Australian Government

Department of the Environment

Referral of proposed action

What is a referral?

The *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act) provides for the protection of the environment, especially matters of national environmental significance (NES). Under the EPBC Act, a person must not take an action that has, will have, or is likely to have a significant impact on any of the matters of NES without approval from the Australian Government Environment Minister or the Minister's delegate. (Further references to 'the Minister' in this form include references to the Minister's delegate.) To obtain approval from the Environment Minister, a proposed action should be referred. The purpose of a referral is to obtain a decision on whether your proposed action will need formal assessment and approval under the EPBC Act.

Your referral will be the principal basis for the Minister's decision as to whether approval is necessary and, if so, the type of assessment that will be undertaken. These decisions are made within 20 business days, provided sufficient information is provided in the referral.

Who can make a referral?

Referrals may be made by or on behalf of a person proposing to take an action, the Commonwealth or a Commonwealth agency, a state or territory government, or agency, provided that the relevant government or agency has administrative responsibilities relating to the action.

When do I need to make a referral?

A referral must be made for actions that are likely to have a significant impact on the following matters protected by Part 3 of the EPBC Act:

- World Heritage properties (sections 12 and 15A)
- National Heritage places (sections 15B and 15C)
- Wetlands of international importance (sections 16 and 17B)
- Listed threatened species and communities (sections 18 and 18A)
- Listed migratory species (sections 20 and 20A)
- Protection of the environment from nuclear actions (sections 21 and 22A)
- Commonwealth marine environment (sections 23 and 24A)
- Great Barrier Reef Marine Park (sections 24B and 24C)
- A water resource, in relation to coal seam gas development and large coal mining development (sections 24D and 24E)
- The environment, if the action involves Commonwealth land (sections 26 and 27A), including:
    - actions that are likely to have a significant impact on the environment of Commonwealth land (even if taken outside Commonwealth land);
    - actions taken on Commonwealth land that may have a significant impact on the environment generally;
- The environment, if the action is taken by the Commonwealth (section 28)
- Commonwealth Heritage places outside the Australian jurisdiction (sections 27B and 27C)

You may still make a referral if you believe your action is not going to have a significant impact, or if you are unsure. This will provide a greater level of certainty that Commonwealth assessment requirements have been met.

To help you decide whether or not your proposed action requires approval (and therefore, if you should make a referral), the following guidance is available from the Department's website:

- the Policy Statement titled Significant Impact Guidelines 1.1 – Matters of National Environmental Significance. Additional sectoral guidelines are also available.

- the Policy Statement titled Significant Impact Guidelines 1.2 - Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies.
- the Policy Statement titled Significant Impact Guidelines: Coal seam gas and large coal mining developments—Impacts on water resources.
- the interactive map tool (enter a location to obtain a report on what matters of NES may occur in that location).

Can I refer part of a larger action?

In certain circumstances, **the Minister may not accept a referral for an action that is a component of a larger action and may request the person proposing to take the action to refer the larger action for consideration under the EPBC Act (Section 74A, EPBC Act).** If you wish to make a referral for a staged or component referral, read 'Fact Sheet 6 Staged Developments/Split Referrals' and contact the Referrals Gateway (1800 803 772).

Do I need a permit?

Some activities may also require a permit under other sections of the EPBC Act or another law of the Commonwealth. Information is available on the Department's web site.

Is your action in the Great Barrier Reef Marine Park?

If your action is in the Great Barrier Reef Marine Park it may require permission under the *Great Barrier Reef Marine Park Act 1975* (GBRMP Act). If a permission is required, referral of the action under the EPBC Act is deemed to be an application under the GBRMP Act (see section 37AB, GBRMP Act). This referral will be forwarded to the Great Barrier Reef Marine Park Authority (the Authority) for the Authority to commence its permit processes as required under the Great Barrier Reef Marine Park Regulations 1983. If a permission is not required under the GBRMP Act, no approval under the EPBC Act is required (see section 43, EPBC Act). The Authority can provide advice on relevant permission requirements applying to activities in the Marine Park.

The Authority is responsible for assessing applications for permissions under the GBRMP Act, GBRMP Regulations and Zoning Plan. Where assessment and approval is also required under the EPBC Act, a single integrated assessment for the purposes of both Acts will apply in most cases. Further information on environmental approval requirements applying to actions in the Great Barrier Reef Marine Park is available from http://www.gbrmpa.gov.au/ or by contacting GBRMPA's Environmental Assessment and Management Section on (07) 4750 0700.

The Authority may require a permit application assessment fee to be paid in relation to the assessment of applications for permissions required under the GBRMP Act, even if the permission is made as a referral under the EPBC Act. Further information on this is available from the Authority:

Great Barrier Reef Marine Park Authority

2-68 Flinders Street PO Box 1379
Townsville QLD 4810
AUSTRALIA

Phone: + 61 7 4750 0700
Fax: + 61 7 4772 6093

www.gbrmpa.gov.au

What information do I need to provide?

Completing all parts of this form will ensure that you submit the required information and will also assist the Department to process your referral efficiently. If a section of the referral document is not applicable to your proposal enter N/A.

You can complete your referral by entering your information into this Word file.

Instructions

Instructions are provided in blue text throughout the form.

Attachments/supporting information

The referral form should contain sufficient information to provide an adequate basis for a decision on the likely impacts of the proposed action. You should also provide supporting documentation, such as environmental reports or surveys, as attachments.

Coloured maps, figures or photographs to help explain the project and its location should also be submitted with your referral. Aerial photographs, in particular, can provide a useful perspective and context. Figures should be good quality as they may be scanned and viewed electronically as black and white documents. Maps should be of a scale that clearly shows the location of the proposed action and any environmental aspects of interest.

Please ensure any attachments are below three megabytes (3mb) as they will be published on the Department's website for public comment. To minimise file size, enclose maps and figures as separate files if necessary. If unsure, contact the Referrals Gateway (email address below) for advice. Attachments larger than three megabytes (3mb) may delay processing of your referral.

Note: the Minister may decide not to publish information that the Minister is satisfied is commercial-in-confidence.

How do I pay for my referral?

From 1 October 2014 the Australian Government commenced cost recovery arrangements for environmental assessments and some strategic assessments under the EPBC Act. If an action is referred on or after 1 October 2014, then cost recovery will apply to both the referral and any assessment activities undertaken. Further information regarding cost recovery can be found on the Department's website.

Payment of the referral fee can be made using one of the following methods:

- **EFT Payments can be made to:**

  BSB: 092-009
  Bank Account No. 115859
  Amount: $7352
  Account Name: Department of the Environment.
  Bank: Reserve Bank of Australia
  Bank Address: 20-22 London Circuit Canberra ACT 2601
  Description: The reference number provided (see note below)

- **Cheque** - Payable to "Department of the Environment". Include the reference number provided (see note below), and if posted, address:

  The Referrals Gateway
  Environment Assessment Branch
  Department of the Environment
  GPO Box 787
  Canberra ACT 2601

- **Credit Card**

  Please contact the Collector of Public Money (CPM) directly (call (02) 6274 2930 or 6274 20260 and provide the reference number (see note below).

Note: in order to receive a reference number, submit your referral and the Referrals Gateway will email you the reference number.

How do I submit a referral?

Referrals may be submitted by mail or email.

Mail to:

Referrals Gateway
Environment Assessment Branch
Department of Environment
GPO Box 787
CANBERRA ACT 2601

- If submitting via mail, electronic copies of documentation (on CD/DVD or by email) are required.

Email to: epbc.referrals@environment.gov.au

- Clearly mark the email as a 'Referral under the EPBC Act'.
- Attach the referral as a Microsoft Word file and, if possible, a PDF file.
- **Follow up with a mailed hardcopy including copies of any attachments or supporting reports.**

What happens next?

Following receipt of a valid referral (containing all required information) you will be advised of the next steps in the process, and the referral and attachments will be published on the Department's web site for public comment.

The Department will write to you within 20 business days to advise you of the outcome of your referral and whether or not formal assessment and approval under the EPBC Act is required. There are a number of possible decisions regarding your referral:

The proposed action is NOT LIKELY to have a significant impact and does NOT NEED approval

No further consideration is required under the environmental assessment provisions of the EPBC Act and the action can proceed (subject to any other Commonwealth, state or local government requirements).

The proposed action is NOT LIKELY to have a significant impact IF undertaken in a particular manner

The action can proceed if undertaken in a particular manner (subject to any other Commonwealth, state or local government requirements). The particular manner in which you must carry out the action will be identified as part of the final decision. You must report your compliance with the particular manner to the Department.

The proposed action is LIKELY to have a significant impact and does NEED approval

If the action is likely to have a significant impact a decision will be made that it is a *controlled action*. The particular matters upon which the action may have a significant impact (such as World Heritage values or threatened species) are known as the *controlling provisions*.

The controlled action is subject to a public assessment process before a final decision can be made about whether to approve it. The assessment approach will usually be decided at the same time as the controlled action decision. (Further information about the levels of assessment and basis for deciding the approach are available on the Department's web site.)

The proposed action would have UNACCEPTABLE impacts and CANNOT proceed

The Minister may decide, on the basis of the information in the referral, that a referred action would have clearly unacceptable impacts on a protected matter and cannot proceed.

Compliance audits

If a decision is made to approve a project, the Department may audit it at any time to ensure that it is completed in accordance with the approval decision or the information provided in the referral. If the project changes, such that the likelihood of significant impacts could vary, you should write to the Department to advise of the changes. If your project is in the Great Barrier Reef Marine Park and a decision is made to approve it, the Authority may also audit it. (See "*Is your action in the Great Barrier Reef Marine Park,"* p.2, for more details).

For more information

- call the Department of the Environment Community Information Unit on 1800 803 772 or
- visit the web site http://www.environment.gov.au/topics/about-us/legislation/environment-protection-and-biodiversity-conservation-act-1999

All the information you need to make a referral, including documents referenced in this form, can be accessed from the above web site.

Referral of proposed action

Project title: Collie Motorplex Drag Strip

1 Summary of proposed action

NOTE: You must also attach a map/plan(s) and associated geographic information system (GIS) vector (shapefile) dataset showing the location and approximate boundaries of the area in which the project is to occur. Maps in A4 size are preferred. You must also attach a map(s)/plan(s) showing the location and boundaries of the project area in respect to any features identified in 3.1 & 3.2, as well as the extent of any freehold, leasehold or other tenure identified in 3.3(i).

1.1 **Short description**

Use 2 or 3 sentences to uniquely identify the proposed action and its location.

Motoring South West (the proponent) proposes to construct a drag strip at the Collie Motorplex Site. The Motorplex land is currently leased to "Motoring South West Incorporated" by the Department of Parks and Wildlife (DPaW). The lease area is located on Forest Lease No. 2071/97 Part of State Forest No.4 and comprises 349 hectares (ha).

Funds have been allocated to this project by the Department of Regional Development and the Department of Sport and Recreation. The Shire of Collie as the project funding recipient is the project manager acting on behalf of Motoring South West.

Of the 349 ha of leased land, an area of 42.7 ha (the site) has been identified for the proposed drag strip (Figure 1). A portion of the site is already cleared (6.1 ha) and 14.89 ha of vegetation is proposed to be cleared to construct the proposed drag strip.

1.2 **Latitude and longitude**

Latitude and longitude details are used to accurately map the boundary of the proposed action. If these coordinates are inaccurate or insufficient it may delay the processing of your referral.

	Latitude			Longitude		
Location Point	Degrees	Minutes	seconds	Degrees	Minutes	seconds
A	33	26	10.98	116	15	0.23
B	33	26	4.74	116	15	16.94
C	33	26	39.91	116	15	25.73
D	33	26	40.14	116	15	11.00

Coordinates are shown on Figure 2 and a GIS compliant file is attached.

The Interactive Mapping Tool may provide assistance in determining the coordinates for your project area.

If the area is less than 5 hectares, provide the location as a single pair of latitude and longitude references. If the area is greater than 5 hectares, provide bounding location points.

There should be no more than 50 sets of bounding location coordinate points per proposal area.

Bounding location coordinate points should be provided sequentially in either a clockwise or anticlockwise direction.

If the proposed action is linear (eg. a road or pipeline), provide coordinates for each turning point.

Also attach the associated GIS-compliant file that delineates the proposed referral area. If the area is less than 5 hectares, please provide the location as a point layer. If greater than 5 hectares, please provide a polygon layer. If the proposed action is linear (eg. a road or pipline) please provide a polyline layer (refer to GIS data supply guidelines at Attachment A).

Do not use AMG coordinates.

1.3 **Locality and property description**

Provide a brief physical description of the property on which the proposed action will take place and the project location (eg. proximity to major towns, or for off-shore projects, shortest distance to mainland).

The site is situated in State Forest Number 4 (Collie State Forest), approximately 300 metres (m) south-east of the Collie Motorplex in Cardiff and 12 kilometres (km) south-east of the Collie town site (Figure 1).

The site encompasses an area of 42.7 ha, of which 6.1 ha is cleared (road and verges) and the remaining 36.6 ha comprises native vegetation. The proponent is proposing to clear up to 14.89 ha of vegetation within the site during construction of the drag strip. A summary of the proposal is provided below.

Aspect	Proposal Characteristic
Description	The development includes the installation of a 1/8th mile drag strip, traffic-specific items i.e. arrestor bed, return road and also for access and facilities for parking and spectators, ticketing, storage and security facilities etc.
Site Area	42.7 ha
Maximum area of construction	14.89 ha
Native vegetation to be cleared	Up to 14.89 ha of open forest of Jarrah and Marri with other subdominant species of native vegetation within understorey.

1.4 **Size of the development footprint or work area (hectares)**

Site area – 42.7 ha

Development / construction footprint - 14.89 ha

1.5 **Street address of the site**

Collie State Forest, Neath Road, Cardiff WA 6225

1.6 **Lot description**

Describe the lot numbers and title description, if known.

NA

1.7 **Local Government Area and Council contact (if known)**

If the project is subject to local government planning approval, provide the name of the relevant council contact officer.

Geoff Klem – Project Manager Supertowns, Shire of Collie

1.8 **Time frame**

Specify the time frame in which the action will be taken including the estimated start date of construction/operation.

Construction will commence in 2015 / 2016.

1.9	**Alternatives to proposed action** Were any feasible alternatives to taking the proposed action (including not taking the action) considered but are not proposed?	X	No
			Yes, you must also complete section 2.2
1.10	**Alternative time frames etc** Does the proposed action include alternative time frames, locations or activities?	X	No
			Yes, you must also complete Section 2.3. For each alternative, location, time frame, or activity identified, you must also complete details in Sections 1.2-1.9, 2.4-2.7 and 3.3 (where relevant).
1.11	**State assessment** Is the action subject to a state or territory environmental impact assessment?	X	No
			Yes, you must also complete Section 2.5

1.12	**Component of larger action** Is the proposed action a component of a larger action?	X 	No Yes, you must also complete Section 2.7
1.13	**Related actions / proposals** Is the proposed action related to other actions or proposals in the region (if known)?	X 	No Yes, provide details:
1.14	**Australian Government funding** Has the person proposing to take the action received any Australian Government grant funding to undertake this project?	X 	No Yes, provide details:
1.15	**Great Barrier Reef Marine Park** Is the proposed action inside the Great Barrier Reef Marine Park?	X 	No Yes, you must also complete Section 3.1 (h), 3.2 (e)

2 Detailed description of proposed action

NOTE: It is important that the description is complete and includes all components and activities associated with the action. If certain related components are not intended to be included within the scope of the referral, this should be clearly explained in section 2.7.

2.1 Description of proposed action

This should be a detailed description outlining all activities and aspects of the proposed action and should reference figures and/or attachments, as appropriate.

The proposed development site comprises 42.7 ha, of which 14.89 ha of remnant vegetation is proposed to be cleared. The remainder of the site's remnant vegetation will be retained.

The proposed location of the drag strip was selected due to the presence of an abandoned haul road which was identified as an ideal location for the development of a drag strip. The proposal is to upgrade the pavement itself to comply with ANDRA requirements for a 1/8th mile drag strip. Supporting infrastructure will also be provided, including:

- Concrete safety barriers
- A sealed turn-around area
- An arrestor bed
- A return road
- Pit area (sealed and overflow)
- Scrutineering and weighbridge facilities
- Marshalling and safety facilities
- Spectator facilities
- Corporate / Media facilities
- Storage facilities for track equipment

2.2 Alternatives to taking the proposed action

This should be a detailed description outlining any feasible alternatives to taking the proposed action (including not taking the action) that were considered but are not proposed (note, this is distinct from any proposed alternatives relating to location, time frames, or activities – see section 2.3).

NA

2.3 Alternative locations, time frames or activities that form part of the referred action

If you have identified that the proposed action includes alternative time frames, locations or activities (in section 1.10) you must complete this section. Describe any alternatives related to the physical location of the action, time frames within which the action is to be taken and alternative methods or activities for undertaking the action. For each alternative location, time frame or activity identified, you must also complete (where relevant) the details in sections 1.2-1.9, 2.4-2.7, 3.3 and 4. Please note, if the action that you propose to take is determined to be a controlled action, any alternative locations, time frames or activities that are identified here may be subject to environmental assessment and a decision on whether to approve the alternative.

NA

2.4 Context, planning framework and state/local government requirements

Explain the context in which the action is proposed, including any relevant planning framework at the state and/or local government level (e.g. within scope of a management plan, planning initiative or policy framework). Describe any Commonwealth or state legislation or policies under which approvals are required or will be considered against.

The Collie Motorplex proposed expansion site is leased by Motoring South West Incorporated. According to the Shire of Collie Town Planning Scheme 5, the site is currently zoned as 'Park and Recreation'.

In 2011, the Motorplex Business Plan identified the need to substantially expand and update the Motorplex. Town Planning Management and Engineering (TME) was commissioned to prepare the associated Motorplex Master Plan. The Motorplex Master Plan was adopted as the basis of future complex development (Figure 3)

2.5 Environmental impact assessments under Commonwealth, state or territory legislation

If you have identified that the proposed action will be or has been subject to a state or territory environmental impact statement (in section 1.11) you must complete this section. Describe any environmental assessment of the relevant impacts of the project that has been, is being, or will be carried out under state or territory legislation. Specify the type and nature of the assessment, the relevant legislation and the current status of any assessments or approvals. Where possible, provide contact details for the state/territory assessment contact officer.

Describe or summarise any public consultation undertaken, or to be undertaken, during the assessment. Attach copies of relevant assessment documentation and outcomes of public consultations (if available).

No Environmental Impact Assessments under Commonwealth or State legislation have been undertaken. To support this EPBC referral and state clearing permits, the following environmental investigations have been undertaken for the proposed Collie Motorplex development:

- Fauna Assessment (Harewood 2013).
- Level 2 Flora and Vegetation Survey (Ecoedge 2013).

2.6 Public consultation (including with Indigenous stakeholders)

Your referral must include a description of any public consultation that has been, or is being, undertaken. Where Indigenous stakeholders are likely to be affected by your proposed action, your referral should describe any consultations undertaken with Indigenous stakeholders. Identify the relevant stakeholders and the status of consultations at the time of the referral. Where appropriate include copies of documents recording the outcomes of any consultations.

TME attended several workshops with stakeholders (e.g. motoring clubs, training providers, track operators) in 2009 / 2010 during the development phase of the Motorplex Master Plan.

RPS (Glenn Yeatman) and Shire of Collie (Geoff Klem) have also undertaken a meeting and liaison with the State Department of Environment Regulation regarding vegetation clearing on the site. Based on this consultation, a clearing permit will be submitted to obtain approval to clear vegetation on the site.

2.7 A staged development or component of a larger project

If you have identified that the proposed action is a component of a larger action (in section 1.12) you must complete this section. Provide information about the larger action and details of any interdependency between the stages/components and the larger action. You may also provide justification as to why you believe it is reasonable for the referred action to be considered separately from the larger proposal (eg. the referred action is 'stand-alone' and viable in its own right, there are separate responsibilities for component actions or approvals have been split in a similar way at the state or local government levels).

NA

3 Description of environment & likely impacts

3.1 Matters of national environmental significance

Describe the affected area and the likely impacts of the proposal, emphasising the relevant matters protected by the EPBC Act. Refer to relevant maps as appropriate. The interactive map tool can help determine whether matters of national environmental significance or other matters protected by the EPBC Act are likely to occur in your area of interest.

Your assessment of likely impacts should refer to the following resources (available from the Department's web site):

- specific values of individual World Heritage properties and National Heritage places and the ecological character of Ramsar wetlands;
- profiles of relevant species/communities (where available), that will assist in the identification of whether there is likely to be a significant impact on them if the proposal proceeds;
- *Significant Impact Guidelines 1.1 – Matters of National Environmental Significance*; and
- associated sectoral and species policy statements available on the web site, as relevant.

Your assessment of likely impacts should consider whether a bioregional plan is relevant to your proposal. The Minister has prepared four marine bioregional plans (MBP) in accordance with section 176. It is likely that the MBP's will be more commonly relevant where listed threatened species, listed migratory species or a Commonwealth marine area is considered.

Note that even if your proposal will not be taken in a World Heritage area, Ramsar wetland, Commonwealth marine area, the Great Barrier Reef Marine Park or on Commonwealth land, it could still impact upon these areas (for example, through downstream impacts). Consideration of likely impacts should include both direct and indirect impacts.

3.1 (a) World Heritage Properties

Description

NA

Nature and extent of likely impact

Address any impacts on the World Heritage values of any World Heritage property.

NA

3.1 (b) National Heritage Places

Description

NA

Nature and extent of likely impact

Address any impacts on the National Heritage values of any National Heritage place.

NA

3.1 (c) Wetlands of International Importance (declared Ramsar wetlands)

Description

NA

Nature and extent of likely impact

Address any impacts on the ecological character of any Ramsar wetlands.

NA

3.1 (d) Listed threatened species and ecological communities

Description

A search was undertaken of the Department of the Environment's (DoE) Protected Matters Search Tool on 12 February 2015 (Appendix 1). No Threatened Ecological Communities (TEC) were identified on, or within vicinity of the site. However the species outlined in Table 1 were identified as potentially occurring in the area.

Table 1: EPBC Act Listed Threatened Species

Species	Common Name	Status	Habitat / Presence
Birds			
Calyptorhynchus banksii naso	Forest Red-tailed Black-Cockatoo	Vulnerable	Species or species habitat may occur within area
Calyptorhynchus baudinii	Baudin's Black-Cockatoo	Vulnerable	Breeding known to occur within area
Calyptorhynchus latirostris	Carnaby's Black-Cockatoo	Endangered	Breeding likely to occur within area
Leipoa ocellata	Malleefowl	Vulnerable	Species or species habitat may occur within area
Mammals			
Dasyurus geoffroii	Chuditch	Vulnerable	Species or species habitat likely to occur within area
Myrmecobius fasciatus	Numbat	Vulnerable	Species or species habitat likely to occur within area
Pseudocheirus occidentalis	Western Ringtail Possum	Vulnerable	Species or species habitat may occur within area
Setonix brachyurus	Quokka	Vulnerable	Species or species habitat may occur within area
Plants			
Diuris micrantha	Dwarf Bee-orchid	Vulnerable	Species or species habitat likely to occur within area
Jacksonia velveta	Collie Jacksonia	Endangered	Species or species habitat likely to occur within area
Rulingia sp Trigwell Bridge	Trigwells Rulingia	Endangered	Species or species habitat may occur within area
Caladenia lodgeana	Lodge's Spider-orchid	Critically Endangered	Species or species habitat known to occur within area

Nature and extent of likely impact

Address any impacts on the members of any listened threatened species (except a conservation dependent species) or any threatened ecological community, or their habitat.

Nature and extent of likely impact

Address any impacts on the members of any listened threatened species (except a conservation dependent species) or any threatened ecological community, or their habitat.

A Fauna Assessment was undertaken by G. Harewood in 2013 (Appendix 2). Based on this assessment, the likelihood of those species detailed in Table 1 occurring on the site is provided in Table 2. Based on the Fauna Assessment, the only species that may potentially occur on the site are listed below.

- *Calyptorhynchus banksii naso* (Forest Red-tailed Black Cockatoo)
- *Calyptorhynchus baudinii* (Baudin's Black Cockatoo)
- *Calyptorhynchus latirostris* (Carnaby's Black Cockatoo)
- *Pseudocheirus occidentalis* (Western Ringtail Possum)
- *Dasyurus geoffroii* (Chuditch)

Table 2: EPBC Act -listed threatened species likelihood of occurrence

Species	Habitat Description and Distribution (fauna) / Species Description (flora)	Likelihood of Occurrence	Likelihood Justification
BIRDS			
Calyptorhynchus banksii naso (Forest Red-tailed Black-Cockatoo)	Eucalypt forests. Feeds on seeding *Corymbia calophylla* (Marri), *Eucalyptus marginata* (Jarrah), *Eucalyptus todtiana* (Blackbutt), *Eucalyptus diversicolor* (Karri), *Allocasuarina fraseriana* (Sheoak) and *Persoonia micranthera* (Snottygobble) (Johnstone & Storr, 1998).	High	Individuals were heard calling during the survey and foraging evidence was observed.

	This subspecies occurs in the humid and subhumid south west, mainly in hilly interior, north to Gingin (formerly to Dandaragan) and east to Mt Helena (formerly to Toodyay), Christmas Tree Well, North Bannister (formerly to Wandering), Mt Saddleback (formerly to Kojonup), Rocky Gully and the upper King River. It is endemic to Western Australia (Johnstone & Storr, 1998).		Almost all of the vegetation present represents foraging or potential breeding habitat for this species.
*Calyptorhynchus baudinii (*Baudin's Black Cockatoo)	Baudin's Black-Cockatoo occurs in forests dominated by Marri (*Corymbia calophylla*) and *Eucalyptus* species, especially Karri (*E. diversicolor*) and Jarrah (*E. marginata*). However, it also occurs in woodlands of Wandoo (*E. wandoo*), Blackbutt (*E. patens*), Flooded Gum (*E. rudis*), Yate (*E. cornuta*) (DSEWPC 2012a) Confined to the south-west of Western Australia, north to Gidgegannup, east to Mt Helena, Wandering, Quindanning, Kojonup, Frankland and King River and west to the eastern strip of the Swan Coastal Plain including West Midland, Byford, Nth Dandalup, Yarloop, Wokalup and Bunbury (Johnstone and Storr 1998). On the southern Swan Coastal Plain this cockatoo is in some areas resident but mainly a migrant moving from the deep south-west to the central and northern Darling Range.	High	Individuals observed flying overhead during survey. Vegetation present on site represents potential foraging or breeding habitat for this species.
Calyptorhynchus latirostris (Carnaby's Black-Cockatoo, Short-billed Black-Cockatoo)	Woodlands and scrubs of semi-arid interior of Western Australia, in non-breeding season wandering in flocks to coastal areas, especially pine plantations. Food includes seeds of Banksia species, Dryandra species, Hakea species, Eucalyptus species, Grevillea species and Pinus species; also fruiting almonds (Johnstone & Storr 1998). Occurs in south-west north to lower Murchison and east to Nabawa, Wilroy, Waddi Forest, Manmanning, Durokoppin, Lake Cronin and just east of Condingup. Endemic to Western Australia (Johnstone & Storr 1998).	High	The site contains potential foraging habitat and potential foraging evidence of Carnaby's Black Cockatoo was observed on site during the Fauna Assessment. The potential for this species to breed on the site is low.
*Leipoa ocellata (*Malleefowl)	Malleefowl are known to occur in shrublands and low woodlands that are dominated by mallee vegetation and eucalypt or native pine vegetation such as *Callitris* woodlands, acacia shrublands, Broombush *Melaleuca uncinata* vegetation or coastal heathlands (DSEWPC 2012b). Current distribution mainly southern arid and semi-arid zones, north to Shark Bay, Jingemarra, Colga Downs and Yeelirrie, east to Earnest Giles Range, Yeo Lake, lower Ponton Creek and to Eucla and west and south to Cockleshell Gully, the Wongan Hills, Stirling Range, Beaufort Inlet, Hatters Hill, Mt Ragged and Point Malcolm (Johnstone and Storr 1998).	Unlikely	Species is locally extinct and there is no habitat present on site.
Mammals			
Dasyurus geoffroii (Chuditch, Western Quoll)	Chuditch are known to have occupied a wide range of habitats from woodlands, dry sclerophyll (leafy) forests, riparian vegetation, beaches and deserts (DEC 2009). The Chuditch now has a patchy distribution through the *Eucalyptus marginata* (Jarrah) forest and mixed *Eucalyptus diversicolor* (Karri)/*Corymbia calophylla* (Marri)/Jarrah forest of south-west Western Australia. In Jarrah forest, Chuditch populations occur in both moist, densely vegetated, steeply sloping forest and drier, open, gently sloping forest (DSEWPC 2012e)	Possible	No evidence of this species was identified on site during the site surveys. However, it is known to occur in state forest and national park areas around Collie and therefore may occasionally utilise the site.
Myrmecobius fasciatus	This species is restricted to remnant forests of Wandoo, Powderbark Wandoo or jarrah in the south west of WA. Habitat is generally dominated by eucalypts which provide hollow logs and branches for shelter and food.	Unlikely	Evidence suggests that this species is locally and regionally extinct.

	The distribution of the species has contracted to two remnant native populations at Dryandra and Perup. There are several reintroduced populations including Boyagin Nature Reserve, Tutanning Nature Reserve, Batalling block and Karroun Hill Nature Reserve (Friend & Thomas 1995).		No evidence of this species was identified on site
Pseudocheirus occidentalis (Western Ringtail Possum)	The Western Ringtail Possum occurs most commonly in coastal or near coastal forest that includes Peppermint Tree (*Agonis flexuosa*) as a major component. Most known populations (natural and translocated) are now restricted to near coastal areas of the south west from the Dawesville area to the Waychinicup National Park. Inland, it is also known to be relatively common in a small part of the lower Collie River valley, the Perup Nature Reserve and surrounding forest blocks near Manjimup.	Unlikely	Site surveys found no evidence of Western Ringtail Possums within the site and vegetation present on site is either unsuitable or marginal habitat for the species.
Setonix brachyurus (Quokka)	The distribution of the Quokka includes Rottnest and Bald Islands, and at least 25 known sites on the mainland, including Two Peoples Bay Nature Reserve, Torndirrup National Park, Mt Manypeaks National Park, Walpole-Nornalup National Park, and various swamp areas through the south-west forests from Jarrahdale to Walpole. One population, north of the Collie River, is considered to be the largest in the northern jarrah forest. Mainland populations of this species are currently restricted to densely vegetated coastal heaths, swamps, riverine habitats including tea-tree thickets on sandy soils along creek systems	Unlikely	There is no suitable habitat for this species present on site and no evidence of this species was identified during surveys
Plants			
Caladenia lodgeana Lodge's Spider-orchid	The species inhabits areas of seasonally moist to wet clay soil on the margins of low granite outcrops and moist podzolic sand amongst laterite on the margins of ephemeral wetlands. Lodge's spider-orchid is endemic to Western Australia with populations near Augusta and south-east of Collie.	Unlikely	Not identified on site during level 2 surveys
Diuris micrantha Dwarf Bee-orchid	This species is found in small populations, on dark, grey to blackish, sandy clay-loam substrates in winter wet depressions or swamps. The bases of the flowering plants are often covered with shallow water. This species occurs within the South West and South Coast (Western Australia) Natural Resource Management Regions, from east of Kwinana and south towards the Frankland area.	Unlikely	Not identified on site during level 2 surveys
Jacksonia velveta Collie Jacksonia	The species occurs on brown gravelly loam, dry grey sand, ironstone on slight hill slopes, ridges. The species occurs in the Jarrah Forests and wheatbelt regions near Collie, West Arthur and Woodanilling.	Unlikely	Not identified on site during level 2 surveys
*Commersonia erythrogyna C.*F.Wilkins (previously known as *Rulingia sp Trigwell Bridge)* Trigwells Rulingia	The species is known from a single wild population in the West Arthur area over a range of less than 1 km, new translocated populations are being established near this population. In its natural state the species is found on a lateritic ridge supporting open low jarrah (*Eucalyptus marginata*) and marri (*Corymbia calophylla*) woodland, growing in small fissures in the rock. It is not known whether this is the species' preferred habitat or if these plants have survived because they were less accessible to grazing animals. Soils at translocation sites differ in being laterite rich rather than an exposed laterite ridge.	Unlikely	Not identified on site during level 2 surveys. Outside the expected range of this species and the translocated population not within this site.

Black Cockatoos

The black cockatoo habitat assessment undertaken by Greg Harewood (2013) included the following:

- Habitat tree survey: identification of all suitable trees species within the study area that have a Diameter at Breast Height (DBH) of over 50cm.

- Black cockatoo foraging assessment: The location and nature of black cockatoo foraging evidence (e.g. chewed fruits around base of trees) observed during the field survey was recorded.

- Roosting habitat survey: Direct and indirect evidence of black cockatoos roosting within trees on site was noted if observed (e.g. branch clippings, droppings or moulted feathers).

At this point in the design phase, it is not possible to determine the exact number of potential habitat trees or area of foraging habitat which will be cleared. Therefore, the site has been separated into zones as shown in Figure 4 and as discussed below (Table 3). These zones address the worst case scenario and it is anticipated that clearing at the site based on final designs will be less extensive.

Table 3: Development Zones

Zone	Approximate percentage of habitat estimated to be lost	Explanation of zones
Minimal loss of existing habitat	<5%	This zone should essentially remain undisturbed. There will be pedestrian access links which will meander through the existing vegetation, and there will be limited disturbance to Vegetation. There may also be some requirement to provide bioretention facilities to treat stormwater runoff prior to entering into the creeks. However, detailed designs will ensure minimal disturbance to the significant habitat trees where possible.
Some loss of existing habitat	50%	This zone will only need to be partially cleared. Vegetation to eb cleared will be determined based on more detailed project designs. It is proposed that the final design avoid more significant habitat (e.g. trees with hollows) where possible. In the case of the track periphery, the area will need to accommodate batters, construction working space and stormwater infrastructure etc. As mentioned above, it will be possible to design around specific trees at the detailed design stage. One third of the larger spectator carpark area will be comprised of a hard stand area (total loss of habitat). However, the majority (approximately two thirds) will comprise overflow parking. This overflow area will only involve clearing some of the existing vegetation, with significant habitat protected where possible. It will essentially be created by parkland clearing around existing habitat trees.
Total loss of existing habitat	100%	This zone is likely to be completely cleared for the construction of pit areas, spectator parking and track support facilities.

A total of 559 potential habitat trees (trees with a DBH of >50 cms) were identified within the site (Figure 4). The vast majority of these trees consisted of Jarrah (474), with the remaining trees comprising Marri (78) and unknown species (7). Potential impacts to these habitat trees based on the zones discussed above (Table 3) are summarised below (Table 4):

- It is estimated that a total of 255 potential habitat trees will be impacted from the proposal as outlined below:
    - 218 Marri trees will potentially be cleared.
    - 33 Jarrah trees will potentially be cleared.
    - 4 trees of unknown species which may provide habitat will potentially be cleared.

Vegetation within the site is dominated by healthy stands of Marri and Jarrah – both of these are important food sources for black cockatoos. Foraging evidence by black cockatoos (e.g. chewed jarrah and marri fruits) was found at several locations across the site. This foraging evidence was attributed to the Forest red-tailed black cockatoo, though it is possible that some of the chewed jarrah fruits were the result of foraging by Carnaby's black-cockatoo. Several Forest red-tailed black cockatoo individuals were also heard calling during the survey period.

Almost all of the remnant native vegetation within the site (~36.6 ha) can be regarded as representative of foraging habitat for black cockatoos due to the dominance of jarrah and to a lesser extent marri along with other subdominant species such as Banksia and Allocasuarina. Therefore, in addition to the potential habitat trees that may be impacted, the zones discussed in Table 3 have also been used to estimate that 14.89 ha of potential foraging habitat may be impacted.

It should be noted that this impact assessment presents the worst case scenario regarding impacts to potential black cockatoo habitat and these impacts are likely to be reduced at the detailed planning stages.

Table 4: Potential Impacts to Potential Habitat Trees Based on Approximate Development Zones

Tree Species	Potential Habitat Type (DEC 2011)	Trees with No Hollows Observed	Number of Trees within site	Number of Trees within Zones			Number of trees estimated to be impacted within each zone		
				Minimal loss of existing trees	Some loss of existing trees	total loss of existing trees	Minimal loss of existing trees	Some loss of existing trees	total loss of existing trees
Jarrah	Medium priority feeding and roosting	no hollows observed	244	118	53	73	6	27	73
		Small hollows (<12cm entrance)	187	76	39	72	4	20	72
		Large hollows (>12cm entrance)	43	25	8	10	2	4	10
Sub Total			474	219	100	155	12	51	155
Marri	High priority feeding, roosting and breeding	no hollows observed	39	20	6	13	1	3	13
		Small hollows (<12cm entrance)	25	15	7	3	1	4	3
		Large hollows (>12cm entrance)	14	5	5	4	1	3	4
Sub Total			78	40	18	20	3	10	20
Unknown	Unknown (assume to be high priority feeding, roosting and breeding)	no hollows observed	1	1	0	0	1	0	0
		Small hollows (<12cm entrance)	3	3	0	0	1	0	0
		Large hollows (>12cm entrance)	3	2	0	1	1	0	1
Sub Total			7	6	0	1	3	0	1
Total Number of trees			**559**	**265**	**118**	**176**	**18**	**61**	**176**

Further detail on the fauna habitat assessment is provided within the Fauna Assessment of Collie Motorplex Proposed Clearing Areas Cardiff (Harewood 2013) in Appendix 2.

