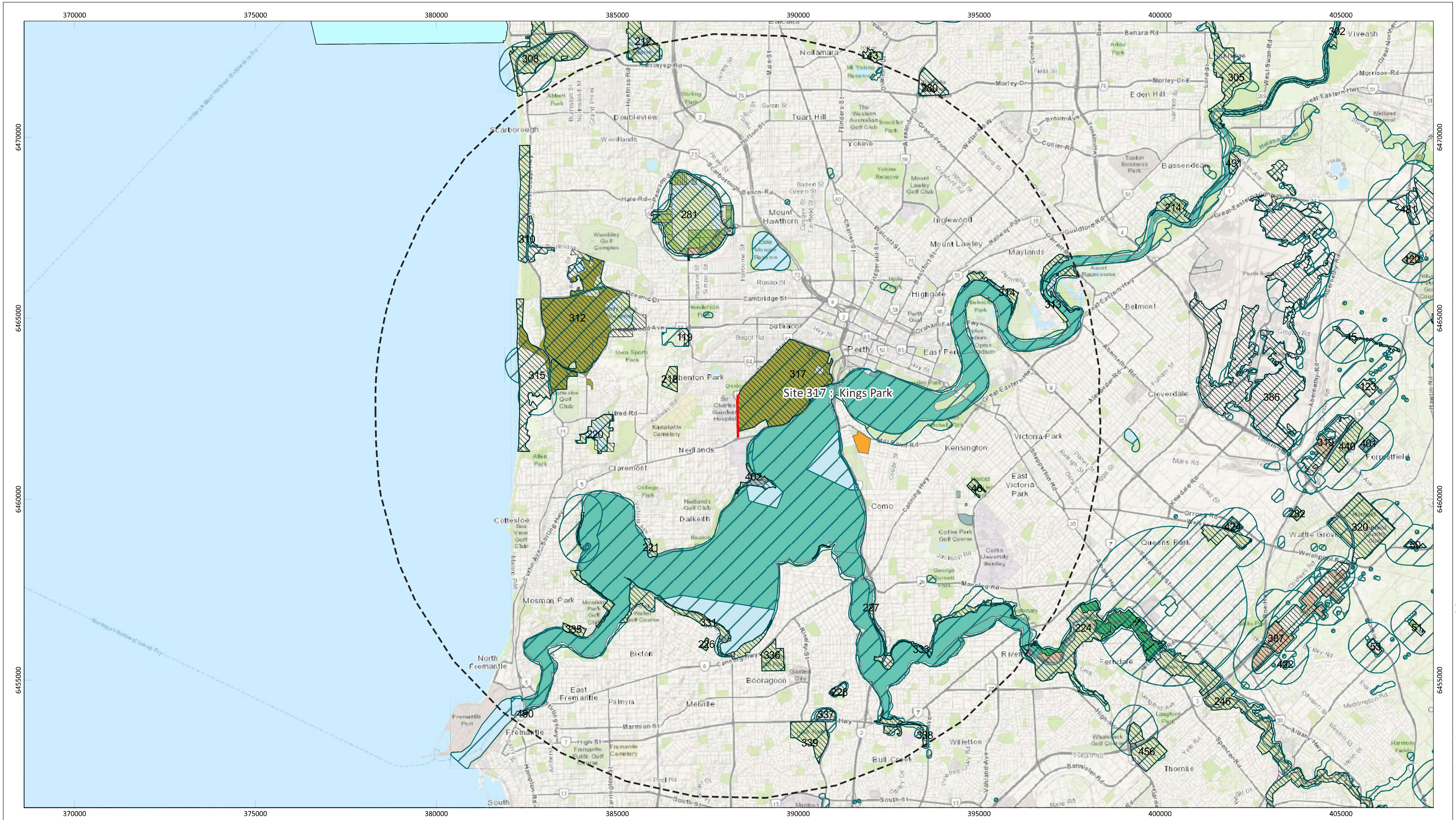

Figure 2: Vegetation, Bush Forever and Conservation Estate

N

0 1 2 3 4 5 km

SCALE 1:100,000	SHEET SIZE A3 COLOUR	PROJECT/REPORT NAME Winthrop Avenue Shared Path Upgrade	
COORDINATE REFERENCE SYSTEM GDA2020 / MGA zone 50		CLIENT City of Perth	
DATA SOURCE LANDGATE AERIAL IMAGERY 12/2021		PROJECT NUMBER A22.078	VERSION 0
		DRAWN BY / REVIEWED BY CR / CG	DATE 16/1/2023

Legend

- Survey Area
- 10 km Buffer
- Bush Forever Areas - 2000 (DPLH-019)
- Clearing Regulations - Environmentally Sensitive Areas (DWER-046)

DBCA - Legislated Lands and Waters (DBCA-011)

- National Park
- Nature Reserve
- Conservation Park
- Section 5(1)(g) Reserve
- Section 5(1)(h) Reserve
- Marine Park
- SCRM Act - River Reserve
- Crown Freehold - Dept Managed
- Botanic Gardens and Parks Auth. Reserve
- Zoological Parks Authority Reserve

No	Description	Drawn	Approved	Date
A	Original issue	CR	CG	16/1/2023

NOTES:
Cadastral boundary from LANDGATE 2022

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3. Methodology

3.1 Desktop Assessment

3.1.1 Literature Review

Background information on the Survey Area and surrounds was reviewed prior to the field survey. In addition, the literature review considered a selection of publicly available biological reports detailing previous assessments. These included:

- Surveys which intersect the current Survey Area:
    - A description of the plant communities of Kings Park bushland and associated vegetation mapping was prepared by BGPA (McChesney 2017; as provided in Biota (2020)).
    - Biota (2020) Perth Children's Hospital Pedestrian Bridge Vegetation, Flora and Black Cockatoo Assessment. Report prepared for Main Roads WA.
- Regional surveys:
    - Kings Park and Botanic Garden Management Plan 2021 – 2026 (DBCA and Botanic Gardens & Parks Authority, 2021).
    - Bush Forever report description for the Kings Park Bushland site 317 (WA Planning Commission 2000a).
    - The Floristic Survey of the Southern Swan Coastal Plain by Gibson et al. (1994).
    - The 2019 Great Cocky Count: A community-based survey for Carnaby's Black-Cockatoo (*Calyptorhynchus latirostris*), Baudin's Black-Cockatoo (*Calyptorhynchus baudinii*) and Forest Red-tailed Black-Cockatoo (*Calyptorhynchus banksii naso*) (Peck et al 2019).
    - WEPL (2022) Flora, Vegetation and Black-Cockatoo Survey: Kings Park Road Shared Path. Unpublished Report for Arup.
    - WSP (2020) Winthrop Avenue Shared Path (University Hall to Aberdare Road): 100% Design Report. Unpublished Report for City of Perth.

3.1.2 Database Searches

Database searches were undertaken to compile a list of potential conservation listed flora, communities and Matters of National Environmental Significance (MNES), within or surrounding the Survey Area (Table 2).

Table 2: Database Searches of the Survey Area

Database Name	Date Received and Reference Number	Search Type	Search Area
Protected Matters Search Tool (Department of Climate Change, Energy, the Environment and Water)	25/10/2022	Commonwealth listed Threatened flora and fauna and TECs	10 km buffer around the Survey Area
Threatened and Priority Ecological Communities database search (Department of Biodiversity Conservation and Attractions)	12/10/2022 22-0922EC	TECs and PECs	10 km buffer around the Survey Area
Threatened and Priority Flora (TPFL) database search (Department of Biodiversity Conservation and Attractions)	12/10/2022 42-1022FL	Threatened and Priority Flora	10 km buffer around the Survey Area
Western Australian Herbarium (WAHerb) flora database search (Department of Biodiversity Conservation and Attractions)	12/10/2022 42-1022FL	Threatened and Priority Flora	10 km buffer around the Survey Area
Dandjoo: Biodiversity Data Repository (Department of Biodiversity Conservation and Attractions)	25/10/2022	Black Cockatoo Records	12 km buffer around the Survey Area

3.1.3 Likelihood of Occurrence

Conservation listed flora and communities identified from the database searches were assessed to determine the likelihood of their occurrence within the Survey Area. The assessment was conducted both prior and post field survey, and based on the likelihood of occurrence criteria presented in Table 3.

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

Table 3: Likelihood of Occurrence Criteria

Likelihood	Criteria
Recorded	Recorded in the Survey Area from database searches (if confident record is accurate), previous survey by others or by current survey.
High	Suitable habitat occurs within the Survey Area; and • Records of flora species <2 km from the Survey Area. With record <30 years old.
Medium	Suitable or marginally suitable habitat occurs within the Survey Area; and • Records of flora species <5 km from the Survey Area. • Species is strongly linked to a specific habitat, which occurs within the Survey Area and records are present <10 km from the Survey Area
Low	• The species has a well understood and specific habitat preference/ requirements, which is absent from the Survey Area. • Records are historical only, or are pre mapping procedures (e.g. records assigned to towns or place names). • Suitable habitat is present, but there are no existing records of the species from the region despite reasonable previous search effort.

3.2 Field Survey

The Survey Area represented the potential impact area for the Shared Pathway, and as such was very small (up to 4 m wide). Considering the existing disturbances, (cleared areas and paths), only a small area of native vegetation on the fringe of Kings Park Bushland occurred within the Survey Area. To ensure sufficient information was collected to contextualise values and meet regulator expectations, areas immediately adjacent were also surveyed, and the Survey Area included a 3 m buffer into the bushland (as demonstrated by track logs on Figure 3.

3.2.1 Survey Team

The field survey was conducted dover one-person day on 15 December 2022 by the survey team listed in Table 4.

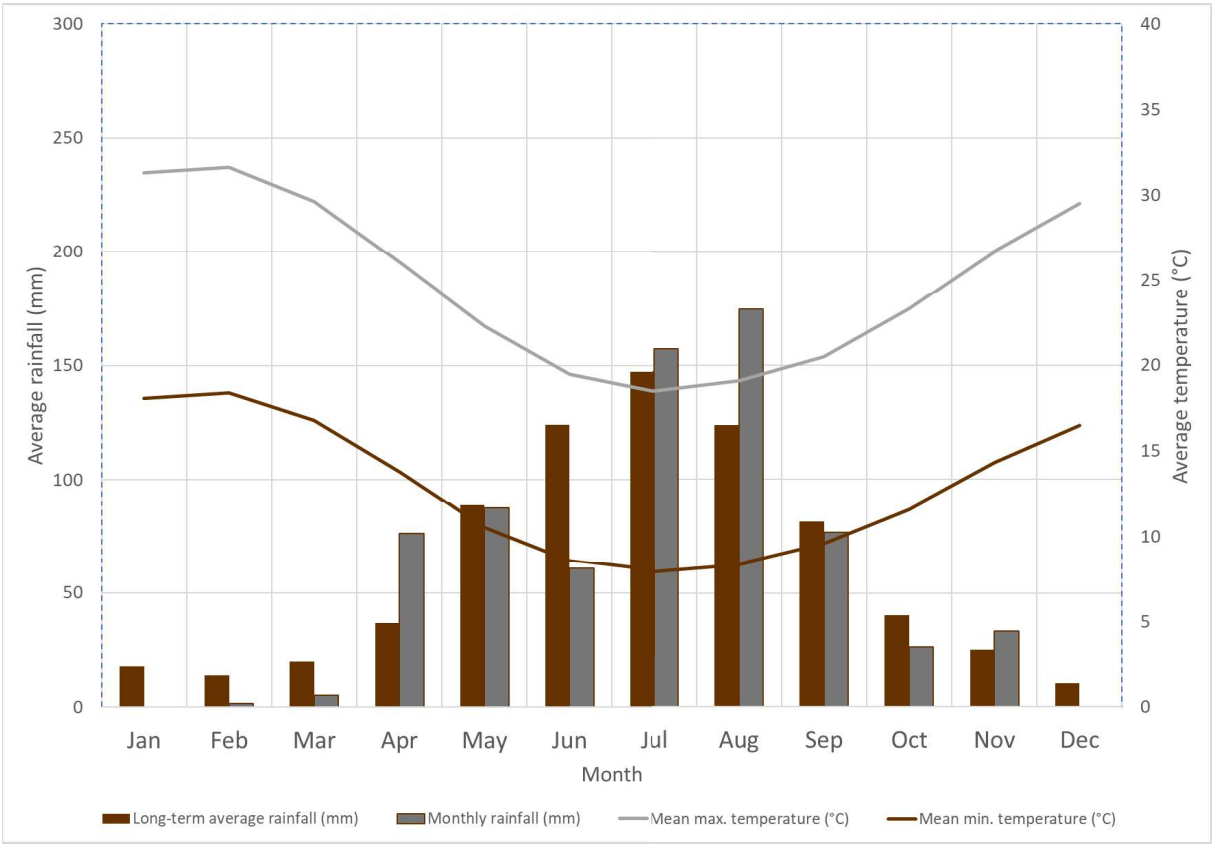
Table 4: Survey Team

Name	Position and years of Experience	DBCA Licence No.
Ciaran Gibson	Associate Environmental Scientist, 15 years	FB62000464
Lovisa Thambert	Graduate Environmental Scientist, 1 year	FB62000468

3.2.2 Field Survey Timing

The Survey Area is located on the Swan Coastal Plain, this region experiences a Mediterranean climate characterised by hot, dry, summers and cool, wet, winters (Bureau of Meteorology [BoM] 2022) (Graph 1). According to EPA Guidance, the optimal time for botanical surveys in the region is Spring (September – November) (EPA, 2016).

The average annual rainfall recorded at Perth Metro is 729.4 mm, with most of the precipitation occurring during the winter months (BoM 2022) (Graph 1). Perth Metro recorded 699.2 mm of rain in the eleven months prior to the survey (January 2022 – November 2022). This was slightly below the long-term average for the same period of 719.2 mm (1993 to 2022). Conditions were fair, however not optimal at the time of survey (15th December 2022). The survey was conducted outside spring, however above average rain had fallen in November 2022 (33.4 mm in 2022 compared to 25.3 mm; Bom 2022), and several species were still in flower/ fruit.



Graph 1: Long Term and Monthly Total Rainfall, Maximum and Minimum Temperatures for Perth Metro WA (9225) (BoM 2022)

3.2.3 Floristic Sampling

Due to the small size of the Survey Area and the reduced condition of much of the native vegetation, quadrats could not be conducted. Alternatively, a relevé and mapping notes were conducted to describe vegetation and record changes in composition and condition. Relevé sampling included observations for an area similar in size to an unmarked quadrat (approximately 10 x 10 m). Much of the native remnant vegetation within the Survey Area had previously been described by larger surveys conducted by McChesney (2017) and Biota (2020). The relevé and mapping notes were used to confirm the presence of these vegetation units.

