

# Hydrogen Refueller @H2Perth NVCP Supporting Document

PE0006RH0000002

Revision 1

July 2023

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# 1 INTRODUCTION

Woodside Energy Technologies Pty Ltd (Woodside) is proposing to develop the Hydrogen Refueller @H2Perth (H2Refueller Project), a self-contained hydrogen production, storage and refuelling facility in the Rockingham Industry Zone (RIZ).

In August 2022, the H2Refueller Project was announced as the successful EOI application in the A\$10 million Hydrogen Fuelled Transport Program (HFT Program), an initiative of the Department of Jobs, Tourism, Science and Innovation (JTSI). Eligibility criteria provided as part of the EOI required that applicants must complete the project (Design, Planning, Approvals and Construction) by end 2024. Subject to regulatory approvals construction is planned to commence by late Q4 2023 or early Q1 2024 at the latest to ensure commitments in the application are met (e.g delivery by end 2024).

The H2Refueller Project is proposed to be located within an approximate 1.24 ha portion of vacant industrial land, currently part of a 130 ha area under an Option to Lease Agreement for Woodside's proposed H2Perth hydrogen and ammonia production facility.

Within the 1.24 ha portion of vacant industrial land (the Development Envelope), the total area of native vegetation required to be cleared is up to 1.12 ha.

The objectives of the H2Refueller Project are to:

- supply low-cost hydrogen from renewable electricity to local customers;
- generate interest and learnings in hydrogen as a fuel and aid general community awareness of, and comfort with, hydrogen production;
- stimulate and enable hydrogen demand in Western Australia (WA); and
- support State Government objectives for hydrogen to be a significant fuel source for transportation by 2030.

The H2Refueller Project plans to use electricity sourced from the South-West Interconnected System (SWIS) and procurement of Renewable Energy Certificates (RECs).

## 1.1 Rockingham Industry Zone Approvals History

### 1.1.1 State approval

The H2Refueller Project is proposed to be located within the RIZ. In 2004, the areas of the RIZ with significant environmental features were referred by Landcorp (now DevelopmentWA) to EPA as a Strategic Environmental Assessment under Section 38 of the EP Act. The EPA assessed the Proposal as a strategic proposal at the level of Public Environmental Review and published its report in April 2011 (Report 1390).

The RIZ Strategic Environmental Assessment (SEA) was subsequently approved by the Minister for the Environment in May 2011 through Ministerial Statement (MS) 863. MS 863 states that it is expected that future proposals that may be considered by the EPA under this SEA as 'derived' proposals include subdivision for industrial purposes and the provision of infrastructure. Since the original publication of MS 863, four derived proposals for subdivision have been approved.

Approved Derived Proposals 1, 2 and 4 do not extend over with the H2Refueller Development Envelope. However, Derived Proposal 3 represented a super-lot subdivision over the remainder of the RIZ including the H2Refueller Development Envelope. In 2016, a subsequent Ministerial Statement (MS 1043) amended the conditions in the original proposal (MS 863) as relevant for Derived Proposal 3.

The authorisation to implement Derived Proposal 3 in accordance with MS 1043 (published 6 December 2016) has since lapsed as the Proposal had not yet commenced.

*The authorisation to implement a derived proposal provided for in this statement (MS 863) shall lapse and be void five years after the declaration of the Environmental Protection Authority under section 39B(3) of the Environmental Protection Act 1986 that the proposal is a derived proposal*

Woodside understands that DevelopmentWA is intending to submit a new Derived Proposal 5 to replace Derived Proposal 3, which is intended to cover the same area within the RIZ SEA. However, given DevelopmentWA are unlikely to have approval to clear prior to planned ground disturbance for the H2Refueller Project, Woodside intends to obtain separate approvals to clear the Refueller Development Envelope (this NVCP).

### 1.1.2 Commonwealth approval

Due to the presence of MNES within the RIZ, the proposed RIZ SEA development was referred to the then Department of Sustainability, Environment, Water, Population and Communities (DSEWPac), now DCCEEW, under the EPBC Act<sup>1</sup>. The referral was for clearing native vegetation to create industrial development sites and retaining a core 78 ha conservation area that supports the key environmental factors of the RIZ site.

The proposed development was assessed as a Controlled Action (EPBC 2010/5337) and was approved on 30 November 2011. The controlled provision related to listed threatened species and communities: Sedgeland in Holocene dune swales of the southern Swan Coastal Plain threatened ecological community (TEC) and black cockatoo habitat.

Variations to the conditions attached to EPBC 2010/5337 were made in 2014 and 2016. The 2016 variation outlined a new SEA area based on the expired Derived Proposal 3. The H2Refueller Project is proposed to lie within this new SEA area. While clearing activities for the Refueller Development Envelope are already approved in accordance with EPBC 2010/5337, given Woodside intends to clear this land a separate EPBC referral will be submitted for the project in parallel to this NVCP.

### 1.1.3 Offsets

Woodside understands that the proposed Derived Proposal 5 would seek to use the existing State Offsets Package and associated Conservation Area, given it is already being implemented for the RIZ SEA. The key environmental factor considered relevant to the original proposal (MS 863) was conservation values and protection of the Sedgeland in Holocene dune swales of the southern Swan Coastal Plain TEC and associated wetlands. As such, DevelopmentWA (then Landcorp) proposed to establish a conservation area that contains areas of the highest environmental value within the SEA, including the most viable long-term TEC and wetlands in the extent of the SEA. This became a managed offset area known as the Conservation Area.

All State Ministerial Conditions relating to offsets (MS 863, Condition 7) and the associated Conservation Area (MS 1043, Condition 5) are being implemented in compliance with the approved Offsets Package.

A Commonwealth Offsets Management Package that includes many commonalities with the State Offsets Package is also being implemented in compliance with the EPBC Act Controlled Action 2010/5337 and subsequent variations, specifically Conditions 10, 11 and 14 (DevelopmentWA, 2021b). The Commonwealth Offsets Management package in accordance with Controlled Action 2010/5337 is still current for the H2Refueller Development Envelope.

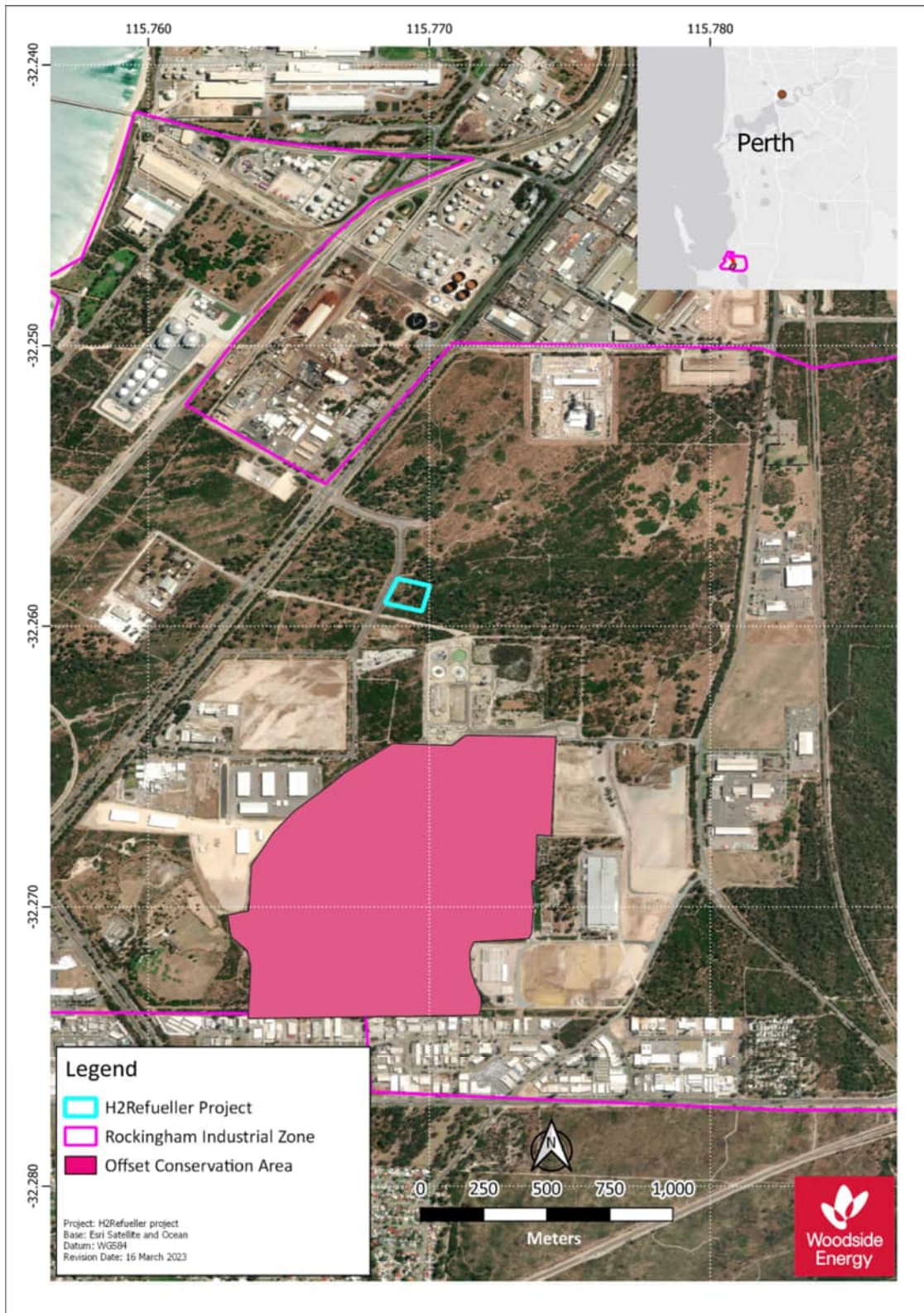
<sup>1</sup> The Commonwealth process was initiated separate to the State Approvals process as there was no bilateral agreement at that time

## 2 PROPOSED LOCATION AND LAND TENURE

### 2.1 Location

The Development Envelope of the proposed H2Refueller Project is planned to occupy an area of approximately 1.24 ha located on Lot 149 on Plan P068599 off Alumina Road in the City of Rockingham (Figure 2-1). The Development Envelope is the same area as the Prescribed Premises detailed in the Works Approval Application. The total area to be cleared is up to 1.12 ha.

While currently proposed to be located on part of the H2Perth Option to Lease area, Woodside and DevelopmentWA intend to excise the portion of land required for the H2Refueller Project and place it under a separate lease Agreement between DevelopmentWA and Woodside.



**Figure 2-1: Proposed location of the Hydrogen Refueller @H2Perth Project and existing Offset Conservation Area**

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## 2.2 Site Selection

In line with prospective customer conversations, Woodside initially started searching a wide geographic area to locate the proposed H2Refueller Project and looked at land as far south as Mandurah. However, after assessing the customer prospects against the timeframes of the HFT Program, Woodside identified that the proposed H2 Refueller Project needed to be established closer to industrial customers in the Rockingham and Kwinana areas, and there would be schedule advantages to progressing a facility within the existing O2L parcel.

For diligence, the geographic search focused on an area within 2 km of Rockingham. Noting existing constraints such as proximity to residential receptors, Woodside identified multiple sites both within the O2L and outside the RIZ for further investigation. Woodside reviewed each option and engaged with key stakeholders (including DEVWA) who recommended that Woodside avoid sites outside of the RIZ due to potential impacts arising from increased traffic use and requirements for specific infrastructure connections.

Woodside has an existing OTL in place with DevelopmentWA for development of 130 ha of land within the RIZ for the purpose of determining whether the land is suitable for a New Energy Technology Hub to produce hydrogen. Given the scarcity of available industrial land and the previous and current environmental approvals held by DevelopmentWA over the RIZ (Section 1.1), Woodside moved forward with the RIZ as the location for the proposed H2 Refueller Project. Woodside has sought to validate the assumptions that environmental and social impacts were acceptable in accordance with approvals granted to DevelopmentWA for the RIZ by completing environmental field baseline studies and a number of other desktop studies to inform this NVCP.

Woodside reviewed the proposed H2 Refueller Project design to identify if it could be constructed around existing tuarts and further minimise the environmental impacts. However, it is within a designated bushfire prone area as per the WA Map of Bush Fire Prone Areas, that requires certain mitigations to be in place. In addition to this, the proposed H2 Refueller Project is assessed as a “high-risk land use” under SPP 3.7 and the Guidelines with modelling indicating that all vegetation onsite (including Tuarts) must be cleared to achieve acceptable Bushfire Attack Levels.

## 2.3 Project Definition

The proposed H2Refueller Project is one of a number of new energy opportunities that Woodside is currently progressing within its portfolio. This project, in collaboration with the WA Government, aims to promote the future adoption of low-cost renewable hydrogen for customers. The H2Refueller Project is proposed to be located adjacent to another proposed Woodside new energy project called H2Perth which aims to develop a domestic and export scale hydrogen and ammonia production facility within the RIZ.

Woodside acknowledges that H2Perth is a significant project, that is proposed to be subject to primary approvals under Part IV of the *Environmental Protection Act 1986* (EP Act) and the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The H2Refueller Project and H2Perth are separate projects. The H2Refueller Project is proposed to have a separate lease to H2Perth and does not require H2Perth to proceed to enable the project outcomes to be delivered. The H2Refueller Project will also have separate power, water and wastewater disposal connections to enable this project to meet government driven timelines.

The H2Perth project will consider the cumulative impacts within the RIZ associated with this H2Refueller Project.

## 2.4 Facility Overview

The entire Development Envelope is required to be cleared to ensure risks associated with bushfires are sufficiently mitigated. Key components of the project are planned as follows:

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- **Water treatment package.** Once the feed water is treated, the high-quality water feedstock is then transferred to the electrolyser and the wastewater is transferred to waste storage. Further information regarding water use onsite is provided below. The water treatment system will comprise of a de-mineralisation or reverse osmosis process that removes imperfections and impurities from the water feedstock.
- **Electrolyser.** The electrolyser receives the high-quality feed water and produces hydrogen and oxygen through electrolysis using power sourced from the South West Interconnected System. Hydrogen is then transferred to a compressor whilst oxygen is routed to an onsite vent.
- **Hydrogen compression.** Once generated, hydrogen is then compressed with increased pressure and reduced volume, to enable a greater amount of hydrogen to be stored in the system and to suit the standard pressures for hydrogen refuelling. Hydrogen is stored at various pressures within the system, with a total inventory of approximately an efficient flow of gas for dispensing. Once compressed, the hydrogen is transferred to onsite storage tanks that cumulatively store a total volume in the order of 1500 kg.
- **H2 Vent.** A single ~9 metre (m) vent stack is proposed to be installed onsite. The vent stack will comprise a small diameter pipe that will be secured and stabilised through tensioned cables. The Hydrogen vent stacks is located on the Electrolyser skid. The onsite vent is designed to ensure that sufficient dispersion is achieved to meet safety requirements.
- **Warehouse, offices and ablutions.** To support the operation of the H2Refueller Project, a number of subsidiary buildings will be built. These include a warehouse, office buildings and ablutions. Ablutions are planned to be connected to a septic tank with no discharges anticipated from the warehouse and offices.
- **Wastewater storage.** Once treated, wastewater is transferred to storage tanks for removal offsite or onsite irrigation (depending on water quality specification). Wastewater will comprise of treated feedstock (water with higher concentrations of salts and trace concentrations of treatment chemicals such as oxygen scavenger, corrosion inhibitor, etc.) and wastewater from the electrolysis process. Water will be kept in ~ 13 m<sup>3</sup> storage tanks of plastic material to prevent corrosion. No bunding is planned.

### 3 STAKEHOLDER CONSULTATION

Woodside strives to build and maintain respectful relationships that celebrate the culture and values of its host communities and generate positive social and economic outcomes.

Woodside's approach to stakeholder engagement is guided by its Sustainable Communities Policy, Human Rights Policy, Social Performance Framework, Our Values and First Nations Communities Policy.

Woodside implements this guidance through a localised model for the communities where it is active. Impact assessments and engagement plans are fit-for-purpose to reflect the nature, scale and impact of the proposed activities.

For the initial phase of the H2Refueller Project, Woodside has focused on:

- **Direct engagement.** Using stakeholder identification completed for the proposed H2Perth Project and augmented by the HFT Program requirements, Woodside has prepared, delivered and distributed H2Refueller Project briefings and slide packs in line with Table 3-1.
- **Public information.** Following the outcome of the HFT Program and EOI process, [Woodside](#) and the [WA Government](#) issued announcements and concept imagery at a launch event in August 2022.

**Table 3-1: Stakeholder consultation for the H2Refueller Project**

Stakeholder	Date	Outcomes of Consultation
City of Kwinana – Mayor and CEO	August 2022 to present	<ul style="list-style-type: none"> <li>• City of Kwinana understood that the H2Refueller Project would be taking place wholly within the City of Rockingham, and that it is a separate project to H2Perth.</li> <li>• Expressed interest in the potential for City waste trucks to run on hydrogen and make use of the facility.</li> </ul>
City of Rockingham (CoR) – Council and Executive officer session	6 June 2023	<ul style="list-style-type: none"> <li>• CoR understood that the H2Refueller Project would be taking place wholly within the City of Rockingham, and that it is a separate project to H2Perth.</li> <li>• CoR understood that the H2Refueller Project would be progressed on an earlier timeframe than H2Perth, with a different end product (gaseous hydrogen) and different target markets (local, heavy industry – including waste trucks).</li> <li>• CoR confirmed the planning department remains the principal interface for the H2Refueller Project, including progress on the Development Application (DA).</li> </ul>
City of Rockingham (CoR) Planning Department	November 2022 to present	<ul style="list-style-type: none"> <li>• CoR advised H2Refueller Project would trigger a mandatory Joint Development Assessment Panel (JDAP) determination of the Development Application (DA).</li> <li>• Discussed timing of the DA submission, approximately 1-2 months after submitting this Part V Works Approval application, with the suggestion to review a draft.</li> <li>• Discussed Woodside's engagement with DFES regarding bushfire management and the Bushfire Management Plan also supporting the DA.</li> <li>• Discussed the need for a traffic impact assessment consistent with WA Planning Commission guidelines.</li> <li>• Requested a stormwater management plan be developed.</li> </ul>
Department of Climate Change, Energy, the Environment and Water (DCCEEW)	December 2022 to present	<ul style="list-style-type: none"> <li>• DCCEEW understood that the H2Perth project is a separate project to the H2Refueller.</li> <li>• General discussion around approval strategy and referrals</li> </ul>

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Stakeholder	Date	Outcomes of Consultation
Department of Fire and Emergency Services (DFES)	September 2022 to present	<ul style="list-style-type: none"> <li>Discussed the Bushfire Attack levels (BAL) recommended by Bushfire consultant (Linfire Consultancy)</li> <li>Sought alignment on local planning rules and bushfire risk management measures</li> <li>Sought comments and recommendations on the proposed plant layout aiming to comply with bushfire risk assessment and local planning rules</li> <li>Presented the strategy to clear as a mitigation measure to safety risks posed by presence of vegetation in this bushfire prone area</li> <li>Prior review of emergency management plans</li> </ul>
Department of Jobs, Science, Tourism and Innovation (JTSI)	January 2022 to present	<ul style="list-style-type: none"> <li>Successful EOI for HFT Program, progressing Funding Assistance Agreement</li> <li>JTSI facilitated an interagency risk workshop in September 2022 to produce government risk register, providing visibility to and comment from agencies including: Department of Transport (DoT), Department of Mines, Industry Regulation and Safety (DMIRS), and Department of Fire and Emergency Services (DFES). Further bilateral engagements.</li> <li>General discussion around appropriate project facilitation mechanism.</li> </ul>
Department of Mines, Industry Regulation and Safety – Building and Energy, Dangerous Goods Divisions	September 2022 to present	<ul style="list-style-type: none"> <li>Understanding of role of different Divisions for hydrogen refuelling - B&amp;E regulate gas fitting; DG regulate storage, DG licence required; Worksafe.</li> </ul>
Department of Transport – Vehicle Licensing	September 2022 to present	<ul style="list-style-type: none"> <li>Licensing requirements and steps for new imported hydrogen heavy vehicles versus local retrofitted vehicles.</li> <li>Right-hand drive considerations.</li> </ul>
Department of Water, Environmental Regulation (DWER) - Native Vegetation Branch (NVB)	December 2022 to present	<ul style="list-style-type: none"> <li>Woodside conveyed its understanding that referral under Part IV is not likely required under the EP Act given the impacts can be managed (and mitigated) under Part V of the EP Act.</li> <li>DWER understood that the H2Perth project is a separate project/referral and requested this information be clearly included in the Native Vegetation Clearing Permit (NVCP) Application.</li> <li>Woodside kept DWER-NVB informed of the increase in proposed site size for potential clearing implications.</li> <li>Discussed commonwealth and state accredited assessment process and offset requirements (and preference for rehabilitation within proximity of the disturbance). Woodside will organise a joint meeting post-submission.</li> </ul>
DWER - Process Industries	January 2023 to present	<ul style="list-style-type: none"> <li>Woodside discussed Premises category and confirmed that category 31 will be used.</li> <li>DWER discussed the need for including water quality triggers prior to discharge (onsite).</li> <li>General discussion on approvals strategy and schedules, noting 4-5 months would be a reasonable allowance for an assessment process of this type.</li> </ul>

Stakeholder	Date	Outcomes of Consultation
		<ul style="list-style-type: none"> <li>Discussed the requirement for the City of Rockingham to make planning decision before DWER can finalise their assessment.</li> <li>Discussed interface between NVB and Process industries branch Woodside advised that the NVCP would not be granted until the works approval is granted.</li> </ul>
DWER – EPA Services	September 2022 to present	<ul style="list-style-type: none"> <li>General discussion on approvals strategy and potential environmental impacts associated with clearing remnant native vegetation on the site.</li> <li>EPA Services understood that the H2Perth project is a separate project/referral from the H2Perth project with the tests to be considered including are facilities or connections shared.</li> <li>Discussed suitability of the H2Refueller Project for facilitation under the new Green Energy Initiative</li> </ul>
DevelopmentWA	September 2022 to present	<ul style="list-style-type: none"> <li>Advice provided on optimal siting of the Refueller within the O2L area</li> <li>Agreed preferred land tenure mechanism per attached correspondence</li> <li>Courtesy notifications of planned survey activities</li> <li>Intention to begin lease discussions Q3 2023</li> </ul>
Gnaala Karla Booja (GKB)	July 2022 to present	<ul style="list-style-type: none"> <li>Establishment of relationship with the Cultural Advice Committee and GKB Aboriginal Corporation Board</li> <li>Conduct of heritage surveys in July 2022</li> <li>Agreement to work together on various matters including cultural heritage management, cultural awareness training, ongoing consultation about matters of importance to Woodside and GKB, the economic participation of GKB in Woodside's proposed projects where able, and generally the creation of a relationship and partnership to deliver an economic, social and cultural legacy as set out in Woodside's First Nations Communities Policy</li> </ul>
Kwinana Industries Council Community and Industry Forum	March 2023	<ul style="list-style-type: none"> <li>Interest from potential local industrial offtake customers</li> </ul>
Main Roads (MRWA)	November 2022 to present	<ul style="list-style-type: none"> <li>MRWA understood H2Refueller Project as separate to H2Perth, with a standalone Development Application.</li> <li>City of Rockingham jurisdiction over relevant roads.</li> <li>Received advice on positioning of equipment in relation to roads.</li> </ul>
Water Corporation (Infill Developments Development Services)	August 2022 to present	<ul style="list-style-type: none"> <li>Presented the H2Refueller Project and its requirement in Water supply as a feedstock to the Electrolysis plant</li> <li>Engaged with Infrastructure Markets to study feasibility of connecting to the KWRP (Kwinana Water Recycling Plant)</li> <li>Lodged formally a water scheme connection application form through the Infill Developments Development Services</li> <li>Progressing the required detailed design</li> </ul>
Western Power (Connection Services)	August 2022 to present	<ul style="list-style-type: none"> <li>Presented the H2Refueller Project and its requirement in electricity supply from the SWIS</li> <li>Provided high level modelling of the power requirement to support the production profile of the Facility</li> </ul>

Stakeholder	Date	Outcomes of Consultation
		<ul style="list-style-type: none"><li>• Confirmed availability of power to support the project schedule</li><li>• Lodged formally a Service Connection application form and secured payment / order of Long Lead Items</li><li>• Progressing the required detailed design</li></ul>

## 4 SITE OVERVIEW

### 4.1 Climate

The Development Envelope is located within an area comprising a Mediterranean climate, experiencing mild, wet winters and hot, dry summers.

The closest operational long-term Bureau of Meteorology (BOM) weather station with a complete dataset is Garden Island (Station 9256) located approximately 8 km west of the Development Envelope.

The average annual rainfall within is approximately 617 mm (BOM, 2022a). Approximately 90 per cent of the annual rainfall is received during the period from April to October. Rainfall normally exceeds evaporation during the five months from May to August. The average annual evaporation is 1,800 mm (BOM, 2022a).

The long-term mean minimum temperature for Garden Island ranges from 11.3°C (July) to 19.4°C (February) and the long-term mean maximum temperature ranges from 17.5°C (July) to 28.3°C (February) (BOM, 2022a).

### 4.2 Interim Biogeographic Regionalisation of 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 (DCCEE, 2022). The Development Envelope occurs within the Swan Coastal Plain bioregion and the Perth (SWA2) subregion.

The Perth (SWA2) subregion is a low lying coastal plain, mainly covered with woodlands (Mitchell, Williams, & Desmond, 2002). It is dominated by Banksia or Tuart on sandy soils, *Casuarina obesa* on outwash plains, and paperbark in swampy areas. In the east, the plain rises to duricrusted Mesozoic sediments dominated by Jarrah woodland. The subregion is represented by heath and/or Tuart woodlands on limestone, Banksia, and Jarrah – Banksia woodlands on Quaternary marine dunes of various ages, Marri on colluvial and alluvials.

### 4.3 Geomorphology

The slope and relief of the land and nature of the soils are basic considerations in planning. They determine, to a large extent, how the land may be used and the ease or difficulty associated with various activities. Regional geology has a major influence on the pattern of landform-soil units and provides the basis for primary classification. The geomorphology (landform-soil relationships) of the entire Perth region has been described in considerable detail by McArthur and Bettenay (1960); Playford *et al.* (1976) and Seddon (1972).

The geomorphological province identified in the Development Envelope is the Swan Coastal Plain which consists of aeolian and fluvial sediments. The site is relatively flat with a slight downwards undulation to the east.

The Development Envelope lies within the Quindalup Dune System of the 'Coastal Belt' geomorphological unit of the Swan Coastal Plain. The Quindalup Dune System consists of windblown lime and quartz beach sand, forming both dunes and ridges generally oriented parallel to the coastline.

The DWER Acid Sulphate Soil (ASS) Risk Map of the Swan Coastal Plain suggests that the Development Envelope is not considered to present an ASS risk (DWER, 2022a).

#### 4.4 Hydrology - Surface Water

The Development Envelope does not intersect any major waterbodies mapped by DWER (DWER, 2022b). Hydrographic features in the vicinity of the broader H2Perth OTL area are described in Table 4-1.

**Table 4-1: Hydrographical Features in the Vicinity of the Proposed Development Envelope**

Hydrographical Feature		Distance from the proposed Development Envelope
Level and Type	Name	
Major Tributary – Lake Perennial	Lake Coo loongup	Located 2.2 km south
Major Tributary – Swamp	Bollard Bulrush Swamp	Located 4.8 km east
Minor River – Main Drain	Peel Main Drain	Located 5.2 km east
Insignificant Tributary – Drain	Bertram Drain	Located 5.5 km northeast
Major Tributary – Lake	Spectacles South	Located 5.8 km northeast
Minor River – Lake	The Spectacles Wetland	Located 5.9 km northeast

#### 4.5 Hydrogeology - Groundwater

Groundwater occurs in the superficial formations beneath the Swan Coastal Plain and the underlying geological formations of the Perth Basin. Groundwater within the shallow sediments originates from direct rainfall recharge on the coastal plain, and groundwater in the deeper, confined aquifers flows from the recharge areas to the north and east adjacent to the Darling Scarp.

The geological formations have been assigned to three distinct aquifers. The aquifer names represent the dominant stratigraphic unit within each geological unit grouping.

The Development Envelope is located within the Wellard sub-area of the Cockburn Groundwater Area (CGA) which is a proclaimed groundwater area under the *Rights in Water and Irrigation (RiWI) Act* (1914). The groundwater resources of the CGA comprise both unconfined and confined aquifers that exist as separate layered systems.

The three major aquifers of the CGA (in order of increasing depth) are:

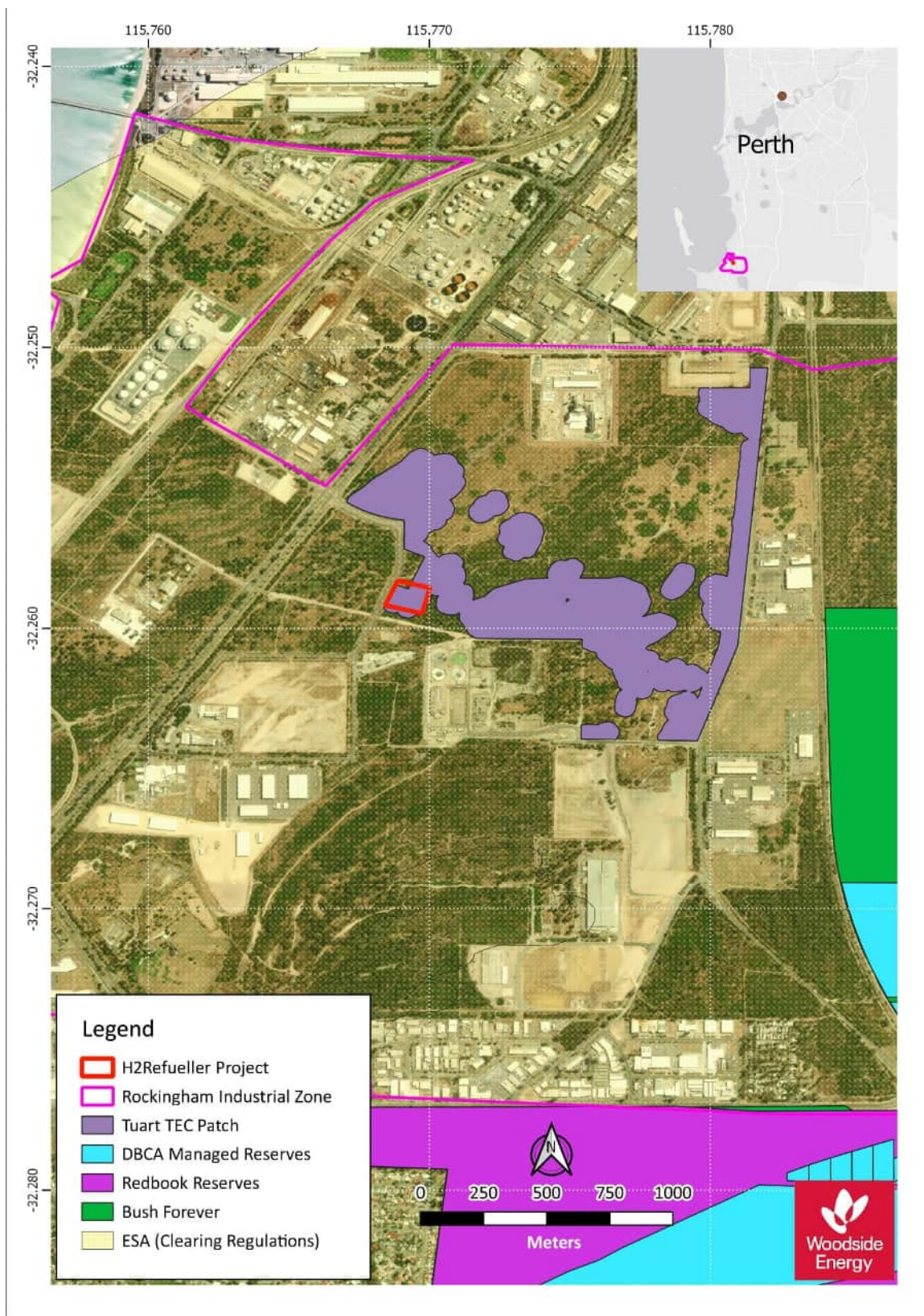
- Superficial aquifer: a major unconfined aquifer consisting of the Quaternary-Tertiary Tamala Sand, Tamala Limestone, Safety Bay Sand and Bassendean Sands. (Development Envelope falls within the Safety Bay Sand);
- Leederville aquifer: a major confined aquifer comprising the Cretaceous Osborne Formation (Henley Sandstone Member) and Leederville Formation (Pinjar Member, Wanneroo Member and Mariginiup Member) (Development Envelope falls within the Pinjar Member); and
- Yarragadee aquifer: a major confined aquifer comprising the Cretaceous Gage Formation and the Jurassic Yarragadee Formation.

No groundwater dependent ecosystems have been identified within the Development Envelope (BOM, 2022b).

#### 4.6 Environmental Sensitivities

A summary of the environmental values within proximity of the Development Envelope is included in Figure 4-1.





**Figure 4-1: Environmental values and sensitivities**

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## 5 ENVIRONMENTAL IMPACT ASSESSMENT

### 5.1 Flora and Vegetation

A detailed flora and vegetation survey within the Development Envelope was undertaken by 360 Environmental Pty Ltd in Spring 2021 to identify key biological values (Appendix B). A summary of the survey results, of relevance are provided below.

#### 5.1.1 Flora of Conservation Significance

No Threatened flora species pursuant to the EPBC Act and/or gazetted as Threatened Flora pursuant to the *Biodiversity Conservation Act 2016* (BC Act) were recorded within the Development Envelope (360 Environmental, 2023).

No Priority species as listed by the Department of Biodiversity, Conservation and Attractions (DBCA), were recorded within the Development Envelope (360 Environmental, 2023).

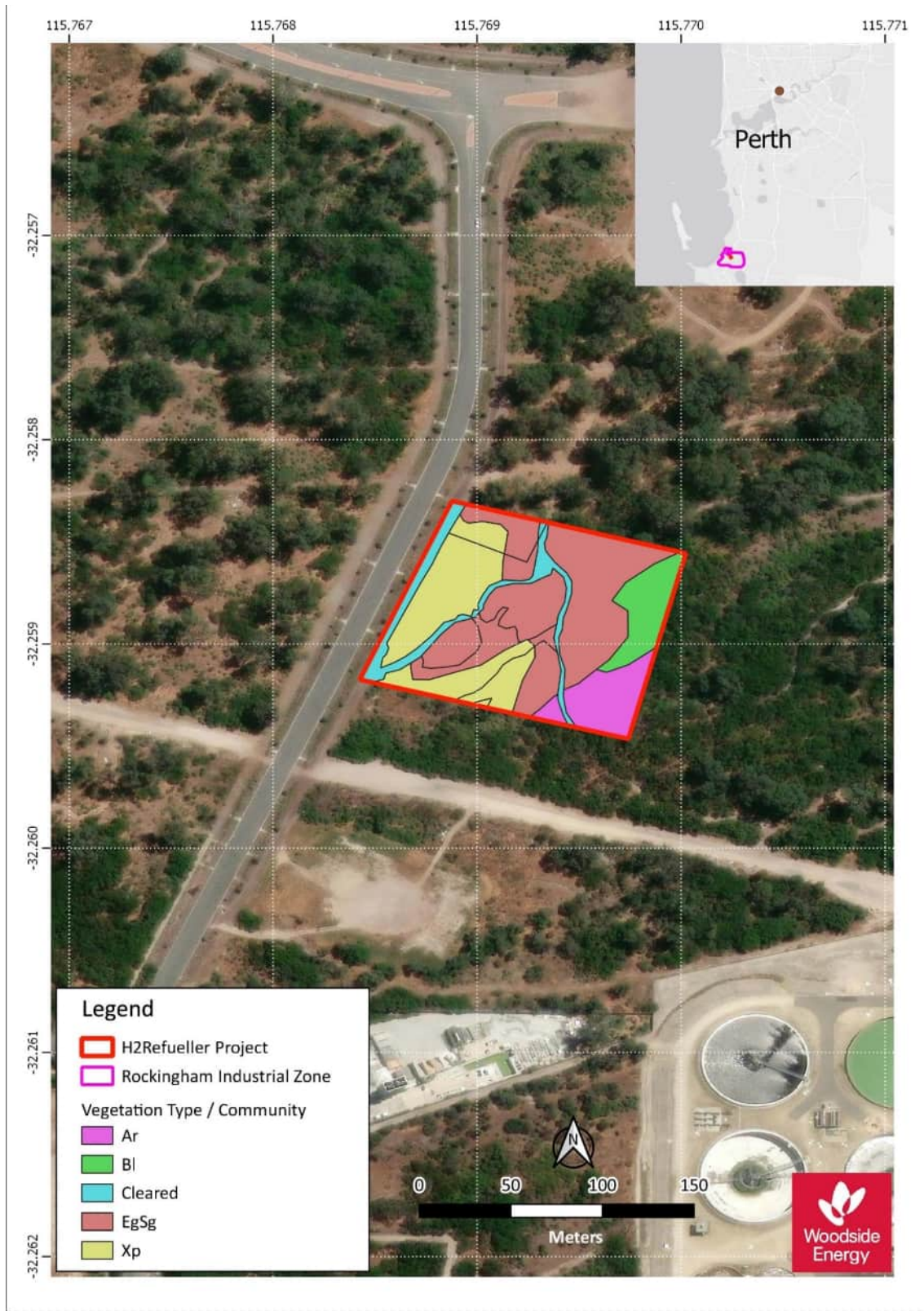
#### 5.1.2 Vegetation of Conservation Significance

The following vegetation types were recorded within the Development Envelope:

- **EgSg:** *Eucalyptus gomphocephala* mid woodland over *Acacia rostellifera*, *Spyridium globulosum*, *Olea europaea* and (*Melaleuca huegelii*, *Clematis linearifolia*) tall shrubland over *Avena barbata*, *Ehrharta longiflora* and *Lolium rigidum* low grassland over *Euphorbia peplus*, *Asparagus asparagoides* and *Euphorbia terracina* low to mid sparse forbland.
- **Xp:** *Xanthorrhoea preissii* mid shrubland to closed shrubland with scattered *Acacia rostellifera*, *Hakea prostrata* and *Clematis linearifolia*.
- **Ar:** *Acacia rostellifera* (*Clematis linearifolia*, *Spyridium globulosum* and *Melaleuca huegelii*) tall closed shrubland over *Ehrharta longiflora* and *Avena barbata* low to mid closed grassland over *Euphorbia peplus* and *Euphorbia terracina* low sparse forbland.
- **Bl:** *Banksia littoralis* low open woodland over *Melaleuca huegelii*, (*Xanthorrhoea preissii*) and *Acacia rostellifera* (*Spyridium globulosum*) mid to tall shrubland over *Ehrharta longiflora* and *Bromus diandrus* low grassland over *Gahnia trifida* mid sparse sedgeland over *Euphorbia peplus* and *Euphorbia terracina* low forbland.

These vegetation types are shown in Figure 5-1.





**Figure 5-1: Vegetation types present within Development Envelope**

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Vegetation type EgSg has been assessed to determine whether it is analogous to Floristic Community Type (FCT) SCP 25 'Southern Swan Coastal Plain *Eucalyptus gomphocephala* – *Agonis flexuosa* Woodlands' which is listed as Priority 3 by the State, but can also potentially be considered, in association with (form part of) 'Tuart (*Eucalyptus gomphocephala*) Woodlands and forests of the Swan Coastal Plain' ecological community which is listed under the EPBC Act.

An assessment against the condition thresholds was undertaken by 360 Environmental (2023) to determine whether the 'patch' of vegetation in which the Development Envelope falls, meets the criteria to be included as the 'Tuart (*Eucalyptus gomphocephala*) Woodlands and forests of the Swan Coastal Plain' ecological community. This 'patch' of vegetation has been identified as meeting the key diagnostic criteria for the Commonwealth-listed TEC. The description, area and condition thresholds that apply to the Commonwealth-listed Tuart TEC, also apply to the State (DBCA) listed Priority 3 Ecological Community of the same name. Therefore, the community represents both the Commonwealth TEC and State listed PEC.

Species richness from the quadrat data from this flora and vegetation survey was compared with that collected for upland FCT SCP 25 by Gibson et. al., (1994) and Keighery et. al., (2012), with results showing the floristic diversity was considerably lower for this survey, despite the rainfall being slightly above average for the three months preceding the survey.

Vegetation type Ar was determined to have an affiliation with FCT SCP 29b – Acacia shrublands on taller dunes. FCT SCP29b is listed as Priority 3 by the State and is not listed under the EPBC Act. The vegetation community is described as being dominated by Acacia shrublands or mixed heaths on the larger dunes. This community has been recorded from Seabird to south of Mandurah. The vegetation type does not have a consistent dominant species but species such as *Acacia rostellifera*, *Acacia lasiocarpa* and *Melaleuca systema* were important.

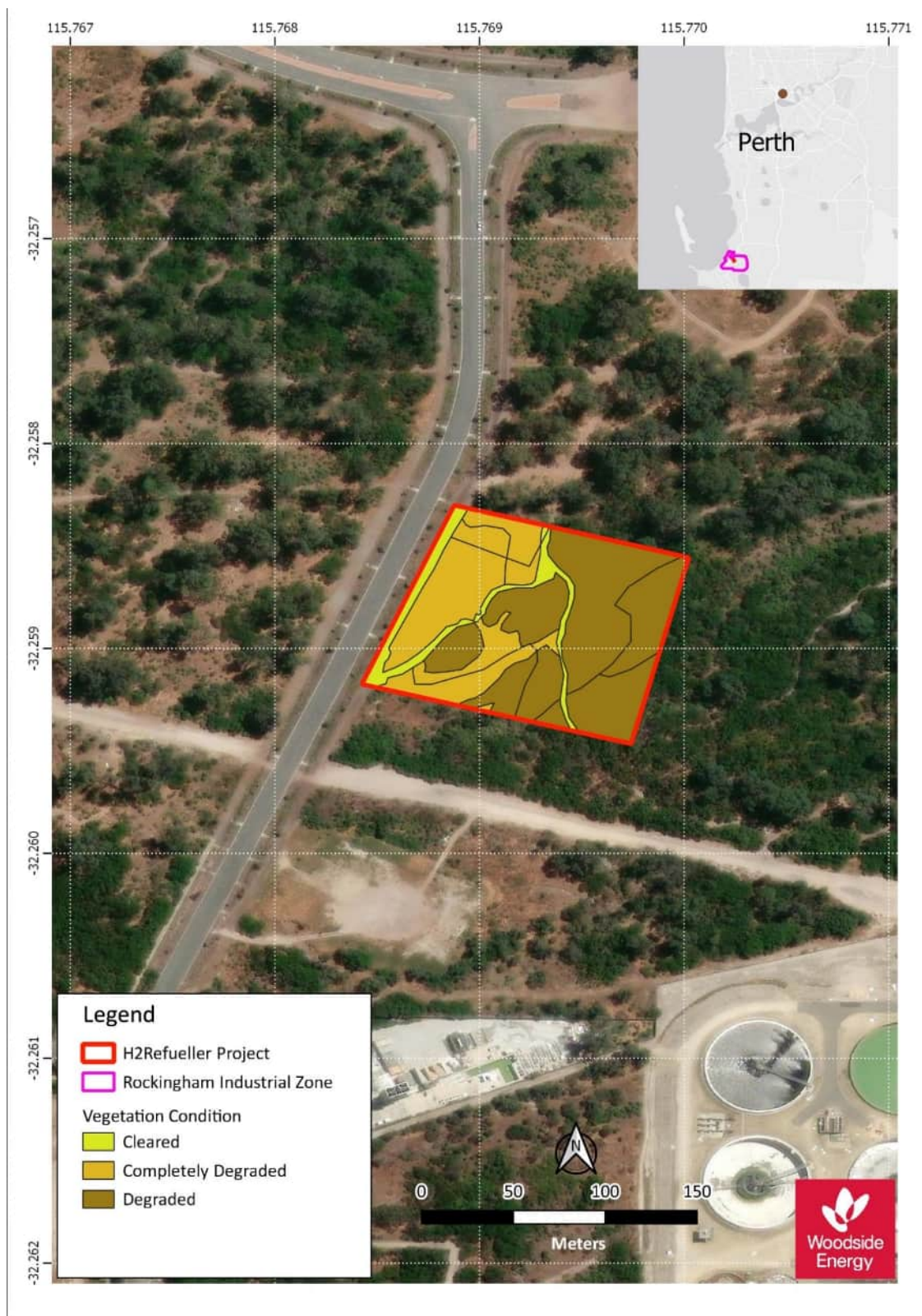
### 5.1.3 Introduced Flora

Thirteen introduced taxa were recorded within the Development Envelope. Two species, *Asparagus asparagoides* and *Zantedeschia aethiopica* are classified as a Declared Pest under the *Biosecurity and Agriculture Management Act 2007*. *Asparagus asparagoides* is also considered a Weed of National Significance.