Chuditch

Although this species was not identified on site during surveys, it has been identified in surveys undertaken within vicinity of the site, and therefore may occasionally utilise the site. Based on the impact zones discussed in Table 3, it is estimated that 19.64 ha of vegetation which may provide potential habitat for the Chuditch may be impacted by the proposal.

Western Ring tail Possum

The fauna survey undertaken identified that it was possible for the Western Ringtail Possum to occur within the site however no evidence of the Western Ringtail Possum was identified on site. As both the fauna and flora and vegetation surveys undertaken at the site identified that vegetation present on site does not provide suitable habitat for this species, it is unlikely that this species or any habitat significant to this species will be impacted by the proposal.

3.1 (e) Listed migratory species

Description

The EPBC Act Protected Matters Search Tool (Appendix 1) identified five migratory species potentially occurring on the site (Table 5).

Table 5: EPBC Act -listed migratory species

Species	Species name	Type of Presence
MIGRATORY MARINE BIRDS		
Fork-tailed Swift	*Apus pacificus*	Species or species habitat likely to occur within area
MIGRATORY TERRESTRIAL SPECIES		
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	Species or species habitat may occur within area
Rainbow Bee-eater	*Merops ornatus*	Species or species habitat may occur within area
MIGRATORY WETLAND SPECIES		
Great Egret, White Egret	*Ardea alba*	Breeding known to occur within area
Cattle Egret	*Ardea ibis*	Species or species habitat likely to occur within area

Nature and extent of likely impact

Address any impacts on the members of any listed migratory species, or their habitat.

During the Fauna Assessment (Harewood 2013), no species protected under international agreements were identified on site and it is unlikely that there would be any significant impacts to any migratory species based on the proposed action (Table 6).

Table 6: EPBC Act -listed migratory species – Likelihood of presence

Species	Habitat	Likelihood of Presence
Fork-tailed Swift *Apus pacificus*	Fork-tailed Swifts are vagrant, aerial species that migrate to Australia in winter months (BirdForum 2010). The species breeds in the Himalayas, Siberia and Japan (BirdForum 2010). Preferred habitats include mountains and human habitations, usually near water (BirdForum 2010).	This species was not identified on the site during surveys. This species may occur in the area, however is unlikely to roost.
White-bellied Sea-Eagle *Haliaeetus leucogaster*	This species is normally seen perched high in a tree, or soaring over waterways and adjacent land. Birds form permanent pairs that inhabit territories throughout the year (Australian Museum 2007). The White-bellied Sea-Eagle feeds mainly off aquatic animals, such as fish, turtles and sea snakes, but it takes birds and mammals as well (Australian Museum 2007).	This species was not identified on the site during surveys and there is no suitable habitat present on the site.
Rainbow Bee-eater *Merops ornatus*	The Rainbow Bee-eater is most often found in open forests, woodlands and shrublands, and cleared areas, usually near water (Australian Museum 2007). It can be found on farmland with remnant vegetation and in orchards and vineyards (Australian Museum 2007). It will use disturbed sites such as quarries, cuttings and mines to build its nesting tunnels (Australian Museum 2007).	This species was not identified on the site during surveys. However there is potential habitat present on the site and therefore this species may occasionally utilise the site
Great Egret, White Egret *Ardea alba*	Prefer shallow water, particularly when foraging, but may be seen on any watered area, including damp grasslands (Australian Museum 2007). The Great Egret usually feeds on molluscs, amphibians, aquatic insects, small reptiles, crustaceans and occasionally other small animals, but fish make up the bulk of its diet (DEWHA 2010d).	This species was not identified on the site during surveys. Habitat is present on site, however this has been identified as very marginal. Consequently it is possible that this species may occasionally utilise the site
Cattle Egret *Ardea ibis*	Found in grasslands, woodlands and wetlands, and is not common in arid areas (Australian Museum 2007). It also uses pastures and croplands, especially where drainage is poor (Australian Museum 2007). The Cattle Egret prefers grasshoppers, especially during breeding season, but eats many other invertebrates (DEWHA 2010e).	This species was not identified on the site during surveys. Habitat is present on site, however this has been identified as very marginal. Consequently it is possible

	Cattle Egret pairs are monogamous for the breeding season, and they breed in colonies, usually with other water birds. Their shallow platform nests are made in wetland areas in trees and bushes, usually as high as possible (DEWHA 2010e).	that this species may occasionally utilise the site

3.1 (f) Commonwealth marine area

(If the action is in the Commonwealth marine area, complete 3.2(c) instead. This section is for actions taken outside the Commonwealth marine area that may have impacts on that area.)

Description

NA

Nature and extent of likely impact

Address any impacts on any part of the environment in the Commonwealth marine area.

NA

3.1 (g) Commonwealth land

(If the action is on Commonwealth land, complete 3.2(d) instead. This section is for actions taken outside Commonwealth land that may have impacts on that land.)

Description

If the action will affect Commonwealth land also describe the more general environment. The Policy Statement titled *Significant Impact Guidelines 1.2 - Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies* provides further details on the type of information needed. If applicable, identify any potential impacts from actions taken outside the Australian jurisdiction on the environment in a Commonwealth Heritage Place overseas.

NA

Nature and extent of likely impact

Address any impacts on any part of the environment in the Commonwealth land. Your assessment of impacts should refer to the *Significant Impact Guidelines 1.2 - Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies* and specifically address impacts on:

- ecosystems and their constituent parts, including people and communities;
- natural and physical resources;
- the qualities and characteristics of locations, places and areas;
- the heritage values of places; and
- the social, economic and cultural aspects of the above things.

NA

3.1 (h) The Great Barrier Reef Marine Park

Description

NA

Nature and extent of likely impact

Address any impacts on any part of the environment of the Great Barrier Reef Marine Park.

Note: If your action occurs in the Great Barrier Reef Marine Park you may also require permission under the *Great Barrier Reef Marine Park Act 1975* (GBRMP Act). If so, section 37AB of the GBRMP Act provides that your referral under the EPBC Act is deemed to be an application under the GBRMP Act and Regulations for necessary permissions and a single integrated process will generally apply. Further information is available at www.gbrmpa.gov.au

NA

3.1 (i) A water resource, in relation to coal seam gas development and large coal mining development

Description

If the action is a coal seam gas development or large coal mining development that has, or is likely to have, a significant impact on water resources, the draft *Policy Statement Significant Impact Guidelines: Coal seam gas and large coal mining developments—Impacts on water resources* provides further details on the type of information needed.

NA

Nature and extent of likely impact

Address any impacts on water resources. Your assessment of impacts should refer to the draft *Significant Impact Guidelines: Coal seam gas and large coal mining developments—Impacts on water resources*.
NA

3.2 Nuclear actions, actions taken by the Commonwealth (or Commonwealth agency), actions taken in a Commonwealth marine area, actions taken on Commonwealth land, or actions taken in the Great Barrier Reef Marine Park

You must describe the nature and extent of likely impacts (both direct & indirect) on the whole environment if your project:

- is a nuclear action;
- will be taken by the Commonwealth or a Commonwealth agency;
- will be taken in a Commonwealth marine area;
- will be taken on Commonwealth land; or
- will be taken in the Great Barrier Reef marine Park.

Your assessment of impacts should refer to the *Significant Impact Guidelines 1.2 - Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies* and specifically address impacts on:

- ecosystems and their constituent parts, including people and communities;
- natural and physical resources;
- the qualities and characteristics of locations, places and areas;
- the heritage values of places; and
- the social, economic and cultural aspects of the above things.

3.2 (a)	**Is the proposed action a nuclear action?**	X	No
			Yes (provide details below)
	If yes, nature & extent of likely impact on the whole environment		

3.2 (b)	**Is the proposed action to be taken by the Commonwealth or a Commonwealth agency?**	X	No
			Yes (provide details below)
	If yes, nature & extent of likely impact on the whole environment		

3.2 (c)	**Is the proposed action to be taken in a Commonwealth marine area?**	X	No
			Yes (provide details below)
	If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(f))		

3.2 (d)	**Is the proposed action to be taken on Commonwealth land?**	X	No
			Yes (provide details below)

If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(g))

3.2 (e)	**Is the proposed action to be taken in the Great Barrier Reef Marine Park?**	X	No
			Yes (provide details below)

If yes, nature & extent of likely impact on the whole environment (in addition to 3.1(h))

3.3 Other important features of the environment

Provide a description of the project area and the affected area, including information about the following features (where relevant to the project area and/or affected area, and to the extent not otherwise addressed above). If at Section 2.3 you identified any alternative locations, time frames or activities for your proposed action, you must complete each of the details below (where relevant) for each alternative identified.

3.3 (a) Flora and fauna

A Level 2 Flora and Vegetation assessment was undertaken for the site in spring 2013 by Ecoedge Environmental (Appendix 3). At that time, two locations were being considered for the proposed drag strip; "Area A" and "Area B". The Level 2 Flora and Vegetation Survey - Collie Motorplex, Collie (Ecoedge 2013) report includes an assessment across both of these areas.

Area B has since been selected as the preferred option for the drag strip site. The vegetation and flora information summarised below is specific (where possible) to Area B (referred to as "the site").

One hundred and eighty vascular flora species were identified across both Area A and Area B, of which 10 are naturalised or planted non-native species. The Fabaceae family was the most well represented with 26 species, followed by the Orchidaceae (17 species), Myrtaceae and Proteaceae (16 species each).

Species richness was low to average for 100m^2 quadrats in open forest in south-western Australia, with 34 taxa within the site (Quadrat COLL01).

No Declared Rare Flora, Priority Flora, Threatened species pursuant to the EPBC Act or other flora of conservation significance was found within the site.

Fauna

A Level 1 Fauna Survey including a Black Cockatoo Habitat Assessment was conducted by Greg Harewood in October 2013. At the time of this assessment, two locations were being considered for the drag strip site; "Area A" and "Area B". The fauna assessment and associated report; Fauna Assessment of Collie Motorplex Proposed Clearing Areas Cardiff (Harewood 2013) therefore includes an assessment across both of these areas.

As previously stated, Area B has since been selected as the preferred option within which the proposed clearing for the drag strip is proposed. The fauna information summarised below is therefore specific to Area B (where practicable).

The following broadly defined fauna habitats identified at the site based on the remaining vegetation units are as follows:

- Open-forest of jarrah-marri-sheoak with a range of understorey species.
- Plantation and rehabilitation areas - some sections of the site have been planted with non-endemic eucalypts and/or a range of shrubs.

- Existing cleared or partly cleared areas: some of which contain scattered trees and shrubs.

A total of 40 native fauna species were observed (or positively identified from foraging evidence, scats etc) across Area A and Area B during the survey period. Fauna species protected under the EPBC Act which were identified on the site are listed below:

- *Calyptorhynchus banksii naso (*Forest Red-tailed Black Cockatoo)
- *Calyptorhynchus baudinii (*Baudin`s Black Cockatoo)

Fauna species protected under the EPBC Act which were not identified on site but which are known to occur in the area and which may occasionally utilise the site includes the Chuditch and Western ringtail possum.

3.3 (b) Hydrology, including water flows

The proposal is located within the Upper Collie Surface and Groundwater Areas. The Upper Collie surface and groundwater area covers two proclaimed areas – the Collie groundwater area and part of the Collie irrigation district (Department of Water, 2007).

The Upper Collie surface water area covers the reaches of the Upper Collie catchment, above Wellington Reservoir, and encompasses over 2,800 km2 of land. The Collie River is the catchment's major river and it flows across the Swan Coastal Plain to discharge into the Leschenault Estuary, immediately north of Bunbury.

The Upper Collie groundwater area covers the groundwater of the Collie Coal Basin. This significant groundwater resource sits in the centre of the Upper Collie catchment. Groundwater from the Collie Basin discharges, at various points, into the Collie River and its tributaries (Department of Water, 2007). The hydrogeology of the Collie Coal Basin is complex with multiple aquifers separated by shale and coal seams with numerous faults throughout. The groundwater system is highly modified from both historic and existing mining operations by Griffin and others as well as abstraction for power station water supply.

3.3 (c) Soil and Vegetation characteristics

Geology and Soil

The site is situated on the Darling Plateau within the Western Darling Range Zone. The Western Darling Range Zone is a deeply dissected undulating lateritic plateau overlying crystalline rocks (e.g. granite and gneiss) (Ecoedge 2013).

Regional mapping indicates that the site consists of sandstone, carbonaceous shale, coal, pebble conglomerate; includes Ewington, Premier and Muja Coal Measures (Figure 5).

Vegetation

The vegetation complex mapped across the entire site is Collie (Cl) as detailed in Table 7 (Figure 6).

Table 7: Vegetation Complexes

Vegetation Complex	Soils	Soil Hydrology	Over Storey	Second Storey	Shrubs and Herbs
Collie (Cl)	Gravelly-sandy upland soils.	Shallow, upstream, minor valleys with sands and gravels	Open forest of Eucalyptus marginata subsp. marginata-Corymbia calophylla-Allocasuarina fraseriana	*Banksia grandis, Persoonia longifolia, Xylomelum occidentale*	*Acacia browniana, Banksia dallanneyi, Bossiaea ornata, Bossiaea eriocarpa, Hakea lissocarpha, Hakea ruscifolia, Hibbertia hypericoides, Macrozamia riedlei, Styphelia tenuiflora, Xanthorrhoea gracilis, Xanthorrhoea preissii*

Vegetation identified on the site during the Level 2 survey is discussed in Section 3.3(e).

3.3 (d) Outstanding natural features

None

3.3 (e) Remnant native vegetation

The Level 2 Flora and Vegetation Survey – Collie Motorplex, Collie (Ecoedge 2013) identified the following vegetation units within the site (Figure 7):

- Open Forest of Jarrah (*Eucalyptus marginata*) and *Allocasuarina fraseriana* with occasional Marri (*Corymbia calophylla*) over Low Open Woodland of *Banksia grandis* and *Persoonia longifolia* over Shrubland of *Xanthorrhoea preissii* over Low Shrubland of *Bossiaea ornata*, *Hakea ruscifolia*, *Hibbertia hypericoides*, *Styphelia tenuiflora* and *Xanthorrhoea gracilis* on shallow grey gravelly sand often with exposed laterite.

- Open Forest of Jarrah (*Eucalyptus marginata*) and *Allocasuarina fraseriana* with occasional Marri (*Corymbia calophylla*) over Very Low Open Woodland of *Persoonia longifolia* and *Xylomelum occidentale* over Shrubland/Low shrubland of *Acacia extensa, Bossiaea eriocarpa, B. ornata, Macrozamia riedlei, Xanthorrhoea preissii* and *X. gracilis* (with *Hypocalymma angustifolium* in damper areas) on grey-brown loamy sands

- Open forest of Jarrah (*Eucalyptus marginata*) and Marri (*Corymbia calophylla*) and sometimes *Allocasuarina fraseriana* over Shrubland/Low Shrubland of *Acacia browniana, Banksia dallanneyi, Bossiaea eriocarpa, B. ornata, Hakea lissocarpha, Hibbertia hypericoides* and *Xanthorrhoea gracilis* on gravelly grey-brown sandy loam (with exposed laterite) or grey-brown sandy loam

- Cleared vegetation

No threatened or priority ecological communities were identified or are known to occur within or in the vicinity of the site.

The majority of the site is in Good Condition (36.3 ha) and the remainder is cleared for existing roads and verges etc. (6.1 ha) (Figure 8).

3.3 (f) Gradient (or depth range if action is to be taken in a marine area)

NA

3.3 (g) Current state of the environment

Include information about the extent of erosion, whether the area is infested with weeds or feral animals and whether the area is covered by native vegetation or crops.

Vegetation condition was assessed as part of the Flora and Vegetation Survey (Ecoedge 2013) using the criteria outlined in Keighery (1994) and is classified as Very Good Condition (Figure 8).

Echium plantagineum (Patterson's Curse) was identified in the area during the flora survey. This species is a Declared Plant under the Agriculture and Related Resources Protection Act, 1976 (DAFWA 2011). It is classified as P1 ("Introduction of the plant into, or movement of the plant within, an area is prohibited") and P3 ("Plant to be controlled by reduction in number or distribution of the plant or both"). Management actions will be in place during clearing activities to prevent the further spread of this species.

3.3 (h) Commonwealth Heritage Places or other places recognised as having heritage values

NA

3.3 (i) Indigenous heritage values

A search of the Department of Aboriginal Affairs database was undertaken on 3 March 2015, with no 'Registered Aboriginal Heritage Site' or 'Other Heritage Place' identified within the site.

3.3 (j) Other important or unique values of the environment

Describe any other key features of the environment affected by, or in proximity to the proposed action (for example, any national parks, conservation reserves, wetlands of national significance etc).

There are no other important or unique environmental values on the site or in close vicinity to the site. However, there are a number of Reserves and National Parks within 10 km of the site as outlined in Table 8.

Table 8: Reserves within 10 km of the Proposed Action

Reserve	Reserve Area (ha)	Vegetation Complex within Reserves (ha)
		CI
State Forest	23327.33	6146.52
CALM Executive Body Freehold	36.66	0
Total	**23363.99**	**6146.52**

3.3 (k) Tenure of the action area (eg freehold, leasehold)

The proposed action is located within reserve.

3.3 (l) Existing land / marine uses of area

The site comprises mostly native vegetation (part of the Collie State Forest) with 6.1 ha cleared as part of the existing haulage road.

3.3 (m) Any proposed land / marine uses of area

The proposed land use for the site is for a drag strip forming part of the Collie Motorplex.

4 Measures to avoid or reduce impacts

Note: If you have identified alternatives in relation to location, time frames or activities for the proposed action at Section 2.3 you will need to complete this section in relation to each of the alternatives identified.

Provide a description of measures that will be implemented to avoid, reduce, manage or offset any relevant impacts of the action. Include, if appropriate, any relevant reports or technical advice relating to the feasibility and effectiveness of the proposed measures.

For any measures intended to avoid or mitigate significant impacts on matters protected under the EPBC Act, specify:
- what the measure is,
- how the measure is expected to be effective, and
- the time frame or workplan for the measure.

Examples of relevant measures to avoid or reduce impacts may include the timing of works, avoidance of important habitat, specific design measures, or adoption of specific work practices.

Provide information about the level of commitment by the person proposing to take the action to implement the proposed mitigation measures. For example, if the measures are preliminary suggestions only that have not been fully researched, or are dependent on a third party's agreement (e.g. council or landowner), you should state that, that is the case.

Note, the Australian Government Environment Minister may decide that a proposed action is not likely to have significant impacts on a protected matter, as long as the action is taken in a particular manner (section 77A of the EPBC Act). The particular manner of taking the action may avoid or reduce certain impacts, in such a way that those impacts will not be 'significant'. More detail is provided on the Department's web site.

For the Minister to make such a decision (under section 77A), the proposed measures to avoid or reduce impacts must:
- clearly form part of the referred action (eg be identified in the referral and fall within the responsibility of the person proposing to take the action),
- be must be clear, unambiguous, and provide certainty in relation to reducing or avoiding impacts on the matters protected, and
- must be realistic and practical in terms of reporting, auditing and enforcement.

More general commitments (eg preparation of management plans or monitoring) and measures aimed at providing environmental offsets, compensation or off-site benefits CANNOT be taken into account in making the initial decision about whether the proposal is likely to have a significant impact on a matter protected under the EPBC Act. (But those commitments may be relevant at the later assessment and approval stages, including the appropriate level of assessment, if your proposal proceeds to these stages).

Potential impacts to 14.89 ha of vegetation (40.7% of remnant vegetation on the site), including approximately 255 potential habitat trees may be unavoidable. However, as part of the detailed design process, potential impacts to vegetation on the site will be avoided where possible.

Further actions proposed to reduce impacts to significant fauna species due to the proposed action are summarised below:

- Any landscaping or plantings undertaken on the site will utilise local seed stock which includes black cockatoo foraging species (e.g. *Eucalyptus, Corymbia, Banksia, Hakea* etc.). The final selection of suitable species will be determined after liaison with suitable experts and regulatory agencies.

- During site works, construction areas will be clearly marked and all site personnel will be inducted regarding protection of fauna and fauna habitat on site.

- Any logs and hollows removed as part of clearing activities will be retained for use in rehabilitated areas or areas in which construction does not occur.

- During clearing operations a suitably experienced "fauna spotter" will be employed to inspect logs and hollow trees (where possible) before clearing to reduce likelihood of injury to fauna. Any fauna encountered will be relocated to retained suitable habitat on site.

- Any trenching required for services will be kept open for only as long as necessary and suitable escape ramps (45°) and bridging provided if the site is to be left unattended for extended periods (>1day). Significant sized trenches should be inspected for fauna immediately prior to filling.

- The proponent is also currently investigating vegetation rehabilitation options within degraded areas in the locality.

5 Conclusion on the likelihood of significant impacts

Identify whether or not you believe the action is a controlled action (ie. whether you think that significant impacts on the matters protected under Part 3 of the EPBC Act are likely) and the reasons why.

5.1 Do you THINK your proposed action is a controlled action?

	No, complete section 5.2
X	Yes, complete section 5.3

5.2 Proposed action IS NOT a controlled action.

Specify the key reasons why you think the proposed action is NOT LIKELY to have significant impacts on a matter protected under the EPBC Act.

5.3 Proposed action IS a controlled action

Type 'x' in the box for the matter(s) protected under the EPBC Act that you think are likely to be significantly impacted. (The 'sections' identified below are the relevant sections of the EPBC Act.)

	Matters likely to be impacted
	World Heritage values (sections 12 and 15A)
	National Heritage places (sections 15B and 15C)
	Wetlands of international importance (sections 16 and 17B)
x	Listed threatened species and communities (sections 18 and 18A)
	Listed migratory species (sections 20 and 20A)
	Protection of the environment from nuclear actions (sections 21 and 22A)
	Commonwealth marine environment (sections 23 and 24A)
	Great Barrier Reef Marine Park (sections 24B and 24C)
	A water resource, in relation to coal seam gas development and large coal mining development (sections 24D and 24E)
	Protection of the environment from actions involving Commonwealth land (sections 26 and 27A)
	Protection of the environment from Commonwealth actions (section 28)
	Commonwealth Heritage places overseas (sections 27B and 27C)

Specify the key reasons why you think the proposed action is likely to have a significant adverse impact on the matters identified above.

Potential impacts to matters of NES have been identified during the desktop assessment and field surveys. However, these impacts are unlikely to be significant when viewed in context of the local and regional environmental setting, and the matters of NES being avoided as a result of the preliminary design process (as summarised below).

A summary of the potential impacts is provided below and further detail, including an assessment of the significance of impacts in accordance with the DoE Significant Impact Guidelines 1.1, is provided in Table 9.

- Over 6000 ha of similar vegetation is protected in reserves within 10km of the site. Consequently, clearing 14.89 ha will only be impacting 0.25% of the potential habitat in the locality.

- only 14.89 ha (40.7%) of vegetation (providing potential habitat for black cockatoos and the Chuditch) within the site will be impacted
- it is estimated that 255 (45.6%) of the 559 trees present on site are likely to be impacted.

Table 9 Assessment Using Significant Impact Guidelines 1.1

Significant Impact Criterion	Comments			Meets Criterion
	Black Cockatoos	Western Ringtail Possums	Chuditch	
Lead to a long-term decrease in the size of an important population of a species	No roosting or nesting sites will be impacted by the proposed action. The site is unlikely to be specifically used to maintain a population of any of the black cockatoo species. Birds are likely to utilise the site opportunistically within their larger home range. It is not considered likely that clearing 0.25% of similar vegetation within a 10km radius will lead to a decrease in population size.	No evidence of WRP was identified and the vegetation appears largely unsuitable to marginal within the site for WRP to utilise.	No evidence of the species was found during surveys. Therefore, the site is unlikely to be specifically used to maintain a population of Chuditch. The species are likely to utilise the site opportunistically within their larger home range. It is not considered likely that the proposed action will lead to a decrease in population size.	No
Reduce the area of occupancy of an important population	The proposed action will involve clearing approximately 14.89ha of potential habitat. Considering the amount of similar habitat available to the black cockatoos within the area (over 6000 ha of similar vegetation within 10km of the proposed action), this is not considered likely to reduce the area of occupancy of this species especially considering their high mobility through the landscape.	As vegetation on site is either unsuitable or provides only marginal habitat for this species, it is unlikely that the proposed action will impact any habitat important for this species and therefore reduce the area of occupancy of any WRP population.	The proposed action will involve clearing approximately 14.89 ha of potential habitat. As no Chuditch were actually identified utilising this vegetation, this impact is considered low. Furthermore, considering the amount of similar habitat available in the area (over 6000 ha of similar vegetation within 10km of the proposed action), clearing vegetation for the proposed action is not considered likely to reduce the area of occupancy of this Species	No
Fragment an existing important population into two or more populations	Black cockatoos are mobile within the landscape and removing this small area will not impede their movements or fragment an existing	No evidence of a WRP population was identified and the vegetation appears largely unsuitable to marginal within the site for WRP to utilise.	No Chuditch were identified as using the site, therefore it is unlikely that the proposed action would cause the fragmentation of a population.	No

Significant Impact Criterion	Comments			Meets Criterion
	Black Cockatoos	**Western Ringtail Possums**	**Chuditch**	
	population.	Therefore clearing this vegetation will not cause the fragmentation of an existing population.	Furthermore, due to the large ranges (3 km2 – 15 km2) of the Chuditch, clearing vegetation for the proposed action is unlikely to limit the movements or fragment Chuditch populations in the area.	
Adversely affect habitat critical to the survival of a species	The proposed action will remove approximately 14.89 ha of foraging habitat. However, many similar areas of habitat exist adjoining the site and therefore this impact is considered low. No confirmed roosting or breeding trees exist on the site and the habitat on site is not considered critical to the species or populations survival.	The proposed action will not impact habitat critical to the WRP as the vegetation present on site provides only marginal habitat at best.	The proposed action will remove approximately 14.89 ha of potential habitat. However, as the surveys identified no evidence of the Chuditch utilising the site it is unlikely that the proposal will impact habitat critical to the survival of this species, especially as there is over 6,000 ha of similar habitat available in the vicinity.	No
Disrupt the breeding cycle of an important population	No confirmed breeding trees will be cleared as part of the proposed action and the project is unlikely to disrupt the breeding cycle of black cockatoos.	No evidence of the WRP or breeding sites was identified on site. The Fauna survey found the vegetation to be largely unsuitable for the species, therefore the proposed action is unlikely to disrupt the breeding cycle of the species.	No evidence of Chuditch activity was identified on site and the proposed action is unlikely to disrupt the breeding cycle of the species.	No
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The proposed action will involve clearing approximately 14.89ha of potential habitat and 255 potential breeding trees. Considering the amount of similar habitat available to black cockatoos within the area (over 6000 ha of similar vegetation within 10km of the proposed action), the proposed action will only involve clearing 0.25% of habitat present within the	The habitat on site is not considered suitable for WRP, therefore removal of this vegetation will not lead to a decline of the species.	No Chuditch were identified as using the site. The proposed action will remove approximately 14.89 ha of potential habitat (0.25% of that present within a 10km radius). Considering the large amount of habitat present in the area and the large home ranges of the Chuditch, removal of potential habitat for the proposal is unlikely to cause this species to decline.	No

Significant Impact Criterion	Comments			Meets Criterion
	Black Cockatoos	**Western Ringtail Possums**	**Chuditch**	
	locality. Therefore, due to the abundance of other resources in the area, the potential impacts from the proposal are unlikely to cause the species to decline.			
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The proposed action is for a Drag Racing facility and will therefore not involve the introduction of invasive species.	The proposed action is for a Drag Racing facility and will therefore not involve the introduction of invasive species.	The proposed action is for a Drag Racing facility and will therefore not involve the introduction of invasive species.	No
Introduce disease that may cause the species to decline	The proposed action is for a Drag Racing facility and introduction of disease is highly unlikely to occur. The area is already intersected with tracks and therefore the likelihood of disease to be introduced to the area due to the proposal is unlikely to increase. Appropriate hygiene measures will be in place during construction activities to prevent the spread of disease.	The proposed action is for a Drag Racing facility and introduction of disease is highly unlikely to occur. The area is already intersected with tracks and therefore the likelihood of disease to be introduced to the area due to the proposal is unlikely to increase. Appropriate hygiene measures will be in place during construction activities to prevent the spread of disease.	The proposed action is for a Drag Racing facility and introduction of disease is highly unlikely to occur. The area is already intersected with tracks and therefore the likelihood of disease to be introduced to the area due to the proposal is unlikely to increase. Appropriate hygiene measures will be in place during construction activities to prevent the spread of disease.	No
Interfere substantially with the recovery of the species	The proposal will not impact on the recovery of this species as the habitat proposed to be impacted is not significant in comparison to that available in the area.	The proposal will not impact on the recovery of this species as the habitat proposed to be impacted is not significant in comparison to that available in the area.	The proposal will not impact on the recovery of this species as the habitat proposed to be impacted is not significant in comparison to that available in the area.	No

As a consequence of the proposal and based on the above assessment, no significant impacts to black cockatoos, Western ringtail possums or Chuditch are anticipated. As discussed, the degree of the impact is expected to be low and relates to the loss of a relatively small area of vegetation (14.89 ha) within the landscape. That is, taking into consideration the presence of large areas of similar habitat adjacent to the proposal and in the wider region.

The criteria in these significant impact guidelines refer to "populations" and "important populations". These terms have not been defined for black cockatoos due to their mobile and widely-distributed nature, and the variation in flock compositions (for example, between breeding and non-breeding seasons).

The DoE released referral guidelines for the three threatened black cockatoo species (Department of Sustainability, Environment, Water, Population and Communities, 2012), which provides guidance for when one or more "habitat impacts" may trigger the need to refer an "action". Therefore, an assessment of the project's clearing impact against the 2012 criteria is included in Table 10.

Table 10 Assessment Against black cockatoo referral guidelines

Risk Type	Referral Trigger
High Risk of Significant Impacts: Referral to DoE Recommended	
Clearing of Any Known Nesting Tree	Referral is not triggered. No breeding trees were identified within the site, however 255 potential breeding trees may be impacted by the proposal.
Clearing or Degradation of Any Part of a Vegetation Community Known to Contain Breeding Habitat	Referral is triggered No known breeding habitat was identified within the site. However the proposal involves clearing 255 potential habitat trees. During the detailed design process, the proposal will be designed to avoid impacts to potential habitat trees where possible.
Clearing of More Than One Ha of Quality Foraging Habitat	Referral is triggered The proposal will involve clearing 14.89 ha of potential foraging vegetation. This comprises 40.7% of the habitat present on the site and 0.25% of habitat protected within a 10km radius. Therefore, due to the area of habitat retained or protected within vicinity of the proposal this impact is considered unlikely to have a significant impact on black cockatoo populations.
Clearing or Degradation (Including Pruning the Top Canopy) of a Known Night Roosting Site	Referral is not triggered No known roosting sites were identified during site surveys and no known roosting trees will be impacted.
Creating a Gap of Greater than 4 Km Between Patches of Black Cockatoo Habitat (Breeding, Foraging or Roosting)	Referral is not triggered The proposed action extends for less than 4km in any one direction. And will therefore not create a gap greater than 4km between potential habitat.
Actions That Have an Uncertain Risk of Significant Impacts	
Degradation (Such as Through Altered Hydrology or Fire Regimes) of More than 1 Ha of Foraging Habitat. Significance will Depend on the Level and Extent of Degradation and the Quality of the Habitat	Referral is not triggered The proposal is unlikely to alter the hydrology or fire regimes in the area. Appropriate management plans will be in place both during and post construction to ensure vegetation maintained on site and the surrounding vegetation is not impacted (through altered hydrology and fire regimes).
Clearing or Disturbance in Areas Surrounding Black Cockatoo Habitat that has the Potential to Degrade Habitat through Introduction of Invasive Species, Edge Effects, Hydrological Changes, Increased Human Visitation or Fire	Referral may triggered No invasive species will be introduced to the area as part of the proposal. As the proposal is unlikely to cause the introduction of weed species to the area and there is vegetation being retained around the majority of the proposal which should act as a buffer to vegetation outside the site, surrounding vegetation is unlikely to be impacted by edge effects. Management plans will be in place to ensure increased human visitation to the area is managed appropriately.

Actions that Do Not Directly Affect the Listed Species but that have the Potential for Indirect Impacts such as Increasing Competitors for Nest Hollows	Referral is not triggered No indirect impacts are considered likely from the proposal.
Actions with the Potential to Introduce Known Plant Diseases such as Phytophthora Spp. to an Area where the Pathogen was Not Previously Known	Referral is not triggered The proposed action is for a Drag Racing facility and introduction of disease is highly unlikely to occur. The area is already intersected with tracks and therefore the likelihood of disease to be introduced to the area due to the proposal is unlikely to increase. Appropriate hygiene measures will be in place during construction activities to prevent the spread of disease.
Actions that have a Low Risk of Significant Impacts	
Actions that Do Not Affect Black Cockatoo Habitat or Individuals	NA
Actions Whose Impacts Occur Outside the Modelled Distribution of the Three Black Cockatoos	NA

6 Environmental record of the responsible party

NOTE: If a decision is made that a proposal needs approval under the EPBC Act, the Environment Minister will also decide the assessment approach. The EPBC Regulations provide for the environmental history of the party proposing to take the action to be taken into account when deciding the assessment approach.

		Yes	No
6.1	**Does the party taking the action have a satisfactory record of responsible environmental management?** **Provide details**	X	
6.2	**Has either (a) the party proposing to take the action, or (b) if a permit has been applied for in relation to the action, the person making the application - ever been subject to any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources?** **If yes, provide details**		X
6.3	**If the party taking the action is a corporation, will the action be taken in accordance with the corporation's environmental policy and planning framework?** **If yes, provide details of environmental policy and planning framework**	NA	
6.4	**Has the party taking the action previously referred an action under the EPBC Act, or been responsible for undertaking an action referred under the EPBC Act?** **Provide name of proposal and EPBC reference number (if known)**		X

7 Information sources and attachments

(For the information provided above)

7.1 References

- List the references used in preparing the referral.
- Highlight documents that are available to the public, including web references if relevant.

7.2 Reliability and date of information

For information in section 3 specify:

- source of the information;
- how recent the information is;
- how the reliability of the information was tested; and
- any uncertainties in the information.

7.3 Attachments

Indicate the documents you have attached. All attachments must be less than three megabytes (3mb) so they can be published on the Department's website. Attachments larger than three megabytes (3mb) may delay the processing of your referral.

		✓ attached	Title of attachment(s)
You must attach	figures, maps or aerial photographs showing the project locality (section 1)	✓	Figure 1: Site Location Plan Figure 2: Site Coordinates GIS files attached
	GIS file delineating the boundary of the referral area (section 1)	✓	
	figures, maps or aerial photographs showing the location of the project in respect to any matters of national environmental significance or important features of the environments (section 3)	✓	Figure 3: Master Plan Figure 4: Potential Black Cockatoo Habitat Figure 5: Geology Figure 6: Vegetation Complexes Figure 7: Vegetation Units Figure 8: Vegetation Condition
If relevant, attach	copies of any state or local government approvals and consent conditions (section 2.5)		
	copies of any completed assessments to meet state or local government approvals and outcomes of public consultations, if available (section 2.6)		
	copies of any flora and fauna investigations and surveys (section 3)	✓	• Appendix 1: DoE Protected Matters Search • Appendix 2: Collie Fauna Assessment Report • Appendix 3: Level 2 Flora and Vegetation Survey at the Collie Motorplex

technical reports relevant to the assessment of impacts on protected matters that support the arguments and conclusions in the referral (section 3 and 4)	✓	• Appendix 1: DoE Protected Matters Search • Appendix 2: Collie Fauna Assessment Report • Appendix 3: Level 2 Flora and Vegetation Survey at the Collie Motorplex
report(s) on any public consultations undertaken, including with Indigenous stakeholders (section 3)	NA	

8 Contacts, signatures and declarations

NOTE: Providing false or misleading information is an offence punishable on conviction by imprisonment and fine (s 489, EPBC Act).

Under the EPBC Act a referral can only be made by:

- the person proposing to take the action (which can include a person acting on their behalf); or
- a Commonwealth, state or territory government, or agency that is aware of a proposal by a person to take an action, and that has administrative responsibilities relating to the action[1].