The following information was collected from within the relevé:

- Observer.
- Date.
- Quadrat/site number.
- Global Position System (GPS) location (GDA2020) of the north-west corner.
- Digital photograph (spatially referenced with a reference number), taken from the north-west corner, looking diagonally across the quadrat.

- Broad soil type and colour.
- Topography.
- List of flora species recorded with total foliar cover within the quadrat for each species.
- National Vegetation Information System (NVIS) Vegetation description (as per below).
- Vegetation condition.

Data collected from the relevé is provided in Appendix D. Survey effort, including the location of the relevé and track logs, is presented on Figure 3.

3.2.4 Targeted Searches

Threatened and Priority Flora identified during the desktop analysis as potentially occurring within the Survey Area were targeted for searches in areas of potential habitat. Track logs for searches are presented on Figure 3.

The locations of all targeted species collected were recorded using a handheld GPS with the following data recorded:

- Observer, date and time.
- Local abundance/population size and/or population boundary.
- Representative photos of each species and habitat.
- Collection of representative specimens.
- Notes on habitat and vegetation type.

3.2.5 Vegetation Description and Classification

Existing vegetation units were confirmed (McChesney 2017, Biota 2020) from the relevé and mapping notes, using the height and estimated cover of dominant and characteristic species of each stratum based on NVIS, recorded at Level V (NVIS Technical Working Group, 2017). Vegetation types were defined by observation of species dominance and structural composition by the field survey team. Due to the small size of the Survey Area and degraded condition of the vegetation, statistical analysis was not applied to assist in defining Floristic Community Types, as per Gibson et al. (1994).

3.2.6 Vegetation Condition Assessment

Vegetation condition was assessed during traverses of the Survey Area using the Vegetation Condition Scale for the appropriate bioregion as per the Flora and Vegetation Technical Guidance (EPA, 2016).

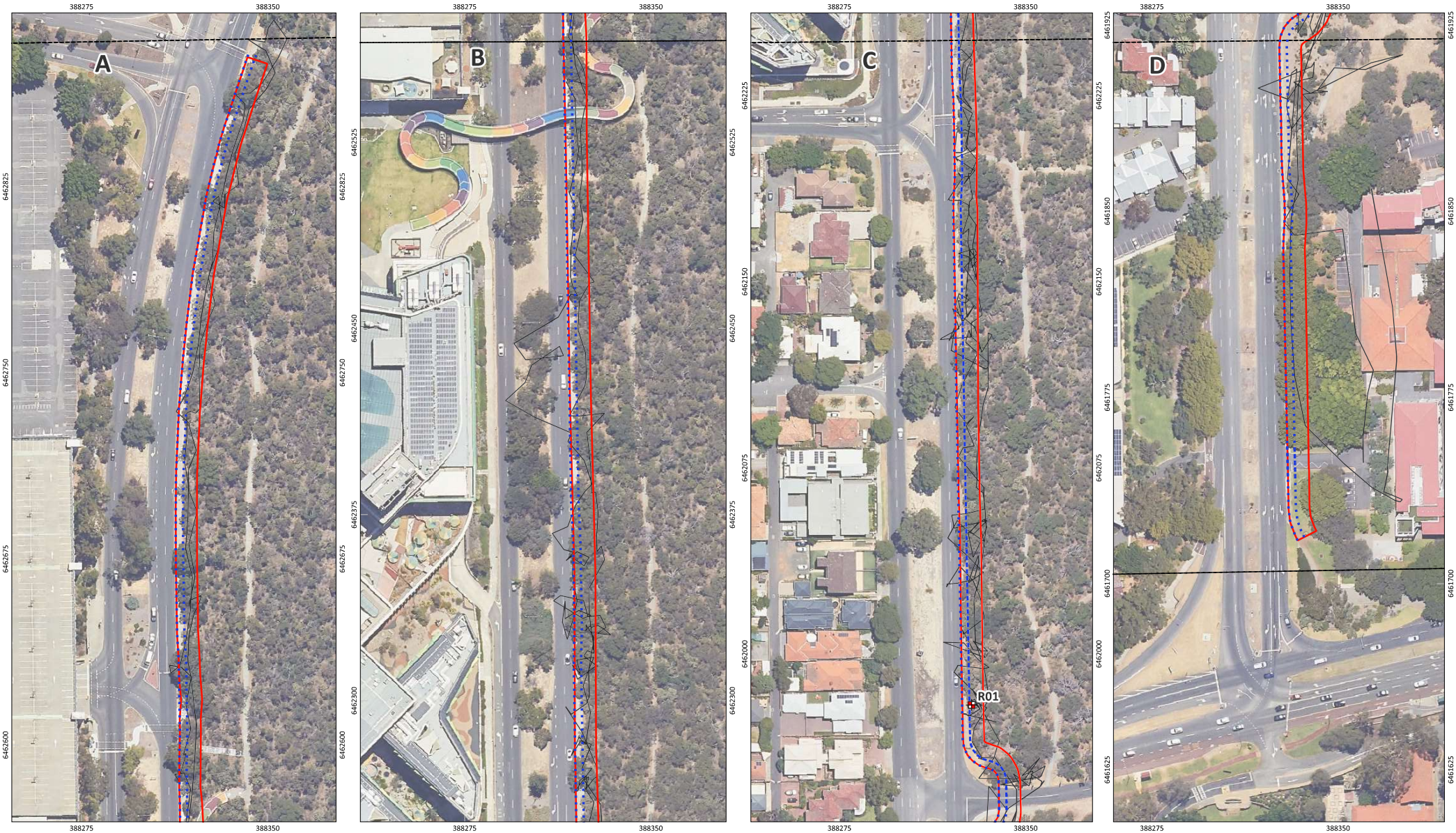


Figure 3: Survey Effort

0 20 40 60 80 100 m

N

PROJECT/REPORT NAME	Winthrop Avenue Shared Path Upgrade
SCALE: 1:1,500	SHEET SIZE: A3 COLOUR
CLIENT: City of Perth	
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	PROJECT NUMBER: A22.078 / VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY 12/2021	DRAWN BY / REVIEWED BY: CR / CG / DATE: 19/1/2023

Legend

- Survey Area
- Proposed Shared Path
- Releve
- Tracklog

No	Description	Drawn	Approved	Date
A	Original issue	CR	CG	19/1/2023

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

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G:\GIS\Project Data\A22.078\A22.078CG\A22.078CG_qfield.qgs

3.2.7 Flora Taxonomy and Lodgement of Specimens

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

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

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

3.3 Black Cockatoo Assessment

The Swan Coastal Plain is used by Black-Cockatoos primarily for foraging resources, with some small patches of breeding habitat. Vegetation used by Black-Cockatoos is dominated by *Banksia* spp. and Tuart (*Eucalyptus gomphocephala*) woodlands, as well as Marri (*Corymbia calophylla*) and Jarrah (*E. marginata*) (DCCEEW 2022).

The black cockatoo habitat field survey followed the *Commonwealth referral guidelines for Threatened Black Cockatoos* (DotEE 2017, DCCEEW 2022) for identifying breeding and foraging habitat.

Breeding Habitat

The Commonwealth defines breeding habitat as trees species, known to support breeding, within the range of the species, which either have a suitable nest hollow or are of a suitable diameter at breast height (DBH) (1.3 m from the ground) to develop a hollow, including:

- greater than 500 mm DBH for most Eucalypts (Jarrah, Marri or Tuart); or
- 300 mm in the case of Wandoo and Salmon Gum (DCCEEW 2022).

All trees of species with the potential to form hollows (primarily Jarrah, Marri and Tuart) and with sufficient diameter (i.e. DBH >500 mm) were recorded using a GPS. The following was recorded for each such tree:

- species;
- DBH (approximately 1.3 m from the ground);
- tree health (such as presence of *Phytophthora cinnamomi* or Marri Canker (*Quambalaria coyrecup*) and other threatening processes); and
- presence of hollows (as observable form the ground).

Track logs for searches are presented on Figure 3 and notes of recorded trees are presented in Appendix G.

Foraging Habitat

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

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

Vegetation mapping of the Survey Area was used in conjunction with the site assessment to determine the foraging quality using the Foraging Habitat Scoring Tool (DCCEEW 2022).

Information collected for the Survey Area was contextualised with consideration to the wider availability of foraging habitat for Black-Cockatoo's in the surround area (12 km radius).

3.4 Assessment against Clearing Principles

To assess whether clearing of native remnant vegetation associated with the Proposal is likely to have a significant impact on the environment, the results of the biological survey informed an assessment against the ten clearing principles (Schedule 5 of the EP Act). Each principle was assessed in accordance with DWER's guidance (DER 2014).

The proposed Shared Path construction methodology and specifics provided in WSP (2020) were considered and advice on the potential loss of trees was provided by CTS (2020) and City of Perth Arborist (pers comm. January 2023).

3.5 Survey Limitations and Constraints

Limitations and constraints of the flora, vegetation and Black-Cockatoo survey as outlined in the Flora and Vegetation Technical Guidance and Fauna Technical Guidance are detailed below in Table 5.

Table 5: Limitations and Constraints of the Flora, Vegetation and Black Cockatoo Survey

Possible Limitation	Degree of Limitation (Significant, Moderate or Negligible)	Potential Constraints on Survey Outcomes
Survey Level/ Scope	Negligible	The detailed flora and vegetation survey was undertaken in accordance with the *EPA Flora and Vegetation Technical Guidance* and was considered appropriate to support approvals applications and EIA processes. Targeted searching for flora of conservation significance was undertaken at a sufficient level of detail. A Black-Cockatoo survey was undertaken in accordance with *Commonwealth referral guidelines for Threatened Black Cockatoos*. The primary objectives were to identify biological values of conservation significance within the Survey Area, by verifying the adequacy of the desktop study, and mapping the habitats present. The survey was adequate to address these requirements.
Availability of contextual information at a regional and local scale	Negligible	All data required to complete the scope of works including regional and local contextual information was available. A significant volume of previous survey reports for Kings Park and region is available. Available literature was reviewed, and publicly available databases of information relating to rare species and communities were also searched. The current surveys added new data specific to the survey area. Contextual information is therefore not considered to be a limiting factor for this study.
Site Access	Negligible	The Survey Area was accessible by foot, and the entire the Survey Area was traversed.
Survey Intensity and Extent	Negligible	One relevé was sampled within the Survey Area, with additional mapping notes undertaken to aid vegetation and condition mapping and delineation. Quadrat sampling was not suitable due to the small size, and reduced vegetation condition, of the Survey Area. The entire Survey Area was traversed to search to conservation significant flora and Black Cockatoo foraging and roosting values. Sufficient time was allocated to survey, given the size and complexity of the Survey Area (see **Error! Not a valid result for table.**). The survey effort was considered adequate to assess values of the Survey Area and provide information required to support approvals applications.
Experience	Negligible	The field survey team and leading scientist (Ciaran Gibson) had sufficient experience in conducting flora and vegetation surveys and fauna surveys in Western Australia, and on the Swan Coastal Plain (see Table 4).
Timing, weather, season	Negligible	The recommended primary survey period for flora and vegetation surveys for the region as per the EPA Technical Guidance occurs during Spring (September through November). The survey was completed in December, after above average rainfall in November 2022 (see Graph 1). Observed conditions were fair with many species still in fruit /flower and annuals present. The seasonal timing was considered appropriate considering the objectives of the survey. No annual or timing dependant Threatened or Priority flora are expected to occur within the Survey Area. Further known orchid species had already been removed from the Survey Area and translocated into storage or bushland in Kings Park (see Section 4.1.2).

Possible Limitation	Degree of Limitation (Significant, Moderate or Negligible)	Potential Constraints on Survey Outcomes
Proportion of the flora and fauna recorded and/or collected, and any identification issues	Negligible	A total of 41 vascular flora taxa were recorded. Despite the season, many species were identifiable by the field survey team. The lower flora diversity recorded is as a result of the small size and degraded condition of the Survey Area.
Mapping Reliability	Negligible	The entire of the Survey Area was traversed by foot and mapping reliability is considered high.
Disturbances (fire, flood etc.)	Negligible	Areas of disturbance associated with access tracks, previous clearing and weeds were recorded but were not a constraint on the results of the survey.

4. Results

4.1 Desktop Assessment

4.1.1 Threatened and Priority Flora

The desktop assessment identified 92 flora taxa of conservation significance recorded within 10 km of the Survey Area. The occurrence of these species is shown on Figure 4 (records from DBCA database searches). Appendix C presented the assessment of these species against the likelihood of occurrence criteria (see Table 3).

No Commonwealth or State listed Threatened Flora have previously been recorded from Kings Park and none are considered to have the potential to occur within the Survey Area.

One Priority 4 flora species, *Jacksonia sericea*, has previously been recorded within Survey Area. Biota (2020) recorded 219 individuals of this species in the adjacent bushland. It was considered to be a 'High' likelihood that additional individuals of this species would occur within the Survey Area.

No other Priority flora were considered to have a 'High' likelihood of occurrence in the Survey Area.

4.1.2 Flora of Local Significance

Four orchid species of local significance were known to occur in the Survey Area (pers. Comm. R. Glowacki, Bushland Manager BGPA, December 2022). These species are not listed as Threatened or Priority but are of local importance. These species included:

- *Caladenia flava* - Cowslip Orchid
- *Caladenia arenicola* - Carousel Spider Orchid
- *Diuris corymbosa* - Common Donkey Orchid
- *Thelymitra macrophylla*

These species were removed from the Survey Area over several days in November 2020[1]. Most individuals went into glass house storage at the Botanic Parks and Gardens Authority (BGPA) Biodiversity Conservation Centre, to try to improve long term survival. Individuals of *C. arenicola* were translocated to the bushland closest the Biodiversity Conservation Centre (pers. Comm. R. Glowacki, Bushland Manager BGPA, December 2022). Although the individuals were removed and translocated, it is possible some dominant tubers still exist within the soil.

[1] Some confusion as to whether one individual of *Thelymitra macrophylla* was removed, which hasn't been able to be resolved (pers. Coom R. Glowacki, Bushland Manager BGPA, December 2022).