### 5.1.4 Vegetation Condition

Vegetation condition within the Development Envelope (Figure 5-2) ranged from Degraded (58.4%) to Completely Degraded (32%), with tracks of distinctly cleared areas (9.6%). Native understory species are absent with weeds occurring extensively throughout the area. The botanical survey completed by 360 Environmental (2023), indicates that unauthorised access appeared to be a major contributing factor to the poor condition of the vegetation, as unauthorised recreational tracks were extensive, and these tracks appear to have led to rubbish dumping.





**Figure 5-2: Vegetation condition present within Development Envelope**

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### 5.1.5 Environmentally Sensitive Areas

The Development Envelope intersects a mapped ESA, which is associated with the Woodlands over sedgeland in Holocene dune swales of the southern Swan Coastal Plain TEC (CR, EN) (DWER, 2020; DBCA, 2021b).

## 5.2 Fauna

Four broad fauna habitats were identified as occurring within the Development Envelope. These are:

- *Xanthorrhoea* shrubland;
- Tuart woodland;
- *Acacia/Melaleuca* Shrubland; and
- *Banksia* Woodland

The *Xanthorrhoea* Shrubland and Tuart Woodland habitats are likely to provide refuge and foraging habitat for small to medium sized terrestrial vertebrate species. The Tuart Woodland habitat will also be used by arboreal reptiles, mammals, and birds, the latter of which will use the trees for nesting, roosting, and foraging.

### 5.2.1 Conservation Significant Fauna

360 Environmental (2023) indicated that five conservation significant taxa have a high likelihood of occurrence within the Development Envelope. These are:

- Carnaby's Black Cockatoo (*Zanda latirostris*, EN);
- Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*, VU);
- Fork-tailed Swift, Pacific Swift (*Apus pacificus*, P4); and
- Quenda (*Isodon fusciventer*, P4)
- Perth Slider (*Lerista lineata*, P3).

No other fauna taxa of conservation significance, or evidence such as tracks, scats, nest, diggings, burrows, or direct sightings, were recorded within the Development Envelope or the broader H2Perth OTL area (360 Environmental, 2023).

### 5.2.2 Black Cockatoos

No black cockatoos were recorded (sightings, calls, foraging evidence) during the survey completed by 360 Environmental (2023). An assessment of habitat quality (360 Environmental, 2023) indicates the H2Refueller Project will impact 0.81 ha of high-quality black cockatoo foraging habitat.

In total, 12 tuarts with diameter at breast height (DBH) greater than (>) 500 millimetre (mm) (> 500 mm DBH) will be cleared within the Development Envelope. At least two of these trees (> 500 mm DBH) contain hollows > 120 mm which are suitable for black cockatoo nesting. Tuarts are known to provide foraging habitat for black cockatoos and trees that are > 500 mm DBH also provide future potential nesting habitat for some species.

The habitat was also assessed for potential roosting habitat, with the Development Envelope comprising ~ 0.59 ha of potential roosting habitat associated with Tuarts (*Eucalyptus gomphocephala*). All twelve trees recorded as potential breeding trees were considered as also being possibly suitable for roosting.

### 5.2.2.1 Carnaby's Black Cockatoos

The Development Envelope occurs within the non-breeding modelled distribution for Carnaby's Cockatoo and contains suitable habitat for the species (DAWE, 2022).

No sightings, calls or foraging evidence of Carnaby's Cockatoos were recorded in the Development Envelope during the field survey. The Tuart Woodland and *Banksia* Woodland habitats contains some known foraging plants, including *E. gomphocephala*, *Allocasuarina*, *Banksia*, and *Hakea*.

As such the clearing activities associated with the H2Refueller Project may result in indirect impacts to this species either through removal of a small amount of foraging habitat or by removal of habitat that may pose breeding and nesting value in the future.

### 5.2.2.2 Forest Red-tailed Black Cockatoo

The Development Envelope occurs within the modelled distribution for Forest Red-tailed Black Cockatoo and contains suitable habitat for the species (DAWE, 2022).

No sightings, calls or foraging evidence of Forest Red-tailed Black Cockatoos were recorded in the Development Envelope during the field survey. Although most records for this species indicates they prefer jarrah-marri forests, they have been observed within tuart woodlands (Abbott, 1998). The Forest Red-tailed Black Cockatoo mainly nests in old veteran and stag marrispecies (Johnstone, 2013) thus tuarts on-site are unlikely to provide future nesting potential to this species.

As such the clearing activities associated with the H2Refueller Project may result in indirect impacts to this species through removal of a small amount of foraging habitat.

### 5.2.2.3 Fork-tailed Swift, Pacific Swift

The Fork-tailed Swift is almost exclusively an aerial species that flies from less than 1 m to at least 300 m above ground (Department of the Environment, 2023 ). In Western Australia, there are sparsely scattered records that indicate they are widespread in coastal and subcoastal areas between Augusta and Carnarvon, including some on nearshore and offshore islands. They mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh but also prefer habitat close to cliffs, beaches and offshore islands. The Fork-tailed Swift does not breed in Australia (Department of the Environment, 2023 ).

Although this species has the potential to occur, as none of the habitat is known to be critical to the survival of the species, nor support breeding activities, clearing for the H2Refueller Project is not expected to result in any exposure to this species.

### 5.2.2.4 Perth Slider

The Perth Slider is a lined skink that has a small distribution on the southern Swan Coastal Plain, south of the Swan River and mostly near the coast (Threatened Species Scientific Committee, 2022). It is known to occur in several bush remnants near Perth with its main habitat comprising pale sands (calcareous and siliceous) on coastal plains with *Banksia* and/or *Eucalyptus*, and coastal and low fixed dunes, supporting heathlands and shrublands, providing a well-developed patchy litter ground cover (Threatened Species Scientific Committee, 2022). This species relies on litter ground cover and other debris for shelter making vegetation disturbance a key threat.

Although this species has the potential to occur, as none of the habitat is known to be critical to the survival of the species, nor support breeding activities, clearing is not expected to result in any significant exposure to this species.

### 5.2.2.5 Quenda

Quenda are nocturnal and omnivorous, feeding on insects, spiders, worms, and plant roots and are typically found in dense vegetation, including wetland fringes, forest woodland, shrub and heath

communities (Department of Biodiversity Conservation and Attractions., 2012). No evidence of the quenda was recorded within the Development Envelope; however, they are likely to utilise the Xanthorrhoea Shrubland, Banksia Woodland and Tuart Woodland habitats which may provide shelter and foraging opportunities for the species.

Although this species has the potential to occur, as none of the habitat is known to be critical to the survival of the species, nor support breeding activities, clearing is not expected to result in any significant exposure to this species.



## 6 ASSESSMENT AGAINST THE 10 CLEARING PRINCIPLES

An assessment against the 10 clearing principles in accordance with DER (2014) is provided in Table 6-1 and a residual environmental impact summary is provided in Section 6.1.

**Table 6-1: Assessment against the 10 clearing principles**

Clearing Principle	Assessment
(a) Native vegetation should not be cleared if it comprises a high level of biological diversity.	<p>The Development Envelope (approximately 1.24 ha) comprises approximately 1.12 ha of native vegetation.</p> <p>Within the Development Envelope, four vegetation communities were identified, however the vegetation condition ranged from 'Degraded' (58.4%) to 'Completely Degraded' (32%) (360 Environmental, 2023). Although four vegetation communities were identified, the diversity of native species was low as 13 introduced taxa were recorded from the quadrat located within the proposed Development Envelope. The quadrat only identified seven native species onsite indicating that the site does not comprise a high level of biological diversity and is a degraded state (360 Environmental, 2023).</p> <p>Two species, <i>Asparagus asparagoides</i> and <i>Zantedeschia aethiopica</i> are classified as Declared Pests under the Biosecurity and Agriculture Management Act 2007.</p> <p>Flora and vegetation surveys indicate that the Development Envelope is comprised of vegetation communities that are highly disturbed and have low native biodiversity, as such:</p> <p><b>THE PROPOSAL IS NOT AT VARIANCE WITH THIS PRINCIPLE.</b></p>
(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.	<p>Five conservation significant taxa have a high likelihood of occurrence within the broader H2Perth OTL area, the Carnaby's Cockatoo (<i>Calyptorhynchus latirostris</i>, EN), the Forest Red-tailed Black Cockatoo (<i>Calyptorhynchus banksii naso</i>, VU), the Pacific Swift (<i>Apus pacificus</i>, P4), Quenda (<i>Isodon fusciventer</i>, P4) and the Perth Slider (<i>Lerista lineata</i>, P3).</p> <p>With the exception of black cockatoo habitat, no significant habitat was identified for the Pacific Swift, Perth Slider and the Quenda as detailed in Section 5.2.2.3, Section 5.2.2.4 and Section 5.2.2.5 respectively. As such the remainder of this assessment is focused on black cockatoo habitat.</p> <p>No black cockatoos were observed within the Development Envelope or the broader H2Perth OTL area during the survey (360 Environmental, 2023).</p> <p>Vegetation within the Development Envelope was identified as suitable foraging habitat and potential breeding habitat. The Development Envelope contains 0.81 ha of High Quality black cockatoo foraging habitat.</p> <p>There are two suitable breeding trees within the Development Envelope, with a DBH &gt; 500 mm and comprising at least one hollow. In addition to these two trees, ten other tuarts with a DBH &gt; 500 mm will also need to be removed. The survey completed by 360 Environmental indicates that the vegetation onsite is considered important for foraging, potential breeding and roosting habitat.</p> <p>Although the area of remnant native vegetation to be cleared is up to 1.12 ha and was found to be in a 'Degraded' to 'Completely Degraded' condition, this vegetation is considered to provide important foraging and potential breeding and roosting habitat for protected black cockatoo species. As the habitat value is still considered to be high, regardless of the vegetation quality:</p> <p><b>THE PROPOSAL MAY BE AT VARIANCE WITH THIS PRINCIPLE.</b></p>
(c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.	<p>No Threatened flora taxa pursuant to the EPBC Act and/or gazetted as Threatened pursuant to the BC Act were recorded during the survey. No Priority flora were recorded within the Development Envelope (360 Environmental, 2023).</p> <p><b>THE PROPOSAL IS NOT AT VARIANCE WITH THIS PRINCIPLE.</b></p>
(d) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a	<p>Vegetation within the Development Envelope falls within a 'Patch' of vegetation which meets the EPBC Act's TEC criteria for 'Tuart' (<i>Eucalyptus gomphocephala</i>) Woodlands and Forests of the Swan Coastal Plain' ecological community. This vegetation community is also considered a State (DBCA) Priority 3 Ecological Community of the same name. In addition to this, vegetation type Ar, being Acacia shrublands on taller</p>

Clearing Principle	Assessment
threatened ecological community.	<p>dunes, is also listed as Priority 3 Ecological Community by the State. The areas proposed to be cleared for these vegetation communities are:</p> <ul style="list-style-type: none"> <li>EgSg ~0.57 ha</li> <li>Ar ~0.13 ha</li> </ul> <p>The area of remnant native vegetation to be cleared is up to 1.12 ha and was found to be in a 'Degraded' (58.4%) to 'Completely Degraded' (32%).</p> <p>Clearing of tuarts within the Development Envelope (~1.24 ha) will be limited 12 tuart trees &gt; 500 mm DBH.</p> <p>Given that no state listed vegetation communities will be impacted by the proposal, and that only small areas (&lt;0.7 ha total) of priority ecological communities comprising low vegetation quality:</p> <p><b>THE PROPOSAL IS NOT AT VARIANCE WITH THIS PRINCIPLE.</b></p>
(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.	<p>The Development Envelope is mapped over one broad system association, Rockingham 3048, which comprises mixed heath with scattered tall shrubs (<i>Acacia</i> spp., Proteaceae and Myrtaceae). There is a current representation of 29.90% remaining within the City of Rockingham, of which 28.70% is managed in DBCA Lands. This is currently above the 10% retention target of the EPA (2016) and hence will not be a constraint to clearing.</p> <p>The native vegetation proposed to be cleared is unlikely to have significance as remnant vegetation is in degraded state.</p> <p><b>THE PROPOSAL IS NOT AT VARIANCE WITH THIS PRINCIPLE.</b></p>
(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.	<p>According to the Geomorphic Wetlands of the Swan Coastal Plain dataset, Directory of Impact Wetlands and RAMSAR wetland datasets, no wetlands or vegetated watercourses or associated buffer zones occur within the Development Envelope. This has been verified during the 2021 field assessment (360 Environmental, 2023).</p> <p><b>THE PROPOSAL IS NOT AT VARIANCE WITH THIS PRINCIPLE.</b></p>
(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.	<p>The Development Envelope is situated within the Quindalup Land System (211Qu), which is characterised by coastal dunes of the Swan Coastal Plain, with calcareous deep sands and yellow sands with high infiltration rates (Tille, Stuart-Street, &amp; Gardiner, 2020). With the limited amount of native vegetation to be cleared (up to 1.12 ha), and as the site is flat (slightly undulating to the east) the clearing activity is not expected to cause land degradation within, or adjacent to the Development Envelope. The vegetation was found to be in a 'Degraded' to 'Completely Degraded' condition, with the land already cleared to an extent. Clearing impacts are not expected to affect the present or future use of the land; specifically, such clearing is not expected to result in increased salinity, waterlogging or particular erosion onsite or offsite and as further mitigations are presented in Section 7:</p> <p><b>THE PROPOSAL IS NOT AT VARIANCE WITH THIS PRINCIPLE.</b></p>
(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.	<p>The Development Envelope does not fall within a Conservation Area (Figure 4-1) (DBCA, 2022). The nearest conservation areas are:</p> <ul style="list-style-type: none"> <li>an unnamed conservation and recreation reserve located 739 metres (m) southeast of the broader H2Perth OTL area and is vested under the Conservation Commission of Western Australia; and</li> <li>Leda Nature Reserve, which is located 1.6 km southeast of the broader H2Perth OTL area and is vested under the Conservation Commission of Western Australia.</li> </ul> <p>The land within the Development Envelope does not provide a buffer, ecological linkage or outlier to either conservation areas as there is no connection between these and the environment between them has been previously fragmented with industrial buildings. The proposed clearing area is not significant in maintaining any landscape-level connectivity with regard to this principle.</p> <p><b>THE PROPOSAL IS NOT AT VARIANCE WITH THIS PRINCIPLE.</b></p>
(i) Native vegetation should not be cleared if the clearing of the	<p>The DWER Perth Groundwater Map shows that the depth to groundwater over the Development Envelope is between 3 m and 10 m below the land surface (DWER, 2022b). No surface water bodies or groundwater dependent ecosystems are present</p>

Clearing Principle	Assessment
vegetation is likely to cause deterioration in the quality of surface or underground water.	within the Development Envelope. ASS risk is low due to the absence of pyritic soils and limited requirement for excessive excavation during site preparation activities. No dewatering or excavation below the water table is required, nor major drainage modifications are required. <b>THE PROPOSAL IS NOT AT VARIANCE WITH THIS PRINCIPLE.</b>
(j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.	Elevation over the Development Envelope ranges between approximately 4 m AHD to 6 m AHD and depth to groundwater is between 3 m and 10 m below the land surface. The soils of the Development Envelope are sandy and porous, and the area is generally well-drained. No wetlands, watercourses or areas subject to inundation are located within the Development Envelope. As the vegetation is partially already cleared and heavily degraded, any further clearing is unlikely to change the landscape in a way that would cause or exacerbate any flooding or waterlogging onsite or offsite. Given the small scale of the project and the limited size of the clearing areas, no change to the frequency or intensity of any flooding is expected from the native vegetation clearing activities. <b>THE PROPOSAL IS NOT AT VARIANCE WITH THIS PRINCIPLE.</b>

## 6.1 Residual Impact Summary

Given avoidance, mitigation and rehabilitation of the environmental impacts associated with the Development Envelope are not possible, the following significant residual impacts are expected (and summarised from earlier sections):

- Loss of 0.13 ha of the 'Ar' vegetation community which forms part of the 'Acacia shrublands on taller dunes' DBCA Priority 3 Ecological Community.
- Loss of up to 1.12 ha of potential foraging habitat for Carnaby's Black Cockatoo of which 0.81 ha provides High foraging quality
- Loss of 12 *Eucalyptus gomphocephala* potential breeding trees (>500 DBH), two of which have hollows.
- Loss of 0.57 ha of the 'EgSg' vegetation community which forms part of the 'Tuart (*Eucalyptus gomphocephala*) Woodlands and Forests of the Swan Coastal Plain' DBCA Priority 3 Ecological Community

Occurrences of the Acacia shrublands on taller dunes vegetation community stretch along the WA coastline between Preston Beach and Cevantes (DEP, no date). As impacts to the 'Ar' vegetation community are small in extent (0.13 ha) and the community is comprised of Completely Degraded to Degraded vegetation condition, the H2Refueller Project is not expected to result in a significant local or regional impact associated with the reduction in extent of this vegetation community.

Although impacts to the 'EgSg' vegetation community are small in extent (0.57 ha), and the community is comprised of Completely Degraded to Degraded vegetation condition, this area is connected to the broader 'EgSg' patch identified by 360 Environment (2023) throughout the RIZ. In addition to this, the Tuarts associated with this vegetation community provide foraging, roosting and potential breeding habitat for Carnaby's Black Cockatoo.

## 7 MANAGEMENT MEASURES

Environmental management measures that will be implemented to avoid, minimise and reduce the impacts associated with the clearing of up to 1.12 ha are presented in Table 7-1.

**Table 7-1: Environmental Management Measures**

Environmental Management Measures	Mitigation Hierarchy	Description
Induction	Avoid	Personnel will be inducted and educated on the environmental requirements of the project.
Onsite inspection of all civil equipment	Avoid	Earth-moving equipment will be inspected for the presence of soils and vegetation matter prior to commencement and after completion of clearing activities. Clean-down of the equipment will be as directed by the inspection.
Demarcation of clearing areas	Avoid	Post surveying, areas designated for clearing will have their boundaries clearly demarcated. Personnel will be familiar with demarcated areas prior to commencement of clearing to ensure no clearing is undertaken beyond the clearing areas. The movement of machines and other vehicles will be restricted to these areas.
Speed limits	Minimise	Vehicles and equipment will adhere to speed limits during construction and avoid driving over, or parking on, vegetation and/or tree roots that are not designated for clearing.
Removal of weed material offsite	Minimise	Woodside will stockpile weed infested debris in a dedicated area with this material transferred to skips or trucks depending on the volume of material generated. Skips or trucks will be covered so material does not become wind-blown during transport. This material will be disposed off-site using specialist disposal company.
Stormwater management plan	Mitigate	Stormwater design and management will be detailed in a Stormwater Management Plan to support the projects Development Application through the City of Rockingham. This management plan will ensure that the risk associated with stormwater are identified as sufficiently mitigated.
Offset mitigation strategy	Mitigate	<p>Following various engagements with DWER and DCCEEW, Woodside understands that offsets are required to mitigate the impacts given the limited ability to avoid and minimise impacts onsite.</p> <p>Woodside's preferred approach is to utilise the previously approved Offsets Package under MS 863, Condition 7) and the in-force Commonwealth Offsets Management package in accordance with Controlled Action 2010/5337.</p> <p>Further information is included as Section 0.</p>

## 7.1 Proposed Offset Strategy

Woodside understands that an Offsets Package and associated Conservation Area was previously accepted for the DevelopmentWA proposal to offset native vegetation impacts in the RIZ (Ministerial Statement 863 and Ministerial Statement 1043) (Section 1.1). The ecological considerations associated with this offset comprise similar values, though not like for like, as comprising the Sedgeland in Holocene dune swales of the southern Swan Coastal Plain TEC and associated wetlands. DevelopmentWA (then Landcorp) proposed to establish a conservation area (Figure 2-1) that protected areas of the highest environmental value within the RIZ.

The Commonwealth Offsets Management package in accordance with Controlled Action 2010/5337 is still current for the Development Envelope. This offset package included revegetation of areas within the Rockingham Lakes Regional Park and resulted in planting over 5,000 tuart trees to offset the loss of 830 significant trees. These trees were planted adjacent to habitats comprised of *Eucalyptus gomphocephala* open woodland, indicating that the specific values and environmental impacts associated with the H2Refueller Project may already be considered offset.

However, Woodside acknowledge the complexities of existing approval arrangements and will seek to engage with DWER, DCCEEW and DevelopmentWA once approvals for the H2 Refueller Project have been submitted.

In the event that utilising the existing offset package comprising conservation estate creation and revegetation activities are not considered appropriate, Woodside will engage with DBCA and seek to find an alternative area within 20 km (where possible) of the H2Refueller Project's Development Envelope. 20 km was considered a suitable geographic area as during the non-breeding period, black cockatoos are known to forage in areas up to 20 km from known night roosting habitat, though in some cases, foraging distances can be greater (DAWE, 2022).. Given the potential impacts to breeding and roosting habitat within the Development Envelope, replacing these within 20 km of the impact site would be considered an optimal outcome. To support identification of these areas with DBCA, Woodside intends to complete the following exercise:

- conduct geospatial mapping to identify areas within existing DBCA or City of Rockingham (or City of Kwinana) reserves that comprise similar values
- engage with landowner / manager to understand if the area is available for onsite restoration
- review existing botanical surveys where they exist, or complete additional surveys to validate vegetation condition and environmental values.

## 8 REFERENCES

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## 9 LIST OF TERMS AND ACRONYMS

Acronym	Description
< ; >	less than; greater than
ASS	Acid sulphate soil
BC Act	<i>Biodiversity Conservation Act 2016</i>
CGA	Cockburn Groundwater Area
DBCA	Department of Biodiversity, Conservation and Attractions
DBH	Diameter at breast height
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DMA	Decision Making Authority
DWER	Department of Water and Environmental Regulation
EN	Endangered
EPA	Environmental Protection Authority
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
FCT	Floristic Community Type
H2	Hydrogen
ha	hectare
IBRA	Interim Biogeographic Regionalisation of Australia
km	kilometre
m	metre
mm	millimetre
NES	(matters of) National Environmental Significance
NVCP	Native Vegetation Clearing Permit
P3	Priority 3
P4	Priority 4
RIZ	Rockingham Industrial Zone
RPZ	Root protection zone
SEA	Strategic Environmental Assessment
TEC	Threatened Ecological Community
VU	Vulnerable
WA	Western Australia(n)



## **APPENDIX A      PROOF OF LANDOWNERSHIP (LETTER FROM DEVELOPMENTWA REGARDING OPTION TO LEASE)**

**Our Ref:** A2660529  
**Enquiries:** Ellen Sherman – 9482 7522; [ellen.sherman@developmentwa.com.au](mailto:ellen.sherman@developmentwa.com.au)  
**Date:** 14 June 2023

---

Environmental Protection Authority  
Department of Water and Environmental Regulation  
Locked Bag 10  
Joondalup DC  
JOONDALUP WA 6919

Dear Sir/Madam,

**Clearing Application by Woodside Energy Technologies Pty Ltd (Woodside) over Part Lot 9009 on Deposited Plan 421737**

We refer to the application made by Woodside seeking approval to clear on part of Lot 9009 on Deposited Plan P421737 being the whole of the land in Certificate of Title Volume 4030, Folio 578 (Property) for the purpose of Woodside's proposed Hydrogen Refueller @H2Perth, a self-contained hydrogen production, storage and refueling facility.

DevelopmentWA is the owner of the Property and DevelopmentWA and Woodside have entered into an Option to Lease over the Property and are progressing negotiations for a lease.

DevelopmentWA confirms its consent to Woodside submitting the Clearing Application to progress its project approvals. Woodside will not be granted access to the Property for any clearing purposes until it has entered into the lease.

Please contact Ellen Sherman on the above details if you would like to discuss this matter further.

Yours sincerely



Vaughan Brazier  
**Manager Leasing and Buildings**

## **APPENDIX B H2REFUELLER FLORA, FAUNA, BLACK COCKATOO, AND TREE ASSESSMENT TECHNICAL REPORT**



**Kwinana H2 Refueller**

# **H2 Refueller Flora, Fauna, Black Cockatoo, and Tree Assessment Technical Report**

**Prepared for**

**Australasian Environmental Solutions**

**March 2023**

● people ● planet ● professional

Document Reference	Revision	Prepared by	Reviewed by	Admin Review	Submitted to Client	
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5723AA_Rev2	Client Final	P. Walker	Australasian Environmental Solutions	LI	1 electronic	13/06/2023

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# Executive Summary

360 Environmental Pty Ltd (360 Environmental), part of SLR Consulting (SLR) surveyed the H2 Refueller Survey Area as part of broader works for Woodside Energy in 2021 (360 Environmental part of SLR Consulting, 2022). The prior surveys consisted of a detailed flora and vegetation survey, basic fauna, and black cockatoo assessment.

This report presents the biological information collected from the 2021 survey conducted within the H2 Refueller Survey Area, encompassing 1.25 ha, required for the environmental approvals process of the construction works.

## Flora and Vegetation

The flora desktop assessment identified 53 conservation significant taxa occurring within 30 km of the Survey Area. A pre-survey likelihood of occurrence assessment was undertaken and determined four taxa as having a high likelihood of occurrence, 23 taxa as having a medium likelihood of occurrence and 26 taxa as having a low likelihood of occurrence.

No Threatened flora species pursuant to the *Environment Protection and Biodiversity Conservation Act 1999* and/or gazetted as Threatened Flora pursuant to the *Biodiversity and Conservation Act 2016* were recorded during the 2021 survey. No Priority flora listed by the Department of Biodiversity, Conservation and Attractions (DBCA) were recorded.

13 introduced flora taxa were previously recorded in the Survey Area. Two of these are listed as a Declared Pest under the BAM Act (\**Asparagus asparagoides* and \**Zantedeschia aethiopica*) \**Asparagus asparagoides* is listed as a WoNS (Table 9) (Department of the Environment and Energy, 2020).

Four vegetation types were described and mapped within the Survey Area. Vegetation was representative of existing broad scale vegetation and soil and land system mapping for the area. Two of the FCTs identified as occurring in the Survey Area from the analysis are listed as conservation significant.

- FCT SCP 29b – Acacia shrublands on taller dunes is listed as Priority 3 by the State and is not listed under the EPBC Act
- FCT SCP 25 – Southern Swan Coastal Plain *Eucalyptus gomphocephala* - *Agonis flexuosa* woodlands is listed as Priority 3 by the State and can be associated with or, form part of the Tuart (*Eucalyptus gomphocephala*) Woodlands and forests of the Swan Coastal Plain ecological community which is listed under the EPBC Act.

Vegetation condition within the Survey Area ranged from Degraded to Completely degraded with the majority considered to be in Degraded condition. Evidence of disturbance across the Survey Areas included vehicle tracks, weeds, and litter.

## Vertebrate Fauna

The vertebrate fauna desktop assessment identified 57 significant species occurring within eight km of the Survey Area. An assessment of the likelihood of occurrence within the Survey Area was undertaken and identified that of the potential significant fauna, five had a high likelihood of occurrence, one had a medium likelihood of occurrence, and 51 had a low likelihood of occurrence.

Fauna habitat mapping was based on a combination of field observations and aerial imagery. Four fauna habitats were mapped within the Survey Area, of which the Tuart Woodland and *Banksia* Woodland represent the most value to significant fauna and overall fauna assemblages.

The basic terrestrial vertebrate fauna survey recorded opportunistic fauna observations. A total of five fauna species from five families were recorded, comprising four bird species from four families, and one reptile species from one family.

No conservation significant species was recorded during the fauna survey. No introduced species were recorded during the survey.

## Black Cockatoo

The black cockatoo habitat assessment identified 12 black cockatoo potential nesting trees with a diameter at breast height of greater than 500 mm. All 12 trees were Tuarts (*Eucalyptus gomphocephala*). A total of two trees contained hollows that are potentially suitable for black cockatoo nesting.

A total of 0.81 ha of high-quality foraging habitat for the Carnaby's Cockatoo and the Forest Red-tailed Black Cockatoo was identified within the Survey Area. This habitat consisted primarily of Tuart (*E. gomphocephala*), *Banksia* sp. and *Hakea* sp.

No evidence of black cockatoo breeding, foraging, or roosting was observed within the Survey Area.

# Abbreviations

Abbreviations used through the report are described below in Table 1.

**Table 1: Abbreviations**

Abbreviation	Description
360 Environmental	360 Environmental Pty Ltd
BAM Act	Biosecurity and Agriculture Management Act 2007
BC Act	Biodiversity Conservation Act 2016
BoM	Bureau of Meteorology
°C	Degree Celsius
CD	Conservation Dependent Fauna
CR	Critically Endangered
DAFF	Department of Agriculture, Fisheries, and Forestry
DBCA	Department of Biodiversity, Conservation and Attractions
DCCEEW	Department Climate Change, Energy, the Environment and Water
DP	Declared Pest
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
GIS	Geographic Information System
ha	Hectare
IBRA	Interim Biogeographic Regionalisation for Australia
IBSA	Index of Biodiversity Surveys for Assessments
km	Kilometres
m	Metres
mm	Millimetres
MNES	Matters of National Environmental Significance
OS	Other Specially Protected Fauna
P	Priority
Survey Area	The Survey Area covers 1.25 ha within Kwinana, approximately 33 km south of Perth, in the Swan Coastal Plain bioregion of Western Australia.
PEC	Priority Ecological Community
PMST	Protected Matters Search Tool
Study Area	The database search area (varied according to each parameter)



Abbreviation	Description
T	Threatened
TEC	Threatened Ecological Community
VU	Vulnerable
WA	Western Australia
WAM	Western Australian Museum

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# 1 Introduction

## 1.1 The Project

360 Environmental Pty Ltd (360 Environmental), part of SLR Consulting (SLR) surveyed the H2 Refueller Survey Area as part of broader works for Woodside Energy in 2021 (360 Environmental part of SLR Consulting, 2022). The prior surveys consisted of a detailed flora and vegetation survey, basic fauna, and black cockatoo assessment.

This report presents the biological information collected from the 2021 survey which has been refined for the purposes of the H2 Refueller Project. (1.25 ha). This report is to provide site specific information to support the environmental approvals process and construction works.

## 1.2 Scope and Objectives

In order to meet the objectives, the following scope of work was undertaken:

- Provide a project specific concise report outlining the results of the flora and vegetation, fauna, black cockatoo assessment previously undertaken in 2021 (360 Environmental part of SLR Consulting, 2022)
- Provide all spatial and mapping data collected during the survey in IBSA format.

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

## 2 Background

### 2.1 Protection of Flora, Vegetation and Fauna

Western Australian flora and fauna is protected formally and informally by legislative and non-legislative measures.

Legislative measures:

- Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)
- WA Biodiversity Conservation Act 2016 (BC Act)
- WA Environmental Protection Act 1986 (EP Act)
- WA Biosecurity and Agriculture Management Act 2007 (BAM Act).

Non-legislative measures:

- WA Department of Biodiversity Conservation and Attractions (DBCA) Priority lists for fauna, flora, and ecological communities
- Weeds of National Significance (WoNS)
- Recognition of locally significant populations by DBCA.

These protection mechanisms are supported by guidance documents published by the Environmental Protection Authority (EPA) and Department of Climate Change, Energy, the Environment and Water (DCCEEW):

- Approved Conservation Advice for the Tuart Woodlands and Forests of the Swan Coastal Plain Ecological Community (Department of the Environment and Energy, 2019a)
- 'Banksia Woodlands of the Swan Coastal Plain' Guidelines (Department of the Environment and Energy, 2019b)
- Carnaby's Cockatoo (*Zanda latirostris*) Recovery Plan (Department of Parks and Wildlife, 2013)
- Matters of National Environmental Significance Significant impact guidelines 1.1 Environment Protection and Biodiversity Conservation Act 1999 (Department of the Environment, 2013)
- Referral Guideline for 3 WA Threatened Black Cockatoo Species (Department of Climate Change, Energy, the Environment and Water, 2022)
- Survey Guidelines for Australia's Threatened Birds Under the Environment Protection and Biodiversity Conservation Act 1999 (Department of the Environment Water Heritage and the Arts, 2010)
- Survey Guidelines for Australia's threatened mammals (Department of Sustainability Environment Population and Communities, 1999)

- Survey Guidelines for Australia's threatened reptiles (Department of Sustainability Environment Water Population and Communities, 2011)
- Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (Environmental Protection Authority, 2016c)
- Environmental Factor Guideline – Flora and Vegetation (Environmental Protection Authority, 2016a)
- Environmental Factor Guideline – Terrestrial Fauna (Environmental Protection Authority, 2016b)
- Technical Guidance - Terrestrial vertebrate fauna surveys for environmental impact assessment (Environmental Protection Authority, 2020).

Australian Standards:

- Australian Standard – Protection of trees on development sites (AS 4970-2009) (Standards Australia, 2009).

## 2.2 Existing Environment

### 2.2.1 Climate

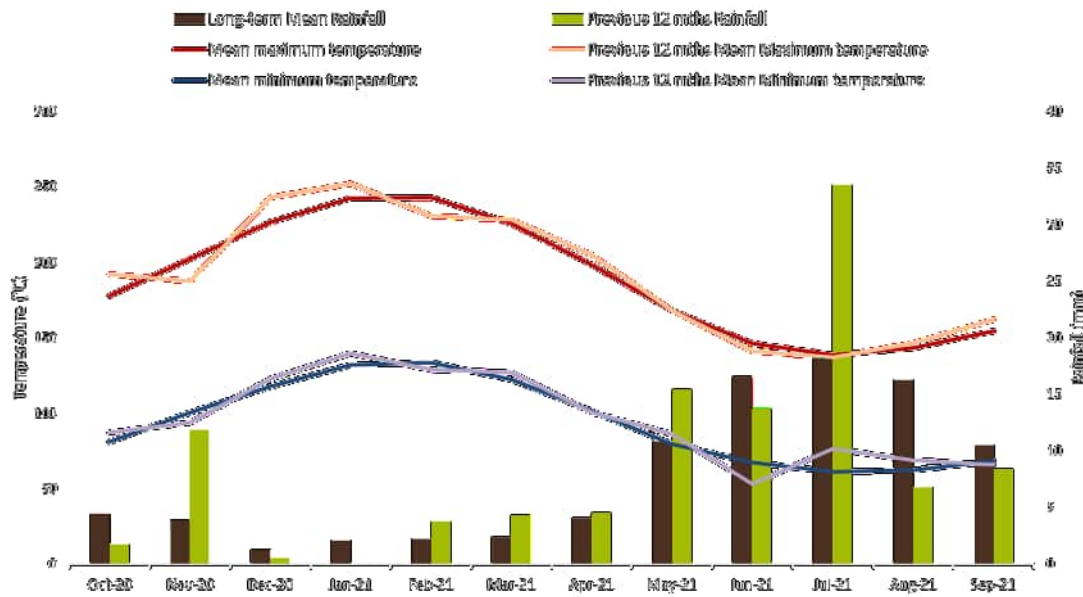
The closest long-term Bureau of Meteorology (BoM) weather station with a complete dataset is Perth Airport (Station 9021), located approximately 34 km northeast of the Survey Area.

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

The long-term mean maximum temperature for Perth Airport ranges from 18°C (July) to 32°C (February). The long-term mean minimum temperature for Perth Airport ranges from 8.1°C (July and August) to 17.6°C (February) (1944 to 2022) (Graph 1) (Bureau of Meteorology, 2023).

#### 2.2.1.1 2021 Spring Survey

The Perth Airport weather station recorded 785.4 mm of rainfall in the 12 months prior to the 2021 biological survey (October 2020 to September 2021), which is 25.7 mm above the long-term average of 759.7 mm. In the three months prior to the survey (July to September 2021), 365.0 mm of rainfall was recorded, which is 18.7 mm above the long-term average of 346.3 mm for the same time period (Bureau of Meteorology, 2023) Graph 1.



**Graph 1: Long term and monthly total rainfall, maximum and minimum temperatures for Perth Airport in 2021 (9021) (Bureau of Meteorology, 2023).**

### 2.2.2 Interim Biogeographic Regionalisation of 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 (Department of the Environment and Energy, 2016). The Survey Area occurs within the Swan Coastal Plain bioregion and the Perth (SWA2) subregion.

The Perth (SWA2) subregion is a low-lying coastal plain, mainly covered with woodlands (Mitchell, Williams, and Desmond, 2002). It is dominated by *Banksia* or Tuart on sandy soils, *Casuarina obesa* on outwash plains, and paperbark in swampy areas. In the east, the plain rises to duricrusted Mesozoic sediments dominated by Jarrah woodland. The subregion is represented by heath and/or Tuart woodlands on limestone, *Banksia*, and Jarrah – *Banksia* woodlands on Quaternary marine dunes of various ages, Marri on colluvial and alluvials.

### 2.2.3 Soil Landscapes and Land Systems

Soil landscapes and land system mapping of Western Australia describes broad soil and landscape characteristics from regional to local scales, ranging from 1:20,000 to 1:250,000 (Department of Primary Industries and Regional Development, 2018). The Survey Area occurs within the Quindalup Land System (211Qu), which is characterised by coastal dunes of the Swan Coastal Plain, with calcareous deep sands and yellow sands, and is represented by coastal scrub (Department of Primary Industries and Regional Development, 2018).

#### 2.2.4 Hydrography

The Survey Area does not intersect any geomorphic wetlands or other major waterbodies mapped by DWER (Department of Water and Environmental Regulation, 2018). Two conservation category wetlands (CCW) occur to the east and northeast of the Survey Area. All hydrographic features in the vicinity of the Survey Area are described in Table 2 and shown in Figure 2.

**Table 2: Hydrographical features in the vicinity of the Survey Area**

Hydrographical Feature			Distance from the Survey Area
Level and Type	Name	UFI	
Major Tributary – Lake Perennial	Lake Cooloongup	6385	Located 3.4 km southeast
Major Tributary – Swamp	Bollard Bulrush Swamp	15866	Located 6.2 km east
Minor River – Main Drain	Peel Main Drain	N/A	Located 6.6 km east
Insignificant Tributary – Drain	Bertram Drain	N/A	Located 7 km northeast
Major Tributary – Lake	Spectacles South	6537	Located 7.4 km northeast
Minor River – Lake	The Spectacles Wetland	6,39	Located 7.9 km northeast
CCW	Unnamed	6389	Located 2 km northeast
CCW	Unnamed	6392	Located 1.5 km east

#### 2.2.5 Broad Vegetation Types

##### 2.2.5.1 Beard/Shephard Vegetation Types

Mapping of pre-European vegetation in Western Australia was completed on a broad scale (1:1,000,000) by Beard (1976). These vegetation types were later refined by Shepherd et al. (Shepherd, Beeston, and Hopkins, 2002) resulting in 819 vegetation types.

The Survey Area is mapped over one broad system association, Rockingham 3048, which comprises mixed heath with scattered tall shrubs (*Acacia* spp., Proteaceae, and Myrtaceae (Figure 3). Representation of the vegetation system association at a local, regional, and state level is shown in Table 3.



**Table 3: Representations of the vegetation association 3048 at the state, regional, and local levels (Government of Western Australia, 2019).**

Extent			
Pre-European (ha)	Current (ha)	Remaining (%)	Managed in DBCA Lands (%)*
<b>Representation across Western Australia</b>			
12,100.76	3,055.38	25.25	28.25
<b>Representation across the Swan Coastal Plain Bioregion</b>			
10,418.06	3,043.13	29.21	28.13
<b>Representation across the Perth Subregion</b>			
10,418.06	3,043.13	29.21	28.13
<b>Representation across the City of Kwinana</b>			
1,328.25	176.51	13.29	9.02
<b>Representation across the City of Rockingham</b>			
9,147.49	2,735.19	29.90	28.70

#### 2.2.5.2 Heddle Vegetation Complexes

Mapping by (Heddle, Loneragan and Havel, 1980) is based on the relationship to the landform-soil units determined by (Churchward and McArthur, 1980). The delineation of vegetation complexes is based on the concept of a series of plant communities forming regularly repeating complexes associated with a particular soil unit.

The (Heddle, Loneragan and Havel, 1980) mapping identified that the Survey Area occurs over the Quindalup complex, which is summarised in Table 4. The Quindalup complex is a dune complex consisting mainly of two alliances:

- The strand and fore-dune alliance
- The mobile and stable dune alliance.

Local variations include the low closed forest of *Melaleuca lanceolata* (Rottnest Teatree) - *Callitris preissii* (Rottnest Island Pine), the closed scrub of *Acacia rostellifera* (Summer-scented Wattle) and the low closed *Agonis flexuosa* (Peppermint) forest of Geographe Bay.

In 2016 the extension of vegetation complex mapping to landform boundaries within the Swan Coastal Plain landform and forested region of south-west Western Australia was undertaken (Webb A, Kinloch J, Keighery G, 2016). This involved extending and consolidating the (Heddle, Loneragan and Havel, 1980) 1:250,000 mapping, to the boundary of the Swan Coastal Plain and

Dandaragan Plateau landforms and the extension and consolidation of the (Mattiske and Havel, 1998) 1:50,000 mapping to the boundaries of the Whicher Scarp and Darling Plateau landforms. This has removed overlaps and different scale joins ensuring that the full extent of each landform is mapped at the same scale.

**Table 4: State Representation of the Quindalup Complex**

Pre-European area (ha)	Current extent (ha)	Remaining (%)
54,573.87	33,011.64	60.49

#### 2.2.6 Conservation and Environmentally Sensitive Areas

The Survey Area is not identified within a Conservation Area (Figure 4) (Department of Biodiversity Conservation and Attractions, 2021a). The nearest conservation areas are:

- An unnamed conservation and recreation reserve located 1.8 km southeast of the Survey Area and is vested under the Conservation Commission of Western Australia
- Leda Nature Reserve, which is located 2.8 km southeast of the Survey Area and is vested under the Conservation Commission of Western Australia.

The Conservation Area Alumina Reserve (R 52979), which is not currently listed in the State GIS database, is adjacent to the southern boundary of the Survey Area (City of Rockingham, 2021).

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

The Survey Area intersects a mapped ESA, which is associated with the Woodlands over sedgeland in Holocene dune swales of the southern Swan Coastal Plain TEC (CR, EN) (Department of Water and Environmental Regulation, 2020)(Figure 4).

##### 2.2.6.1 Bush Forever

Bush Forever is a State Government Policy and program that identifies 51,200 ha of regionally significant vegetation for protection, covering 26 vegetation complexes. This amounts to approximately 18% of the original vegetation on the Swan Coastal Plain (SCP) portion of the Perth Metropolitan Area. Regionally significant vegetation has been identified based on criteria relating to its conservation value. Important criteria in the identification process include the achievement, where possible, of a comprehensive representation of all the ecological communities originally occurring in the region, principally through protecting a target of at least 10% of each vegetation complex in the Bush Forever project boundary (Government of Western Australia, 2000).

There are no Bush Forever sites within the Survey Area, the closest occurrence is BF 349, located 1.3 km east of the Survey Area (Figure 4).

#### 2.2.6.2 Ecological linkages

The purpose of the Regional Ecological Linkages identified by the Perth Biodiversity Project was to link protected natural areas with other areas of mapped native vegetation. Priority was given to identifying linkages through those areas having the greatest assumed protection and to those areas that maximised opportunities to form continuous corridors of native vegetation.