Project title:

8.1 Person proposing to take action

This is the individual, government agency or company that will be principally responsible for, or who will carry out, the proposed action.

If the proposed action will be taken under a contract or other arrangement, this is:

- the person for whose benefit the action will be taken; or
- the person who procured the contract or other arrangement and who will have principal control and responsibility for the taking of the proposed action.

If the proposed action requires a permit under the Great Barrier Reef Marine Park Act[2], this is the person requiring the grant of a GBRMP permission.

The Minister may also request relevant additional information from this person.

If further assessment and approval for the action is required, any approval which may be granted will be issued to the person proposing to take the action. This person will be responsible for complying with any conditions attached to the approval.

If the Minister decides that further assessment and approval is required, the Minister must designate a person as a proponent of the action. The proponent is responsible for meeting the requirements of the EPBC Act during the assessment process. The proponent will generally be the person proposing to take the action[3].

1. Name and Title:	DAVID BLURTON . CHIEF EXECUTIVE OFFICER
2. Organisation (if applicable):	SHIRE OF COLLIE
	Organisation name should match entity identified in ABN/ACN search
3. EPBC Referral Number (if known):	NA
4: ACN / ABN (if applicable):	80581297683
5. Postal address	87 THROSSELL STREET COLLIE WA 6225
6. Telephone:	97349024
7. Email:	geoff.klemm@collie.wa.gov.au
8. Name of designated proponent (if not the same person at item 1	Motoring South West Inc

[1] *If the proposed action is to be taken by a Commonwealth, state or territory government or agency, section 8.1 of this form should be completed. However, if the government or agency is aware of, and has administrative responsibilities relating to, a proposed action that is to be taken by another person which has not otherwise been referred, please contact the Referrals Gateway (1800 803 772) to obtain an alternative contacts, signatures and declarations page.*

[2] *If your referred action, or a component of it, is to be taken in the Great Barrier Reef Marine Park the Minister is required to provide a copy of your referral to the Great Barrier Reef Marine Park Authority (GBRMPA) (see section 73A,* EPBC Act*). For information about how the GBRMPA may use your information, see http://www.gbrmpa.gov.au/privacy/privacy_notice_for_permits.*

[3] *If a person other than the person proposing to take action is to be nominated as the proponent, please contact the Referrals Gateway(1800 803 772) to obtain an alternative contacts, signatures and declarations page.*

above and if applicable):
9. ACN/ABN of designated proponent (if not the same person named at item 1 above): 95 330 658 214

COMPLETE THIS SECTION ONLY IF YOU QUALIFY FOR EXEMPTION FROM THE FEE(S) THAT WOULD OTHERWISE BE PAYABLE

I qualify for exemption from fees under section 520(4C)(e)(v) of the EPBC Act because I am:

□ an individual; OR

□ a small business entity (within the meaning given by section 328-110 (other than subsection 328-119(4)) of the *Income Tax Assessment Act 1997*); OR

□ not applicable.

If you are small business entity you must provide the Date/Income Year that you became a small business entity:

Note: You must advise the Department within 10 business days if you cease to be a small business entity. Failure to notify the Secretary of this is an offence punishable on conviction by a fine (regulation 5.23B(3) *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth)).

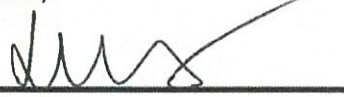
COMPLETE THIS SECTION ONLY IF YOU WOULD LIKE TO APPLY FOR A WAIVER

I would like to apply for a waiver of full or partial fees under Schedule 1, 5.21A of the EPBC Regulations. Under sub regulation 5.21A(5), you must include information about the applicant (if not you) the grounds on which the waiver is sought and the reasons why it should be made:

X I would like to apply for a full exemption as Motoring South West has an annual turnover well below $2 million

Declaration

I declare that to the best of my knowledge the information I have given on, or attached to this form is complete, current and correct.
I understand that giving false or misleading information is a serious offence.
I agree to be the proponent for this action.
I declare that I am not taking the action on behalf of or for the benefit of any other person or entity.

Signature  Date 17-3-15

8.2 Person preparing the referral information (if different from 8.1)

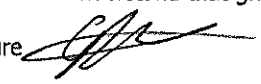
Individual or organisation who has prepared the information contained in this referral form.

Name: Glenn Yeatman

Title: Principal Scientist

Organisation: Organisation name should match entity identified in ABN/ACN search

ACN / ABN (if applicable): RPS Environment and Planning Pty Ltd

Postal address	45 108 680 977
Telephone	PO Box 749 Busselton WA 6280 08 9751 1148
Email	Glenn.yeatman@rpsgroup.com.au
Declaration	I declare that to the best of my knowledge the information I have given on, or attached to this form is complete, current and correct. I understand that giving false or misleading information is a serious offence.
Signature	 Date 18.03.15

REFERRAL CHECKLIST

NOTE: This checklist is to help ensure that all the relevant referral information has been provided. It is not a part of the referral form and does not need to be sent to the Department.

HAVE YOU:

- ❑ Completed all required sections of the referral form?
- ❑ Included accurate coordinates (to allow the location of the proposed action to be mapped)?
- ❑ Provided a map showing the location and approximate boundaries of the project area?
- ❑ Provided a map/plan showing the location of the action in relation to any matters of NES?
- ❑ Provided a digital file (preferably ArcGIS shapefile, refer to guidelines at Attachment A) delineating the boundaries of the referral area?
- ❑ Provided complete contact details and signed the form?
- ❑ Provided copies of any documents referenced in the referral form?
- ❑ Ensured that all attachments are less than three megabytes (3mb)?
- ❑ Sent the referral to the Department (electronic and hard copy preferred)?

Geographic Information System (GIS) data supply guidelines

If the area is less than 5 hectares, provide the location as a point layer. If the area greater than 5 hectares, please provide as a polygon layer. If the proposed action is linear (eg. a road or pipline) please provide a polyline layer.

GIS data needs to be provided to the Department in the following manner:

- Point, Line or Polygon data types: ESRI file geodatabase feature class (preferred) or as an ESRI shapefile (.shp) zipped and attached with appropriate title
- Raster data types: Raw satellite imagery should be supplied in the vendor specific format.
- Projection as GDA94 coordinate system.

Processed products should be provided as follows:

- For data, uncompressed or lossless compressed formats is required - GeoTIFF or Imagine IMG is the first preference, then JPEG2000 lossless and other simple binary+header formats (ERS, ENVI or BIL).
- For natural/false/pseudo colour RGB imagery:
    - If the imagery is already mosaiced and is ready for display then lossy compression is suitable (JPEG2000 lossy/ECW/MrSID). Prefer 10% compression, up to 20% is acceptable.
    - If the imagery requires any sort of processing prior to display (i.e. mosaicing/colour balancing/etc) then an uncompressed or lossless compressed format is required.

Metadata or 'information about data' will be produced for all spatial data and will be compliant with ANZLIC Metadata Profile. (http://www.anzlic.org.au/policies_guidelines#guidelines).

The Department's preferred method is using ANZMet Lite, however the Department's Service Provider may use any compliant system to generate metadata.

All data will be provide under a Creative Commons license (http://creativecommons.org/licenses/by/3.0/au/)

RPS

Job Number: 11319103
Doc Number: 001
Date: 13.03.14
Scale: Map 1:2500000 Inset 1:10000 @ A4
Created by: MA
Source: Imagery - Landgate

0 12.5 25 50 75 100 km

Figure 1

Site Location

38 Station Street, Subiaco | T +61 8 92111111 | F +61 8 92111122 | www.rpsgroup.com.au

38 Station Street, Subiaco | T +61 8 92111111 | F +61 8 92111122 | www.rpsgroup.com.au

LEGEND

- Coordinates
- Contour (mAHD)
- Proposed Design
- Site Boundary

A
B
C
D

Coordinates in GDA 1994 MGA Zone 50S				
Location	**Easting**	**Northing**	**Latitude (DMS)**	**Longitude (DMS)**
A	430290	6300083	33° 26' 10.975" S	116° 15' 0.231" E
B	430720	6300278	33° 26' 4.740" S	116° 15' 16.935" E
C	430955	6299196	33° 26' 39.909" S	116° 15' 25.729" E
D	430575	6299186	33° 26' 40.142" S	116° 15' 10.996" E

RPS

Job Number: 1131903
Doc Number: 002
Date: 13.03.15
Scale: 1:3,000 @ A3
Created by: MA
Source: Cadastre - Landgate, 2013 Orthophoto - Landgate, 2012 Proposed Design & Contours - TME, 2014

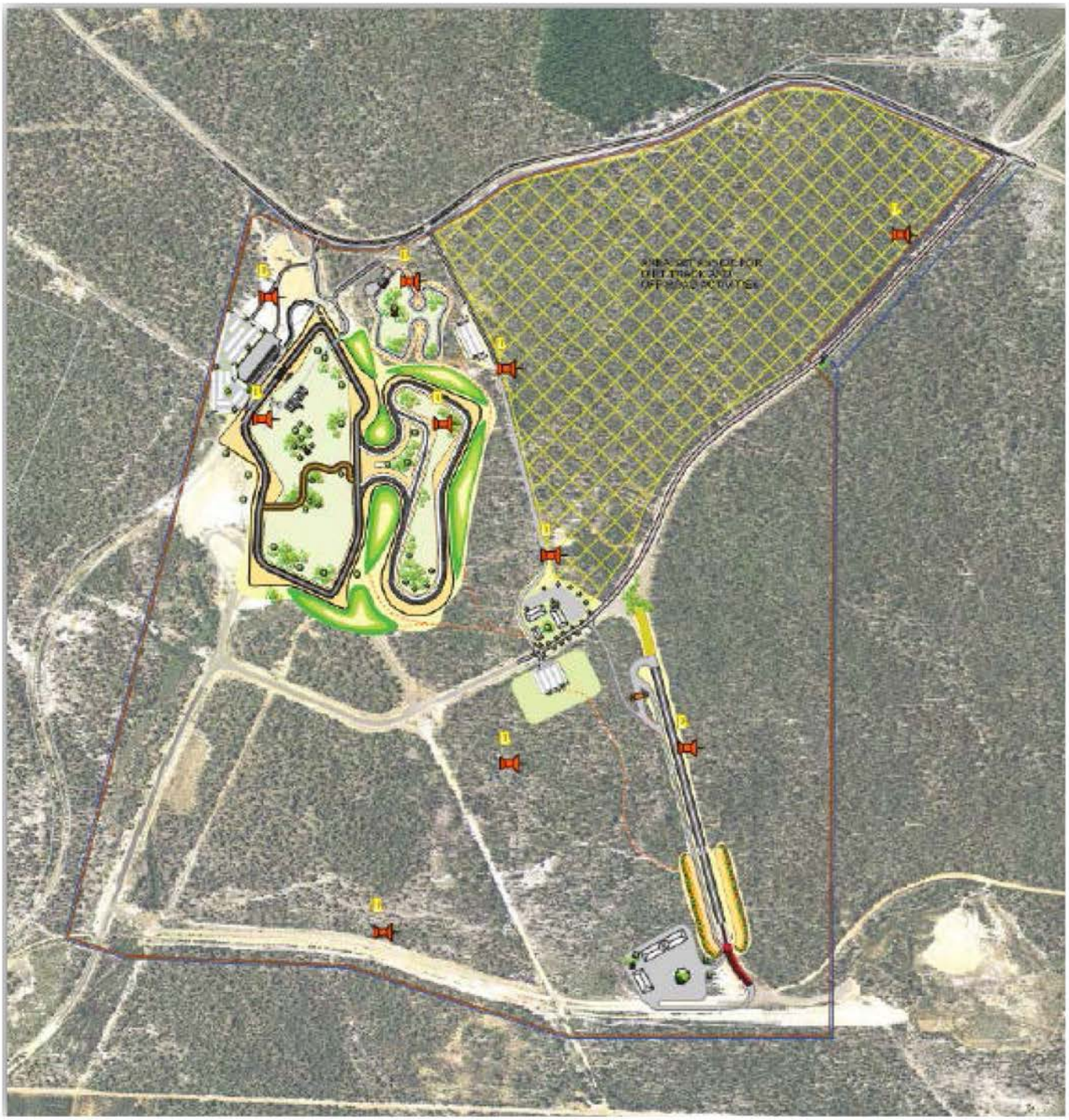
GDA 1994 MGA Zone 50

0 12.5 25 50 75 100 m

Figure 2

Site Coordinates

38 Station Street Subiaco | T +61 8 92111111 | F +61 8 92111122 | www.rpsgroup.com.au



RPS

Job Number: I1319103
Doc Number: 003
Date: 13.03.15
Scale: NTS @ A4
Created by: MA
Source: Masterplan - TME, 2011

Figure 3

Motorplex Master Plan

38 Station Street, Subiaco | T +61 8 92111111 | F +61 8 92111122 | www.rpsgroup.com.au

LEGEND

- Habitat Trees (DBH >50 cm)
- Proposed Design
- Site Boundary
- Previously Cleared Area
- Minimal Loss of Existing Trees (<5%) - 18.60 ha
- Some Loss of Existing Trees (50%) - 8.07 ha
- Total Loss of Existing Trees - 9.93 ha

Tree Loss Areas	Total Number of Trees	Number of Trees Lost
Minimal Loss of Existing Trees (<5%)	265	18 (<5%)
Some Loss of Existing Trees (50%)	118	61 (50%)
Total Loss of Existing Trees	176	176 (100%)

RPS

Job Number: 11319103
Doc Number: 004
Date: 11.03.15
Scale: 1:3,000 @ A3
Created by: MA
Source: Cadastre - Landgate, 2013 Orthophoto - Landgate, 2012 Proposed Design - 2014

GDA 1994 MGA Zone 50

0 12.5 25 50 75 100 m

Figure 4

Potential Black Cockatoo Habitat

LEGEND

Cadastre

Site Boundary

Geology (Geoscience 500K)

A-g-YSW, Granitic rock; monzogranite dominant

P-CL-ss, sandstone with interbedded subordinate siltstone in coarsening-upward sequence; includes WESTRALIA and ALLANSON SANDSTONES

P-CL-ssh, sandstone, carbonaceous shale, coal, pebble conglomerate; includes EWINGTON, PREMIER and MUJA COAL MEASURES

P-CL-ssh

P-CL-ssh

P-CL-ss

A-g-YSW

P-CL-ssh

A-g-YSW

Job Number: 11319103
Doc Number: 005
Date: 07.07.14
Scale: 1:20,000 @ A3
Created by: MA
Source: Orthophoto - Landgate, 2012 Proposed Design - TME, 2014

Collie Grid 1994 COL94

0 125 250 500 750 1,000 m

Figure 5

Geology

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LEGEND

Proposed Design

Site Boundary

RFA Vegetation Complexes

CF - Cardiff

CI - Collie

MJ - Muja

MJ

CI

MJ

CF

MJ

MJ

RPS

Job Number: 11319103
Doc Number: 006
Date: 13.03.15
Scale: 1:10,000 @ A3
Created by: MA
Source: Cadastre - Landgate, 2013 Orthophoto - Landgate, 2012 Proposed Design - 2014

Collie Grid 1994 COL94

0 62.5 125 250 375 500 m

Figure 6

Vegetation Complexes

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LEGEND

- Habitat Trees (DBH >50 cm)
- Proposed Design
- Site Boundary

Vegetation Units Legend

A — Open Forest of Jarrah (*Eucalyptus marginata*) and *Allocasuarina fraseriana* with occasional Marri (*Corymbia calophylla*) over Low Open Woodland of *Banksia grandis* and *Persoonia longifolia* over Shrubland of *Xanthorrhoea preissii* over Low Shrubland of *Bossiaea ornata*, *Hakea ruscifolia*, *Hibbertia hypericoides*, *Styphelia tenuiflora* and *Xanthorrhoea gracilis* on shallow grey gravelly sand often with exposed laterite.

B — Open Forest of Jarrah (*Eucalyptus marginata*) and *Allocasuarina fraseriana* with occasional Marri (*Corymbia calophylla*) over Very Low Open Woodland of *Persoonia longifolia* and *Xylomelum occidentale* over Shrubland/Low shrubland of *Acacia extensa*, *Bossiaea eriocarpa*, *B. ornata*, *Macrozamia riedlei*, *Xanthorrhoea preissii* and *X. Gracilis* (with *Hypocalymma angustifolium* in damper areas) on grey-brown loamy sands.

C — Woodland of Jarrah (*Eucalyptus marginata*) and *Nuytsia floribunda* with *Melaleuca preissiana* in damper areas over Open Low Woodland of *Xylomelum occidentale* over Shrubland/Low Shrubland of *Acacia extensa*, *Adenanthos obovatus*, *Hibbertia vaginata*, *Kunzea glabrescens* and *Xanthorrhoea preissii* on grey-brown loamy sand. (This vegetation unit was only found in Area A).

D — Open forest of Jarrah (*Eucalyptus marginata*) and Marri (*Corymbia calophylla*) and sometimes *Allocasuarina fraseriana* over Shrubland/ Low Shrubland of *Acacia browniana*, *Banksia dallanneyi*, *Bossiaea eriocarpa*, *B. ornata*, *Hakea lissocarpha*, *Hibbertia hypericoides* and *Xanthorrhoea gracilis* on gravelly grey-brown sandy loam (with exposed laterite) or grey-brown sandy loam.

Exotics

Cleared

Cleared

RPS

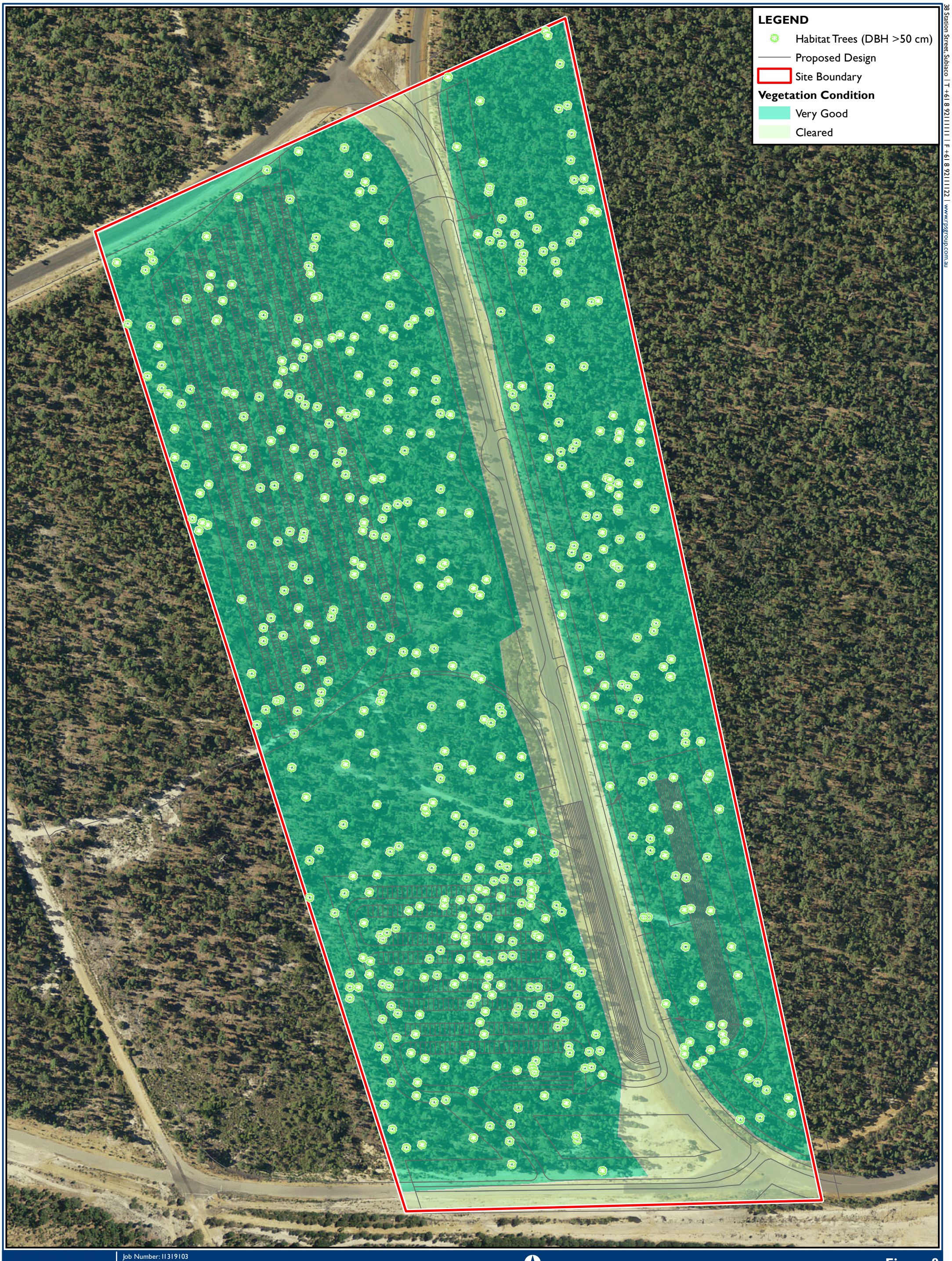
Job Number: 11319103
Doc Number: 007
Date: 13.03.15
Scale: 1:3,000 @ A3
Created by: MA
Source: Cadastre - Landgate, 2013 Orthophoto - Landgate, 2012 Proposed Design - 2014 Veg Units - Eco Edge, 2013

GDA 1994 MGA Zone 50

0 12.5 25 50 75 100 m

Figure 7

Vegetation Units



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RPS

Job Number: 11319103
Doc Number: 008
Date: 13.03.15
Scale: 1:3,040 @ A3
Created by: MA
Source: Cadastre - Landgate, 2013 Orthophoto - Landgate, 2012 Proposed Design - 2014

GDA 1994 MGA Zone 50

0 12.5 25 50 75 100 m

Figure 8

Vegetation Condition

Australian Government

Department of the Environment

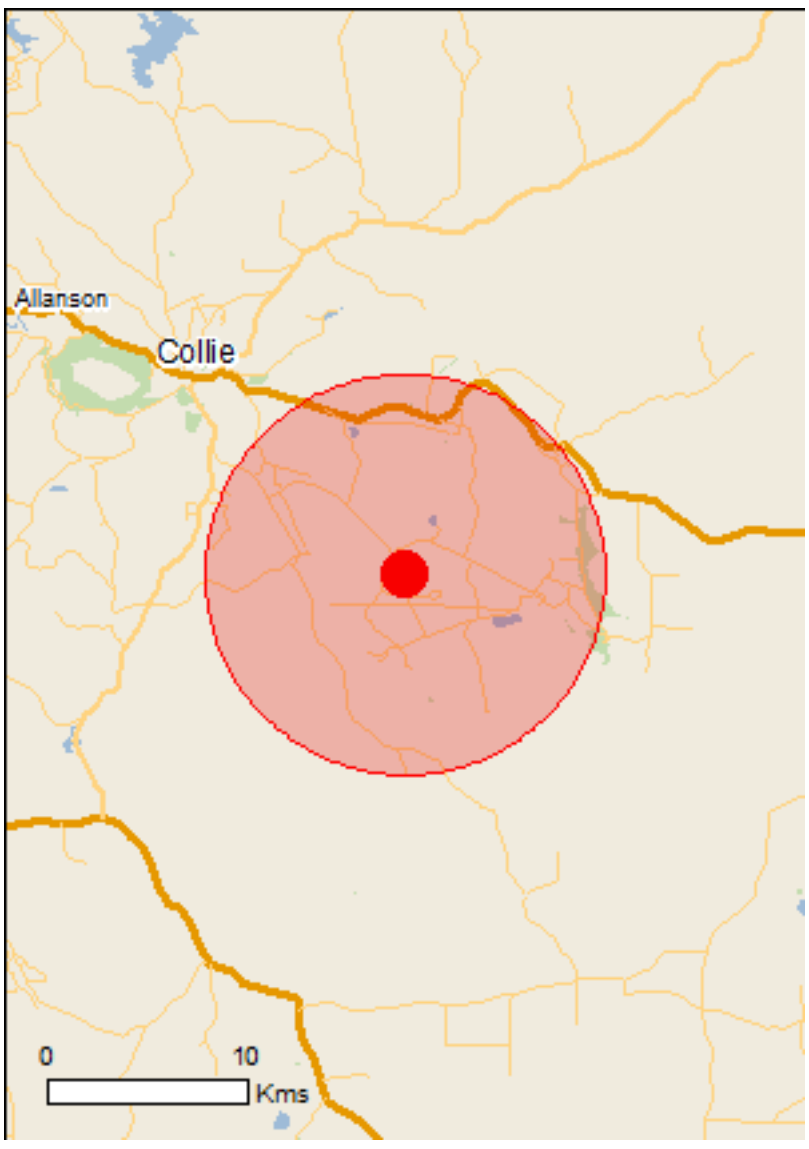
EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

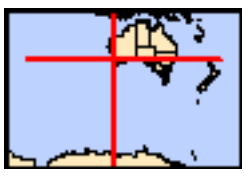
Report created: 12/02/15 16:00:02



This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

Coordinates

Buffer: 10.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Areas:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	12
Listed Migratory Species:	5

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place and the heritage values of a place on the Register of the National Estate.

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	7
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

Place on the RNE:	None
State and Territory Reserves:	None
Regional Forest Agreements:	1
Invasive Species:	18
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Calyptorhynchus banksii naso		
Forest Red-tailed Black-Cockatoo, Karrak [67034]	Vulnerable	Species or species habitat may occur within area
Calyptorhynchus baudinii		
Baudin's Black-Cockatoo, Long-billed Black-Cockatoo [769]	Vulnerable	Breeding known to occur within area
Calyptorhynchus latirostris		
Carnaby's Black-Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Breeding likely to occur within area
Leipoa ocellata		
Malleefowl [934]	Vulnerable	Species or species habitat may occur within area
Mammals		
Dasyurus geoffroii		
Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat known to occur within area
Myrmecobius fasciatus		
Numbat [294]	Vulnerable	Species or species habitat likely to occur within area
Pseudocheirus occidentalis		
Western Ringtail Possum, Ngwayir [25911]	Vulnerable	Species or species habitat may occur within area
Setonix brachyurus		
Quokka [229]	Vulnerable	Species or species habitat may occur within area
Plants		
Caladenia lodgeana		
Lodge's Spider-orchid [68664]	Critically Endangered	Species or species habitat known to occur within area

Name	Status	Type of Presence
Commersonia erythrogyna		
Trigwell's Rulingia [86397]	Endangered	Species or species habitat may occur within area
Diuris micrantha		
Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat likely to occur within area
Jacksonia velveta		
Collie Jacksonia [82671]	Endangered	Species or species habitat likely to occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Haliaeetus leucogaster		
White-bellied Sea-Eagle [943]		Species or species habitat may occur within area
Merops ornatus		
Rainbow Bee-eater [670]		Species or species habitat may occur within area
Migratory Wetlands Species		
Ardea alba		
Great Egret, White Egret [59541]		Breeding known to occur within area
Ardea ibis		
Cattle Egret [59542]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba		
Great Egret, White Egret [59541]		Breeding known to occur within area
Ardea ibis		
Cattle Egret [59542]		Species or species habitat likely to occur within area
Haliaeetus leucogaster		
White-bellied Sea-Eagle [943]		Species or species habitat may occur within area
Merops ornatus		
Rainbow Bee-eater [670]		Species or species habitat may occur within area
Pandion haliaetus		
Osprey [952]		Species or species habitat may occur within

Name	Threatened	Type of Presence
		area
Thinornis rubricollis		
Hooded Plover [59510]		Species or species habitat may occur within area

Extra Information

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included.

Name	State
South West WA RFA	Western Australia

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Anas platyrhynchos		
Mallard [974]		Species or species habitat likely to occur within area
Columba livia		
Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus		
House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus		
Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Streptopelia senegalensis		
Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
Sturnus vulgaris		
Common Starling [389]		Species or species habitat likely to occur within area
Mammals		
Felis catus		
Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer		
Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Mus musculus		
House Mouse [120]		Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
[Oryctolagus cuniculus](#) Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
[Rattus rattus](#) Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
[Sus scrofa](#) Pig [6]		Species or species habitat likely to occur within area
[Vulpes vulpes](#) Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
[Asparagus asparagoides](#) Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
[Chrysanthemoides monilifera](#) Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
[Genista sp. X Genista monspessulana](#) Broom [67538]		Species or species habitat may occur within area
[Pinus radiata](#) Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
[Rubus fruticosus aggregate](#) Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area

Coordinates

-33.43612 116.25035

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World Heritage and Register of National Estate properties, Wetlands of International Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Department of Environment, Climate Change and Water, New South Wales
-Department of Sustainability and Environment, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment and Natural Resources, South Australia
-Parks and Wildlife Service NT, NT Dept of Natural Resources, Environment and the Arts
-Environmental and Resource Management, Queensland
-Department of Environment and Conservation, Western Australia
-Department of the Environment, Climate Change, Energy and Water
-Birds Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-SA Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Atherton and Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
-State Forests of NSW
-Geoscience Australia
-CSIRO
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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Fauna Assessment

of

Collie Motorplex

Proposed Clearing Areas

Cardiff

DECEMBER 2013

Version 1

On behalf of:
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BUSSELTON WA, 6280

Prepared by:
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APPENDICES

SUMMARY

This report details the results of a fauna assessment of two areas of land associated with the Collie Motorplex located in Cardiff near Collie (Figure 1). The two areas of investigation have been designated Area A and Area B and have a combined total area of about 63 hectares (ha). Area A covers about 20 ha and is over 65% cleared of native vegetation. Area B has a total area of about 43 ha, with about 18% of the native vegetation having been previously cleared (Figure 2).

It is understood that the owners/operators of the existing Motorplex are assessing the feasibility of expanding the existing complex. One of the two investigation areas will be selected for future development based on a range of criteria. Development in either area will require the clearing of some native vegetation and a range of investigations, including this fauna survey, have been undertaken in order to fully understand the suite of environmental values across the area.

It is anticipated that the information presented will be used by regulatory authorities to assess the potential impact of the proposal on fauna and fauna habitats as part of any required approval process.

The scope of works was to conduct a level 1 fauna survey as defined by the Environmental Protection Authority (EPA 2004). Because some listed threatened species (i.e. several species of black cockatoo) are known to occur in the general area, the scope of the survey work was expanded to include targeted assessment of the site's significance to these particular species. The assessment has included a desktop study and two day reconnaissance survey.

Descriptions of the broadly defined fauna habitats, mainly based on the remaining vegetation units onsite are given below, with the extent of each identified unit being shown in Figure 3. Plates 1 to 4 illustrate the nature of the vegetation units/habitats present inside the boundary of the two study areas.

- Open-forest of jarrah-marri-sheoak with a range of understorey species as summarised by Maunsell (2004) (Plate 1). Total area about 41 ha (Area A ~6 ha, Area B ~35 ha);
- Low Open Woodland of *Melaleuca* sp. – this small area of vegetation is located in Area A and is subject to seasonal inundation/waterlogging (Plate 2). Total area about 0.5 ha (Area A ~0.5. ha, Area B = 0 ha);
- Man-made dam – A small man-made dams is present within the open low woodland area (Plate 3). Total area about 260 m^2 (Area A ~260 m^2, Area B = 0 m^2);
- Plantation and rehabilitation areas - Some sections of the study area have been planted with non-endemic eucalypts and/or a range of shrubs (Plate 4). Total area about 2 ha (Area A ~1.7 ha, Area B ~0.3 ha);

- Man-made drain – A man-made drain is present with the plantation area located in Area A and would be subject to seasonal inundation/waterlogging (Plate 4).

- Existing cleared or partly cleared areas: Represented by the existing racetrack area and associated infrastructure including car parks and storage areas, some of which contain scattered trees and shrubs and also includes previously constructed mine roads and a decommissioned railway line. Total area about 19 ha (Area A ~12 ha, Area B ~7 ha).

Opportunistic fauna observations are listed in Appendix B. A total of 40 native fauna species were observed (or positively identified from foraging evidence, scats, tracks, skeletons or calls) within the study area during the two day survey period. Three introduced species were also either seen or evidence of their presence found.

Evidence of two listed threatened species was observed (the forest red-tailed black-cockatoo – individuals heard calling and foraging evidence (chewed marri/jarrah fruits) and Baudin's black-cockatoo - individuals observed flying overhead/heard calling). Diggings attributed to the southern brown bandicoot (Department of Parks and Wildlife (DPaW) Priority 5 species) were found at a number of locations. No evidence of any migratory fauna species using the area was found.

The habitat tree assessment identified 681 specimens within the areas examined that fit the federal Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC 2012) criteria for black cockatoo breeding habitat (i.e. suitable tree species with a diameter at breast height (DBH) of >50cms) (Figure 4). A summary of the habitat trees identified and the area they were located is provided in Table 1.

Three hundred and fourteen (314) of the 681 trees were observed to contain hollows of some type with 38 assessed at the time to possibly have large enough hollows for black cockatoos to use for nesting though this assessment was based on the size of the entrance into an apparent hollow only. No actual evidence of any hollows being used by black cockatoos for nesting (currently or previously) was however seen.

Additional details on each observed "habitat tree" can be found in Appendix D.

Foraging evidence left by black cockatoos in the form of chewed jarrah and marri fruits were found at several; locations across the site. This evidence was attributed to the forest red-tailed black cockatoo, though it is possible that some of the chewed jarrah fruits were the result of foraging by Carnaby's black-cockatoo. Several forest red-tailed black cockatoo individuals were also heard calling during the survey period. No foraging evidence directly attributable to Baudin's black-cockatoos was seen though several individuals were observed flying overhead and calling during the survey period.

Almost all the remnant native vegetation within Area A (estimated to total ~6 ha) and Area B (estimated to total ~35 ha) can be regarded as representing foraging habitat for

black cockatoos due to the dominance of jarrah and to a lesser extent marri along with other subdominant species such as *Banksia and Allocasuarina*.

No existing roosting trees (trees used at night by black cockatoos to rest) were positively identified during the survey.

With respect to native vertebrate fauna, 22 mammals (including nine bat species), 101 bird, 38 reptile and 12 frog species have previously been recorded in the general area, some of which have the potential to occur in or utilise sections of the study area at times.

Of the 172 native animals that are listed as potentially occurring in the area, eight are considered to be endangered/vulnerable or in need of special protection under State and/or Federal law. In addition, three migratory species and six DPaW priority species may frequent the area at times.

Constraints on development within the study area will largely be centred on the presence of habitat used or potentially used by threatened fauna species in particular those listed under the *Environment Protection and Biodiversity Conservation Act 1999* (*EPBC Act*), namely the three species of black cockatoo and to a lesser extent the western ringtail possum. Any proposed development may also compromise some Department of Environment Regulation (DER) criteria used when assessing clearing permits given the area is used or potentially used by a number of species of conservation significance including those mentioned above and also several additional species only listed under state legislation (Wildlife Conservation Act 1950 (*WC Act*)) or given priority status by DPaW. The potential impacts on these species and/or their habitat will therefore need to be taken into consideration during the planning process to minimise impacts and facilitate approvals.

The extent of clearing that may be required at the site is yet to be determined so impact *EPBC Act* threatened fauna species identified as utilising the site cannot be fully determined at this stage. The need to commence dialogue or submit a referral to DSEWPaC regarding this project should be assessed against relevant significant impact criteria once areas to be cleared are accurately defined.

A series of other recommendations aimed at mitigating and minimising potential impacts on fauna and fauna habitat in general are provided in Section 8. These should be taken into consideration during planning and development where considered reasonable and practicable.

1. INTRODUCTION

This report details the results of a fauna assessment of two areas of land associated with the Collie Motorplex located in Cardiff near Collie (Figure 1). The study areas the subjects of this assessment are situated about 11.5 kilometres south east of the Collie townsite in south west Western Australia and are centred at approximately -33.43535°S and 116.24489°E.

The two areas of investigation have been designated Area A and Area B (Figure 2). The sites have a combined total area of about 63 hectares (ha). Area A covers about 20 ha and is over 65% cleared of native vegetation. Area B has a total area of about 43 ha, with about 18% of the native vegetation having been previously cleared.

2. DEVELOPMENT PROPOSAL

It is understood that the owners/operators of the existing Motorplex are assessing the feasibility of expanding the existing complex. Two potential areas have been identified (Area A and Area B – Figure 2), one of which will be selected for future development based on a range of criteria.

Development in either area will require the clearing of some native vegetation and a range of investigations, including this fauna survey, have been undertaken in order to fully understand the suite of environmental values across the area. The findings of this fauna survey and other investigations will be used to inform and support the selection of the final development area based on identified opportunities and constraints.

It is anticipated that the information presented will be used by regulatory authorities to assess the potential impact of the proposal on fauna and fauna habitats as part of any required approval process.

3. SCOPE OF WORKS

The scope of works was to conduct a level 1 fauna survey as defined by the Environmental; Protection Authority (EPA 2004). Because some listed threatened species (i.e. several species of black cockatoo) are known to occur in the general area, the scope of the survey work was expanded to include targeted assessment of the site's significance to these species.