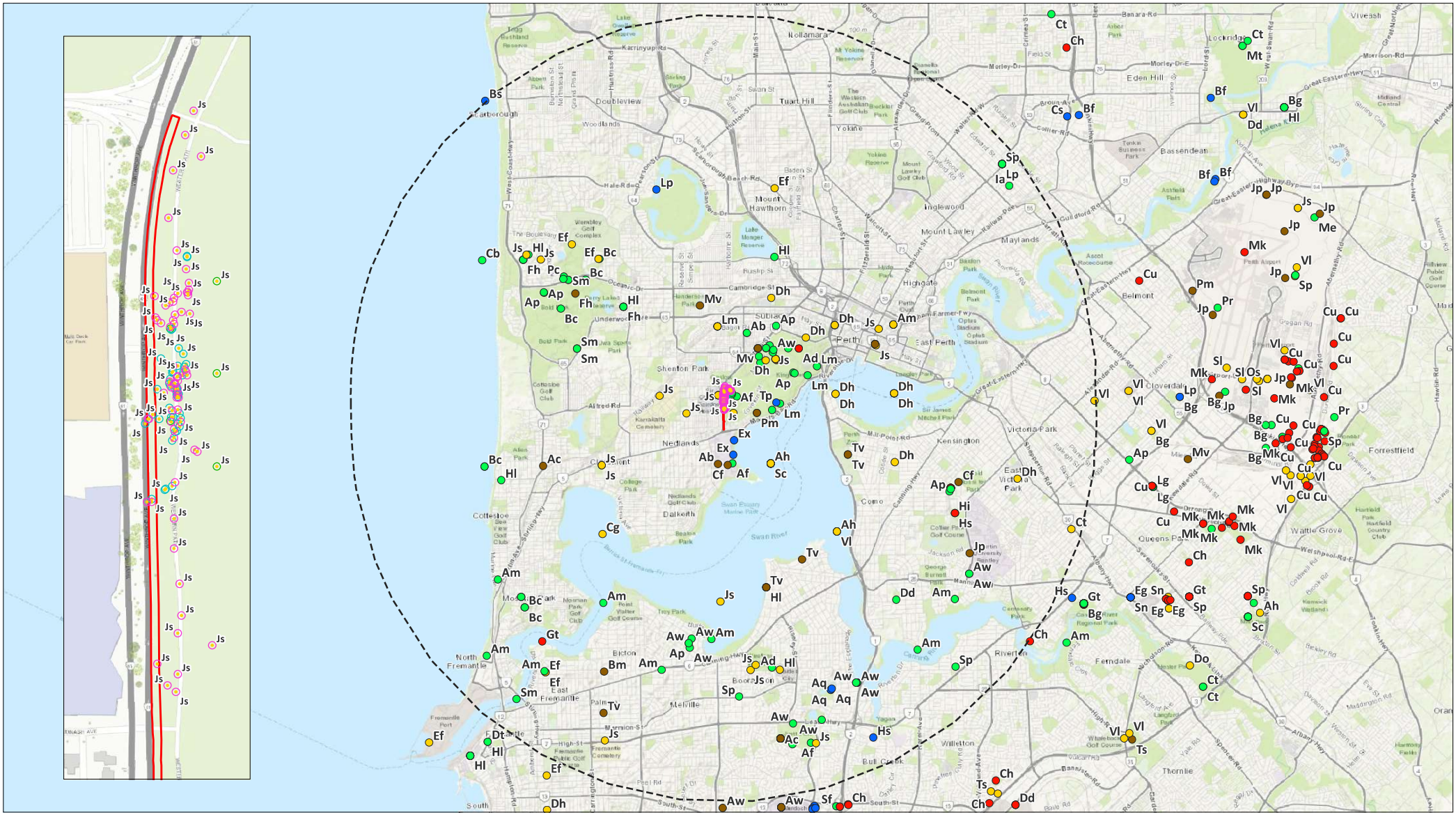

Figure 4: Flora of conservation significance known from the locality (DBCA 2022)

N

0 1 2 3 4 5 km

PROJECT/REPORT NAME	Winthrop Avenue Shared Path Upgrade
SCALE	1:100,000
SHEET SIZE	A3 COLOUR
CLIENT	City of Perth
COORDINATE REFERENCE SYSTEM	GDA2020 / MGA zone 50
PROJECT NUMBER	A22.078
VERSION	0
DATA SOURCE	LANDGATE AERIAL IMAGERY 12/2021
DRAWN BY / REVIEWED BY	CR / CG
DATE	16/1/2023

Legend

- Survey Area
- 10 km Buffer

DBCA Conservation Status

- 1
- 2
- 3
- 4
- T

Previous Priority flora locations

- BGPA (2020)
- Biota (2020)

NOTES:
Cadastral boundary from LANDGATE 2022

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4.1.3 Previous Vegetation Mapping within Kings Park and the Survey Area

McChensey 2017 mapped the vegetation within Kings Park, delineating communities through multivariate analysis of native plant cover data sampled throughout the Park. Consistent with the Bush Forever (WA Planning Commission 2000) description of vegetation (Bush Forever Site 317), McChensey (2017) concluded the vegetation within Kings Park was related to two Floristic Community Types (FCT), as described by Gibson et al (1994):

- FCT 27: "Species poor mallees and shrublands on limestone"
- FCT 28: "Spearwood *Banksia attenuata* or *Banksia attenuata* – Eucalyptus woodlands"

According to McChensey (2017) remnant vegetation within and adjacent to the Survey Area forms two vegetation units which are related to FCT28; DBm and DBg (Table 6).

A survey conducted by Biota in 2020 intersects a large portion of the current Survey Area. This survey confirmed and further refined the descriptions of the McChensey (2017) vegetation units (Table 6).

Table 6 Vegetation Types Described by McChensey (2017) and Biota (2020) within and adjacent to the Survey Area.

Unit	McChensey (2017)	Biota (2020)
DBm	Mixed *Eucalyptus - Allocasuarina – Banksia* Woodland on grey-phase (often deeply bleached) coarse-textured Karrakatta sands with higher relative abundance of *Banksia attenuata, Banksia menziesii, Xanthorrhoea preissii, Daviesia triflora, Hovea trisperma, Monotaxis grandiflora, Stylidium striatum, Waitzia suaveolens* and *Caladenia flava* than other plateau woodlands	*Allocasuarina fraseriana, Eucalyptus marginata subsp. marginata mid-height woodland over Banksia attenuata, B. menziesii low woodland over Acacia saligna, Banksia sessilis var. cygnorum isolated tall shrubs over Xanthorrhoea preissii, X. brunonis subsp. brunonis sparse shrubland over Hibbertia hypericoides subsp. hypericoides sparse low shrubland over Tetraria octandra, Mesomelaena pseudostygia sparse low sedgeland to open low sedgeland.*
DBg	Mixed *Eucalyptus - Allocasuarina – Banksia* Woodland on grey-phase medium-textured Karrakatta sands at relatively low elevation with higher relative abundance of *Banksia grandis*, *Allocasuarina fraseriana, Lomandra preissii* and *Scaevola repens* and distinguished by the presence of the locally rare *Banksia ilicifolia*.	*Allocasuarina fraseriana mid-height woodland over Banksia attenuata, B. menziesii low woodland over Acacia saligna, Banksia sessilis var. cygnorum sparse tall shrubland over Xanthorrhoea preissii sparse shrubland over Tetraria octandra, Mesomelaena pseudostygia sparse low sedgeland.*

4.1.4 Threatened and Priority Ecological Communities

The desktop assessment identified that nine Threatened Ecological Communities (TECs) and Priority Ecological Communities (PECs) occurred within 10 km of the Survey Area, including:

- Four Commonwealth listed TECs.
- One State listed TECs.

- Four PECs.

These communities are listed along with a justification for the likelihood that occur within the Survey Area in Table 7. The occurrence of these communities within the locality is presented on Figure 5 (records from DBCA database searches).

The buffers of two Commonwealth listed TECs have been mapped by the DBCA (DBCA-038) within the Survey Area and have extensive distributions in Kings Park (see Table 7; Figure 5):

- Banksia Woodlands of the Swan Coastal Plain ecological community; and
- Tuart (Eucalyptus gomphocephala) woodlands and forests of the Swan Coastal Plain.

Analysis conducted by Biota (2020) indicated vegetation units DBm and DBg are both representative of the Banksia Woodlands of the Swan Coastal Plain ecological community and mapped this TEC within the Survey Area.

Table 7: TECs and PECs identified within 10 km of the Survey Area, and the likelihood of occurrence within the Survey Area.

Floristic Community Type/ Common ID	Community name	Conservation Status		Source			Likelihood of Occurrence
		State	Commonwealth	PMST	DBCA	Biota (2020)	
Banksia WL SCP	Banksia Woodlands of the Swan Coastal Plain ecological community	P3	EN	x	x	**x**	**Recorded** The buffer for this TEC intersects with the Survey Area.
Tuart woodlands	Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain	P3	CR	x	x		**Medium** The buffer for this TEC intersects with the Survey Area.
SCP20a	*Banksia attenuata* woodlands over species rich dense shrublands	EN	EN		x		Low Suitable habitat does not occur within the Survey Area
SCP30a	*Callitris preissii* (or *Melaleuca lanceolata*) forests and woodlands, Swan Coastal Plain	VU			x		Low Suitable habitat does not occur within the Survey Area
Wooded waterbird wetlands	Wooded wetlands which support colonial waterbird nesting areas	P2			x		Low Suitable habitat does not occur within the Survey Area
Coastal Saltmarsh	Subtropical and Temperate Coastal Saltmarsh	P3	VU		x		Low Suitable habitat does not occur within the Survey Area
SCP24	Northern Spearwood shrublands and woodlands	P3			x		Low Suitable habitat does not occur within the Survey Area

Floristic Community Type/ Common ID	Community name	Conservation Status		Source			Likelihood of Occurrence
		State	Commonwealth	PMST	DBCA	Biota (2020)	
SCP25	Southern *Eucalyptus gomphocephala-Agonis flexuosa* woodlands	P3			x		Low Suitable habitat does not occur within the Survey Area
SCP29b	Acacia shrublands on taller dunes	P3			x		Low Suitable habitat does not occur within the Survey Area

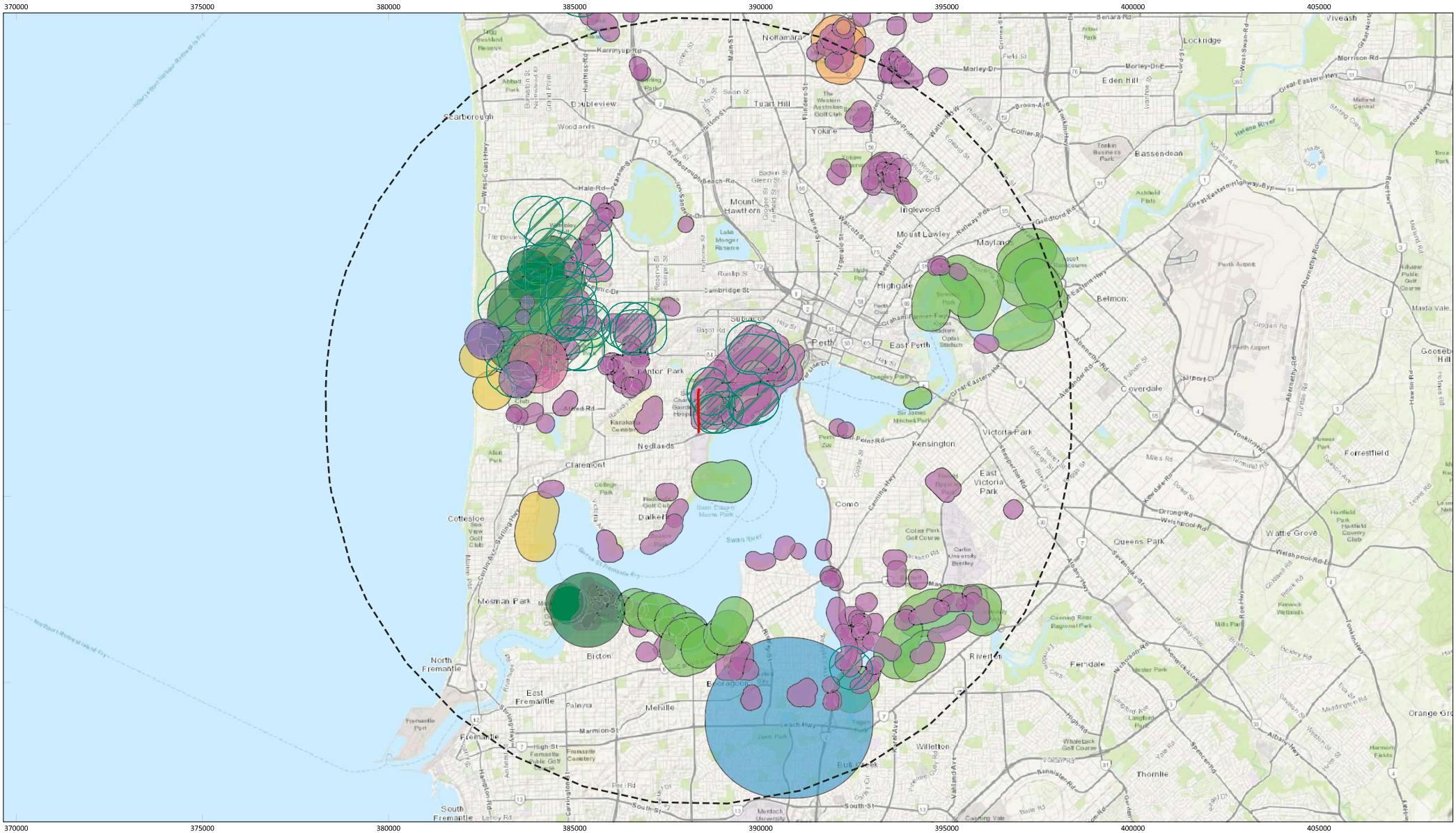

Figure 5: Communities of conservation significance known from the locality (DBCA 2022)

N

0 1 2 3 4 5 km

PROJECT/REPORT NAME	Winthrop Avenue Shared Path Upgrade
SCALE	1:100,000
SHEET SIZE	A3 COLOUR
CLIENT	City of Perth
COORDINATE REFERENCE SYSTEM	GDA2020 / MGA zone 50
PROJECT NUMBER	A22.078
VERSION	0
DATA SOURCE	LANDGATE AERIAL IMAGERY 12/2021
DRAWN BY / REVIEWED BY	CR / CG
DATE	16/1/2023

Legend

Survey Area

10 km Buffer

14-1022EC_Perth_WesternEnvironmental

- Banksia WL SCP - Banksia Woodlands of the Swan Coastal Plain ecological community
- Coastal Saltmarsh - Subtropical and Temperate Coastal Saltmarsh
- SCP20a - Banksia attenuata woodlands over species rich dense shrublands (floristic community type 20a as originally described in Gibson et al. (1994))
- SCP24 - Northern Spearwood shrublands and woodlands
- SCP25 - Southern Eucalyptus gomphocephala-Agonis flexuosa woodlands
- SCP29b - Acacia shrublands on taller dunes
- SCP30a - Callitris preissii (or Melaleuca lanceolata) forests and woodlands, Swan Coastal Plain (floristic community type 30a as originally described in Gibson et al. (1994))
- Tuart woodlands - Tuart (Eucalyptus gomphocephala) woodlands and forests of the Swan Coastal Plain
- Wooded waterbird wetlands - Wooded wetlands which support colonial waterbird nesting areas

No	Description	Drawn	Approved	Date
A	Original issue	CR	CG	16/1/2023

NOTES:

Cadastral boundary from LANDGATE 2022

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4.1.5 Black Cockatoos

Three species of Black-Cockatoo occur in the south-west of Western Australia: Carnaby's Black-Cockatoo (*Calyptorhynchus latirostris*), Baudin's Black-Cockatoo (*C. baudinii*) and Forest Red-tailed Black-Cockatoo (*C. banksii naso*). Both Carnaby's Black Cockatoo and Baudin's Black-Cockatoo are listed as Endangered under Commonwealth EPBC Act and the State BC Act. The Forest Red-tailed Cockatoo is listed as Vulnerable under both the Commonwealth EPBC Act and the State BC Act.