Ecological linkages are not legislatively protected but the EPA expects that in preparing plans and proposals for development, consideration will be given to both the site-specific biodiversity conservation values of patches of native vegetation, as well as to the landscape function and core linkage significance of a patch in supporting the maintenance of an ecological linkage. The Survey Area does not form part of the Perth Biodiversity Project's Draft Regional Ecological linkage network and the nearest linkage (Linkage ID 76) runs north-south approximately 2.2 km to the east (Figure 4).

## 3 Methods

### 3.1 Desktop Assessment

#### 3.1.1 Literature Review

Background information on the Survey Area and surrounds was compiled prior to the field survey (see Section 4.1.1 and 4.2.1). Historical vegetation mapping (Beard, 1976; Shepherd, Beeston and Hopkins, 2002), land systems mapping (Department of Primary Industries and Regional Development, 2018), and the IBRA classification system (Mitchell, Williams and Desmond, 2002) were consulted to provide broad contextual knowledge of the vegetation units and habitat likely to be encountered within the Survey Area.

The literature review also considered a selection of biological reports detailing assessments undertaken in the region, that were either publicly available or provided by Advisian:

- Assessment of Vegetation Access Road, Lussky – Hope Valley Road (Landform Research, 2015), Approximately 7.7 km north of the Survey Area
- Covalent Lithium Refinery Environmental Approvals – Threatened Species Assessment (GHD, 2019), Approximately 3 km north of the Survey Area
- Flora and Fauna Assessment of Proposed Kwinana Ethanol Bio-Refinery (Umwelt Environmental Consultants, 2006), Approximately 1 km west of the Survey Area
- Kwinana Island Vegetation Assessment (Strategen JBS&G, 2019), Approximately 1.7 km north of the Survey Area
- Kwinana Nickel Refinery Eucalyptus gomphocephala (Tuart) TEC Assessment (Biologic, 2021), 0.5 km north west of the Survey Area
- Kwinana Nickel Refinery – Native Vegetation Clearing Permit Supporting Document for the Effluent Storage Pond Project (BHP Billiton Nickel West Pty Ltd, 2019), 0.5 km north west of the Survey Area
- Lot 101 Mandurah Road, Lakelands, Fauna Assessment (Harewood, 2014), 22 km south of the Survey Area
- Lots 511 and 512 Rockingham Road, Kwinana Beach (Strategen Environmental, 2019), 3 km northeast of the Survey Area
- Memorandum: Targeted Black Cockatoo hollow inspection (GHD, 2020), 2 km north-east of the Survey Area.

#### 3.1.2 Database Searches

Database searches were undertaken to compile a list of potential flora and fauna and identify potential conservation significant flora, fauna, and ecological communities within or surrounding the Survey Areas (Table 5). In addition, an EPBC Protected Matters Search (PMST) was undertaken to identify the potential for Matters of National Environmental Significance

(MNES) to occur within or surrounding the Survey Area (Department of Agriculture Water and the Environment, 2020).

**Table 5: Database Searches of the Survey Area**

Database Name	Date Received	Search Target	Search Area
Threatened and Priority Ecological Communities database search (Department of Biodiversity Conservation and Attractions, 2021d)	15 October 2021	Threatened Ecological Communities (TECs) and Priority Ecological Communities (PECs)	10 km buffer around the Survey Area
Threatened and Priority Flora (TPFL) database search (Department of Biodiversity Conservation and Attractions, 2020)	12 October 2021	Threatened and Priority Flora	18 km buffer around the Survey Area
Western Australian Herbarium flora database search (Department of Biodiversity Conservation and Attractions, 2021f)			
DBCA Threatened and Priority Fauna database search inclusive of Black Cockatoo (Department of Biodiversity Conservation and Attractions, 2021e)	27 October 2021	Threatened and Priority Fauna	8 km (fauna) and 10 km (Black Cockatoo) buffer around the Survey Area
NatureMap (Department of Biodiversity Conservation and Attractions, 2021f)	8 October 2021	Threatened and Priority flora and fauna, and inventory of potential flora and fauna	10 km buffer around the Survey Area
Protected Matters Search Tool (Department of Agriculture Water and the Environment, 2021)		Commonwealth listed Threatened flora and fauna and TECs	10 km buffer around the Survey Area

### 3.1.2.1 Likelihood of Occurrence

Conservation significant flora and fauna species identified by the database searches were reviewed to determine a likelihood of occurrence both prior and post field survey. The assessment was completed based on the likelihood of occurrence criteria presented in Table 6. Only species recorded within the Survey Areas or considered as having a high or medium likelihood of occurrence are discussed in the report. Species classified as having a low likelihood of occurrence based on the above criteria are not discussed unless a justification for this classification is required.

For fauna, species identified by database searches that only occur within marine environments or are known to be extinct or locally extinct were excluded.

**Table 6: Likelihood of Occurrence Criteria**

Rank	Criteria
Previously Recorded	The species has been previously recorded in the Survey Areas
High (Likely to occur)	There are existing records of the species in close proximity to the Survey Areas (within 5 km), and for fauna has been recorded in the Survey Areas in the last 15 years; or The species is strongly linked to a specific habitat, which is present in the Survey Areas; or The species has more general habitat preferences, and suitable habitat is present.
Medium (May occur)	There are existing records of the species from the locality (within 10 km), however: The species is strongly linked to a specific habitat, of which only a small amount is present in the Survey Areas; or The species has more general habitat preferences, but only some suitable habitat is present. There is suitable habitat in the Survey Area, but the species is recorded infrequently in the locality.
Low (Unlikely to occur)	The species is linked to a specific habitat, which is absent from the Survey Areas; or Suitable habitat is present, however there are no existing records of the species from the locality despite reasonable previous search effort in suitable habitat; or There is some suitable habitat in the Survey Areas, however the species is very infrequently recorded in the locality.

## 3.2 Field Surveys

The detailed flora, basic fauna and black cockatoo survey was undertaken in Spring 2021. The detailed flora and vegetation survey was led by Principal Botanist Narelle Whittington (Flora Licenses FB6200177-2, TFL 2223-0068) with assistance from Ecologist Bridget Duncan (FB620000370) and Botanist, Megan Young (FB62000388). The basic terrestrial vertebrate fauna and black cockatoo surveys were undertaken by Senior Ecologists Lukas Geidans and Poppy

Walker and Ecologists Lachlan Crossley and Bridget Duncan. Survey effort is demonstrated in Figure 5.

### 3.3 Flora and Vegetation

#### 3.3.1 Establishment of Flora Sites

One quadrat was established in the H2 Refueller Survey Area (10 x 10 m) with corners aligned to northwest, northeast, southeast and southwest, and accurately measured using measuring tapes. The northwest corner of the quadrat was demarcated with an aluminium fence dropper. A comprehensive record of the flora present at the time of sampling was recorded within the quadrat.

The following was recorded using a Fulcrum mobile data collection device:

- Site code
- Date and personnel
- Landform and soil description
- Relevant site descriptors including, slope, aspect, litter cover, bare ground cover and fire history
- Inventory of vascular flora including the approximate average height and percentage foliar cover for each taxon recorded
- Vegetation description in accordance with the National Vegetation Information System (NVIS), Level 5 'association', whereby the dominant growth form, height, cover and species (three species) for the three traditional strata (upper, mid, and ground) are described
- Vegetation condition in accordance with the South West and Interzone Botanical Provinces vegetation condition scale (Environmental Protection Authority, 2016c) and evidence of disturbance (for example clearing, rubbish, feral animals, weed incursion and evidence of feral animals and dieback) where present
- Photograph of the vegetation occurring within the site.

#### 3.3.2 Opportunistic Flora

Additional flora taxa observed opportunistically around flora sites or while traversing on foot within the Survey Area were also recorded. Where populations of conservation significant flora taxa, Declared Pests (DPs) or WoNS were encountered, a GPS location and a count of the individuals present was recorded.

### 3.3.3 Targeted Searching

Conservation significant flora likelihood of occurrence was determined prior to commencing the field survey. Field personnel familiarised themselves with photographs, reference samples and descriptions of these taxa before conducting the survey.

Each field botanist actively searched for conservation significant flora species in and around flora sites, while traversing on foot within the Survey Area and in known locations or preferred habitat encountered in the Survey Area.

In the event Threatened or Priority flora were encountered in the field, a GPS location was taken, and a count of individuals was recorded, followed by a search in the local vicinity to determine if any other individuals were present nearby and delineate population boundaries where relevant. Specimens of any potential conservation significant flora that could not be identified in the field were collected for identification and lodgement at the Western Australian Herbarium (WAH).

### 3.3.4 Vegetation Type and Condition Mapping

The H2 Refueller Survey Area was surveyed as part of broader works for Woodside Energy in 2021 (360 Environmental part of SLR Consulting, 2022). Vegetation types and condition mapping was conducted in the field, with boundaries delineated over aerial photography, at a scale of 1:2,000.

Broad vegetation units were refined based on taxonomic identification of flora collections, and mapping notes taken during the field survey. Vegetation condition mapping was refined based on site data and mapping notes. Finalised polygons were digitised and produced as electronic mapping data using GIS software.

### 3.3.5 Taxonomy and Nomenclature

Where field identification of plant taxa was not possible, specimens were collected for identification using resources of the WAH. Identification of flora collections was completed by Narelle Whittington.

The finalised species list was checked against FloraBase (Department of Biodiversity Conservation and Attractions, 2021b) to determine the conservation status and known distribution of each taxon. Introduced species were compared against the current BAM Act Declared Plants list and the WoNS list to determine their control status (Department of the Environment and Energy, 2020).

### 3.3.6 Statistical Analyses

Statistical analysis of quadrat data was undertaken in accordance with EPA guidelines for a detailed flora and vegetation survey.



#### 3.3.6.1 Multivariate Analysis

Quadrats were classified on the basis of similarity in species composition using Primer-E version 6.1.5. Species presence/absence quadrat data was pre-treated, transformed and then analysed using Bray-Curtis similarity tests.

A Bray-Curtis similarity analysis was undertaken on the floristic composition of the quadrats recorded during the survey against the weed and native flora quadrat data compiled between 1990 - 1996 for the Southern Swan Coastal Plain (SCP) (Keighery et al., 2012). The (Keighery et al., 2012) dataset combines a total of 1098 sites across the SCP and is a publicly available standardised regional vegetation dataset. Attempt was made to correlate the vegetation in the Survey Area with the Floristic Community Types (FCTs) as presented in the SCP dataset as an aid in determining the conservation significance of the vegetation surveyed.

### 3.4 Terrestrial Vertebrate Fauna

#### 3.4.1 Opportunistic Observation

Opportunistic observations of fauna were recorded throughout the Survey Area. Observations of primary evidence (direct sightings, calls) and secondary evidence (tracks, scats, diggings, etc.) were recorded. These records were documented using the mobile data collection application Fulcrum.

#### 3.4.2 Identification and Taxonomy

Where there was doubt on a species name (through subsequent name changes or taxonomic reviews), an effort was made to determine the current scientific name for each taxon. Taxonomy and nomenclature in this report follows the WA Museum checklist 2022 (Western Australian Museum, 2022) where relevant.

### 3.5 Black Cockatoo Habitat

#### 3.5.1 Foraging Habitat

The black cockatoo assessment involved assessing the habitat for tree and shrub species known to be important dietary items e.g. Marri and *Banksia* spp. as outlined within the Referral Guideline for 3 WA Threatened Black Cockatoo Species (Department of Climate Change, Energy, the Environment and Water, 2022). It also included looking for:

- Evidence of feeding (chewed cones, seeds, and nut material)
- Proximity to foraging habitat outside the Survey Area
- Proximity to known breeding habitat
- Proximity to known roosting habitat
- Presence and impact of plant disease in the area
- Opportunistic observations of black cockatoos foraging or utilising the Survey Area.

Foraging habitat was mapped and classified as low or high quality using criteria based on the Foraging Habitat Scoring Tool in the Referral Guidelines (Department of Agriculture Water and the Environment, 2022).

### 3.5.2 Nesting Habitat

Tree species with the potential to form suitable hollows, including eucalypt species endemic to southwest Western Australia (e.g. Jarrah, Tuart, Marri, Wandoo, and Salmon Gum) and non-endemic eucalypt species that met the following criteria were recorded using the Fulcrum mobile data-collection application:

- Trees with a diameter at breast height (DBH) of greater than 500 mm (greater than 300 mm for Wandoo and Salmon Gum) that did not contain hollows or contained hollows that were unsuitable for black cockatoo breeding, for example hollows with an estimated opening diameter of less than 100 mm or downwards-facing hollows, were recorded as potential nesting trees
- Trees that contained hollows that were potentially suitable for black cockatoo breeding, for example upwards or sideways-facing hollows with an estimated opening diameter of greater than 100 mm (Saunders, Smith, and Rowley, 1982), were recorded as suitable nesting trees.

DBH is measured approximately 1.3 m from the ground. Hollows (if present) were observed from the ground. In instances where trees had multiple stems, the largest stem was measured. In instances where trees had swellings or forking/branching at breast height, the diameter was measured as close as possible to breast height, above or below the swelling/forking, to gain a more accurate measurement of diameter.

### 3.5.3 Roosting Habitat

Areas suitable for black cockatoo night roosting (i.e., tall trees in or near riparian environments, or on the fringes of forests) were identified and recorded. If observed, evidence of roosting such as scat at the base of trees was recorded (lack of roosting evidence does not rule out the possibility of black cockatoo roosting as dusk/dawn surveys were not undertaken).

## 3.6 Limitations

Limitations and constraints of the flora, vegetation, and fauna assessment are detailed below in Table 7.

**Table 7: Limitations and Constraints Associated with the Survey**

Variable	Constraint (Yes/Partial/No)	Potential Constraints on Survey Outcomes
<b>Survey Scope</b>	Partial	<p>The 2021 detailed flora and vegetation surveys were undertaken in accordance with (Environmental Protection Authority, 2016a) and was considered appropriate to support approvals applications. The H2 Refueller station Survey Area was not resurveyed for the purpose of the project.</p> <p>Targeted searching for flora of conservation significance was undertaken, searching focussed on habitat suitable for conservation significant flora.</p> <p>A basic terrestrial vertebrate fauna and black cockatoo survey was undertaken in accordance with EPA Technical Guidance (Environmental Protection Authority, 2020) and EPBC Act Referral Guidelines (Department of Agriculture Water and the Environment, 2022) and was considered appropriate to support approvals applications.</p>
<b>Availability of Data</b>	No	<p>All data required to complete the scope of works including regional and local contextual information was available.</p>
<b>Access and Survey Intensity</b>	No	<p>The location of the proposed H2 Refueller station doesn't contain any quadrats, however, the data was acquired from the 2021 survey report. Additional mapping notes were undertaken to aid vegetation mapping and delineation.</p> <p>Given the degraded condition of the Survey Area, sufficient time was allocated to the flora and vegetation survey.</p> <p>The entirety of the Survey Area was traversed.</p> <p>The basic fauna survey consisted of opportunistic fauna records, fauna habitat assessment, and black cockatoo assessments.</p>
<b>Experience</b>	No	<p>The flora and vegetation survey was undertaken by botanists Narelle Whittington and Bridget Duncan, who have experience conducting surveys of similar scope throughout Western Australia, including the Perth region.</p> <p>The fauna and black cockatoo survey was undertaken by Senior Ecologists Lukas Geidans and Poppy Walker and Ecologist Lachlan Crossley who have experience conducting surveys of similar scope throughout Western Australia, including the Perth region.</p>

Variable	Constraint (Yes/Partial/No)	Potential Constraints on Survey Outcomes
<b>Timing, weather, season</b>	No	<p>The recommended primary survey period for the region as per the EPA Technical Guidance is Spring (September – November). The survey was undertaken within the recommended timing period.</p> <p>In the three months prior to the 2021 survey 365.0 mm of rainfall was recorded, which is 24.4 mm above the long-term average of 340.6 mm for the same period.</p> <p>Weather during the survey periods did not affect the adequacy of the survey.</p>
<b>Life forms sampled</b>	No	<p>The Survey Area was traversed on foot and all remnant vegetation was surveyed. All dominant flora species were recorded within each vegetation unit.</p> <p>All life forms and broad habitats occurring within the Survey Area were identified. The basic fauna survey utilised passive detection methods and resulted in five species from five families being recorded. Fauna habitat assessments were conducted and identified four broad fauna habitat types (excluding cleared). The black cockatoo survey identified a total of 0.81 ha of foraging habitat and 12 potential breeding trees throughout the Survey Area.</p>
<b>Disturbances (fire, flood etc.)</b>	No	<p>No disturbances were a constraint on the results of the survey.</p>
<b>Completeness</b>	Partial (Flora)	<p>A complete detailed flora and vegetation survey was undertaken in 2021, all vegetation types were surveyed and delineated within the Survey Area. The location of the proposed H2 Refueller Station did not have three quadrat established within its boundary; however, mapping notes and targeted searches were undertaken within the survey boundary.</p> <p>The survey was considered complete for a basic vertebrate fauna survey and black cockatoo assessment.</p>

## 4 Results

### 4.1 Flora and vegetation

#### 4.1.1 Literature Review

The key findings of the flora and vegetation reports reviewed are summarised in Appendix A.

#### 4.1.2 Database searches

The database searches identified 53 extant conservation significant flora species occurring within a 30 km buffer (Figure 6, Appendix B). This included:

- 13 Threatened species
- Four Priority 1 species
- Four Priority 2 species
- 18 Priority 3 species
- 14 Priority 4 species.

No additional taxa of conservation significance were identified by the literature review.

The database search identified 10 Commonwealth and/or State listed TECs and DBCA-listed PECs and their buffers within 20 km of the Survey Area (Table 8; Figure 7).

One State and Commonwealth listed TEC was identified within the Survey Area by the database searches, the Woodlands over sedgeland in Holocene dune swales of the southern Swan Coastal Plain (SCP19b), which is listed by the State as Critically Endangered and listed by the Commonwealth as Endangered.

One State listed PEC was identified within the Survey Area by the database searches, the Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain (Priority 3).

**Table 8: TECs and PECs within 20 km of the Survey Area**

Community ID	Community Name	State Listing	Commonwealth Listing
SCP20a	<i>Banksia attenuata</i> woodlands over species rich dense shrublands (floristic community type 20a as originally described in Gibson et al. (1994))	EN	EN
SCP22	<i>Banksia ilicifolia</i> woodlands	P3	Subcommunity of Banksia WL SCP
Banksia WL SCP	Banksia Woodlands of the Swan Coastal Plain ecological community	P3	EN
SCP21c	Low lying <i>Banksia attenuata</i> woodlands or shrublands	P3	Subcommunity of Banksia WL SCP

Community ID	Community Name	State Listing	Commonwealth Listing
SCP26a	<i>Melaleuca huegelii</i> - <i>Melaleuca systena</i> shrublands on limestone ridges (floristic community type 26a as originally described in Gibson et al. (1994))	EN	-
SCP24	Northern Spearwood shrublands and woodlands	P3	Subcommunity of Banksia WL SCP
SCP10a	Shrublands on dry clay flats (floristic community type 10a as originally described in Gibson et al. (1994))	EN	CR
SCP25	Southern <i>Eucalyptus gomphocephala</i> - <i>Agonis flexuosa</i> woodlands	P3	Subcommunity of Tuart woodlands
SCP23b	Swan Coastal Plain <i>Banksia attenuata</i> - <i>Banksia menziesii</i> woodlands	P3	Subcommunity of Banksia WL SCP
Tuart woodlands	Tuart ( <i>Eucalyptus gomphocephala</i> ) woodlands and forests of the Swan Coastal Plain	P3	CR

T = Threatened, CR = Critically Endangered, EN = Endangered, VU = Vulnerable, P = Priority

#### 4.1.3 Likelihood of Occurrence

The conservation significant species identified in the desktop assessment were reviewed for their likelihood of occurrence within the Survey Area based on the criteria outlined in Table 6. Prior to the field survey, of the 53 extant vascular species identified in the desktop assessment:

- No taxa had previously been recorded within the Survey Area
- Four taxa were considered to have a high likelihood of occurrence
- Twenty-three taxa were considered to have a medium likelihood
- Twenty-six taxa were considered to have a low likelihood of occurrence.

The post field survey likelihood assessment considered the habitat types observed, vegetation condition and survey effort, which, resulted in:

- No taxa were considered to have a high likelihood of occurrence
- One taxon was considered to have a medium likelihood of occurrence
- Fifty-two taxa were considered to have a low likelihood of occurrence.

The likelihood assessment is displayed in Appendix C.

#### 4.1.4 Flora of Conservation Significance

No Threatened flora species pursuant to the EPBC Act and/or gazetted as Threatened pursuant to the BC Act were recorded during the survey. Additionally, no DBCA listed Priority species were recorded within the Survey Area.

#### 4.1.5 Introduced Flora

A total of 13 introduced taxa were recorded within the Survey Area. The introduced taxa of the Survey Area are primarily weedy grasses that are widespread on the Swan Coastal Plain, such as Bearded Oat (*\*Avena barbata*), Shivery Grass (*\*Briza minor*), and Great Brome (*\*Bromus diandrus*). Two of the weed species are listed as Declared Pests under the BAM Act (*\*Asparagus asparagoides* and *\*Zantedeschia aethiopica*) *\*Asparagus asparagoides* is also listed as a WoNS (Table 9, Figure 9) (Department of the Environment and Energy, 2020).



**Table 9: Introduced Flora Taxa within the Survey Area**

Species	Common Name	Status under BAM Act	WONS
<i>*Asparagus asparagoides</i>	Bridal Creeper	Declared Pest - s22(2)	Yes
<i>*Avena barbata</i>	Bearded Oat	Permitted - s11	No
<i>*Avena fatua</i>	Wild Oat	Permitted - s11	No
<i>*Briza minor</i>	Shivery Grass	Permitted - s11	No
<i>*Bromus diandrus</i>	Great Brome	Permitted - s11	No
<i>*Euphorbia peplus</i>	Petty Spurge	Permitted - s11	No
<i>*Euphorbia terracina</i>	Geraldton Carnation Weed	Permitted - s11	No
<i>*Galium murale</i>	Small Goosegrass	Permitted - s11	No
<i>*Lagurus ovatus</i>	Hare's Tail Grass	Permitted - s11	No
<i>*Lysimachia arvensis</i>	Pimpernel	Permitted - s11	No
<i>*Petrorhagia dubia</i>	Hairy pink	Permitted - s11	No
<i>*Sonchus oleraceus</i>	Common Sowthistle	Permitted - s11	No
<i>*Zantedeschia aethiopica</i>	Arum Lily	Declared Pest - s22(2)	No



#### 4.1.6 Vegetation Types

Four vegetation types were described and mapped within the Survey Area (Table 10, Figure 8), excluding cleared areas. Quadrat site sheet for vegetation type BI is in Appendix D.

**Table 10: Vegetation types occurring within the Survey Area**

Vegetation Unit and Description*	Total Area, Proportion of the Survey Area	Representative Photograph
<b>Ar:</b> <i>Acacia rostelifera</i> ( <i>Clematis linearifolia</i> , <i>Spyridium globulosum</i> and <i>Melaleuca huegelii</i> ) tall closed shrubland over <i>*Ehrharta longiflora</i> and <i>*Avena barbata</i> low to mid closed grassland over <i>*Euphorbia peplus</i> and <i>*Euphorbia terracina</i> low sparse forbland.	0.13 ha 10%	
<b>Bl:</b> <i>Banksia littoralis</i> low open woodland over <i>Melaleuca huegelii</i> , ( <i>Xanthorrhoea preissii</i> ) and <i>Acacia rostelifera</i> ( <i>Spyridium globulosum</i> ) mid to tall shrubland over <i>*Ehrharta longiflora</i> and <i>*Bromus diandrus</i> low grassland over <i>Gahnia trifida</i> mid sparse sedgeland over <i>*Euphorbia peplus</i> and <i>*Euphorbia terracina</i> low forbland	0.11 ha 9%	



Vegetation Unit and Description*	Total Area, Proportion of the Survey Area	Representative Photograph
<b>EgSg:</b> <i>Eucalyptus gomphocephala</i> mid woodland over <i>Acacia rostellifera</i> , <i>Spyridium globulosum</i> , * <i>Olea europaea</i> and ( <i>Melaleuca huegelii</i> , <i>Clematis linearifolia</i> ) tall shrubland over * <i>Avena barbata</i> , * <i>Ehrharta longiflora</i> and * <i>Lolium rigidum</i> low grassland over * <i>Euphorbia peplus</i> , * <i>Asparagus asparagoides</i> and * <i>Euphorbia terracina</i> low to mid sparse forbland.	0.57 ha 45 %	
<b>Xp:</b> <i>Xanthorrhoea preissii</i> mid shrubland to closed shrubland with scattered <i>Acacia rostellifera</i> , <i>Hakea prostrata</i> and <i>Clematis linearifolia</i> .	0.32 ha 26 %	
<b>Cleared</b>	0.12 ha 10 %	

\*Brackets indicate species that may or may not be present, but were observed as dominant at some of the sites that make up the vegetation type

#### 4.1.7 Vegetation Condition

Vegetation condition within the Survey Area predominantly ranged from Degraded to Completely Degraded (Figure 9). The industrial and urban setting of the Survey Area means that the majority of the native vegetation has been subject to severe disturbance. Introduced species and historical clearing have had the largest impact on reducing native species diversity and density. Native understory species are absent across large sections of the Survey Area, with extensive areas of weeds occurring. Vegetation condition within the Survey Area is summarised in Table 11.

**Table 11: Vegetation Condition within the Survey Area**

Vegetation Condition	Extent within the Survey Area (ha)*
Degraded	0.73 58.4%
Completely Degraded	0.40 32%
Cleared	0.12 9.6%

\*Rounded to the nearest decimal place.

#### 4.1.8 Floristic Community Types Analysis

Within the H2 Refueller Survey Area, one quadrat is present in vegetation type Bl. No quadrats were established within vegetation types Ar, EgSg or XP within the H2 Refueller Survey Area during the 2021 survey. Instead, the Floristic Community Types (FCTs) have been determined by the statistical analysis undertaken on the quadrats in the surrounding area as part of the 360 Environmental (2021) survey. The statistical analysis is presented in Appendix E.

The FCT analysis (nearest neighbour method) of the quadrat data within vegetation types Bl, Ar and SgEg (no quadrats were established in Xp vegetation type) identified nine Swan Coastal Plain (SCP) floristic community types, which were statistically similar to the vegetation recorded in and adjacent to the H2 Refueller Station Survey Area. These were:

- FCT S11 – Northern *Acacia rostellifera* – *Melaleuca systema* shrublands
- FCT S07 – Northern woodlands to forests over tall sedgeland alongside permanent wetlands
- FCT S13 – Northern *Olearia axillaris* – *Scaevola crassifolia* shrublands
- FCT S15 – Weed group (not allied with any supergroup)
- FCT SCP 17 – *Melaleuca raphiophylla* – *Gahnia trifida* seasonal wetlands
- FCT SCP 24 – Northern Spearwood shrublands and woodlands
- FCT SCP 29a – Coastal shrublands on Shallow sands

- FCT SCP 29b – Acacia shrublands on taller dunes
- FCT SCP 30a2 - *Callitris preissii* and/or *Melaleuca lanceolata* forests and woodlands.

The outcomes of the statistical analysis were unreliable, and as a result further validation of the FCTs that included using key information like the presence of indicator species, soil types and landform position as well as knowledge of regional occurrences inferred the following FCTs as potentially being present within the Survey Area:

- FCT SCP 17 – *Melaleuca raphiophylla* - *Gahnia trifida* seasonal wetlands
- FCT SCP 29b – Acacia shrublands on taller dunes
- FCT SCP 25 – Southern Swan Coastal Plain *Eucalyptus gomphocephala* – *Agonis flexuosa* woodlands/Tuart (*Eucalyptus gomphocephala*) woodlands of the Swan Coastal Plain.

#### 4.1.9 Vegetation of Conservation Significance

Two of the FCTs identified as potentially occurring in the Survey Area are listed as conservation significant:

- FCT SCP 29b – Acacia shrublands on taller dunes is listed as Priority 3 by the State and is not listed under the EPBC Act
- FCT SCP 25 – Southern Swan Coastal Plain *Eucalyptus gomphocephala* - *Agonis flexuosa* woodlands is listed as Priority 3 by the State but can also potentially be considered, in association with (form part of) Tuart (*Eucalyptus gomphocephala*) Woodlands and forests of the Swan Coastal Plain ecological community which is listed under the EPBC Act.

##### 4.1.9.1 *Eucalyptus gomphocephala* (Tuart) TEC Assessment

One patch of Tuarts was identified within the Survey Area, the patch was defined based on the distances between the Tuart trees, where trees within 60 m of each other are considered part of the same 'patch' (Figure 10). The patch was initially selected based on the diagnostic criteria (Table 12) followed by an assessment against the condition thresholds (Table 13).

**Table 12: Assessment of Key Diagnostic Characteristics**

<b>Location</b>	The patch occurs on the Swan Coastal Plain bioregion
<b>Soil Type</b>	The Patch occurs within the Quindalup and Spearwood dune systems
<b>Dominant Canopy Species</b>	Tuart ( <i>Eucalyptus gomphocephala</i> ) was the dominant overstorey species.
<b>Vegetation Unit Structure</b>	Patches consisted of Tuart woodland, Tuart Forest, or isolated trees over weeds
<b>Native Understorey Composition</b>	Patches consisted of Degraded to Completely Degraded native understorey shrubs, forbs, and grasses. There were locations where native understorey was absent

As evident in Table 12, the Tuart 'Patch' meets the criteria for Tuart (*Eucalyptus gomphocephala*) Woodlands and forests of the Swan Coastal Plain ecological community.

**Table 13: Condition Thresholds Assessment of Patches within the Survey Area**

Key Criteria Assessment	Biotic Threshold	Patch Size within Survey Area (ha)	Total Patch Size including outside Survey Area (ha)	Meets TEC Criteria
<p>Meets criteria:</p> <ul style="list-style-type: none"> <li>Occurs on Swan Coastal Plain Bioregion</li> <li>Quindalup and Spearwood soils</li> <li>Presence of more than 2 living established Tuart trees in upper canopy</li> <li>Woodland and Forest structure</li> <li>Understory of native species typically present</li> <li>Native fauna species present.</li> </ul>	<p>Poor Condition:</p> <ul style="list-style-type: none"> <li>Has minimal or no native cover</li> <li>&lt;50% of all understorey vegetation cover is native; and</li> <li>Less than 4 native understorey species per 10 m x 10 m plot.</li> </ul>	0.57	58.42	<p><b>Yes</b></p> <p>All patches &gt;5 ha are part of the nationally protected ecological community regardless of its understorey condition.</p>

#### 4.1.10 Regional Representation

Vegetation mapping units described in the Survey Area were correlated with the Beard (1976) and Shepherd et al. (2002) broad vegetation types by examining similarities in vegetation descriptions (Table 14). Differences exist with the terminology used in the descriptions as they are based on different methods of categorising and characterising vegetation types, and the different spatial scale of the analysis (i.e. region vs. local scale).

**Table 14: Representation of Broad Vegetation Types and Surveyed Vegetation Types**

Vegetation Type and Description	Corresponding Vegetation Association	Vegetation Type Extent in Survey Area (ha)
Rockingham 3048 (Beard, 1976)	Ar and Xp	0.45 (35.92%)
Quindalup (Mattiske & Havel, 1998)	Ar and Xp	0.45 (35.92%)

## **4.2 Terrestrial Vertebrate Fauna**

### **4.2.1 Desktop Assessment**

The desktop assessment identified 84 conservation significant terrestrial vertebrate fauna species potentially occurring within the Survey Area, comprising 46 birds, eight mammals and three reptiles. These are discussed further in Section 4.2.4.

Key findings of the literature review are summarized below in Appendix A. Database search results are presented in Figure 11, Figure 12 and Appendix B.


### **4.2.2 Fauna Habitat**

The Survey Area extended across four different fauna habitat types (excluding cleared areas). A description and extent are provided for each fauna habitat in Table 15. Fauna habitat mapping is presented in Figure 13.

**Table 15: Fauna habitats within the Survey Area**

Fauna habitat	Extent within Survey Area*		Habitat Description	Representative Photo
	Area (ha)	%		
Acacia/Melaleuca Shrubland	0.13	10 %	<p><i>Acacia rostellifera</i>, <i>Clematis linearifolia</i>, <i>Spyridium globulosum</i> and <i>Melaleuca huegelii</i> shrubland over <i>*Ehrharta longiflora</i>, <i>*Bromus diandrus</i> and <i>*Avena barbata</i> grassland over <i>*Euphorbia peplus</i>, <i>*Euphorbia terracina</i>, <i>*Asparagus asparagoides</i> low sparse forbland.</p> <p>Peeling bark, leaf litter, and woody debris provide shelter for small reptiles and mammals. Shrublands provide shelter and foraging habitat for birds, reptiles, and mammals.</p> <p>Quenda and Perth Sliders may use this habitat for foraging and shelter.</p> <p>The condition of this fauna habitat varied from highly degraded to good.</p>	
Banksia Woodland	0.11	9%	<p><i>Banksia littoralis</i> woodland over <i>Melaleuca huegelii</i>, <i>Xanthorrhoea preissii</i>, <i>Acacia rostellifera</i> and <i>Spyridium globulosum</i> shrubland over <i>*Ehrharta longiflora</i> and <i>*Bromus diandrus</i> grassland over <i>Gahnia trifida</i> sedgeland over <i>*Euphorbia peplus</i> and <i>*Euphorbia terracina</i> forbland.</p> <p>Peeling bark, leaf litter, and woody debris provide shelter for small reptiles and mammals. Shrublands provide shelter and foraging habitat for birds, reptiles, and mammals. <i>Xanthorrhoea sp.</i> grass skirts provide excellent sheltering opportunities for mammals and reptiles.</p> <p>Black Cockatoos may feed on <i>Banksia</i> cones. Quenda may use this habitat for foraging and shelter. Western Brush Wallabies may use this habitat for foraging and shelter. Perth Sliders may use this habitat.</p>	



Fauna habitat	Extent within Survey Area*		Habitat Description	Representative Photo
	Area (ha)	%		
			The condition of this fauna habitat was disturbed.	
Tuart Woodland	0.57	45 %	<p>Tuart (<i>Eucalyptus gomphocephala</i>) woodland over <i>Melaleuca lanceolata</i>, <i>Acacia rostellifera</i> and <i>Spyridium globulosum</i> shrubland over *<i>Tetragonia decumbens</i>, <i>Clematis linearifolia</i> and <i>Templetonia retusa</i> shrubland over *<i>Bromus diandrus</i>, *<i>Avena barbata</i> and *<i>Ehrharta longiflora</i> grassland over *<i>Sonchus oleraceus</i>, *<i>Euphorbia peplus</i>, *<i>Asparagus asparagoides</i> and *<i>Euphorbia terracina</i> forbland.</p> <p>Peeling bark, leaf litter, and woody debris provide shelter for small reptiles and mammals. Shrublands provide shelter and foraging habitat for birds, reptiles, and mammals. Hollows provide shelter and foraging habitat for birds and mammals.</p> <p>The Carnaby's Cockatoo and the Forest Red-tailed Black Cockatoo may use hollows for breeding and feed on Tuart blossoms. Quenda, and Western Brush Wallabies may use this habitat for foraging and shelter. Perth Sliders may use this habitat.</p> <p>The condition of this fauna habitat varied from highly degraded to good.</p>	

Fauna habitat	Extent within Survey Area*		Habitat Description	Representative Photo
	Area (ha)	%		
<i>Xanthorrhoea</i> Shrubland	0.32	26 %	<p><i>Xanthorrhoea preissii</i> shrubland with scattered <i>Acacia rostellifera</i>, <i>Hakea prostrata</i>, and <i>Clematis linearifolia</i> shrubs.</p> <p>Peeling bark, leaf litter, and woody debris provide shelter for small reptiles and mammals. Shrublands provide shelter and foraging habitat for birds, reptiles, and mammals. <i>Xanthorrhoea sp.</i> grass skirts provide excellent sheltering opportunities for reptiles and mammals, particularly Quenda.</p> <p>Carnaby's Cockatoos may feed on <i>Hakea</i> fruits. Quenda may use this habitat for foraging and shelter. Perth Sliders may use this habitat.</p> <p>The condition of this fauna habitat varied from highly degraded to good.</p>	
Cleared	0.12	10 %	Areas that have been cleared and do not contain vegetation. These areas include roads, footpaths, and infrastructure, which do not provide habitat value to native fauna.	
<b>TOTAL</b>	<b>1.25</b>	<b>100</b>		



#### 4.2.3 Fauna Inventory

The terrestrial vertebrate fauna survey recorded a total of four bird taxa from four families and one reptile taxa from one family, summarised in Table 16. None of the recorded species are of conservation significance.

**Table 16: Overview of vertebrate fauna species recorded.**

Family	Scientific Name	Common Name
<b>AVIAN</b>		
Cacatuidae	<i>Eolophus roseicapilla</i>	Galah
Corvidae	<i>Corvus coronoides</i>	Australian Raven
Maluridae	<i>Malurus splendens</i>	Splendid Fairywren
Meliphagidae	<i>Gavicalis virescens</i>	Singing Honeyeater
<b>REPTILIAN</b>		
Scincidae	<i>Tiliqua rugosa</i>	Bobtail

#### 4.2.4 Significant Fauna Records

No fauna species of significance were recorded during the field survey.

The post-survey results identified five significant taxa as having a high likelihood of occurrence within the Survey Area:

- Carnaby's Cockatoo (*Zanda latirostris*), listed as Endangered under the BC Act and EPBC Act
- Forest Red-tailed Black Cockatoo (*Calyptrorhynchus banksii naso*), listed as Vulnerable under the BC Act and EPBC Act
- Pacific Swift (*Apus pacificus*), listed as Migratory Marine under the EPBC Act
- Quenda (*Isoodon fusciventer*), listed as Priority 4 by DBCA
- Perth Slider (*Lerista lineata*), listed as Priority 3 by DBCA.

One significant taxon was identified as having a medium likelihood of occurrence within the Survey Area:

- Western Brush Wallaby (*Notamacropus irma*), listed as Priority 4 by DBCA.

A further 51 significant taxa were assessed as having a low likelihood of occurrence within the Survey Area. Further detail regarding potential significant fauna is provided in Table 17 below.