The fauna assessment has therefore included:

1. Level 1 Fauna Survey (to EPA standard).

2. Black Cockatoo habitat Assessment ("habitat trees" = DBH >50cm, existing and potential nest hollows, roosting habitat and foraging evidence); and

3. Report summarising results with management/planning recommendations and requirements under state and federal legislation

Note: For the purposes of this report the term black cockatoo is in reference to Baudin's black cockatoo *Calyptorhynchus baudinii*, Carnaby's black cockatoo *Calyptorhynchus latirostris* and the forest red-tailed black cockatoo *Calyptorhynchus banksii naso*.

4. METHODS

4.1 POTENTIAL FAUNA INVENTORY - DESKTOP STUDY

4.1.1 Database Searches

Searches of the following databases were undertaken to aid in the compilation of a list of vertebrate fauna potentially occurring within the study area:

- DPaW's NatureMap Database Search (combined data from DPaW, Western Australian Museum, Birds Australia and consultants reports) (DPaW 2013b): and

- Protected matters search tool (Department of Sustainability, Environment, Water, Population and Communities – DSEWPaC 2013).

It should be noted that these lists are based on observations from a broader area than the study site and therefore may include species that would only ever occur as vagrants in the actual study area due to a lack of suitable habitat or the presence of only marginal habitat. The databases also often included very old records and in some cases the species in question have become locally or regionally extinct.

Information from these sources should therefore be taken as indicative only and local knowledge and information needs also to be taken into consideration when determining what actual species may be present within the specific area being investigated.

4.1.2 Previous Fauna Surveys in the Area

Fauna surveys, assessments and reviews have been undertaken in nearby areas in the past, though not all are publically available and could not be referenced. The

most significant of those available have been used as the primary reference material for compiling the potential fauna assemblage for the general area.

Those reports referred to included, but were not limited to:

- Bancroft, W. and Bamford, M. (2006). Fauna Survey of the Muja South Extension Project. Unpublished report for Griffin Coal.

- Bancroft, W.J., Metcalf, B.M. and Bamford, M.J (2006). Fauna survey of Griffin Coal's Ewington II and Buckingham sites, January 2006. Unpublished report prepared for Kellogg Brown and Root (KBR) Pty Ltd on behalf of Griffin Coal Mining Company Pty Ltd.

- Bancroft, W. J. and Bamford, M. J. (2007). Fauna survey of Griffin Coal's Buckingham site, September 2006. Unpublished report to Griffin Coal Mining Co Pty Limited.

- Bancroft, W.J. Metcalf, B.M. and Bamford, M.J (2007). Fauna values of Griffin Coal's proposed Ewington conveyor alignment. Unpublished report prepared for The Griffin Group.

- Bancroft, W.J. and Bamford, M.J (2008). Inspection of Griffin Coal's proposed Ewington powerline clearing zones for Black-Cockatoo nesting activity, August 2008. Unpublished report prepared for The Griffin Group.

- Coffey Environments (2008). Fauna Relocation Program at Ewington Mine Site, Collie. Unpublished letter report prepared for The Griffin Coal Mining Company Pty Ltd by Coffey Environments. May 2008.

- Ecologia (1991). Ewington Consultative Environmental Review: Fauna Survey. Prepared for Halpern Glick Maunsell on behalf of Griffin Coal Mining Company. January 1991.

- GHD (2008). Collie Shotts Industrial Park, Spring Flora, Fauna and Wetland Assessment. Unpublished report for LandCorp.

- GHD (2009). Level 1 Fauna Assessment - Collie Urea Project. Unpublished report for Perdaman Industries.

- Griffin Coal (2008). Ewington Mining Operations Environmental Management Programme - Fauna Management Plan.

- Halpern Glick Maunsell (1994). Notice of Intent for: Ewington II Open-Cut Mine. Prepared on behalf of the Griffin Coal Mining Company Pty Ltd. July 1994.

- Halpern Glick Maunsell (2002). South West Project Strategic Environmental Review. Unpublished report for Griffin Energy.

- Harewood, G. (2010). Fauna Survey (Level 2) - Buckingham Way - Collie - Residential Development. Unpublished report for Strategen.

- Harewood, G. (2013). Fauna Assessment - Coalfields Highway Realignment (15.9 SLK to 26.3 SLK) Allanson. Unpublished report for RPS/MRWA.

- Maunsell (2003). Bluewater's Power Station Flora and Fauna Survey. Unpublished report for Griffin Energy.

- Maunsell (2004). Ewington I Open-Cut Mine: Environmental Management Programme. Prepared for Griffin Coal Mining Company, May 2004.

- Tonga, J. (2008). Ewington Mine Micro Bat Survey. Unpublished report prepared for Griffin Coal Mining Company by Natsync Environmental. May 2008.

As with the databases searches some reports refer to species that would not occur in the study area due to a lack of suitable habitat (extent and/or quality) and this fact was taken into consideration when compiling the potential fauna species list for the study area. It should also be noted that the NatureMap database is likely to include some records from previous fauna surveys in the area including some of those listed above.

4.1.3 Existing Publications

The following represent the main publications used to identify and refine the potential fauna species list for the study area:

- Barrett, G., Silcocks, A., Barry, S., Cunningham, R. and Poulter, R. (2003). The New Atlas of Australian Birds. Royal Australasian Ornithologists Union, Victoria.

- Bush, B., Maryan, B., Browne-Cooper, R. & Robinson, D. (2007). Reptiles and Frogs in the Bush: Southwestern Australia. UWA Press, Nedlands.

- Churchill, S. (2008). Australian Bats. Second Edition, Allen & Unwin.

- Johnstone, R.E. and Storr, G.M. (1998). Handbook of Western Australian Birds: Volume 1 – Non-passerines (Emu to Dollarbird). Western Australian Museum, Perth Western Australia.

- Johnstone, R.E. and Storr, G.M. (2004). Handbook of Western Australian Birds: Volume 2 – Passerines (Blue-winged Pitta to Goldfinch). Western Australian Museum, Perth Western Australia.

- Menkhorst, P. and Knight, F. (2011). A Field Guide to the Mammals of Australia. Oxford University Press, Melbourne.

- Morgan, D.L., Beatty, S.J., Klunzinger, M.W, Allen, M.G. and Burnham, Q.E (2011). Field Guide to the Freshwater Fishes, Crayfishes and Mussels of South Western Australia. Published by SERCUL.

- Storr, G.M., Smith, L.A. and Johnstone R.E. (1983). Lizards of Western Australia II: Dragons and Monitors. WA Museum, Perth.

- Storr, G.M., Smith, L.A. and Johnstone R.E. (1990). Lizards of Western Australia III: Geckos and Pygopods. WA Museum, Perth.

- Storr, G.M., Smith, L.A. and Johnstone R.E. (1999). Lizards of Western Australia I: Skinks. Revised Edition, WA Museum, Perth.

- Storr, G.M., Smith, L.A. and Johnstone R.E. (2002). Snakes of Western Australia. Revised Edition, WA Museum, Perth.

- Tyler M.J. & Doughty P. (2009). Field Guide to Frogs of Western Australia, Fourth Edition, WA Museum, Perth.

- Van Dyck, S. & Strahan, R. Eds (2008). The Mammals of Australia. Third edition. Queensland Museum.

- Wilson, S. and Swan, G. (2013). A Complete Guide to Reptiles of Australia. Reed, New Holland, Sydney.

4.1.4 Fauna of Conservation Significance

The conservation significance of fauna species has been assessed using data from the following sources:

- *Environment Protection and Biodiversity Conservation Act 1999* (*EPBC Act*). Administered by the Australian Government Department of Sustainability, Environment, Water, Population and Communities (DSEWPaC);

- *Wildlife Conservation Act 1950 (WC Act).* Administered by the Western Australian Department of Parks and Wildlife (DPaW) (Govt. of WA 2012);

- Red List produced by the Species Survival Commission (SSC) of the World Conservation Union (also known as the IUCN Red List - the acronym derived from its former name of the International Union for Conservation of Nature and Natural Resources). The Red List has no legislative power in Australia but is used as a framework for State and Commonwealth categories and criteria; and the

- DPaW Priority Fauna list. A non-legislative list maintained by the DPaW for management purposes (DPaW 2013a).

The *EPBC Act* also requires the compilation of a list of migratory species that are recognised under international treaties including the:

- Japan Australia Migratory Bird Agreement 1981 (JAMBA);

- China Australia Migratory Bird Agreement 1998 (CAMBA);

- Republic of Korea-Australia Migratory Bird Agreement 2007 (ROKAMBA); and

- Bonn Convention 1979 (The Convention on the Conservation of Migratory Species of Wild Animals).

(Note - Species listed under JAMBA are also protected under Schedule 3 of the *WC Act*.)

All migratory bird species listed in the annexes to these bilateral agreements are protected in Australia as matters of national environmental significance (NES) under the *EPBC Act*.

The conservation status of all vertebrate fauna species listed as occurring or possibly occurring in the vicinity of the study area has been assessed using the most recent lists published in accordance with the above-mentioned instruments and is indicated as such in the fauna listings of this report. A full listing of conservation codes are provided in Appendix A.

A number of other species not listed in official lists can also be considered of local or regional conservation significance. These include species that have a restricted range, those that occur in breeding colonies and those at the limit of their range.

While not classified as rare, threatened or vulnerable under any State or Commonwealth legislation, a number of bird species have been listed as of significance on the Swan Coastal portion of the Perth Metropolitan Region (Bush Forever - Government of Western Australia 1998 and 2000). The bird species are often referred to as Bush Forever Decreaser Species. The three categories used for birds within the Bush Forever documents are:

- Habitat specialists with reduced distribution on the Swan Coastal Plain (code Bh)
- Wide ranging Species with reduced population's on the Swan Coastal Plain. (code Bp)
- Extinct in the Perth region (code Be)

Other fauna species of regional significance due to declining populations on the Swan Coastal Plain, especially between Mandurah and Busselton, include the honey possum and pygmy possum (Dell 2000).

While the study area is not on the coastal plain, the presence of Bush Forever species should be taken into some consideration when determining the fauna values of an area. Bush Forever decreaser species are indicated as such within the species list held in Appendix B.

4.1.5 Invertebrates

It can be difficult to identify what may be significant invertebrate species (e.g. Short Range Endemics - SREs) as there are uncertainties in determining the range-restrictions of many species due to lack of surveys, lack of taxonomic resolutions within target taxa and problems in identifying certain life stages. Where invertebrates are collected during surveys, a high percentage are likely to be unknown, or for known species there can be limited knowledge or information on their distribution (Harvey 2002).

For this project, the assessment for conservation significant invertebrates has been limited to those listed by the DPaW and *EPBC Act* database searches (which rely on distribution records and known habitat preferences). No assessment of the potential for SREs to be present has been made.

4.1.6 Taxonomy and Nomenclature

Taxonomy and nomenclature for fauna species used in this report is generally taken from the DPaW's WA Fauna Census Database which is assumed to follow Aplin and Smith (2001) for amphibians and reptiles, How *et al*. (2001) for mammals and Johnstone (2001) for birds.

Common names are taken from the Western Australia Museum (WAM) recognised primary common name listings when specified, though where common names are not provided they have been acquired from other publications. Sources include Wilson and Swan (2013), Van Dyck *et al.* (2013), Christidis and Boles (2008), Bush *et al.* (2007), Bush *et al.* (2002), Tyler *et al*. (2000), and Glauret (1961). Not all common names are generally accepted.

4.2 SITE SURVEYS

The daytime reconnaissance surveys of the site were carried out on the 9 and 10 October, 2013. All survey work was carried out by Greg Harewood (B.Sc. Zoology).

4.2.1 Fauna Habitat Assessment

Vegetation units, landforms and soils observed during the site survey have been used to define broad fauna habitat types present within the study area. The main aim of the habitat assessment was to determine if it was likely that any species of conservation significance would be utilising the areas that maybe impacted on as a consequence of development at the site. The habitat information obtained was also used to aid in finalising the overall potential fauna list.

As part of the desktop literature review, available information on the habitat requirements of the species of conservation significance listed as possibly occurring in the area was researched. During the field survey the habitats within the study area were assessed and specific elements identified, if present, to determine the likelihood of listed threatened species utilising the area and its significance to them.

4.2.2 Opportunistic Fauna Observations

Opportunistic observations of fauna species were made during all field survey work which involved a series of close spaced transects across the site during the day while searching microhabitats such as logs, rocks, leaf litter and observations of bird species with binoculars. Secondary evidence of a species presence such as tracks, scats, skeletal remains, foraging evidence or calls were also noted if observed/heard.

4.2.3 Black Cockatoo Habitat Assessment

The black cockatoo habitat assessment included a:

- Habitat tree survey: This involved the identification of all suitable trees species within the study area that have a Diameter at Breast Height (DBH) of over 50cm (irrespective of the presence/absence of suitable hollows – DSEWPaC (2012) criteria). The location of each tree identified was recorded with a GPS and details on tree species, number and size of hollows (if any) noted. Trees with hollows were marked with “H” using spray paint.

  Target tree species included marri and jarrah or any other suitable *Corymbia/Eucalyptus* species of a suitable size that may be present. Peppermints, banksia, sheoak and melaleuca tree species (for example) were not assessed as they typically do not develop hollows that are used by black cockatoos.

For the purposes of this study a potential cockatoo nest hollow was defined as:

Generally any tree which is alive or dead that contains one or more visible hollows (cavities within the trunk or branches) suitable for occupation by any of the three black cockatoo species for the purpose of nesting/breeding. Hollows that had an entrance greater than about 12cm in diameter and would allow the entry of a cockatoo (white tailed or red-tailed) into a suitably orientated and sized branch/trunk, were recorded as a "potential nest hollow".

Identified hollows were examined using binoculars for evidence of actual use by black cockatoos (e.g. chewing around hollow entrance, scarring and scratch marks on trunks and branches). Trees with possible nest hollows were also scratched and raked with a large stick/pole to flush any sitting birds from hollows and calls of chicks were also listened for.

- Black cockatoo foraging assessment: The location and nature of black cockatoo foraging evidence (e.g. chewed fruits around base of trees) observed during the field survey was recorded.

- Roosting habitat survey: Direct and indirect evidence of black cockatoos roosting within trees on site was noted if observed (e.g. branch clippings, droppings or moulted feathers).

5. SURVEY CONSTRAINTS

No seasonal sampling has been carried out as part of this fauna assessment. The conclusions presented are based upon field data and the environmental monitoring and/or testing carried out over a limited period of time and are therefore merely indicative of the environmental condition of the site at the time of the field assessments. It should also be recognised that site conditions can change with time.

Some fauna species are reported as potentially occurring within the study area based on there being suitable habitat (quality and extent) within the study area or immediately adjacent. With respect to opportunistic observations, the possibility exists that certain species may not have been detected during field investigations due to:

- seasonal inactivity during the field survey;

- species present within micro habitats not surveyed;

- cryptic species able to avoid detection; and

- transient wide-ranging species not present during the survey period.

Lack of observational data on some species should therefore not necessarily be taken as an indication that a species is absent from the site.

The habitat requirements and ecology of many of the species known to occur in the wider area are often not well understood or documented. It can therefore be difficult to exclude species from the potential list based on a lack of a specific habitat or microhabitat within the study area. As a consequence of this limitation the potential fauna list produced is most likely an overestimation of those species that actually utilise the study area for some purpose. Some species may be present in the general area but may only use the study area itself on rare occasions or as vagrants/transients.

In recognition of survey limitations, a precautionary approach has been adopted for this assessment. Any fauna species that would possibly occur within the study area (or immediately adjacent), as identified through ecological databases, publications, discussions with local experts/residents and the habitat knowledge of the Author, has been assumed to potentially occur in the study area.

During the black cockatoo habitat survey trees with hollows were searched for. It should be noted that identifying hollows suitable for fauna species from ground level has limitations. Generally the full characteristics of any hollow seen are not fully evident (e.g. internal dimensions). It is also difficult to locate all hollows within all trees as some are not observable from ground level.

The location of observations was recorded using a handheld GPS. The accuracy of the GPS cannot be guaranteed above a level of about 5 to 10 metres, though it should be noted that in some circumstance the accuracy can be worse or better than this.

6. RESULTS

6.1 POTENTIAL FAUNA INVENTORY - DESKTOP STUDY

A list of fauna species considered most likely to occur in the study area has compiled from information obtained during the desktop study and is presented in Appendix B. This listing was refined after information gathered during the site reconnaissance survey was assessed. The results of some previous fauna surveys carried out in the general area are summarised in this species listing as are the DPaW NatureMap database search results. The raw database search results from NatureMap (DPaW 2013b) and the Protected Matters Search Tool (DSEWPaC 2013) are contained within Appendix C.

The list of potential fauna takes into consideration that firstly the species in question is not known to be locally extinct and secondly that suitable habitat for each species, as identified during the habitat assessment, is present within the study area, though compiling an accurate list has limitations (see Section 5 above) and therefore as discussed the listing is likely to be an overestimation of the fauna species that actually use the site for some purpose.

6.2 SITE SURVEYS

6.2.1 Fauna Habitat Assessment

The Motorplex site falls within the Southern Jarrah Forest subregion of the greater Jarrah Forest Bioregion of the Interim Biogeographic Regionalisation for Australia (IBRA) classification system (EA 2000; McKenzie *et al.* 2003). The general features of this bioregion were summarised as part of the Biodiversity Audit of Western Australia:

"Duricrusted plateau of Yilgarn Craton characterised by Jarrah-Marri forest on laterite gravels and, in the eastern part, by woodlands of Wandoo - Marri on clayey soils. Eluvial and alluvial deposits support Agonis shrublands. In areas of Mesozoic sediments, Jarrah forests occur in a mosaic with a variety of speciesrich shrublands. The climate is Warm Mediterranean. Southern Jarrah Forest: South of Collie the plateau broadens and slopes gently to the south coast. Drainage is still dissected in the west but broadening and levelling of the surface in the east causes poor drainage and large and small wetlands. The ironstone becomes less evident being buried beneath sands. Rainfall is from 1200 mm in the south-west to 500 mm in the east. Vegetation comprises Jarrah - Marri forest in the west grading to Marri and Wandoo woodlands in the east. There are extensive areas of swamp vegetation in the south–east, dominated by Paperbarks and Swamp Yate. The understory component of the forest and woodland reflects the more mesic nature of this area. The majority of the diversity in the communities occurs on the lower slopes or near granite soils where there are rapid changes in site conditions." (Hearn *et al.* 2002).

The major vegetation complexes of the broader Collie area were summarised by Mattiske Consulting and reported in Maunsell (2004). Vegetation in the vicinity of the Motorplex supports the Collie Complex, as described in Maunsell (2004):

"consisting of an open-forest of jarrah-marri-sheoak with a range of understorey species that reflect the relative proportion of sand and gravel in the soils.

Those species commonly associated with gravely soils include *Banksia grandis*, *Persoonia longifolia*, *Hibbertia hypercoides*, *Leucopogon capitellatus*, *Bossiaea ornata*, *Acacia browniana*, *Hakea lissocarpha* and *Astroloma pallidum*.

On the sandier soils common plant species include *Xylomelum occidentale*, *Daviesia incrassata*, *Bossiaea eriocarpa*, *Lyginia barbata* (formerly *Lyginia tenax*), *Dasypogon bromeliifolius* and species of *Calytrix*."

Descriptions of the broadly defined fauna habitats, mainly based on the remaining vegetation units onsite are given below, with the extent of each identified unit being shown in Figure 3. Plates 1 to 4 illustrate the nature of the vegetation units/habitats present inside the boundary of the two study areas.

- Open-forest of jarrah-marri-sheoak with a range of understorey species as summarised by Maunsell (2004) (Plate 1). Total area about 41 ha (Area A ~6 ha, Area B ~35 ha);

- Low Open Woodland of *Melaleuca* sp. – this small area of vegetation is located in Area A and is subject to seasonal inundation/waterlogging (Plate 2). Total area about 0.5 ha (Area A ~0.5. ha, Area B = 0 ha);

- Man-made dam – A small man-made dams is present within the open low woodland area (Plate 3). Total area about 260 m^2 (Area A ~260 m^2, Area B = 0 m^2);

- Plantation and rehabilitation areas - Some sections of the study area have been planted with non-endemic eucalypts and/or a range of shrubs (Plate 4). Total area about 2 ha (Area A ~1.7 ha, Area B ~0.3 ha);

- Man-made drain – A man-made drain is present with the plantation area located in Area A and would be subject to seasonal inundation/waterlogging (Plate 4).

- Existing cleared or partly cleared areas: Represented by the existing racetrack area and associated infrastructure including car parks and storage areas, some of which contain scattered trees and shrubs and also includes previously constructed mine roads and a decommissioned railway line. Total area about 19 ha (Area A ~12 ha, Area B ~7 ha).

6.2.2 Opportunistic Fauna Observations

Opportunistic fauna observations are listed in Appendix B. A total of 40 native fauna species were observed (or positively identified from foraging evidence, scats, tracks, skeletons or calls) within the study area during the two day survey period. Three introduced species were also either seen or evidence of their presence found.

Evidence of two listed threatened species was observed (the forest red-tailed black-cockatoo – individuals heard calling and foraging evidence (chewed marri/jarrah

fruits) and Baudin's black-cockatoo - individuals observed flying overhead/heard calling). Diggings attributed to the southern brown bandicoot (DPaW Priority 5 species) were found at a number of locations. No evidence of any migratory fauna species using the area was found.

6.2.3 Black Cockatoo Habitat Assessment

The habitat tree assessment identified 681 specimens within the areas examined that fit DSEWPaC's (2012) criteria for black cockatoo breeding habitat (i.e. suitable tree species with a diameter at breast height (DBH) of >50cms) (Figure 4). Most of the trees were jarrah (*E. marginata*) (581 specimens), while the balance were comprised of marri (C*. calophylla* - 100 specimens) and 10 unidentified species.

A summary of the habitat trees identified and the area they were located is provided in Table 1.

Table 1: Summary of habitat trees (DBH >50cm)

Area	Number of Trees >50cm DBH	Number of Trees with No Hollows Observed	Number of Trees with Small (<12cm entrance) Hollows	Number of Trees with Large (>12cm entrance) Hollows	Tree Species		
					Jarrah	Marri	Unknown*
"A"	122	84	30	8	107	12	3
"B"	559	283	245	31	474	78	7

*Note: Unknown tree species were all dead individuals that could not be identified to species level.

Three hundred and fourteen (314) of the 681 trees were observed to contain hollows of some type with 38 assessed at the time to possibly have large enough hollows for black cockatoos to use for nesting though this assessment was based on the size of the entrance into an apparent hollow only. No actual evidence of any hollows being used by black cockatoos for nesting (currently or previously) was however seen.

Additional details on each observed "habitat tree" can be found in Appendix D.

Foraging evidence left by black cockatoos in the form of chewed jarrah and marri fruits were found at several; locations across the site. This evidence was attributed to the forest red-tailed black cockatoo, though it is possible that some of the chewed jarrah fruits were the result of foraging by Carnaby's black-cockatoo. Several forest red-tailed black cockatoo individuals were also heard calling during the survey period. No foraging evidence directly attributable to Baudin's black-cockatoos was

seen though several individuals were observed flying overhead and calling during the survey period.

Almost all the remnant native vegetation within Area A (estimated to total ~6 ha) and Area B (estimated to total ~35 ha) can be regarded as representing foraging habitat for black cockatoos due to the dominance of jarrah and to a lesser extent marri along with other subdominant species such as *Banksia and Allocasuarina*.

No existing roosting trees (trees used at night by black cockatoos to rest) were positively identified during the survey.

6.3 FAUNA INVENTORY – SUMMARY

6.3.1 Vertebrate Fauna

Table 2 summarises the number of vertebrate fauna species potentially occurring within or utilising at times the study area, based on results from the desktop study and observations made during the field assessment. A complete list of vertebrate fauna possibly inhabiting or frequenting the study area is located in Appendix B.

Not all species listed as potentially occurring within the study area in existing databases and publications (i.e. *EPBC Act* Threatened Fauna and Migratory species lists, DPaW's NatureMap database, various reports and publications) are shown in the expected listing in Appendix B. Some species have been excluded from this list based largely on the lack of suitable habitat at the study site and in the general area or known local extinction even if suitable habitat is present.

Despite the omission of some species it should be noted that the list provided is still very likely an over estimation of the fauna species utilising the site (either on a regular or infrequent basis) as a result of the precautionary approach adopted for the assessment. At any one time only a small proportion of the listed potential species would likely to be present.

Table 2: Summary of Potential Vertebrate Fauna Species (as listed in Appendix B)

Group	Total number of potential species	Potential number of specially protected species	Potential number of migratory species	Potential number of priority species	Number of species observed - field survey 2013
Fish	0	0	0	0	0
Amphibians	12	0	0	0	0
Reptiles	38	1	0	1	2
Birds	104[3]	4	3	2	35[1]
Non-Volant Mammals	20[7]	3	0	2	6[2]
Volant Mammals (Bats)	9	0	0	1	0
Total	**183[10]**	**8**	**3**	**6**	**43[3]**

Superscript = number of introduced species included in total.

6.3.2 Vertebrate Fauna of Conservation Significance

A review of the *EPBC Act* threatened fauna list, DPaW's Threatened Fauna Database and Priority List, unpublished reports and scientific publications identified 22 specially protected, priority or migratory vertebrate fauna species as potentially occurring in the general vicinity of the study area. Of these species, most that have no potential whatsoever to utilise the study area for any purpose have been omitted from the potential list for the site (Appendix B), principally due to lack of suitable habitat on-site (including extent and/or quality) or known local extinction.

In summary, three vertebrate fauna species of conservation significance were positively identified as utilising the study area for some purpose during the survey period, these being:

- *Calyptorhynchus banksii naso* Forest Red-tailed Black Cockatoo – S1 (*WC Act*), Vulnerable (*EPBC Act*)
  Individuals of this species were heard calling during the field survey and foraging evidence observed (chewed marri and jarrah fruits). Almost all of the vegetation present represents foraging habitat for this species (e.g. marri trees, jarrah trees) and using DSEWPaC criteria the area also contains

potential breeding habitat (i.e. any suitable tree species with a DBH>50cm). May also roost on site though no evidence of this was found.

- *Calyptorhynchus baudinii* Baudin`s Black Cockatoo - S1 (*WC Act*), Vulnerable (*EPBC Act*)
  Observed flying overhead and heard calling several times within the survey area and nearby. Almost all the remnant vegetation within the study area presents potential foraging habitat for this species. Larger trees (>50cm DBH) can be considered potential breeding habitat. This species may also roost on site on occasions though no roost trees observed.

- *Isoodon obesulus fusciventer* Southern Brown Bandicoot – P5 (DPaW Priority Species)
  Evidence of this species foraging (diggings) in some sections of the study area observed.

Based on the habitats present and current documented distributions it is considered possible that six additional species may use the study site for some purpose at times, though, as no evidence of any using the study site at the time of the field survey was found, the status of some in the area remains uncertain.

These species are:

- *Ctenotus delli* Dell's Ctenotus – P4 (DPaW Priority Species)
  Potentially present though actual status onsite is difficult to determine. A single record from 2006 1.5km east of the study area (DPaW 2013). Most areas probably represent marginal habitat due to history of disturbance.

- *Morelia spilota imbricata* Southern Carpet Python - S4 (*WC Act*)
  Status onsite difficult to determine. Very few records near Collie. Most habitats look marginal due to sparse nature of groundcover. Typically only occurs in low densities.

- *Ardea alba* Great Egret – S3 (*WC Act*), Migratory (*EPBC Act*)
  Suitable habitat for this species is limited to the very small man made dam present in the western section of the area investigated. Listed as a potential species but would only occur very infrequently and for limited periods. Would not breed within the study area.

- *Ardea ibis* Cattle Egret – S3 (*WC Act*), Migratory (*EPBC Act*)
  Suitable habitat for this species is limited to the very small man made dam present in the western section of the area investigated. Listed as a potential species but would only occur very infrequently and for limited periods. Would not breed within the study area.

- *Falco peregrinus* Peregrine Falcon - S4 (*WC Act*),
  Study site may form part of larger home range for individuals of this species. No existing nest sites observed.

- *Tyto novaehollandae* Masked Owl – P3 (DPaW Priority Species)
  Status on the site and in the general area difficult to determine. May frequent the area at times.

- *Merops ornatus* Rainbow Bee-eater – S3 (*WC Act*), Migratory (*EPBC Act*)
  Common seasonal visitor to south west and likely to forage and roost in sections of the study area. Possibly breeds in some sections of the study area where sandier ground conditions are present though population levels would not be significant as it usually breeds in pairs, rarely in small colonies (Johnstone and Storr 1998).

- *Phascogale tapoatafa ssp* Southern Brush-tailed Phascogale - S1 (*WC Act*).
  This species is known to persist in state forest and national park areas surrounding Collie and therefore it may frequent the study site.

- *Dasyurus geoffroii* Chuditch - S1 (*WC Act*), Vulnerable (*EPBC Act*)
  This species is known to persist in state forest and national park areas surrounding Collie and therefore it may frequent the study site.

- *Pseudocheirus occidentalis* Western Ringtail Possum - S1 (*WC Act*), Vulnerable (*EPBC Act*)
  No evidence of this species observed which suggests low population densities at best. In general terms the vegetation appears largely unsuitable or at best marginal for WRPs to utilise. WRPs are however known to occur in some areas of bushland surrounding Collie and therefore their presence within some sections of the study area, if only infrequently, cannot be discounted.

- *Macropus irma* Western Brush Wallaby – P4 (DPaW Priority Species)
  This species is relatively common in the Collie area and is likely to frequent sections of the study area at times.

- *Falsistrellus mackenziei* Western False Pipistrelle - P4 (DPaW Priority Species)
  Potentially present with the study area when it is likely to forage and possibly roost given presence of suitable tree hollow.

Note: Habitat for some of these species on-site, while considered possibly suitable, may be marginal in extent/quality and species listed may only visit the area for short periods, or as rare/uncommon vagrants/transients.

A number of other species of conservation significance, while possibly present in the wider area (e.g. forested areas of the Darling Range), are not listed as potential species due to known localised extinction (and no subsequent recruitment from adjoining areas) and/or lack of suitable habitat and/or the presence of feral

predators. Details on conservation significant species and reasons for the omission of some from the potential listing are provided in Appendix E and Table 3.

Thirty two bird species that potentially frequent or occur in the study area are noted as Bush Forever Decreaser Species in the Perth Metropolitan Region (seven were sighted/identified as having used the study area during the survey). Decreaser species are a significant issue in biodiversity conservation in the Perth section of the coastal plain as there have been marked reductions in range and population levels of many sedentary bird species as a consequence of disturbance and land clearing (Dell & Hyder-Griffiths 2002).

6.3.3 Invertebrate Fauna

One species of conservation significant invertebrate species appeared in the DPaW or *EPBC Act* database searches (DPaW 2013b, DSEWPaC 2013), this being an unnamed cricket (*Pachysaga munggai*) which is listed a priority 3 by DPaW (DPaW 2013a and 2013b).

The actual status of this species in and near the study area is difficult to determine. The general areas history of disturbance (logging and frequent fires) would suggest the area represents marginal habitat for this species given the reduced ground cover and leaf litter. It therefore considered unlikely that any part of the possible clearing areas would represent an area of significance for this species given the extent of similar habitat in surrounding areas.

Additional information on both species can be found in Appendix E.

7. POTENTIAL IMPACTS AND DEVELOPMENT CONSTRAINTS

7.1 POTENTIAL IMPACTS OF DEVELOPMENT

In general the most significant potential impacts to fauna of any development include:

- Loss of vegetation/fauna habitat that may be used for foraging, breeding, roosting, or dispersal (includes loss of hollow bearing trees);
- Fragmentation of vegetation/fauna habitat which may restrict the movement of some fauna species;
- Modifications to surface hydrology, siltation of creek lines;

- Changes to fire regimes;
- Pollution (e.g. oil spills);
- Noise/Light/Dust;
- Spread of plant pathogens (e.g. dieback) and weeds;
- Potential increase in the number of predatory introduced species (e.g. cats);
- Death or injury of fauna during clearing and construction; and
- An increase in fauna road kills subsequent to development.

The location and extent of clearing that may take place has yet to be decided, however based on the habitats present and the maximum extent of clearing likely to be required the anticipated impacts on species of conservation significance previously recorded in the general area has been assessed, a summary of which is provided in Table 3 below. Additional information on specific fauna species is provided in Appendix E.

Table 3: Likelihood of Occurrence and Possible Impacts – Fauna Species of Conservation Significance (continues on following pages).

Common Name	Genus & Species	Conservation Status	Habitat Present	Likelihood of Occurrence	Possible Impacts
Unnamed cricket	*Pachysaga munggai*	P3	Yes?/Marginal?	Possible but unlikely	Loss/modification of small areas of marginal habitat
Darling Range Heath Ctenotus	*Ctenotus dell*	P4	Yes/Marginal	Possible	Loss/modification of small areas of habitat
Southern Carpet Python	*Morelia spilota imbricata*	S4	Yes/Marginal	Possible	Loss/modification of small areas of habitat
Malleefowl	*Leipoa ocellata*	S1, Mig	No	Unlikely - species locally extinct.	None
Great Egret	*Ardea alba*	S3, Mig	Yes/Very Marginal	Possible but unlikely	Loss/modification of very small areas of man-made habitat
Cattle Egret	*Ardea ibis*	S3, Mig	Yes/Very Marginal	Possible but unlikely	Loss/modification of very small areas of man-made habitat
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	S3, Mig	No	Unlikely	None
Osprey	*Pandion haliaetus*	Mig	No	Unlikely	None

Common Name	Genus & Species	Conservation Status	Habitat Present	Likelihood of Occurrence	Possible Impacts
Peregrine Falcon	*Falco peregrinus*	S4	Yes	Possible	Loss/modification of some areas of habitat
Carnaby`s Black Cockatoo	*Calyptorhynchus latirostris*	S1, EN	Yes	Possible	Loss/modification of some areas of habitat
Baudin`s Black Cockatoo	*Calyptorhynchus baudinii*	S1, VU	Yes	Known to occur	Loss/modification of some areas of habitat
Forest Red-tailed Black Cockatoo	*Calyptorhynchus banksii naso*	S1, VU	Yes	Possible	Loss/modification of some areas of habitat
Masked Owl (SW population)	*Tyto n. novaehollandiae*	P3	Yes	Possible	Loss/modification of some areas of habitat
Fork-tailed Swift	*Apus pacificus*	S3, Mig	Yes	Unlikely	None
Rainbow Bee-eater	*Merops ornatus*	S3, Mig	Yes	Possible	Loss/modification of some areas of habitat
Chuditch	*Dasyurus geoffroii*	S1, VU	Yes	Possible	Loss/modification of some areas of habitat
Numbat	*Myrmecobius fasciatus*	S1, VU	Yes	Unlikely - species locally extinct.	None
Southern Brush-tailed Phascogale	*Phascogale tapoatafa ssp*	S1	Yes	Possible	Loss/modification of some areas of habitat
Southern Brown Bandicoot	*Isoodon obesulus fusciventer*	P5	Yes	Known to occur	Loss/modification of some areas of habitat
Western Ringtail Possum	*Pseudocheirus occidentalis*	S1, VU	Yes/Marginal	Possible	Loss/modification of some small areas of habitat
Western Brush Wallaby	*Macropus irma*	P4	Yes	Possible	Loss/modification of some areas of habitat
Quokka	*Setonix brachyurus*	S1, VU	No	Unlikely	None
Western False Pipistrelle	*Falsistrellus mackenziei*	P4	Yes	Possible	Loss/modification of some areas of habitat

7.2 POTENTIAL CONSTRAINTS ON DEVELOPMENT

The primary constraint on any proposed development in either of the identified locations (i.e. Area A or Area B) will largely be related to the presence of habitat used or potentially used by threatened fauna species in particular those listed under the *EPBC Act*, namely the three species of black cockatoo, the chuditch and to a lesser extent the western ringtail possum. While the exact location and extent of clearing that may be required is unknown, the removal of almost any portion of native vegetation within either area has the potential to trigger the need for a federal referral to DSEWPaC to ensure compliance with the *EPBC Act* with respect to significant impact on the abovementioned fauna species.

The results of this assessment also suggest that criteria relating to fauna, used by the Department of Environment Regulation (DER) when assessing clearing permits may also be compromised, as any proposed clearing may impact on areas considered to have a relative “high level of biological diversity” or as being “necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia”. This conclusion is primarily based on the fact that the area is used or potentially used by a number of species of conservation significance including those mentioned above and also several additional species only listed under state legislation (*WC Act*) or given priority status by DPaW.

It is difficult to predict how any application to clear will be assessed by regulatory authorities as a range of factors (including some not related to fauna and therefore not assessed here) are taken into consideration when assessing a developments likely impact. For example, DSEWPaC referral guidelines (DSEWPaC 2012) state that: "In determining the potential significance of your action, the department will consider the particular circumstances of your case. This may include factors such as the suitability of the habitat, its connectivity, and the amount of habitat remaining in the region". It is understood that DER also take a similar approach when to assessing clearing permits.