Carnaby's Black-Cockatoo and Forest Red-tailed Black-Cockatoo (DCCEEW 2022) are known to occur within Kings Park and the surrounding area. Foraging evidence for both species was recently recorded in the bushland adjacent to the Survey Area by Biota (2020). These species are well understood and have been subject to many studies. Descriptions for each is provided below:

Carnaby's Black-Cockatoo

Carnaby's Black-Cockatoo (*Calyptorhynchus latirostris*) has a known distribution from Kalbarri to Esperance. Breeding season for this species occurs between July and November. They generally breed in woodlands or forests, however, can also breed in partially cleared woodland or forest, including isolated trees. Nests are found in hollows (in live or dead trees), particularly Salmon Gum (*E. salmonophloia*), Wandoo (*E. wandoo*), Tuart (E. *gomphocephala*), Jarrah (*E. marginata*), Flooded gum (*E. rudis*), York Gum (*E. loxophleba* subsp. *loxophleba*), Powderbark (*E. accedens*), Karri (*E. diversicolor*) and Marri (*Corymbia calophylla*) (DCCEEW 2022). Long term studies show that Carnaby's Black-Cockatoos utilise hollows ranging from 10 – 65 cm in diameter (average 26 cm) and approximately 130 cm deep (Saunders et al. 2014a). Night roosting occurs generally in or near riparian environments or natural and artificial permanent water sources.

Carnaby's Black-Cockatoo (*Calyptorhynchus latirostris*) prefers to feed in native shrubland, kwongan heathland and woodland on seeds, flowers and nectar of native proteaceous plant species (*Banksia* spp., *Hakea* spp., *Dryandra* spp., and *Grevillea* spp.). They will, however, will also eat the seeds of introduced species (DCCEEW 2022).

Forest Red-tailed Black-Cockatoo

Forest Red-tailed Black-Cockatoo's (*C. banksii naso*) occur from Gingin to near Albany. This species generally breeds in woodlands or forests, however, can also breed in partially cleared woodland or forest, including isolated trees. They nest in live or dead trees, particularly Marri (*Corymbia calophylla*), Wandoo (*E. wandoo*), Tuart *(E. gomphocephala*), Jarrah (*E. marginata*), Blackbutt (*E. patens*) and Karri (*E. diversicolor*). Hollows with the following dimensions are favoured: entrance diameters ranging from 10 x 12 cm to 44 x 150 cm (mean 28 x 30 cm), and depths of between 100 cm and 500 cm (average 144 cm) (Johnstone et al. 2013).

Forest Red-tailed Black-Cockatoo's feed primarily on seeds of Jarrah and Marri in woodlands and forests, as well the edges of Karri forests, including areas of Wandoo and Blackbutt. They will also forage on *E. caesia, E. erythrocorys, Allocasuarina* cones and fruits of snottygobble (*Persoonia longifolia*) (DCCEEW 2022).

4.2 Field Survey

4.2.1 Flora

A total of 41 vascular flora species were recorded within the Survey Area. The flora inventory is presented in Appendix E.

The families with the highest number of taxa were Fabaceae (nine taxa), Proteaceae (five taxa), Poaceae and Asparagaceae (four taxa). The most commonly recorded genera were *Banksia* and *Acacia* (both three taxa), and **Avena, Jacksonia and Thysanotus* (all two taxa). These families and genera are typical and common for the locality.

Threatened and Priority Flora

No Commonwealth or State listed Threatened Flora were recorded in or are expected to occur within the Survey Area.

One Priority 4 flora species was recorded within the Survey Area. Locations of these species are presented on Figure 6 and provided in Appendix F.

Plate 1: *Jacksonia sericea* (P4)

***Jacksonia sericea* (Priority 4)** is a low spreading shrub which grows to 60 cm in height and produces orange flowers (Plate 1). The distribution of this species is confined to the Swan Coastal Plain. However, Barrett and Tay (2005) noted that this species is present throughout the bushland in Kings Park. A total of 44 individuals were recorded during the survey, while an additional 219 individuals had previously been recorded in the adjacent bushland (Biota 2020).

Considering the small area and degraded nature of the remnant vegetation within the Survey Area, no other Priority flora species are expected to occur (Appendix C).

Figure 6: Priority Flora, Orchid sites and Declared Pest recorded within the Survey Area

N

0 20 40 60 80 100 m

PROJECT/REPORT NAME	Winthrop Avenue Shared Path Upgrade
SCALE: 1:1,500	SHEET SIZE: A3 COLOUR
CLIENT: City of Perth	
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	PROJECT NUMBER: A22.078 / VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY 12/2021	DRAWN BY / REVIEWED BY: CR / CG / DATE: 19/1/2023

Legend

- Survey Area
- Proposed Shared Path
- Orchid site

Priority Flora

- Jacksonia sericea (P4)

Declared Pest

- *Asparagus asparagoides

Previous Priority flora locations

- Jacksonia sericea (BGPA)
- Jacksonia sericea (Biota 2020)

No	Description	Drawn	Approved	Date
A	Original issue	CR	CG	19/1/2023

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

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Flora of Local Significance

As described in Section 4.1.2, four species of orchid known to occur within the Survey Area were translocated by BGPA staff in November 2020. Small white flags within the Survey Area mark the locations from which the orchids were removed (Plate 2). These locations were recorded with a handheld GPS during the current survey and are displayed on Figure 6.

No orchids were observed during the current survey. However, none were expected to be present or identifiable as these species are annual and the survey was conducted in summer outside of the spring flowering season.

Plate 2: White flags demarcating location of orchids, which were removed in Nov 2022.

Plate 3: *Bridal Creeper (*Asparagus asparagoides)*

Introduced Flora

A total of eight introduced taxa were recorded within the Survey Area (Table 8). All the introduced species recorded are common weeds from urban bushland areas in Perth (Hussey et al 2007). Due to previous clearing and disturbances, the presence of introduced species in the Survey Area was widespread and diverse. As such only dominant species were recorded. F

One species recorded, Bridal Creeper (**Asparagus asparagoides*), is listed as a Declared Pest pursuant to the BAM Act and considered a Weed of National Significance. Bridal creeper is a perennial climber with white flowers (Plate 2). This species was recorded from nineteen locations during the survey (see Figure 6). Additional locations of this species were recorded by Biota (2020) in the adjacent bushland and species is expected to be widespread in Kings Park. Bridal Creeper is currently subject to management within Kings Park (Biota 2020).

Table 8: Introduced species recorded in the Survey Area.

Family	Species	Common Name	Status Under BAM Act 2007
Asparagaceae	**Asparagus asparagoides*	Bridal Creeper	Declared Pest
Poaceae	**Avena barbata*	Bearded Oat	-
Poaceae	**Avena fatua*	Wild Oat	

Family	Species	Common Name	Status Under BAM Act 2007
Poaceae	**Briza maxima*	Blowfly Grass	-
Poaceae	**Ehrharta longiflora*	Annual Veldt Grass	-
Asteraceae	**Gazania linearis*	Treasure flower	
Asteraceae	**Hypochaeris glabra*	Smooth Cats-ear	
Asteraceae	**Sonchus asper*	Rough Sowthistle	

4.2.2 Vegetation

The majority of the Survey Area was cleared and included an existing path. Remnant vegetation existed on the eastern boundary of the Survey Area.

Remnant native vegetation within the Survey Area formed the fringe of a larger bushland remnant which extends into the Kings Park Bush Forever Site. This vegetation had previously been mapped by McChensey (2017) and Biota (2020).

Overstorey within the Survey Area was intact and dominated by *Allocasuarina fraseriana, Eucalyptus marginata, Corymbia calophylla, Banksia attenuata, B. menziesii* and *B. sessilis*. The understorey was degraded with the structure and composition of native flora impacted by clearing, weeds and the presence of rubbish. Vegetation condition of the understory improved quickly as distance from the clearing increased. The field survey confirmed the presence of vegetation units DBm and DBg, as described by McChensey (2017) and Biota (2020) (see Section 4.1.3).

Descriptions of each of the three sections of the proposed Shared Path is provided in Table 9 and shown on Figure 7.

Table 9: Vegetation within each section of the proposed Shared Path.

Section	Vegetation Description and Condition	Photo
University Hall to Poole Avenue	Vegetation: No remnant vegetation. Condition: Completely Degraded, cleared with existing pathway and some planted species.	

Section	Vegetation Description and Condition	Photo
Poole Avenue to Monash Avenue	Vegetation: Remnant vegetation restricted to eastern side of Survey Area, includes vegetation units DBm and DBg (McChensey 2017, Biota 2020). Vegetation Condition: Completley Degraded to Good. Majority of Survey Area cleared with high presence of weeds and rubbish. Renmant vegetation includes healthy overstorey trees, however, diversity and structure of understorey has been impacted by clearing, edge effects, and high presence of weeds.	 
Monash Avenue to Aberdare Road	Vegetation: Remnant vegetation restrcited to eastern side of Survey Area including vegetation units DBg and DBm (McChensey 2017, Biota 2020). Vegetation Condition: Completley Degraded –Good. Majority of Survey area cleared with existing path and high presence of weeds and rubbish. Renmant vegetation includes healthy overstorey trees, however, diversity and structure of understorey has been impacted by clearing, edge effects, and high presence of weeds.	

Figure 7: Vegetation Units within the Survey Area

0 20 40 60 80 100 m

N

PROJECT/REPORT NAME	Winthrop Avenue Shared Path Upgrade
SCALE: 1:1,500	SHEET SIZE: A3 COLOUR
CLIENT: City of Perth	
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	PROJECT NUMBER: A22.078 — VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY 12/2021	DRAWN BY / REVIEWED BY: CR / CG — DATE: 19/1/2023

Legend

- Survey Area
- Tree locations (CTS 2020)
- Proposed Shared Path

Vegetation

- DBg (McChensey, 2017; Biota, 2020)
- DBm (McChensey, 2017; Biota, 2020)
- Completely Degraded / Built / Cleared

No	Description	Drawn	Approved	Date
A	Original issue	CR	CG	19/1/2023

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

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Threatened and Priority Ecological Communities

Two Commonwealth listed TECs have been mapped by the DBCA (DBCA-038) within the Survey Area and have extensive distributions in Kings Park (see Table 7; Figure 5). Both of these communities are also listed a Priority 3 PECs by the DBCA.

The field survey confirmed the presence of vegetation units DBm and DBg, as previously mapped by McChensey (2017) and Biota (2020). Analysis of these units against the Commonwealth criteria for the determination of the presence of the Banksia Woodlands of the Swan Coastal Plain ecological community, confirm that DBm and DBg are representative of the TEC (Biota 2020). The characteristic dominant presence of *Banksia* in the upperstorey through the Survey Area, confirms the presence of this TEC. The small area of remnant vegetation within the Survey Area forms the degraded fringe of the larger patch of this TEC which extends into the Kings Park Bush Forever Site (Figure 5 and 7; McChensey 2017 and Biota 2020).

No Tuart trees (*Eucalyptus gomphocephala*) were recorded within, or adjacent to, the Survey Area by the current or previous surveys. Therefore, it can be concluded that the Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain TEC is not present within the Survey Area.

4.2.3 Black Cockatoo

Breeding Habitat

A total of 15 Jarrah (*Eucalyptus marginata)* and Marri (*Corymbia calophylla*) trees with DBH >500 mm were recorded during within the Survey Area. The locations of these trees are provided on Figure 8 with descriptions provided in Appendix G.

None of these trees were observed, from the ground, to support hollows (the average DBH of trees measured was 800 mm).

Foraging Habitat

Consistent with Biota (2020), evidence of Black Cockatoo foraging was found throughout the Survey Area. The canopy trees within the Survey Area were favourable to Forest Red-tailed Black-Cockatoos including Marri (*Corymbia calophylla*), Jarrah (*Eucalyptus marginata*) and *Allocasuarina fraseriana* while the shrub layer was favourable for Carnaby's Black-Cockatoo including *Banksia attenuata,* and *B. sessilis*. Evidence of foraging included chewed Marri nuts (Plate 4) likely foraged by Red-tailed Black Cockatoos, and chewed *Banksia* cones (Plate 5) which are the main food item for Carnaby's Black Cockatoo.

Plate 4: Foraging evidence: Marri nuts

Plate 5: Foraging evidence: *Banksia* cone

Application of the Commonwealth Foraging Habitat Scoring Tool (DAWE, 2022) indicates that vegetation within the Survey Area presents 'Very High' quality habitat for both Carnaby's Black-Cockatoos and Forest Red-tailed Black-Cockatoos (Table 10).

Carnaby's Black-Cockatoos are consistently recorded within Kings Park, including two known roost locations (Figure 8), and several nearby roosts at Floreat, Nedlands and Como (Peck et al. 2019). No known roosts for Forest Red-tailed Black-Cockatoo occur within Kings Park, however, several significant roosts occur within 12 km, including at Floreat, Yokine and Morely (Peck et al. 2019).

The Commonwealth states that high quality foraging habitat in proximity to roosting locations is necessary for the maintenance of population size, particularly outside of the breeding season (DCCEEW 2022). Considering Kings Park is one of the largest remaining remnant bushland areas in the Perth metropolitan area

with nearby roosts, maintenance of foraging habitat in the Park is significant to the maintenance of Black-Cockatoos in the area.