**Table 17: Fauna likelihood table**

Family	Scientific Name	Common Name	Conservatio n Status		Source			Likelihood of Occurrence	Justification
			State	Federal	NM	PMST	DBCA		
AVIAN									
Anatidae	<i>Oxyura australis</i>	Blue-billed Duck	P4		x		x	Low	Twenty-eight DBCA records within 8 km of the Survey Area, including approximately 7 km east in 2008 and 5 km southwest in 1991. <sup>1</sup> No suitable habitat present in the Survey Area (densely vegetated freshwater lakes, swamps, dams). <sup>2</sup>
Apodidae	<i>Apus pacificus</i>	Pacific Swift (Fork-tailed Swift)	IA	MI, MA	x	x		High	Recorded within 15 km of the Survey Area in 2019 and 2000. <sup>3</sup> May use all habitats within the Survey Area (low to very high airspace over varied habitat). <sup>2</sup>
Ardeidae	<i>Botaurus poiciloptilus</i>	Australasian Bittern	EN	EN		x		Low	No nearby records identified from the database searches or literature. Only returned by PMST which searches by modelled distribution, not actual records. <sup>4</sup> No suitable habitat present in the Survey Area (freshwater wetlands with heavy vegetation, shrubbery, reedbeds, sedges). <sup>2</sup>

Family	Scientific Name	Common Name	Conservation Status		Source			Likelihood of Occurrence	Justification
			State	Federal	NM	PMST	DBCA		
<b>Ardeidae</b>	<i>Ixobrychus dubius</i>	Australian Little Bittern (Black-backed Bittern)	P4				x	Low	One DBCA record within approximately 8 km of the Survey Area, 4 km south in 1939. <sup>1</sup> No suitable habitat present in the Survey Area (freshwater swamps, lakes, and rivers with dense beds of <i>Baumea</i> , <i>Typha</i> and other tall rushes). <sup>5</sup>
<b>Cacatuidae</b>	<i>Calyptorhynchus banksii naso</i>	Forest Red-tailed Black Cockatoo	VU	VU	x	x	x	High	14 Fourteen DBCA records within 8 km of the Survey Area, including approximately 3 km east in 2016 and 5 km southwest in 2020. <sup>1</sup> Limited suitable habitat present in the Survey Area (tall eucalypt forest, woodland, feeds on seeds of large-fruited eucalypts). <sup>6</sup>
<b>Cacatuidae</b>	<i>Zanda baudinii</i>	Baudin's Cockatoo	EN	EN	x	x	x	Low	One DBCA record within 8 km of the Survey Area, approximately 3 km south in 1939. <sup>1</sup> Limited suitable habitat present in the Survey Area (forests, farm trees; feeds on Marri and wood-boring insects). <sup>2</sup>

Family	Scientific Name	Common Name	Conservation Status		Source			Likelihood of Occurrence	Justification
			State	Federal	NM	PMST	DBCA		
<b>Cacatuidae</b>	<i>Zanda latirostris</i>	Carnaby's Cockatoo	EN	EN	x	x	x	High	Recorded adjacent to and approximately 22 km south of the survey area in 2019 and 2014. <sup>7</sup> A total of 87 DBCA records within 8 km of the Survey Area, including approximately 1 km south in 2009 and 2 km east in 2017. <sup>1</sup> Suitable habitat present in the Survey Area (forests, woodlands, heathlands, farms; feeds on banksias hakeas, dryandras, pine plantations). <sup>2</sup>
<b>Charadriidae</b>	<i>Charadrius dubius</i>	Little Ringed Plover	IA	MI, MA		x		Low	No nearby records identified from the database searches or literature. Only returned by PMST which searches by modelled distribution, not actual records. <sup>4</sup> No suitable habitat present in the Survey Area (mudflats, tidal or freshwater wetlands, lakes, lagoons, ponds). <sup>2</sup>
<b>Charadriidae</b>	<i>Charadrius leschenaultii</i>	Greater Sand Plover	VU, IA	VU, MI, MA	x	x		Low	Recorded within 15 km of the Survey Area in 2010. <sup>3</sup> No suitable habitat present in the Survey Area (tidal flats, beaches). <sup>6</sup>
<b>Charadriidae</b>	<i>Charadrius mongolus</i>	Lesser Sand Plover	EN, IA	EN, MI, MA		x		Low	No nearby records identified from the database searches or literature. Only returned by PMST which searches by modelled distribution, not

Family	Scientific Name	Common Name	Conservation Status		Source			Likelihood of Occurrence	Justification
			State	Federal	NM	PMST	DBCA		
									actual records. <sup>4</sup> No suitable habitat present in the Survey Area (tidal flats). <sup>6</sup>
<b>Charadriidae</b>	<i>Pluvialis squatarola</i>	Grey Plover	IA	MI, MA	x			Low	Recorded within 15 km of the Survey Area in 2020 and 2019. <sup>3</sup> No suitable habitat present in the Survey Area (coastal, tidal flats). <sup>6</sup>
<b>Charadriidae</b>	<i>Thinornis cucullatus</i>	Hooded Plover (Hooded Dotterel)	P4	MA	x	x	x	Low	Three DBCA records within 8 km of the Survey Area, approximately 4 km south in 1998 and 4 km south in 1997. <sup>1</sup> No suitable habitat present in the Survey Area (beaches, margins of inland salt lakes). <sup>6</sup>
<b>Falconidae</b>	<i>Falco peregrinus</i>	Peregrine Falcon	OS		x		x	Low	One DBCA record within 8 km of the Survey Area, approximately 1 km south in 2009. <sup>1</sup> No suitable nesting habitat present in the Survey Area (cliff faces, stick nests built by other species). <sup>6</sup> May use the Survey Area for hunting.
<b>Glareolidae</b>	<i>Glareola maldivarum</i>	Oriental Pratincole	IA	MI, MA		x		Low	No nearby records identified from the database searches or literature. Only returned by PMST which searches by modelled distribution, not actual records. <sup>4</sup> No suitable habitat present in the Survey Area (open plains, open areas around tidal flats, beaches, wetlands). <sup>2</sup>

Family	Scientific Name	Common Name	Conservation Status		Source			Likelihood of Occurrence	Justification
			State	Federal	NM	PMST	DBCA		
Laridae	<i>Anous stolidus</i>	Common Noddy (Brown Noddy)	IA	MI, MA		x		Low	Recorded within 15 km of the Survey Area in 2019. <sup>3</sup> Only returned by PMST which searches by modelled distribution, not actual records. <sup>4</sup> No suitable habitat present in the Survey Area (oceanic). <sup>2</sup>
Laridae	<i>Anous tenuirostris melanops</i>	Australian Lesser Noddy	EN	VU, MA	x	x		Low	Recorded within 15 km of the Survey Area. <sup>3</sup> Breeds on Abrolhos Island and Black Noddy on Ashmore Reef, infrequently storm-blown to coast of mainland WA. <sup>6</sup>
Laridae	<i>Chlidonias leucopterus</i>	White-winged Black Tern	IA	MI, MA	x			Low	Recorded within 15 km of the Survey Area in 2019 and 2018. <sup>3</sup> No suitable habitat present in the Survey Area (fresh to saline wetlands). <sup>6</sup>
Laridae	<i>Hydroprogne caspia</i>	Caspian Tern	IA	MI, MA	x	x		Low	Records approximately 5 km north in 2019 and 4 km southwest in 2018. <sup>3</sup> No suitable habitat present in the Survey Area (sheltered coastal waters, fresh to saline lakes, large rivers, temporary wetlands). <sup>6</sup>
Laridae	<i>Onychoprion anaethetus</i>	Bridled Tern	IA	MI, MA	x	x		Low	Records approximately 2 km west in 2021 and 5 km north in 2021. <sup>3</sup> No suitable habitat present in the Survey Area (tropical and subtropical seas). <sup>2</sup>

Family	Scientific Name	Common Name	Conservation Status		Source			Likelihood of Occurrence	Justification
			State	Federal	NM	PMST	DBCA		
Laridae	<i>Sterna dougallii</i>	Roseate Tern	IA	MI, MA	x	x		Low	Recorded within 15 km of the Survey Area in 2020 and 2019. <sup>3</sup> No suitable habitat present in the Survey Area (tropical and subtropical seas and coastlines). <sup>2</sup>
Laridae	<i>Sternula albifrons</i>	White-shafted Little Tern	IA	MI, MA		x		Low	No nearby records identified from the database searches or literature. Only returned by PMST which searches by modelled distribution, not actual records. <sup>4</sup> No suitable habitat present in the Survey Area (sheltered coastal waters, beaches, sandbars). <sup>6</sup>
Laridae	<i>Sternula nereis nereis</i>	Fairy Tern	VU	VU		x		Low	No nearby records identified from the database searches or literature. Only returned by PMST which searches by modelled distribution, not actual records. <sup>4</sup> No suitable habitat present in the Survey Area (coastal, bays, inlets, beaches, salt ponds and lakes). <sup>2</sup>
Laridae	<i>Thalasseus bergii</i>	Greater Crested Tern	IA	MI, MA	x	x	x	Low	14 DBCA records within 8 km of the Survey Area, including approximately 1 km west in 1981 and 4 km southwest in 2008. <sup>1</sup> No suitable habitat present in the Survey Area (coastal, beaches, bays, lagoons, salt ponds and lakes). <sup>2</sup>

Family	Scientific Name	Common Name	Conservation Status		Source			Likelihood of Occurrence	Justification
			State	Federal	NM	PMST	DBCA		
<b>Megapodiidae</b>	<i>Leipoa ocellata</i>	Malleefowl	VU	VU		x		Low	No nearby records identified from the database searches or literature. Only returned by PMST which searches by modelled distribution, not actual records. <sup>4</sup> No suitable habitat present in the Survey Area (unburned mallee and woodland with abundant litter and low scrub). <sup>2</sup>
<b>Motacillidae</b>	<i>Motacilla cinerea</i>	Grey Wagtail	IA	MI, MA		x		Low	No nearby records identified from the database searches or literature. Only returned by PMST which searches by modelled distribution, not actual records. <sup>4</sup> No suitable habitat present in the Survey Area (fresh sandy or rocky streams, mown grass, ploughed land, sewage ponds). <sup>2</sup>
<b>Pandionidae</b>	<i>Pandion haliaetus</i>	Osprey	IA	MI, MA		x		Low	Records approximately 4 km south in 2019 and 4 km southwest in 2019. <sup>3</sup> Only returned by PMST which searches by modelled distribution, not actual records. <sup>4</sup> No suitable habitat present in the Survey Area (major rivers, wetlands, river pools). <sup>2</sup>
<b>Rostratulidae</b>	<i>Rostratula australis</i>	Australian Painted Snipe	EN	EN, MA	x	x		Low	Records approximately 6 km southwest in 2019 and 2 km southwest in 2005. <sup>3</sup> No suitable habitat present in the Survey Area (beaches, coastal reaches of rivers and large inland waterbodies). <sup>6</sup>



Family	Scientific Name	Common Name	Conservation Status		Source			Likelihood of Occurrence	Justification
			State	Federal	NM	PMST	DBCA		
<b>Scolopacidae</b>	<i>Actitis hypoleucos</i>	Common Sandpiper	IA	MI, MA	x	x	x	Low	No nearby records identified from the database searches or literature. No suitable habitat present in the Survey Area (well vegetated surrounds and shallows of wetlands). <sup>2</sup>
<b>Scolopacidae</b>	<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	IA	MI, MA	x	x	x	Low	Two DBCA records within 8 km of the Survey Area, approximately 7 km northeast in 1990 and 1991. <sup>1</sup> No suitable habitat present in the Survey Area (coastal and interior wetlands, narrow muddy edges of billabongs, river pools, mangroves, rocky beaches). <sup>2</sup>
<b>Scolopacidae</b>	<i>Calidris alba</i>	Sanderling	IA	MI, MA	x	x		Low	Four DBCA records within 8 km of the Survey Area, including approximately 4 km south in 2002 and 3 km south in 2000. <sup>1</sup> No suitable habitat present in the Survey Area (fresh and salt wetlands, muddy edges of lagoons, swamps, lakes, dams, soaks, sewage farms, temporary floodwaters). <sup>2</sup>
<b>Scolopacidae</b>	<i>Calidris canutus</i>	Red Knot	EN, IA	EN, MI, MA		x		Low	Recorded within 15 km of the Survey Area in 2013 and 2010. <sup>3</sup> No suitable habitat present in the Survey Area (beaches, sandy tidal flats). <sup>6</sup>

Family	Scientific Name	Common Name	Conservation Status		Source			Likelihood of Occurrence	Justification
			State	Federal	NM	PMST	DBCA		
<b>Scolopacidae</b>	<i>Calidris ferruginea</i>	Curlew Sandpiper	CR, IA	CR, MI, MA	x	x	x	Low	Recorded within 15 km of the Survey Area in 2020 and 2000. <sup>3</sup> Only returned by PMST which searches by modelled distribution, not actual records. <sup>4</sup> No suitable habitat present in the Survey Area (coastal, extensive firm tidal flats). <sup>6</sup>
<b>Scolopacidae</b>	<i>Calidris melanotos</i>	Pectoral Sandpiper	IA	MI, MA	x	x		Low	Seven DBCA records within 8 km of the Survey Area, including approximately 4 km south in 2008 and 3 km south in 2000. <sup>1</sup> No suitable habitat present in the Survey Area (inter-tidal mudflats of estuaries, lagoons, mangrove channels, dams, floodwaters, flooded saltbush surrounds of inland lakes). <sup>2</sup>
<b>Scolopacidae</b>	<i>Calidris pugnax</i>	Ruff	IA			x		Low	Recorded within 15 km of the Survey Area in 2019 and 2015. <sup>3</sup> No suitable habitat present in the Survey Area (coastal fresh to saline wetlands, inland permanent and temporary wetlands, swamps with dense vegetation). <sup>2</sup>
<b>Scolopacidae</b>	<i>Calidris ruficollis</i>	Red-necked Stint	IA	MI, MA	x	x	x	Low	No nearby records identified from the database searches or literature. Only returned by PMST which searches by modelled distribution, not actual records. <sup>4</sup> No suitable habitat present in the Survey Area (shallow wetlands, lake margins,

Family	Scientific Name	Common Name	Conservation Status		Source			Likelihood of Occurrence	Justification
			State	Federal	NM	PMST	DBCA		
									floodlands, salt ponds, dry grassland, tidal mudflats, beaches). <sup>5</sup>
<b>Scolopacidae</b>	<i>Calidris subminuta</i>	Long-toed Stint	IA	MI, MA	x	x		Low	Seven DBCA records within 8 km of the Survey Area, including approximately 4 km south in 2008 and 3 km south in 2000. <sup>1</sup> No suitable habitat present in the Survey Area (inter-tidal mudflats of estuaries, lagoons, mangrove channels, dams, floodwaters, flooded saltbush surrounds of inland lakes). <sup>2</sup>
<b>Scolopacidae</b>	<i>Calidris tenuirostris</i>	Great Knot	CR, IA	CR, MI, MA	x	x		Low	Recorded within 15 km of the Survey Area in 2019 and 2018. <sup>3</sup> No suitable habitat present in the Survey Area (muddy fringes of fresh wetlands). <sup>6</sup>
<b>Scolopacidae</b>	<i>Limosa lapponica</i>	Bar-tailed Godwit	IA	MI, MA	x	x		Low	Recorded within 15 km of the Survey Area in 2019 and 2014. <sup>3</sup> No suitable habitat present in the Survey Area (coastal, tidal flats, beaches). <sup>6</sup>
<b>Scolopacidae</b>	<i>Limosa limosa</i>	Black-tailed Godwit	IA	MI, MA	x	x		Low	Recorded within 15 km of the Survey Area in 2019. <sup>3</sup> No suitable habitat present in the Survey Area (coastal, tidal flats). <sup>6</sup>

Family	Scientific Name	Common Name	Conservation Status		Source			Likelihood of Occurrence	Justification
			State	Federal	NM	PMST	DBCA		
<b>Scolopacidae</b>	<i>Numenius madagascariensis</i>	Far Eastern Curlew (Eastern Curlew)	CR, IA	CR, MI, MA	x	x	x	Low	One DBCA record within 8 km of the Survey Area, approximately 4 km south in 1938. <sup>1</sup> No suitable habitat present in the Survey Area (coastal, tidal flats). <sup>6</sup>
<b>Scolopacidae</b>	<i>Numenius phaeopus</i>	Whimbrel	IA	MI, MA	x			Low	Recorded within 15 km of the Survey Area in 2010. <sup>3</sup> No suitable habitat present in the Survey Area (coastal, tidal flats, mangroves). <sup>6</sup>
<b>Scolopacidae</b>	<i>Tringa brevipes</i>	Grey-tailed Tattler	IA, P4	MI, MA		x		Low	Recorded within 15 km of the Survey Area in 2021 and 2020. <sup>3</sup> No suitable habitat present in the Survey Area (coastal, tidal flats, rocky shorelines). <sup>6</sup>
<b>Scolopacidae</b>	<i>Tringa glareola</i>	Wood Sandpiper	IA	MI, MA	x	x		Low	Recorded within 15 km of the Survey Area in 2019 and 2016. <sup>3</sup> No suitable habitat present in the Survey Area (freshwater wetlands with emergent sedges and taller fringing vegetation). <sup>6</sup>
<b>Scolopacidae</b>	<i>Tringa nebularia</i>	Common Greenshank	IA	MI, MA	x	x	x	Low	Eight DBCA records within 8 km of the Survey Area, including approximately 3 km south in 2000 and 4 km south in 2002. <sup>1</sup> No suitable habitat present in the Survey Area (permanent and temporary wetlands, billabongs, swamps, lakes, floodplains, sewage farms and salt works ponds, flooded irrigated crops, mudflats,

Family	Scientific Name	Common Name	Conservation Status		Source			Likelihood of Occurrence	Justification
			State	Federal	NM	PMST	DBCA		
									mangrove swamps, muddy shallows of lagoons). <sup>2</sup>
<b>Scolopacidae</b>	<i>Tringa stagnatilis</i>	Marsh Sandpiper	IA	MI, MA	x	x		Low	Recorded within 15 km of the Survey Area in 2019 and 2016. <sup>3</sup> No suitable habitat present in the Survey Area (shallow, fresh to brackish inland wetlands). <sup>6</sup>
<b>Threskiornithidae</b>	<i>Plegadis falcinellus</i>	Glossy Ibis	IA	MI, MA	x		x	Low	Three DBCA records within 8 km of the Survey Area, including approximately 6 km east in 1991 and 7 km northeast in 2001. <sup>1</sup> No suitable habitat present in the Survey Area (shallow, fresh water, and estuarine waters, dry grasslands). <sup>6</sup>
<b>MAMMALIAN</b>									
<b>Dasyuridae</b>	<i>Dasyurus geoffroii fortis</i>	Western Quoll, Chuditch	VU	VU	x	x		Low	No nearby records identified from the database searches or literature. Limited suitable habitat present in the Survey Area (sclerophyll forest or drier woodland, heath and mallee shrubland). <sup>8</sup>
<b>Dasyuridae</b>	<i>Phascogale tapoatafa wambenger</i>	Wambenger Brush-tailed Phascogale	CD		x		x	Low	One DBCA record within 8 km of the Survey Area, approximately 7 km northeast in 1961. <sup>1</sup> Limited suitable habitat present in the Survey Area (mature rough-barked trees, large logs, dead standing trees). <sup>8</sup>

Family	Scientific Name	Common Name	Conservation Status		Source			Likelihood of Occurrence	Justification
			State	Federal	NM	PMST	DBCA		
<b>Macropodidae</b>	<i>Notamacropus irma</i>	Western Brush Wallaby	P4		x		x	Medium	Two DBCA records within 8 km of the Survey Area, approximately 3 km southeast in 2019 and 4 km southeast in 1989 (Department of Biodiversity Conservation and Attractions, 2021). Limited suitable habitat present in the Survey Area (open forest and woodland, open seasonally wet flats). <sup>8</sup>
<b>Muridae</b>	<i>Hydromys chrysogaster</i>	Water Rat	P4		x		x	Low	One DBCA record within 8 km of the Survey Area, approximately 3 km northeast in 1973 (Department of Biodiversity Conservation and Attractions, 2021). No suitable habitat present in the Survey Area (fresh to brackish water bodies). <sup>8</sup>
<b>Peramelidae</b>	<i>Isodon fusciventer</i>	Quenda	P4				x	High	226 DBCA records within 8 km of the Survey Area, including approximately 0.1 km south in 2009 and 1 km south in 2018. <sup>1</sup> Suitable habitat present in the Survey Area (sandy soils with dense heathy vegetation). <sup>8</sup>
<b>Potoroidae</b>	<i>Bettongia penicillata ogilbyi</i>	Brush-tailed Bettong, Woylie	CR			x		Low	No nearby records identified from the database searches or literature. Only returned by PMST which searches by modelled distribution, not actual records. <sup>4</sup> No suitable habitat present in

Family	Scientific Name	Common Name	Conservation Status		Source			Likelihood of Occurrence	Justification
			State	Federal	NM	PMST	DBCA		
									the Survey Area (areas dominated by <i>Gastrolobium</i> thickets). <sup>8</sup>
<b>Pseudocheiridae</b>	<i>Pseudocheirus occidentalis</i>	Western Ringtail Possum	CR	CR		x		Low	No nearby records identified from the database searches or literature. Only returned by PMST which searches by modelled distribution, not actual records. <sup>4</sup> Limited suitable habitat present in the Survey Area (Agonis forest and woodland, Tuart forest with Agonis mid storey). <sup>8</sup>
<b>Vespertilionidae</b>	<i>Falsistrellus mackenziei</i>	Western Falsistrelle	P4		x			Low	No nearby records identified from the database searches or literature. Limited suitable habitat present in the Survey Area (mature Karri forests, wetter stands of Jarrah and Tuart, and woodlands on Swan Coastal Plain). <sup>8</sup>
<b>REPTILIAN</b>									
<b>Elapidae</b>	<i>Neelaps calonotos</i>	Black-striped Snake	P3		x		x	Low	Three historical DBCA records within 8 km of the Survey Area, approximately 3 km south and 5 km north. <sup>1</sup> Suitable habitat present in the Survey Area (dunes and sandplains vegetated with heaths and eucalypt/banksia woodlands). <sup>9</sup>

Family	Scientific Name	Common Name	Conservation Status		Source			Likelihood of Occurrence	Justification
			State	Federal	NM	PMST	DBCA		
Scincidae	<i>Ctenotus gemmula</i>	Jewelled Sandplain Ctenotus	P3		x			Low	Recorded approximately 3 km northeast in 1980. <sup>3</sup> Suitable habitat present in the Survey Area (pale sand-plains supporting heaths in association with banksia or mallee woodlands). <sup>9</sup>
Scincidae	<i>Lerista lineata</i>	Perth Slider	P3		x		x	High	Ten DBCA records within 8 km of the Survey Area, including approximately 2 km north in 2001 and 6 km north in 2014. <sup>1</sup> Suitable habitat present in the Survey Area (sandy coastal shrubland and heathland). <sup>8</sup>

1 - (Department of Biodiversity Conservation and Attractions, 2021d), 2 - (Morcombe, 2003), 3 - (ALA, 2022), 4 - (Department of Agriculture Water and the Environment, 2021), 5 - (Johnstone & Storr, 1998), 6 - (Menkhurst et al., 2017), 7 - (BHP Billiton Nickel West Pty Ltd, 2019; Harewood, 2014), 8 - (van Dyck & Strahan, 2008) and, 9 - (Wilson & Swan, 2021).



## 4.3 Black Cockatoo Habitat

### 4.3.1 Desktop Assessment

The Survey Area occurs within the non-breeding modelled distribution of the Carnaby's Cockatoo and the modelled distribution of the Forest Red-tailed Black Cockatoo, however, is outside the modelled distribution of the Baudin's Cockatoo (Department of Agriculture Water and the Environment, 2022).

The DBCA database search identified 87 records of the Carnaby's Cockatoo within a 8 km radius of the Survey Area, including records from 0.3 km south of the Survey Area in 2009 and 2.7 km east of the Survey Area in 2016, and 14 records of the Forest Red-tailed Black Cockatoo within a 8 km radius of the Survey Area, including records from 4.0 km east of the Survey Area in 2018 and 2016 and 4.3 km north of the Survey Area in 2011 (Department of Biodiversity Conservation and Attractions, 2021d). One historical record of Baudin's Cockatoo was recorded 3.0 km south of the Survey Area in 1939 (Department of Biodiversity Conservation and Attractions, 2021d).

The DBCA database search identified an artificial hollow 10 km south of the Survey Area that was used by white-tailed black cockatoos (unconfirmed whether this was Carnaby's Cockatoo or Baudin's Cockatoo) in 2018 (Department of Biodiversity Conservation and Attractions, 2021d).

The database search identified 22 black cockatoo roosting sites within 12 km of the Survey Area, of which, eight roost sites were located within 5 km of the Survey Area. Nine white-tailed black cockatoo roost sites occur within 12 km of the Survey Area, the nearest of which are 4.0 km and 4.1 km east, and 5.4 km southeast of the Survey Area. Five Forest Red-tailed Black Cockatoo roost sites occur within 12 km of the Survey Area, the nearest of which are 4.0 km and 4.9 km east of the Survey Area (Department of Biodiversity Conservation and Attractions, 2021d).

The results of the DBCA Database black cockatoo searches are presented in Figure 12.

### 4.3.2 Foraging Habitat

The Survey Area contained a total of 0.81 ha of High-Quality foraging habitat as identified from the Foraging Habitat Scoring Tool (Department of Agriculture Water and the Environment, 2022). This habitat comprised mainly individual Tuarts (*Eucalyptus gomphocephala*) and mixed *Banksia* species. The results of the Foraging Habitat Scoring Tool are shown below in Table 18 and displayed in Figure 15.

**Table 18: Black Cockatoo Foraging Tool Results**

Species	Foraging Potential	Connectivity	Proximity to Breeding	Proximity to Roosting	Impact from Significant Plant Disease	Total	Quality
Baudin's Cockatoo	-2	0	0	0	0	8	High Quality Habitat
Carnaby's Cockatoo	-2	0	0	0	0	8	High Quality Habitat
Forest Red-tailed Black Cockatoo	-2	0	0	0	0	8	High Quality Habitat

#### 4.3.3 Nesting Habitat

A total of 12 potential nesting trees with a DBH of greater than 500 mm were recorded within the Survey Area (Figure 14). Two of the recorded trees contained visible hollows. Two of the identified hollows are potentially suitable for black cockatoo nesting, but no visible chew marks could be seen from the ground. Internal hollow inspections to determine occupancy or previous use by black cockatoos were not included in the scope of works for this project. A summary of these trees is presented below in (Table 19).

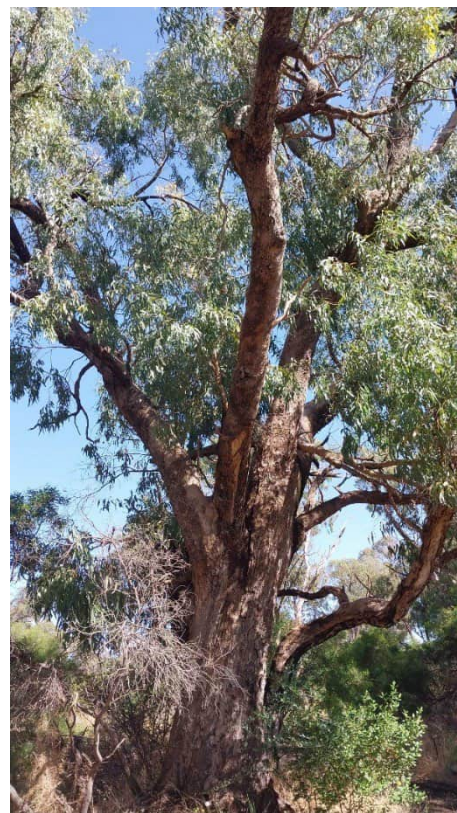
**Table 19: Potential Nesting Trees within the Survey Area**

Taxon	DBH (mm)	Height (m)	Latitude	Longitude	Hollows	Suitable Hollows
Tuart ( <i>E. gomphocephala</i> )	650	12	-32.2591343	115.769414	0	0
Tuart ( <i>E. gomphocephala</i> )	930	18	-32.2584735	115.7692173	2	1 (a)
Tuart ( <i>E. gomphocephala</i> )	550	12	-32.2584084	115.7692695	0	0
Tuart ( <i>E. gomphocephala</i> )	1340	18	-32.2586917	115.7693937	2	1 (b)
Tuart ( <i>E. gomphocephala</i> )	990	12	-32.2588312	115.7693074	0	0
Tuart ( <i>E. gomphocephala</i> )	950	11	-32.2587931	115.7692671	0	0
Tuart ( <i>E. gomphocephala</i> )	880	10	-32.2588021	115.769209	0	0
Tuart ( <i>E. gomphocephala</i> )	620	10	-32.2588162	115.7691986	0	0

Taxon	DBH (mm)	Height (m)	Latitude	Longitude	Hollows	Suitable Hollows
Tuart ( <i>E. gomphocephala</i> )	770	10	-32.2588822	115.769129	0	0
Tuart ( <i>E. gomphocephala</i> )	1370	16	-32.2590258	115.7688363	0	0
Tuart ( <i>E. gomphocephala</i> )	580	12	-32.258647	115.769567	0	0
Tuart ( <i>E. gomphocephala</i> )	680	12	-32.258608	115.769645	0	0



a) 930 mm DBH Tuart with one suitable hollow



b) 1340 mm DBH Tuart with one suitable hollow

#### 4.3.4 Roosting Habitat

The Survey Area contains 0.69 ha of potential roosting habitat, predominantly Tuarts (*Eucalyptus gomphocephala*). All twelve trees recorded as potential breeding trees may also be suitable for roosting. No direct sightings of roosting black cockatoos were recorded inside the Survey Area during the field survey.

## 5 Discussion

### 5.1 Flora and Vegetation

#### 5.1.1 Flora Composition

Rainfall was 24.4 mm above the long-term average for the three-month period prior to the survey, however species diversity was lower than representative FCTs for the Survey Area. Table 20 illustrates the comparative species richness of the quadrat data collected from this survey, (Gibson et al., 1994) and (Keighery et al., 2012), where results show floristic diversity is considerably higher for the upland FCTs 29b and 25. For the dampland FCT 17, the average species richness was higher for this survey compared to Beard and Keighery. This result is likely attributed to the presence of several species from adjacent vegetation types as well as high weed diversity and abundance.

**Table 20: FCT Average Species Richness**

FCT	Current Survey	Gibson et al., 1994	Keighery et al., 2012
29b	11.38	35.6	34.29
25	13.91	52.8	48.96
17	19.11	13.6	14.2

#### 5.1.2 Survey Adequacy

The location of the proposed H2 Refueller Station contained only one quadrat within the BI vegetation type, however, results were inferred from the 360 Environmental (2021) report. Additional mapping notes were undertaken to aid vegetation mapping and delineation. Given the degraded condition of the Survey Area, the methods used to determine the flora and vegetation attributes is considered sufficient.

#### 5.1.3 Flora of Conservation Significance

No Threatened flora species pursuant to the EPBC Act and/or gazetted as Threatened Flora pursuant to the BC Act were recorded within the Survey Area. No DBCA listed Priority species were recorded in the Survey Area.

#### 5.1.4 Introduced Flora

Weed species richness and abundance was extensive throughout the Survey Area. The amount of weeds present is attributed to the historical use of the Survey Area, which, included housing and agriculture. The weeds of greatest density were grasses; however, the weeds of greatest concern are the Declared Pests, *\*Zantedeschia aethiopica* and *\*Asparagus asparagoides*.

To protect Western Australian agriculture the Department of Primary Industries and Regional Development regulates harmful plants (Declared Pests) under the BAM Act. *\*Asparagus asparagoides* is listed under the BAM Act as category 2, requiring that:

- Introduction of the plant or its seeds into, or movement within the area is prohibited
- The presence or suspected presence of this pest should be reported
- Control measures must be taken to destroy, prevent or eradicate it
- Ensure that any person conducting an activity on the land is aware that measures are required to be taken to control the declared pest.

#### 5.1.5 Vegetation of Conservation Significance

Vegetation type Ar was determined to have an affiliation with FCT SCP 29b – Acacia shrublands on taller dunes. FCT SCP29b is listed as Priority 3 by the State and is not listed under the EPBC Act. The vegetation community is described as being dominated by Acacia shrublands or mixed heaths on the larger dunes. This community has been recorded from Seabird to south of Mandurah. The vegetation type does not have a consistent dominant species but species such as *Acacia rostellifera*, *Acacia lasiocarpa* and *Melaleuca systema* were important.

Vegetation type EgSg has been assessed to be analogous to FCT SCP 25: Southern *Eucalyptus gomphocephala* and/or *Agonis flexuosa* woodlands due to the presence of *E. gomphocephala* recorded throughout. FCT SCP 25 is listed as a Priority 3 community by the State, and can be associated with or, form part of, the Tuart (*Eucalyptus gomphocephala*) Woodlands and forests of the Swan Coastal Plain ecological community, which is listed under the EPBC Act. Any vegetation containing *Eucalyptus gomphocephala* is potentially representative of the TEC, if it meets the diagnostic criteria described in the approved conservation advice (Department of the Environment and Energy, 2019c).

The one Tuart ‘patch’ as per the Approved Conservation Advice for the Tuart Woodland TEC (Department of the Environment and Energy, 2019c) was acknowledged so that it could be assessed against set criteria. Vegetation containing Tuarts beyond the Survey Area boundary was extrapolated based on aerial imagery to demonstrate the potential extent of the Tuart Woodland as per the conservation advice.

Outcomes from the assessment against the thresholds determined that the Tuart Patch has been identified as meeting the key diagnostic criteria for the Commonwealth listed Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain TEC. A total of 0.57 ha of vegetation that is analogous to the Tuart TEC was mapped within the Survey Area. With the inclusion of the 30 m buffer requirement this equates to 0.74 ha encompassing the entire Survey area. It is also important to note that the actual patch size inclusive of the vegetation outside of the survey boundary equated to an area estimated to be at least 58.42 ha.

The description, area and condition thresholds that apply to the Federally (EPBC) listed Tuart TEC, also apply to the State (DBCA) listed Priority 3 Ecological Community of the same name.



Therefore, the same 0.57 ha of vegetation within the development represent both the Federal TEC and State PEC.

#### 5.1.6 Regional Representation

The DBCA has mapped native vegetation extent by vegetation complex on the Swan Coastal Plain. It is estimated that the Rockingham (3048) vegetation type has 29.21% remaining and the Quindalup complex has 60.49% native vegetation remaining on the Swan Coastal Plain based on the pre-European extent.

The EPA recognises vegetation complexes that are not well represented as being significant. Vegetation complexes which have 10-30% remaining may be considered regionally significant. Proposals that would affect a vegetation complex with 10% or less remaining are likely to be formally assessed by the EPA (Environment Protection Authority, 2006).

These levels may be modified for 'Constrained Areas'. Such areas include the Swan Coastal Plain portion of the Perth Metropolitan Region, and may include urban, urban deferred and industrial zoned lands, and lands with development approvals.

The modified objectives for Constrained Areas are to:

- Retain at least 10 % of the pre-clearing extent of the ecological community where >10% of the ecological community remains; or
- Retain all remaining areas of each ecological community where <10% of this ecological community remains.

The remaining extent of the vegetation type/complex is greater than the 10% threshold set by the EPA for protecting Australia's biological diversity in constrained areas and is therefore not considered a constraint.

## 5.2 Vertebrate Fauna

### 5.2.1 Fauna Habitat

The fauna habitats within the Survey Area have been disturbed and altered by human activity (clearing, weeds, litter dumping). The most valuable habitat within the Survey Area is the Tuart Woodland habitat, primarily due to the condition within the Survey Area and the presence of mature Tuarts and other black cockatoo foraging species. All four habitats (excluding cleared) are likely to provide refuge and foraging habitat for small to medium sized terrestrial vertebrate species. The Tuart Woodland habitat will also be used by arboreal reptiles, mammals, and birds, the latter of which will use the trees for nesting, roosting, and foraging. The Survey Area has good connectivity with surrounding native bushland and provides ample opportunity for species to migrate through the area.

## 5.2.2 Significant Fauna

### 5.2.2.1 High Likelihood

#### **Carnaby's Cockatoo (*Zanda latirostris*) – Endangered (BC Act and EPBC Act)**

Carnaby's Cockatoos nest in the hollows of a wide range of eucalypt trees, with a preference for smooth barked trees such as Salmon Gum (*E. salmonophloia*) and Wandoo (*E. wandoo*) but also rough barked *Eucalyptus* and *Corymbia* trees such as Red Morrell (*E. longicornis*), York Gum (*E. loxophleba*), Marri (*Corymbia calophylla*) and Tuart (*E. gomphocephala*) (Johnstone & Storr, 1998). Carnaby's Cockatoos feed on seeds, nuts, and flowers of a variety of native and exotic plants, including *Banksia* spp., Pine trees (*Pinus* sp.), Marri, Jarrah (*E. marginata*), *Grevillea* spp., *Allocasuarina* spp., and *Hakea* spp. (Shah, 2006).

The Survey Area occurs within the non-breeding modelled distribution for Carnaby's Cockatoo and contains suitable habitat for the species (Department of Agriculture Water and the Environment, 2022). The species has been recorded near the Survey Area; including records located 0.3 km south (2009) and 2.7 km east (2016) of the Survey Area, 87 records are located within 8 km of the Survey Area. The nearest confirmed white-tailed black cockatoo breeding hollow (artificial) is located 10.0 km south of the Survey Area (unconfirmed whether this was Carnaby's Cockatoo or Baudin's Cockatoo). Nearby roost sites are located 4.0 and 4.1 km east as well as 5.4 km southeast of the Survey Area (Department of Biodiversity Conservation and Attractions, 2021d).

No sightings, calls or foraging evidence of Carnaby's Cockatoos were recorded in the Survey Area during the field survey. The Tuart Woodland and *Banksia* Woodland habitat contains known foraging plants, including *E. gomphocephala* and *Banksia* sp.. The Tuart Woodland habitat contained trees that may have suitable breeding hollows.

#### **Forest Red-tailed Black Cockatoo (*Calypotorhynchus banksii naso*) – Vulnerable (BC Act and EPBC Act)**

The Forest Red-tailed Black Cockatoo is distributed through the south-west of WA from Gingin through the Darling Ranges to the south-west from Bunbury to Albany. The Forest Red-tailed Black Cockatoo inhabits dense Jarrah, Karri (*E. diversicolor*) and Marri forests and feeds primarily on the fruit of Marri and Jarrah trees (Johnstone & Kirkby, 1999). The species has also been found to feed on the non-native Cape Lilac (*Melia azedarach*) throughout the Swan Coastal Plain (Department of Environment and Conservation, 2008).

The Survey Area occurs within the modelled distribution for Forest Red-tailed Black Cockatoo and contains suitable habitat for the species (Department of Agriculture Water and the Environment, 2022). The species have been recorded near the Survey Area; including records located 4.0 km east (2016, 2018) and 4.3 km north (2011), 14 records are located within 8 km of the Survey Area and the nearest known Forest Red-tailed Black Cockatoo roosts are located

4.0 km and 4.9 km east of the Survey Area (Department of Biodiversity Conservation and Attractions, 2021d).

No sightings, calls, or foraging evidence of Forest Red-tailed Black Cockatoos were recorded in the Survey Area during the field survey. The Tuart Woodland habitat contained trees that may have suitable breeding hollows whilst the *Banksia* Woodland may provide suitable foraging material for the species.

**Pacific Swift (*Apus pacificus*) – International Agreement (BC Act), Migratory/Marine (EPBC Act)**

The Pacific Swift is almost exclusively aerial, flying from less than 1 m to at least 300 m above ground and probably much higher. The Pacific Swift occupies a large airspace range (i.e. low to very high) over varied habitats, ranging from rainforests to semi-deserts (Morcombe, 2003).

No Pacific Swifts were recorded within the Survey Area. The taxon may use airspace above the Survey Area; however, it will not be reliant on terrestrial fauna habitats within the Survey Area.

**Perth Slider (*Lerista lineata*) – Priority 3 (DBCA)**

The Perth Slider is found along the lower west coast of Western Australia between Perth and Mandurah, including Rottnest Island and typically favours sandy coastal heath and shrubland, *Banksia* woodland, Tuart open woodland over deep sands, and coastal dunes immediately adjacent to the beach (Wilson & Swan, 2017).

The Perth Slider was not recorded within the Survey Area. The *Xanthorrhoea* Shrubland, *Banksia* Woodland and Tuart Woodland habitats contained sandy soils which may be used by the Perth Slider.

**Quenda (*Isodon fusciventer*) – Priority 4 (DBCA)**

Quenda are nocturnal and omnivorous, feeding on insects, spiders, worms, and plant roots and are typically found in dense vegetation, including wetland fringes, forest woodland, shrub and heath communities (Department of Biodiversity Conservation and Attractions, 2012; van Dyck & Strahan, 2008).

No evidence of the quenda was recorded within the Survey Area; however, they are likely to utilise the *Xanthorrhoea* Shrubland, *Banksia* Woodland and Tuart Woodland habitats which may provide significant shelter and foraging opportunities for the species.

**5.2.2.2 Medium Likelihood**

**Western Brush Wallaby (*Notamacropus irma*) - Priority 4 (DBCA)**

The Western Brush Wallaby occurs only in the south-west of Western Australia and closely resembles a larger kangaroo (van Dyck & Strahan, 2008). It has an optimum habitat of open forest or woodland, particularly favoring open and seasonally wet flats with low grasses and open scrubby thickets (van Dyck & Strahan, 2008). The Western Brush Wallaby was a common species during the early days of settlement, however, ongoing clearing and fragmentation of



bushland in the Wheatbelt as well as the dramatic increase in foxes within the south-west of Western Australia has led to this species decline (van Dyck & Strahan, 2008).

No Western Brush Wallabies were recorded within the Survey Area. The Tuart Woodland and *Banksia* Woodland habitats may be used by the Western Brush Wallaby.

### 5.3 Black Cockatoo Habitat Assessment

The field surveys identified suitable breeding habitat within the Survey Area, contained primarily within the Tuart Woodland habitats. This habitat was comprised mainly of Tuart (*Eucalyptus gomphocephala*) species which have reached a size that are considered to be potential future hollow bearing trees (Department of Agriculture Water and the Environment, 2022). The field survey identified 12 trees that met the criteria to be classed as potential breeding trees and have the potential to be used for black cockatoo breeding in the future. Of these breeding trees, two contained hollows. Two of the identified hollows may be suitable for breeding use by black cockatoos.

The Survey Area contains vegetation which is suitable as a foraging resource for black cockatoo species. This included Tuart, *Banksia* spp., and *Hakea* spp. and other preferred foraging plant species. This habitat was calculated to be of high-quality for Carnaby's and Forest Red-tailed Black Cockatoos using the foraging habitat scoring tool in the EPBC Act *Referral Guidelines for 3 WA Threatened black cockatoo species: Carnaby's Cockatoo, Baudin's Cockatoo, and the Forest Red-Tailed Black Cockatoo* (Department of Agriculture Water and the Environment, 2022).

No evidence of the three threatened black cockatoo species was identified throughout the Survey Area. However, the DBCA database search results indicate that 22 known black cockatoo roosting sites occur within 12 km of the Survey Area, the closest site occurring 4 km to the east. Given the proximity of this roosting site and the unbroken patch of vegetation that continues up to the boundary of the Survey Area, it is possible that the trees within the Survey Area may also be utilised as a roosting site.

## 6 Conclusion

### Flora and Vegetation:

- No Threatened flora species pursuant to the EPBC Act 1999 and/or gazetted as Threatened pursuant to the BC Act 2016 were recorded during the survey.
- No Priority species as listed by DBCA were recorded within the Survey Area.
- A total of 13 introduced flora species were recorded within the Survey Area. Two recorded taxa are listed as Declared Pests under the BAM Act (*\*Asparagus asparagoides* and *\*Zantedeschia aethiopica*) *\*Asparagus asparagoides* is also listed as a WoNS.
- The majority of the Survey Area was significantly altered for urban infrastructure and is regarded as being in Degraded to Completely Degraded condition.
- Two of the FCTs identified as occurring in the Survey Area from the analysis are listed as conservation significant:
  - FCT SCP 29b – Acacia shrublands on taller dunes is listed as Priority 3 by the State and is not listed under the EPBC Act (vegetation type Ar, 0.13 ha)
  - FCT SCP 25 – Southern Swan Coastal Plain *Eucalyptus gomphocephala* - *Agonis flexuosa* woodlands is listed as Priority 3 by the State and can be associated with or, form part of the Tuart (*Eucalyptus gomphocephala*) Woodlands and forests of the Swan Coastal Plain ecological community which is listed under the EPBC Act (vegetation type EgSg, 0.57 ha).

### Vertebrate Fauna and Black Cockatoo:

- Four fauna habitats (excluding cleared) were identified within Survey Area, the *Acacia/Melaleuca* Shrubland, *Banksia* Woodland, Tuart Woodland, and the *Xanthorrhoea* Shrubland.
- No significant fauna species were recorded during the field survey.
- Five significant fauna species have a high likelihood of occurring within the Survey Area, the Carnaby's Cockatoo (*Zanda latirostris*) listed as Endangered (BC Act, EPBC Act), the Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksia naso*) listed as Vulnerable (BC Act, EPBC Act), Pacific Swift (*Apus pacificus*) listed as Migratory (BC Act), and Migratory and Marine (EPBC), the Quenda (*Isodon fusciventer*) listed as Priority 4 (DBCA) and the Perth Slider (*Lerista lineata*) listed as Priority 3 (DBCA).
- One species has a medium likelihood of occurrence, the Western Brush Wallaby (*Notamacropus irma*), listed as Priority 4 (DBCA).
- The black cockatoo foraging habitat assessment identified 0.81 ha of High-Quality foraging habitat occurring within the Survey Area.
- Twelve potential breeding trees were identified within the Survey Area. Two of the identified potential breeding trees contained visible hollows.

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- Two of the identified hollows may be suitable for use by black cockatoos for breeding.
  - 0.69 ha of habitat has the potential to be used by black cockatoos for roosting.

## 7 Report Disclaimer

This report is produced strictly in accordance with the scope of services set out in the contract or otherwise agreed in accordance with the contract. 360 Environmental makes no representations or warranties in relation to the nature and quality of soil and water other than the visual observation and analytical data in this report.

In the preparation of this report, 360 Environmental has relied upon documents, information, data, and analyses ('client's information') provided by the client and other individuals and entities. In most cases where client's information has been relied upon, such reliance has been indicated in this report. Unless expressly set out in this report, 360 Environmental has not verified that the client's information is accurate, exhaustive, or current and the validity and accuracy of any aspect of the report including, or based upon, any part of the client's information is contingent upon the accuracy, exhaustiveness, and currency of the client's information. 360 Environmental shall not be liable to the client or any other person in connection with any invalid or inaccurate aspect of this report where that invalidity or inaccuracy arose because the client's information was not accurate, exhaustive, and current or arose because of any information or condition that was concealed, withheld, misrepresented, or otherwise not fully disclosed or available to 360 Environmental.

Aspects of this report, including the opinions, conclusions, and recommendations it contains, are based on the results of the investigation, sampling and testing set out in the contract and otherwise in accordance with normal practices and standards. The investigation, sampling and testing are designed to produce results that represent a reasonable interpretation of the general conditions of the site that is the subject of this report. However, due to the characteristics of the site, including natural variations in site conditions, the results of the investigation, sampling and testing may not accurately represent the actual state of the whole site at all points.

It is important to recognise that site conditions, including the extent and concentration of contaminants, can change with time. This is particularly relevant if this report, including the data, opinions, conclusions, and recommendations it contains, are to be used a considerable time after it was prepared. In these circumstances, further investigation of the site may be necessary.