As the proposed development project is located within large areas of relatively continuous native forest, similar in charterer to that contained within the project areas, impacts may not be considered as overly significant and clearing will be allowed subject to standard conditions that are relatively easy to comply with.

Proceeding with development in Area A is likely to be less constrained by fauna issues than Area B as it is already mostly cleared though other factors (flora, geotechnics) also need to be considered.

8. RECOMMENDATIONS

The following recommendations aimed at reducing the impact on fauna and fauna habitat as much as reasonable and practicable are provided for guidance during ongoing site selection, development planning and for the formulation of management plans. This listing is not exhaustive and management plans and offsets (if required) will need to be finalised after liaison with relevant regulatory advisers/authorities (e.g. DPaW/DER and DSEWPaC). It is recommended that:

- Planning for the development should aim to avoid the need to clear as much of the existing vegetation as possible. Existing disturbed/previously cleared areas should be used where possible. Reducing the area of vegetation requiring removal will minimise possible offset requirements that maybe set by DER/DSEWPaC if conditional approval is obtained.

- The need to commence dialogue or submit a referral to DSEWPaC regarding this project should be assessed against relevant significant impact criteria once site selection and planning for the development is finalised.

- Any proposed landscaping/plantings on site should utilise local seed stock that includes cockatoo food plants, specifically *Eucalyptus, Corymbia, Banksia, Hakea*, and *Allocasuarina*. The final selection of suitable species should be carried out after liaison with appropriate experts or local land care groups to ascertain which species are most suitable for the area. Dieback resistant species may need to be utilised if the spread of the disease in rehabilitated areas cannot be managed.

- During site works areas requiring clearing should be clearly marked and access to other areas restricted to prevent accidental clearing of areas to be retained.

- No dead, standing or fallen timber should be removed unnecessarily. Logs (hollow or not) and other debris resulting from land clearing should be used to enhance fauna habitat in untouched and rehabilitated areas if possible.

- During clearing operations a suitably experienced “fauna spotter” should be employed to inspect logs and hollow trees (where possible) before clearing to reduce likelihood of injury to fauna. If feasible any fauna encountered should be relocated to retained suitable habitat.

- A Construction and Operations Fire Management Plan should be prepared to reduce the risk of unplanned fires and provide contingency measures to minimise any associated impacts. The plan will include a contingency and

response plan in the event of any bushfires that commence as a result of the works on site.

- Native fauna injured during clearing or normal site operations should be taken to a designated veterinary clinic or a DPaW nominated wildlife carer.

- Any trenching required for services should be kept open for only as long as necessary and suitable escape ramps (45°) and bridging provided if the site is to be left unattended for extended periods (>1day). Significant sized trenches should be inspected for fauna immediately prior to filling.

9. CONCLUSION

The fauna assessment of the two potential development areas was undertaken for the purposes of categorising the fauna assemblages and identifying fauna habitats. A targeted assessment of the areas value as black cockatoo habitat was also carried out.

With respect to native vertebrate fauna, 22 mammals (including nine bat species), 101 bird, 38 reptile and 12 frog species have previously been recorded in the general area, some of which have the potential to occur in or utilise sections of the study area at times.

Of the 172 native animals that are listed as potentially occurring in the area, eight are considered to be endangered/vulnerable or in need of special protection under State and/or Federal law. In addition, three migratory species and six DPaW priority species may frequent the area at times.

Constraints on development within the study area will largely be centred on the presence of habitat used or potentially used by threatened fauna species in particular those listed under the *EPBC Act*, namely the three species of black cockatoo and to a lesser extent the western ringtail possum. Any proposed development may also compromise some DER criteria used when assessing clearing permits given the area is used or potentially used by a number of species of conservation significance including those mentioned above and also several additional species only listed under state legislation (*WC Act*) or given priority status by DPaW. The potential impacts on these species and/or their habitat will therefore need to be taken into consideration during the planning process to minimise impacts and facilitate approvals.

The extent of clearing that may be required at the site is yet to be determined so impact *EPBC Act* threatened fauna species identified as utilising the site cannot be

fully determined at this stage. The need to commence dialogue or submit a referral to DSEWPaC regarding this project should be assessed against relevant significant impact criteria once areas to be cleared are accurately defined.

A series of other recommendations aimed at mitigating and minimising potential impacts on fauna and fauna habitat in general are provided in Section 8. These should be taken into consideration during planning and development where considered reasonable and practicable.

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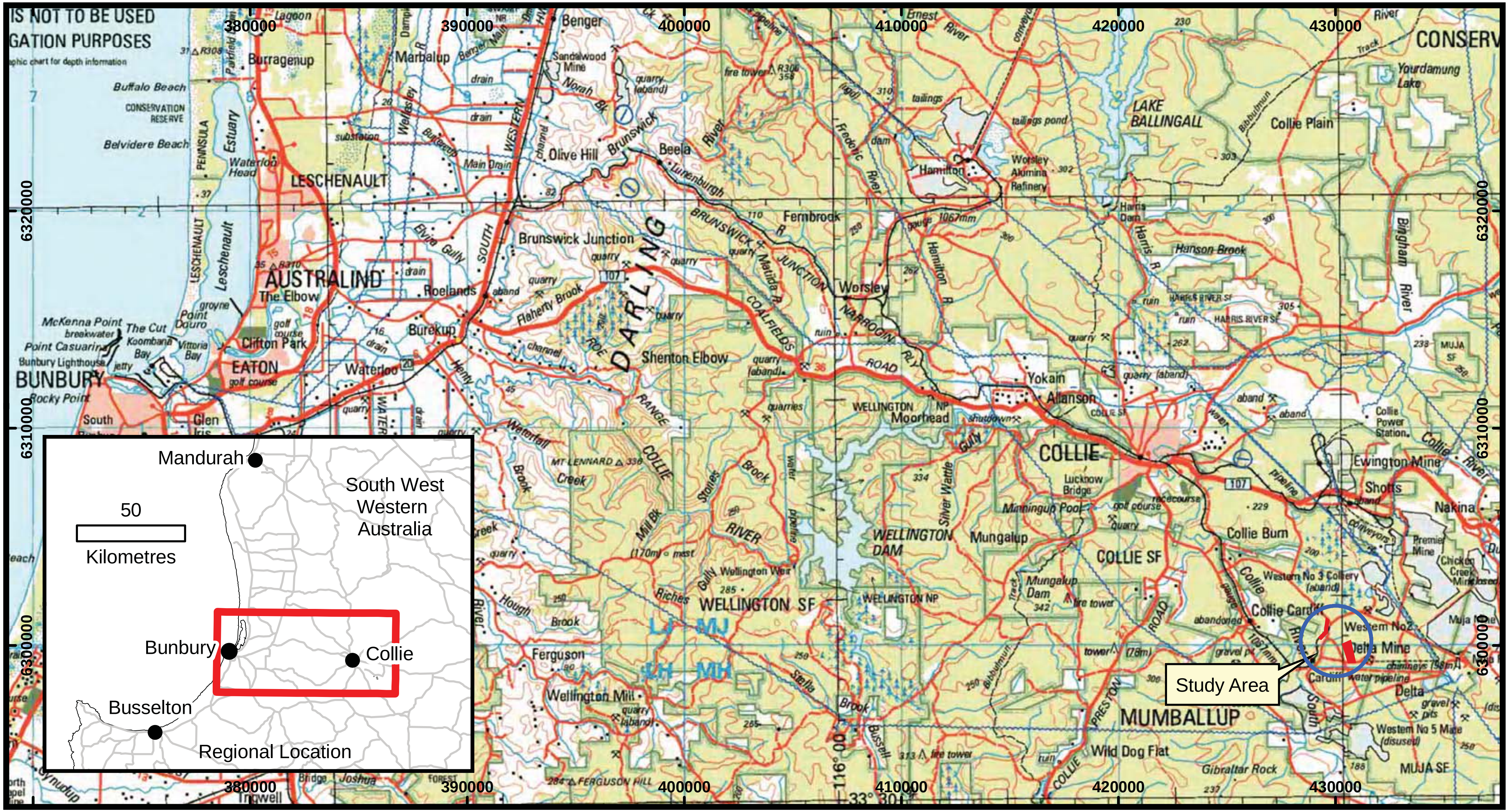
FIGURES



Legend

Collie Motorplex Study Areas

0 2 4 6 8 10

Kilometres

MGA Zone 50

Fauna Survey

DRAWN: G Harewood

DATE: Dec 2013

SCALE: 1: 250,000

Collie Motorplex Cardiff

Study Areas and Surrounds

Figure: 1

Legend

Collie Motorplex Study Areas

N

0 100 200 300 400 500

Metres

MGA Zone 50

Fauna Survey

DRAWN:G Harewood

DATE : Dec 2013

SCALE: 1:10,000

Collie Motorplex
Cardiff

Study Areas Air Photo

Figure: 2

Legend

- Collie Motorplex Study Areas
- Tracks

Fauna Survey

DRAWN:G Harewood

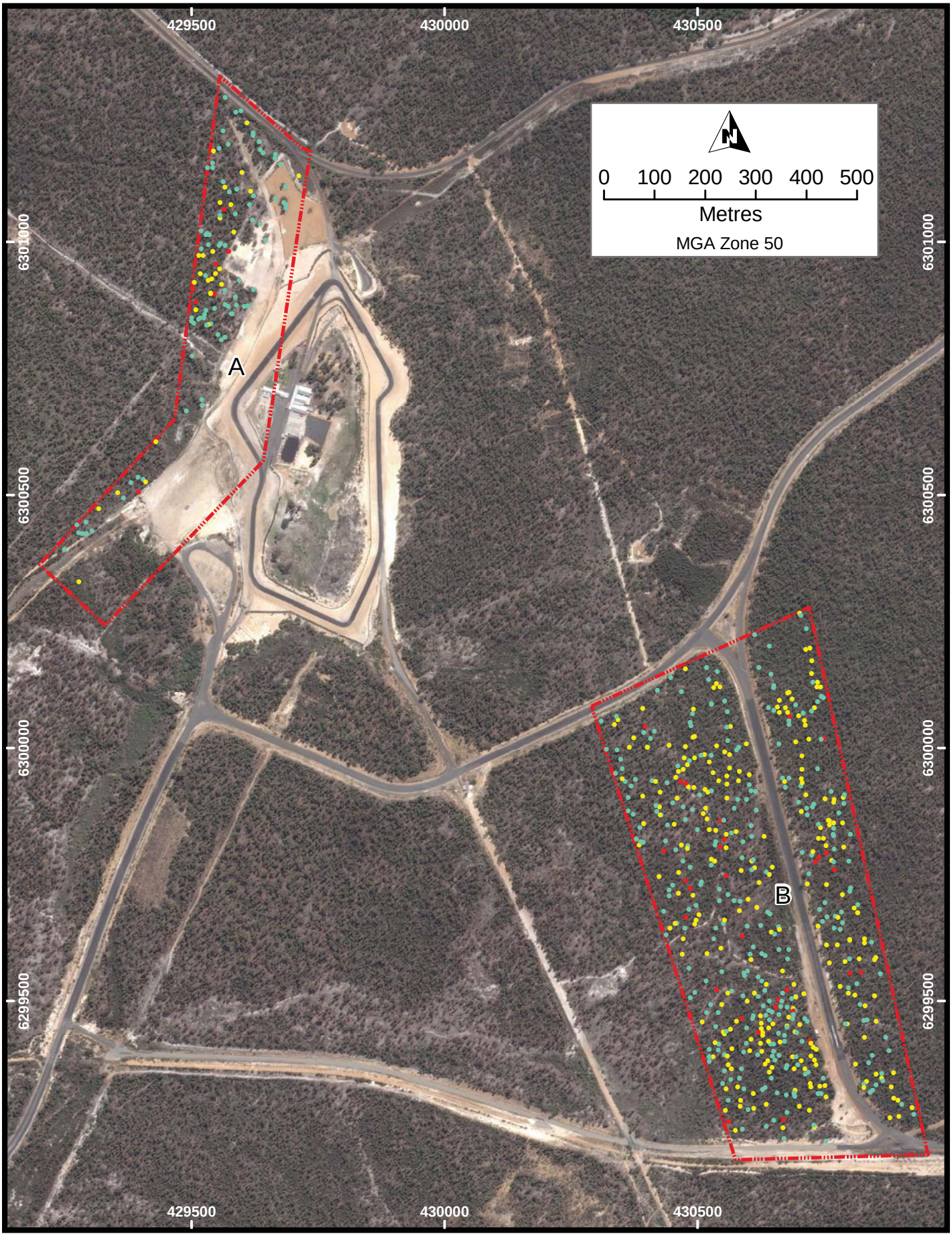
DATE : Dec 2013

SCALE: 1:10,000

Collie Motorplex
Cardiff

Fauna Habitats

Figure: 3



Legend

- Collie Motorplex Study Areas
- Tree >50cm DBH, no hollows seen (367)
- Tree >50cm DBH, one or more hollows seen (275)
- Tree >50cm DBH, one or more hollows possibly suitable for a Black Cockatoo (39)

Fauna Survey

DRAWN:G Harewood

DATE : Dec 2013

SCALE: 1:10,000

Collie Motorplex
Cardiff

Habitat Trees (DBH >50cm)

Figure: 4

PLATES

Plate 1: Open-forest of jarrah-marri-sheoak with a range of understorey species – Area B.

Plate 2: Low Open Woodland of *Melaleuca* sp. – Area A.

Plate 3: Man-made dam – Area A.

Plate 4: Planted non-endemic *Eucalyptus* species and man-made drain – Area A.

APPENDIX A

CONSERVATION CATEGORIES

EPBC Act (1999) Threatened Fauna Categories

Category	Code	Description
Extinct	E	There is no reasonable doubt that the last member of the species has died.
*Extinct in the wild	EW	A species (a) is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or (b) has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
*Critically endangered	CE	A species is facing an extremely high risk of extinction in the wild in the immediate future.
*Endangered	EN	A species: (a) is not critically endangered; and (b) is facing a very high risk of extinction in the wild in the near future.
*Vulnerable	VU	A species (a) is not critically endangered or endangered; and (b) is facing a high risk of extinction in the wild in the medium-term future.
Conservation dependent	CD	A species is the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered
*Migratory	Migratory	(a) all migratory species that are: (i) native species; and (ii) from time to time included in the appendices to the Bonn Convention; and (b) all migratory species from time to time included in annexes established under JAMBA, CAMBA and ROKAMBA; and (c) all native species from time to time identified in a list established under, or an instrument made under, an international agreement approved by the Minister.
Marine	Ma	Species in the list established under s248 of the EPBC Act

Note: Only species in those categories marked with an asterix are matters of national environmental significance under the *EPBC Act*.

Western Australian Wildlife Conservation Act (1950) Threatened Fauna Categories

Category	Code	Description
Schedule 1	S1	Fauna which is rare or likely to become extinct Threatened fauna (Schedule 1) are further ranked by the DEC according to their level of threat using IUCN Red List criteria: **CR: Critically Endangered** - considered to be facing an extremely high risk of extinction in the wild. **EN: Endangered** - considered to be facing a very high risk of extinction in the wild. **VU: Vulnerable** - considered to be facing a high risk of extinction in the wild.
Schedule 2	S2	Fauna which is presumed extinct
Schedule 3	S3	Birds which are subject to an agreement between the governments of Australia and Japan (JAMBA) relating to the protection of migratory birds and birds in danger of extinction
Schedule 4	S4	Fauna that is otherwise in need of special protection

Western Australian DPaW Priority Fauna Categories

Category	Code	Description
Priority 1	P1	Taxa that are known from one or a few collections or sight records (generally less than five), all on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, Shire, Westrail and Main Roads WA road, gravel and soil reserves, and active mineral leases and under threat of habitat destruction or degradation. Taxa may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes..
Priority 2	P2	Taxa that are known from one or a few collections or sight records, some of which are on lands not under imminent threat of habitat destruction or degradation, e.g. national parks, conservation parks, nature reserves, State forest, vacant Crown land, water reserves, etc. Taxa may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes.
Priority 3	P3	Taxa that are known from collections or sight records from several localities not under imminent threat, or from few but widespread localities with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Taxa may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and known threatening processes exist that could affect them.
Priority 4	P4	(a) **Rare**. Taxa that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These taxa are usually represented on conservation lands. (b) **Near Threatened**. Taxa that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable. (c) Taxa that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.
Priority 5	P5	Taxa that are not threatened but are subject to a specific conservation program, the cessation of which would result in the taxa becoming threatened within five years.

IUCN Red List Threatened Species Categories

Category	Code	Description
Extinct	EX	Taxa for which there is no reasonable doubt that the last individual has died.
Extinct in the Wild	EW	Taxa which is known only to survive in cultivation, in captivity or and as a naturalised population well outside its past range and it has not been recorded in known or expected habitat despite exhaustive survey over a time frame appropriate to its life cycle and form.
Critically Endangered	CR	Taxa facing an extremely high risk of extinction in the wild.
Endangered	EN	Taxa facing a very high risk of extinction in the wild.
Vulnerable	VU	Taxa facing a high risk of extinction in the wild.
Near Threatened	NT	Taxa which has been evaluated but does not qualify for CR, EN or VU now but is close to qualifying or likely to qualify in the near future.
Least Concern	LC	Taxa which has been evaluated but does not qualify for CR, EN, VU, or NT but is likely to qualify for NT in the near future.
Data Deficient	DD	Taxa for which there is inadequate information to make a direct or indirect assessment of its risk of extinction based on its distribution and/or population status.

A full list of categories and their meanings are available at:

http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria

APPENDIX B

FAUNA OBSERVED OR POTENTIALLY IN STUDY AREA

Fauna Observed or Potentially in Study Area

Compiled by Greg Harewood - November 2013

Collie Motorplex, Cardiff, W.A.

Approx Centroid -33.43535°S and 116.24489°E

Recorded (Trapped/Sighted/Heard/Signs) = X

A = Harewood, G. (2013b). Fauna Assessment of Collie Motorplex, Proposed Clearing Areas, Cardiff. Unpublished report for RPS.

B = Harewood, G. (2013a). Fauna Assessment Coalfields Highway Realignment (15.9 SLK to 26.3 SLK), Allanson. Unpublished report for RPS.

C = Harewood, G. (2010). Fauna Survey (Level 2) Buckinghma Way, Collie. Unpublished report for Stategen.

D = Ecologia (1991). Ewington Consultative Environmental Review: Fauna Survey. Unpublished report for HGM.

HGM (1994). Notice of Intent for: Ewington II Open-Cut Mine. Unpublished report for Griffin Coal Mining Company Pty Ltd.

Bancroft, W. et al. (2006). Fauna survey of Griffin Coal's Ewington II and Buckingham sites. Unpublished report for KBR Pty Ltd.

Bancroft, W. J. and Bamford, M. J. (2007). Fauna survey of Griffin Coal's Buckingham site. Unpublished report to Griffin Coal Mining Co Pty Limited.

Bancroft, W.J. and Bamford, M.J (2008). Inspection of Griffin Coal's proposed Ewington powerline clearing zones for Black-Cockatoo nesting activity. Unpublished report for The Griffin Group.

Coffey Environments (2008). Fauna Relocation Program at Ewington Mine Site, Collie. Unpublished letter report prepared for The Griffin Coal Mining Company Pty Ltd.

Tonga, J. (2008). Ewington Mine Micro Bat Survey. Unpublished report for Griffin Coal Mining Company.

E = GHD (2009). Level 1 Fauna Assessment - Collie Urea Project. Unpublished report for Perdaman Industries.

F = GHD (2008). Collie Shotts Industrial Park, Spring Flora, Fauna and Wetland Assessment. Unpublished report for LandCorp.

G = Bancroft, W. and Bamford, M. (2006). Fauna Survey of the Muja South Extension Project. Unpublished report for Griffin Coal.

H = DPaW (2013). NatureMap Database search. "By Circle" 116°14' 42" E, 33°26' 07" S – Study area (plus 10 km buffer). 22 November 2013.

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H
Amphibians										
Myobatrachidae Ground or Burrowing Frogs										
Crinia georgiana	Quacking Frog	LC				X		X	X	X
Crinia glauerti	Glauert`s Froglet	LC				X	X	X	X	X

WC Act Status - S1 to S4, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DEC Priority Status - P1 to P5, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, Bush Forever Decreaser Species - Bh = habitat specialists, Bp = wide ranging species, Be = extinct in Perth Coastal Plain Region. IUCN Red List Category Definitions LC = Least Concern - see Appendix A and http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria for others.

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H
Crinia pseudinsignifera	Bleating Froglet	LC					X	X		
Geocrinia leai	Lea`s Frog	LC					X	X		X
Heleioporus barycragus	Western Marsh Frog	LC							X	
Heleioporus eyrei	Moaning Frog	LC				X			X	X
Heleioporus inornatus	Whooping Frog	LC				X			X	X
Heleioporus psammophilus	Sand Frog	LC				X	X		X	
Limnodynastes dorsalis	Banjo Frog	LC				X			X	X
Pseudophryne guentheri	Güenther`s Toadlet	LC							X	
Hylidae Tree or Water-Holding Frogs										
Litoria adelaidensis	Slender Tree Frog	LC							X	X
Litoria moorei	Motorbike Frog	LC							X	

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Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H
Reptiles										
Gekkonidae Geckoes										
Christinus marmoratus	Marbled Gecko									
Diplodactylus polyophthalmus	Speckled Stone Gecko					X				
Underwoodisaurus milii	Barking Gecko									
Pygopodidae Legless Lizards										
Aprasia pulchella	Pretty Worm Lizard					X			X	X
Aprasia repens	Sand-plain Worm Lizard					X			X	
Lialis burtonis	Common Snake Lizard					X				
Pygopus lepidopodus	Southern Scaleyfoot									

WC Act Status - S1 to S4, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DEC Priority Status - P1 to P5, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, Bush Forever Decreaser Species - Bh = habitat specialists, Bp = wide ranging species, Be = extinct in Perth Coastal Plain Region. IUCN Red List Category Definitions LC = Least Concern - see Appendix A and http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria for others.

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H
Agamidae Dragon Lizards										
Pogona minor	Western Bearded Dragon					X			X	
Varanidae Monitor's or Goanna's										
Varanus gouldii	Gould's Sand Monitor					X			X	
Varanus rosenbergi	Heath Monitor					X			X	

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Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H
Scincidae Skinks										
Acritoscincus trilineatum	South-western Cool Skink					X			X	X
Cryptoblepharus buchananii	Fence Skink		X	X		X			X	X
Ctenotus catenifer	Chain-striped Heath Ctenotus									
Ctenotus delli	Dell's Skink	P4				X				X
Ctenotus impar	South-western Odd-striped Ctenotus					X			X	X
Ctenotus labillardieri	Red-legged Skink					X				
Egernia kingii	King's Skink									
Egernia napoleonis	Salmon-bellied Skink			X		X			X	X
Egernia pulchra	Spectacled Rock Skink									
Hemiergis gracilipes	Southwestern Mulch Skink					X				X

WC Act Status - S1 to S4, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DEC Priority Status - P1 to P5, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, Bush Forever Decreaser Species - Bh = habitat specialists, Bp = wide ranging species, Be = extinct in Perth Coastal Plain Region. IUCN Red List Category Definitions LC = Least Concern - see Appendix A and http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria for others.

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H
Hemiergis initialis	Five-toed Earless Skink									
Hemiergis peronii peronii	Four-toed Mulch Skink									X
Lerista distinguenda	South-western Four-toed Lerista			X		X			X	X
Lerista microtis microtis	Southwestern Five-toed Lerista									
Menetia greyii	Dwarf Skink					X			X	
Morethia obscura	Dusky Morethia			X		X			X	X
Tiliqua rugosa rugosa	Western Bobtail		X	X	X	X		X	X	X
Typhlopidae Blind Snakes										
Ramphotyphlops australis	Southern Blind Snake					X			X	
Ramphotyphlops pinguis	Stout Blind Snake									X

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Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H
Boidae Pythons, Boas										
Morelia spilota imbricata	Southern Carpet Python	S4 NT								
Elapidae Elapid Snakes										
Echiopsis curta	Bardick									
Elapognathus coronatus	Crowned Snake									
Neelaps bimaculatus	Black-naped Snake									
Notechis scutatus	Tiger Snake							X	X	X
Parasuta gouldii	Gould's Hooded Snake						X		X	
Parasuta nigriceps	Black-backed Snake									
Pseudonaja affinis	Dugite					X		X	X	X
Simoselaps bertholdi	Jan`s Banded Snake									

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Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H
Birds										
Casuariidae Emus, Cassowarries										
Dromaius novaehollandiae	Emu	Bp LC	X						X	
Phasianidae Quails, Pheasants										
Coturnix ypsilophora	Brown Quail	LC							X	
Anatidae Geese, Swans, Ducks										
Anas gracilis	Grey Teal	LC							X	
Anas superciliosa	Pacific Black Duck	LC				X	X	X	X	X
Chenonetta jubata	Australian Wood Duck	LC	X			X		X	X	X
Tadorna tadornoides	Australian Shelduck	LC							X	

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Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H
Ardeidae Herons, Egrets, Bitterns										
Ardea alba	Great Egret	S3 Mig CA JA								
Ardea ibis	Cattle Egret	S3 Mig CA JA								
Ardea pacifica	White-necked Heron	LC							X	
Egretta novaehollandiae	White-faced Heron	LC				X			X	

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Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H
Accipitridae Kites, Goshawks, Eagles, Harriers										
Accipiter cirrocephalus	Collared Sparrowhawk	Bp LC		X					X	
Accipiter fasciatus	Brown Goshawk	Bp LC	X			X			X	
Aquila audax	Wedge-tailed Eagle	Bp LC		X		X			X	X
Aquila morphnoides	Little Eagle	Bp LC		X		X			X	
Circus approximans	Swamp Harrier	LC							X	
Elanus caeruleus	Black-shouldered Kite	LC		X		X				
Haliastur sphenurus	Whistling Kite	Bp LC	X							
Hamirostra isura	Square-tailed Kite	Bp LC								

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Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H
Falconidae Falcons										
Falco berigora	Brown Falcon	Bp LC							X	
Falco cenchroides	Australian Kestrel	LC				X			X	X
Falco longipennis	Australian Hobby	LC								
Falco peregrinus	Peregrine Falcon	S4 Bp LC								X
Turnicidae Button-quails										
Turnix varia	Painted Button-quail	Bp LC				X				
Turnix velox	Little Button-quail	LC				X				
Charadriidae Lapwings, Plovers, Dotterels										
Charadrius melanops	Black-fronted Dotterel					X			X	

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Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H
Columbidae Pigeons, Doves										
Columba livia	Domestic Pigeon	Introduced								
Ocyphaps lophotes	Crested Pigeon	LC							X	
Phaps chalcoptera	Common Bronzewing	Bh LC	X	X	X	X	X	X	X	X
Streptopelia senegalensis	Laughing Turtle-Dove	Introduced								
Cacatuidae Cockatoos, Corellas										
Calyptorhynchus banksii naso	Forest Red-tailed Black-Cockatoo	S1 VU Be VU A2c+3c+4c	X	X	X	X	X		X	X
Calyptorhynchus baudinii	Baudin`s Black-Cockatoo	S1 VU Bp VU C2a(ii)	X	X	X	X	X	X		X
Calyptorhynchus latirostris	Carnaby`s Black-Cockatoo	S1 EN Bp EN A2bcde+3bcd		X		X	X		X	X
Eolophus roseicapilla	Galah	LC			X	X				

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Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H
Psittacidae Parrots										
Glossopsitta porphyrocephala	Purple-crowned Lorikeet	LC							X	X
Neophema elegans	Elegant Parrot	LC	X			X			X	X
Platycercus icterotis icterotis	Western Rosella (Western ssp)	Bp LC	X	X		X	X	X		X
Platycercus spurius	Red-capped Parrot	LC	X		X	X	X	X	X	X
Platycercus zonarius	Australian Ringneck Parrot	LC	X	X	X	X	X	X	X	X
Polytelis anthopeplus	Regent Parrot	LC								

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Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H
Cuculidae Parasitic Cuckoos										
Cacomantis flabelliformis	Fan-tailed Cuckoo	LC	X			X		X	X	X
Chrysococcyx basalis	Horsfield`s Bronze Cuckoo	LC				X			X	
Chrysococcyx lucidus	Shining Bronze Cuckoo	LC	X		X	X			X	
Cuculus pallidus	Pallid Cuckoo	LC				X		X	X	
Strigidae Hawk Owls										
Ninox novaeseelandiae	Boobook Owl	LC		X		X				
Tytonidae Barn Owls										
Tyto alba	Barn Owl	LC								
Tyto n. novaehollandiae	Masked Owl (SW population)	P3 Bp								

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Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H
Podargidae Frogmouths										
Podargus strigoides	Tawny Frogmouth	LC				X			X	X
Aegothelidae Owlet-nightjars										
Aegotheles cristatus	Australian Owlet-nightjar	LC							X	
Halcyonidae Tree Kingfishers										
Dacelo novaeguineae	Laughing Kookaburra	Introduced	X	X	X	X	X	X	X	X
Todiramphus sanctus	Sacred Kingfisher	LC				X		X	X	X
Meropidae Bee-eaters										
Merops ornatus	Rainbow Bee-eater	S3 Mig JA LC		X		X			X	X
Climacteridae Treecreepers										
Climacteris rufa	Rufous Treecreeper	Bh		X		X				

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Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H
Maluridae Fairy Wrens, GrassWrens										
Malurus elegans	Red-winged Fairy-wren	Be LC		X	X	X				X
Malurus splendens	Splendid Fairy-wren	Bh LC	X	X		X	X	X	X	X

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Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H
Pardalotidae Pardalotes, Bristlebirds, Scrubwrens, Gerygones, Thornbills										
Acanthiza apicalis	Broad-tailed Thornbill	Bh LC	X	X	X	X	X		X	X
Acanthiza chrysorrhoa	Yellow-rumped Thornbill	Bh LC	X	X		X		X	X	X
Acanthiza inornata	Western Thornbill	Bh LC	X	X	X	X			X	X
Gerygone fusca	Western Gerygone	LC	X	X	X	X	X	X	X	X
Pardalotus punctatus	Spotted Pardalote	LC			X	X			X	
Pardalotus striatus	Striated Pardalote	LC	X		X	X			X	X
Sericornis frontalis	White-browed Scrubwren	Bh LC		X		X		X	X	X
Smicrornis brevirostris	Weebill	Bh LC	X		X	X	X	X	X	X

WC Act Status - S1 to S4, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DEC Priority Status - P1 to P5, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, Bush Forever Decreaser Species - Bh = habitat specialists, Bp = wide ranging species, Be = extinct in Perth Coastal Plain Region. IUCN Red List Category Definitions LC = Least Concern - see Appendix A and http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria for others.

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H
Meliphagidae Honeyeaters, Chats										
Acanthorhynchus superciliosus	Western Spinebill	LC	X	X	X	X			X	X
Anthochaera carunculata	Red Wattlebird	LC	X	X	X	X	X	X	X	X
Anthochaera lunulata	Western Little Wattlebird	Bp	X						X	X
Lichenostomus ornatus	Yellow-plumed Honeyeater	Bh LC								
Lichenostomus virescens	Singing Honeyeater	LC				X			X	
Lichmera indistincta	Brown Honeyeater	LC	X	X	X	X	X	X	X	X
Melithreptus brevirostris	Brown-headed Honeyeater	LC								
Melithreptus chloropsis	Western White-naped Honeyeater	LC	X	X						X
Phylidonyris melanops	Tawny-crowned Honeyeater	Bp LC				X		X		
Phylidonyris nigra	White-cheeked Honeyeater	Bp LC								

WC Act Status - S1 to S4, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DEC Priority Status - P1 to P5, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, Bush Forever Decreaser Species - Bh = habitat specialists, Bp = wide ranging species, Be = extinct in Perth Coastal Plain Region. IUCN Red List Category Definitions LC = Least Concern - see Appendix A and http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria for others.

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H
Phylidonyris novaehollandiae	New Holland Honeyeater	Bp LC	X		X	X		X	X	X
Petroicidae Australian Robins										
Eopsaltria australis	Western Yellow Robin	Bh LC	X	X			X		X	X
Eopsaltria georgiana	White-breasted Robin	Bh LC		X						X
Microeca fascinans	Jacky Winter	LC					X			
Petroica cucullata	Hooded Robin	Bh				X				
Petroica goodenovii	Red-capped Robin	LC				X				
Petroica multicolor	Scarlet Robin	Bh LC	X	X	X	X	X		X	X
Pomatostomidae Babblers										
Pomatostomus superciliosus ashbyi	White-browed Babbler (Western spp)	P4	X							

WC Act Status - S1 to S4, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DEC Priority Status - P1 to P5, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, Bush Forever Decreaser Species - Bh = habitat specialists, Bp = wide ranging species, Be = extinct in Perth Coastal Plain Region. IUCN Red List Category Definitions LC = Least Concern - see Appendix A and http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria for others.

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H
Neosittidae Sitellas										
Daphoenositta chrysoptera	Varied Sittella	Bh LC	X	X	X	X			X	X
Pachycephalidae Crested Shrike-tit, Crested Bellbird, Shrike Thrushes, Whistlers										
Colluricincla harmonica	Grey Shrike-thrush	Bh LC	X	X		X	X	X	X	X
Pachycephala pectoralis	Golden Whistler	Bh LC	X	X	X	X	X		X	X
Pachycephala rufiventris	Rufous Whistler	LC			X	X			X	X
Dicruridae Monarchs, Magpie Lark, Flycatchers, Fantails, Drongo										
Grallina cyanoleuca	Magpie-lark	LC		X	X	X	X		X	X
Rhipidura fuliginosa	Grey Fantail	LC	X	X	X	X	X	X	X	X
Rhipidura leucophrys	Willie Wagtail	LC		X	X	X	X	X	X	X

WC Act Status - S1 to S4, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DEC Priority Status - P1 to P5, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, Bush Forever Decreaser Species - Bh = habitat specialists, Bp = wide ranging species, Be = extinct in Perth Coastal Plain Region. IUCN Red List Category Definitions LC = Least Concern - see Appendix A and http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria for others.

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H
Campephagidae Cuckoo-shrikes, Trillers										
Coracina novaehollandiae	Black-faced Cuckoo-shrike	LC		X	X	X	X	X	X	X
Lalage sueurii	White-winged Triller	LC				X				
Artamidae Woodswallows, Butcherbirds, Currawongs										
Artamus cyanopterus	Dusky Woodswallow	Bp LC		X		X		X	X	X
Cracticus nigrogularis	Pied Butcherbird	LC						X		
Cracticus tibicen	Australian Magpie	LC		X	X	X	X	X	X	X
Cracticus torquatus	Grey Butcherbird	LC		X	X	X			X	X
Strepera versicolor	Grey Currawong	Bp LC							X	
Corvidae Ravens, Crows										
Corvus coronoides	Australian Raven	LC	X	X	X	X	X	X	X	X

WC Act Status - S1 to S4, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DEC Priority Status - P1 to P5, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, Bush Forever Decreaser Species - Bh = habitat specialists, Bp = wide ranging species, Be = extinct in Perth Coastal Plain Region. IUCN Red List Category Definitions LC = Least Concern - see Appendix A and http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria for others.

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H
Motacillidae Old World Pipits, Wagtails										
Anthus novaeseelandiae	Australian Pipit	LC				X			X	
Passeridae Grass Finches, Mannikins, Sparrows										
Stagonopleura oculata	Red-eared Firetail	LC				X	X			
Dicaeidae Flowerpeckers										
Dicaeum hirundinaceum	Mistletoebird	LC								
Hirundinidae Swallows, Martins										
Hirundo ariel	Fairy Martin	LC				X				
Hirundo neoxena	Welcome Swallow	LC				X	X	X	X	X
Hirundo nigricans	Tree Martin	LC		X		X			X	X

WC Act Status - S1 to S4, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DEC Priority Status - P1 to P5, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, Bush Forever Decreaser Species - Bh = habitat specialists, Bp = wide ranging species, Be = extinct in Perth Coastal Plain Region. IUCN Red List Category Definitions LC = Least Concern - see Appendix A and http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria for others.

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H
Sylviidae Old World Warblers										
Cincloramphus cruralis	Brown Songlark	LC								
Cincloramphus mathewsi	Rufous Songlark	LC								X
Zosteropidae White-eyes										
Zosterops lateralis	Grey-breasted White-eye	LC		X	X	X	X	X	X	X

Mammals

Tachyglossidae Echidnas										
Tachyglossus aculeatus	Echidna	LC	X			X	X		X	X

WC Act Status - S1 to S4, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DEC Priority Status - P1 to P5, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, Bush Forever Decreaser Species - Bh = habitat specialists, Bp = wide ranging species, Be = extinct in Perth Coastal Plain Region. IUCN Red List Category Definitions LC = Least Concern - see Appendix A and http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria for others.