Table 10: Foraging Habitat Score (DCCEEW 2022)

Attribute	Carnaby's Black Cockatoo	Forest red-tailed Black Cockatoo
Starting score	10- contains native eucalypt woodland with Marri and Banksia species	10- contains Marri woodland
Foraging potential (-2 if no foraging evidence)	No change, foraging evidence present	No change, foraging evidence present
Connectivity (-2 if no other foraging habitat in 12km)	No change, other foraging habitat <1 km away	No change, other foraging habitat <1 km away
Proximity to breeding habitat (-2 if no breeding habitat in 12km)	No change, breeding habitat within 12 km	No change, breeding habitat within 12 km
Proximity to roosting (-1 if >20km from known night roost)	No change, known roosting site <20 km distant	No change, known roosting site <20 km distant
Impact from significant plant disease (-1 if >50% impact)	No change, impact from plant disease affecting <50% of foraging plants	No change, impact from plant disease affecting <50% of foraging plants
Total score	**10: Very High**	**10: Very High**

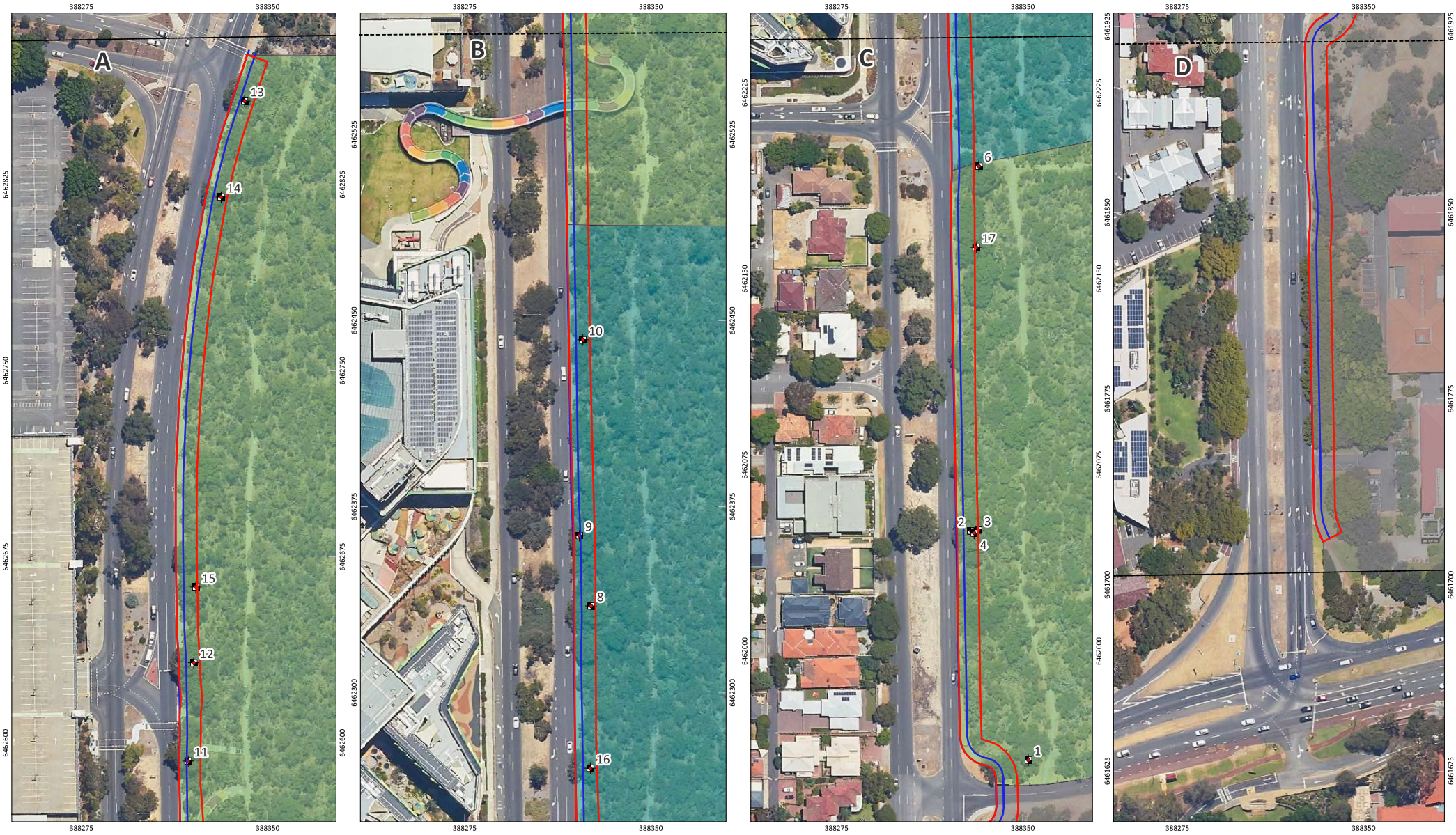

Figure 8: Black-Cockatoo Habitat

N 0 20 40 60 80 100 m		PROJECT/REPORT NAME: Winthrop Avenue Shared Path Upgrade	
SCALE: 1:1,500	SHEET SIZE: A3 COLOUR	CLIENT: City of Perth	
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50		PROJECT NUMBER: A22.078	VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY 12/2021		DRAWN BY / REVIEWED BY: CR / CG	DATE: 19/1/2023

Legend

- Survey Area
- BlackCockatoo
- Proposed Shared Path

Very High Quality Foraging Habitat

- DBg (McChensey, 2017; Biota, 2020)
- DBm (McChensey, 2017; Biota, 2020)
- Completely Degraded / Built / Cleared

No	Description	Drawn	Approved	Date
A	Original issue	CR	CG	19/1/2023

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

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5. Assessment Against Clearing Principles

The Proposal includes the construction of the Winthrop Avenue Shared Path. The proposed path runs to the east of Winthrop Avenue, from Stirling Highway to Aberdare Road, along the Kings Park Bush Forever Site. Key design elements have been proposed to reduce potential impacts to native vegetation. Despite this, native vegetation which forms part of the broader Kings Park Bush Forever Site may be impacted. CTS (2020) assessed mature trees along the length of the Proposal and a list of trees that will be cleared or impacted by the Proposal is provided in Appendix H.

The total area of native vegetation proposed to be cleared as part of the Proposal is approximately 0.1 ha; this area includes one *Corymbia calophylla* (Marri) potential breeding habitat (>500 mm DBH) and 15 Jacksonia sericea (P4), 13 individuals from the current survey and 2 from previous surveys (BGPA; Biota, 2020). The locations of the *Jacksonia sericea* that are within the impact area are listed in Table 11.

In addition, 0.01 ha of clearing occur within the Kings Park Bush Forever Environmentally Sensitive Area boundary.

Table 11: Location of Priority Flora within the Impact Area

Species	Easting	Northing
Jacksonia sericea	388318.8311	6462545.1791
Jacksonia sericea	388320.5698	6462467.8080
Jacksonia sericea	388322.6629	6462277.6688
Jacksonia sericea	388323.1052	6462322.6920
Jacksonia sericea	388323.4905	6462268.7306
Jacksonia sericea	388324.0209	6462169.6184
Jacksonia sericea	388324.7863	6462183.3819
Jacksonia sericea	388324.9557	6462197.5548
Jacksonia sericea	388325.4746	6462192.5325
Jacksonia sericea	388325.5782	6462196.0215
Jacksonia sericea	388326.4506	6462025.5533
Jacksonia sericea	388326.4506	6462025.5533

Species	Easting	Northing
Jacksonia sericea	388328.1561	6461992.8930
Locations from Previous Surveys (BGPA; Biota, 2020)		
Jacksonia sericea	388320.0	6462465.0
Jacksonia sericea	388320.0	6462462.0

The route is split into three sections, as described by WSP (2020):

- University Hall to Poole Avenue: involves clearing and upgrade of the existing concrete path to 'primary route' standard. No native remnant vegetation occurs within this section. However, 0.007 ha of this section occurs within the ESA boundary.

- Poole Avenue to Monash Avenue: involves clearing and construction for a new 3.2 m concrete shared path. The kerb line will be shifted into Winthrop Avenue to reduce impacts. However, clearing will extend into native vegetation and approximately 0.005 ha occurs within the ESA boundary. Within the impact area eight Jacksonia sericea (P4) and three trees will be removed (as per CTS, 2020). Of these three trees, one is a *Corymbia calophylla* that is a potential Black-Cockatoo habitat tree. In addition, 16 trees will be removed within this section outside of the impact area.

- Monash Avenue to Aberdare Road involves clearing and upgrade of the existing concrete path to 'primary route' standard. Five Jacksonia sericea (P4) individuals within the impact area. In addition, one tree will be removed within this section outside of the impact area.

Based on the above Proposal description and biological assessment, each of the ten clearing principles under Schedule 5 of the EP Act were accessed to determine if the Proposal is likely to have a significant impact on the environment. Specifically, the assessment considered the proposed clearing area as the 'impact area' and used the information collected from the broader Survey Area to provide context. Results of this assessment are presented in Table 12 and on Figure 9a-9c.

Table 12: Assessment against clearing principles.

Principle (Schedule 5 of the EP Act)	Assessment	Outcome
(a) Native vegetation should not be cleared if it comprises a high level of biological diversity	The impact area does not support a high diversity of flora species. Most of the area is already cleared and supports an existing pathway. A total of 41 species were recorded within the broader Survey Area, however, fewer native species occurred in the proposed clearing area. CTS (2020) identified 19 trees within the survey area to be removed, which includes *Jacksonia fusiana, Acacia saligna, Allocasuarina fraseriana, Banksia menziesii, B. attenuata, B. sessilis, Hakea sp* and *Corymbia calophylla*. The understory had low diversity, generally a degraded condition and the presence of introduced species was high.	Proposed clearing is not at variance to this Principle.
(b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.	One potential Black-Cockatoo habitat tree will be removed as part of the Proposal; *Corymbia calophylla* (Marri), CTS (2020) number 24 (Appendix H; Figure 9). This individual has a DBH of 55 cm, however no hollows were observed from the ground. Six Banksia trees, foraging species for Black Cockatoo's, are also required to be removed (Appendix H). The Commonwealth Foraging Habitat Scoring Tool scored the Survey Area to have 'Very High' habitat quality. Black-Cockatoos are known to occur in the Kings Park, and foraging evidence of Forest Red-tailed and Carnaby's Black Cockatoo were observed in the Survey Area. Removal of six foraging habitat trees and one potential breeding tree from the degraded fringe is not expected to significantly impact the overall foraging or breeding habitat value of this area.	Proposed clearing is unlikely to be variance to this Principle.

Principle (Schedule 5 of the EP Act)	Assessment	Outcome
(c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.	No Threatened flora pursuant the Commonwealth EPBC Act or the State BC Act were recorded within, or are expected to occur, within the proposed impact area. One Priority 4 flora species (*Jacksonia sericea*) was recorded within the broader Survey Area, including 44 individuals. This species is also known to occur more broadly in the adjacent bushland, with 219 individuals recorded by Biota (2020). A total of 15 individuals (two individuals from previous surveys; BGPA; Biota,2020) occurs within impact area. However, as this species is locally common, the proposed clearing is not expected to be necessary for the continued existence of this species at the location, or within Kings Park.	Proposed clearing is unlikely to be variance to this 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.	One community listed as a TEC by the Commonwealth and Priority 3 PEC by the State occurred within the Survey Area and may be impacted by the Proposal: *Banksia Woodlands of the Swan Coastal Plain Threatened Ecological Community.* Six Banksia trees will be removed for the Proposal, including 3 *B. menziesii* and 2 *B. sessilis* and 1 *B. attenuata.* Vegetation within the Proposal impact area forms part of a larger 'patch' of the TEC which extends into the adjacent Kings Park Bushland. Remnant native vegetation within the Survey Area, comprised the fringe of the extent of this patch, including a degraded understorey which did not represent the structure or diversity of the TEC. Proposed clearing of 0.11 ha, including six Banksia trees from the degraded fringe of the TEC patch is not expected to impact the maintenance of this community.	Proposed clearing is unlikely to be variance to this Principle.

Principle (Schedule 5 of the EP Act)	Assessment	Outcome
(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.	The vegetation complexes within the impact area are the Karrakatta complex and on the southern corner the Vasse complex. The majority of the Survey Area is within the Karrakatta complex. This system has 23.5 % remaining and 3.9% being managed for conservation purposes. The impact area is adjacent to Kings Park which is a significant remnant bushland of native vegetation. However, the proposed clearing area is small (0.11 ha) and on the fringe of the larger remnant vegetation patch with a degraded condition. The proposed clearing is considered to not impact the maintenance of the vegetation complex.	Proposed clearing is not at variance to this 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.	The proposed clearing area does not intersect any surface wetlands or drainage lines. The nearest watercourse is the Swan River 800 m to the east.	Proposed clearing is not at variance to this Principle.
(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.	The disturbance of native vegetation is confined to the impact area. It is considered extremely unlikely to cause appreciable land degradation given: • Small area to be cleared. • Stable soil type. • Not adjacent to permanent water source. • Relatively flat topography. Declared pest species were recorded throughout the area, weed hygiene will be used during construction to limit spread of this species and other weeds.	Proposed clearing is not at variance to this 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	The proposed impact area is largely adjacent to the Kings Park Bush Forever Site (Site 317). The impact area extends 0.01 ha into the Bush Forever Site. The impact is unlikely to be significant as the vegetation is degraded and have limited conservation value.	Proposed clearing is unlikely to be variance to this Principle.

Principle (Schedule 5 of the EP Act)	Assessment	Outcome
(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.	There are no regionally significant wetlands or watercourses with permanent water within the project area. The survey area does not intersect with any surface water or occurs within any Public Drinking Water Source Areas. The project will not change the hydrology of the area, as no surface water will be taken for this project and due to the minor nature of the works, it is unlikely there will be a significant impact to the surface or underground water quality of this area.	Proposed clearing is not at variance to this Principle.
(j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.	A large proportion of the alignment follows pre-existing tracks, roads and previously cleared land. Additional stormwater drains will be constructed to manage stormwater (WSP, 2020). The minimal amount of clearing required for the project would have no significant impact on the natural surface and groundwater processes. The proposal is not likely to cause, or exacerbate, the incidence or intensity of flooding.	Proposed clearing is not at variance to this Principle.