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# Figures





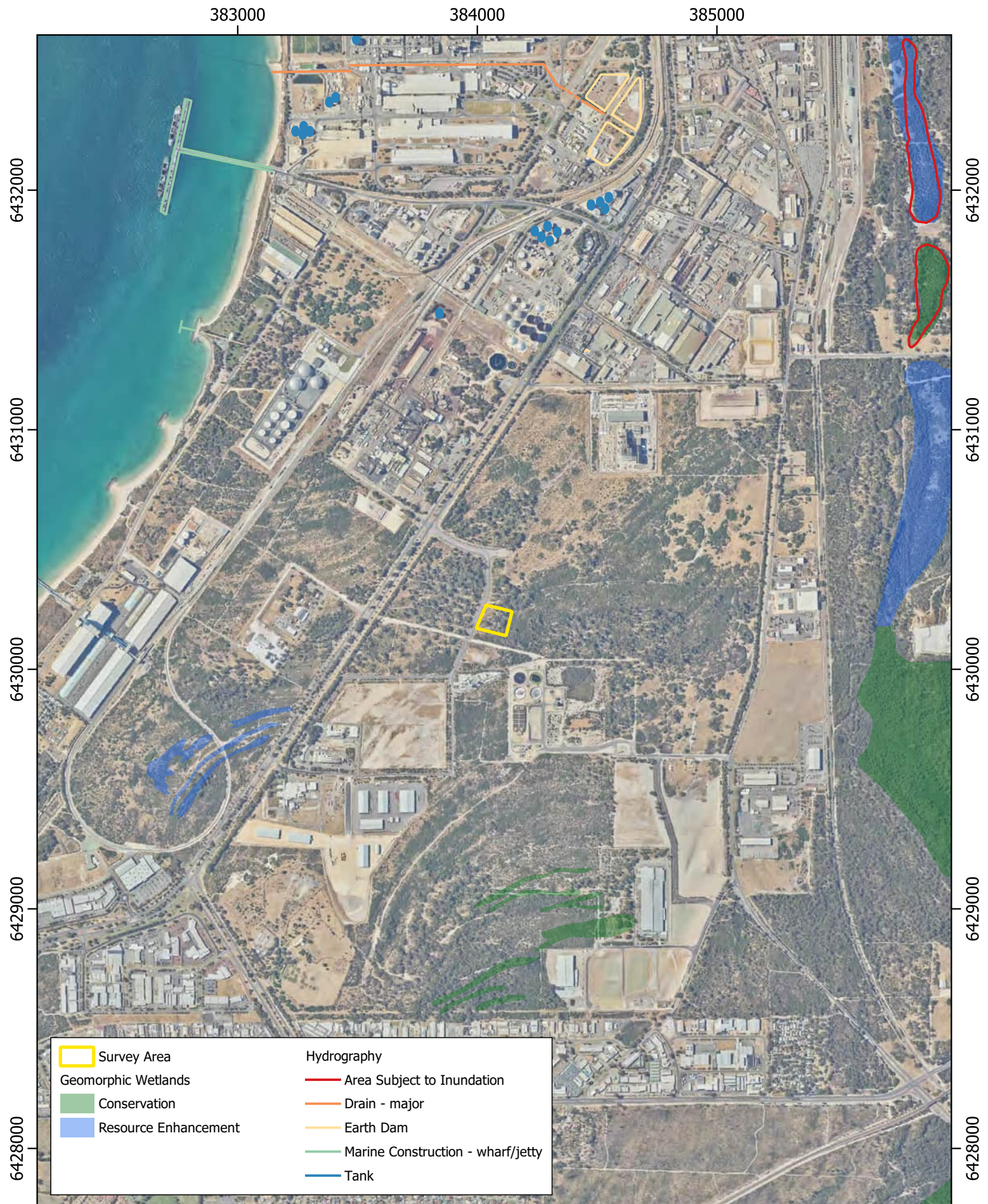
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



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Project Number: 5840  
Date Drawn: 02-Jun-2023  
Drawn By: PW  
Reviewed By: NW

H2 Refueller Flora, Fauna and Black Cockatoo Assessment Technical Report


Survey Area  
FIGURE 1





 Survey Area	<b>Hydrography</b>
 Geomorphic Wetlands	 Area Subject to Inundation
 Conservation	 Drain - major
 Resource Enhancement	 Earth Dam
	 Marine Construction - wharf/jetty
	 Tank



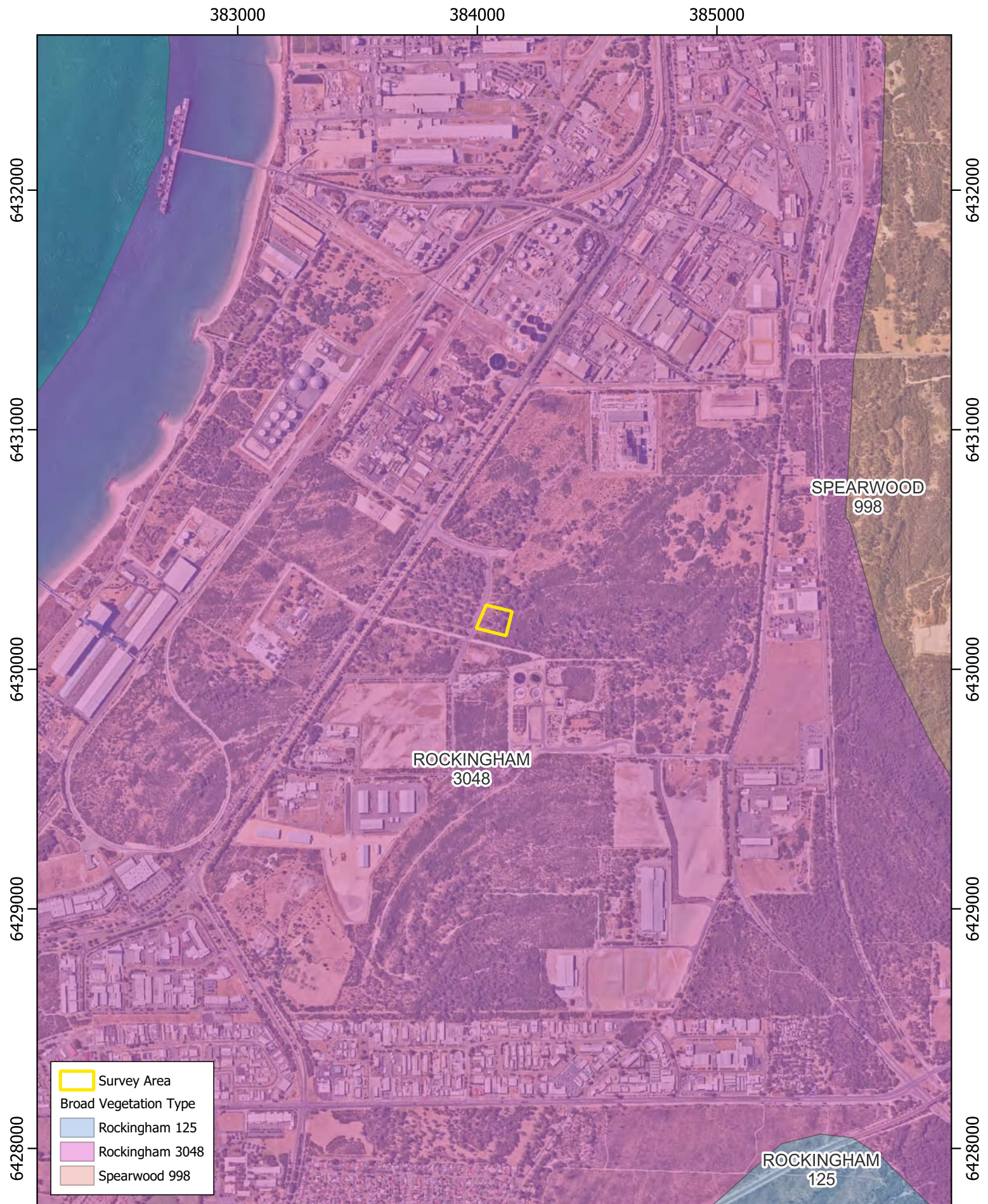
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 Project Number: 5840  
 Date Drawn: 02-Jun-2023  
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Hydrography  
FIGURE 2

Geomorphic Wetlands: Department of Biodiversity, Conservation and Attractions (2022). Geomorphic Wetlands, Swan Coastal Plain (DBCA-019)  
 Hydrography: Department of Water and Environmental Regulation. (2018). Hydrography, Linear (Hierarchy) (DWER-031)





Survey Area

Broad Vegetation Type

Rockingham 125

Rockingham 3048

Spearwood 998



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N

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Coordinate System: GDA94 / MGA zone 50

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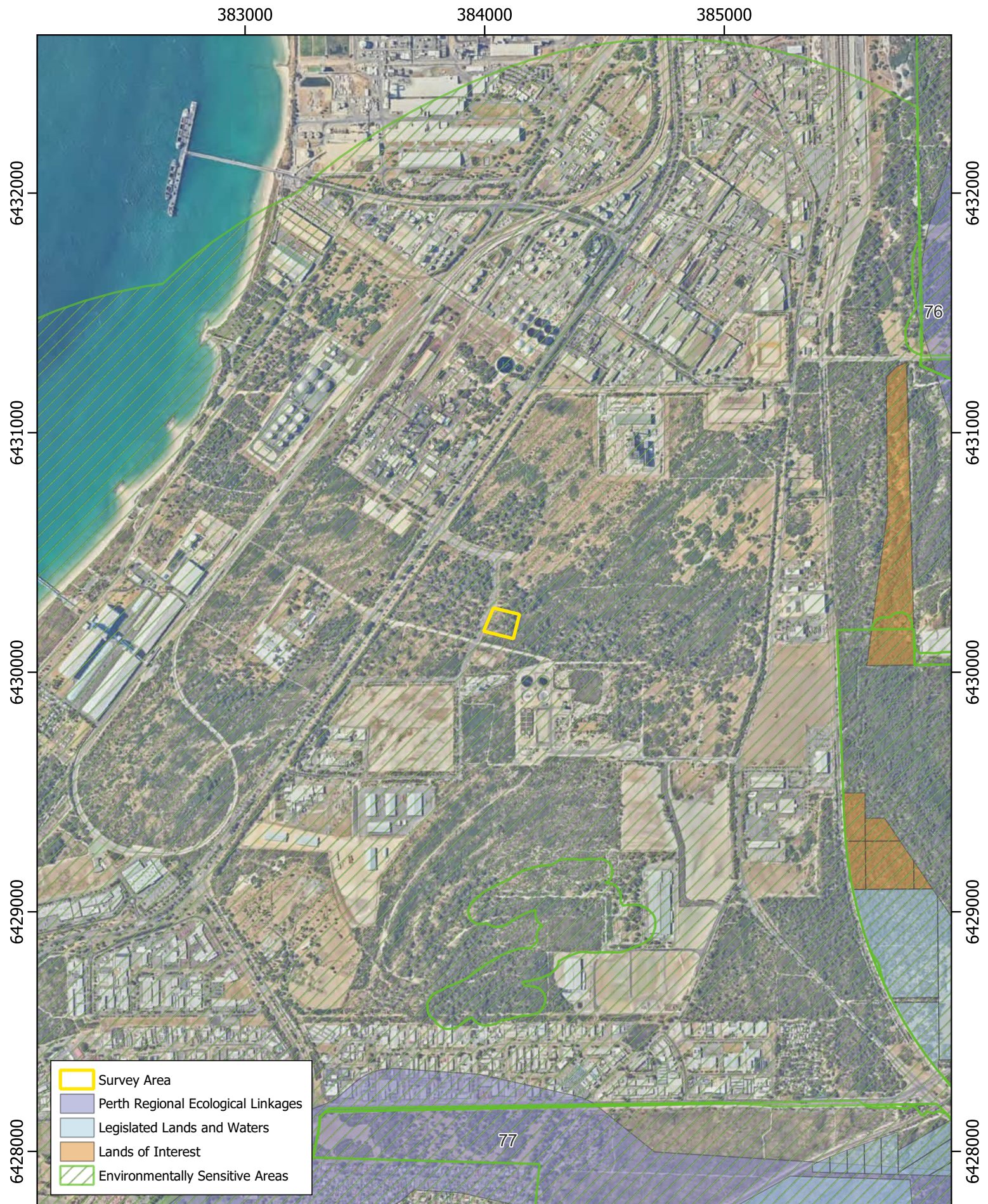
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Broad Vegetation Types  
FIGURE 3

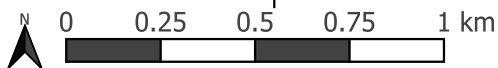




- Survey Area
- Perth Regional Ecological Linkages
- Legislated Lands and Waters
- Lands of Interest
- Environmentally Sensitive Areas

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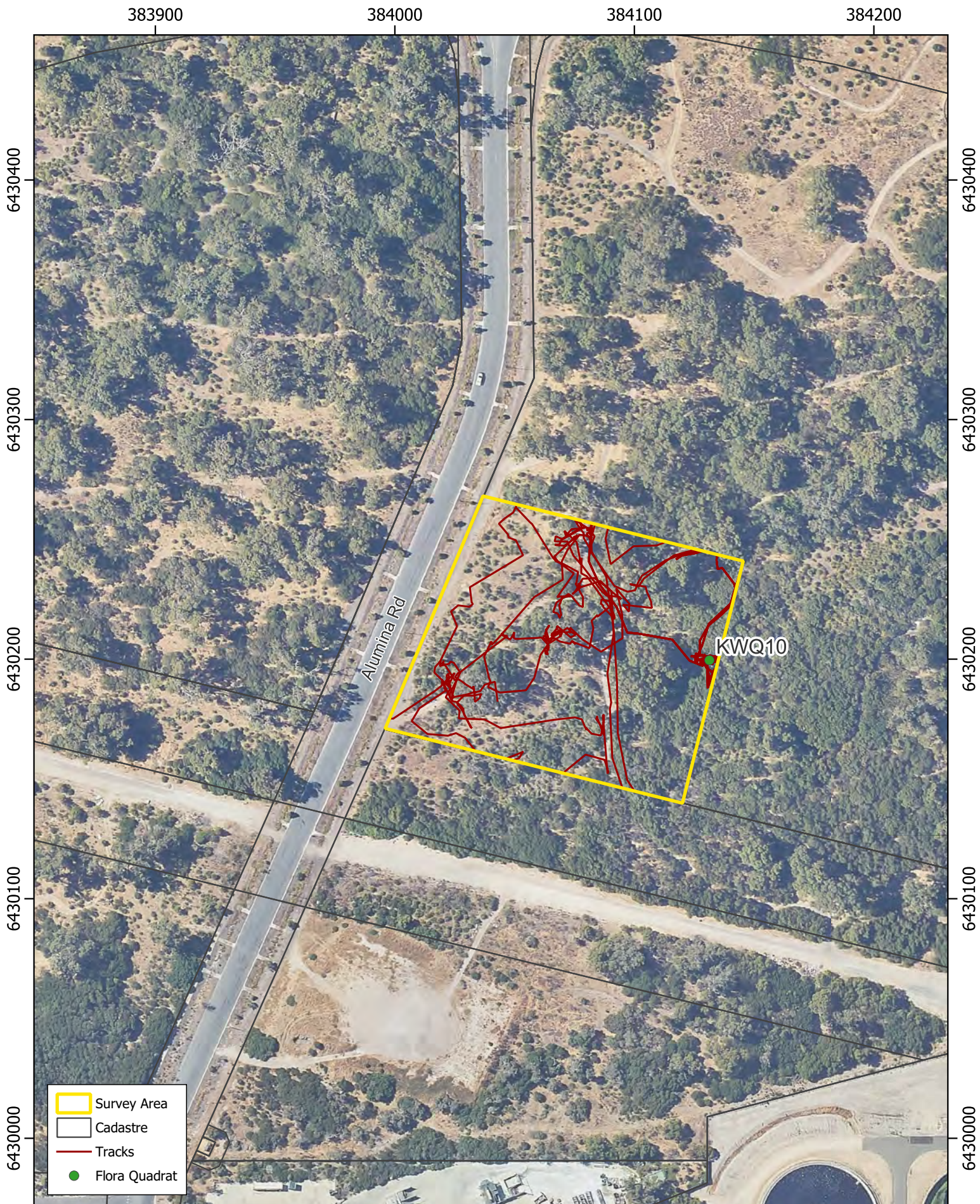


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ESAs and Conservation Areas  
FIGURE 4





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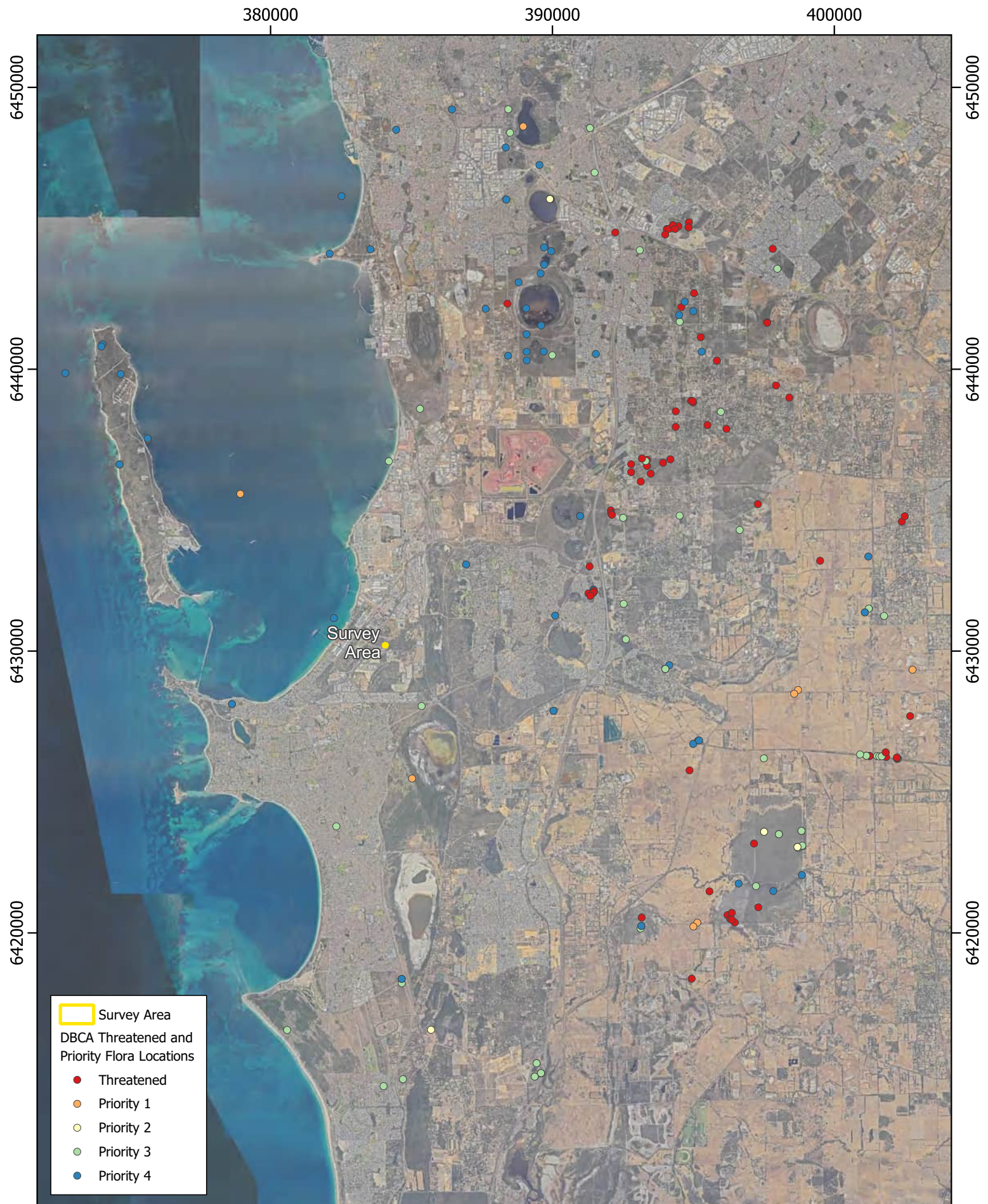
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Date Drawn: 02-Jun-2023  
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Cockatoo Assessment Technical Report

Survey Effort  
FIGURE 5





- Survey Area**
- DBCA Threatened and Priority Flora Locations**
- Threatened
  - Priority 1
  - Priority 2
  - Priority 3
  - Priority 4

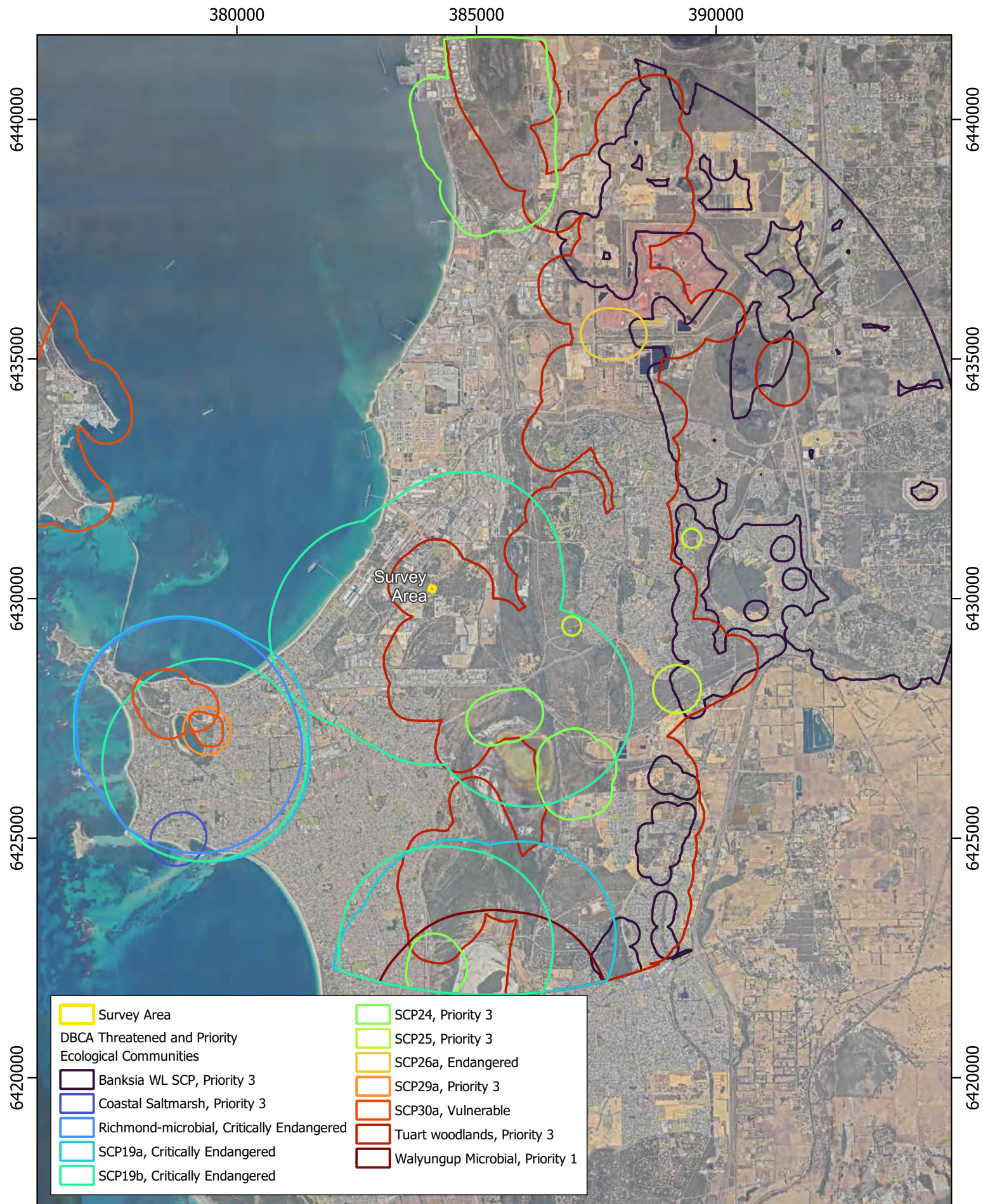


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 Cockatoo Assessment Technical Report  
 DBCA Threatened and Priority Flora  
 Locations  
**FIGURE 6**

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N 0 2 4 6 km  
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 Project Number: 5840  
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DBCA Threatened and Priority Ecological Communities  
 FIGURE 7

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Alumina Rd

-  Survey Area  
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 0 15 30 45 m  
 Service Layer Credits: Landgate / SLIP

Coordinate System: GDA94 / MGA zone 50  
 Scale: 1:1,000 at A4  
 Project Number: 5840  
 Date Drawn: 02-Jun-2023  
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Vegetation Types  
FIGURE 8

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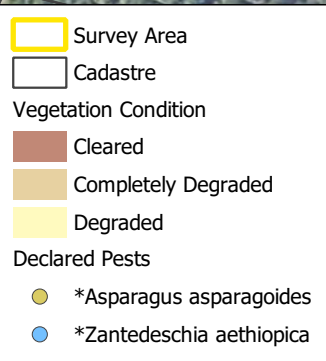
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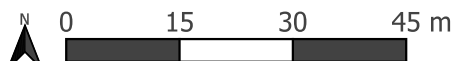
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Alumina Rd



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 Coordinate System: GDA94 / MGA zone 50  
 Scale: 1:1,000 at A4  
 Project Number: 5840  
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 and Tree Assessment Technical Report

**Vegetation Condition**  
**FIGURE 9**

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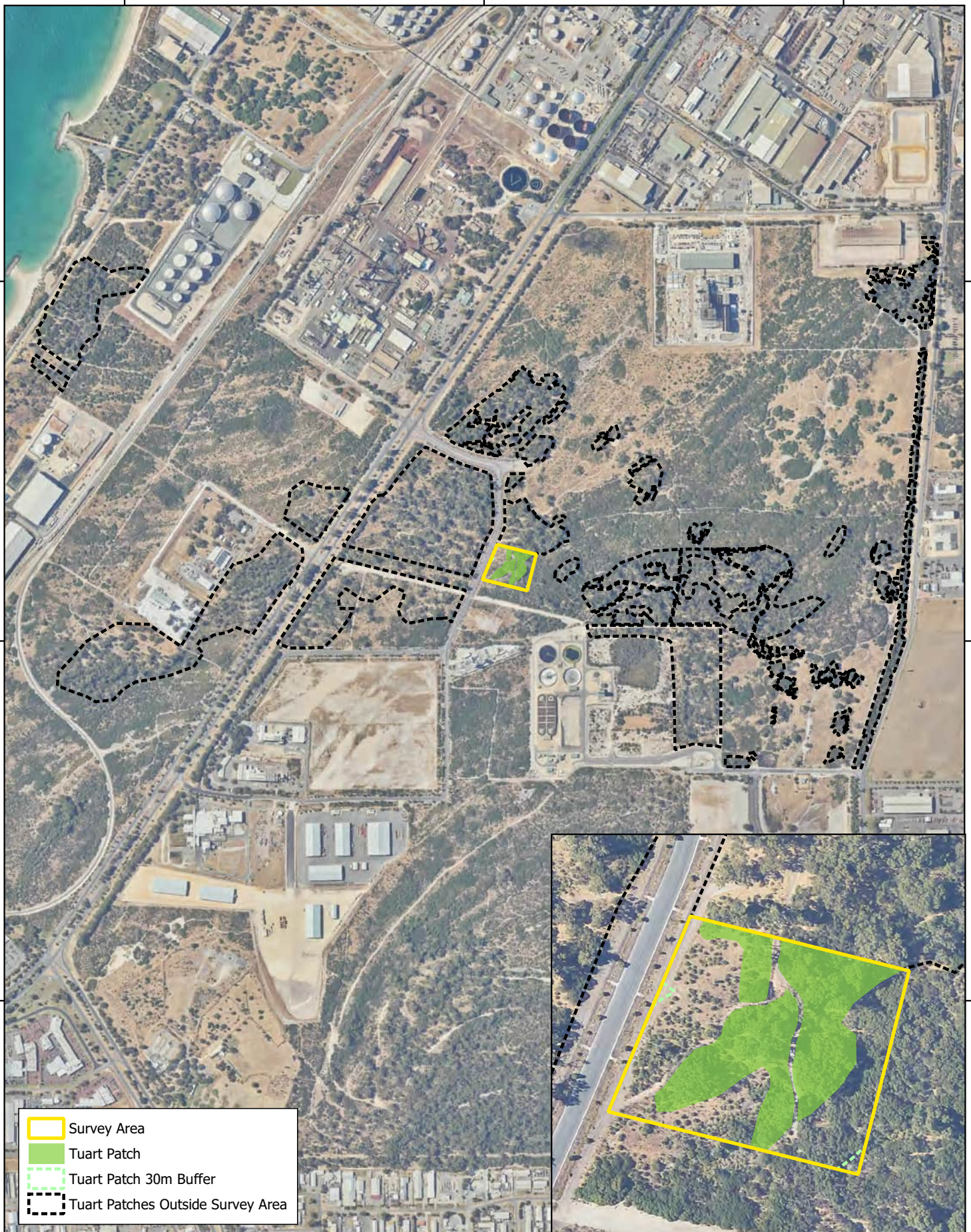
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0 0.25 0.5 0.75 km

Service Layer Credits: Landgate / SLIP  
Coordinate System: GDA94 / MGA zone 50  
Scale: 1:14,000 at A4  
Project Number: 5840  
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H2 Refueller Flora, Fauna and Black  
Cockatoo Assessment Technical Report

Tuart Patch Assessment  
FIGURE 10



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environmental

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**SLR**

0 1 2 3 4 km

Service Layer Credits: Landgate / SLIP  
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DBCA Threatened and Priority Fauna Locations  
FIGURE 11







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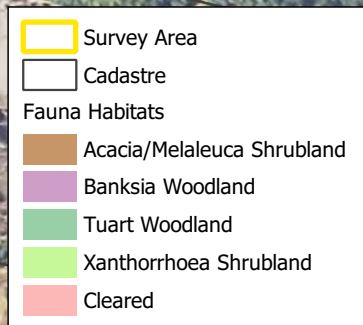
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Alumina Rd



**360**  
environmental

Part of  
**SLR**

0 15 30 45 m  
Service Layer Credits: Landgate / SLIP

Coordinate System: GDA94 / MGA zone 50  
Scale: 1:1,000 at A4  
Project Number: 5840  
Date Drawn: 02-Jun-2023  
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**Fauna Habitat  
FIGURE 13**



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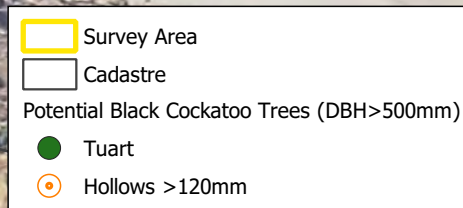
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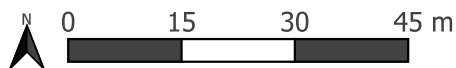
Alumina Rd



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environmental

Part of  
**SLR**

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 Coordinate System: GDA94 / MGA zone 50  
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H2 Refueller Flora, Fauna and Black  
Cockatoo Assessment Technical Report

Black Cockatoo Trees  
FIGURE 14



384000

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Alumina Rd

- Survey Area
- Black Cockatoo Foraging Habitat
- Low Quality
- High Quality

**360**  
environmental

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**SLR**

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N 0 15 30 45 m  
Service Layer Credits: Landgate / SLIP

Coordinate System: GDA94 / MGA zone 50  
Scale: 1:1,000 at A4  
Project Number: 5840  
Date Drawn: 02-Jun-2023  
Drawn By: PW  
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H2 Refueller Flora, Fauna and Black  
Cockatoo Assessment Technical Report

Black Cockatoo Habitat  
FIGURE 15

# Appendices



# **Appendix A1**

## **Flora Literature Review**

## Appendix: Literary Review of Biological Surveys in the vicinity of the Survey Area

Report	Project Area	Survey Timing	Survey Effort	Conservation Significant Ecological Communities	Conservation Significant Flora	Introduced Flora
Assessment of Vegetation Access Road, Lussky - Hope Valley Road (Landform Research, 2015)	6.3 km north of the Survey Area	July 2015	<ul style="list-style-type: none"> <li>Reconnaissance flora survey</li> </ul>	None recorded.	None recorded.	Twenty-two introduced taxa, including one taxon of environmental significance, <i>*Asparagus asparagoides</i> (DP, WoNS).
Covalent Lithium Refinery Environmental Approvals - Threatened Species Assessment (GHD, 2019)	2.2 km north of the Survey Area	May 2019	<ul style="list-style-type: none"> <li>Desktop assessment</li> <li>Reconnaissance flora survey</li> </ul>	None recorded.	None recorded.	Sixteen introduced taxa, including two taxa of environmental significance: <ul style="list-style-type: none"> <li><i>*Asparagus asparagoides</i> (DP, WoNS)</li> <li><i>*Gomphocarpus fruticosus</i> (DP).</li> </ul>
Flora and Fauna Assessment of Proposed Kwinana Ethanol Bio-Refinery (Umwelt Pty Limited, 2006)	Overlapping the Survey Area	August 2006	<ul style="list-style-type: none"> <li>Literature Review</li> <li>Reconnaissance flora survey</li> </ul>	None recorded.	None recorded.	Sixteen introduced taxa, including one taxon of environmental significance, <i>*Asparagus asparagoides</i> (DP, WoNS).
Kwinana Nickel Refinery <i>Eucalyptus gomphocephala</i> (Tuart) TEC Assessment (Biologic, 2021)	Adjacent to the Survey Area	June 2021	<ul style="list-style-type: none"> <li><i>Eucalyptus gomphocephala</i> TEC Assessment</li> </ul>	None recorded.	Not part of the assessment.	Three introduced taxa, including two taxa of environmental significance: <ul style="list-style-type: none"> <li><i>*Asparagus asparagoides</i> (DP, WoNS)</li> <li><i>*Tamarix aphylla</i> (DP, WoNS).</li> </ul>
Kwinana Nickel Refinery - Native Vegetation Clearing Permit Supporting Document for the Effluent Storage Pond Project (BHP Billiton Nickel West Pty Ltd, 2019)	Adjacent to the Survey Area	March 2019	<ul style="list-style-type: none"> <li>Reconnaissance flora survey</li> </ul>	None recorded.	None recorded.	Twenty-eight introduced taxa, including three taxa of environmental significance: <ul style="list-style-type: none"> <li><i>*Asparagus asparagoides</i> (DP, WoNS)</li> <li><i>*Gomphocarpus fruticosus</i> (DP)</li> <li><i>*Tamarix aphylla</i> (DP, WoNS).</li> </ul>
Kwinana Island Vegetation Assessment (Strategen JBS&G, 2019)	1.8 km north of the Survey Area	September 2019	<ul style="list-style-type: none"> <li>Flora Inventory</li> </ul>	Tuart Woodlands of the Swan Coastal Plain TEC	None recorded.	Sixteen introduced taxa, including one taxon of environmental significance, <i>*Zantedeschia aethiopica</i> (DP).
Lots 511 and 512 Rockingham Road, Kwinana Beach (Strategen Environmental, 2019)	240 m northeast of the Survey Area	May 2019 August 2019	<ul style="list-style-type: none"> <li>Reconnaissance flora survey</li> </ul>	Tuart Woodlands of the Swan Coastal Plain TEC and PEC  <i>Banksia</i> woodlands of the Swan Coastal Plain PEC	None recorded.	Eighteen introduced taxa, including three taxa of environmental significance: <ul style="list-style-type: none"> <li><i>*Asparagus asparagoides</i> (DP, WoNS)</li> <li><i>*Gomphocarpus fruticosus</i> (DP)</li> <li><i>*Zantedeschia aethiopica</i> (DP)</li> </ul>

## **Appendix A2**

# **Fauna Literature Review**

Report	Distance to current Survey Area	Survey timing	Survey effort	Recorded conservation significant fauna	Fauna habitats
Flora and Fauna Assessment of Proposed Kwinana Ethanol Bio-Refinery (Umwelt Pty Limited, 2006)	Overlaps the Survey Area	22-23 August 2006	Reconnaissance (Basic) Fauna Survey	None	Four fauna habitats identified: <ul style="list-style-type: none"> <li>• Open woodland</li> <li>• Tall Shrubland</li> <li>• Open Shrubland</li> <li>• Cleared.</li> </ul>
Kwinana Island Vegetation Assessment (Strategen JBS&G, 2019)	1.8 km North of the Survey Area	18 September 2019	Site walk over to obtain a: <ul style="list-style-type: none"> <li>• Detailed list of flora species occurring on the island</li> <li>• Total count of trees suitable for Black Cockatoos</li> <li>• Waypoints for any significant trees.</li> </ul>	None	BC habitat: <ul style="list-style-type: none"> <li>• 0.21 ha Moderate quality Carnaby's Black Cockatoo foraging habitat</li> <li>• 0.04 ha of Very Poor quality Carnaby's Black Cockatoo foraging habitat</li> <li>• Eight significant trees (&gt;500 mm DBH) of which one contained visible hollows.</li> </ul>
Kwinana Nickel Refinery – Native Vegetation Clearing Permit Supporting Document For the Effluent Storage Pond Project (BHP Billiton Nickel West Pty Ltd, 2019)	Adjacent to the Survey Area	8 March 2019	Level 1 Fauna and Black Cockatoo habitat assessment	Carnaby's Cockatoo ( <i>Calyptrorhynchus latirostris</i> ) - EN	One fauna habitat identified: <ul style="list-style-type: none"> <li>• Rehabilitated woodland.</li> </ul>
Lot 101 Mandurah Road, Lakelands, Fauna Assessment (Harewood, 2014)	22 km South of the Survey Area	30 August 2014	Reconnaissance (Basic) Fauna Survey and Black Cockatoo Habitat Assessment	Carnaby's Cockatoo ( <i>Calyptrorhynchus latirostris</i> ) - EN	Six fauna habitats identified: <ul style="list-style-type: none"> <li>• Cleared Limestone Extraction Area</li> <li>• Parkland cleared, planted, or entirely cleared vegetation</li> <li>• Shrubland</li> <li>• Open woodland</li> <li>• Open mallee forest</li> <li>• Closed tall shrubland.</li> </ul>
Lots 511 and 512 Rockingham Road, Kwinana Beach (Strategen Environmental, 2019)	0.2 km NE of the Survey Area	15 May 2019, 6 August 2019	Black Cockatoo Habitat assessment	None	BC habitat: <ul style="list-style-type: none"> <li>• 319 significant trees (chiefly <i>Eucalyptus gomphocephala</i>)</li> <li>• 11 trees contained visible hollows of at least 10 cm diameter</li> <li>• 25.94 ha of potential Carnaby's Black Cockatoo foraging habitat.</li> </ul>
Memorandum: Targeted Black Cockatoo hollow inspection (GHD, 2020)	2 km NE of the Survey Area	2020	Targeted Black Cockatoo hollow inspection	None	No suitable Black Cockatoo hollows. No evidence of Black Cockatoo use was observed within the survey area