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H
Dasyuridae Carnivorous Marsupials										
Antechinus flavipes	Yellow-footed Antechinus	LC				X	X		X	X
Dasyurus geoffroii	Chuditch	S1 VU VU C1				X	X		X	X
Phascogale tapoatafa ssp	Southern Brush-tailed Phascogale	S1 NT								X
Sminthopsis gilberti	Gilbert`s Dunnart	LC							X	
Peramelidae Bandicoots										
Isoodon obesulus fusciventer	Southern Brown Bandicoot	P5 LC	X			X			X	X
Phalangeridae Brushtail Possums, Cuscuses										
Trichosurus vulpecula	Common Brushtail Possum	LC	X	X	X	X	X	X	X	X
Burramyidae Pygmy Possums										
Cercartetus concinnus	Western Pygmy-possum	LC								X

WC Act Status - S1 to S4, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DEC Priority Status - P1 to P5, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, Bush Forever Decreaser Species - Bh = habitat specialists, Bp = wide ranging species, Be = extinct in Perth Coastal Plain Region. IUCN Red List Category Definitions LC = Least Concern - see Appendix A and http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria for others.

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H
Tarsipedidae Honey Possum										
Tarsipes rostratus	Honey Possum	LC								
Pseudocheiridae Ringtail Posssums										
Pseudocheirus occidentalis	Western Ringtail Possum	S1 VU VU C2a								X
Macropodidae Kangaroos, Wallabies										
Macropus fuliginosus	Western Grey Kangaroo	LC	X	X	X	X	X	X	X	X
Macropus irma	Western Brush Wallaby	P4 NT				X	X	X	X	X
Molossidae Freetail Bats										
Mormopterus planiceps	Western Freetail Bat	LC			X				X	
Tadarida australis	White-striped Freetail-bat	LC			X	X				

WC Act Status - S1 to S4, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DEC Priority Status - P1 to P5, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, Bush Forever Decreaser Species - Bh = habitat specialists, Bp = wide ranging species, Be = extinct in Perth Coastal Plain Region. IUCN Red List Category Definitions LC = Least Concern - see Appendix A and http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria for others.

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H
Vespertilionidae Ordinary Bats										
Chalinolobus gouldii	Gould`s Wattled Bat	LC			X	X			X	
Chalinolobus morio	Chocolate Wattled Bat	LC			X					
Falsistrellus mackenziei	Western False Pipistrelle	P4 VU A2c			X					
Nyctophilus geoffroyi	Lesser Long-eared Bat	LC			X				X	
Nyctophilus gouldi	Gould`s Long-eared Bat	LC								
Nyctophilus timoriensis	Western Long-eared Bat	DD								
Vespadelus regulus	Southern Forest Bat	LC			X				X	

WC Act Status - S1 to S4, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DEC Priority Status - P1 to P5, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, Bush Forever Decreaser Species - Bh = habitat specialists, Bp = wide ranging species, Be = extinct in Perth Coastal Plain Region. IUCN Red List Category Definitions LC = Least Concern - see Appendix A and http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria for others.

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H
Muridae Rats, Mice										
Mus musculus	House Mouse	Introduced				X			X	
Rattus fuscipes	Western Bush Rat	LC								
Rattus rattus	Black Rat	Introduced								X
Canidae Dogs, Foxes										
Canis lupus	Dog	Introduced			X	X	X		X	
Vulpes vulpes	Red Fox	Introduced			X	X	X		X	
Felidae Cats										
Felis catus	Cat	Introduced			X					
Suidae Pigs										
Sus scrofa	Pig	Introduced	X			X	X			X

WC Act Status - S1 to S4, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DEC Priority Status - P1 to P5, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, Bush Forever Decreaser Species - Bh = habitat specialists, Bp = wide ranging species, Be = extinct in Perth Coastal Plain Region. IUCN Red List Category Definitions LC = Least Concern - see Appendix A and http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria for others.

Class **Family** *Species*	Common Name	Conservation Status	A	B	C	D	E	F	G	H
Leporidae Rabbits, Hares										
Oryctolagus cuniculus	Rabbit	Introduced	X	X		X	X	X	X	X

WC Act Status - S1 to S4, EPBC Act Status - EN = Endangered, VU = Vulnerable, EX = Extinct, DEC Priority Status - P1 to P5, Int. Agmts - CA = CAMBA, JA = JAMBA, RK = ROKAMBA, Bush Forever Decreaser Species - Bh = habitat specialists, Bp = wide ranging species, Be = extinct in Perth Coastal Plain Region. IUCN Red List Category Definitions LC = Least Concern - see Appendix A and http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria for others.

APPENDIX C

DPaW & EPBC DATABASE SEARCH RESULTS

NatureMap
Mapping Western Australia's biodiversity

NatureMap - Invertebrates - Cardiff

Created By Greg Harewood on 22/11/2013

Kingdom	Animalia
Current Names Only	Yes
Core Datasets Only	Yes
Species Group	Invertebrates
Method	'By Circle'
Centre	116°14' 42" E,33°26' 07" S
Buffer	10km

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
1.	33939	*Cherax cainii (Marron)*			
2.	33988	*Pachysaga munggai (cricket)*		P3	

Conservation Codes
T - Rare or likely to become extinct
X - Presumed extinct
IA - Protected under international agreement
S - Other specially protected fauna
1 - Priority 1
2 - Priority 2
3 - Priority 3
4 - Priority 4
5 - Priority 5

[1] For NatureMap's purposes, species flagged as endemic are those whose records are wholely contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.

NatureMap - Frogs - Cardiff

Created By Greg Harewood on 22/11/2013

Kingdom	Animalia
Current Names Only	Yes
Core Datasets Only	Yes
Species Group	Amphibians
Method	'By Circle'
Centre	116°14' 42" E,33°26' 07" S
Buffer	10km

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
1.	25398	*Crinia georgiana (Quacking Frog)*			
2.	25399	*Crinia glauerti (Clicking Frog)*			
3.	25404	*Geocrinia leai (Ticking Frog)*			
4.	25410	*Heleioporus eyrei (Moaning Frog)*			
5.	25411	*Heleioporus inornatus (Whooping Frog)*			
6.	25415	*Limnodynastes dorsalis (Western Banjo Frog)*			
7.	25378	*Litoria adelaidensis (Slender Tree Frog)*			

Conservation Codes
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X - Presumed extinct
IA - Protected under international agreement
S - Other specially protected fauna
1 - Priority 1
2 - Priority 2
3 - Priority 3
4 - Priority 4
5 - Priority 5

[1] For NatureMap's purposes, species flagged as endemic are those whose records are wholely contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.

NatureMap
Mapping Western Australia's biodiversity

NatureMap - Reptiles - Cardiff

Created By Greg Harewood on 22/11/2013

Kingdom Animalia
Current Names Only Yes
Core Datasets Only Yes
Species Group Reptiles
Method 'By Circle'
Centre 116°14' 42" E,33°26' 07" S
Buffer 10km

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
1.	42368	*Acritoscincus trilineatus (Western Three-lined Skink)*			
2.	24990	*Aprasia pulchella (Granite Worm-lizard)*			
3.	30893	*Cryptoblepharus buchananii*			
4.	25035	*Ctenotus delli (Dell's Ctenotus, Darling Range Heath Ctenotus)*		P4	
5.	25047	*Ctenotus impar*			
6.	25100	*Egernia napoleonis*			
7.	30919	*Hemiergis gracilipes*			
8.	25118	*Hemiergis peronii subsp. tridactyla*			
9.	25131	*Lerista distinguenda*			
10.	25192	*Morethia obscura*			
11.	25252	*Notechis scutatus (Tiger Snake)*			
12.	25259	*Pseudonaja affinis subsp. affinis (Dugite)*			
13.	25285	*Ramphotyphlops pinguis*			
14.	25519	*Tiliqua rugosa*			

Conservation Codes
T - Rare or likely to become extinct
X - Presumed extinct
IA - Protected under international agreement
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1 - Priority 1
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3 - Priority 3
4 - Priority 4
5 - Priority 5

[1] For NatureMap's purposes, species flagged as endemic are those whose records are wholely contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.

NatureMap
Mapping Western Australia's biodiversity

NatureMap - Birds - Cardiff

Created By Greg Harewood on 22/11/2013

Kingdom Animalia
Current Names Only Yes
Core Datasets Only Yes
Species Group Birds
Method 'By Circle'
Centre 116°14' 42" E,33°26' 07" S
Buffer 10km

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
1.	24260	*Acanthiza apicalis (Broad-tailed Thornbill, Inland Thornbill)*			
2.	24261	*Acanthiza chrysorrhoa (Yellow-rumped Thornbill)*			
3.	24262	*Acanthiza inornata (Western Thornbill)*			
4.	24560	*Acanthorhynchus superciliosus (Western Spinebill)*			
5.	24316	*Anas superciliosa (Pacific Black Duck)*			
6.	24561	*Anthochaera carunculata (Red Wattlebird)*			
7.	24562	*Anthochaera lunulata (Western Little Wattlebird)*			
8.	24285	*Aquila audax (Wedge-tailed Eagle)*			
9.	25566	*Artamus cinereus (Black-faced Woodswallow)*			
10.	24353	*Artamus cyanopterus (Dusky Woodswallow)*			
11.	25598	*Cacomantis flabelliformis (Fan-tailed Cuckoo)*			
12.	42307	*Cacomantis pallidus (Pallid Cuckoo)*			
13.	25717	*Calyptorhynchus banksii (Red-tailed Black-Cockatoo)*			
14.	24731	*Calyptorhynchus banksii subsp. naso (Forest Red-tailed Black-Cockatoo)*		T	
15.	24733	*Calyptorhynchus baudinii (Baudin's Cockatoo (long-billed black-cockatoo), Baudin's Cockatoo)*		T	
16.	24734	*Calyptorhynchus latirostris (Carnaby's Cockatoo (short-billed black-cockatoo), Carnaby's Cockatoo)*		T	
17.	24321	*Chenonetta jubata (Australian Wood Duck, Wood Duck)*			
18.	24834	*Cincloramphus mathewsi (Rufous Songlark)*			
19.	25675	*Colluricincla harmonica (Grey Shrike-thrush)*			
20.	25568	*Coracina novaehollandiae (Black-faced Cuckoo-shrike)*			
21.	25592	*Corvus coronoides (Australian Raven)*			
22.	25595	*Cracticus tibicen (Australian Magpie)*			
23.	25596	*Cracticus torquatus (Grey Butcherbird)*			
24.	30901	*Dacelo novaeguineae (Laughing Kookaburra)*	Y		
25.	25673	*Daphoenositta chrysoptera (Varied Sittella)*			
26.	25692	*Eopsaltria australis (Yellow Robin)*			
27.	24651	*Eopsaltria australis subsp. griseogularis (Western Yellow Robin)*			
28.	24652	*Eopsaltria georgiana (White-breasted Robin)*			
29.	25622	*Falco cenchroides (Australian Kestrel)*			
30.	25624	*Falco peregrinus (Peregrine Falcon)*		S	
31.	25530	*Gerygone fusca (Western Gerygone)*			
32.	24735	*Glossopsitta porphyrocephala (Purple-crowned Lorikeet)*			
33.	24443	*Grallina cyanoleuca (Magpie-lark)*			
34.	24491	*Hirundo neoxena (Welcome Swallow)*			
35.	25629	*Hirundo nigricans (Tree Martin)*			
36.	25661	*Lichmera indistincta (Brown Honeyeater)*			
37.	25650	*Malurus elegans (Red-winged Fairy-wren)*			
38.	25654	*Malurus splendens (Splendid Fairy-wren)*			
39.	24587	*Melithreptus chloropsis (Western White-naped Honeyeater)*			
40.	24598	*Merops ornatus (Rainbow Bee-eater)*		IA	
41.	25610	*Myiagra inquieta (Restless Flycatcher)*			
42.	24738	*Neophema elegans (Elegant Parrot)*			
43.	25679	*Pachycephala pectoralis (Golden Whistler)*			
44.	25680	*Pachycephala rufiventris (Rufous Whistler)*			
45.	25682	*Pardalotus striatus (Striated Pardalote)*			
46.	25695	*Petroica multicolor (Scarlet Robin)*			
47.	24409	*Phaps chalcoptera (Common Bronzewing)*			
48.	25587	*Phaps elegans (Brush Bronzewing)*			
49.	24596	*Phylidonyris novaehollandiae (New Holland Honeyeater)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
50.	25720	*Platycercus icterotis (Western Rosella)*			
51.	24745	*Platycercus icterotis subsp. icterotis (Western Rosella)*			
52.	24747	*Platycercus spurius (Red-capped Parrot)*			
53.	25721	*Platycercus zonarius (Australian Ringneck, Ring-necked Parrot)*			
54.	25703	*Podargus strigoides (Tawny Frogmouth)*			
55.	25613	*Rhipidura fuliginosa (Grey Fantail)*			
56.	25614	*Rhipidura leucophrys (Willie Wagtail)*			
57.	25616	*Rhipidura rufiventris (Northern Fantail)*			
58.	25534	*Sericornis frontalis (White-browed Scrubwren)*			
59.	30948	*Smicrornis brevirostris (Weebill)*			
60.	25549	*Todiramphus sanctus (Sacred Kingfisher)*			
61.	25765	*Zosterops lateralis (Grey-breasted White-eye, Silvereye)*			

Conservation Codes
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1 - Priority 1
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NatureMap - Mammals - Cardiff

Created By Greg Harewood on 22/11/2013

Kingdom Animalia
Current Names Only Yes
Core Datasets Only Yes
Species Group Mammals
Method 'By Circle'
Centre 116°14' 42" E,33°26' 07" S
Buffer 10km

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
1.	25449	*Antechinus flavipes (Yellow-footed Antechinus)*			
2.	24088	*Antechinus flavipes subsp. leucogaster (Yellow-footed Antechinus, Mardo)*			
3.	24086	*Cercartetus concinnus (Western Pygmy-possum, Mundarda)*			
4.	24092	*Dasyurus geoffroii (Chuditch, Western Quoll)*		T	
5.	24153	*Isoodon obesulus subsp. fusciventer (Quenda, Southern Brown Bandicoot)*		P5	
6.	24132	*Macropus fuliginosus (Western Grey Kangaroo)*			
7.	24133	*Macropus irma (Western Brush Wallaby)*		P4	
8.	24146	*Myrmecobius fasciatus (Numbat, Walpurti)*		T	
9.	24085	*Oryctolagus cuniculus (Rabbit)*	Y		
10.	25508	*Phascogale tapoatafa (Brush-tailed Phascogale)*			
11.	34045	*Phascogale tapoatafa subsp. (WAM M434) (Brush-tailed Phascogale (SW subsp), Wambenger)*		T	
12.	24166	*Pseudocheirus occidentalis (Western Ringtail Possum)*		T	
13.	24245	*Rattus rattus (Black Rat)*	Y		
14.	24145	*Setonix brachyurus (Quokka)*		T	
15.	24259	*Sus scrofa (Pig)*	Y		
16.	24207	*Tachyglossus aculeatus (Short-beaked Echidna)*			
17.	24158	*Trichosurus vulpecula subsp. vulpecula (Common Brushtail Possum)*			

Conservation Codes
T - Rare or likely to become extinct
X - Presumed extinct
IA - Protected under international agreement
S - Other specially protected fauna
1 - Priority 1
2 - Priority 2
3 - Priority 3
4 - Priority 4
5 - Priority 5

[1] For NatureMap's purposes, species flagged as endemic are those whose records are wholely contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.

Australian Government
Department of the Environment

EPBC Act Protected Matters Report

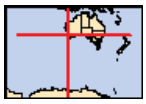
This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 22/11/13 16:24:35

Coordinates
Buffer: 0.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Areas:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	8
Listed Migratory Species:	6

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place and the heritage values of a place on the Register of the National Estate.

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	6
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

Place on the RNE:	None
State and Territory Reserves:	None
Regional Forest Agreements:	1
Invasive Species:	15
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Calyptorhynchus banksii naso		
Forest Red-tailed Black-Cockatoo [67034]	Vulnerable	Species or species habitat may occur within area
Calyptorhynchus baudinii		
Baudin's Black-Cockatoo, Long-billed Black-Cockatoo [769]	Vulnerable	Breeding likely to occur within area
Calyptorhynchus latirostris		
Carnaby's Black-Cockatoo, Short-billed Black-Cockatoo [59523]	Endangered	Breeding likely to occur within area
Leipoa ocellata		
Malleefowl [934]	Vulnerable	Species or species habitat may occur within area
Mammals		
Dasyurus geoffroii		
Chuditch, Western Quoll [330]	Vulnerable	Species or species habitat likely to occur within area
Pseudocheirus occidentalis		
Western Ringtail Possum [25911]	Vulnerable	Species or species habitat may occur within area
Setonix brachyurus		
Quokka [229]	Vulnerable	Species or species habitat may occur within area
Plants		
Diuris micrantha		
Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat likely to occur within area

Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		

Name	Threatened	Type of Presence
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Haliaeetus leucogaster		
White-bellied Sea-Eagle [943]		Species or species habitat may occur within area
Leipoa ocellata		
Malleefowl [934]	Vulnerable	Species or species habitat may occur within area
Merops ornatus		
Rainbow Bee-eater [670]		Species or species habitat may occur within area
Migratory Wetlands Species		
Ardea alba		
Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis		
Cattle Egret [59542]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba		
Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis		
Cattle Egret [59542]		Species or species habitat likely to occur within area
Haliaeetus leucogaster		
White-bellied Sea-Eagle [943]		Species or species habitat may occur within area
Merops ornatus		
Rainbow Bee-eater [670]		Species or species habitat may occur within area
Pandion haliaetus		
Osprey [952]		Species or species habitat may occur within area

Extra Information

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included.

Name	State
South West WA RFA	Western Australia

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Streptopelia senegalensis Laughing Turtle-dove, Laughing Dove [781]		Species or species habitat likely to occur within area
Mammals		
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species

Name	Status	Type of Presence
		habitat may occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area

Coordinates

-33.43535 116.24489

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World Heritage and Register of National Estate properties, Wetlands of International Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Department of Environment, Climate Change and Water, New South Wales
-Department of Sustainability and Environment, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment and Natural Resources, South Australia
-Parks and Wildlife Service NT, NT Dept of Natural Resources, Environment and the Arts
-Environmental and Resource Management, Queensland
-Department of Environment and Conservation, Western Australia
-Department of the Environment, Climate Change, Energy and Water
-Birds Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-SA Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Atherton and Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
-State Forests of NSW
-Geoscience Australia
-CSIRO
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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APPENDIX D

HABITAT TREE DETAILS

Habitat Trees
Datum - GDA94

Waypoint Number	Zone	mE	mN	Tree Species	Tree Height (m)	Number of Hollows	Hollow Type 1	Hollow Size 1 (cm)	Hollow Type 2	Hollow Size 2 (cm)	Hollow Type 3	Hollow Size 3 (cm)	Hollow Type 4	Hollow Size 4 (cm)	Hollow Type 5	Hollow Size 5 (cm)	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt001	50H	430613	6300224	Jarrah	15-20	0											No Signs	No Signs	No	
wpt002	50H	430702	6300266	Marri	15-20	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt003	50H	430704	6300262	Jarrah	15-20	0											No Signs	No Signs	No	
wpt004	50H	430715	6300236	Jarrah	20+	0											No Signs	No Signs	No	
wpt005	50H	430722	6300198	Jarrah	15-20	1	Spout Branch	5-12									No Signs	No Signs	No	Depth of hollows unknown
wpt006	50H	430714	6300195	Marri	15-20	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt007	50H	430726	6300172	Marri	15-20	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt008	50H	430725	6300148	Marri	20+	1	Spout Branch	5-12									No Signs	No Signs	No	Depth of hollows unknown
wpt009	50H	430728	6300130	Jarrah	0-5	0											No Signs	No Signs	No	
wpt010	50H	430737	6300131	Jarrah	20+	2	Knot Hole	5-12	Branch	5-12							No Signs	No Signs	No	Depth of hollows unknown
wpt011	50H	430736	6300121	Jarrah	15-20	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt012	50H	430743	6300121	Jarrah	20+	5+	Knot Hole	<5	Branch	5-12	Branch	<5	Branch	5-12	Branch	<5	No Signs	No Signs	No	Depth of hollows unknown
wpt013	50H	430744	6300103	Jarrah	20+	0											No Signs	No Signs	No	
wpt014	50H	430749	6300100	Jarrah	20+	0											No Signs	No Signs	No	
wpt015	50H	430737	6300092	Jarrah	20+	0											No Signs	No Signs	No	
wpt016	50H	430731	6300080	Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt017	50H	430725	6300073	Jarrah	20+	0											No Signs	No Signs	No	
wpt019	50H	430750	6300019	Jarrah	15-20	2	Spout Branch	12-20	Spout Trunk	20+							No Signs	No Signs	Yes	Depth of hollows unknown
wpt020	50H	430744	6300018	Marri	20+	0											No Signs	No Signs	No	
wpt022	50H	430764	6299914	Jarrah	15-20	0											No Signs	No Signs	No	
wpt023	50H	430752	6299900	Jarrah	15-20	2	Spout Branch	5-12	Spout Branch	5-12							No Signs	No Signs	No	Depth of hollows unknown
wpt024	50H	430770	6299899	Marri	20+	5+	Spout Branch	5-12	Spout Branch	5-12	Spout	5-12	Spout Branch	5-12	Spout Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt025	50H	430769	6299893	Jarrah	15-20	2	Spout Branch	5-12	Spout Branch	5-12							No Signs	No Signs	No	Depth of hollows unknown
wpt026	50H	430788	6299902	Jarrah	15-20	1	Spout Trunk	5-12									No Signs	No Signs	No	Depth of hollows unknown
wpt027	50H	430790	6299907	Jarrah	15-20	0											No Signs	No Signs	No	
wpt028	50H	430789	6299890	Jarrah	15-20	0											No Signs	No Signs	No	
wpt029	50H	430447	6300139	Marri	20+	0											No Signs	No Signs	No	
wpt030	50H	430779	6299872	Jarrah	15-20	0											No Signs	No Signs	No	
wpt031	50H	430758	6299857	Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt032	50H	430761	6299856	Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt033	50H	430761	6299848	Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt034	50H	430743	6299843	Jarrah	15-20	5+	Branch	<5	Branch	5-12	Branch	<5	Branch	5-12	Branch	<5	No Signs	No Signs	No	Depth of hollows unknown
wpt035	50H	430749	6299822	Jarrah	15-20	5+	Branch	5-12	Spout Branch	12-20	Branch	5-12	Branch	5-12	Branch	5-12	Bees	No Signs	No	Depth of hollows unknown
wpt036	50H	430739	6299822	Marri	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt037	50H	430754	6299807	Jarrah	15-20	1	Spout Trunk	20+									No Signs	No Signs	No	Depth of hollows unknown
wpt038	50H	430755	6299792	Jarrah	20+	5+	Branch	5-12	Branch	12-20	Branch	5-12	Spout Branch	20+	Spout Branch	20+	No Signs	No Signs	Yes	Depth of hollows unknown
wpt039	50H	430740	6299785	Jarrah	20+	2	Fissure	12-20	Spout Branch	12-20							No Signs	No Signs	Yes	Depth of hollows unknown
wpt040	50H	430765	6299778	Jarrah	15-20	2	Knot Hole	5-12	Knot Hole	5-12							No Signs	No Signs	No	Depth of hollows unknown
wpt041	50H	430769	6299775	Jarrah	0-5	0											No Signs	No Signs	No	
wpt042	50H	430771	6299760	Jarrah	15-20	1	Spout Trunk	20+									No Signs	No Signs	Yes	Depth of hollows unknown
wpt043	50H	430799	6299777	Jarrah	15-20	0											No Signs	No Signs	No	
wpt044	50H	430789	6299804	Dead Unknown	5-10	1	Spout Trunk										No Signs	No Signs	No	Too shallow
wpt045	50H	430802	6299829	Jarrah	20+	0											No Signs	No Signs	No	
wpt046	50H	430787	6299852	Jarrah	15-20	1	Spout Branch	12-20									No Signs	No Signs	No	Depth of hollows unknown
wpt047	50H	430769	6299852	Dead Jarrah	10-15	1	Spout Trunk	12-20									No Signs	No Signs	No	Depth of hollows unknown
wpt048	50H	430769	6299841	Jarrah	20+	0											No Signs	No Signs	No	
wpt049	50H	430768	6299829	Jarrah	15-20	0											No Signs	No Signs	No	
wpt050	50H	430769	6299827	Jarrah	15-20	0											No Signs	No Signs	No	
wpt051	50H	430770	6299801	Jarrah	20+	0											No Signs	No Signs	No	
wpt052	50H	430803	6299724	Jarrah	20+	0											No Signs	No Signs	No	
wpt053	50H	430801	6299717	Jarrah	20+	0											No Signs	No Signs	No	
wpt054	50H	430786	6299711	Jarrah	20+	2	Branch	5-12	Branch	5-12							No Signs	No Signs	No	Depth of hollows unknown
wpt055	50H	430817	6299691	Jarrah	15-20	0											No Signs	No Signs	No	
wpt056	50H	430810	6299684	Dead Jarrah	10-15	1	Spout Trunk	12-20									No Signs	No Signs	No	Depth of hollows unknown
wpt057	50H	430817	6299675	Jarrah	15-20	1	Branch	5-12									No Signs	No Signs	No	Depth of hollows unknown
wpt058	50H	430816	6299675	Jarrah	15-20	1	Spout Branch	5-12									No Signs	No Signs	No	Depth of hollows unknown
wpt059	50H	430830	6299623	Jarrah	15-20	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Spout Branch	12-20	No Signs	No Signs	No	Depth of hollows unknown
wpt060	50H	430830	6299615	Jarrah	5-10	2	Branch	5-12	Branch	5-12							No Signs	No Signs	No	Depth of hollows unknown
wpt061	50H	430844	6299616	Jarrah	20+	0											No Signs	No Signs	No	
wpt062	50H	430819	6299583	Jarrah	15-20	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt063	50H	430850	6299582	Jarrah	15-20	1	Spout Trunk	20+									No Signs	No Signs	No	Depth of hollows unknown
wpt064	50H	430852	6299586	Jarrah	15-20	4	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12			No Signs	No Signs	No	Depth of hollows unknown

Waypoint Number	Zone	mE	mN	Tree Species	Tree Height (m)	Number of Hollows	Hollow Type 1	Hollow Size 1 (cm)	Hollow Type 2	Hollow Size 2 (cm)	Hollow Type 3	Hollow Size 3 (cm)	Hollow Type 4	Hollow Size 4 (cm)	Hollow Type 5	Hollow Size 5 (cm)	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt065	50H	430861	6299554	Jarrah	20+	0											No Signs	No Signs	No	
wpt066	50H	430850	6299510	Jarrah	5-10	1	Spout Trunk	20+									No Signs	No Signs	No	Too shallow
wpt067	50H	430831	6299491	Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Spout Branch	12-20	Spout Trunk	20+	No Signs	No Signs	No	Depth of hollows unknown
wpt068	50H	430853	6299461	Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt069	50H	430835	6299463	Jarrah	20+	0											No Signs	No Signs	No	
wpt070	50H	430829	6299462	Marri	20+	0											No Signs	No Signs	No	
wpt071	50H	430872	6299428	Jarrah	15-20	0											No Signs	No Signs	No	
wpt072	50H	430878	6299402	Jarrah	20+	0											No Signs	No Signs	No	
wpt073	50H	430887	6299359	Jarrah	15-20	2	Branch	5-12	Branch	5-12							No Signs	No Signs	No	Depth of hollows unknown
wpt074	50H	430864	6299357	Jarrah	20+	0											No Signs	No Signs	No	
wpt075	50H	430853	6299356	Jarrah	15-20	3	Branch	5-12	Branch	5-12	Branch	5-12					No Signs	No Signs	No	Depth of hollows unknown
wpt076	50H	430864	6299348	Dead Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt077	50H	430866	6299342	Jarrah	20+	0											No Signs	No Signs	No	
wpt078	50H	430883	6299331	Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt079	50H	430888	6299308	Dead Jarrah	0-5	1	Spout Trunk	20+									No Signs	No Signs	No	Depth of hollows unknown
wpt080	50H	430896	6299304	Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt081	50H	430904	6299297	Jarrah	15-20	0											No Signs	No Signs	No	
wpt082	50H	430924	6299290	Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt083	50H	430927	6299276	Marri	20+	0											No Signs	No Signs	No	
wpt084	50H	430898	6299272	Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt085	50H	430880	6299270	Jarrah	20+	3	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt086	50H	430846	6299324	Marri	20+	0											No Signs	No Signs	No	
wpt087	50H	430841	6299320	Marri	20+	0											No Signs	No Signs	No	
wpt088	50H	430853	6299334	Marri	20+	0											No Signs	No Signs	No	
wpt089	50H	430834	6299341	Jarrah	15-20	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt090	50H	430829	6299336	Marri	15-20	0											No Signs	No Signs	No	
wpt091	50H	430829	6299330	Jarrah	15-20	1	Spout Branch	5-12									No Signs	No Signs	No	Depth of hollows unknown
wpt092	50H	430838	6299379	Marri	20+	0											No Signs	No Signs	No	
wpt093	50H	430845	6299393	Marri	20+	0											No Signs	No Signs	No	
wpt094	50H	430812	6299376	Jarrah	15-20	3	Fissure	5-12	Branch	5-12	Branch	5-12					No Signs	No Signs	No	Depth of hollows unknown
wpt095	50H	430830	6299428	Jarrah	15-20	1	Fissure	12-20									Bees	No Signs	No	Depth of hollows unknown
wpt096	50H	430796	6299455	Dead Jarrah	10-15	4	Branch	5-12	Spout Branch	5-12	Spout	5-12	Branch	5-12			No Signs	No Signs	No	Depth of hollows unknown
wpt097	50H	430792	6299455	Jarrah	20+	0											No Signs	No Signs	No	
wpt098	50H	430821	6299493	Jarrah	20+	0											No Signs	No Signs	No	
wpt099	50H	430811	6299512	Jarrah	20+	5+	Knot Hole	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt100	50H	430798	6299516	Dead Jarrah	15-20	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt101	50H	430798	6299527	Marri	15-20	0											No Signs	No Signs	No	
wpt102	50H	430782	6299529	Jarrah	20+	1	Fissure	5-12									No Signs	No Signs	No	Depth of hollows unknown
wpt103	50H	430801	6299555	Dead Jarrah	15-20	2	Spout Branch	20+	Spout Branch	20+							No Signs	No Signs	Yes	Depth of hollows unknown
wpt104	50H	430815	6299535	Jarrah	15-20	0											No Signs	No Signs	No	
wpt105	50H	430823	6299557	Marri	15-20	1	Spout Trunk	20+									No Signs	No Signs	Yes	Depth of hollows unknown
wpt106	50H	430800	6299584	Jarrah	15-20	0											No Signs	No Signs	No	
wpt107	50H	430791	6299579	Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt108	50H	430761	6299575	Dead Unknown	5-10	1	Spout Trunk	20+									No Signs	No Signs	No	Too low/shallow
wpt109	50H	430801	6299621	Jarrah	15-20	4	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12			No Signs	No Signs	No	Depth of hollows unknown
wpt110	50H	430801	6299622	Jarrah	15-20	1	Knot Hole	5-12									No Signs	No Signs	No	Depth of hollows unknown
wpt111	50H	430776	6299612	Jarrah	20+	1	Knot Hole	5-12									No Signs	No Signs	No	Depth of hollows unknown
wpt112	50H	430755	6299612	Jarrah	20+	4	Knot Hole	5-12	Branch	5-12	Branch	5-12	Branch	5-12			No Signs	No Signs	No	Depth of hollows unknown
wpt113	50H	430782	6299641	Jarrah	20+	0											No Signs	No Signs	No	
wpt114	50H	430770	6299645	Marri	15-20	0											No Signs	No Signs	No	
wpt115	50H	430787	6299655	Jarrah	15-20	0											No Signs	No Signs	No	
wpt116	50H	430772	6299668	Jarrah	20+	0											No Signs	No Signs	No	
wpt117	50H	430777	6299666	Jarrah	20+	4	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12			No Signs	No Signs	No	Depth of hollows unknown
wpt118	50H	430784	6299676	Jarrah	20+	0											No Signs	No Signs	No	
wpt119	50H	430756	6299667	Jarrah	20+	0											No Signs	No Signs	No	
wpt120	50H	430747	6299657	Jarrah	20+	0											No Signs	No Signs	No	
wpt121	50H	430738	6299648	Jarrah	20+	5+	Knot Hole	5-12	Knot Hole	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt122	50H	430741	6299681	Jarrah	15-20	0											No Signs	No Signs	No	
wpt123	50H	430752	6299695	Jarrah	15-20	0											No Signs	No Signs	No	
wpt124	50H	430755	6299730	Jarrah	20+	5+	Knot Hole	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	12-20	No Signs	No Signs	No	Depth of hollows unknown
wpt125	50H	430717	6299732	Jarrah	20+	5+	Knot Hole	5-12	Knot Hole	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt126	50H	430720	6299751	Jarrah	20+	0											No Signs	No Signs	No	
wpt127	50H	430733	6299776	Jarrah	15-20	5+	Branch	5-12	Branch	12-20	Spout	12-20	Spout Branch	12-20	Branch	5-12	No Signs	No Signs	Yes	Depth of hollows unknown
wpt128	50H	430726	6299789	Jarrah	15-20	0											No Signs	No Signs	No	
wpt129	50H	430728	6299795	Jarrah	15-20	2	Branch	5-12	Branch	5-12							No Signs	No Signs	No	Depth of hollows unknown
wpt130	50H	430707	6299794	Jarrah	15-20	0											No Signs	No Signs	No	