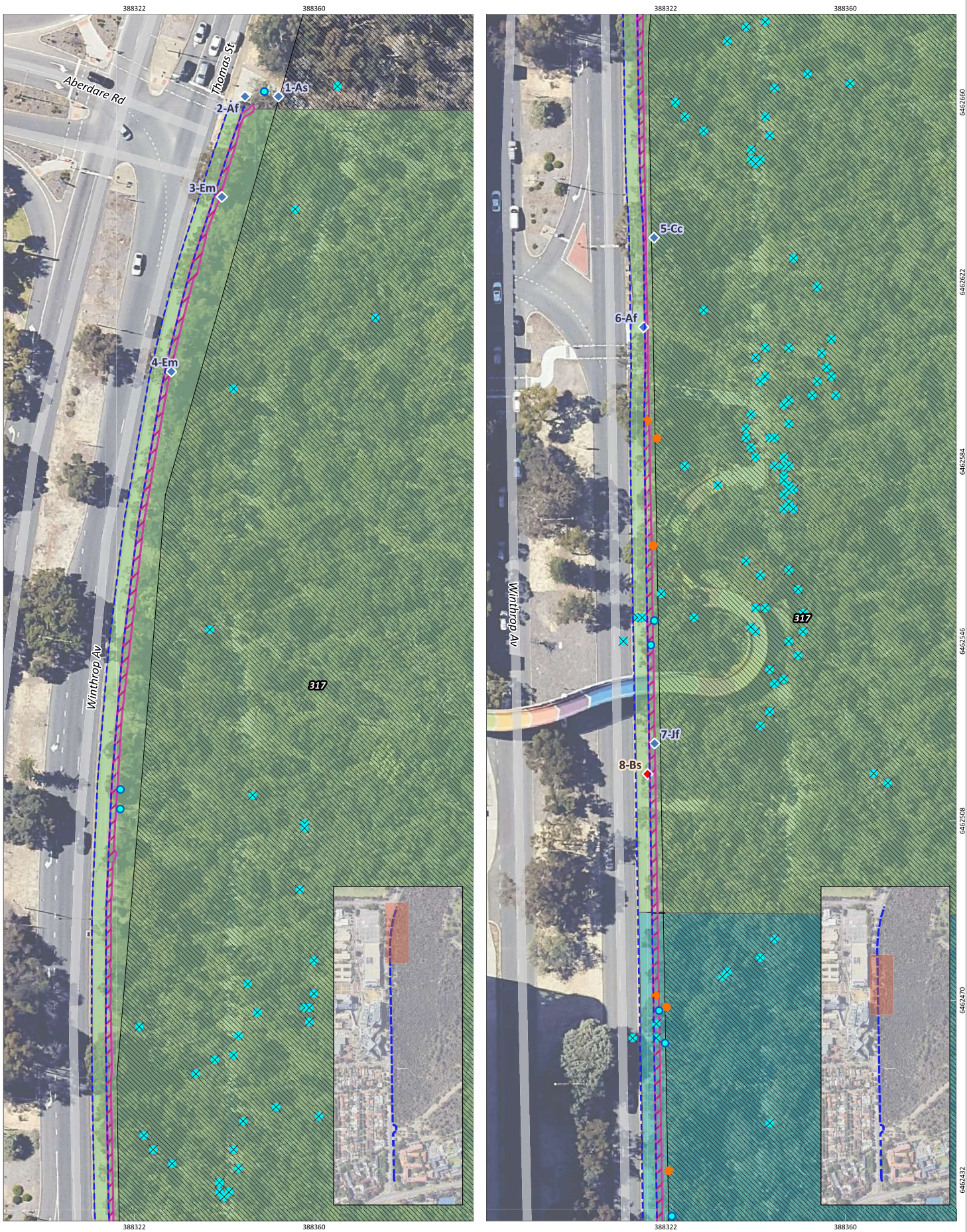

Figure 9a: Proposed impacts from Proposal

N

0 5 10 15 20 m

PROJECT/REPORT NAME: Winthrop Avenue Shared Path Upgrade			
SCALE: 1:750	SHEET SIZE: A3 COLOUR	CLIENT: City of Perth	
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50		PROJECT NUMBER: A22.078	VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY 12/2021		DRAWN BY / REVIEWED BY: CR / CG	DATE: 1/3/2023

Legend

- Impact Area
- Shared Path
- Bush Forever Areas - 2000 (DPLH-019)
- Orchid site

Declared Pest

- *Asparagus asparagoides

Priority Flora

- Jacksonia sericea
- Jacksonia sericea (BGPA; Biota 2020)

Tree locations (CTS 2020)

- Remove
- Retain

Vegetation

- DBg (McChensey, 2017; Biota, 2020)
- DBm (McChensey, 2017; Biota, 2020)
- Completely Degraded / Built / Cleared

No	Description	Drawn	Approved	Date
A	Original issue	CR	CG	1/3/2023

NOTES:
Cadastral boundary (LGATE-002)

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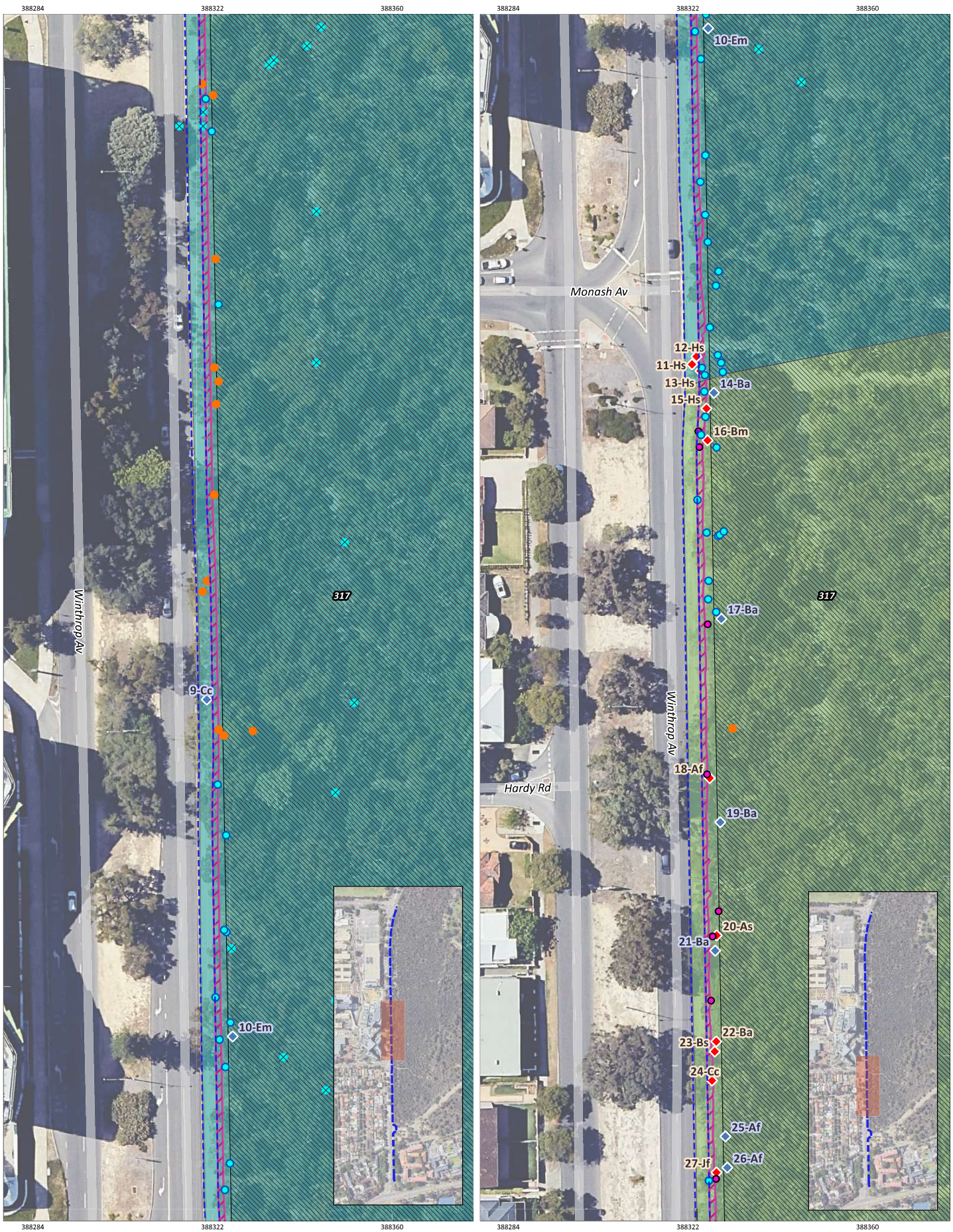

Figure 9b: Proposed impacts from Proposal

0 5 10 15 20 m

N

PROJECT/REPORT NAME	Winthrop Avenue Shared Path Upgrade
SCALE: 1:750	SHEET SIZE: A3 COLOUR
CLIENT: City of Perth	
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	PROJECT NUMBER: A22.078
VERSION: 0	
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Legend

- Impact Area
- Shared Path
- Bush Forever Areas - 2000 (DPLH-019)
- Orchid site

Declared Pest

- *Asparagus asparagoides

Priority Flora

- Jacksonia sericea
- Jacksonia sericea (BGPA; Biota 2020)

Tree locations (CTS 2020)

- Remove
- Retain

Vegetation

- DBg (McChensey, 2017; Biota, 2020)
- DBm (McChensey, 2017; Biota, 2020)
- Completely Degraded / Built / Cleared

No	Description	Drawn	Approved	Date
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NOTES:
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Figure 9c: Proposed impacts from Proposal

N 0 5 10 15 20 m	PROJECT/REPORT NAME: Winthrop Avenue Shared Path Upgrade		
SCALE: 1:750	SHEET SIZE: A3 COLOUR	CLIENT: City of Perth	
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50		PROJECT NUMBER: A22.078	VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY 12/2021		DRAWN BY / REVIEWED BY: CR / CG	DATE: 1/3/2023

Legend

- Impact Area
- Shared Path
- Bush Forever Areas - 2000 (DPLH-019)
- Orchid site

Declared Pest

- *Asparagus asparagoides

Priority Flora

- Jacksonia sericea
- Jacksonia sericea (BGPA; Biota 2020)

Tree locations (CTS 2020)

- Remove
- Retain

Vegetation

- DBg (McChensey, 2017; Biota, 2020)
- DBm (McChensey, 2017; Biota, 2020)
- Completely Degraded / Built / Cleared

No	Description	Drawn	Approved	Date
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6. Conclusion and Approval Advice

The Proposal will impact 0.11 ha of native vegetation. This vegetation comprises the following values:

- 0.11 ha of native vegetation in Degraded condition
- 0.11 ha Banksia Woodland TEC
- One *Corymbia calophylla* (Marri) potential breeding habitat (>500 mm DBH)
- 0.11 ha 'Very High' quality Black Cockatoo foraging habitat
- 15 Priority 4 flora individuals of *Jacksonia sericea*
- 0.01 ha of vegetation within the Kings Park Bush Forever Site ESA boundary

The proposed clearing associated with the impact area has been assessed against the 10 clearing principles. The project is not variance with six clearing principles and is unlikely to be at variance with four principles.

The clearing that is proposed outside of the Kings Park Bush Forever Site contains values of conservation significance, however, the area being cleared and its location, being at the edge of a larger area of native vegetation, limit the significance of this clearing, such that the potential for an exemption from the requirement for a Clearing Permit should be considered in discussion with DWER and Kings Park Botanical Authority.

It is proposed that two potential exemptions are applicable:

- Regulation 5, Item 1 - Clearing to construct a building - Clearing of a site for the lawful construction of a building or other structure on a property, being clearing which does not, together with all other limited clearing on the property in the financial year in which the clearing takes place, exceed five hectares.

  For this exemption, the proposed shared path may be considered as another structure and therefore an exemption could be applied.

- As described by the Guideline: Native Vegetation Clearing Referrals (DWER, 2021), DWER have the ability to determine that a Clearing Permit is not required for low impact proposals.

The Kings Park Bush Forever Site is identified as an ESA. Clearing Permit exemptions do not apply where clearing is proposed within an ESA. An area of 0.01 ha is proposed to be cleared within the ESA. The potential for an exemption to be applied to this activity should be discussed with DWER and Kings Park Botanical Authority.

7. References

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Appendix A

Legislation

Environment Protection and Biodiversity Conservation Act 1999

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

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

Biodiversity Conservation Act 2016

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

Environmental Protection Act 1986

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

Biosecurity and Agricultural Management Act 2007

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

Weeds of National Significance

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

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

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

Department of Biodiversity, Conservation and Attractions Priority Lists

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

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

Informal Recognition of Flora and Fauna

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

Appendix B
Definitions and Criteria

EPBC Act Categories for Flora, Fauna and Ecological Communities

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

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

Conservation Codes for Western Australian Flora and Fauna (DBCA)

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

Conservation Codes for Western Australian Flora and Fauna	
VU	**Vulnerable species** Threatened species considered to be "facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines". Listed as vulnerable undersection 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for vulnerable fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for vulnerable flora.
Extinct species **Listed by order of the Minister as extinct under section 23(1) of the BC Act as extinct or extinct in the wild.**	
EX	**Extinct species** Species where "there is no reasonable doubt that the last member of the species has died", and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act). Published as presumed extinct under schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for extinct fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for extinct flora.
EW	**Extinct in the wild species** Species that "is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form", and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act). Currently there are no threatened fauna or threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.
Specially protected species **Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection.** **Species that are listed as threatened species (critically endangered, endangered or vulnerable) or extinct species under the BC Act cannot also be listed as Specially Protected species.**	
MI	**Migratory species** Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act). Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species. Published as migratory birds protected under an international agreement under schedule 5 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.

Conservation Codes for Western Australian Flora and Fauna	
CD	**Species of special conservation interest (conservation dependent fauna)** Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act). Published as conservation dependent fauna under schedule 6 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.
OS	**Other specially protected species** Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act). Published as other specially protected fauna under schedule 7 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.
P	**Priority species** Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened fauna or flora. Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring. Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.
1	**Priority 1: Poorly-known species** Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.
2	**Priority 2: Poorly-known species** Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.
3	**Priority 3: Poorly-known species** Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.

Conservation Codes for Western Australian Flora and Fauna	
4	**Priority 4: Rare, Near Threatened and other species in need of monitoring** (a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands. (b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent. (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

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

DBCA Definitions and Criteria for TECs and PECs

Criteria	Definition
Threatened Ecological Communities	
Presumed Totally Destroyed (PD)	An ecological community that has been adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure in the foreseeable future. An ecological community will be listed as presumed totally destroyed if there are no recent records of the community being extant and either of the following applies (A or B): A. Records within the last 50 years have not been confirmed despite thorough searches of known or likely habitats or B. All occurrences recorded within the last 50 years have since been destroyed.
Critically Endangered (CR)	An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated. An ecological community will be listed as Critically Endangered when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future. This will be determined on the basis of the best available information, by it meeting any one or more of the following criteria (A, B or C): A. The estimated geographic range, and/or total area occupied, and/or number of discrete occurrences since European settlement have been reduced by at least 90% and either or both of the following apply (i or ii): i. geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is imminent (within approximately 10 years). ii. modification throughout its range is continuing such that in the immediate future (within approximately 10 years) the community is unlikely to be capable of being substantially rehabilitated. B. Current distribution is limited, and one or more of the following apply (i, ii or iii): i. geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the immediate future (within approximately 10 years). ii. there are very few occurrences, each of which is small and/or isolated and extremely vulnerable to known threatening processes.