## **Appendix B**

# **Flora and Fauna Database Searches**

Taxon	ConsStatus	WARank	Location	District	CountDate	LiveTotal	InFlower	PopCondit	HabCondit	HabNotes	SoilCondit	Landform	RockType	Gravel	SoilType	SoilColor	Drainage	Aspect	AssSpecies
<i>Acacia lasiocarpa</i> var. <i>bracteolata</i> long peduncle variant (G.J. Keighery 5026)		1	Approx. 1.6km E of King Rd on Leopold Rd, between drain and road reserve. (6km WNW of Mundijong).	SWAN COASTAL	05/08/1982 0:00	0	N				MOIST				CLAY_SND				
<i>Acacia lasiocarpa</i> var. <i>bracteolata</i> long peduncle variant (G.J. Keighery 5026)		1	Lowlands: Serpentine River.	PERTH HILLS	13/08/1992 0:00	0	Y			Euc. calophylla woodland					CLAY_SND	GREY			Eucalyptus calophylla
<i>Aponogeton hexatepalus</i>		4	ca 250m WNW of Mundijong Rd & Duckpond Rd jnc.	SWAN COASTAL	10/08/1992 0:00	150	Y			Tribonanthes australis, Drosera sp., Stylidium sp., Stylidium utriculairoides, Legyrodia muriei		OD_SWAMP			LOAM	RED	PERMINUN		Melaleuca hamulosa, Hakea varia, Caesia micrantha, Triglochin procer
<i>Aponogeton hexatepalus</i>		4	ca 600m S of Orton Rd on Johnson Rd, W side. W side of swamp, almost adj drain on E side.	SWAN COASTAL	16/09/1993 0:00	100	N			Diuris micrantha. Sedges.									Melaleuca raphiophylla, Eucalyptus rudis, Kunzea recurva, Cryptostylis
<i>Aponogeton hexatepalus</i>		4	PRI Lot 200. Duckpond reserve, cnr Duckpond Rd & Mundajong Rd, Peel Estate.	SWAN COASTAL	05/11/1997 0:00	0	N			Dromp: Triglochin sp.		OD_SWAMP			CLAY	GREY	SEASUN		Orestia ovalifolia
<i>Babingtonia urbana</i>		3	Abernethy Rd, Oakford.	SWAN COASTAL	23/03/1981 0:00	0	N			Dry summer swamp. Sandy white clay.					SAND	WHITE			
<i>Caladenia hungerei</i>	T	CR	West of Johnson Road, 200m west and then 120m south of intersection (roundabout) of Holden Close (extension of Orton Road). Opposite Johnson Rd and Orton Rd intersection.	SWAN COASTAL	01/10/2004 0:00	0	N			Healthy to moderate woodland. Conostylis aculeata, Dasypogon bromeliifolius, Stirlingia latifolia, Pimelea	DRY	RJ_DUNE			SAND	GREY			Eucalyptus marginata, Eucalyptus rudis, Allocasuarina fraseriana, Melaleuca, Banksia attenuata, Banksia ilicifolia, Banksia menziesii
<i>Caladenia hungerei</i>	T	CR	*Extinct? 52m W of Freeman Rd, S of swamp near firebreak. (Lot 127)	SWAN COASTAL	15/10/1997 0:00	0	N			Xanthorrhoea preissii, Patersonia sp., Hibbertia sp., Stirlingia latifolia.	DRY	FL_PLAIN			SAND	GREY			Allocasuarina fraseriana, Banksia attenuata, Banksia menziesii, Banksia ilicifolia
<i>Caladenia hungerei</i>	T	CR	Lowlands farm. ca 1km SW of shed.	SWAN COASTAL	28/07/1991 0:00	7	N			Sparse understorey. On edge of firebreak.		FL_PLAIN			SAND	WHITE			Banksia ilicifolia, Eucalyptus marginata, Banksia attenuata, Allocasuarina fraseriana
<i>Caladenia hungerei</i>	T	CR	Lowlands farm. 1km W of T-jnc of Rowe & Hopelands Rd then 400m N of S bdy of farm. West of firebreak/fence.	SWAN COASTAL	16/09/2005 0:00	2	N			Drakaea elastica, Caladenia flava, Caladenia discoidea, C macrostylis, Drakaea livida. Banksia Woodland.		FLAT			SAND	GREY			Banksia ilicifolia, Banksia menziesii, Banksia attenuata, Kunzea
<i>Caladenia hungerei</i>	T	CR	Approximately 800m W of Rowe Rd & Hopelands Rd T-jnc. 10m N of track on N road res.	SWAN COASTAL	05/10/2004 0:00	2	N			Conostylis aculeata, Sowerbaea, Annual grasses, Loxophleba sedges. Banksia Woodland.		FLAT			SAND	GREY			Banksia attenuata, Banksia menziesii, Banksia ilicifolia, Kunzea
<i>Caladenia hungerei</i>	T	CR	Lowlands Farm, ca. 300m w of powerline along the southern boundary of farm, then north along firebreak ca. 200m, then east of firebreak, ca. 50m.	SWAN COASTAL	05/10/2004 0:00	1	Y			Banksia Woodland.		FLAT			SAND	GREY			
<i>Caladenia hungerei</i>	T	CR	Beneath the Cannington to Marriott Transmission Line on the 'Lowlands' Property.	SWAN COASTAL	23/09/2009 0:00	0	Y			100%: Medium very sparse woodland; jarrah, with low woodland, banksia and casuarina.	DRY	RIDGE			SAND	WHITE			
<i>Caladenia hungerei</i>	T	CR	EXTINCT - Area cleared for Kwinana Freeway on-ramp (NW corner of Beelair Rd & Kwinana Freeway in bushland. North from second overhead light)	SWAN COASTAL	23/10/2006 0:00	0	N			Banksia/Jarrah woodland. Xanthorrhoea preissii, Patersonia sp., Hibbertia sp., Stirlingia latifolia.	DRY	FLAT			SAND	GREY			Banksia attenuata, Banksia menziesii, Banksia ilicifolia, Allocasuarina fraseriana
<i>Caladenia hungerei</i>	T	CR	Lot 820 (previously part of Lot 136), Fraser Rd. WAPC owned private property. East side of Fraser Road. Plants scattered throughout the remaining bushland. Bush Forever Site 390 covers most of Lot 820.	SWAN COASTAL	23/09/2011 0:00	0	Y	HEALTHY	VR_Y_GOOD	Low open woodland over low open shrubland and herbland on lower slopes. Banksia Woodland. The overall condition of the vegetation due to drought conditions is declining. Recent fire (April 2011) in NE edge of Lot 820, NW edge of Lot 4 (423) & SE edge o	MOIST	SLOPE			SAND	WHITE	WLL_DRND		Melaleuca thymoides, Desmodium sp., Melaleuca preissiana, Dasypogon sp. <2% cover of sedges & Grasses - Schoenus caespitosus, S. candelastrius, Lyginia imberbis. Orchid species present : Pterostylis recurva, P. anguineus, Diuris bruniata/convulsa, caladeni
<i>Caladenia hungerei</i>	T	CR	Lot 9012 (Lot 135) Fraser Road, Banjup. Located on the west side of Fraser Road.	SWAN COASTAL	02/10/2013 0:00	0	Y	HEALTHY	GOOD	Vegetation away from the edges within the wider remnants were in Excellent condition; the more narrow remnants were Good to Completely Degraded. This site contains a high diversity of flora species.	MOIST	FL_PLAIN			SAND	GREY	WLL_DRND		Nuytsia floribunda, Allocasuarina humilis, Conostephium preissii, Gompholobium tomentosum, Bossiaea eriocarpa, Stirlingia latifolia, Amphipogon turbinatus, Conostylis aculeata ssp. cynurum, Eremaea pauciflora, Burchardia congesta, Acacia lasiocarpa, Item
<i>Caladenia hungerei</i>	T	CR	Lot 131 Fraser Road, Banjup. Located along the southern boundary of the lot, from the southern terminal to the northern terminal transmission line route.	SWAN COASTAL	09/10/2004 0:00	5	Y			Low open woodland over low open shrubland and herbland on lower slopes. Banksia Woodland. Low open woodland over low open shrubland and herbland on lower slopes. Banksia Woodland. Lowerslope to drainage line. Undulating topography. Habitat condition: Good to degraded.		SLOPE			SAND	GREY			Melaleuca thymoides, Desmodium sp., Melaleuca preissiana, Dasypogon sp.
<i>Caladenia hungerei</i>	T	CR	Fraser Road, Banjup, within the road reserve.	SWAN COASTAL	23/09/2011 0:00	0	N		DEGRADED	The road reserve is declining in condition due to the impacts of rubbish	MOIST	SLOPE			SAND	GREY	WLL_DRND		Melaleuca thymoides, Desmodium sp., Melaleuca preissiana, Dasypogon sp.
<i>Caladenia hungerei</i>	T	CR	Lot 821 (previously part of Lot 136) Fraser Road, Banjup. Private property owned by the Housing Commission. East side of Fraser Road [ca. 340m along Fraser Rd from Armadale Rd].	SWAN COASTAL	14/10/2005 0:00	0	Y	MODERATE		Low open woodland over low open shrubland and herbland on lower slopes. Banksia Woodland.		SLOPE			SAND	GREY			Melaleuca thymoides, Desmodium sp., Melaleuca preissiana, Dasypogon sp.
<i>Caladenia hungerei</i>	T	CR	Private Property, Lot 4, Armadale Rd, Banjup. Adjacent to Lots 820 & 821 Fraser Road. Previously included as part of Pop 43A. Part of Lot 4 is Bush Forever Site 390. (Plants found in the vegetation in the northern and western parts of Lot 4).	SWAN COASTAL	14/10/2005 0:00	0	Y	MODERATE		Low open woodland over low open shrubland and herbland on lower slopes. Banksia Woodland.		SLOPE			SAND	GREY			Melaleuca thymoides, Desmodium sp., Melaleuca preissiana, Dasypogon sp.
<i>Caladenia hungerei</i>	T	CR	The north western boundary of Wandii Nature Reserve (Reserve No. 36110), within the Town of Kwinana. Approximately 100m NE of 30 Blackboy Grove, Wandii.	SWAN COASTAL	21/09/2004 0:00	1	N			Banksia woodland.		FLAT			SAND	GREY			
<i>Caladenia hungerei</i>	T	CR	Wandii Nature Reserve (Reserve No. 36110), from 30 Blackboy Grove, Wandii head south along Wandii NR boundary fence for ca. 150m, then east ca. 200m (ca. 130m NW of the southern boundary fence).	SWAN COASTAL	21/09/2004 0:00	1	Y			Banksia woodland.	DRY	FLAT			SAND	GREY			
<i>Caladenia hungerei</i>	T	CR	Western boundary of Wandii Nature Reserve (Reserve No. 36110). Halfway down track along W boundary. Approx 320m in from De Haer Rd. ~5m E of track. Town of Kwinana.	SWAN COASTAL	04/10/2010 0:00	0	N			Banksia woodland. * (Eriharta calycina at densities >70%.	DRY	SLOPE			SAND	WHITE			Banksia attenuata, Allocasuarina fraseriana, Banksia menziesii
<i>Caladenia hungerei</i>	T	CR	121 De Haer Rd, Wandii. The southern boundary of Wandii Nature Reserve (Reserve No. 36110). Approx 440m SW down De Haer Rd from E corner of Reserve, approx 40m in from Road verge. Within the Town of Kwinana.	SWAN COASTAL	04/10/2011 0:00	0	Y	HEALTHY	VR_Y_GOOD	Presence of perennial veldt grass (highly invasive weed species) is the factor downgrading condition from excellent to very good. Intact native species structure and diversity	DRY	SLOPE			SAND	GREY	WLL_DRND		
<i>Caladenia hungerei</i>	T	CR	Approx 150m SW down De Haer Rd from E corner of Wandii Nature Reserve (Reserve No. 36110). Approx 10m in from Road verge. Within the Town of Kwinana.	SWAN COASTAL	25/09/2012 0:00	0	Y	HEALTHY	VR_Y_GOOD		DRY	SLOPE			SAND	GREY	WLL_DRND		Conostylis aculeata, Lyginia barbata, Sowerbaea laxiflora
<i>Caladenia hungerei</i>	T	CR	Crown Reserve (R17957) at intersection between Lyon Rd and De Haer Rd, Wandii. Bush Forever Site No. 347. Plants found in NE Corner of reserve.	SWAN COASTAL	25/09/2012 0:00	0	Y	HEALTHY	EXCELENT	Located in small patch of excellent bush adjacent to a more disturbed area		HILL			SAND	GREY	WLL_DRND		
<i>Caladenia hungerei</i>	T	CR	Private Property, 36 (Lot 149) Stefaneli Road, Wandii.	SWAN COASTAL	11/10/2005 0:00	6	Y			Banksia Woodland		FLAT			SAND	GREY			
<i>Caladenia hungerei</i>	T	CR	Private Property, Lot 51 (previously part of Lot 137 which was subdivided) Rowley Road, Wandii, scattered in bush in southern half of block.	SWAN COASTAL	11/10/2005 0:00	0	Y												
<i>Caladenia hungerei</i>	T	CR	Private Property, Lot 1 (previously part of Lot 132) Wandii Road, Wandii, scattered in bush in northern half of block.	SWAN COASTAL	16/10/2005 0:00	3	Y												
<i>Caladenia hungerei</i>	T	CR	Private Property, Lot 52 (previously part of Lot 137 which was subdivided) Rowley Road, Wandii, scattered in bush in southern half of block.	SWAN COASTAL	10/10/2005 0:00	0	Y												
<i>Caladenia hungerei</i>	T	CR	Private Property 384 Bartram Street, Banjup, remnant at back of property.	SWAN COASTAL	05/10/2005 0:00	1	Y			Banksia woodland, understorey of a variety of grasses of Hibbertia.		FLAT			SAND	GREY			
<i>Caladenia hungerei</i>	T	CR	Crown Reserve 33002 known as Denis De Young Reserve. Lots 423 and 424, Liddelow Rd, Banjup. Population is on the central western boundary.	SWAN COASTAL	27/09/2013 0:00	0	Y	HEALTHY	VR_Y_GOOD	Low Open Forest of Banksia attenuata, B. menziesii, B. ilicifolia, Allocasuarina fraseriana and Nuytsia floribunda over Tall Shrubland of Adenanthos cynurum and Kunzea glabrescens over Open Low Heath of Xanthorrhoea preissii, Melaleuca thymoides, Calytr	MOIST	FLAT			SAND	GREY	WLL_DRND		Lyginia barbata, Amphipogon turbinatus, Patersonia occidentalis, Burchardia congesta, Drosera erythrorhiza, Conostylis juncea, Amigazanthos mangiesii, Jacksonia stembergia
<i>Caladenia hungerei</i>	T	CR	Unvested Reserve No. 41438, known as Shirley Balla Reserve in the Jandakot Regional park, east of Shirley Balla Swamp, Banjup. Lot 418 Liddelow Rd, Banjup. Plants are east of the swamp and on the northern boundary of the reserve (see attached map)	SWAN COASTAL	10/10/2011 0:00	0	Y	HEALTHY	EXCELLENT		MOIST	FLAT			SAND	GREY	WLL_DRND		Allocasuarina fraseriana, Nuytsia floribunda, Amphipogon turbinatus, Angioasanthos mangiesii, Burchardia congesta, Patersonia occidentalis, Conostylis aculeata, Lechea nulloba, Pterostylis sanguineus
<i>Caladenia hungerei</i>	T	CR	Private Property, Lot 3 [54 Oxley Road], Banjup. Ca. 20m S of water tank.	SWAN COASTAL	19/09/2007 0:00	1	Y				DRY	FLAT			SAND				Allocasuarina fraseriana, Banksia attenuata, Stirlingia latifolia, Hibbertia hypericoides
<i>Caladenia hungerei</i>	T	CR	Private property. 22 Robinson Rd (Lot 31), Wandii. Remnant bush/garden bed close to house within 1m of driveway. Town of Kwinana.	SWAN COASTAL	01/10/2009 0:00	1	Y			Banksia woodland. Kunzea ericifolia, Lepidosperma spp, Xanthorrhoea preissii,	DRY				SAND	GREY			Eucalyptus todtiana, Banksia ilicifolia, Allocasuarina fraseriana
<i>Caladenia hungerei</i>	T	CR	Private Property Lot 674 Lyon Road, Wandii. Site is 720m north of Ankettell Road. Plant is on the disturbed edge of the eastern firebreak that runs parallel to Lyon Road.	SWAN COASTAL	25/09/2012 0:00	0	Y	HEALTHY	GOOD	Tall Open Scrub of Kunzea glabrescens and Adenanthos cynurum	DRY	SLOPE			SAND	GREY	WLL_DRND		



	ConsStatus	WARank	Location	District	CountDate	LiveTotal	Inflower	PopCondit	HabCondit	HabNotes	SoilCondit	Landform	RockType	Gravel	SoilType	SoilColor	Drainage	Aspect	AssSpecies	
<i>Caladenia hughelli</i>	T	CR	Private Property Lot 52 Lyon Road, Wandl. Site is 430m north of Ankettell Road. Plants are on the disturbed edge of the eastern firebreak that runs parallel to Lyon Road and approx 20m in the bushland.	SWAN COASTAL	25/09/2013 0:00	0	Y	HEALTHY												Lepidosperma squamata, Xanthorrhoea preissii, Austostipa elegantissima, Britia maxima
<i>Caladenia hughelli</i>	T	CR	Private property (Lot 25 on Plan 13024), 90 Robinson Rd, Wandl/ Plants are between 2-5m into the bush at several sites along the driveway and the firebreak on the northern portion of the property.	SWAN COASTAL	20/10/2011 0:00	0	Y	HEALTHY	EXCELLENT		MOIST	FLAT			SAND	GREY	WLL_DRND			Melaleuca preissiana, Eucalyptus rudis subsp. rudis, Pteridium esculentum
<i>Cyathochaeta teretifolia</i>		3	Private Property, Lot 100, Treeby Rd, Ankettell, Kwinana.	SWAN COASTAL	24/10/2007 0:00	0	N			Woodland.	INUNDATE	OD_SWAMP			PEAT	BLACK				Melaleuca preissiana, Melaleuca raphiophylla, Astartea scoparia, Centella asiatica
<i>Cyathochaeta teretifolia</i>		3	Private Property, No. 52 Braddock Rd, Wellard (in possible wetland ca 360m N-NNE of Braddock-Levington Rd intersection - EXTRAPOLATED), Kwinana	SWAN COASTAL	02/12/2005 0:00	0	N					SLOPE			LOAM_SND	BROWN	SEASINUN	N		Melaleuca preissiana, Melaleuca raphiophylla, Astartea scoparia, Centella asiatica
<i>Dilwynia dilwynioides</i>		3	N side of Lowlands Rd, at approx 2.25 km W of the junction with Rapids Rd. N of residence.	SWAN COASTAL	15/06/1994 0:00	0	N			Low lying seasonal wetland area.										
<i>Dilwynia dilwynioides</i>		3	Seasonal wetland adjoining Hymus Swamp. Ca 2 km N of Karnup Rd, at approx 1 km W of the junction with Yangetti Rd.	SWAN COASTAL	15/06/1994 0:00	0	N			Low lying seasonal wetland.										
<i>Dilwynia dilwynioides</i>		3	Baldvis Ordance Reserve (ID: 37090).	SWAN COASTAL	15/09/2006 0:00	20	Y				MOIST	OD_SWAMP			LOAM	GREY				Eucalyptus rudis, Hibbertia stellaris, Kunzea glabrescens, Villarsia albiflora
<i>Dilwynia dilwynioides</i>		3	Baldvis Ordance Reserve (ID: 37090). Site 8, 1.4km S of Stakehill Rd and the N boundary of Baldvis Pine Plantation, Karnup.	SWAN COASTAL	04/11/1998 0:00	0	N					FL_PALLU					SEASINUN			Melaleuca raphiophylla, Kunzea ericifolia
<i>Dilwynia dilwynioides</i>		3	Baldvis Ordance Reserve (ID: 37090). Site 10, 100m N of S boundary of Baldvis Pine Plantation & 1.8km E of Karri St, Karnup.	SWAN COASTAL	04/11/1998 0:00	0	N					FL_PALLU					SEASINUN			Eucalyptus rudis, Melaleuca raphiophylla, Kunzea ericifolia
<i>Dilwynia dilwynioides</i>		3	Lot 1 (Lot No.: 245). Remnant vegetation of Lowlands property (M103) 9 km WNW of Serpentine (plot low08).	SWAN COASTAL	28/10/1993 0:00	0	N					FL_PALLU				BROWN	SEASINUN			Melaleuca raphiophylla, Kunzea ericifolia, Astartea fascicularis
<i>Diuris micrantha</i>	T	VU	UCL Lot 9206 Johnson Road, Berrimah. Population occurs within swamp on western side of Johnson Road approximately 610m south of Holden and Johnson intersection, and approximately 70m west of eastern boundary fence	SWAN COASTAL	17/10/2019 0:00	0	N		VERY_GOOD	Closed Sedgeland of Lepidosperma longistylate over Open Herbland of *Lyimacchia arvensis, *Lotus sp., *Trifolium sp., *Romulea rosea, Microtis browni, Tribonanthes australensis.	DRY	OD_SWAMP			PEAT	BLACK	SEASINUN			Occ. Hakea varia, Acacia saligna
<i>Diuris micrantha</i>	T	VU	UCL Ca 600m S of Orton Rd on Johnson Rd, W side. On W side of drain (previously known as Lot 1201, State Housing Commission).	SWAN COASTAL	24/09/2002 0:00	0	N													Banksia, Eucalyptus marginata
<i>Diuris purdiei</i>		4	PP, Lot 112 'Jandakot Regional Park'. NW side of Thomas Rd, 900m SW of Ankettell Rd.	SWAN COASTAL	14/01/2004 0:00	0	N				MOIST	OD_SWAMP			CLAY	GREY				Leptospermum ellipticum, Melaleuca preissiana, Horia floribunda
<i>Dodonaea hackettiana</i>		4	Along the NE side of Kogolup Lake, Yangebup. For 0.6 km NNE along the lake edge from Wedge Rd.	SWAN COASTAL	15/10/1980 0:00	0	N													
<i>Dodonaea hackettiana</i>		4	N verge of Wedge Rd, along the S edge of Kogolup Lake, Yangebup.	SWAN COASTAL	15/10/1980 0:00	0	N													
<i>Dodonaea hackettiana</i>		4	N edge of Thomsons Lake. W end of Haring Rd, Success.	SWAN COASTAL	15/10/1980 0:00	0	N													
<i>Dodonaea hackettiana</i>		4	NW edge of Thomsons Lake. 0.6 km W of Wedge Rd and 0.5 km E of Lorimer Rd.	SWAN COASTAL	15/10/1980 0:00	0	N													
<i>Dodonaea hackettiana</i>		4	W edge of Thomsons Lake. From 0.8 to 1 km S of Wedge Rd.	SWAN COASTAL	15/10/1980 0:00	0	N													
<i>Dodonaea hackettiana</i>		4	Russell Rd, Watkeup. From Pearce Rd, E for approx 0.6 km.	SWAN COASTAL	15/10/1980 0:00	27	N			Sand with outcropping limestone.	OUTCROP	LIMESTN			SAND					Banksia
<i>Dodonaea hackettiana</i>		4	S side of Russell Rd, Watkeup. NW corner of Harry Waring Marsupial Reserve.	SWAN COASTAL	15/10/1980 0:00	13	N													
<i>Dodonaea hackettiana</i>		4	S edge of Thomsons Lake. From 0.5 to 1.5 km E of Pearce Rd.	SWAN COASTAL	15/10/1980 0:00	0	N													
<i>Dodonaea hackettiana</i>		4	Harry Waring Marsupial Reserve. W edges of Banganup (Toodjabubup) Lake.	SWAN COASTAL	15/10/1980 0:00	1750	N													
<i>Dodonaea hackettiana</i>		4	Harry Waring Marsupial Reserve. E side of Banganup (Toodjabubup) Lake. 375 m S of Russell Rd.	SWAN COASTAL	15/10/1980 0:00	23	N													
<i>Dodonaea hackettiana</i>		4	WSW edge of Banganup (Toodjabubup) Lake. 0.5 km SE of the intersection of Russell and Pearce Rds.	SWAN COASTAL	15/10/1980 0:00	0	N													
<i>Dodonaea hackettiana</i>		4	SE side of the junction of Forrest Rd and Mason Rd, ca 1 km S of Bibra Lake.	SWAN COASTAL	11/11/1981 0:00	0	N					SLOPE	LIMESTN		SAND					
<i>Dodonaea hackettiana</i>		4	Near the Spectacles, Peel Estate. W side of Johnson Rd, 1 km N of Thomas Rd.	SWAN COASTAL	05/01/1987 0:00	3	N					FLAT			SAND					
<i>Dodonaea hackettiana</i>		4	Clarence Township, 377 Cockburn Rd. 0.25 km W of Cockburn Rd and 0.5 km E of The D.V.S.R. camp.	SWAN COASTAL	15/06/1987 0:00	0	N													
<i>Dodonaea hackettiana</i>		4	PRI Lot.88. Woodman Point Nature Reserve, Coogee.	SWAN COASTAL	28/10/2001 0:00	0	N					RJ_DUNE			SAND	GREY				Acacia rostellifera, Melaleuca systema
<i>Dodonaea hackettiana</i>		4	NON Lot.459. About 40m S of Osprey Drv & just E of the drain going under Osprey Drv (which is W of Parkes Rd); Yangebup. Beellar Regional Park.	SWAN COASTAL	16/10/2003 0:00	12	Y				DRY	CD_LKBED			SAND	GREY				Eucalyptus rudis
<i>Dodonaea hackettiana</i>		4	PRI Lot.100. Manning Lake Reserve immediately adj. to Whitton Rd, Hamilton Hill (DECgis coords used).	SWAN COASTAL	01/12/2005 0:00	20	N			DomSp: Victorian Tea Tree		RIDGE	LIMESTN		SAND	BROWN		N		Melaleuca hughelli, Dryandra sessilis, Templetonia retusa
<i>Drakaea elastica</i>	T	CR	**Extinct - Cleared for housing** Mandogalup, south west of Perth. 0.8km south of Hope Valley Rd on west side of Treeby Rd, on Lot 33.	SWAN COASTAL	28/07/2005 0:00	0	N			Kunzea ericifolia scrub	DRY	FLAT			SAND	WHITE				Banksia attenuata, Banksia menziesii, Banksia illicifolia, Adenanthos cygnorum
<i>Drakaea elastica</i>	T	CR	**Extinct - cleared for housing** Mandogalup, south west of Perth. 0.8km south of Hope Valley Rd on west side of Treeby Rd, on Lot 34.	SWAN COASTAL	28/07/2005 0:00	0	N			Kunzea ericifolia scrub		FL_PLAIN			SAND	GREY				Banksia attenuata, Banksia menziesii, Banksia illicifolia, Adenanthos cygnorum
<i>Drakaea elastica</i>	T	CR	**Extinct - cleared for housing** Mandogalup, south west of Perth. 0.8km south of Hope Valley Rd on west side of Treeby Rd, on Lot 35.	SWAN COASTAL	28/07/2005 0:00	0	N			Kunzea ericifolia scrub		FL_PLAIN			SAND	GREY				Banksia attenuata, Banksia menziesii, Banksia illicifolia, Adenanthos cygnorum
<i>Drakaea elastica</i>	T	CR	200m SW of the Rowley Rd and Nicholson Rd junction. Exact location of population unknown. See other comments.	SWAN COASTAL	28/07/2005 0:00	0	N					FLAT			SAND	GREY				Banksia attenuata
<i>Drakaea elastica</i>	T	CR	Private Property, Loc 16, part 2 (Lowlands Farm). 1km W of T-junction of Hopelands Rd & Rowe Rd, then ca 150m N of S boundary of Farm. East of fence. Shire of Serpentine-Jarrahdale.	SWAN COASTAL	09/08/2010 0:00	0	N			Intact						SAND	WHITE			Banksia illicifolia, Banksia menziesii, Banksia attenuata, Kunzea
<i>Drakaea elastica</i>	T	CR	Private Property, Loc 16, part 2 (Lowlands Farm). 1km W of T-junction of Hopelands Rd & Rowe Rd, then ca 400m N of S boundary of Farm. Ca 40m W of fence. Shire of Serpentine-Jarrahdale.	SWAN COASTAL	09/08/2010 0:00	0	N			Caladenia hughelli						SAND	WHITE			Banksia illicifolia, Banksia menziesii, Banksia attenuata, Kunzea
<i>Drakaea elastica</i>	T	CR	Private Property, Loc 16, part 2 (Lowlands Farm). Ca 600m N of S boundary of Farm, N of T-junction of Hopelands Rd & Rowe Rd, and then 150m E of track. Shire of Serpentine-Jarrahdale.	SWAN COASTAL	09/08/2010 0:00	0	N				DRY	OD_DRGLN						W		Kunzea ericifolia
<i>Drakaea elastica</i>	T	CR	Private property, Lot 2 Lowlands Rd, Mardella (Lowlands Farm). 5 from Wilkinson Road/Serpentine River junction. Within Hymus Swamp, along the 'Dampier to Bunbury Natural Gas Pipeline Corridor'. Both sides of gas pipeline.	SWAN COASTAL	29/09/2005 0:00	54	N			Banksia woodland over kunzea thicket.	DRY	FL_PLAIN			SAND	WHITE				Banksia menziesii, Banksia attenuata, Banksia illicifolia, Kunzea glabrescens, Adenanthos cygnorum, Hibbertia hypericoides
<i>Drakaea elastica</i>	T	CR	Private Property, Lot 129 Bodeman Road, Wandl. Plants scattered in bush in rear of block near western boundary. Shire of Kwinana.	SWAN COASTAL	17/08/2010 0:00	0	N			Banksia sp., Calothamnus sp., Conostylis sp., grasses (interpreted from photo).	MOIST	FLAT	FLAT	LATERITE		SAND	WHITE			Banksia
<i>Drakaea micrantha</i>	T	EN	PP (Loc 33,37,1 or 27). SW of Forrestdale. N of Gibbs Rd, ca 500m W of Nicholson Rd. Armadale-Kelmscott.	SWAN COASTAL	14/11/2002 0:00	0	N													Kunzea ericifolia, Pericalymma ellipticum
<i>Johnstonia pubescens</i> subsp. cygnorum		2	Remnant vegetation on Lowlands property (M103). N of Lowlands Rd., 7.5 km WNW of Serpentine (adj. to plot low09a)	SWAN COASTAL	13/08/1992 0:00	0	N					FLAT			SAND	GREY	SEASINUN			Eucalyptus marginata, Melaleuca preissiana, Chamaecilla corymbosa, Dasypogon bromeliifolius
<i>Johnstonia pubescens</i> subsp. cygnorum		2	Remnant vegetation on Lowlands property (M103). N of Lowlands Rd., 7.5 km WNW of Serpentine (plot low06a)	SWAN COASTAL	12/08/1992 0:00	0	N			Loxocarya fascicularis, Hypolaema exsuka		FLAT			SAND	WHITE				Leptrodia macra, Tribonanthes australis, Oenati grabe
<i>Lepidosperma rostratum</i>	T	EN	Road Reserve, Mardella. 26m S of Mundijong Rd and 120m W of Kargotich Rd (plot Mu002). Immediately adjacent to CR 23793 (Govt Requirements) and adjacent to PRI Lot 29 (Plan 3269)	SWAN COASTAL	18/09/2013 0:00	3	Y	HEALTHY	VERY_GOOD	Melaleuca uncinata shrubland over Chorizandra enodis,	INUNDATE	WETLAND			SCL_LOAM	BROWN	SEASINUN			Verticordia plumosa, Leptocarpus canis, Chorizandra enodis, Borya scopridoides, Babiana angustifolia
<i>Lepidosperma rostratum</i>	T	EN	Gov Requirements Crown Reserve (CR 23793). Lot 1724, Mardella. 23m S of Mundijong Rd and 130m W of Kargotich Rd. Immediately adjacent to Road Reserve.	SWAN COASTAL	31/10/2017 0:00	0	N	POOR	VERY_GOOD	Melaleuca uncinata shrubland over Chorizandra enodis,	INUNDATE	WETLAND			SCL_LOAM	BROWN	SEASINUN			Melaleuca raphiophylla, Baumea articulata, Triglochin linearis, Villarsia albiflora
<i>Lepidosperma rostratum</i>	T	EN	Government Requirements Crown Reserve (CR 23793). Lot 1724, Cockburn Sound. ~2.2km WSW of Mundijong Town and ~190m W of Pure Steel Lane and Mundijong Rd (LGA Rd) junction.	SWAN COASTAL	05/11/2012 0:00	0	Y	HEALTHY	VERY_GOOD	Veg Class 1: Melaleuca uncinata over shrubs, sedges and herbs.	INUNDATE	WETLAND			CLA_LOAM	BROWN	SEASINUN			Stylidium longitubum, Lepidosperma longistylate
<i>Schoenus capillifolius</i>		3	Baldvis Ordinance Reserve (No. 37090), Rockingham	SWAN COASTAL	15/09/2006 0:00	0	N			VegClass:Densie low forest of Melaleuca raphiophylla. DomSp: Calliche stajnalis (others - but illegible)	INUNDATE	OD_SWAMP			CLAY	GREY				Melaleuca preissiana, Melaleuca raphiophylla, Astartea scoparia, Centella asiatica
<i>Stylidium longitubum</i>		4	PRI Lot.2. Remnant bushland near Hymus Swamp in SW cnr of lowlands property (M105). 11km WNW of Serpentine (plot hymu05).	SWAN COASTAL	06/11/1993 0:00	0	N			DomSp: Melaleuca raphiophylla, Lotus sauevolens						FL_PALLU				Stylidium longitubum, Lepidosperma longistylate
<i>Stylidium longitubum</i>		4	PRI Lot.305. Braddock Rd, Wellard.	SWAN COASTAL	17/11/1995 0:00	0	N					SLOPE				LOAM_SND	BROWN	SEASINUN	N	Melaleuca preissiana, Melaleuca raphiophylla, Astartea scoparia, Centella asiatica
<i>Synsphaea</i> sp. Pinjarra Plain (A.S. George 17182)	T	EN	Crown Reserve (R 23793) S of Mundijong Rd, Mardella / Mundijong. 180m W of Pure Steel Lane. 13-34m south of the Mundijong Rd.	SWAN COASTAL	09/10/2012 0:00	0	Y	POOR	EXCELLENT	Woodland of Corymbia calophylla, Nuytsia floribunda, over heath of Xanthorrhoea preissii, Kingia australis, Allocasuarina humilis, Hakea varia, Hypocalymma angustifolium, Calothamnus quadrifidus, Hibbertia hypericoides, over sedgeland of Mesembryema tenax	DRY	FLAT			SND_LOAM		WLL_DRND			Plants occur in a disturbed embankment on the edge of the firebreak.
<i>Synsphaea</i> sp. Serpentine (G.R. Brand 103)	T	CR	PP Lot 96 Abernethy Rd, Byford. ~840m west of the intersection of Hopkinson and Abernethy Rds. Plants are on the south side of Abernethy Rd just inside the fence line of Lot 96, and grow on both edges of the firebreak. [lot owned by WAPC]	SWAN COASTAL	12/01/2012 0:00	0		MODERATE	DEGRADED	Open Shrubland of *Leptospermum laevigatum and occasional Regelia ciliata with Verticordia densiflora var. cespitosa over Dense *Eragrostis curvula.	DRY	FLAT			SND_LOAM	YELLOW				
<i>Synsphaea</i> sp. Serpentine (G.R. Brand 103)	T	CR	CR 23793, S of Mundijong Rd, Mardella. 230-300m E of Kargotich Rd. ~22m S of rd shoulder. Plants occur in 2 small patches 53m apart	SWAN COASTAL	15/12/2011 0:00	0		MODERATE	VERY_GOOD	SCP-08 Threatened Ecological Community - Melaleuca viminea, Callitris pyramidalis, Hypocalymma angustifolium	DRY	FLAT			SND_LOAM	GREY	SEASINUN			
<i>Tripterococcus</i> sp. Brachylobus (A.S. George 14234)		4	Reserve 41438 (Location 418), cnr of Liddlow & Gibbs Rds, Banjup.	SWAN COASTAL	21/02/1992 0:00	10	N			Winter wet flats, peaty sand over clay.						CLAY_SND		SEASINUN		Hypocalymma angustifolium

[illegible]

Taxon	Cons_Code	Plant_Desc	Site	Vegetation	Frequency	Notes	Locality	Date
<i>Acacia benthamii</i>	2		Low plain. Grey sand.	Open Jarrah & Tuart woodland. Allocasuarina fraseriana, Banksia attenuata, Kunzea glabrescens, Hibbertia hypericoides.	ca 20 plants.		Lot 203, Stock Road, Stake Hill	31/03/2005
<i>Acacia lasiocarpa</i> var. <i>bracteolata</i> long peduncle variant (G.J. Keighery 5026)	1	Erect slender shrub to 1.5 m. Flowers yellow, in full flower.	Grey sand over clay.	Eucalyptus calophylla woodland.		Abundance: scattered in area.	Lowlands: Serpentine River	13/08/1992
<i>Acacia lasiocarpa</i> var. <i>bracteolata</i> long peduncle variant (G.J. Keighery 5026)	1		Black sandy swampy area.	Jarrah.			1 mile past bridge, Nicholson Road - Bibra Lake	26/08/1957
<i>Acacia lasiocarpa</i> var. <i>bracteolata</i> long peduncle variant (G.J. Keighery 5026)	1	Low spreading, sparsely branched shrub, to 1 m x 1 m. Flowers yellow.	Low lying sand over clay. Winter wet, open.				6 km WNW of Mundijong	05/08/1982
<i>Acacia lasiocarpa</i> var. <i>bracteolata</i> long peduncle variant (G.J. Keighery 5026)	1	Low shrub. In fruit.	Flat, brown sandy loam soil.	Isolated low trees of Melaleuca preissiana over isolated tall shrubs of Viminaria juncea and Callitris pyramidalis over mid to low shrubland to low shrubland of mixed species dominated by Regelia ciliata, Hakea varia, Pericalymma ellipticum, Calothamnus Tuart woodland. Associated species: Acacia saligna, Xanthorrhoea preissii, Rhagodia baccata, Spyridium globosum, Acaenothorcapus preissii and annual grasses.	single plant seen.		Rail reserve along Bishop Road, 500 m W of Hopkinson Road, ca. 3.3 km NW of Mundijong	17/10/2019
<i>Acacia</i> sp. Binningup (G. Cockerton et al. WB 37784)	1	Suckering clumping shrubs to 1.5 m.	Sand.	Banksia/Eucalypt woodland, nearby Eucalyptus marginata and Allocasuarina fraseriana.	c. 200 in 20 m x 20 m.		Rockingham Golf Course eastern fenceline	24/10/2017
<i>Amanita fibrilloses</i>	3		In sand with a deep mulch of leaf litter.	Nearby Eucalyptus marginata and Proteaceae.			Lowlands, near Rockingham	01/06/2008
<i>Amanita fibrilloses</i>	3		Under leaf litter, sandy soil.				Lowlands, near Rockingham	25/06/2006
<i>Amanita fibrilloses</i>		Characteristic Features: (i) Cap: hemispheric when young, appanate when mature; 42 and 65 mm diameter; surface smooth and slightly viscid; covered with thick universal veil; vinaceous buff, breaking into polygonal, pyramidal warts, smaller in centre, la		Emergent Eucalyptus marginata in a woodland of Banksia.		Other code: PUBF Orange 4, Specimen ID 1822, Group 122.	Lowlands, Lowlands Road, Mardella, Perth	20/05/2006
<i>Amanita fibrilloses</i>	3	Characteristic Features: (i) Sand covered pastel pinkish-orange to peach coloured when young; (ii) mealy warts on cap inconspicuous at first but become quite tall and pyramidal in old specimens; (iii) white to cream gills. Pileus: Up to 70 mm; flat	Submerged in white to grey sand, emerging in part when quite old.	Eucalyptus marginata.		Field name: Pink-capped Amanita.	Lowlands, Lowlands Road, Mardella, Shire of Serpentine-Jarrahdale	21/05/2006
<i>Amanita preissii</i>	3	Pileus 83 mm diameter, cream (C, pale 3A2), plane with decurved margin and slightly raised centre, margin not striate, appendiculate. Universal veil on pileus crustose, thin, as small soft floccose warts, adnate, white. Lamellae cream (D, 3A2-4A2), narrow		Banksia/eucalypt woodland with Kunzea ericifolia, Acacia pulchella, Eucalyptus marginata.	one.		Jandakot Regional Park	04/06/2018
<i>Amanita preissii</i>	3	Pileus 50-60 mm diameter, white, plane with decurved margin, dry, margin not striate, appendiculate. Universal veil on pileus as a thin, floccose layer over whole of disc, ivory white (B), adnate.		Jarrah/marri/banksia woodland. Eucalyptus marginata, Hibbertia hypericoides.	two.		Bibra Lake, Beellar Regional Park	18/06/2017
<i>Amanita wadjukiarum</i>	3	Pileus 90 mm diameter, milky coffee (5D4-6D4), plane with depressed centre and upturned margin, dry, margin not striate, appendiculate. Universal veil on pileus as large straight sided warts in centre of disc, vinaceous buff (6B2), adnate. Lamellae cream		Jarrah/marri/banksia woodland. Eucalyptus marginata, Corymbia calophylla.	one.		Bibra Lake, Beellar Regional Park	18/06/2017
<i>Angianthus drummondii</i>	3	Annual herb.	Seasonally wet poorly drained flat. Brown clay.	Melaleuca acutifolia over Leptocarpus decipiens, Apodasmia ceramophila over rich herb layer.		Vegetation condition: very good. TEC, communities 7 & 8.	Plot Mud 03. Roadside remnant Mundijong Road, W of Kargotich Road	05/11/2012
<i>Apanogeton hexatepalus</i>	4	Aquatic bulbous herb 15 cm high.	Seasonal wetland on Pinjarra Plain. Red loam.	Open Melaleuca vineacea scrub over Leptocarpus coangustatus dense low sedges.	common.		Bushland remnant W of junction of Mundijong and Duckpond roads (plot duck-3)	07/08/1992
<i>Austroripia mundula</i>	3	Caespitose perennial grass.	In sand over limestone.				Between Woodman Point and Naval Base, S of Fremantle	30/08/1967
<i>Babingtonia urbana</i>	3	Spreading shrub to 1 m tall x 1.5 m wide. Flowers pink.	Winterwet depression.	With Verticordia densiflora, Melaleuca vineacea, Hakea varia, Meeboldina cana and Ficinia nodosa.	>1000 in estimated area 30 m x 500 m.		Along Mundijong Road by Kargotich Road intersection	19/02/2014
<i>Babingtonia urbana</i>	3	Spreading shrub to 1 m tall x 1.5 m wide. Flowers pink.	Winterwet depression.	With Verticordia densiflora, Melaleuca vineacea, Hakea varia, Meeboldina cana and Ficinia nodosa.	>1000 in estimated area 30 m x 500 m.		Along Mundijong Road by Kargotich Road intersection	19/02/2014
<i>Babingtonia urbana</i>	3	0.5 m high x 1.5 m wide. Flowers pink.	Fenceline of drainage line.	Planted Eucalyptus trees, Verticordia densiflora.	2 in estimated area 10 m x 5 m.		Cardup, 600 m N of Gossage Road	13/02/2014
<i>Babingtonia urbana</i>	3	Erect open shrub, 40 cm high. Flowers white and pink centres.	Dry summer swamp. Sandy white clay soil.	Heath type vegetation.			Abernethy Road, Oakford	23/03/1981
<i>Beyeria cinerea</i> subsp. <i>cinerea</i>	3	Many stemmed shrub to 30 cm. Male flowers pale yellow.	In sand over limestone.	With low scrub.			The Plains, Mandurah Road	07/10/1967
<i>Beyeria cinerea</i> subsp. <i>cinerea</i>	3	Semi-erect shrub 0.2 m high x 0.2 m wide.	Limestone ridge. Brown-orange sand with outcropping limestone. Tamala limestone.	Mixed Low Heath C. Grevillea preissii, Rhagodia baccata.	uncommon.		Lot 4, Mandurah Road (Bushplan Site 395)	30/06/1999
<i>Baronia juncea</i> subsp. <i>juncea</i>	1	Shrub to 1 m high x 0.5 m wide. Pink and purple flowers.	Gentle slope with a north aspect. Surface soil is dark brown sandy loam and sub surface soil is dark brown sandy loam. Drainage is poor and wet during winter and spring only with soil being waterlogged at present.	Melaleuca preissiana, M. raphiophylla low open woodland over Astartea scoparia closed heath over Centella asiatica herbland. Excellent to pristine vegetation condition with some weed species affecting the herb layer.	a couple.		Braddock Road, Wellard	02/12/2005
<i>Caladenia huegellii</i>	T	To 80 cm tall, one with two flowers, no odour.	In grey sand on gently undulating terrain.	Low woodland - low forest over scrub and heath; Banksia attenuata, B. menziesii, B. illicifolia, Allocasuarina fraseriana, Eucalyptus todiana, E. marginata over Adenanthos.		Abundance: four plants in full flower.	900 metres SW of Randford Road on Warton Road, Canning Vale, Prisons Department	09/09/1985
<i>Caladenia huegellii</i>	T		In sandy soil.	Jarrah - Banksia woodland.			Bartram Road, Jandakot	07/09/1958
<i>Caladenia huegellii</i>	T	Up to 60 cm high.	Coastal plain. Grey sand.	Closed Banksia woodland. Banksia sp., Stirlingia latifolia, Hibbertia spp., Hypocalymma robustum, Conostephium pendulum		Abundance: 23 plants flowering. Plants found only in 'depression' ca 50 m x 75 m.	300 m E (right) on sand track, 300 m N up Fraser Road from Forrest Road, Banjup	20/09/1996
<i>Caladenia huegellii</i>	T	Up to 60 cm high.	Coastal plain. Grey sand.	Closed Banksia woodland. Banksia sp., Stirlingia latifolia, Hibbertia spp., Hypocalymma robustum, Conostephium pendulum		Abundance: 23 plants flowering. Plants found only in 'depression' ca 50 m x 75 m.	300 m E (right) on sand track, 300 m N up Fraser Road from Forrest Road, Banjup	20/09/1996
<i>Caladenia huegellii</i>	T	Ca 30 cm tall. Linear hairy leaf 15 cm x 1 cm.	Grey sand.	Low open woodland of Melaleuca preissiana over Low Open Shrubland of Melaleuca thymoides over Dayopogon sp. and Desmodcladus sp. herbland on lower slopes.	2 mature plants, one dead over 2 sq m.	Condition of population: healthy.	Bush Forever Site 390, Fraser Road Bushland, Banjup	30/10/2003
<i>Caladenia huegellii</i>	T		Private land. Flat. White / grey sand.	Open heath/grassland. Characteristic species: Melaleuca systena, Lomandra maritima.	452 mature plants.	Healthy population but at risk from disturbance given location and proximity to sand.	Lot 4, 131, 135 and 136, Fraser road. Fro. Armadale road head E onto Fraser road, Banjup	21/10/2004
<i>Calandrinia oraria</i>	3	Annual herb 30 cm high x 10 cm wide. Pink flowers. Reproductive method: seeds.	Beach ridge plain. Grey sand.		over 50 plants in area >1 ha.	<5% weed cover. 4 or more alien species.	PK/1, Port Kennedy Scientific Park	19/10/2001
<i>Calectasia grandiflora</i>	2	Erect, open, perennial herb 60 cm high x 40 cm wide. Flowers metallic blue.	Wetland. Seasonally moist, littered black clay.	Dense Heath B.		Abundance: occasional.	Mundijong Road, 200 m E of intersection with Kargotich Road	06/11/1997
<i>Calectasia grandiflora</i>	2	Erect perennial, rhizomatous.	Winter-wet sand.	Low heath.	uncommon.		Mundajong Road, 1 km E of Kartogich Road, near Canning Vale, S of Perth	16/12/1999
<i>Carex tereticaulis</i>	3	Sedge to 1.5 m.	Edge of Serpentine River, brown clay.	Eucalyptus rudis woodland. Lepidosperma effusum, Astartea fascicularis.	uncommon.		Serpentine River, 'Lowlands'	21/12/2009
<i>Cyathochaeta teretifolia</i>	3	Tufted sedge with height of 1.5 m and width of 1 m.	Gentle slope with a north aspect. Surface soil is dark brown sandy loam and sub surface soil is dark brown sandy loam. Drainage is poor and wet during winter and spring only with soil being waterlogged at present.	Melaleuca preissiana, M. raphiophylla low open woodland over Astartea scoparia closed heath over Centella asiatica herbland. Excellent to pristine vegetation condition with some weed species affecting the herb layer.	locally common.	Outside quadrat.	Braddock Road, Wellard	02/12/2005
<i>Cyathochaeta teretifolia</i>	3		Black peat.	Melaleuca preissiana, Eucalyptus rudis subsp. rudis, Pyridium esculentum			Lot 100, Treeby Rd, Anketell	24/10/2007