Waypoint Number	Zone	mE	mN	Tree Species	Tree Height (m)	Number of Hollows	Hollow Type 1	Hollow Size 1 (cm)	Hollow Type 2	Hollow Size 2 (cm)	Hollow Type 3	Hollow Size 3 (cm)	Hollow Type 4	Hollow Size 4 (cm)	Hollow Type 5	Hollow Size 5 (cm)	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt131	50H	430739	6299850	Jarrah	15-20	0											No Signs	No Signs	No	
wpt132	50H	430717	6299868	Jarrah	15-20	0											No Signs	No Signs	No	
wpt133	50H	430716	6299881	Jarrah	15-20	0											No Signs	No Signs	No	
wpt134	50H	430727	6299884	Jarrah	15-20	0											No Signs	No Signs	No	
wpt135	50H	430705	6299875	Jarrah	15-20	2	Spout Branch	5-12	Spout Branch	5-12							No Signs	No Signs	No	Depth of hollows unknown
wpt136	50H	430700	6299894	Jarrah	20+	0											No Signs	No Signs	No	
wpt137	50H	430704	6299925	Marri	20+	0											No Signs	No Signs	No	
wpt138	50H	430705	6299940	Jarrah	15-20	1	Spout Trunk	12-20									No Signs	No Signs	No	Depth of hollows unknown
wpt139	50H	430707	6299932	Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt140	50H	430714	6299908	Jarrah	15-20	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt141	50H	430730	6299889	Marri	20+	0											No Signs	No Signs	No	
wpt142	50H	430737	6299959	Marri	20+	0											No Signs	No Signs	No	
wpt143	50H	430706	6299958	Jarrah	20+	5+	Knot Hole	5-12	Branch	<5	Branch	5-12	Branch	<5	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt144	50H	430681	6299941	Jarrah	15-20	0											No Signs	No Signs	No	
wpt145	50H	430672	6299934	Jarrah	20+	3	Fissure	5-12	Branch	5-12	Knot Hole	5-12					No Signs	No Signs	No	Depth of hollows unknown
wpt146	50H	430674	6299922	Jarrah	15-20	0											No Signs	No Signs	No	
wpt147	50H	430668	6299941	Marri	15-20	0											No Signs	No Signs	No	
wpt148	50H	430661	6300009	Marri	20+	0											No Signs	No Signs	No	
wpt149	50H	430681	6300055	Jarrah	20+	0											No Signs	No Signs	No	
wpt150	50H	430681	6300046	Jarrah	20+	0											No Signs	No Signs	No	
wpt151	50H	430711	6300055	Jarrah	15-20	1	Spout Trunk	20+									No Signs	No Signs	No	Depth of hollows unknown
wpt152	50H	430713	6300045	Jarrah	15-20	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt153	50H	430720	6300017	Dead Unknown	0-5	1	Spout Trunk	20+									No Signs	No Signs	No	Too low/shallow
wpt154	50H	430694	6300012	Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt155	50H	430706	6299984	Jarrah	20+	5+	Knot Hole	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt156	50H	430709	6300069	Jarrah	15-20	0											No Signs	No Signs	No	
wpt157	50H	430700	6300064	Jarrah	15-20	2	Branch	5-12	Branch	5-12							No Signs	No Signs	No	Depth of hollows unknown
wpt158	50H	430682	6300062	Jarrah	20+	5+	Branch	5-12	Branch	12-20	Branch	5-12	Branch	12-20	Spout Branch	12-20	No Signs	No Signs	Yes	Depth of hollows unknown
wpt159	50H	430678	6300071	Jarrah	15-20	5+	Knot Hole	12-20	Knot Hole	12-20	Branch	<5	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt160	50H	430640	6300080	Jarrah	15-20	0											No Signs	No Signs	No	
wpt161	50H	430651	6300074	Jarrah	15-20	0											No Signs	No Signs	No	
wpt162	50H	430658	6300081	Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Spout Branch	12-20	No Signs	No Signs	No	Depth of hollows unknown
wpt163	50H	430662	6300071	Jarrah	15-20	5+	Branch	<5	Branch	5-12	Branch	<5	Branch	5-12	Branch	<5	No Signs	No Signs	No	Depth of hollows unknown
wpt164	50H	430674	6300080	Jarrah	20+	5+	Branch	<5	Branch	5-12	Branch		Branch	5-12	Branch	<5	No Signs	No Signs	No	Depth of hollows unknown
wpt165	50H	430662	6300094	Jarrah	15-20	4	Branch	5-12	Branch	5-12	Spout	5-12	Spout Branch	5-12			No Signs	No Signs	No	Depth of hollows unknown
wpt166	50H	430650	6300119	Jarrah	20+	0											No Signs	No Signs	No	
wpt167	50H	430651	6300123	Jarrah	20+	0											No Signs	No Signs	No	
wpt168	50H	430645	6300146	Jarrah	20+	0											No Signs	No Signs	No	
wpt169	50H	430621	6300160	Jarrah	20+	0											No Signs	No Signs	No	
wpt170	50H	430642	6300202	Marri	20+	0											No Signs	No Signs	No	
wpt172	50H	430681	6300110	Dead Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt173	50H	430678	6300109	Jarrah	10-15	1	Spout Trunk	12-20									No Signs	No Signs	No	Depth of hollows unknown
wpt174	50H	430687	6300097	Jarrah	15-20	1	Branch	5-12									No Signs	No Signs	No	Depth of hollows unknown
wpt175	50H	430694	6300085	Jarrah	15-20	0											No Signs	No Signs	No	
wpt176	50H	430710	6299514	Jarrah	15-20	1	Spout Branch	5-12									No Signs	No Signs	No	Depth of hollows unknown
wpt177	50H	430694	6299509	Jarrah	15-20	0											No Signs	No Signs	No	
wpt178	50H	430694	6299508	Jarrah	15-20	2	Spout Branch	5-12	Spout Branch	5-12							No Signs	No Signs	No	Depth of hollows unknown
wpt179	50H	430686	6299505	Jarrah	15-20	0											No Signs	No Signs	No	
wpt180	50H	430689	6299486	Marri	10-15	1	Spout Trunk	12-20									No Signs	No Signs	No	Depth of hollows unknown
wpt181	50H	430692	6299481	Jarrah	20+	0											No Signs	No Signs	No	
wpt182	50H	430689	6299480	Marri	15-20	2	Spout Branch	20+	Spout Trunk	20+							No Signs	No Signs	Yes	Depth of hollows unknown
wpt183	50H	430689	6299474	Jarrah	20+	0											No Signs	No Signs	No	
wpt184	50H	430680	6299468	Jarrah	20+	2	Branch	5-12	Branch	5-12							No Signs	No Signs	No	Depth of hollows unknown
wpt185	50H	430688	6299466	Jarrah	20+	0											No Signs	No Signs	No	
wpt186	50H	430677	6299451	Jarrah	15-20	1	Branch	5-12									No Signs	No Signs	No	Depth of hollows unknown
wpt187	50H	430677	6299448	Jarrah	20+	0											No Signs	No Signs	No	
wpt188	50H	430693	6299439	Jarrah	20+	1	Branch	5-12									No Signs	No Signs	No	Depth of hollows unknown
wpt189	50H	430696	6299437	Jarrah	20+	0											No Signs	No Signs	No	
wpt190	50H	430702	6299454	Dead Jarrah	15-20	3	Branch	5-12	Branch	5-12	Branch	5-12					No Signs	No Signs	No	Depth of hollows unknown
wpt191	50H	430712	6299466	Jarrah	20+	0											No Signs	No Signs	No	
wpt192	50H	430717	6299460	Jarrah	15-20	0											No Signs	No Signs	No	
wpt193	50H	430707	6299420	Jarrah	20+	0											No Signs	No Signs	No	
wpt194	50H	430722	6299422	Jarrah	20+	1	Knot Hole	20+									No Signs	No Signs	Yes	Depth of hollows unknown
wpt195	50H	430724	6299417	Dead Jarrah	15-20	5+	Branch	<5	Branch	5-12	Branch	<5	Branch	5-12	Branch	<5	No Signs	No Signs	No	Depth of hollows unknown
wpt196	50H	430729	6299409	Jarrah	20+	5+	Branch	5-12	Branch	12-20	Spout	20+	Spout Branch	12-20	Spout Branch	20+	No Signs	No Signs	No	Depth of hollows unknown
wpt197	50H	430735	6299405	Jarrah	15-20	3	Branch	5-12	Branch	5-12	Branch	5-12					No Signs	No Signs	No	Depth of hollows unknown

Waypoint Number	Zone	mE	mN	Tree Species	Tree Height (m)	Number of Hollows	Hollow Type 1	Hollow Size 1 (cm)	Hollow Type 2	Hollow Size 2 (cm)	Hollow Type 3	Hollow Size 3 (cm)	Hollow Type 4	Hollow Size 4 (cm)	Hollow Type 5	Hollow Size 5 (cm)	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt198	50H	430724	6299392	Jarrah	15-20	2	Spout Branch	5-12	Spout Branch	5-12							No Signs	No Signs	No	Depth of hollows unknown
wpt199	50H	430731	6299384	Jarrah	20+	3	Branch	5-12	Branch	5-12	Branch	5-12					No Signs	No Signs	No	Depth of hollows unknown
wpt200	50H	430734	6299374	Jarrah	15-20	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt201	50H	430748	6299348	Jarrah	20+	0											No Signs	No Signs	No	
wpt202	50H	430752	6299333	Jarrah	15-20	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt203	50H	430742	6299332	Jarrah	15-20	4	Knot Hole	5-12	Branch	5-12	Branch	5-12	Branch	5-12			No Signs	No Signs	No	Depth of hollows unknown
wpt204	50H	430754	6299311	Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt205	50H	430754	6299223	Jarrah	15-20	0											No Signs	No Signs	No	
wpt206	50H	430731	6299251	Jarrah	15-20	1	Spout Branch	5-12									No Signs	No Signs	No	Depth of hollows unknown
wpt207	50H	430730	6299255	Jarrah	20+	0											No Signs	No Signs	No	
wpt208	50H	430670	6299266	Jarrah	20+	1	Spout Trunk	20+									No Signs	No Signs	Yes	Depth of hollows unknown
wpt209	50H	430669	6299250	Jarrah	15-20	5+	Branch	5-12	Spout Branch	5-12	Branch	5-12	Spout Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt210	50H	430671	6299229	Jarrah	20+	0											No Signs	No Signs	No	
wpt211	50H	430636	6299253	Jarrah	15-20	0											No Signs	No Signs	No	
wpt212	50H	430651	6299264	Jarrah	15-20	0											No Signs	No Signs	No	
wpt213	50H	430589	6299247	Jarrah	15-20	0											No Signs	No Signs	No	
wpt214	50H	430575	6299244	Dead Jarrah	15-20	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt215	50H	430562	6299261	Dead Jarrah	15-20	2	Spout Branch	20+	Spout Branch	20+							No Signs	No Signs	Yes	Depth of hollows unknown
wpt216	50H	430555	6299284	Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt217	50H	430561	6299304	Jarrah	15-20	0											No Signs	No Signs	No	
wpt218	50H	430556	6299326	Jarrah	20+	3	Branch	5-12	Spout Branch	5-12	Spout	5-12					No Signs	No Signs	No	Depth of hollows unknown
wpt219	50H	430550	6299337	Jarrah	20+	0											No Signs	No Signs	No	
wpt220	50H	430566	6299345	Jarrah	20+	0											No Signs	No Signs	No	
wpt221	50H	430553	6299362	Jarrah	20+	0											No Signs	No Signs	No	
wpt222	50H	430567	6299367	Jarrah	20+	3	Branch	5-12	Branch	5-12	Branch	5-12					No Signs	No Signs	No	Depth of hollows unknown
wpt223	50H	430561	6299374	Jarrah	20+	3	Branch	<5	Branch	5-12	Branch	5-12					No Signs	No Signs	No	Depth of hollows unknown
wpt224	50H	430553	6299394	Jarrah	20+	0											No Signs	No Signs	No	
wpt225	50H	430559	6299392	Jarrah	20+	5+	Branch	<5	Branch	5-12	Branch	<5	Branch	5-12	Branch	<5	No Signs	No Signs	No	Depth of hollows unknown
wpt226	50H	430541	6299403	Jarrah	20+	0											No Signs	No Signs	No	
wpt227	50H	430531	6299391	Dead Jarrah	20+	5+	Branch	<5	Branch	5-12	Branch	<5	Branch	5-12	Branch	<5	No Signs	No Signs	No	Depth of hollows unknown
wpt228	50H	430523	6299381	Jarrah	15-20	0											No Signs	No Signs	No	
wpt229	50H	430523	6299404	Marri	15-20	0											No Signs	No Signs	No	
wpt230	50H	430523	6299391	Jarrah	15-20	0											No Signs	No Signs	No	
wpt231	50H	430509	6299459	Marri	15-20	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt232	50H	430486	6299473	Jarrah	15-20	2	Spout Branch	20+	Spout Trunk	20+							No Signs	No Signs	Yes	Depth of hollows unknown
wpt233	50H	430486	6299507	Jarrah	15-20	0											No Signs	No Signs	No	
wpt234	50H	430495	6299517	Jarrah	15-20	0											No Signs	No Signs	No	
wpt235	50H	430483	6299565	Jarrah	20+	0											No Signs	No Signs	No	
wpt236	50H	430470	6299592	Jarrah	15-20	2	Spout Branch	5-12	Spout Branch	12-20							No Signs	No Signs	No	Too low/shallow
wpt237	50H	430472	6299623	Jarrah	15-20	5+	Knot Hole	5-12	Knot Hole	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt238	50H	430519	6299595	Jarrah	15-20	5+	Knot Hole	5-12	Knot Hole	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt239	50H	430546	6299605	Jarrah	15-20	2	Spout Branch	5-12	Spout Branch	12-20							No Signs	No Signs	No	Too shallow
wpt240	50H	430532	6299623	Jarrah	15-20	0											No Signs	No Signs	No	
wpt241	50H	430536	6299644	Jarrah	15-20	0											No Signs	No Signs	No	
wpt242	50H	430593	6299551	Jarrah	15-20	0											No Signs	No Signs	No	
wpt243	50H	430592	6299555	Jarrah	15-20	0											No Signs	No Signs	No	
wpt244	50H	430599	6299560	Jarrah	20+	0											No Signs	No Signs	No	
wpt245	50H	430620	6299548	Jarrah	15-20	0											No Signs	No Signs	No	
wpt246	50H	430627	6299540	Jarrah	15-20	0											No Signs	No Signs	No	
wpt247	50H	430636	6299533	Marri	15-20	1	Spout Branch	12-20									No Signs	No Signs	No	Too shallow
wpt248	50H	430633	6299521	Jarrah	20+	0											No Signs	No Signs	No	
wpt249	50H	430668	6299516	Jarrah	15-20	0											No Signs	No Signs	No	
wpt250	50H	430677	6299523	Dead Jarrah	15-20	1	Spout Trunk	12-20									No Signs	No Signs	Yes	Depth of hollows unknown
wpt251	50H	430690	6299533	Jarrah	15-20	5+	Fissure	5-12	Branch	5-12	Spout	5-12	Spout Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt252	50H	430677	6299488	Jarrah	20+	0											No Signs	No Signs	No	
wpt253	50H	430664	6299490	Jarrah	20+	0											No Signs	No Signs	No	
wpt254	50H	430655	6299488	Marri	15-20	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Spout Trunk	20+	No Signs	No Signs	Yes	Depth of hollows unknown
wpt255	50H	430661	6299474	Jarrah	20+	0											No Signs	No Signs	No	
wpt256	50H	430642	6299463	Jarrah	20+	0											No Signs	No Signs	No	
wpt257	50H	430649	6299455	Jarrah	15-20	1	Spout Branch	5-12									No Signs	No Signs	No	Depth of hollows unknown
wpt258	50H	430641	6299447	Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt259	50H	430660	6299436	Jarrah	20+	0											No Signs	No Signs	No	
wpt260	50H	430672	6299433	Jarrah	15-20	0											No Signs	No Signs	No	
wpt261	50H	430672	6299420	Jarrah	20+	0											No Signs	No Signs	No	
wpt262	50H	430663	6299419	Jarrah	20+	1	Branch	5-12									No Signs	No Signs	No	Depth of hollows unknown
wpt263	50H	430688	6299391	Jarrah	20+	2	Branch	5-12	Branch	5-12							No Signs	No Signs	No	Depth of hollows unknown

Waypoint Number	Zone	mE	mN	Tree Species	Tree Height (m)	Number of Hollows	Hollow Type 1	Hollow Size 1 (cm)	Hollow Type 2	Hollow Size 2 (cm)	Hollow Type 3	Hollow Size 3 (cm)	Hollow Type 4	Hollow Size 4 (cm)	Hollow Type 5	Hollow Size 5 (cm)	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt264	50H	430695	6299391	Jarrah	20+	0											No Signs	No Signs	No	
wpt265	50H	430705	6299382	Jarrah	20+	5+	Branch	<5	Branch	5-12	Branch	<5	Branch	5-12	Branch	<5	No Signs	No Signs	No	Depth of hollows unknown
wpt266	50H	430698	6299375	Marri	20+	0											No Signs	No Signs	No	
wpt267	50H	430691	6299367	Jarrah	20+	5+	Branch	<5	Branch	5-12	Branch	<5	Branch	5-12	Branch	<5	No Signs	No Signs	No	Depth of hollows unknown
wpt268	50H	430712	6299367	Jarrah	15-20	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt269	50H	430719	6299360	Jarrah	15-20	0											No Signs	No Signs	No	
wpt270	50H	430713	6299355	Jarrah	20+	0											No Signs	No Signs	No	
wpt271	50H	430723	6299337	Jarrah	15-20	5+	Branch	<5	Branch	5-12	Branch	<5	Branch	5-12	Branch	<5	No Signs	No Signs	No	Depth of hollows unknown
wpt272	50H	430724	6299331	Jarrah	20+	5+	Branch	<5	Branch	5-12	Branch	12-20	Branch	<5	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt273	50H	430738	6299317	Jarrah	20+	0											No Signs	No Signs	No	
wpt274	50H	430744	6299318	Jarrah	15-20	0											No Signs	No Signs	No	
wpt275	50H	430721	6299285	Jarrah	15-20	2	Knot Hole	5-12	Branch	5-12							No Signs	No Signs	No	Depth of hollows unknown
wpt276	50H	430701	6299292	Jarrah	15-20	2	Branch	5-12	Branch	5-12							Bees	No Signs	No	Depth of hollows unknown
wpt277	50H	430677	6299281	Jarrah	15-20	0											No Signs	No Signs	No	
wpt278	50H	430636	6299296	Dead Jarrah	15-20	5+	Knot Hole	<5	Knot Hole	5-12	Knot Hole	<5	Knot Hole	5-12	Spout Branch	<5	No Signs	No Signs	No	Depth of hollows unknown
wpt279	50H	430611	6299288	Jarrah	20+	5+	Branch	<5	Branch	<5	Branch	<5	Branch	<5	Branch	<5	No Signs	No Signs	No	Depth of hollows unknown
wpt280	50H	430600	6299286	Jarrah	20+	0											No Signs	No Signs	No	
wpt281	50H	430584	6299292	Jarrah	20+	5+	Branch	<5	Branch	5-12	Branch	5-12	Branch	<5	Spout Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt282	50H	430585	6299304	Jarrah	15-20	5+	Branch	<5	Branch	5-12	Branch	5-12	Branch	<5	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt283	50H	430592	6299326	Jarrah	15-20	0											No Signs	No Signs	No	
wpt284	50H	430579	6299331	Marri	15-20	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt285	50H	430583	6299348	Jarrah	20+	0											No Signs	No Signs	No	
wpt286	50H	430587	6299366	Jarrah	20+	0											No Signs	No Signs	No	
wpt287	50H	430591	6299400	Jarrah	15-20	0											No Signs	No Signs	No	
wpt288	50H	430603	6299402	Jarrah	15-20	1	Spout Trunk	20+									No Signs	No Signs	No	Too shallow
wpt289	50H	430596	6299417	Jarrah	20+	0											No Signs	No Signs	No	
wpt290	50H	430606	6299425	Jarrah	15-20	1	Spout Branch	5-12									No Signs	No Signs	No	Depth of hollows unknown
wpt291	50H	430624	6299417	Jarrah	20+	5+	Branch	<5	Branch	5-12	Branch	<5	Branch	5-12	Branch	<5	No Signs	No Signs	No	Depth of hollows unknown
wpt292	50H	430627	6299401	Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt293	50H	430619	6299394	Jarrah	20+	0											No Signs	No Signs	No	
wpt294	50H	430639	6299382	Jarrah	20+	1	Knot Hole	5-12									No Signs	No Signs	No	Depth of hollows unknown
wpt295	50H	430634	6299376	Jarrah	20+	5+	Fissure	<5	Branch	5-12	Branch	5-12	Branch	12-20	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt296	50H	430647	6299369	Dead Jarrah	15-20	1	Spout Trunk	12-20									No Signs	No Signs	No	Depth of hollows unknown
wpt297	50H	430675	6299368	Marri	20+	0											No Signs	No Signs	No	
wpt298	50H	430677	6299373	Jarrah	20+	0											No Signs	No Signs	No	
wpt299	50H	430693	6299324	Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt300	50H	430690	6299319	Jarrah	20+	0											No Signs	No Signs	No	
wpt301	50H	430691	6299316	Jarrah	20+	0											No Signs	No Signs	No	
wpt302	50H	430692	6299313	Jarrah	20+	0											No Signs	No Signs	No	
wpt303	50H	430676	6299315	Jarrah	20+	0											No Signs	No Signs	No	
wpt304	50H	430628	6299325	Jarrah	20+	0											No Signs	No Signs	No	
wpt305	50H	430610	6299318	Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt306	50H	430634	6299330	Jarrah	15-20	0											No Signs	No Signs	No	
wpt307	50H	430646	6299348	Jarrah	15-20	0											No Signs	No Signs	No	
wpt308	50H	430657	6299319	Jarrah	20+	0											No Signs	No Signs	No	
wpt309	50H	430642	6299359	Jarrah	15-20	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt310	50H	430653	6299384	Jarrah	15-20	0											No Signs	No Signs	No	
wpt311	50H	430661	6299393	Jarrah	15-20	0											No Signs	No Signs	No	
wpt312	50H	430648	6299392	Jarrah	15-20	0											No Signs	No Signs	No	
wpt313	50H	430650	6299401	Jarrah	15-20	0											No Signs	No Signs	No	
wpt314	50H	430650	6299415	Jarrah	15-20	0											No Signs	No Signs	No	
wpt315	50H	430644	6299415	Jarrah	15-20	0											No Signs	No Signs	No	
wpt316	50H	430640	6299420	Dead Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Spout Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt317	50H	430629	6299432	Jarrah	20+	1	Branch	5-12									No Signs	No Signs	No	Depth of hollows unknown
wpt318	50H	430629	6299437	Jarrah	20+	2	Branch	5-12	Spout Branch	5-12							No Signs	No Signs	No	Depth of hollows unknown
wpt319	50H	430626	6299446	Jarrah	20+	5+	Fissure	<5	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Bees	No Signs	No	Depth of hollows unknown
wpt320	50H	430620	6299438	Dead Jarrah	20+	5+	Spout Trunk	20+	Branch	12-20	Branch	5-12	Branch	12-20	Branch	5-12	No Signs	No Signs	Yes	Depth of hollows unknown
wpt321	50H	430597	6299447	Jarrah	20+	0											No Signs	No Signs	No	
wpt322	50H	430587	6299465	Jarrah	15-20	1	Spout Trunk	20+									No Signs	No Signs	Yes	Depth of hollows unknown
wpt323	50H	430598	6299500	Jarrah	15-20	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt324	50H	430590	6299511	Jarrah	20+	0											No Signs	No Signs	No	
wpt325	50H	430568	6299520	Jarrah	15-20	0											No Signs	No Signs	No	
wpt326	50H	430560	6299515	Jarrah	15-20	1	Knot Hole	12-20									No Signs	No Signs	No	Too low/shallow
wpt327	50H	430538	6299523	Marri	10-15	1	Spout Trunk	20+									No Signs	No Signs	Yes	Depth of hollows unknown
wpt328	50H	430548	6299558	Jarrah	15-20	0											No Signs	No Signs	No	
wpt329	50H	430517	6299540	Jarrah	20+	0											No Signs	No Signs	No	

Waypoint Number	Zone	mE	mN	Tree Species	Tree Height (m)	Number of Hollows	Hollow Type 1	Hollow Size 1 (cm)	Hollow Type 2	Hollow Size 2 (cm)	Hollow Type 3	Hollow Size 3 (cm)	Hollow Type 4	Hollow Size 4 (cm)	Hollow Type 5	Hollow Size 5 (cm)	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt330	50H	430526	6299493	Jarrah	20+	0											No Signs	No Signs	No	
wpt331	50H	430518	6299477	Jarrah	20+	0											No Signs	No Signs	No	
wpt332	50H	430536	6299450	Jarrah	20+	0											No Signs	No Signs	No	
wpt333	50H	430551	6299439	Jarrah	15-20	1	Branch	5-12									No Signs	No Signs	No	Depth of hollows unknown
wpt334	50H	430553	6299435	Jarrah	15-20	2	Knot Hole	5-12	Branch	5-12							No Signs	No Signs	No	Depth of hollows unknown
wpt335	50H	430557	6299441	Jarrah	15-20	0											No Signs	No Signs	No	
wpt336	50H	430565	6299445	Jarrah	20+	1	Knot Hole	5-12									No Signs	No Signs	No	Depth of hollows unknown
wpt337	50H	430542	6299415	Jarrah	15-20	0											No Signs	No Signs	No	
wpt338	50H	430535	6299418	Jarrah	15-20	1	Branch	5-12									No Signs	No Signs	No	Depth of hollows unknown
wpt339	50H	430568	6299406	Jarrah	15-20	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt340	50H	430577	6299461	Jarrah	20+	5+	Branch	<5	Branch	5-12	Branch	<5	Branch	5-12	Branch	<5	No Signs	No Signs	No	Depth of hollows unknown
wpt341	50H	430548	6299494	Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt342	50H	430541	6299478	Marri	15-20	0											No Signs	No Signs	No	
wpt343	50H	430609	6299466	Jarrah	20+	0											No Signs	No Signs	No	
wpt344	50H	430610	6299471	Jarrah	20+	0											No Signs	No Signs	No	
wpt345	50H	430624	6299471	Jarrah	20+	2	Knot Hole	5-12	Knot Hole	5-12							No Signs	No Signs	No	Depth of hollows unknown
wpt346	50H	430626	6299456	Jarrah	20+	2	Branch	5-12	Spout Branch	5-12							No Signs	No Signs	No	Depth of hollows unknown
wpt347	50H	430635	6299472	Jarrah	15-20	0											No Signs	No Signs	No	
wpt348	50H	430647	6299479	Jarrah	20+	0											No Signs	No Signs	No	
wpt349	50H	430641	6299481	Jarrah	20+	0											No Signs	No Signs	No	
wpt350	50H	430630	6299491	Jarrah	15-20	0											No Signs	No Signs	No	
wpt351	50H	430620	6299509	Jarrah	15-20	0											No Signs	No Signs	No	
wpt352	50H	430612	6299515	Jarrah	10-15	1	Spout Trunk	12-20									No Signs	No Signs	No	Depth of hollows unknown
wpt353	50H	430642	6299500	Jarrah	20+	0											No Signs	No Signs	No	
wpt354	50H	430476	6300156	Dead Unknown	20+	3	Spout Branch	5-12	Spout Branch	5-12	Spout	5-12					No Signs	No Signs	No	Depth of hollows unknown
wpt355	50H	430660	6299503	Marri	10-15	1	Spout Trunk	20+									No Signs	No Signs	Yes	Depth of hollows unknown
wpt356	50H	430667	6299501	Jarrah	20+	0											No Signs	No Signs	No	
wpt357	50H	430518	6300159	Jarrah	15-20	0											No Signs	No Signs	No	
wpt358	50H	430539	6300151	Jarrah	20+	0											No Signs	No Signs	No	
wpt359	50H	430522	6300136	Jarrah	20+	0											No Signs	No Signs	No	
wpt360	50H	430537	6300128	Dead Jarrah	15-20	5+	Branch	5-12	Spout Branch	5-12	Spout	5-12	Spout Branch	5-12	Spout Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt361	50H	430544	6300121	Jarrah	15-20	2	Branch	5-12	Branch	5-12							No Signs	No Signs	No	Depth of hollows unknown
wpt362	50H	430532	6300119	Marri	15-20	2	Branch	5-12	Branch	5-12							No Signs	No Signs	No	Depth of hollows unknown
wpt363	50H	430468	6300112	Marri	20+	0											No Signs	No Signs	No	
wpt364	50H	430490	6300068	Marri	20+	0											No Signs	No Signs	No	
wpt365	50H	430492	6300077	Dead Unknown	15-20	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt366	50H	430528	6300087	Jarrah	15-20	0											No Signs	No Signs	No	
wpt367	50H	430527	6300088	Jarrah	20+	0											No Signs	No Signs	No	
wpt368	50H	430554	6300093	Jarrah	20+	0											No Signs	No Signs	No	
wpt369	50H	430559	6300072	Marri	15-20	0											No Signs	No Signs	No	
wpt370	50H	430565	6300043	Jarrah	15-20	2	Spout Branch	5-12	Spout Branch	12-20							No Signs	No Signs	No	Depth of hollows unknown
wpt371	50H	430558	6300041	Jarrah	20+	0											No Signs	No Signs	No	
wpt372	50H	430560	6300015	Jarrah	15-20	0											No Signs	No Signs	No	
wpt373	50H	430596	6300009	Jarrah	15-20	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt374	50H	430582	6300002	Marri	20+	0											No Signs	No Signs	No	
wpt375	50H	430577	6299997	Jarrah	20+	0											No Signs	No Signs	No	
wpt376	50H	430554	6299993	Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt377	50H	430563	6299987	Jarrah	15-20	2	Spout Branch	12-20	Spout Branch	12-20							No Signs	No Signs	No	Too shallow
wpt378	50H	430563	6299961	Jarrah	20+	2	Branch	5-12	Branch	5-12							No Signs	No Signs	No	Depth of hollows unknown
wpt379	50H	430558	6299945	Marri	15-20	1	Spout Branch	5-12									Bees	No Signs	No	Depth of hollows unknown
wpt380	50H	430581	6299936	Marri	15-20	1	Spout Branch	12-20									No Signs	No Signs	No	Too shallow
wpt381	50H	430583	6299954	Jarrah	15-20	5+	Branch	5-12	Spout Branch	5-12	Branch	5-12	Spout Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt382	50H	430602	6299947	Jarrah	15-20	1	Spout Branch	5-12									No Signs	No Signs	No	Depth of hollows unknown
wpt383	50H	430602	6299928	Jarrah	15-20	0											No Signs	No Signs	No	
wpt384	50H	430606	6299916	Jarrah	20+	0											No Signs	No Signs	No	
wpt385	50H	430615	6299915	Jarrah	20+	0											No Signs	No Signs	No	
wpt386	50H	430597	6299898	Jarrah	20+	0											No Signs	No Signs	No	
wpt387	50H	430579	6299898	Jarrah	20+	0											No Signs	No Signs	No	
wpt389	50H	430616	6299877	Marri	20+	0											No Signs	No Signs	No	
wpt390	50H	430606	6299847	Jarrah	20+	0											No Signs	No Signs	No	
wpt391	50H	430607	6299826	Jarrah	20+	0											No Signs	No Signs	No	
wpt392	50H	430632	6299825	Marri	20+	1	Spout Branch	5-12									No Signs	No Signs	No	Depth of hollows unknown
wpt393	50H	430590	6299816	Jarrah	20+	0											No Signs	No Signs	No	
wpt394	50H	430607	6299777	Dead Jarrah	10-15	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt395	50H	430610	6299779	Jarrah	20+	0											No Signs	No Signs	No	
wpt396	50H	430613	6299763	Dead Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown

Waypoint Number	Zone	mE	mN	Tree Species	Tree Height (m)	Number of Hollows	Hollow Type 1	Hollow Size 1 (cm)	Hollow Type 2	Hollow Size 2 (cm)	Hollow Type 3	Hollow Size 3 (cm)	Hollow Type 4	Hollow Size 4 (cm)	Hollow Type 5	Hollow Size 5 (cm)	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt397	50H	430636	6299756	Jarrah	20+	0											No Signs	No Signs	No	
wpt398	50H	430642	6299750	Jarrah	20+	5+	Branch	<5	Branch	5-12	Branch	<5	Branch	3	Branch	<5	No Signs	No Signs	No	Depth of hollows unknown
wpt399	50H	430648	6299764	Jarrah	15-20	2	Branch	5-12	Branch	5-12							No Signs	No Signs	No	Depth of hollows unknown
wpt400	50H	430622	6299734	Jarrah	15-20	1	Knot Hole	5-12									No Signs	No Signs	No	Depth of hollows unknown
wpt401	50H	430600	6299701	Jarrah	15-20	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt402	50H	430584	6299697	Jarrah	15-20	0											No Signs	No Signs	No	
wpt403	50H	430583	6299679	Jarrah	15-20	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt404	50H	430617	6299685	Dead Unknown	10-15	2	Knot Hole	<5	Knot Hole	5-12							No Signs	No Signs	No	Depth of hollows unknown
wpt405	50H	430638	6299676	Jarrah	15-20	0											No Signs	No Signs	No	
wpt406	50H	430643	6299673	Jarrah	15-20	0											No Signs	No Signs	No	
wpt407	50H	430625	6299650	Jarrah	15-20	0											No Signs	No Signs	No	
wpt408	50H	430646	6299636	Jarrah	15-20	1	Branch	5-12									No Signs	No Signs	No	Depth of hollows unknown
wpt409	50H	430652	6299633	Jarrah	20+	0											No Signs	No Signs	No	
wpt410	50H	430660	6299647	Jarrah	20+	0											No Signs	No Signs	No	
wpt411	50H	430662	6299642	Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt412	50H	430661	6299602	Jarrah	20+	0											No Signs	No Signs	No	
wpt413	50H	430680	6299602	Jarrah	15-20	0											No Signs	No Signs	No	
wpt414	50H	430678	6299584	Marri	15-20	0											No Signs	No Signs	No	
wpt415	50H	430668	6299560	Marri	10-15	1	Spout Trunk	12-20									No Signs	No Signs	No	Too shallow
wpt416	50H	430634	6299590	Jarrah	20+	0											No Signs	No Signs	No	
wpt417	50H	430627	6299595	Jarrah	15-20	0											No Signs	No Signs	No	
wpt418	50H	430606	6299582	Jarrah	15-20	1	Spout Branch	5-12									No Signs	No Signs	No	Depth of hollows unknown
wpt419	50H	430604	6299592	Jarrah	20+	0											No Signs	No Signs	No	
wpt420	50H	430610	6299607	Marri	20+	0											No Signs	No Signs	No	
wpt421	50H	430598	6299648	Jarrah	20+	0											No Signs	No Signs	No	
wpt422	50H	430589	6299629	Jarrah	20+	5+	Knot Hole	20+	Branch	5-12	Branch	12-20	Branch	5-12	Branch	12-20	No Signs	No Signs	Yes	Depth of hollows unknown
wpt423	50H	430551	6299653	Jarrah	20+	0											No Signs	No Signs	No	
wpt424	50H	430553	6299660	Jarrah	15-20	1	Knot Hole	<5									No Signs	No Signs	No	Depth of hollows unknown
wpt425	50H	430572	6299698	Jarrah	20+	0											No Signs	No Signs	No	
wpt426	50H	430543	6299699	Jarrah	15-20	0											No Signs	No Signs	No	
wpt427	50H	430560	6299711	Jarrah	15-20	0											No Signs	No Signs	No	
wpt428	50H	430543	6299722	Jarrah	15-20	0											No Signs	No Signs	No	
wpt429	50H	430556	6299748	Jarrah	15-20	1	Knot Hole	12-20									No Signs	No Signs	Yes	Depth of hollows unknown
wpt430	50H	430586	6299758	Marri	15-20	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt431	50H	430607	6299759	Jarrah	20+	0											No Signs	No Signs	No	
wpt432	50H	430588	6299783	Jarrah	15-20	0											No Signs	No Signs	No	
wpt433	50H	430556	6299803	Jarrah	15-20	3	Branch	5-12	Branch	5-12	Branch	5-12					No Signs	No Signs	No	Depth of hollows unknown
wpt434	50H	430545	6299805	Marri	10-15	3	Knot Hole	5-12	Spout Branch	5-12	Spout	20+					No Signs	No Signs	Yes	Depth of hollows unknown
wpt435	50H	429260	6300306	Dead Jarrah	20+	5+	Branch	5-12	Spout Branch	5-12	Spout	12-20	Branch	5-12	Branch	5-12	No Signs	No Signs	Yes	Depth of hollows unknown
wpt436	50H	430553	6299820	Jarrah	15-20	5+	Branch	5-12	Branch	12-20	Branch	5-12	Spout Branch	5-12	Spout Branch	12-20	No Signs	No Signs	Yes	Depth of hollows unknown
wpt437	50H	430557	6299830	Jarrah	15-20	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt438	50H	430536	6299837	Jarrah	15-20	5+	Branch	5-12	Spout Branch	12-20	Branch	5-12	Spout Branch	12-20	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt439	50H	430545	6299856	Dead Jarrah	5-10	2	Spout Branch	20+	Spout Trunk	20+							No Signs	No Signs	Yes	Depth of hollows unknown
wpt440	50H	430552	6299857	Jarrah	15-20	0											No Signs	No Signs	No	
wpt441	50H	430516	6299881	Marri	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt442	50H	430521	6299913	Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12		5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt443	50H	430528	6299916	Jarrah	20+	0											No Signs	No Signs	No	
wpt444	50H	430515	6299918	Jarrah	15-20	2	Spout Branch	5-12	Spout Branch	12-20							No Signs	No Signs	No	Depth of hollows unknown
wpt445	50H	430504	6299907	Jarrah	15-20	0											No Signs	No Signs	No	
wpt446	50H	430493	6299922	Dead Jarrah	5-10	1	Spout Trunk	20+									No Signs	No Signs	No	Too shallow
wpt447	50H	430482	6299924	Jarrah	15-20	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt448	50H	430472	6299958	Dead Jarrah	15-20	4	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12			No Signs	No Signs	No	Depth of hollows unknown
wpt449	50H	430461	6299964	Marri	20+	0											No Signs	No Signs	No	
wpt450	50H	430480	6299967	Jarrah	15-20	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt451	50H	430484	6299976	Jarrah	15-20	0											No Signs	No Signs	No	
wpt452	50H	430494	6299980	Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt453	50H	430474	6299981	Jarrah	15-20	1	Spout Branch	5-12									No Signs	No Signs	No	Depth of hollows unknown
wpt454	50H	430476	6300003	Jarrah	15-20	1	Spout Trunk	20+									Bees	No Signs	No	Depth of hollows unknown
wpt455	50H	430494	6300023	Jarrah	15-20	5+	Branch	5-12	Spout Branch	5-12	Branch	5-12	Spout Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt456	50H	430485	6300051	Marri	20+	0											No Signs	No Signs	No	
wpt457	50H	430487	6300044	Jarrah	20+	0											No Signs	No Signs	No	
wpt458	50H	430491	6300022	Dead Jarrah	10-15	1	Spout Trunk	20+									No Signs	No Signs	No	Too shallow
wpt459	50H	430538	6300005	Dead Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt460	50H	430514	6299988	Dead Jarrah	10-15	1	Spout Trunk	20+									No Signs	No Signs	No	Too shallow
wpt461	50H	430507	6299985	Jarrah	20+	0											No Signs	No Signs	No	
wpt462	50H	430527	6299986	Jarrah	20+	0											No Signs	No Signs	No	