Criteria	Definition
	iii. there may be many occurrences but total area is very small and each occurrence is small and/or isolated and extremely vulnerable to known threatening processes. C. The ecological community exists only as highly modified occurrences that may be capable of being rehabilitated if such work begins in the immediate future (within approximately 10 years).
Endangered (EN)	An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future. An ecological community will be listed as Endangered when it has been adequately surveyed and is not Critically Endangered but is facing a very high risk of total destruction in the near future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria (A, B, or C): A. The geographic range, and/or total area occupied, and/or number of discrete occurrences have been reduced by at least 70% since European settlement and either or both of the following apply (i or ii): i. the estimated geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is likely in the short-term future (within approximately 20 years). ii. modification throughout its range is continuing such that in the short-term future (within approximately 20 years) the community is unlikely to be capable of being substantially restored or rehabilitated. B. Current distribution is limited, and one or more of the following apply (i, ii or iii): i. geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the short-term future (within approximately 20 years). ii. there are few occurrences, each of which is small and/or isolated and all or most occurrences are very vulnerable to known threatening processes. iii. there may be many occurrences but total area is small and all or most occurrences are small and/or isolated and very vulnerable to known threatening processes. The ecological community exists only as very modified occurrences that may be capable of being substantially restored or rehabilitated if such work begins in the short-term future (within approximately 20 years).
Vulnerable (VU)	An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range. An ecological community will be listed as Vulnerable when it has been adequately surveyed and is not Critically Endangered or Endangered but is facing a high risk of total destruction or significant modification in the medium to long-term future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria (A, B or C): A. The ecological community exists largely as modified occurrences that are likely to be capable of being substantially restored or rehabilitated.

Criteria	Definition
	B. The ecological community may already be modified and would be vulnerable to threatening processes, is restricted in area and/or range and/or is only found at a few locations. C. The ecological community may be still widespread but is believed likely to move into a category of higher threat in the medium to long term future because of existing or impending threatening processes.
Priority Ecological Communities	
Priority One	**Poorly known ecological communities** Ecological communities with apparently few, small occurrences, all or most not actively managed for conservation (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) and for which current threats exist. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.
Priority Two	**Poorly known ecological communities** Communities that are known from few small occurrences, all or most of which are actively managed for conservation (e.g. within national parks, conservation parks, nature reserves, state forest, unallocated Crown land, water reserves, etc.) and not under imminent threat of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities, but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.
Priority Three	**Poorly known ecological communities** i. Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or. ii. Communities known from a few widespread occurrences, which are either large or within significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat, or. iii. Communities made up of large, and/or widespread occurrences, that may or may not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, and inappropriate fire regimes. Communities may be included if they are comparatively well known from several localities, but do not meet adequacy of survey requirements and / or are not well defined, and known threatening processes exist that could affect them.
Priority Four	**Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list**. These communities require regular monitoring. i. Rare. Ecological communities known from few occurrences that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change These communities are usually represented on conservation lands. ii. Near Threatened. Ecological communities that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable. iii. Ecological communities that have been removed from the list of threatened communities during the past five years.

Criteria	Definition
Priority Five	**Conservation Dependent Ecological Communities** Ecological Communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

Appendix C

Desktop Flora Assessment Results and Likelihood of Occurrence Assessments

Flora Database Search Results (DBCA Database Search using 15 Km Buffer, PMST 10 km buffer), Likelihood and Flora Survey Records

Species	Conservation Status		Source			Species information (WAH 2022)		Habitat Occurs Within the Survey Area	Pre-Survey Likelihood of Occurrence	Post-Survey Likelihood of Occurrence
	State	Federal	PMST	DBCA	Biota (2020)	Flowering Period	Preferred Habitat			
Acacia denticulosa	T			x		Sep-Oct	Sand, loam, clay. Granite outcrops, rarely on sandplains.	No	Low	Low
Caladenia huegelii	CR	EN		x		Sep-Oct	Grey or brown sand, clay loam.	Yes	Low	Low
Eremophila glabra* subsp. *chlorella	EN	EN	x	x		Jul-Nov	Sandy clay. Winter-wet depressions.	No	Low	Low
Eucalyptus rhodantha* var. *rhodantha	T			x		Jul or Sep-Dec or Jan	Grey/yellow/red sand over laterite. Undulating country, hillslopes.	No	Low	Low
Grevillea thelemanniana	T			x		May-Nov	Sand, sandy clay. Winter-wet low-lying flats.	No	Low	Low
***Hypocalymma* sp. Cascade (R. Bruhn 20/896 CAS)**	T			x		Aug	Sandy loam.	Yes	Low	Low
Macarthuria keigheryi	EN	EN	x	x		Sep-Dec or Feb-Mar	White or grey sand.	Yes	Low	Low
Morelotia australiensis	T			x					Low	Low
Conospermum undulatum	VU	VU	x	x		May-Oct	Grey or yellow-orange clayey sand.	No	Low	Low
Andersonia gracilis		EN		x		Sep-Nov	White/grey sand, sandy clay, gravelly loam. Winter-wet areas, near swamps.	No	Low	Low
Diuris drummondii		VU	x			Nov-Dec or Jan	Low-lying depressions, swamps.	No	Low	Low
Diuris purdiei		EN	x			Sep-Oct	Grey-black sand, moist. Winter-wet swamps.	No	Low	Low
Eleocharis keigheryi		VU	x			Aug-Nov	Clay, sandy loam. Emergent in freshwater: creeks, claypans.	No	Low	Low
***Synaphea* sp. Fairbridge Farm (D. Papenfus 696)**		CR	x			Oct	Sandy with lateritic pebbles. Near winter-wet flats, in low woodland with weedy grasses.	No	Low	Low
***Baeckea* sp. Limestone (N. Gibson & M.N. Lyons 1425)**	P1			x		Nov-Jan	Occurs on grey sand on limestone breakaways.	No	Low	Low
Bolboschoenus fluviatilis	P1			x		Oct-Dec	Scattered, in open swamps	No	Low	Low
***Calandrinia* sp. Bayswater (C. Andrews s.n. 11/1902)**	P1			x					Low	Low
Calandrinia uncinella	P1			x		Aug-Oct	Seasonally wet swamps or on saline river flats on ground or embankments just above water, growing in soils described as grey-brown sandy or silty loams or white to creamy sands over clays usually with poor drainage.	No	Low	Low
Drosera patens	P1			x		Dec or Feb	Sandy soils. Margins of winter-wet depressions, swamps and lakes.	No	Low	Low
Drosera* x *sidjamesii	P1			x		Nov-Dec or Jan-Mar	Peaty sand. Along lake margins, close to winter high-water line.	No	Low	Low
Eucalyptus* x *mundijongensis	P1			x			Loam. Paddocks.	No	Low	Low
Haloragis scoparia	P1			x					Low	Low
Hydrocotyle striata	P1			x			Clay. Springs.	No	Low	Low
Lepidium pseudohyssopifolium	P1			x		Jun-Sep	Swampy ground.	No	Low	Low
Levenhookia preissii	P1			x		Sep-Dec or Jan	Grey or black, peaty sand. Swamps.	No	Low	Low
Ptilotus sericostachyus subsp. roseus	P1			x		Sep-Dec			Low	Low
Acacia benthamii	P2			x		Aug-Sep	Sand. Typically on limestone breakaways.	No	Low	Low

Species	Conservation Status		Source			Species information (WAH 2022)		Habitat Occurs Within the Survey Area	Pre-Survey Likelihood of Occurrence	Post-Survey Likelihood of Occurrence
	State	Federal	PMST	DBCA	Biota (2020)	Flowering Period	Preferred Habitat			
Bossiaea modesta	P2			x		Oct-Dec	Soils derived from granite. Damp areas close to stream.	No	Low	Low
Calectasia grandiflora	P2			x		Jun-Nov	White, grey or yellow sand, sandy clay, gravel, laterite, granite. Swampy areas, rock outcrops, flats, slopes, ridges.	Yes	Low	Low
Calothamnus macrocarpus	P2			x		Feb or Apr or Aug-Dec	Rocky quartzite soils, sand. Slopes.	No	Low	Low
Chamelaucium floriferum **subsp. *diffusum***	P2			x		Aug-Oct	Grey sand or shallow loam. Granite hills & outcrops.	No	Low	Low
Eucalyptus educta	P2			x		Apr	Shallow soils. Granite rocks.	No	Low	Low
Fabronia hampeana	P2			x					Low	Low
Grevillea ornithopoda	P2			x					Low	Low
Hypocalymma inopinatum	P2			x		Sep-Nov	Shallow white sandy soil on the crest of a low hill or moderate slope.	No	Low	Low
Johnsonia pubescens subsp. cygnorum	P2			x		Sep	Grey-white-yellow sand. Flats, seasonally wet sites.	No	Low	Low
Melaleuca viminalis	P2			x					Low	Low
Poranthera moorokatta	P2			x					Low	Low
Thelymitra variegata	P2			x		Jun-Sep	Sandy clay, sand, laterite.	No	Low	Low
Thysanotus **sp. Badgingarra (E.A. Griffin 2511)**	P2			x		Dec	Grey sand with lateritic gravel.	No	Low	Low
Acacia horridula	P3			x		May-Aug	Gravelly soils over granite, sand. Rocky hillsides.	No	Low	Low
Angianthus micropodioides	P3			x		Nov-Dec- or Jan-Feb	Saline sandy soils. River edges, saline depressions, claypans.	No	Low	Low
Austrostipa mundula	P3			x		Oct-Nov	Sandy soils in mallee-scrub and in low woodland. Isolated occurrence on limestone.	No	Low	Low
Babingtonia urbana	P3			x			Brown clay over ironstone. Heath of *Calothamnus hirsutus, Jacksonia, Melaleuca* and *Baeckea emergent*.	No	Low	Low
Beyeria cinerea **subsp. *cinerea***	P3			x			White to brown/grey sand over limestone on upper slopes and ridges	No	Low	Low
Byblis gigantea	P3			x		Sep-Dec or Jan	Sandy-peat swamps. Seasonally wet areas.	No	Low	Low
Carex tereticaulis	P3			x		Sep-Oct	Black peaty sand.	No	Low	Low
Conostylis bracteata	P3			x		Aug-Sep	Sand, limestone. Consolidated sand dunes.	No	Low	Low
Cyathochaeta teretifolia	P3			x		Jan	Grey sand, sandy clay. Swamps, creek edges.	No	Low	Low
Dampiera triloba	P3			x		Aug-Dec	Loamy sand in lower lying areas.	No	Low	Low
Dicrastylis micrantha	P3			x		Sep-Dec	Red sand. Sandplains.	No	Low	Low
Dillwynia dillwynioides	P3			x		Aug-Dec	Sandy soils. Winter-wet depressions.	No	Low	Low
Eryngium pinnatifidum **subsp. *palustre* (G.J. Keighery 13459)**	P3			x		Oct-Nov	Clay, sandy clay. Claypans,seasonally wet flats	No	Low	Low
Eryngium **sp. Subdecumbens (G.J. Keighery 5390)**	P3			x		Oct-Nov	Clay, grey sand. Seasonally wet flats, claypans, swamps	No	Low	Low
Hibbertia leptotheca	P3			x		Jul-Oct	Sand. Near-coastal limestone ridges, outcrops & cliffs.	No	Low	Low

Species	Conservation Status		Source			Species information (WAH 2022)		Habitat Occurs Within the Survey Area	Pre-Survey Likelihood of Occurrence	Post-Survey Likelihood of Occurrence
	State	Federal	PMST	DBCA	Biota (2020)	Flowering Period	Preferred Habitat			
***Hypocalymma* sp. Nambung (R. Spjut & R. Smith s.n. 22/09/1992)**	P3			x					Low	Low
Isopogon autumnalis	P3			x		Feb-May	Sandy soils, often in *Banksia* woodlands.	Yes	Low	Low
Jacksonia gracillima	P3			x					Low	Low
Lasiopetalum glutinosum subsp. glutinosum	P3			x					Low	Low
Lasiopetalum membranaceum	P3			x		Sep-Dec	Sand over limestone.	No	Low	Low
Meionectes tenuifolia	P3			x					Low	Low
Myriophyllum echinatum	P3			x		Nov	Winter-wet flats.	No	Low	Low
Pimelea calcicola	P3			x		Sep-Nov	Sand. Coastal limestone ridges.	No	Low	Low
Platysace ramosissima	P3			x		Oct-Nov	Sandy soils.	Yes	Low	Low
Schoenus benthamii	P3			x		Oct-Nov	White, grey sand, sandy clay. Winter-wet flats, swamps.	No	Low	Low
Schoenus capillifolius	P3			x		Oct-Nov	Brown mud. Claypans.	No	Low	Low
Schoenus pennisetis	P3			x		Aug-Sep	Grey or peaty sand, sandy clay. Swamps, winter-wet depressions.	No	Low	Low
***Schoenus* sp. Waroona (G.J. Keighery 12235)**	P3			x		Oct-Nov	Clay or sandy clay. Winter-wet flats.	No	Low	Low
Stylidium aceratum	P3			x		Oct-Nov	Sandy soils. Swamp heathland.	No	Low	Low
Stylidium maritimum	P3			x		Sep-Nov	Sand over limestone. Dune slopes and flats. Coastal heath and shrubland, open Banksia woodland.	No	Low	Low
Stylidium paludicola	P3			x		Oct-Nov	Peaty sand over clay. Winter wet habitats. Marri and Melaleuca woodland, Melaleuca shrubland.	No	Low	Low
Styphelia filifolia	P3			x					Low	Low
Aponogeton hexatepalus	P4			x		Jul-Oct	Mud. Freshwater: ponds, rivers, claypans.	No	Low	Low
Calothamnus graniticus* subsp. *leptophyllus	P4			x		Jun-Aug	Clay over granite, lateritic soils. Hillsides	No	Low	Low
Cyanothamnus tenuis	P4			x		Aug-Dec	Laterite and granite in stony soils.	No	Low	Low
Dodonaea hackettiana	P4			x		Jul-Oct	Sand. Outcropping limestone.	No	**Medium**	Low
Drosera occidentalis	P4			x		Oct-Dec or Jan	Sandy & clayey soils. Swamps & wet depressions.	No	Low	Low
Eucalyptus caesia* subsp. *caesia	P4			x		May-Sep	Loam. Granite outcrops.	No	Low	Low
Eucalyptus caesia* subsp. *magna	P4			x		May-Sep	Loam. Granite outcrops.	No	Low	Low
Eucalyptus foecunda* subsp. *foecunda	P4			x					Low	Low
Eucalyptus kruseana	P4			x		Jun-Sep	Sandy loam. Granite outcrops & hills.	No	Low	Low
Grevillea pimeleoides	P4			x		May-Nov	Gravelly soils over granite. Rocky hillsides.	No	Low	Low
Hydrocotyle lemnoides	P4			x		Aug-Oct	Swamps.	No	Low	Low
Hypolaena robusta	P4			x		Sep-Oct	White sand. Sandplains.	No	Low	Low
Jacksonia sericea	**P4**			**x**	**x**	**Dec or Jan-Feb**	**Calcareous & sandy soils.**	**No**	**High**	**Recorded**
Ornduffia submersa	P4			x					Low	Low
Schoenus natans	P4			x		Oct	Winter-wet depressions.	No	Low	Low
Stylidium longitubum	P4			x		Oct-Dec	Sandy clay, clay. Seasonal wetlands.	No	Low	Low

Species	Conservation Status		Source			Species information (WAH 2022)		Habitat Occurs Within the Survey Area	Pre-Survey Likelihood of Occurrence	Post-Survey Likelihood of Occurrence
	State	Federal	PMST	DBCA	Biota (2020)	Flowering Period	Preferred Habitat			
***Tripterococcus* sp. Brachylobus (A.S. George 14234)**	P4			x			Grey, black or peaty sand winter-wet flats.	No	Low	Low
Verticordia lindleyi* subsp. *lindleyi	P4			x		Mar or Nov - Dec or Jan	Sand, sandy clay. Winter-wet depressions.	No	Low	Low

Appendix D
Relevé Data Sheet

Flora Site Sheet			
Project Name	A22.078		
Site	KPR01		
Location	MGA 50	388328 mE	6461979 mN
Described By	Ciaran Gibson		
Date	15 December 2022		
Type	Releve (unbounded sampling site)		
Landform	Lower Slope		
Slope	Gentle		
Rock Type	None		
Soil Type	Sand		
Soil Colour	Grey		

Vegetation	*Allocasuarina fraseriana* low open forest over *Banksia menzesii, Jacksonia furcellata* low open woodland over *Hakea amplexicaulis, Acacia saligna* sparse shrubland over mixed weedy sparse grassland and forbland.