Taxon	Cons_Code	Plant_Desc	Site	Vegetation	Frequency	Notes	Locality	Date
<i>Cyathochaeta teretifolia</i>		3					In or adjacent to Emma Treeby Reserve, S Armadale Road, Banjup	10/12/1995
<i>Dillwynia dillwynioides</i>		3 Shrub 1.5m.	Soil: Grey sand. Topography/drainage: Seasonally wet poorly drained flat. Geomorphology: Bassendean sands.	Vegetation: Kunzea ericifolia Scrub over Pericalymma ellipticum Open Low Scrub B over mixed Open Herbs.			Remnant vegetation on Lowlands property (M103) 9 km WNW of Serpentine (plot low09a).	12/09/1992
<i>Dillwynia dillwynioides</i>		3	Seasonal dampland.	Melaleuca raphiophylla Low Forest B over M. raphiophylla Low Scrub B over Dense Low Grass and Dense Low Sedges.			Site 8, 1.4 km S of Stakehill Road and the N boundary of Baldvis Pine Plantation, Karnup.	04/11/1998
<i>Dillwynia dillwynioides</i>		3	Seasonal dampland.	Eucalyptus rudis Low Forest A over Melaleuca raphiophylla Open Low Woodland A over Kunzea ericifolia Open Scrub over Dense Low Scrub of mixed grasses, weeds and sedges.			Site 10, 100 m N of S boundary of Baldvis Pine Plantation and 1.8 km E of Karri Street, Karnup.	04/11/1998
<i>Dillwynia dillwynioides</i>		3	Moist grey loam.	Low Woodland A of Eucalyptus rudis, Melaleuca raphiophylla, Banksia littoralis, Lepidosperma longitudinale, Hibbertia stellaris, Kunzea glabrescens, Villarsia albiflora.	>20 plants.	Condition of population: moderate.	Baldvis Ordnance Reserve	15/09/2006
<i>Dillwynia dillwynioides</i>		3 Shrub 1.5m.	Soil: Dark brown sand. Topography/drainage: Seasonally wet flat. Geomorphology: Bassendean sands.	Vegetation: Melaleuca raphiophylla Open Low Woodland A over Kunzea ericifolia Thicket over Astartea fascicularis Low Scrub A over mixed Herbs.			Remnant vegetation on Lowlands property (M103) 9 km WNW of Serpentine (plot low08).	06/11/1993
<i>Diuris drummondii</i>	T						Banganup Swamp	06/12/1959
<i>Diuris micrantha</i>	T	Orchid.	Swamp. Inundated black clay peat. Burnt in 2009.	Open scrub over dense low sedges. Lepidosperma longitudinale, Wurmbea sp., Burchardia sp., Romulea rosea, Trifolium sp., cape tulip.	7 plants.	Area occupied is c. 2.5 m x 1.5 m. Population 1a.	Lot 9206 Johnson Road, Bertram. Population occurs within swamp on W side of Johnson Road c. 630 m S of Holden and Johnson Roads intersection and c. 70 m W of E boundary fence	22/09/2009
<i>Diuris micrantha</i>	T	Full flower.	Winter wet swamp.	Dense herbs, Wurmbea dioica, Tribonanthes, sedges bordered by Melaleuca raphiophylla, Acacia saligna Low Woodland A (Muir 1977), Thelymitra holmsii.		D. laxiflora complex small.	1.2 km S of Thomas Road on Johnson Road, W verge, 0.45 km 12 degrees N of Bertram	09/09/1985
<i>Diuris micrantha</i>	T	Plants tall, flowers very small, yellow with red-brown markings.	Swamp. Black peaty soil.	Miscellaneous rushes and sedges.			Mandogolup, Johnsons Road, Darling District	23/09/1985
<i>Diuris micrantha</i>	T						Medina	24/09/1984
<i>Diuris purdiei</i>	T		Burnt winter wet swamp on N side (private land). Burnt last summer.	Low heath of Homalospermum, Pericalymma ? etc. over sedges and many herbaceous species, Drosera, Stylidium etc. Paperbarks (Melaleuca preissiana).	30+ plants.		Thomas Road (Oakford), 600 m W of Anketell Road	11/10/1987
<i>Dadonaea hackettiana</i>		4					Russell Road (S side of Reserve) between Thomsons Lake and Marsupial Reserves, Wattleup	28/11/1993
<i>Dadonaea hackettiana</i>		4 Shrub 2.5 m high. Fruit red/green.	Grey sand.				Intersection Mason and Forrest roads, Jandakot	20/12/1980
<i>Dadonaea hackettiana</i>		4					Bibra Lakes	11/11/1981
<i>Dadonaea hackettiana</i>		4					Thomson's Lake Reserve, Jandakot	/09/1962
<i>Dadonaea hackettiana</i>		4 Erect shrub, 2 m high, variable age structure.	Disturbed area, in sandy paddock.	Eucalyptus marginata open forest, with grasses, Carpobrotus sp.		Abundance: large population, dominant shrub. (Within population 3262-3267).	20 km S of Perth, 1 km S of Bibra Lake on E side of Forrest Road	05/12/1978
<i>Dadonaea hackettiana</i>		4 Erect shrub, 1 m high, variable age structure.	Disturbed area, in sandy paddock.	Eucalyptus marginata open forest, with grasses, Carpobrotus sp.		Abundance: large population, dominant shrub. (Within population 3262-3267).	20 km S of Perth, 1 km S of Bibra Lake on E side of Forrest Road	05/12/1978
<i>Dadonaea hackettiana</i>		4 Erect shrub, of small tree, 4 - 5 m high.	Sand with outcropping limestone.	Tall danse Banksia forest.		(Within population 3268-3271).	24 km S of Perth, S of Thompson's Lake on Russell road	05/12/1978
<i>Dadonaea hackettiana</i>		4 Erect shrub, ca 1.5 m high.	level, but disturbed sand.	Eucalyptus rudis, Banksia sp	rare.		The Spectacles, near Medina	22/04/1986
<i>Dadonaea hackettiana</i>		4 Tall shrub 3 m high x 1-1.5 m wide.	Flat, leaf litter, grey sand over limestone.	Eucalyptus rudis, Banksia sp	rare, rare, localised.		Russell road, 1.5 km from Hammond Road, Coogee West,	10/12/1996
<i>Dadonaea hackettiana</i>		4	Sandplain.	Eucalyptus gomphocephala mid open woodland to scattered trees over occasional Eucalyptus marginata, Corymbia calophylla and Banksia attenuata low scattered trees over Xanthorrhoea preissii and Macrozamia riedlei mid to tall sparse shrubland with patches	1 individual.		Corner of Forrest Road and Stock Road (W side), 15 km SSW of the Perth metropolitan area	06/01/2021
<i>Dadonaea hackettiana</i>		4 Perennial, erect shrub, 4 m high x 3 m wide. Orange flowers.	Plain. Reserve. Lake upland. Beelilar Regional Park. Grey dry sand.	Tall trees with Eucalyptus rudis and paperbarks.	6-20 plants in 10 m x 10 m area.	Population structure: 50% in bud, 100% flowering. With many alien species.	About 40 m S of Osprey Drive and just E of the drain going under Osprey Drive (which is W of Parkes Road); Yangebup	16/10/2003
<i>Dadonaea hackettiana</i>		4 Slender tall shrub 4/5 m high. In fruit.	Dune, grey sand.	Acacia rostellifera tall shrubland over Melaleuca systena.	scattered.		Woodman Point Nature Reserve, Coogee	28/10/2001
<i>Drakaea elastica</i>	T		In deep grey sand on gradual slopes in undulating plain.	Low woodland of Banksia attenuata, B. menziesii, B. ilicifolia, and Jarrah over scrub of Adenanthos cygnorum and Kunzea over herbs	ca 60 plants.		Mandagolup, S of Perth, 0.8 km S of Hope Valley Road, along Treeby Road	28/10/1982
<i>Drakaea micrantha</i>	T		In white sand.	In Banksia low open woodland.			SW of Forrestdale	02/10/1977
<i>Eucalyptus rudis</i> subsp. <i>cratyantha</i>		4 Tall slender tree, rough bark for basal 2 m, white-grey smooth above. Flowers white, in full flower.				Abundance: locally dominant.	Lowlands, Serpentine River,	10/06/1995
<i>Grevillea olivacea</i>		4 Open erect shrub 1-2 m, style red; perianth green-red.	Coastal dunes. White sand.	Coastal Acacia shrubland.		Self seeding from plantings.	Woodman Point; Rockingham	13/07/1993
<i>Jacksania gracillima</i>		3 Decumbent open shrub, 100 cm high x 150 cm wide. Flower standard orange red at base, wings orange red, keel red. Deep tap roots, tight barked, nondescript smell.	Wetland. Seasonally moist littered black clay.	Dense Heath B (Muir).		Abundance: frequent.	Mundijong Road, 200 m E of intersection with Kargotich Road	06/11/1997
<i>Jacksania gracillima</i>		3 Swamp form. Low spreading shrub.	Soil: Grey sand. Topography/drainage: Well drained flat. Geomorphology: Bassendean sands.	Vegetation: Banksia attenuata, B. ilicifolia Low Forest A over Melaleuca thymoides, Kunzea ericifolia Scrub over Patersonia occidentalis, Dasypogon bromilifolius Herbs over Lepidosperma angustatum Very Open Low Sedges.			Location: Modong Nature Reserve, S of Thomas Rd, 10 km W of Byford (plot modo-5).	27/11/1992
<i>Jacksania gracillima</i>		3 Low spreading shrub to 30 cm x 120 cm. Standard yellow-orange with red band close to base and yellow eye; wings yellow-orange in distal half, red basally, keel red.	Coastal plain, low flat. Dry, but in area of high water table. Grey sand.	Open heath over dense herbs. Kunzea glabrescens, Melaleuca thymoides, Dasypogon bromelilfolius, Phlebocarya ciliata.	occasional.		Piara Nature Reserve, Forrestdale, off N-S track ca 300 m from powerline access track	12/11/2003
<i>Jacksania gracillima</i>		3 Decumbent shrub - 20 cm high and 50 cm wide. Flowers standard orange-yellow; eye yellow with red halo; wings/keel red, in full flower.	Winter wet flats; brown clay.	Melaleuca uncinata tall shrubland over low shrubland of Calothamnus, Verticordia spp over sedges.			Road verge, 2 km W Mundijong	05/11/2004
<i>Jacksania gracillima</i>		3 Spreading low shrub, 50 cm high.	Very gentle lower slope of dune on edge of broad swale. Grey sand. > 7 years since fire.	Corymbia calophylla and Eucalyptus marginata subsp. marginata open forest, over Allocasuarina fraseriana, Banksia ilicifolia, B. menziesii and B. attenuata scattered low trees to low woodland, over Xanthorrhoea preissii high open shrubland, over Daviesia	6 plants.		Area bounded by Thomas Road in the N, Kwinana freeway in the W and Mortimer Road in the S, c. 30 km S of Perth CBD	25/10/2010
<i>Jacksania gracillima</i>		3 Decumbent perennial to 0.3 m high x 1.4 m diam.	Flat, well-drained but adjacent to winter-wet swamp; pale grey sand.	Banksia woodland.	infrequent.		Bushland near Shirley Balla Swamp, north of Gibbs Rd, Banjup	14/11/2010
<i>Jacksania sericea</i>		4 Prostrate shrub 10 cm high, 2 m wide; sterile, only a few spiny branchlets.	Limestone ridge, brown orange sand with outcropping limestone over Tamala limestone.	Mixed Low Heath C of Grevillea preissii, Rhagodia baccata and Melaleuca acerosa.	locally abundant.		Lot 4 Mandurah Road, Singleton (Bushplan Site 395)	30/06/1999
<i>Jacksania sericea</i>		4 Prostrate shrub 10 cm high, 2 m wide; old fruit; reflexed apices, no spiny branchlets; could be considered J. sericea.	Limestone ridge, brown-orange sand with outcropping limestone over Tamala limestone.	Mixed Low Heath C of Grevillea preissii, Rhagodia baccata and Melaleuca acerosa.	locally abundant.		Lot 4 Mandurah Road, Singleton (Bushplan Site 395)	30/06/1999
<i>Jacksania sericea</i>		4 Prostrate shrub, buds and orange flowers.	Soil: Grey sand. Topography/drainage: Seasonally wet poorly drained flat. Geomorphology: Bassendean sands.	Vegetation: Kunzea ericifolia Scrub over Pericalymma ellipticum Open Low Scrub B over mixed Open Herbs.			Remnant vegetation on Lowlands property (M103) 9 km WNW of Serpentine (adj. to plot low09a).	01/12/1995
<i>Johnsania pubescens</i> subsp. <i>cygnorum</i>		2 Tufted perennial herb.	Soil: Grey white sand. Topography/drainage: Well drained flat. Geomorphology: Bassendean sands.	Vegetation: Eucalyptus marginata Forest over Melaleuca preissiana Low Forest A over Chaenascilla corymbosa, Dasypogon bromilifolius Open Herbs over Loxocarya fascicularis, Hypobena exsulca Very Open Low Sedges.			Remnant vegetation on Lowlands property (M103) 9 km WNW of Serpentine (plot low06b).	12/09/1992
<i>Johnsania pubescens</i> subsp. <i>cygnorum</i>		2 Vigorous climbing shrub with twining stems climbing up a Melaleuca preissiana tree to a height of about 4 m. Glabrous leaves divided into 3 leaflets. Inflorescence stalked with obvious amplexicaule bract. Showy orange-red flowers, most still in bud	Poorly drained flat at edge of lake. Black loamy sand. Litter cover 20%, depth <1 cm. Moss cover 50%. Bare ground cover 20%.	Melaleuca preissiana Low Woodland, over an Open Tall Shrubland of Acacia longifolia and Kunzea glabrescens, over an Open Shrubland of Solanum nigrum. Climbers of Kennedy becksiana and Fumaria sp., a Fernleaf of Pteridium esculentum, an Open Grassland of	Two plants present.	Plant is to be removed as it is invading native bushland where it is not a local native.	Shirley Balla Swamp Reserve, Banjup, 320 m N along the track into the reserve from the gate on Gibbs Road, towards the lake; then about 10 m N of the very short track that travels west to the lake edge	19/08/2016
<i>Kennedia beckisiana</i>		4 but s						

Taxon	Cons_Code	Plant_Desc	Site	Vegetation	Frequency	Notes	Locality	Date
<i>Lachnagrostis nesomytica</i> subsp. <i>parala</i>		1 Small upright grass 30 cm high.		Callitris forest.			Garden island	20/10/1978
<i>Lachnagrostis nesomytica</i> subsp. <i>parala</i>		1 Annual grass, 50 mm high x 150 mm wide.	Disturbed soil. Plain. Reserve. Dry grey/brown sand. Dune beside sea.	Medium trees. With scattered Melaleuca lanceolata, Parapholis incurva, Trachyandra divaricata, Geranium molle, Cotula and Euphorbia spp., and grasses.	2-5 plants.		Buchanan Bay picnic area, Garden Island	11/11/2003
<i>Lachnagrostis nesomytica</i> subsp. <i>parala</i>		1 Grass, 0.15 m high x 0.03 m wide.	Reserve. Dune swale. Dry white soil.	With Nicotiana glauca, Callitris preissii and Solanum symoni.	over 50 plants in 11-100 sq m.		Garden island, N side of Sewage Pond Road	23/11/2002
<i>Lepidium puberulum</i>		4		Burnt area, regenerating. Melaleuca/Acacia communities.			Garden island	17/09/1991
<i>Lepidium puberulum</i>		4 Erect annual herb, flowers greenish - inconspicuous.	Mossy black sand over calcareous white sand.	Callitris preissii low forest over moss.		Abundance: common in area	Garden island, Rockingham	02/11/1992
<i>Lepidium puberulum</i>		4 Annual herb 0.2 m high x 0.1 m wide.	Dune. Recent soil disturbance. Dry, white sand.	Medium trees, Melaleuca lanceolata, Trachyandra, Acanthocarpus.	21-50 plants.		Alongside track to Herring Bay, near top of dune, Garden Island	13/10/2002
<i>Lepidium puberulum</i>		4 Erect herb. Height: 150 mm and width: 100 mm. Flower colour: green.	Topography: lawn on sand bench. Collection site: enclosure. Soil colour: brown. Soil: sand.	Associated vegetation: lawn like area with weeds. Characteristic species: Stenotaphrum, Euphorbia, Erodium, Anagallis, Hypochaeris, Trachymene.	2-5 plants.		Buchanan Bay, picnic area, Garden island	24/08/2003
<i>Lepidium puberulum</i>		4 Erect annual herb. Flowers greenish - white; in fruit and flower.	Mossy black sand.	Callitris preissii low woodland.	locally very common.	GARD Q3.	Garden island	17/10/2006
<i>Lepidium puberulum</i>		4 Delicate herb to <0.05 m; clusters of tiny flowers.	Site slopes gently to the W; dark brown sand; well drained.	Heath A/B of Acacia rostellifera and Leucopogon australis over Low Heath C/D of Acanthocarpus preissii and Eremophila glabra; Very Open Herbs of Zantedeschia aethiopica, Trachymene coerules; Very Open Low Sedges of Carex preissii.		Vegetation noted as being in excellent condition with some mature Acacia deaths.	Garden island Plot 05; occurs in 10 x 10 plot located on the right fork off the road to Herring Bay	02/10/2007
<i>Lepidosperma rostratum</i>	T	Perennial herb (sedge).	Seasonally wet poorly drained flat. Orange brown clay.	Melaleuca uncinata over Verticordia plumosa over Leptocarpus canus, Chorizandra enodis and Borya scripoides over herbs.		Vegetation condition: very good to good. 10-30 % cover of Babiana angustifolia. Claypan TEC, communities 7 & 8.	Plot Mud 09. Roadside remnant Mundijong Road, 2 km W of Mundijong	05/11/2012
<i>Lepidosperma rostratum</i>	T	Perennial herb to 40 cm.	Seasonally wet poorly drained flat. Brown clay.	Melaleuca uncinata over Chorizandra enodis, Lepyrodia macra, Tribonanthes australis.		Vegetation condition: very good. Claypan TEC, communities 7 & 8.	Plot Mud 02. Roadside remnant Mundijong Road, W of Kargotich Road	18/09/2013
<i>Microtis quadrata</i>		4	In black peaty soil.	Under paperbarks.			NW side of Lake Jandakot	11/11/1960
<i>Parsonsia diaphanophleba</i>		4	Riverbank. Dry sand/loam.	With Eucalyptus rudis, Melaleuca raphiophylla, Casuarina obesa.			Serpentine River, Lowlands Road	23/04/1997
<i>Parsonsia diaphanophleba</i>		4 Vine, to 10 m, rampant on trees. Flowers pale pink, in full flower.	Edges and banks of Serpentine River. Sand over clay.	Eucalyptus rudis forest.			Lowlands Property, Serpentine	20/04/1992
<i>Phlebocarya pilosissima</i> subsp. <i>pilosissima</i>		3	Sand ridge.	In Banksia woodland.			Prinsrep Road, Jandakot	23/05/1978
<i>Pimelea calicicola</i>		3 Low spreading shrub 20-30 cm high. Flowers pale pink.	Low rises. Grey sand, calcareous/limestone.	Low heath.		Abundance: very common.	Just N of Naval Base, Fremantle to Rockingham	13/11/1983
<i>Pimelea calicicola</i>		3 Erect, compact, perennial shrub, 80 cm high x 80 cm wide.						
<i>Pimelea calicicola</i>		3 Flowers white.	Plain. Reserve. Dry, white sand.	Tall shrubland with Acacia rostellifera.	2-5 plants.	Population structure: 100% flowering.	N of Perth - Mandurah railway line, near Lake Cooloongup	20/10/2014
<i>Schoenus capillifolius</i>		3 Reproductive state: vegetative.	Inundated grey clay.	Dense Low Forst of Melaleuca raphiophylla. With Baumea articulata, Triglochin linearis, Villarsia albiflora, Callitriche stagnalis, Lemna disperma, Cotula coronopifolia.	large numbers, 40% cover.	Condition of population: healthy.	Baldvis Ordnance Reserve	15/09/2006
<i>Schoenus capillifolius</i>		3 Annual herb (sedge).	Seasonally wet poorly drained flat. Brown clay.	Melaleuca acutifolia over Leptocarpus decipiens, Apodasmia ceramophila over rich herb layer.		Vegetation condition: very good. Claypan TEC, communities 7 & 8.	Plot Mud 03. Roadside remnant Mundijong Road, W of Kargotich Road	01/11/2013
<i>Schoenus</i> sp. Waroona (G.J. Keighery 12235)		3 Annual herb (sedge).	Seasonally wet poorly drained flat. Brown clay.	Melaleuca acutifolia over Leptocarpus decipiens, Apodasmia ceramophila over rich herb layer.		Vegetation condition: very good. Claypan TEC, communities 7 & 8.	Plot Mud 03. Roadside remnant Mundijong Road, W of Kargotich Road	05/11/2012
<i>Sphaerolobium calicicola</i>		3 Erect multi-stemmed shrub 20-30 cm tall. In full flower. Flowers yellow-red.	Tall dunes, grey-white sand over white sand.	Low open heath of Jacksonia/Olearia axillaris and Acacia lasiocarpa.	rare in area.		Lake Walyunup, Rockingham	23/10/1993
<i>Sphaerolobium calicicola</i>		3 Multistemmed tall shrub, 1-1.5 m high x 50 cm wide. Flowers yellow, w/keel red, eye yellow, in full flower.	Interdunal swamp. Black sandy clay over limestone. Clay.	Melaleuca raphiophylla low woodland over Gahnia trifida.	common.		Anstey Swamp; Lakes Regional Park, Baldvis	20/06/1997
<i>Styidium aceratum</i>		3 Annual herb.	Seasonally wet poorly drained flat. Brown clay.	Viminaria juncea over Jacksonia stembergiana, Hakea trifurcata, Hypocalymma angustifolium over Cyathochaeta avenacea, Mesomelaena tetragona over a rich herb layer.		Vegetation condition: very good. Claypan TEC, communities 7 & 8.	Plot Mud 06. Roadside remnant Mundijong Road, 3 km W of Mundijong	01/11/2013
<i>Styidium ireneae</i>		4					Kwinana	02/12/2004
<i>Styidium longitubum</i>		4 Delicate annual herb.	Soil: Brown sand. Topography/drainage: Seasonally wet poorly drained flat. Geomorphology: Swamp deposits - holocene.	Vegetation: Melaleuca raphiophylla Low Forest B over exotic Very Open Low Grass over Lotus suaveolens, Styidium longitubum Herbs over Lepidosperma longitudinale Tall Sedges.			Remnant bushland near Hymus Swamp in SW corner of Lowlands property (M105), 11 km WNW of Serpentine (plot hymus05).	06/11/1993
<i>Styidium longitubum</i>		4 Ephemeral herb, flowers pink.					Bartram Road, Jandakot	22/11/1973
<i>Styidium paludicola</i>		3 0.5 m tall, flowers pink.	Near edge of swamp.	Amongst Juncus.			Jandakot Marsupial Breeding Station at Banganup Lake	04/12/1974
<i>Styidium paludicola</i>		3 Small herb to 400 mm high. Just finished flowering.	Gentle slope with a south east aspect. Surface soil is a very dark brown sandy loam and the subsurface soil is a very dark brown sandy loam/loam. Wetland - winter wet. Litter cover 90% with 10% bare ground.	Melaleuca preissiana woodland over Astartea scoparia open heath over Lepidosperma longitudinale open sedgeland.	occasional.		Miyak Court, Anketell	07/12/2005
<i>Styidium paludicola</i>		3 Herb to 0.4 m high. Flowers pink/red.	Gentle slope, south aspect, surface soil is dark grey loamy sand and sub surface soil is very dark grey brown sandy loam, drainage is poor and wet during winter and spring only.	Melaleuca preissiana, Kunzea glabrescens low open forest over Astartea scoparia, Hypocalymma angustifolium open shrubland over Lepidosperma longitudinale open sedgeland. Vegetation is in a pristine to excellent condition with some rabbit diggings and pot	scattered.		Robinson Road, Wandl	22/11/2005
<i>Styphelia filifolia</i>		3 Erect shrub to 60 cm high and 60 cm wide. Flowers white, strictly pendulous.	Sandy rise. Dry littered. Grey sand.	Banksia woodland. B. attenuata, B. menziesii, Allocasuarina humilis, Stirlingia latifolia.	scattered.		Bibra Lake. E side of remnant bush block N of railway line, W of Kwinana freeway and S of Dowell Place	21/04/2002
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	T	Large leaves with oblanceolate ultimate lobes. Flowers glabrous, dorsiventrally compressed.	Flora Road reserve. Moist brown clay loam.	Open Hakea and Melaleuca shrubland on edge of Corymbia calophylla remnant woodland. Associated species: Synaphea petiolaris (RB 1075), S. sp. Serpentine (G.R. Brand 103) (RB 1075), 3 x Verticordia spp., Pimelea, Xanthorrhoea preissii, Kingia australis, C	scattered.		2.1 km W of rail crossing at Mundijong on Mundijong Road, W of Mundijong	18/10/2003
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	T	Shrub 80 cm x 1 m. Flowers opening narrowly. Stigma transversely lunate. Inflorescence greatly exceeding leaves. Leaves with oblanceolate ultimate lobes.	Seasonally wet area. Brown loam.	Shrubland. Sedges, grasses, Xanthorrhoea, Allocasuarina, Jacksonia, Calothamnus.	infrequent, 5 plants seen.		Mundijong Road, 2 km W of South West Highway	26/10/1999
<i>Synaphea</i> sp. Serpentine (G.R. Brand 103)	T	Compact, 45 cm high x 50 cm wide. Flowers yellow. Growth phase: active.	Brown loam. Swamp.		occasional, 21 plants.	80+% of population flowering.	W of Byford, 1 km W along Abernethy Road from junction with Hopkinson Road	22/09/1998
<i>Synaphea</i> sp. Serpentine (G.R. Brand 103)	T	Decumbent shrub.	Orange brown clay. Topography/drainage: Seasonally wet poorly drained flat. Geomorphology: Guildford formation (pinjarra plain)	Melaleuca uncinata Open Scrub over Verticordia plumosa Dwarf Scrub 0 over mixed Open Herbs over Leptocarpus canus, Chorizandra enodes Open Low Sedges.			Roadside remnant Mundijong Rd, 2 km W of Mundijong (adj. to plot mud-9)	07/08/1992
<i>Synaphea</i> sp. Serpentine (G.R. Brand 103)	T	Low shrub 20 cm high x 50 cm wide, flowers yellow.	Pinjarra Plain, sumpland. Red brown loam.	Marri Woodland with Eucalyptus calophylla, Phyllanthus calycinus, Mesomelaena tetragona.			Bushland at intersection Duckpond and Mundijong Roads	15/08/1991
<i>Synaphea</i> sp. Serpentine (G.R. Brand 103)	T	Erect, open shrub 40 cm high x 40 cm wide. Fruit.	Wetland. Seasonally moist, littered black clay.	Dense Heath B.	two plants seen.		Mundijong Road, 200 m E of intersection with Kargotich Road	06/11/1997
<i>Synaphea</i> sp. Serpentine (G.R. Brand 103)	T	Perennial shrub 0.6 m high with yellow flowers.	Coastal plain wetland reserve, with brown clay soil. Burnt ca 3 years ago.	Low shrubland including Hakea ceratophylla, Anigozanthos manglesii, Eutaxia virgata, Pimelea sp., Calectasia sp., Schoenus curvifolius sedges and rushes.	Common.		Lambkin Reserve, Serpentine.	04/09/2008
<i>Thelymitra variegata</i>		2	in yellow sand.	With Banksia attenuata, Casuarina fraseri, Hibbertia hypericoides, etc.			Russel Road, Jandakot	16/08/1959
<i>Tripterococcus</i> sp. Brachylobus (A.S. George 14234)		4 Slender erect multi-stemmed shrub to 40 cm. Flowers orange-yellow, in full flower.	Winter wet flats, peaty sand over clay.	Hypocalymma angustifolium low heath.	scattered groups of 5-15 plants.		Gazetted Reserve 418 [Reserve No. 41438], Bartram Road swamp, Jandakot	21/02/1992
<i>Verticordia lindleyi</i> subsp. <i>lindleyi</i>		4 Compact erect shrub, 36 cm high, flowers pink.	Dry summer swamp. Sandy white clay soil.	Heath type.			Abernethy Road, Oakford	23/03/1981

Appendix: DBCA Threatened and Priority Ecological Communities Database Search Results

COM_ID	COM_NAME	STATE_CATG	COMM_CATG	BUFFER
Banksia WL SCP	Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	Priority 3	Endangered	200
SCP22	Banksia illicifolia woodlands	Priority 3	Endangered	200
SCP30a	Callitris preissii (or Melaleuca lanceolata) forests and woodlands, Swan Coastal Plain	Vulnerable		0
SCP30a	Callitris preissii (or Melaleuca lanceolata) forests and woodlands, Swan Coastal Plain (floristic community type 30a as originally described in Gibson et al. (1994))	Vulnerable		500
SCP29a	Coastal shrublands on shallow sands	Priority 3		500
Mound Springs SCP	Communities of Tumulus Springs (Organic Mound Springs, Swan Coastal Plain)	Critically Endangered	Endangered	2000
SCP21c	Low lying Banksia attenuata woodlands or shrublands	Priority 3	Endangered	200
SCP26a	Melaleuca huegelii - Melaleuca systema shrublands on limestone ridges (floristic community type 26a as originally described in Gibson et al. (1994))	Endangered		500
Walyungup Microbial	Microbial community of a coastal saline lake (Lake Walyungup)	Priority 1		2000
SCP24	Northern Spearwood shrublands and woodlands	Priority 3		500
SCP19a	Sedgelands in Holocene dune swales of the southern Swan Coastal Plain (floristic community type 19 as originally described in in Gibson et al. (1994))	Critically Endangered	Endangered	2000
SCP25	Southern Eucalyptus gomphocephala-Agonis flexuosa woodlands	Priority 3		200
Richmond-microbial	Stromatolite like microbialite community of coastal freshwater lakes (Lake Richmond)	Critically Endangered	Endangered	2000
Coastal Saltmarsh	Subtropical and Temperate Coastal Saltmarsh	Priority 3	Vulnerable	500
Tuart woodlands	Tuart (Eucalyptus gomphocephala) woodlands and forests of the Swan Coastal Plain	Priority 3	Critically Endangered	500
SCP19b	Woodlands over sedgelands in Holocene dune swales of the southern Swan Coastal Plain (original description; Gibson et al. (1994).	Critically Endangered	Endangered	2000

Appendix: DBCA Conservation Significant Vertebrate Fauna Database Search Results

SCI_NAME	COM_NAME	CLASS	WA_LISTING	WA_status	EPBCstatus	Date	COUNT	LOCALITY
<i>Actitis hypoleucos</i>	Common Sandpiper	BIRD	Specially Protected - migratory	MI	MI	01/01/1991	0	
<i>Actitis hypoleucos</i>	Common Sandpiper	BIRD	Specially Protected - migratory	MI	MI	01/10/1990	0	
<i>Arenaria interpres</i>	Ruddy turnstone	BIRD	Specially Protected - migratory	MI	MI	24/02/2002	0	Rockingham Area
<i>Calidris acuminata</i>	Sharp-tailed sandpiper	BIRD	Specially Protected - migratory	MI	MI	17/11/2002	0	Lake Cooloongup
<i>Calidris acuminata</i>	Sharp-tailed sandpiper	BIRD	Specially Protected - migratory	MI	MI	20/10/2001	0	Lake Cooloongup
<i>Calidris acuminata</i>	Sharp-tailed sandpiper	BIRD	Specially Protected - migratory	MI	MI	15/01/2000	0	Lake Cooloongup
<i>Calidris acuminata</i>	Sharp-tailed sandpiper	BIRD	Specially Protected - migratory	MI	MI	28/12/1998	0	Lake Cooloongup Regional Park
<i>Calidris ferruginea</i>	curlew sandpiper	BIRD	Threatened - Critically endangered	CR	CR	17/11/2002	0	Lake Cooloongup
<i>Calidris ferruginea</i>	curlew sandpiper	BIRD	Threatened - Critically endangered	CR	CR	20/10/2001	0	Lake Cooloongup
<i>Calidris ferruginea</i>	curlew sandpiper	BIRD	Threatened - Critically endangered	CR	CR	15/01/2000	0	Lake Cooloongup
<i>Calidris ferruginea</i>	curlew sandpiper	BIRD	Threatened - Critically endangered	CR	CR	28/12/1998	0	Lake Cooloongup Regional Park
<i>Calidris ferruginea</i>	curlew sandpiper	BIRD	Threatened - Critically endangered	CR	CR	01/01/2008	2600	Cooloongup
<i>Calidris ferruginea</i>	curlew sandpiper	BIRD	Threatened - Critically endangered	CR	CR	28/11/1979	1	COOLOONGUP
<i>Calidris ferruginea</i>	curlew sandpiper	BIRD	Threatened - Critically endangered	CR	CR	28/11/1979	1	COOLOONGUP
<i>Calidris ruficollis</i>	Red-necked stint	BIRD	Specially Protected - migratory	MI	MI	25/11/2001	0	Lake Cooloongup
<i>Calidris ruficollis</i>	Red-necked stint	BIRD	Specially Protected - migratory	MI	MI	27/12/2001	0	Lake Cooloongup
<i>Calidris ruficollis</i>	Red-necked stint	BIRD	Specially Protected - migratory	MI	MI	17/11/2002	0	Lake Cooloongup
<i>Calidris ruficollis</i>	Red-necked stint	BIRD	Specially Protected - migratory	MI	MI	20/10/2001	0	Lake Cooloongup
<i>Calidris ruficollis</i>	Red-necked stint	BIRD	Specially Protected - migratory	MI	MI	15/01/2000	0	Lake Cooloongup
<i>Calidris ruficollis</i>	Red-necked stint	BIRD	Specially Protected - migratory	MI	MI	28/12/1998	0	Lake Cooloongup Regional Park
<i>Calidris ruficollis</i>	red-necked stint	BIRD	Specially Protected - migratory	MI	MI	01/01/2008	3700	Cooloongup
<i>Calidris ruficollis</i>	Red-necked stint	BIRD	Specially Protected - migratory	MI	MI	28/11/1979	1	COOLOONGUP
<i>Calyptorhynchus banksii naso</i>	forest red-tailed black cockatoo	BIRD	Threatened - Vulnerable	VU	VU	02/12/2009	4	
<i>Calyptorhynchus banksii naso</i>	forest red-tailed black cockatoo	BIRD	Threatened - Vulnerable	VU	VU	22/09/2011	6	Kwinana
<i>Calyptorhynchus banksii naso</i>	forest red-tailed black cockatoo	BIRD	Threatened - Vulnerable	VU	VU	19/11/2000	6	The Spectacles
<i>Calyptorhynchus banksii naso</i>	forest red-tailed black cockatoo	BIRD	Threatened - Vulnerable	VU	VU	01/07/2000	7	Baldivis
<i>Calyptorhynchus banksii naso</i>	forest red-tailed black cockatoo	BIRD	Threatened - Vulnerable	VU	VU	01/03/2002	10	Baldivis
<i>Calyptorhynchus banksii naso</i>	forest red-tailed black cockatoo	BIRD	Threatened - Vulnerable	VU	VU	03/04/2016	9	WELLARD
<i>Calyptorhynchus banksii naso</i>	forest red-tailed black cockatoo	BIRD	Threatened - Vulnerable	VU	VU	13/08/2018	14	Wellard
<i>Calyptorhynchus banksii naso</i>	forest red-tailed black cockatoo	BIRD	Threatened - Vulnerable	VU	VU	13/08/2018	9	Wellard
<i>Calyptorhynchus banksii naso</i>	forest red-tailed black cockatoo	BIRD	Threatened - Vulnerable	VU	VU	20/10/2019	2	Rockingham
<i>Calyptorhynchus banksii naso</i>	forest red-tailed black cockatoo	BIRD	Threatened - Vulnerable	VU	VU	17/11/2019	3	Rockingham
<i>Calyptorhynchus banksii naso</i>	forest red-tailed black cockatoo	BIRD	Threatened - Vulnerable	VU	VU	11/01/2019	3	Rockinham
<i>Calyptorhynchus banksii naso</i>	forest red-tailed black cockatoo	BIRD	Threatened - Vulnerable	VU	VU	13/01/2020	2	Rockingham
<i>Calyptorhynchus banksii naso</i>	forest red-tailed black cockatoo	BIRD	Threatened - Vulnerable	VU	VU	24/01/2020	4	Rockinham
<i>Calyptorhynchus banksii naso</i>	forest red-tailed black cockatoo	BIRD	Threatened - Vulnerable	VU	VU	25/01/2020	2	Rockinham
<i>Calyptorhynchus baudinii</i>	Baudin's cockatoo	BIRD	Threatened - Endangered	EN	EN	01/01/1939	0	Rockingham
<i>Calyptorhynchus latirostris</i>	Carnaby's cockatoo	BIRD	Threatened - Endangered	EN	EN	19/09/2002	0	The Spectacles
<i>Calyptorhynchus latirostris</i>	Carnaby's cockatoo	BIRD	Threatened - Endangered	EN	EN	12/08/2007	0	Mt Brown
<i>Calyptorhynchus latirostris</i>	Carnaby's cockatoo	BIRD	Threatened - Endangered	EN	EN	20/07/2000	0	Thomas Oval, Medina
<i>Calyptorhynchus latirostris</i>	Carnaby's cockatoo	BIRD	Threatened - Endangered	EN	EN	22/07/2000	0	Hope Valley
<i>Calyptorhynchus latirostris</i>	Carnaby's cockatoo	BIRD	Threatened - Endangered	EN	EN	07/03/2009	4	EAST ROCKINGHAM
<i>Calyptorhynchus latirostris</i>	Carnaby's cockatoo	BIRD	Threatened - Endangered	EN	EN	29/10/2014	6	HOPE VALLEY
<i>Calyptorhynchus latirostris</i>	Carnaby's cockatoo	BIRD	Threatened - Endangered	EN	EN	03/11/2014	8	HOPE VALLEY
<i>Calyptorhynchus latirostris</i>	Carnaby's cockatoo	BIRD	Threatened - Endangered	EN	EN	10/03/2005	230	Baldivis
<i>Calyptorhynchus latirostris</i>	Carnaby's cockatoo	BIRD	Threatened - Endangered	EN	EN	02/04/2005	600	Baldivis
<i>Calyptorhynchus latirostris</i>	Carnaby's cockatoo	BIRD	Threatened - Endangered	EN	EN	25/03/2006	200	Baldivis
<i>Calyptorhynchus latirostris</i>	Carnaby's cockatoo	BIRD	Threatened - Endangered	EN	EN	01/03/2010	1200	Wellard
<i>Calyptorhynchus latirostris</i>	Carnaby's cockatoo	BIRD	Threatened - Endangered	EN	EN	26/03/2006	2	Leda
<i>Calyptorhynchus latirostris</i>	Carnaby's cockatoo	BIRD	Threatened - Endangered	EN	EN	15/04/2012	15	Wellard
<i>Calyptorhynchus latirostris</i>	Carnaby's cockatoo	BIRD	Threatened - Endangered	EN	EN	06/05/2012	16	Wellard
<i>Calyptorhynchus latirostris</i>	Carnaby's cockatoo	BIRD	Threatened - Endangered	EN	EN	07/04/2013	50	Wellard
<i>Calyptorhynchus latirostris</i>	Carnaby's cockatoo	BIRD	Threatened - Endangered	EN	EN	07/04/2011	40	Baldivis
<i>Calyptorhynchus latirostris</i>	Carnaby's cockatoo	BIRD	Threatened - Endangered	EN	EN	17/04/2006	120	KWINANA BEACH
<i>Calyptorhynchus latirostris</i>	Carnaby's cockatoo	BIRD	Threatened - Endangered	EN	EN	19/03/2009	1	WELLARD



## Appendix: DBCA Conservation Significant Vertebrate Fauna Database Search Results

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Appendix: DBCA Conservation Significant Vertebrate Fauna Database Search Results

SCI_NAME	COM_NAME	CLASS	WA_LISTING	WA_status	EPBCstatus	Date	COUNT	LOCALITY
<i>Calyptorhynchus latirostris</i>	Carnaby's cockatoo	BIRD	Threatened - Endangered	EN	EN	23/03/2015	40	Rockingham
<i>Calyptorhynchus latirostris</i>	Carnaby's cockatoo	BIRD	Threatened - Endangered	EN	EN	12/04/2015	125	Wellard
<i>Calyptorhynchus latirostris</i>	Carnaby's cockatoo	BIRD	Threatened - Endangered	EN	EN	19/05/2016	1	Leda Nature Reserve
<i>Calyptorhynchus latirostris</i>	Carnaby's cockatoo	BIRD	Threatened - Endangered	EN	EN	19/05/2016	1	Wellard
<i>Calyptorhynchus latirostris</i>	Carnaby's cockatoo	BIRD	Threatened - Endangered	EN	EN	19/05/2016	1	Leda Nature Reserve
<i>Calyptorhynchus latirostris</i>	Carnaby's cockatoo	BIRD	Threatened - Endangered	EN	EN	19/05/2016	1	Leda
<i>Calyptorhynchus latirostris</i>	Carnaby's cockatoo	BIRD	Threatened - Endangered	EN	EN	19/05/2016	1	Leda
<i>Calyptorhynchus latirostris</i>	Carnaby's cockatoo	BIRD	Threatened - Endangered	EN	EN	19/05/2016	1	Wellard
<i>Calyptorhynchus latirostris</i>	Carnaby's cockatoo	BIRD	Threatened - Endangered	EN	EN	19/05/2016	1	Wellard
<i>Calyptorhynchus latirostris</i>	Carnaby's cockatoo	BIRD	Threatened - Endangered	EN	EN	19/05/2016	1	Naval Base
<i>Calyptorhynchus latirostris</i>	Carnaby's cockatoo	BIRD	Threatened - Endangered	EN	EN	13/08/2018	0	Rockingham
<i>Calyptorhynchus latirostris</i>	Carnaby's cockatoo	BIRD	Threatened - Endangered	EN	EN	24/10/2012	1	BALDIVIS
<i>Calyptorhynchus latirostris</i>	Carnaby's cockatoo	BIRD	Threatened - Endangered	EN	EN	15/07/2013	0	WELLARD
<i>Calyptorhynchus</i> sp. 'white-tailed black cockatoo'	white-tailed black cockatoo	BIRD	Threatened - Endangered	EN		13/08/2018	4	Wellard
<i>Calyptorhynchus</i> sp. 'white-tailed black cockatoo'	white-tailed black cockatoo	BIRD	Threatened - Endangered	EN		13/08/2018	40	Baldivis
<i>Calyptorhynchus</i> sp. 'white-tailed black cockatoo'	white-tailed black cockatoo	BIRD	Threatened - Endangered	EN		13/08/2018	62	Wellard
<i>Calyptorhynchus</i> sp. 'white-tailed black cockatoo'	white-tailed black cockatoo	BIRD	Threatened - Endangered	EN		05/05/2019	50	Rockingham
<i>Calyptorhynchus</i> sp. 'white-tailed black cockatoo'	white-tailed black cockatoo	BIRD	Threatened - Endangered	EN		22/09/2019	1	Rockingham
<i>Calyptorhynchus</i> sp. 'white-tailed black cockatoo'	white-tailed black cockatoo	BIRD	Threatened - Endangered	EN		19/10/2019	3	Rockingham
<i>Calyptorhynchus</i> sp. 'white-tailed black cockatoo'	white-tailed black cockatoo	BIRD	Threatened - Endangered	EN		20/10/2019	3	Kwinana
<i>Falco peregrinus</i>	Peregrine falcon	BIRD	Specially Protected - other specially protected	OS		07/03/2009	1	EAST ROCKINGHAM
<i>Ixobrychus dubius</i>	Australian little biter	BIRD	Priority	P4		01/09/1939	2	Rockingham
<i>Numenius madagascariensis</i>	eastern curlew	BIRD	Threatened - Critically endangered	CR	CR	01/01/1938	0	Rockingham
<i>Oxyura australis</i>	Blue-billed duck	BIRD	Priority	P4		06/10/1991	0	
<i>Oxyura australis</i>	Blue-billed duck	BIRD	Priority	P4		07/01/1992	0	
<i>Oxyura australis</i>	Blue-billed duck	BIRD	Priority	P4		01/04/1991	0	
<i>Oxyura australis</i>	Blue-billed duck	BIRD	Priority	P4		01/01/1991	0	
<i>Oxyura australis</i>	Blue-billed duck	BIRD	Priority	P4		05/07/1991	0	
<i>Oxyura australis</i>	Blue-billed duck	BIRD	Priority	P4		14/04/1990	0	
<i>Oxyura australis</i>	Blue-billed duck	BIRD	Priority	P4		31/07/1990	0	
<i>Oxyura australis</i>	Blue-billed duck	BIRD	Priority	P4		01/01/1991	0	
<i>Oxyura australis</i>	Blue-billed duck	BIRD	Priority	P4		01/10/1990	0	
<i>Oxyura australis</i>	Blue-billed duck	BIRD	Priority	P4		26/07/1990	0	
<i>Oxyura australis</i>	Blue-billed duck	BIRD	Priority	P4		01/01/1991	0	
<i>Oxyura australis</i>	Blue-billed duck	BIRD	Priority	P4		01/10/1990	0	
<i>Oxyura australis</i>	Blue-billed duck	BIRD	Priority	P4		27/07/1991	0	
<i>Oxyura australis</i>	Blue-billed duck	BIRD	Priority	P4		28/04/1990	0	
<i>Oxyura australis</i>	Blue-billed duck	BIRD	Priority	P4		28/07/1990	0	
<i>Oxyura australis</i>	Blue-billed duck	BIRD	Priority	P4		11/10/2001	0	The Spectacles
<i>Oxyura australis</i>	Blue-billed duck	BIRD	Priority	P4		18/10/2001	0	The Spectacles
<i>Oxyura australis</i>	Blue-billed duck	BIRD	Priority	P4		24/01/2002	0	The Spectacles Swamp
<i>Oxyura australis</i>	Blue-billed duck	BIRD	Priority	P4		30/12/2007	0	Wellard Wetlands Baldivis
<i>Oxyura australis</i>	Blue-billed duck	BIRD	Priority	P4		20/11/1999	0	The Spectacles
<i>Oxyura australis</i>	Blue-billed duck	BIRD	Priority	P4		22/03/2008	0	Wellard Wetlands Baldi Vis
<i>Oxyura australis</i>	Blue-billed duck	BIRD	Priority	P4		13/07/2008	0	Wellard Wetlands Baldnis
<i>Oxyura australis</i>	Blue-billed duck	BIRD	Priority	P4		06/07/2008	0	Wellard Wetlands
<i>Oxyura australis</i>	Blue-billed duck	BIRD	Priority	P4		29/06/2008	0	Wellard Wetlands
<i>Oxyura australis</i>	Blue-billed duck	BIRD	Priority	P4		25/06/2008	0	Wellard Wetlands
<i>Oxyura australis</i>	Blue-billed duck	BIRD	Priority	P4		18/06/2008	0	Wellard Wetlands Baldivis
<i>Oxyura australis</i>	Blue-billed duck	BIRD	Priority	P4		22/05/2008	0	Wellard Wetlands Baldivis
<i>Oxyura australis</i>	Blue-billed duck	BIRD	Priority	P4		04/11/1998	0	The Spectacles
<i>Plegadis falcinellus</i>	Glossy ibis	BIRD	Specially Protected - migratory	MI	MI	01/04/1991	0	
<i>Plegadis falcinellus</i>	Glossy ibis	BIRD	Specially Protected - migratory	MI	MI	28/07/1990	0	
<i>Plegadis falcinellus</i>	Glossy ibis	BIRD	Specially Protected - migratory	MI	MI	03/03/2001	0	Beeliar Regional Park, The Spectacles

Appendix: DBCA Conservation Significant Vertebrate Fauna Database Search Results

SCI_NAME	COM_NAME	CLASS	WA_LISTING	WA_status	EPBCstatus	Date	COUNT	LOCALITY
<i>Thalassarche chrysostoma</i>	Grey-headed albatross	BIRD	Threatened - Vulnerable	VU	EN		1	KWINANA BEACH
<i>Thalasseus bergii</i>	Crested tern	BIRD	Specially Protected - migratory	MI	MI	31/05/1981	0	KWINANA BEACH
<i>Thalasseus bergii</i>	Crested tern	BIRD	Specially Protected - migratory	MI	MI	04/04/1981	0	KWINANA BEACH
<i>Thalasseus bergii</i>	Crested tern	BIRD	Specially Protected - migratory	MI	MI	20/08/1977	0	KWINANA BEACH
<i>Thalasseus bergii</i>	Crested tern	BIRD	Specially Protected - migratory	MI	MI	05/11/1977	0	KWINANA BEACH
<i>Thalasseus bergii</i>	Crested tern	BIRD	Specially Protected - migratory	MI	MI	06/07/1977	0	KWINANA BEACH
<i>Thalasseus bergii</i>	Crested tern	BIRD	Specially Protected - migratory	MI	MI	11/12/1977	0	KWINANA BEACH
<i>Thalasseus bergii</i>	Crested tern	BIRD	Specially Protected - migratory	MI	MI	01/08/1978	0	KWINANA BEACH
<i>Thalasseus bergii</i>	Crested tern	BIRD	Specially Protected - migratory	MI	MI	31/12/1978	0	KWINANA BEACH
<i>Thalasseus bergii</i>	Crested tern	BIRD	Specially Protected - migratory	MI	MI	18/03/1979	0	KWINANA BEACH
<i>Thalasseus bergii</i>	Crested tern	BIRD	Specially Protected - migratory	MI	MI	17/03/1979	0	KWINANA BEACH
<i>Thalasseus bergii</i>	Crested tern	BIRD	Specially Protected - migratory	MI	MI	18/03/1979	0	KWINANA BEACH
<i>Thalasseus bergii</i>	Crested tern	BIRD	Specially Protected - migratory	MI	MI	07/04/1979	0	KWINANA BEACH
<i>Thalasseus bergii</i>	Crested tern	BIRD	Specially Protected - migratory	MI	MI	18/11/1979	0	KWINANA BEACH
<i>Thalasseus bergii</i>	Crested tern	BIRD	Specially Protected - migratory	MI	MI	10/03/2008	0	Rockingham Area
<i>Thinornis rubricollis</i>	hooded plover, hooded dotterel	BIRD	Priority	P4		05/04/1997	2	Cooloongup
<i>Thinornis rubricollis</i>	hooded plover, hooded dotterel	BIRD	Priority	P4		15/02/1997	1	Cooloongup
<i>Thinornis rubricollis</i>	hooded plover, hooded dotterel	BIRD	Priority	P4		10/01/1998	1	Cooloongup
<i>Tringa nebularia</i>	Common greenshank, greenshank	BIRD	Specially Protected - migratory	MI	MI	01/04/1991	0	
<i>Tringa nebularia</i>	Common greenshank, greenshank	BIRD	Specially Protected - migratory	MI	MI	01/01/1991	0	
<i>Tringa nebularia</i>	Common greenshank, greenshank	BIRD	Specially Protected - migratory	MI	MI	01/10/1990	0	
<i>Tringa nebularia</i>	Common greenshank, greenshank	BIRD	Specially Protected - migratory	MI	MI	28/04/1990	0	
<i>Tringa nebularia</i>	Common greenshank, greenshank	BIRD	Specially Protected - migratory	MI	MI	11/01/2001	0	Lake Cooloongup
<i>Tringa nebularia</i>	Common greenshank, greenshank	BIRD	Specially Protected - migratory	MI	MI	17/11/2002	0	Lake Cooloongup
<i>Tringa nebularia</i>	Common greenshank, greenshank	BIRD	Specially Protected - migratory	MI	MI	15/01/2000	0	Lake Cooloongup
<i>Tringa nebularia</i>	Common greenshank, greenshank	BIRD	Specially Protected - migratory	MI	MI	28/12/1998	0	Lake Cooloongup Regional Park
<i>Hydromys chrysogaster</i>	water-rat, rakali	MAMMAL	Priority	P4		10/06/1973	1	Medina
<i>Isodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		17/02/2009	12	HOPE VALLEY
<i>Isodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		18/02/2009	11	HOPE VALLEY
<i>Isodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		19/02/2009	15	HOPE VALLEY
<i>Isodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		20/02/2009	10	HOPE VALLEY
<i>Isodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		07/03/2009	1	EAST ROCKINGHAM
<i>Isodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		09/03/2009	1	EAST ROCKINGHAM
<i>Isodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		10/03/2009	1	EAST ROCKINGHAM
<i>Isodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		10/03/2009	1	EAST ROCKINGHAM
<i>Isodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		06/03/2009	1	EAST ROCKINGHAM
<i>Isodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		11/03/2009	1	EAST ROCKINGHAM
<i>Isodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		10/03/2009	1	EAST ROCKINGHAM
<i>Isodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		11/03/2009	1	EAST ROCKINGHAM
<i>Isodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		05/03/2009	1	EAST ROCKINGHAM
<i>Isodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		05/03/2009	1	EAST ROCKINGHAM
<i>Isodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		05/03/2009	1	EAST ROCKINGHAM
<i>Isodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		07/03/2009	1	EAST ROCKINGHAM
<i>Isodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		06/03/2009	1	EAST ROCKINGHAM
<i>Isodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		08/03/2009	1	EAST ROCKINGHAM
<i>Isodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		05/03/2009	1	EAST ROCKINGHAM
<i>Isodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		07/03/2009	1	EAST ROCKINGHAM
<i>Isodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		11/07/2009	6	WELLARD
<i>Isodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		12/07/2009	9	WELLARD
<i>Isodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		13/07/2009	5	WELLARD
<i>Isodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		14/07/2009	3	WELLARD
<i>Isodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		15/07/2009	4	WELLARD
<i>Isodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		16/07/2009	5	WELLARD
<i>Isodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		17/07/2009	5	WELLARD
<i>Isodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		18/07/2009	2	WELLARD

## Appendix: DBCA Conservation Significant Vertebrate Fauna Database Search Results

[illegible]

## Appendix: DBCA Conservation Significant Vertebrate Fauna Database Search Results

[illegible]

Appendix: DBCA Conservation Significant Vertebrate Fauna Database Search Results

SCI_NAME	COM_NAME	CLASS	WA_LISTING	WA_status	EPBCstatus	Date	COUNT	LOCALITY
<i>Isoodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		28/05/2016	13	EAST ROCKINGHAM
<i>Isoodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		29/05/2016	10	EAST ROCKINGHAM
<i>Isoodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		03/05/2016	5	WELLARD
<i>Isoodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		24/11/2016	5	PARMELIA
<i>Isoodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		25/11/2016	6	PARMELIA
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		01/11/2001	6	Parmelia/Bertram
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		01/11/2001	4	Leda Nature Reserve
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		01/11/2001	2	Cooloongup
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		09/07/2004	1	Hope Valley/Postans
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		02/11/2007	3	Hope Valley/Kwinana Beach
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		03/11/2007	6	Hope Valley/Kwinana Beach
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		04/11/2007	6	Hope Valley/Kwinana Beach
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		05/11/2007	3	Hope Valley/Kwinana Beach
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		05/11/2007	5	Hope Valley/Kwinana Beach
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		02/11/2007	1	Hope Valley/The Spectacles
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		04/11/2007	2	Hope Valley/The Spectacles
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		06/11/2007	1	Hope Valley/The Spectacles
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		02/11/2007	2	Hope Valley
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		03/11/2007	2	Hope Valley
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		04/11/2007	3	Hope Valley
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		05/11/2007	3	Hope Valley
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		06/11/2007	5	Hope Valley
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		01/01/2007	1	
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		01/01/2007	1	
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		07/11/2012	1	Naval Base
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		08/04/2013	1	
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		09/09/2013	1	Kwinana
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		21/07/2009	23	WELLARD
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		14/05/2012	3	PARMELIA
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		27/05/2012	2	WELLARD
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		18/06/2012	1	KWINANA BEACH
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		18/05/2012	1	BERTRAM
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		12/05/2012	3	WELLARD
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		15/05/2012	1	WELLARD
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		28/05/2012	5	WELLARD
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		19/05/2012	2	WELLARD
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		18/05/2012	1	BERTRAM
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		01/06/2012	1	MEDINA
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		30/05/2012	1	PARMELIA
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		14/06/2012	1	KWINANA BEACH
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		18/05/2012	1	WELLARD
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		15/05/2012	10	WELLARD
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		15/05/2012	4	WELLARD
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		17/05/2012	6	BERTRAM
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		24/06/2012	1	BERTRAM
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		19/04/2012	1	BALDIVIS
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		18/05/2012	1	WELLARD
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		18/05/2012	1	WELLARD
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		15/05/2012	3	NAVAL BASE
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		15/05/2012	2	BERTRAM
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		20/07/2012	1	MEDINA
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		19/07/2012	2	WELLARD
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		15/05/2012	1	COOLOONGUP
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		01/08/2012	1	COOLOONGUP
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		28/04/2012	1	PARMELIA



Appendix: DBCA Conservation Significant Vertebrate Fauna Database Search Results

SCI_NAME	COM_NAME	CLASS	WA_LISTING	WA_status	EPBCstatus	Date	COUNT	LOCALITY
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		18/05/2008	1	LEDA
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		03/03/2015	1	Medina
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		18/11/2013	1	Medina
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		17/11/2013	3	Wellard
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		17/11/2013	4	Kwinana Beach
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		31/07/2015	1	Kwinana Beach
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		27/10/2014	1	Medina
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		21/01/2013	2	Wellard
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		14/03/2018	4	Rockingham
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		14/03/2018	5	Rockingham
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		14/03/2018	5	Rockingham
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		14/03/2018	14	Rockingham
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		14/03/2018	7	Rockingham
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		14/03/2018	5	Rockingham
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		06/08/2018	1	Anketell
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		01/01/1956	7	Rockingham
<i>Isoodon fusciventer</i>	quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		18/04/2020	1	Tamworth Hill Swamp Reserve
<i>Isoodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4			1	NAVAL BASE
<i>Isoodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4			1	NAVAL BASE
<i>Isoodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4			1	NAVAL BASE
<i>Isoodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4			1	NAVAL BASE
<i>Isoodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4			1	NAVAL BASE
<i>Isoodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4			1	NAVAL BASE
<i>Isoodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4			1	NAVAL BASE
<i>Isoodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4			1	NAVAL BASE
<i>Isoodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4			1	NAVAL BASE
<i>Isoodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		27/09/1993	1	KWINANA BEACH
<i>Isoodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		09/06/1962	1	NAVAL BASE
<i>Isoodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		22/06/1961	1	MEDINA
<i>Isoodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		22/05/2012	1	WELLARD
<i>Isoodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		10/03/2018	0	
<i>Isoodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		27/10/2018	0	
<i>Isoodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		03/05/2018	0	
<i>Isoodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		04/05/2018	0	
<i>Isoodon fusciventer</i>	Quenda, southwestern brown bandicoot	MAMMAL	Priority	P4		01/05/2018	0	
<i>Notamacropus irma</i>	western brush wallaby	MAMMAL	Priority	P4		01/01/1989	3	Leda Nature Reserve
<i>Notamacropus irma</i>	western brush wallaby	MAMMAL	Priority	P4		01/01/2019	2	Leda Nature Reserve
<i>Phascogale tapoatafa wambenger</i>	South-western brush-tailed phascogale, wambenger	MAMMAL	Specially Protected - conservation dependent	CD		01/03/1961	1	HOPE VALLEY
<i>Caretta caretta</i>	loggerhead turtle	REPTILE	Threatened - Endangered	EN	EN	03/01/1990	1	Kwinana Beach
<i>Caretta caretta</i>	loggerhead turtle	REPTILE	Threatened - Endangered	EN	EN	05/02/1991	1	Kwinana Beach
<i>Caretta caretta</i>	loggerhead turtle	REPTILE	Threatened - Endangered	EN	EN	16/11/2011	0	
<i>Caretta caretta</i>	loggerhead turtle	REPTILE	Threatened - Endangered	EN	EN	29/05/2003	1	EAST ROCKINGHAM
<i>Chelonia mydas</i>	green turtle	REPTILE	Threatened - Vulnerable	VU	VU	22/07/2009	1	
<i>Lerista lineata</i>	Perth slider, lined skink	REPTILE	Priority	P3		28/10/2014	1	HOPE VALLEY
<i>Lerista lineata</i>	Perth slider, lined skink	REPTILE	Priority	P3		30/10/2014	1	HOPE VALLEY
<i>Lerista lineata</i>	Perth slider, lined skink	REPTILE	Priority	P3		05/01/1979	1	The Spectacles
<i>Lerista lineata</i>	Perth slider, lined skink	REPTILE	Priority	P3		08/11/2001	1	Kwinana
<i>Lerista lineata</i>	Perth slider, lined skink	REPTILE	Priority	P3		03/11/2007	2	Hope Valley/Kwinana Beach
<i>Lerista lineata</i>	Perth slider, lined skink	REPTILE	Priority	P3		04/11/2007	1	Hope Valley/Kwinana Beach
<i>Lerista lineata</i>	Perth slider, lined skink	REPTILE	Priority	P3		13/11/2007	1	Hope Valley/The Spectacles
<i>Lerista lineata</i>	Perth slider, lined skink	REPTILE	Priority	P3		08/11/2001	1	KWINANA BEACH
<i>Lerista lineata</i>	Perth slider, lined skink	REPTILE	Priority	P3		05/01/1979	1	MEDINA
<i>Lerista lineata</i>	Perth slider, lined skink	REPTILE	Priority	P3		13/11/1978	1	HOPE VALLEY
<i>Neelaps calonotos</i>	black-striped snake, black-striped burrowing snake	REPTILE	Priority	P3			1	East Rockingham
<i>Neelaps calonotos</i>	black-striped snake, black-striped burrowing snake	REPTILE	Priority	P3			1	Naval Base
<i>Neelaps calonotos</i>	Black-striped snake, black-striped burrowing snake	REPTILE	Priority	P3			1	COOLOONGUP

Appendix: DBCA Black Cockatoo Roost Data

SITE_CODE	WT_2010_C	WT_2011_C	WT_2012_C	WT_2013_C	WT_2014_C	WT_2015_C	WT_2016_C	WT_2017_C	WT_2018_C	WT_2019_C	WT_TOT_C	WT_MAX_C	FRT_2014_C	FRT_2015_C	FRT_2016_C	FRT_2017_C	FRT_2018_C	FRT_2019_C	FRT_TOT_C	FRT_MAX_C	N_SURVEYS
COCMUNR001	.	.	.	0	0	.	0	0	0	0	0	0	92	.	73	0	365	259	789	365	6
COCMUNR002	.	.	.	.	0	.	.	.	.	.	0	0	0	.	.	.	.	.	0	0	1
COCMUNR003	.	.	.	.	.	.	0	0	0	3	3	3	.	.	38	0	108	0	146	108	4
KWICASR001	2	.	.	0	19	.	.	0	59	0	80	59	0	.	.	75	16	0	91	75	6
KWICASR002	.	.	.	.	.	.	.	.	.	0	0	0	.	.	.	.	.	0	0	0	1
KWIKWIR001	0	.	0	.	.	.	.	.	.	.	0	0	.	.	.	.	.	.	0	0	2
KWIWANR002	.	.	.	0	0	0	0	5	0	0	5	5	0	0	0	0	0	0	0	0	7
KWIWELR001	.	.	15	50	0	62	0	0	4	40	171	62	0	0	9	0	0	0	9	9	8
KWIWELR002	.	.	.	.	.	.	.	.	4	133	137	133	.	.	.	.	0	0	0	0	2
KWIWELR003	.	.	.	.	.	.	.	.	0	0	0	0	.	.	.	.	14	0	14	14	2
ROCBALR002	0	.	.	.	.	.	0	0	.	.	0	0	.	.	0	0	.	.	0	0	3
ROCBALR004	.	40	0	0	0	.	0	0	.	.	40	40	0	.	0	0	.	.	0	0	6
ROCCOOR001	0	.	.	0	.	0	.	.	.	.	0	0	0	0	.	.	.	.	0	0	3
ROCROCR001	.	0	.	0	.	.	0	.	.	.	0	0	.	.	0	.	.	.	0	0	3
ROCROCR002	.	.	0	.	.	.	.	.	.	.	0	0	.	.	.	.	.	.	0	0	1
ROCWAIR001	0	0	0	0	.	0	0	.	.	.	0	0	0	0	0	.	.	.	0	0	6
ROCWARR001	.	.	.	.	0	.	.	.	.	.	0	0	0	.	.	.	.	.	0	0	1
SEROAKR001	0	110	.	0	0	.	.	0	0	.	110	110	0	.	.	0	0	.	0	0	6
SEROAKR003	167	0	0	0	0	0	.	0	0	0	167	167	0	0	.	0	0	0	0	0	8
SERWELR001	.	.	.	.	0	.	0	.	.	.	0	0	.	.	0	.	.	.	0	0	2
SERWELR002	.	.	.	.	.	.	.	298	75	0	373	298	.	.	.	0	0	0	0	0	3
SERWELR003	.	.	.	.	.	.	.	.	0	0	0	0	.	.	.	.	0	0	0	0	2

Appendix: DBCA Black Cockatoo Breeding Data

WT_ID	HOL_TYPE	TREE_CAT	YRFIRSTBR	YRLASTBR	SCE_ID_FLD	SCE_ID_VAL
2585.000000	artificial	confirmed	2018	2018	hollow code	ROCBALAH001



## **Appendix C**

### **Flora Likelihood**

**Appendix: Assessment of the Likelihood of Occurrence of Threatened and Priority Flora as per Desktop Assessment Database Searches surrounding the Survey Area**

Distance to Nearest Record from the Survey Area is based on a distance analysis undertaken against 2020 DBCA database. High = Suitable habitat present and records less than 5 km from the Survey Area, Medium = Suitable habitat present and records between 5 km and 15 km from the Survey Area, and Low = No suitable habitat present and/or records greater than 15 km from the Survey Area, Unknown = Insufficient information available to classify. CR = Listed as Critically Endangered under the EPBC Act, EN = Listed as Endangered under the EPBC Act, VU = listed as Vulnerable under the EPBC Act. T = Threatened under the BC Act, P = Priority Listed, Ranked and Listed by the DBCA. Likelihoods are assessed both pre and post survey based on knowledge of the Survey Area, nearest known records, known flowering period of flora taxa and knowledge gained from the survey effort during ground truthing. 1: Department of the Environment (2021). SPRAT EPBC Threatened Flora in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: <http://www.environment.gov.au/sprat>. 2: Department of Biodiversity, Conservation and Attractions (2021). FloraBase - The Western Australian Flora. <https://florabase.dpaw.wa.gov.au/>

Species	Conservation Status			Source		Distance to Nearest Record (km)	Flowering Period	Preferred Habitat	Pre-Survey Likelihood of Occurrence	Habitat occurs within the Survey Area	Post-Survey Likelihood of Occurrence
	DBCA	EPBC	NatureMap	PMST	DBCA						
<i>Andersonia gracilis</i>	T	EN		X		26.00	Sep - Nov	Currently known from the Badgingarra, Dandaragan and Kenwick areas where it is found on seasonally damp, black sandy clay flats near or on the margins of swamps, often on duplex soils. <sup>1</sup>	Low	No	Low
<i>Caladenia huegelii</i>	T	EN	X	X	X	7.70	Sep - Oct	Grows in well-drained, deep sandy soils in low mixed woodlands. <sup>1</sup>	Medium	Yes	Low
<i>Diuris drummondii</i>	T	VU		X	X	12.82	Nov - Dec or Jan	Found in low-lying depressions in peaty and sandy clay swamps. <sup>2</sup>	Medium	No	Low
<i>Diuris micrantha</i>	T	VU	X	X	X	7.40	Sep - Oct	Found on dark, grey to blackish, sandy clay-loam substrates in winter wet depressions or swamps. <sup>2</sup>	Medium	No	Low
<i>Diuris purdiei</i>	T	EN		X	X	14.10	Sep - Oct	Typically found on sand to sandy clay soils, in areas subject to winter inundation, and amongst native sedges and dense heath. <sup>1</sup>	Medium	No	Low
<i>Drakaea elastica</i>	T	EN	X	X	X	9.24	Oct - Nov	White, grey sand, low-lying situations adjoining winter-wet swamps. <sup>1</sup>	Medium	No	Low
<i>Drakaea micrantha</i>	T	VU		X	X	17.70	Sep - Oct	Usually found on cleared firebreaks or open sandy patches that have been disturbed, where competition from other plants has been removed. <sup>1</sup>	Low	Yes	Low
<i>Eleocharis keigheryi</i>	T	VU		X		30.50	Aug - Nov	Grows in small clumps in a substrate of clay or sandy loam. This species is emergent in freshwater creeks, and transient waterbodies such as drainage lines and claypans in water to approximately 15 cm deep. <sup>1</sup>	Low	No	Low
<i>Eucalyptus x balanites</i>	T	EN		X		18.90	Oct - Jan	Sandy soils with lateritic gravel. <sup>2</sup>	Low	Yes	Low
<i>Lepidosperma rostratum</i>	T	EN			X	17.90	Aug	Grows in peaty sand and clay amongst low heath, in winter-wet swamps. <sup>2</sup>	Low	No	Low
<i>Synaphea</i> sp. Fairbridge Farm (D. Papenfus 696)	T	CR		X		18.70	Oct	Occurs on grey, clayey sand with lateritic pebbles in low woodland areas near winter-wetflats. <sup>1</sup>	Low	No	Low
<i>Synaphea</i> sp. Pinjarra Plain (A.S. George 17182)	T	EN			X	18.58	Sep - Nov	Grey sandy loam or clay, grey-brown clayey sand, brown clayey loam, laterite. Flats, seasonally wet areas, railroad reserves often with wet depressions or drains. <sup>2</sup>	Low	No	Low
<i>Synaphea</i> sp. Serpentine (G.R. Brand 103)	T	CR		X	X	11.64	Sep - Oct	Yellow-brown sand/clay, Grey loamy sand. Wetlands, winter-wet sites. <sup>2</sup>	Medium	No	Low

<sup>1</sup> Department of Agriculture, Water and Environment (2020) <sup>2</sup>Western Australian Herbarium (2020)

Species	Conservation Status			Source		Distance to Nearest Record (km)	Flowering Period	Preferred Habitat	Pre-Survey Likelihood of Occurrence	Habitat occurs within the Survey Area	Post-Survey Likelihood of Occurrence
	DBCA	EPBC	NatureMap	PMST	DBCA						
<i>Acacia lasiocarpa</i> var. <i>bracteolata</i> long peduncle variant (G.J. Keighery 5026)	P1				X	14.71	May - Aug	Grey or black sand over clay. Swampy areas, winter wet lowlands. <sup>2</sup>	Medium	No	Low
<i>Acacia</i> sp. Binningup (G. Cockerton et al. WB 37784)	P1		X		X	4.77	Aug	Sand. Typically on limestone breakaways. <sup>2</sup>	High	Yes	Low
<i>Boronia juncea</i> subsp. <i>juncea</i>	P1		X		X	9.95	Apr	Sand. Low scrub. <sup>2</sup>	Medium	Yes	Low
<i>Lachnagrostis nesomytica</i> subsp. <i>paralia</i>	P1		X		X	7.37	-	Calcareous sands. Coastal dunes and swales. <sup>2</sup>	Medium	Yes	Low
<i>Acacia benthamii</i>	P2				X	13.69	Aug - Sep	Sand. Typically on limestone breakaways. <sup>2</sup>	Medium	Yes	Low
<i>Calectasia grandiflora</i>	P2				X	18.13	Jun - Nov	White, grey or yellow sand, sandy clay, gravel, laterite, granite. Swampy areas, rock outcrops, flats, slopes, ridges. <sup>2</sup>	Low	Yes	Low
<i>Johnsonia pubescens</i> subsp. <i>cygnorum</i>	P2				X	14.95	Sep	Grey-white-yellow sand. Flats, seasonally-wet sites. <sup>2</sup>	Low	No	Low
<i>Thelymitra variegata</i>	P2				X	16.83	Jun - Sep	Sandy clay, sand, laterite. <sup>2</sup>	Low	Yes	Low
<i>Angianthus drummondii</i>	P3				X	17.49	Oct - Dec	Grey or brown clay soils, ironstone. Seasonally wet flats. <sup>2</sup>	Low	No	Low
<i>Austrostipa mundula</i>	P3		X		X	8.42	Sep - Oct	Upper slope of dune. Pale grey sand over limestone. <sup>2</sup>	Medium	No	Low
<i>Babingtonia urbana</i>	P3				X	17.10	Jan - Mar	Associated with wetlands on the coastal plain. <sup>2</sup>	Low	No	Low
<i>Beyeria cinerea</i> subsp. <i>cinerea</i>	P3				X	11.96	May - Aug	Grey sand over limestone. <sup>2</sup>	Medium	Yes	Low
<i>Calandrinia oraria</i>	P3				X	14.60	Aug - Oct	Low coastal heath or forb-land on small white sand dunes immediately adjacent to the beach and up to 100–150 m inland in slightly larger dunes with grey or grey-brown sands. <sup>2</sup>	Medium	No	Low
<i>Carex tereticaulis</i>	P3				X	15.65	Sep - Oct	Black peaty sand. <sup>2</sup>	Low	No	Low
<i>Cyathochaeta teretifolia</i>	P3		X		X	8.52	Dec	Grey sand, sandy clay, swamps, creek edges. <sup>2</sup>	Medium	No	Low
<i>Dillwynia dillwynioides</i>	P3				X	13.48	Aug - Dec	Sandy soils. Winter-wet depressions. <sup>2</sup>	Medium	No	Low
<i>Hibbertia leptotheca</i>	P3		X			20.90	Aug - Oct	Light brown/yellow to white sand, grey humic sand, Tamala limestone, sand dune, limestone outcrop. <sup>2</sup>	Low	No	Low
<i>Jacksonia gracillima</i>	P3		X		X	8.57	Oct - Nov	Coastal plains, dry grey sand, near seasonal wetlands and winter-wet areas. <sup>2</sup>	Medium	Yes	Low

<sup>1</sup> Department of Agriculture, Water and Environment (2020) <sup>2</sup>Western Australian Herbarium (2020)

Species	Conservation Status			Source		Distance to Nearest Record (km)	Flowering Period	Preferred Habitat	Pre-Survey Likelihood of Occurrence	Habitat occurs within the Survey Area	Post-Survey Likelihood of Occurrence
	DBCA	EPBC	NatureMap	PMST	DBCA						
<i>Phlebocarya pilosissima</i> subsp. <i>pilosissima</i>	P3				X	18.30	Aug - Oct	White or grey sand, lateritic gravel. <sup>2</sup>	Low	Yes	Low
<i>Pimelea calcicola</i>	P3		X		X	2.46	Sep - Nov	Sand, coastal limestone ridges. <sup>2</sup>	High	No	Low
<i>Schoenus capillifolius</i>	P3				X	16.14	Oct - Nov	Brown mud. Claypans. <sup>2</sup>	Low	No	Low
<i>Schoenus</i> sp. Waroona (G.J. Keighery 12235)	P3				X	17.49	Oct - Nov	Clay or sandy clay. Winter-wet flats. <sup>2</sup>	Low	No	Low
<i>Sphaerolobium calcicola</i>	P3		X		X	6.61	Jun or Sep - Nov	White-grey-brown sand, sandy clay over limestone, black peaty sandy clay. Tall dunes, winter-wet flats, interdunal swamps, low-lying areas. <sup>2</sup>	Medium	Yes	Low
<i>Stylidium aceratum</i>	P3				X	17.26	Oct - Nov	Sandy soils. Swamp heathland. <sup>2</sup>	Low	No	Low
<i>Stylidium paludicola</i>	P3		X		X	11.38	Oct - Dec	Peaty sand over clay. Winter wet habitats. Marri and Melaleuca woodland, Melaleuca shrubland. <sup>2</sup>	Medium	Yes	Low
<i>Styphelia filifolia</i>	P3				X	19.69	Mar - May	Yellow sand, brown sand, grey sand, flat sandplains, lower slopes. <sup>2</sup>	Low	Yes	Low
<i>Aponogeton hexatepalus</i>	P4		X		X	7.60	Jul - Oct	Mud. Freshwater: ponds, rivers, claypans. <sup>2</sup>	Medium	No	Low
<i>Dodonaea hackettiana</i>	P4		X		X	4.01	Jul - Oct	Sand. Outcropping limestone. <sup>2</sup>	High	Yes	Low
<i>Eucalyptus rudis</i> subsp. <i>cratyantha</i>	P4				X	16.70	Jul - Sep	Loam. Flats, hillsides. <sup>2</sup>	Low	No	Low
<i>Grevillea olivacea</i>	P4				X	13.50	Jun - Oct	White or grey sand. Coastal dunes, limestone rocks. <sup>2</sup>	Medium	Yes	Low
<i>Jacksonia sericea</i>	P4		X		X	2.01	Dec or Jan - Feb	Calcareous and sandy soils. <sup>2</sup>	High	Yes	Low
<i>Kennedia beckxiana</i>	P4				X	15.64	Sep - Dec	Sand, loam, granite hills and outcrops. <sup>2</sup>	Low	Yes	Low
<i>Lepidium puberulum</i>	P4				X	11.11	Jul - Aug or Oct - Nov	Sandy soils. <sup>2</sup>	Medium	Yes	Medium
<i>Microtis quadrata</i>	P4				X	16.83	Oct - Dec	Sandy clay loam, swamps, flats. <sup>2</sup>	Low	No	Low
<i>Parsonsia diaphanophleba</i>	P4				X	15.08	Jan - Feb or Apr - Jun or Sep	Alluvial soils, along rivers. <sup>2</sup>	Low	No	Low
<i>Stylidium ireneae</i>	P4		X		X	6.10	Oct - Dec	Sandy loam. Valleys near creek lines, woodland, often with Agonis. <sup>2</sup>	Medium	No	Low

<sup>1</sup> Department of Agriculture, Water and Environment (2020) <sup>2</sup>Western Australian Herbarium (2020)



Species	Conservation Status			Source		Distance to Nearest Record (km)	Flowering Period	Preferred Habitat	Pre-Survey Likelihood of Occurrence	Habitat occurs within the Survey Area	Post-Survey Likelihood of Occurrence
	DBCA	EPBC	NatureMap	PMST	DBCA						
<i>Stylidium longitubum</i>	P4		X		X	10.08	Oct - Dec	Sandy clay, clay. Seasonal wetlands. <sup>2</sup>	Medium	No	Low
<i>Stylidium striatum</i>	P4		X			40.00	Oct - Nov	Brown clay loam over laterite. Hillslopes. Jarrah/Marri forest, Wandoo woodland. <sup>2</sup>	Low	No	Low
<i>Tripterococcus</i> sp. <i>Brachylobus</i> (A.S. George 14234)	P4				X	16.09	Feb	Winter wet flats, peaty sand over clay. <sup>2</sup>	Low	No	Low
<i>Verticordia lindleyi</i> subsp. <i>lindleyi</i>	P4				X	15.28	May or Nov - Dec or Jan	Sand, sandy clay. Winter-wet depressions. <sup>2</sup>	Low	No	Low

<sup>1</sup> Department of Agriculture, Water and Environment (2020) <sup>2</sup>Western Australian Herbarium (2020)

## **Appendix D**

### **Flora Site Sheets**

## FLORA SITE SHEET

**Project Name** Kwinana ES Re-fueller  
**Site:** Kw10  
**Location** MGA 50 384131 mE 6430200 mN

**Described by:** NW  
**Date:** 20-10-2021  
**Type:** Quadrat

**Landform:** Plain  
**Slope:** N/A  
**Rock Type:** N/A  
**Soil Type:** Loam,Sand  
**Soil Colour:** Brown



**Vegetation:** *Acacia rostellifera*, *Banksia littoralis* and *Melaleuca huegelii* low open forest over *Spyridium globulosum* and *Xanthorrhoea preissii* mid open shrubland over *Gahnia trifida* mid sparse sedgeland over low mixed weeds

**Condition:** Degraded  
**Fire Age:** > 5 years  
**Disturbance Type:** Weeds

### SPECIES LIST

Taxon	Height (cm)	Cover (%)	Notes
<i>Acacia rostellifera</i>	400	4	
* <i>Asparagus asparagoides</i>	100	0.5	
* <i>Avena barbata</i>	50	2	
* <i>Avena fatua</i>	20	30	
<i>Banksia littoralis</i>	400	3	
* <i>Briza minor</i>	15	0.1	
* <i>Bromus diandrus</i>	30	5	
<i>Clematis linearifolia</i>	300	3	
* <i>Euphorbia peplus</i>	30	30	
* <i>Euphorbia terracina</i>	40	1	
<i>Gahnia trifida</i>	90	2	
* <i>Galium murale</i>	3	0.1	
* <i>Lagurus ovatus</i>	35	0.5	
* <i>Lysimachia arvensis</i>	10	0.5	
<i>Melaleuca huegelii</i>	400	35	
* <i>Petrorhagia dubia</i>	35	0.5	
* <i>Sonchus oleraceus</i>	30	0.5	
<i>Spyridium globulosum</i>	100	3	
<i>Xanthorrhoea preissii</i>	150	15	

## **Appendix E**

### **FCT Analysis**



**Appendix: Floristic Community Type Analysis of Quadrats**

Quadrat	Nearest Neighbour Analysis			FCT Comparison
	Similarity (%)	Site	FCT	
KWQ01 (Ar)	39.02	Buck01	24	FCT SCP 29b – <i>Acacia</i> shrublands on taller dunes
	37.03	WOODP-1	30a2	
	30.30	M4601	S11	
KWQ02 (Ar)	40.00	WOODP-1	30a2	FCT SCP 29b – <i>Acacia</i> shrublands on taller dunes
	30.76	SW10	S11	
	30.00	Rott01	S11	
KWQ03 (EgSg)	44.44	WOODP-1	30a2	FCT SCP 25 - Southern Swan Coastal Plain <i>Eucalyptus gomphocephala</i> - <i>Agonis flexuosa</i> woodlands/Tuart ( <i>Eucalyptus gomphocephala</i> ) woodlands of the Swan Coastal Plain
	42.42	M4601	S11	
	38.09	WOODP-1	30a2	
KWQ04 (Ar)	41.66	WOODP-1	30a2	FCT SCP 29b – <i>Acacia</i> shrublands on taller dunes
	32.20	Caus06	S07	
	31.50	Buck01	24	
KWQ06 (Ar)	54.54	WOODP-1	30a2	FCT SCP 29b – <i>Acacia</i> shrublands on taller dunes
	33.33	Buck01	24	
	32.43	WOODP-2	30a2	
KWQ07 (EgSg)	50.00	WOODP-1	30a2	FCT SCP 25 - Southern Swan Coastal Plain <i>Eucalyptus gomphocephala</i> - <i>Agonis flexuosa</i> woodlands/Tuart ( <i>Eucalyptus gomphocephala</i> ) woodlands of the Swan Coastal Plain
	40.00	WOODP-2	30a2	
	30.76	M4601	S11	

Quadrat	Nearest Neighbour Analysis			FCT Comparison
	Similarity (%)	Site	FCT	
KWQ08 (EgSg)	33.33	M4601	S11	FCT SCP 25 - Southern Swan Coastal Plain <i>Eucalyptus gomphocephala</i> - <i>Agonis flexuosa</i> woodlands/Tuart ( <i>Eucalyptus gomphocephala</i> ) woodlands of the Swan Coastal Plain
	33.33	WOODP-1	30a2	
	30.30	WOODP-2	30a2	
KWQ09 (EgSg)	46.15	WOODP-1	30a2	FCT SCP 25 - Southern Swan Coastal Plain <i>Eucalyptus gomphocephala</i> - <i>Agonis flexuosa</i> woodlands/Tuart ( <i>Eucalyptus gomphocephala</i> ) woodlands of the Swan Coastal Plain
	39.02	WOODP-2	30a2	
	37.5	M4601	S11	
KWQ10 (BI)	43.75	WOODP-1	30a2	FCT SCP 17 – <i>Melaleuca raphiophylla</i> - <i>Gahnia trifida</i> seasonal wetlands
	38.29	WOODP-2	30a2	
	33.33	Tokyu07	29b	
KWQ14 (BI)	43.47	Buck01	24	FCT SCP 17 – <i>Melaleuca raphiophylla</i> - <i>Gahnia trifida</i> seasonal wetlands
	37.5	WOODP-1	30a2	
	31.81	PEPGRV-1	30a2	
KWQ15 (EgSg)	32.65	CHIDPT-1	24	FCT SCP 25 - Southern Swan Coastal Plain <i>Eucalyptus gomphocephala</i> - <i>Agonis flexuosa</i> woodlands/Tuart ( <i>Eucalyptus gomphocephala</i> ) woodlands of the Swan Coastal Plain
	32.55	WOODP-2	30a2	
	31.25	Cool04	17	
KWQ17 (EgSg)	46.15	WOODP-1	30a2	FCT SCP 25 - Southern Swan Coastal Plain <i>Eucalyptus gomphocephala</i> - <i>Agonis flexuosa</i> woodlands/Tuart ( <i>Eucalyptus gomphocephala</i> ) woodlands of the Swan Coastal Plain
	37.5	M4601	S11	
	35.00	Buck01	24	
KWQ21 (EgSg)	38.29	WOODP-2	30a2	
	37.5	WOODP-1	30a2	

Quadrat	Nearest Neighbour Analysis			FCT Comparison
	Similarity (%)	Site	FCT	
	32.43	GARD04	30a2	FCT SCP 25 - Southern Swan Coastal Plain <i>Eucalyptus gomphocephala</i> - <i>Agonis flexuosa</i> woodlands/Tuart ( <i>Eucalyptus gomphocephala</i> ) woodlands of the Swan Coastal Plain
KWQ22 (EgSg)	33.33	WOODP-2	30a2	FCT SCP 25 - Southern Swan Coastal Plain <i>Eucalyptus gomphocephala</i> - <i>Agonis flexuosa</i> woodlands/Tuart ( <i>Eucalyptus gomphocephala</i> ) woodlands of the Swan Coastal Plain
	32.03	WOODP-1	30a2	
	30.30	M4601	S11	
KWQ23 (EgSg)	38.70	Bold06	30a2	FCT SCP 25 - Southern Swan Coastal Plain <i>Eucalyptus gomphocephala</i> - <i>Agonis flexuosa</i> woodlands/Tuart ( <i>Eucalyptus gomphocephala</i> ) woodlands of the Swan Coastal Plain
	37.5	Trigg08	S15	
	35.89	WOODP-2	30a2	
KWQ24 (Ar)	40.00	WOODP-1	30a2	FCT SCP 29b – <i>Acacia</i> shrublands on taller dunes
	38.70	M4601	S11	
	30.00	WOODP-2	30a2	
KWQ25 (Ar)	26.08	M4601	S11	FCT SCP 29b – <i>Acacia</i> shrublands on taller dunes
	23.52	WOODP-1	30a2	
	23.52	TR06	S11	
KWQ27 (Ar)	30.00	WOODP-1	30a2	FCT SCP 29b – <i>Acacia</i> shrublands on taller dunes
	28.52	Trigg08	S15	
	26.66	PRES-1	29a	
KWQ29 (Ar)	50.00	WOODP-1	30a2	FCT SCP 29b – <i>Acacia</i> shrublands on taller dunes
	35.89	WOODP-2	30a2	

Quadrat	Nearest Neighbour Analysis			FCT Comparison
	Similarity (%)	Site	FCT	
	33.33	M4601	S11	
KWQ30 (EgSg)	38.46	WOODP-1	30a2	FCT SCP 25 - Southern Swan Coastal Plain <i>Eucalyptus gomphocephala</i> - <i>Agonis flexuosa</i> woodlands/Tuart ( <i>Eucalyptus gomphocephala</i> ) woodlands of the Swan Coastal Plain
	37.5	M4601	S11	
	30.30	Bold06	30a2	
KWQ31 (Ar)	56.0	WOODP-1	30a2	FCT SCP 29b – <i>Acacia</i> shrublands on taller dunes
	38.70	M4601	S11	
	37.5	Bold06	30a2	
KWQ32 (Ar)	34.78	WOODP-1	30a2	FCT SCP 29b – <i>Acacia</i> shrublands on taller dunes
	32.43	Buck01	24	
	27.58	M4601	S11	
KWQ33 (Ar)	46.15	WOODP-1	30a2	FCT SCP 29b – <i>Acacia</i> shrublands on taller dunes
	37.5	M4601	S11	
	35.00	Buck01	24	
KWQ35 (Ar)	46.15	WOODP-1	30a2	FCT SCP 29b – <i>Acacia</i> shrublands on taller dunes
	37.50	M4601	S11	
	34.14	WOODP-2	30a2	
KWQ36 (EgSg)	40.00	WOODP-1	30a2	FCT SCP 25 - Southern Swan Coastal Plain <i>Eucalyptus gomphocephala</i> - <i>Agonis flexuosa</i> woodlands/Tuart ( <i>Eucalyptus gomphocephala</i> ) woodlands of the Swan Coastal Plain
	40.00	WOODP-2	30a2	
	32.43	Bold06	30a2	
KWQ73	38.88	M4601	S11	



Quadrat	Nearest Neighbour Analysis			FCT Comparison
	Similarity (%)	Site	FCT	
(EgSg)	35.48	NEER-1	24	FCT SCP 25 - Southern Swan Coastal Plain <i>Eucalyptus gomphocephala</i> - <i>Agonis flexuosa</i> woodlands/Tuart ( <i>Eucalyptus gomphocephala</i> ) woodlands of the Swan Coastal Plain
	31.74	Star01	24	
KWQ74 (Ar)	41.66	WOODP-1	30a2	FCT SCP 29b – <i>Acacia</i> shrublands on taller dunes
	40.00	M4601	S11	
	30.76	WOODP-2	30a2	



Level 1, 500 Hay Street, Subiaco WA 6008 **t** (+618) 9388 8360 **f** (+618) 9381 2360  
PO BOX 14, West Perth WA 6872  
**w** 360environmental.com.au **e** admin@360environmental.com.au

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