Condition	Completely Degraded - Good	Disturbance	Weeds, previous clearing, rubbish, tracks, adjacent busy road.
Fire Age	<10		

SPECIES LIST

Taxon	Cover (%)	Notes
Acacia saligna	3	
Allocasuarina fraseriana	10	
Avena barbata	2	*
Avena fatua	1	*
Banksia menzesii	12	
Banksia prionotes	2	
Banksia sessilis		
Briza maxima	2	*
Desmocladus asper	+	
Dianella revoluta	+	
**Ehrharta longiflora*		*
Eucalyptus marginata		

Flora Site Sheet		
Hakea amplexicaulis	1	
Jacksonia furcellata	1	
Jacksonia sericea	+	P4
Lomandra sp.	+	
Macrozamia riedlei	+	
Mesomelaena pseudostygia	+	
Phyllanthus calycinus	+	
Ptilotus polystachyus	+	
**Sonchus asper*	+	*

Appendix E
Flora Inventory

Family	Taxon Name	Conservation Status
Amaranthaceae	*Ptilotus polystachyus*	
Asparagaceae	**Asparagus asparagoides*	Declared Pest
Asparagaceae	*Lomandra* sp.(sterile)	
Asparagaceae	*Thysanotus manglesianus*	
Asparagaceae	*Thysanotus sparteus*	
Asteraceae	**Gazania linearis*	
Asteraceae	**Hypochaeris glabra*	
Asteraceae	**Sonchus asper*	
Casuarinaceae	*Allocasuarina fraseriana*	
Cyperaceae	*Mesomelaena pseudostygia*	
Dilleniaceae	*Hibbertia hypericoides*	
Fabaceae	*Acacia pulchella*	
Fabaceae	*Acacia saligna*	
Fabaceae	*Acacia willdenowiana*	
Fabaceae	*Gompholobium tomentosum*	
Fabaceae	*Hardenbergia comptoniana*	
Fabaceae	*Hovea sp.*	
Fabaceae	*Jacksonia furcellata*	
Fabaceae	*Jacksonia sericea*	P4
Fabaceae	*Kennedia prostrata*	
Goodeniaceae	*Scaevola repens var. repens*	
Haemodoraceae	*Anigozanthos manglesii*	
Hemerocallidaceae	*Dianella revoluta*	
Hemerocallidaceae	*Tricoryne elatior*	
Myrtaceae	*Corymbia calophylla*	
Myrtaceae	*Eremea pauciflora*	
Myrtaceae	*Eucalyptus marginata*	
Phyllanthaceae	*Phyllanthus calycinus*	
Poaceae	**Avena barbata*	
Poaceae	**Avena fatua*	
Poaceae	**Briza maxima*	
Poaceae	**Ehrharta longiflora*	
Proteaceae	*Banksia menzesii*	
Proteaceae	*Banksia prionotes*	
Proteaceae	*Banksia sessilis*	
Proteaceae	*Hakea amplexicaulis*	
Proteaceae	*Stirlingia latifolia*	
Restionaceae	*Desmocladus asper*	
Xanthorrhoeaceae	*Xanthorrhoea preissii*	
Zamiaceae	*Macrozamia riedlei*	

Appendix F
Locations of Priority Flora and Declared Pest

Species	Conservation Status	Location (GDA2020 / MGA50)		Within Impact Area
		Easting	Northing	
Jacksonia sericea	P4	388349.4907	6462880.896	-
Jacksonia sericea	P4	388329.6844	6461971.824	-
Jacksonia sericea	P4	388329.5828	6462162.939	-
Jacksonia sericea	P4	388329.4835	6461978.41	-
Jacksonia sericea	P4	388329.3882	6462196.668	-
Jacksonia sericea	P4	388329.0294	6462198.631	-
Jacksonia sericea	P4	388328.7589	6462162.223	-
Jacksonia sericea	P4	388328.4864	6462217.971	-
Jacksonia sericea	P4	388328.3843	6462161.999	-
Jacksonia sericea	P4	388328.336	6462200.252	-
Jacksonia sericea	P4	388328.1561	6461992.893	Yes
Jacksonia sericea	P4	388328.0476	6462180.712	-
Jacksonia sericea	P4	388327.979	6462145.894	-
Jacksonia sericea	P4	388327.928	6462214.933	-
Jacksonia sericea	P4	388326.6383	6462206.115	-
Jacksonia sericea	P4	388326.4506	6462025.553	Yes
Jacksonia sericea	P4	388326.3836	6462152.49	-
Jacksonia sericea	P4	388326.2901	6462148.591	-
Jacksonia sericea	P4	388326.1978	6462224.171	-
Jacksonia sericea	P4	388325.9593	6462162.694	-
Jacksonia sericea	P4	388325.8016	6462272.351	-
Jacksonia sericea	P4	388325.7069	6462187.185	-
Jacksonia sericea	P4	388325.6928	6462242.541	-
Jacksonia sericea	P4	388325.6632	6462229.936	-
Jacksonia sericea	P4	388325.5782	6462196.021	Yes
Jacksonia sericea	P4	388325.4746	6462192.533	Yes
Jacksonia sericea	P4	388324.9557	6462197.555	Yes
Jacksonia sericea	P4	388324.9235	6462291.503	-
Jacksonia sericea	P4	388324.892	6462311.967	-
Jacksonia sericea	P4	388324.7863	6462183.382	Yes
Jacksonia sericea	P4	388324.7383	6462262.924	-
Jacksonia sericea	P4	388324.6287	6462236.919	-
Jacksonia sericea	P4	388324.4586	6462291.917	-
Jacksonia sericea	P4	388324.0209	6462169.618	Yes

Species	Conservation Status	Location (GDA2020 / MGA50)		Within Impact Area
		Easting	Northing	
Jacksonia sericea	P4	388323.4905	6462268.731	Yes
Jacksonia sericea	P4	388323.2769	6462424.31	-
Jacksonia sericea	P4	388323.1052	6462322.692	Yes
Jacksonia sericea	P4	388322.6629	6462277.669	Yes
Jacksonia sericea	P4	388321.8446	6462460.924	-
Jacksonia sericea	P4	388320.5698	6462467.808	Yes
Jacksonia sericea	P4	388319.5795	6462550.341	-
Jacksonia sericea	P4	388319.0473	6462733.205	-
Jacksonia sericea	P4	388319.0015	6462729.066	-
Jacksonia sericea	P4	388318.8311	6462545.179	Yes
**Asparagus asparagoides*	Declared Pest	388331.4494	6462121.225	
**Asparagus asparagoides*	Declared Pest	388330.564	6462334.047	
**Asparagus asparagoides*	Declared Pest	388325.8016	6462272.351	
**Asparagus asparagoides*	Declared Pest	388324.4287	6462333.064	
**Asparagus asparagoides*	Declared Pest	388323.3003	6462334.312	
**Asparagus asparagoides*	Declared Pest	388323.2913	6462408.005	
**Asparagus asparagoides*	Declared Pest	388322.7898	6462403.184	
**Asparagus asparagoides*	Declared Pest	388322.6279	6462433.92	
**Asparagus asparagoides*	Declared Pest	388322.4049	6462410.96	
**Asparagus asparagoides*	Declared Pest	388322.387	6462384.013	
**Asparagus asparagoides*	Declared Pest	388322.1432	6462468.568	
**Asparagus asparagoides*	Declared Pest	388320.8505	6462365.809	
**Asparagus asparagoides*	Declared Pest	388320.0996	6462588.903	
**Asparagus asparagoides*	Declared Pest	388319.9217	6462363.537	
**Asparagus asparagoides*	Declared Pest	388319.8263	6462470.99	
**Asparagus asparagoides*	Declared Pest	388319.3707	6462566.255	
**Asparagus asparagoides*	Declared Pest	388318.0238	6462592.623	
**Asparagus asparagoides*	Declared Pest	388317.4433	6462403.695	
**Asparagus asparagoides*	Declared Pest	388316.4475	6462383.967	

Appendix G
Potential Black Cockatoo Breeding Habitat

Tree number	Species	DBH (mm)	Hollow notes	Tree Health	Location (GDA2020 / MGA50)		Corresponding Tree Identified by Arborist Survey (as provided by WSP)
					Easting	Northing	
1	Marri	120	None	Healthy	388352.2044	6461956.078	
2	Marri	83	None	Healthy	388328.9847	6462048.381	
3	Marri	75	None	Healthy	388332.0663	6462048.749	
4	**Marri**	**55**	**None**	**Healthy**	**388330.3785**	**6462047.532**	**24: Remove**
6	Jarrah	55	None	Healthy	388332.2325	6462195.405	
8	Marri	70	None	Healthy	388323.9998	6462336.96	9: Retain
9	Marri	70	None	Healthy	388321.1861	6462363.338	
10	Marri	80	None	Healthy	388322.5999	6462442.237	
11	Marri	100	None	Healthy	388318.0238	6462592.623	
12	Marri	100	None	Healthy	388320.2932	6462632.215	5: Retain
13	Jarrah	120	None	Healthy	388340.7676	6462858.654	3: Retain
14	Jarrah	70	None	Healthy	388331.2818	6462819.975	4: Retain
15	Jarrah	120	None	Healthy	388321.0871	6462662.814	
16	Jarrah	110	None	Healthy	388325.6178	6462269.605	10: Retain
17	Jarrah	50	None	Healthy	388331.1589	6462162.719	

Appendix H

Tree Impact

Tree ID	Taxon	Potential impact	Conservation value	Within Impact Area
Monash Avenue to Aberdare Road				
1	*Acacia saligna*	Requires careful management during construction		
2	*Allocasuarina fraseriana*	Requires careful management during construction		
3	*Eucalyptus marginata*	Requires careful management during construction	Potential Black-Cockatoo breeding habitat; DBH 120 cm.	
4	*Eucalyptus marginata*	Requires careful management during construction	Potential Black-Cockatoo breeding habitat; DBH 70 cm.	
5	*Corymbia calophylla*	Requires careful management during construction	Potential Black-Cockatoo breeding habitat; DBH 100 cm.	
6	*Allocasuarina fraseriana*	Requires careful management during construction		
7	*Jacksonia fusiana*	Requires careful management during construction		
8	*Banksia sessilis*	Requires removal	Characteristic species of TEC; Black-Cockatoo foraging habitat.	
9	*Corymbia calophylla*	Requires careful management during construction	Potential Black-Cockatoo breeding habitat; DBH 70 cm.	
10	*Eucalyptus marginata*	Requires careful management during construction	Potential Black-Cockatoo breeding habitat; DBH 100 cm.	
Poole Avenue to Monash Avenue				
11	*Hakea* sp.	Requires removal		
12	*Hakea* sp.	Requires removal		
13	*Hakea* sp.	Requires removal		Yes
14	*Banksia attenuata*	Requires careful management during construction	Characteristic species of TEC; Black-Cockatoo foraging habitat.	
15	*Hakea* sp.	Requires removal		
16	*Banksia menziesii*	Requires removal	Characteristic species of TEC; Black-Cockatoo foraging habitat.	
17	*Banksia attenuata*	Requires careful management during construction	Characteristic species of TEC; Black-Cockatoo foraging habitat.	

Tree ID	Taxon	Potential impact	Conservation value	Within Impact Area
18	*Allocasuarina fraseriana*	Requires removal		
19	*Banksia attenuata*	Requires careful management during construction	Characteristic species of TEC; Black-Cockatoo foraging habitat.	
20	*Acacia saligna*	Requires removal		
21	*Banksia attenuata*	Requires careful management during construction	Characteristic species of TEC; Black-Cockatoo foraging habitat.	
22	*Banksia attenuata*	Requires removal	Characteristic species of TEC; Black-Cockatoo foraging habitat.	
23	*Banksia sessilis*	Requires removal	Characteristic species of TEC; Black-Cockatoo foraging habitat.	
24	***Corymbia calophylla***	**Requires removal**	**Potential Black-Cockatoo breeding habitat tree; DBH 55 cm.**	**Yes**
25	*Allocasuarina fraseriana*	Requires careful management during construction		
26	*Allocasuarina fraseriana*	Requires careful management during construction		
27	*Jacksonia fusiana*	Requires removal		
28	*Banksia menziesii*	Requires removal	Characteristic species of TEC; Black-Cockatoo foraging habitat.	Yes
29	*Jacksonia fusiana*	Requires removal		
30	*Acacia saligna*	Requires removal		
31	*Banksia menziesii*	Requires removal	Characteristic species of TEC; Black-Cockatoo foraging habitat.	
32	*Acacia saligna*	Requires removal		
University Hall to Poole Avenue				
33	*Agonis flexuosa*	Requires careful management during construction	Planted; not native	
34	*Platanus x acerifolia*	Requires careful management during construction	Planted; not native	
35	*Platanus x acerifolia*	Requires careful management during construction	Planted; not native	

Tree ID	Taxon	Potential impact	Conservation value	Within Impact Area
36	*Platanus x acerifolia*	Requires careful management during construction	Planted; not native	
37	*Platanus x acerifolia*	Requires careful management during construction	Planted; not native	
38	*Platanus x acerifolia*	Requires careful management during construction	Planted; not native	
39	*Platanus x acerifolia*	Requires careful management during construction	Planted; not native	
40	*Platanus x acerifolia*	Requires careful management during construction	Planted; not native	
41	*Platanus x acerifolia*	Requires careful management during construction	Planted; not native	
42	*Platanus x acerifolia*	Requires careful management during construction	Planted; not native	
43	*Platanus x acerifolia*	Requires careful management during construction	Planted; not native	