Waypoint Number	Zone	mE	mN	Tree Species	Tree Height (m)	Number of Hollows	Hollow Type 1	Hollow Size 1 (cm)	Hollow Type 2	Hollow Size 2 (cm)	Hollow Type 3	Hollow Size 3 (cm)	Hollow Type 4	Hollow Size 4 (cm)	Hollow Type 5	Hollow Size 5 (cm)	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt463	50H	430523	6299973	Dead Jarrah	5-10	1	Spout Trunk	20+									No Signs	No Signs	No	Too low/shallow
wpt464	50H	430531	6299951	Dead Marri	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt465	50H	430542	6299935	Dead Unknown	5-10	1	Spout Trunk	20+									No Signs	No Signs	No	Depth of hollows unknown
wpt466	50H	430558	6299929	Marri	20+	2	Branch	5-12	Branch	5-12							No Signs	No Signs	No	Depth of hollows unknown
wpt467	50H	430558	6299901	Jarrah	20+	5+	Branch	55	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt468	50H	430573	6299882	Jarrah	15-20	0											No Signs	No Signs	No	
wpt469	50H	430576	6299835	Jarrah	15-20	2	Branch	5-12	Branch	5-12							No Signs	No Signs	No	Depth of hollows unknown
wpt470	50H	430567	6299833	Dead Marri	5-10	0											No Signs	No Signs	No	
wpt471	50H	430536	6299816	Jarrah	20+	0											No Signs	No Signs	No	
wpt472	50H	430535	6299809	Jarrah	20+	0											No Signs	No Signs	No	
wpt473	50H	430527	6299781	Dead Marri	5-10	1	Spout Trunk	20+									No Signs	No Signs	No	Too low/shallow
wpt474	50H	430534	6299777	Dead Marri	0-5	1	Spout Trunk	20+									No Signs	No Signs	No	Too low/shallow
wpt475	50H	430527	6299769	Jarrah	20+	0											No Signs	No Signs	No	
wpt476	50H	430508	6299736	Jarrah	20+	0											No Signs	No Signs	No	
wpt477	50H	430506	6299730	Jarrah	15-20	0											No Signs	No Signs	No	
wpt478	50H	430485	6299723	Jarrah	10-15	5+	Spout Branch	12-20	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	Yes	Depth of hollows unknown
wpt479	50H	430491	6299709	Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Spout Branch	5-12	Spout Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt480	50H	430497	6299690	Jarrah	20+	0											No Signs	No Signs	No	
wpt481	50H	430483	6299682	Jarrah	15-20	0											No Signs	No Signs	No	
wpt482	50H	430503	6299671	Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt483	50H	430497	6299661	Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Bees	No Signs	No	Depth of hollows unknown
wpt484	50H	430495	6299652	Jarrah	15-20	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt485	50H	430477	6299666	Dead Jarrah	15-20	5+	Branch	5-12	Branch	5-12	Spout	12-20	Spout Trunk	20+	Branch	5-12	No Signs	No Signs	Yes	Depth of hollows unknown
wpt486	50H	430475	6299644	Jarrah	20+	0											No Signs	No Signs	No	
wpt487	50H	430459	6299654	Jarrah	20+	0											No Signs	No Signs	No	
wpt488	50H	430456	6299653	Dead Jarrah	10-15	3	Branch	5-12	Spout Branch	12-20	Spout	20+					No Signs	No Signs	No	Too low/shallow
wpt489	50H	430446	6299645	Dead Jarrah	10-15	2	Spout Branch	5-12	Spout Branch	5-12							No Signs	No Signs	No	Depth of hollows unknown
wpt490	50H	430438	6299631	Jarrah	15-20	0											No Signs	No Signs	No	
wpt491	50H	430433	6299678	Jarrah	20+	0											No Signs	No Signs	No	
wpt492	50H	430444	6299708	Jarrah	15-20	0											No Signs	No Signs	No	
wpt493	50H	430444	6299720	Jarrah	20+	0											No Signs	No Signs	No	
wpt494	50H	430451	6299729	Jarrah	20+	0											No Signs	No Signs	No	
wpt495	50H	430424	6299746	Jarrah	20+	5+	Knot Hole	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt496	50H	430433	6299796	Jarrah	20+	5+	Branch	5-12	Branch	12-20	Branch	20+	Branch	5-12	Branch	12-20	No Signs	No Signs	Yes	Depth of hollows unknown
wpt497	50H	430437	6299817	Jarrah	20+	0											No Signs	No Signs	No	
wpt498	50H	430393	6299814	Jarrah	20+	0											No Signs	No Signs	No	
wpt499	50H	430385	6299809	Jarrah	15-20	2	Spout Branch	5-12	Spout Branch	5-12							No Signs	No Signs	No	Depth of hollows unknown
wpt500	50H	430388	6299816	Jarrah	20+	0											No Signs	No Signs	No	
wpt501	50H	430379	6299820	Jarrah	20+	0											No Signs	No Signs	No	
wpt502	50H	430386	6299843	Jarrah	15-20	0											No Signs	No Signs	No	
wpt503	50H	430394	6299851	Jarrah	15-20	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt504	50H	430373	6299869	Jarrah	20+	0											No Signs	No Signs	No	
wpt505	50H	430363	6299876	Jarrah	15-20	0											No Signs	No Signs	No	
wpt506	50H	430363	6299902	Jarrah	20+	0											No Signs	No Signs	No	
wpt507	50H	430369	6299925	Marri	20+	0											No Signs	No Signs	No	
wpt508	50H	430377	6299938	Jarrah	20+	0											No Signs	No Signs	No	
wpt509	50H	430357	6299934	Jarrah	20+	0											No Signs	No Signs	No	
wpt510	50H	430351	6299939	Marri	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt511	50H	430338	6299950	Marri	20+	0											No Signs	No Signs	No	
wpt512	50H	430351	6299960	Marri	20+	0											No Signs	No Signs	No	
wpt513	50H	430348	6299978	Jarrah	20+	0											No Signs	No Signs	No	
wpt514	50H	430341	6299996	Jarrah	20+	0											No Signs	No Signs	No	
wpt515	50H	430320	6299998	Jarrah	20+	0											No Signs	No Signs	No	
wpt516	50H	430310	6300054	Marri	15-20	0											No Signs	No Signs	No	
wpt517	50H	430336	6300047	Jarrah	0-5	1	Spout Trunk	20+									No Signs	No Signs	No	Too low/shallow
wpt518	50H	430343	6300056	Marri	20+	2	Knot Hole	5-12	Branch	5-12							No Signs	No Signs	No	Depth of hollows unknown
wpt519	50H	430340	6300063	Marri	20+	0											No Signs	No Signs	No	
wpt520	50H	430392	6300078	Marri	15-20	5+	Branch	5-12	Spout Branch	12-20	Branch	12-20	Branch	5-12	Branch	12-20	No Signs	No Signs	No	Depth of hollows unknown
wpt521	50H	430421	6300114	Jarrah	20+	0											No Signs	No Signs	No	
wpt522	50H	430415	6300034	Jarrah	20+	0											No Signs	No Signs	No	
wpt523	50H	430396	6300043	Marri	15-20	1	Spout Branch	12-20									No Signs	No Signs	Yes	Depth of hollows unknown
wpt524	50H	430394	6300031	Jarrah	20+	0											No Signs	No Signs	No	
wpt525	50H	430407	6300019	Jarrah	20+	0											No Signs	No Signs	No	
wpt526	50H	430444	6300006	Marri	0-5	1	Spout Trunk	20+									No Signs	No Signs	No	Too low/shallow
wpt527	50H	430462	6299955	Marri	20+	1	Spout Branch	5-12									No Signs	No Signs	No	Depth of hollows unknown
wpt528	50H	430457	6299943	Jarrah	15-20	5+	Spout Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown

Waypoint Number	Zone	mE	mN	Tree Species	Tree Height (m)	Number of Hollows	Hollow Type 1	Hollow Size 1 (cm)	Hollow Type 2	Hollow Size 2 (cm)	Hollow Type 3	Hollow Size 3 (cm)	Hollow Type 4	Hollow Size 4 (cm)	Hollow Type 5	Hollow Size 5 (cm)	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt529	50H	430467	6299934	Marri	20+	3	Knot Hole	12-20	Branch	5-12	Branch	5-12					No Signs	No Signs	Yes	Depth of hollows unknown
wpt530	50H	430477	6299930	Marri	20+	1	Spout Trunk	20+									No Signs	No Signs	Yes	Depth of hollows unknown
wpt531	50H	430460	6299901	Jarrah	15-20	1	Spout Trunk	20+									No Signs	No Signs	No	Depth of hollows unknown
wpt532	50H	430451	6299891	Marri	15-20	0											No Signs	No Signs	No	
wpt533	50H	430472	6299884	Jarrah	20+	0											No Signs	No Signs	No	
wpt534	50H	430490	6299879	Jarrah	20+	0											No Signs	No Signs	No	
wpt535	50H	430476	6299858	Jarrah	20+	0											No Signs	No Signs	No	
wpt536	50H	430511	6299871	Jarrah	15-20	3	Knot Hole	5-12	Spout Branch	12-20	Spout	12-20					No Signs	No Signs	No	Depth of hollows unknown
wpt537	50H	430519	6299860	Marri	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt538	50H	430523	6299839	Jarrah	20+	1	Spout Branch	12-20									No Signs	No Signs	No	Depth of hollows unknown
wpt539	50H	430500	6299839	Jarrah	15-20	0											No Signs	No Signs	No	
wpt540	50H	430481	6299807	Jarrah	20+	0											No Signs	No Signs	No	
wpt541	50H	430480	6299802	Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt542	50H	430468	6299808	Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt543	50H	430457	6299799	Jarrah	15-20	0											No Signs	No Signs	No	
wpt544	50H	430471	6299777	Jarrah	15-20	0											No Signs	No Signs	No	
wpt545	50H	430463	6299754	Dead Jarrah	15-20	1	Knot Hole	5-12									No Signs	No Signs	No	Depth of hollows unknown
wpt546	50H	430476	6299738	Jarrah	15-20	5+	Spout Branch	12-20	Spout Branch	12-20	Spout	12-20	Spout Branch	12-20	Spout Branch	20+	No Signs	No Signs	Yes	Depth of hollows unknown
wpt547	50H	430462	6299713	Dead Jarrah	20+	5+	Branch	5-12	Spout Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt548	50H	430485	6299764	Jarrah	15-20	0											No Signs	No Signs	No	
wpt549	50H	430454	6299850	Jarrah	10-15	1	Spout Branch	12-20									No Signs	No Signs	No	Depth of hollows unknown
wpt550	50H	430441	6299848	Jarrah	20+	0											No Signs	No Signs	No	
wpt551	50H	430428	6299868	Jarrah	15-20	0											No Signs	No Signs	No	
wpt552	50H	430426	6299868	Marri	15-20	3	Branch	5-12	Branch	5-12	Branch	5-12					No Signs	No Signs	No	Depth of hollows unknown
wpt553	50H	430420	6299875	Marri	15-20	0											No Signs	No Signs	No	
wpt554	50H	430425	6299884	Marri	15-20	2	Branch	5-12	Spout Branch	5-12							No Signs	No Signs	No	Depth of hollows unknown
wpt555	50H	430418	6299886	Jarrah	20+	0											No Signs	No Signs	No	
wpt556	50H	430392	6299905	Jarrah	15-20	4	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12			No Signs	No Signs	No	Depth of hollows unknown
wpt557	50H	430410	6299936	Jarrah	20+	0											No Signs	No Signs	No	
wpt558	50H	430417	6299934	Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt559	50H	430426	6299913	Jarrah	15-20	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt560	50H	430440	6299931	Jarrah	20+	0											No Signs	No Signs	No	
wpt561	50H	430402	6300002	Jarrah	20+	0											No Signs	No Signs	No	
wpt562	50H	430401	6300001	Jarrah	20+	1	Spout Branch	5-12									No Signs	No Signs	No	Depth of hollows unknown
wpt563	50H	430365	6300001	Marri	20+	5+	Knot Hole	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt564	50H	430374	6300021	Jarrah	15-20	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt565	50H	429278	6300328	Dead Unknown	15-20	5+	Branch	5-12	Spout Branch	12-20	Branch	5-12	Spout Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt567	50H	429249	6300392	Jarrah	20+	0											No Signs	No Signs	No	
wpt568	50H	429277	6300426	Jarrah	15-20	0											No Signs	No Signs	No	
wpt569	50H	429284	6300424	Jarrah	15-20	0											No Signs	No Signs	No	
wpt570	50H	429291	6300423	Jarrah	15-20	0											No Signs	No Signs	No	
wpt571	50H	429293	6300424	Jarrah	15-20	0											No Signs	No Signs	No	
wpt572	50H	429274	6300441	Jarrah	15-20	0											No Signs	No Signs	No	
wpt573	50H	429292	6300447	Jarrah	20+	0											No Signs	No Signs	No	
wpt574	50H	429304	6300430	Jarrah	20+	0											No Signs	No Signs	No	
wpt575	50H	429317	6300473	Jarrah	15-20	3	Branch	5-12	Branch	5-12	Spout	5-12					No Signs	No Signs	No	Depth of hollows unknown
wpt576	50H	429355	6300505	Dead Unknown	15-20	5+	Branch	5-12	Branch	12-20	Branch	5-12	Branch	12-20	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt577	50H	429366	6300494	Jarrah	20+	0											No Signs	No Signs	No	
wpt578	50H	429381	6300525	Jarrah	15-20	0											No Signs	No Signs	No	
wpt579	50H	429395	6300535	Jarrah	15-20	0											No Signs	No Signs	No	
wpt580	50H	429405	6300531	Jarrah	15-20	0											No Signs	No Signs	No	
wpt581	50H	429410	6300526	Jarrah	15-20	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt582	50H	429430	6300606	Jarrah	20+	5+	Knot Hole	<5	Knot Hole	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt583	50H	429490	6300666	Jarrah	15-20	0											No Signs	No Signs	No	
wpt584	50H	429502	6300775	Jarrah	20+	0											No Signs	No Signs	No	
wpt585	50H	429521	6300688	Jarrah	20+	0											No Signs	No Signs	No	
wpt586	50H	429522	6300677	Jarrah	20+	0											No Signs	No Signs	No	
wpt587	50H	429396	6300506	Jarrah	15-20	1	Spout Trunk	20+									No Signs	No Signs	Yes	Depth of hollows unknown
wpt588	50H	429712	6301131	Jarrah	20+	5+	Knot Hole	5-12	Knot Hole	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt589	50H	429665	6301165	Jarrah	20+	0											No Signs	No Signs	No	
wpt590	50H	429666	6301173	Jarrah	20+	0											No Signs	No Signs	No	
wpt591	50H	429677	6301153	Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Spout Branch	12-20	No Signs	No Signs	No	Depth of hollows unknown
wpt591a	50H	429677	6301153	Jarrah	20+	0											No Signs	No Signs	No	
wpt592	50H	429686	6301110	Jarrah	20+	0											No Signs	No Signs	No	
wpt593	50H	429666	6301086	Jarrah	20+	0											No Signs	No Signs	No	
wpt594	50H	429683	6301078	Jarrah	20+	0											No Signs	No Signs	No	

Waypoint Number	Zone	mE	mN	Tree Species	Tree Height (m)	Number of Hollows	Hollow Type 1	Hollow Size 1 (cm)	Hollow Type 2	Hollow Size 2 (cm)	Hollow Type 3	Hollow Size 3 (cm)	Hollow Type 4	Hollow Size 4 (cm)	Hollow Type 5	Hollow Size 5 (cm)	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt595	50H	429686	6301074	Jarrah	20+	0											No Signs	No Signs	No	
wpt596	50H	429687	6301067	Jarrah	20+	0											No Signs	No Signs	No	
wpt597	50H	429636	6301035	Jarrah	20+	0											No Signs	No Signs	No	
wpt598	50H	429621	6301044	Jarrah	20+	0											No Signs	No Signs	No	
wpt599	50H	429647	6301004	Jarrah	20+	0											No Signs	No Signs	No	
wpt600	50H	429595	6300924	Jarrah	20+	0											No Signs	No Signs	No	
wpt601	50H	429623	6300906	Jarrah	20+	0											No Signs	No Signs	No	
wpt602	50H	429612	6300874	Jarrah	20+	0											No Signs	No Signs	No	
wpt603	50H	429605	6300873	Jarrah	20+	0											No Signs	No Signs	No	
wpt604	50H	429589	6300875	Jarrah	20+	0											No Signs	No Signs	No	
wpt605	50H	429587	6300891	Jarrah	20+	0											No Signs	No Signs	No	
wpt606	50H	429566	6300904	Jarrah	20+	0											No Signs	No Signs	No	
wpt607	50H	429560	6300917	Jarrah	20+	5+	Branch	<5	Branch	5-12	Branch	<5	Branch	5-12	Spout Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt608	50H	429567	6300876	Jarrah	20+	0											No Signs	No Signs	No	
wpt609	50H	429573	6300873	Jarrah	20+	0											No Signs	No Signs	No	
wpt610	50H	429579	6300858	Jarrah	20+	0											No Signs	No Signs	No	
wpt611	50H	429581	6300858	Jarrah	20+	0											No Signs	No Signs	No	
wpt612	50H	429566	6300812	Jarrah	20+	0											No Signs	No Signs	No	
wpt613	50H	429559	6300807	Jarrah	20+	0											No Signs	No Signs	No	
wpt614	50H	429553	6300818	Jarrah	20+	0											No Signs	No Signs	No	
wpt615	50H	429539	6300838	Jarrah	20+	0											No Signs	No Signs	No	
wpt616	50H	429533	6300837	Jarrah	20+	2	Spout Branch	5-12	Spout Branch	5-12							No Signs	No Signs	No	Depth of hollows unknown
wpt617	50H	429530	6300836	Jarrah	20+	0											No Signs	No Signs	No	
wpt618	50H	429525	6300851	Jarrah	20+	0											No Signs	No Signs	No	
wpt619	50H	429518	6300851	Jarrah	20+	0											No Signs	No Signs	No	
wpt620	50H	429514	6300848	Jarrah	20+	0											No Signs	No Signs	No	
wpt621	50H	429505	6300840	Jarrah	15-20	0											No Signs	No Signs	No	
wpt622	50H	429500	6300843	Jarrah	20+	0											No Signs	No Signs	No	
wpt623	50H	429501	6300850	Jarrah	20+	0											No Signs	No Signs	No	
wpt624	50H	429509	6300866	Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt625	50H	429509	6300882	Dead Unknown	15-20	5+	Branch	5-12	Branch	12-20	Branch	5-12	Spout Branch	5-12	Spout Branch	12-20	No Signs	No Signs	Yes	Depth of hollows unknown
wpt626	50H	429504	6300907	Jarrah	20+	5+	Branch	5-12	Branch	12-20	Branch	5-12	Spout Branch	5-12	Spout Branch	12-20	No Signs	No Signs	Yes	Depth of hollows unknown
wpt627	50H	429506	6300920	Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt628	50H	429523	6300973	Jarrah	20+	1	Branch	5-12									No Signs	No Signs	No	Depth of hollows unknown
wpt629	50H	429518	6300937	Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt630	50H	429515	6300974	Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt631	50H	429520	6300987	Jarrah	20+	0											No Signs	No Signs	No	
wpt632	50H	429534	6300995	Jarrah	15-20	0											No Signs	No Signs	No	
wpt633	50H	429536	6301015	Marri	20+	0											No Signs	No Signs	No	
wpt634	50H	429531	6301017	Jarrah	20+	0											No Signs	No Signs	No	
wpt635	50H	429529	6301014	Jarrah	20+	0											No Signs	No Signs	No	
wpt636	50H	429519	6301023	Jarrah	15-20	0											No Signs	No Signs	No	
wpt637	50H	429557	6301078	Jarrah	15-20	5+	Knot Hole	<5	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt638	50H	429566	6301108	Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt639	50H	429563	6301119	Marri	20+	0											No Signs	No Signs	No	
wpt640	50H	429542	6301146	Marri	20+	0											No Signs	No Signs	No	
wpt641	50H	429532	6301147	Marri	15-20	0											No Signs	No Signs	No	
wpt642	50H	429542	6301156	Jarrah	15-20	0											No Signs	No Signs	No	
wpt643	50H	429544	6301180	Jarrah	15-20	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt644	50H	429555	6301185	Jarrah	20+	0											No Signs	No Signs	No	
wpt645	50H	429563	6301220	Jarrah	15-20	0											No Signs	No Signs	No	
wpt646	50H	429573	6301193	Marri	15-20	0											No Signs	No Signs	No	
wpt647	50H	429600	6301138	Dead Marri	20+	5+	Branch	5-12	Spout Branch	12-20	Branch	5-12	Spout Branch	20+	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt648	50H	429590	6301104	Jarrah	20+	0											No Signs	No Signs	No	
wpt649	50H	429575	6301100	Jarrah	20+	0											No Signs	No Signs	No	
wpt650	50H	429617	6301101	Jarrah	10-15	1	Spout Trunk	20+									No Signs	No Signs	No	Too low/shallow
wpt651	50H	429623	6301091	Jarrah	20+	0											No Signs	No Signs	No	
wpt652	50H	429615	6301074	Jarrah	15-20	0											No Signs	No Signs	No	
wpt653	50H	429587	6301056	Marri	20+	0											No Signs	No Signs	No	
wpt654	50H	429584	6301019	Jarrah	10-15	1	Spout Trunk	20+									No Signs	No Signs	No	Too low/shallow
wpt655	50H	429574	6300981	Jarrah	20+	2	Spout Branch	5-12	Spout Trunk	20+							No Signs	No Signs	Yes	Depth of hollows unknown
wpt656	50H	429567	6300994	Jarrah	20+	0											No Signs	No Signs	No	
wpt657	50H	429558	6300997	Jarrah	15-20	0											No Signs	No Signs	No	
wpt658	50H	429555	6300994	Marri	20+	0											No Signs	No Signs	No	
wpt659	50H	429543	6300981	Jarrah	15-20	3	Branch	5-12	Branch	5-12	Branch	5-12					No Signs	No Signs	No	Depth of hollows unknown
wpt660	50H	429548	6300956	Jarrah	20+	1	Spout Trunk	20+									No Signs	No Signs	Yes	Depth of hollows unknown

Waypoint Number	Zone	mE	mN	Tree Species	Tree Height (m)	Number of Hollows	Hollow Type 1	Hollow Size 1 (cm)	Hollow Type 2	Hollow Size 2 (cm)	Hollow Type 3	Hollow Size 3 (cm)	Hollow Type 4	Hollow Size 4 (cm)	Hollow Type 5	Hollow Size 5 (cm)	Occupancy	Chew Marks	Potential Cockatoo Nest Hollow	Comments
wpt661	50H	429556	6300947	Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt662	50H	429548	6300938	Marri	0-5	1	Spout Trunk	20+									No Signs	No Signs	No	Too low/shallow
wpt663	50H	429540	6300928	Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt664	50H	429528	6300934	Jarrah	20+	0											No Signs	No Signs	No	
wpt665	50H	429533	6300924	Jarrah	0-5	1	Spout Trunk	20+									No Signs	No Signs	No	Too low/shallow
wpt666	50H	429545	6300898	Jarrah	15-20	1	Spout Trunk	12-20									No Signs	No Signs	Yes	Depth of hollows unknown
wpt667	50H	429538	6300898	Marri	15-20	3	Branch	5-12	Branch	5-12	Branch	5-12					No Signs	No Signs	No	Depth of hollows unknown
wpt668	50H	429538	6300900	Jarrah	20+	3	Branch	5-12	Branch	5-12	Spout	5-12					No Signs	No Signs	No	Depth of hollows unknown
wpt669	50H	429546	6300869	Jarrah	20+	0											No Signs	No Signs	No	
wpt670	50H	429529	6300865	Jarrah	20+	0											No Signs	No Signs	No	
wpt671	50H	429526	6300857	Jarrah	20+	0											No Signs	No Signs	No	
wpt672	50H	429557	6301047	Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt673	50H	429557	6301053	Jarrah	15-20	0											No Signs	No Signs	No	
wpt674	50H	429565	6301065	Jarrah	20+	5+	Spout Trunk	20+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	Yes	Depth of hollows unknown
wpt675	50H	429578	6301074	Jarrah	20+	5+	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt676	50H	429567	6301286	Jarrah	20+	0											No Signs	No Signs	No	
wpt677	50H	429588	6301257	Jarrah	20+	0											No Signs	No Signs	No	
wpt678	50H	429598	6301259	Jarrah	20+	0											No Signs	No Signs	No	
wpt679	50H	429610	6301235	Jarrah	20+	5+	Knot Hole	5-12	Knot Hole	5-12	Branch	5-12	Branch	5-12	Branch	5-12	No Signs	No Signs	No	Depth of hollows unknown
wpt680	50H	429622	6301216	Marri	20+	0											No Signs	No Signs	No	
wpt681	50H	429622	6301211	Jarrah	15-20	0											No Signs	No Signs	No	
wpt682	50H	429634	6301199	Jarrah	20+	0											No Signs	No Signs	No	
wpt683	50H	429634	6301198	Jarrah	20+	0											No Signs	No Signs	No	
wpt684	50H	429636	6301183	Jarrah	20+	0											No Signs	No Signs	No	
wpt685	50H	429642	6301176	Marri	15-20	0											No Signs	No Signs	No	

APPENDIX E

SIGNIFICANT SPECIES PROFILES

Unnamed cricket *Pachysaga munggai*

Status and Distribution: Listed as Priority 3 by the DPaW. Distribution is poorly documented. NatureMap database contains only five records, two of which are in relatively close proximity to the study area (near Shots and Coalfields Hwy ~3 km east of Collie - DPaW 2013).

Habitat: Heathland habitat with occasional eucalypts and abundant leaf litter. Vegetation and leaf litter must be sufficient to provide this ground dwelling species with cover. Most NatureMap records are in the Jarrah forest belt.

Likely presence in study area: Status in the study area difficult to determine. History of disturbance (logging and frequent fires) would suggest the are represents area is marginal habitat for this species at best given reduced ground cover and leaf litter.

Potential impact of proposed development: Loss of an area of potential though marginal habitat. It is however unlikely that any part of the proposed clearing areas would represent an area of significance for this species given the extent of similar habitat in surrounding areas.

Darling Range Heath Ctenotus *Ctenotus delli*

Status and Distribution: Listed as Priority 4 by DPaW. Main distribution is in the Darling Range from the Darlington/Mundaring area to near Collie (Storr *et al* 1999).

Habitat: Humid zone, mainly laterite and clays (Storr *et al.* 1999) supporting jarrah/marri woodland with a shrub dominated understorey, sheltering in dense vegetation, inside grass trees and beneath rocks, sometimes in burrows (Nevill 2005). Occasionally found on granite outcrops (Bush 2002).

Likely presence in study area: Potentially present though actual status onsite is difficult to determine. A single record from 2006 1.5km east of the study area (DPaW 2013). Most areas probably represent marginal habitat due to history of disturbance.

Potential impact of proposed development: If this species is present then development may result in the loss of some habitat though it is unlikely to alter the species overall status given the relatively small area involved.

Southern Carpet Python *Morelia spilota imbricata*

Status and Distribution: The south western population is classified as Schedule 4 under the *WC Act*. This subspecies has wide distribution within the south west

but is uncommon. Occurs north to Geraldton and Yalgoo and east to Pinjin, Kalgoorlie, Fraser Range and Eyre (Storr *et al.* 2002).

Habitat: This species has been recorded from semi-arid coastal and inland habitats, Banksia woodland, Eucalypt woodlands, and grasslands. Most often found utilising hollow logs in addition the burrows of other animals for shelter. Often arboreal and will also use tree hollows for refuge.

Likely presence in study area: Status onsite difficult to determine. Very few records near Collie. Most habitats looks marginal due to sparse nature of groundcover. Typically only occurs in low densities.

Potential impact of proposed development: Loss of an area of potential habitat. Low probability but the potential for individuals to be killed or injured during clearing.

Malleefowl *Leipoa ocellata*

Status and Distribution: This species is listed as Schedule 1 under the *WC Act* and as Vulnerable and Migratory under the *EPBC Act*. Originally common, but now generally rare to uncommon and patchily distributed.

Current distribution mainly southern arid and semi-arid zones, north to Shark Bay, Jingemarra, Colga Downs and Yeelirrie, east to Earnest Giles Range, Yeo Lake, lower Ponton Creek and to Eucla and west and south to Cockleshell Gully, the Wongan Hills, Stirling Range, Beaufort Inlet, Hatters Hill, Mt Ragged and Point Malcolm (Johnstone and Storr 1998).

Habitat: Mainly scrubs and thickets of mallee *Eucalyptus* spp., boree *Melaleuca lanceolata* and bowgada *Acacia linophylla*, also dense litter forming shrublands.

Likely presence in study area: This species is regionally extinct and would never, under normal circumstances occur anywhere on the Swan Coastal Plain/Darling Range.

Potential impact of proposed development: No impact on this species or its preferred habitat will occur.

Great Egret *Ardea alba*

Status and Distribution: This species of egret is listed as migratory under the *EPBC Act* and under international agreements to which Australia is a signatory. The Great Egret is common and very widespread in any suitable permanent or temporary habitat (Morcombe 2004).

Habitat: Wetlands, flooded pasture, dams, estuarine mudflats, mangroves and reefs (Morcombe 2004).

Likely presence in study area: Suitable habitat for this species is limited to the very small man made dam present in the western section of the area investigated. Listed as a potential species but would only occur very infrequently and for limited periods. Would not breed within the study area.

Potential impact of proposed development: No impact on this species is anticipated. Habitat that this species is likely to use in the study area is comprised of highly degraded man mad dam of limited extent.

Cattle Egret *Ardea ibis*

Status and Distribution: This species of egret is listed as migratory under the *EPBC Act* and under international agreements to which Australia is a signatory. The Cattle Egret is common in the north sections of its range but is an irregular visitor to the better watered parts of the state (Johnstone and Storr 1998). The population is expanding (Morcombe 2003).

Habitat: Moist pastures with tall grasses, shallow open wetlands and margins, mudflats (Morcombe 2003).

Likely presence in study area: Suitable habitat for this species is limited to the very small man made dam present in the western section of the area investigated. Listed as a potential species but would only occur very infrequently and for limited periods. Would not breed within the study area.

Potential impact of proposed development: No impact on this species is anticipated. Habitat that this species is likely to use in the study area is comprised of highly degraded man mad dam of limited extent.

White-bellied Sea Eagle *Haliaeetus leucogaster*

Status and Distribution: This species is listed as Schedule 3 under the *WC Act* and as migratory under the *EPBC Act* and under international agreements to which Australia is a signatory. White-bellied sea eagles are moderately common to common on Kimberley and Pilbara islands, coasts and estuaries, on Bernier, Dorre and Dirk Hartog Is., in Houtman Abrolhos and in the Archipelago of the Recherche; rare to uncommon elsewhere (Johnstone and Storr 1998). Also found in New Guinea, Indonesia, China, southeast Asia and India. Scarce near major coastal cities (Morcombe 2004).

Habitat: They nest and forage usually near the coast over islands, reefs, headlands, beaches, bays, estuaries, mangroves, but will also live near seasonally flooded inland swamps, lagoons and floodplains, often far inland on

large pools of major rivers. Established pairs usually sedentary, immatures dispersive (Morcombe 2004). White-bellied Sea-Eagles build a large stick nest, which is used for many seasons in succession.

Likely presence in study area: No suitable habitat in or near the study area.

Potential impact of proposed development: No impact on this species or its preferred habitat is considered likely.

Osprey *Pandion haliaetus*

Status and Distribution: This species is listed as Migratory under the *EPBC Act* and under international agreements to which Australia is a signatory. Moderately common to very common in sheltered seas around the north and west coast islands south to 31°S; uncommon to common on mainland coasts, estuaries and large rivers north of tropic, rare to uncommon elsewhere (Johnstone and Storr 1998).

Habitat: Coasts, estuaries, bays, inlets, islands, and surrounding waters, coral atolls, reefs, lagoons, rock cliffs and stacks. Ascends larger rivers (Pizzey & Knight 2012). Construct nests on prominent headland, large trees, communication towers (Simpson & Day 2010).

Likely presence in study area: No suitable habitat in or near the study area.

Potential impact of proposed development: No impact on this species or its preferred habitat is considered likely.

Peregrine Falcon *Falco peregrinus*

Status and Distribution: This species is listed as Schedule 4 under the *WC Act*. Individuals of this species are uncommon/rare but wide ranging across Australia. Moderately common at higher levels of the Stirling Range, uncommon in hilly, north west Kimberley, Hamersley and Darling Ranges; rare or scarce elsewhere (Johnstone and Storr 1998).

Habitat: Diverse from rainforest to arid shrublands, from coastal heath to alpine (Morcombe 2004). Mainly about cliffs along coasts, rivers and ranges and about wooded watercourses and lakes (Johnstone and Storr 1998). The species utilises the ledges, cliff faces and large hollows/broken spouts of trees for nesting. It will also occasionally use the abandoned nests of other birds of prey.

Likely presence in study area: Individuals of this species potentially utilises some sections of the study area as part of a much larger home range.

Potential impact of proposed development: Modification of potential foraging habitat and potential for the loss of potential breeding sites (i.e. tall trees with broken spouts).

Forest Red-tailed Black Cockatoo *Calyptorhynchus banksii naso*

Status and Distribution: Listed as Scheduled 1 under the *WC Act* and as Vulnerable under the *EPBC Act*. Found in the humid and subhumid south west, mainly hilly interior, north to Gingin and east to Mt Helena, Christmas Tree Well, North Bannister, Mt Saddleback, Rock Gully and the upper King River (Johnstone and Storr 1998).

Habitat: Eucalypt forests, feeds on Marri, Jarrah, Blackbutt, Karri, Sheoak and Snottygobble. The Forest Red-tailed Black Cockatoo nests in the large hollows of Marri, Jarrah and Karri (Johnstone and Kirkby 1999). In Marri, the nest hollows of the Forest Red-tailed Black Cockatoo range from 8-14m above ground, the entrance is 12 – 41cm in diameter and the depth is one to five metres (Johnstone and Storr 1998).

Breeding commences in winter/spring. There are few records of breeding in the Forest Red-tailed Black Cockatoo (Johnstone and Storr 1998), but eggs are laid in October and November (Johnstone 1997; Johnstone and Storr 1998). Recent data however indicates that breeding in all months of the year occurs with peaks in spring and autumn–winter (Ron Johnstone pers comms). Incubation period 29 – 31 days. Young fledge at 8 to 9 weeks (Simpson and Day 2004).

J	F	M	A	M	J	J	A	S	O	N	D

Period in which breeding is most likely to commence
Period in which fledging/weening could extend through

Likely presence in study area: Individuals of this species were heard calling during the field survey and foraging evidence observed (chewed marri and jarrah fruits). Almost all of the vegetation present represents foraging habitat for this species (e.g. marri trees, jarrah trees) and using DSEWPaC criteria the area also contains potential breeding habitat (i.e. any suitable tree species with a DBH>50cm). May also roost on site though no evidence of this was found.

Potential impact of proposed development: Loss of foraging, breeding and roosting opportunities.

Baudin's Black- Cockatoo *Calyptorhynchus baudinii*

Status and Distribution: Listed as Scheduled 1 under the *WC Act* and as Vulnerable under the *EPBC Act*. Confined to the south-west of Western Australia, north to Gidgegannup, east to Mt Helena, Wandering, Quindanning,

Kojonup, Frankland and King River and west to the eastern strip of the Swan Coastal Plain including West Midland, Byford, Nth Dandalup, Yarloop, Wokalup and Bunbury (Johnstone and Storr 1998). On the southern Swan Coastal Plain this cockatoo is in some areas resident but mainly a migrant moving from the deep south-west to the central and northern Darling Range. Between March and September most flocks move north and are concentrated in the northern parts of the Darling Range. During this period birds forage well out onto the southern Swan Coastal Plain to areas such as Harvey, Myalup, Bunbury, Capel, Dunsborough and Meelup. While generally more common in the Darling Range this species can also be common on parts of the southern Swan Coastal Plain especially in mid-August – September when flocks begin to return to their breeding quarters (Johnstone 2008).

Habitat: Mainly eucalypt forests where it feeds primarily on the Marri seeds, (Morcombe, 2003), Banksia, Hakeas and *Erodium* sp. Also strips bark from trees in search of beetle larvae (Johnstone and Storr 1998). This species of cockatoo nests in large tree hollows, 30–40 cm in diameter and more than 30 cm deep (Saunders 1974).

Baudin's Black-Cockatoo breeds in late winter and spring, from August to November or December (Gould 1972; Johnstone 1997; Saunders 1974; Saunders *et al*. 1985). Eggs laid in October (Johnstone and Storr 1998). Based on observations at currently known nest sites breeding mainly occurs within the October-December period (Ron Johnstone pers comms). Incubation is 28 – 30 days. Young fledge at 8 to 9 weeks (Simpson and Day 2004).

J	F	M	A	M	J	J	A	S	O	N	D

Period in which breeding is most likely to commence
Period in which fledging/weening could extend througho

Likely presence in study area: Observed flying overhead and heard calling several times within the survey area and nearby. Almost all the remnant vegetation within the study area presents potential foraging habitat for this species. Larger trees (>50cm DBH) can be considered potential breeding habitat. This species may also roost on site on occasions though no roost trees observed.

Potential impact of proposed development: Loss of foraging, breeding and roosting opportunities.

Carnaby's Black- Cockatoo *Calyptorhynchus latirostris*

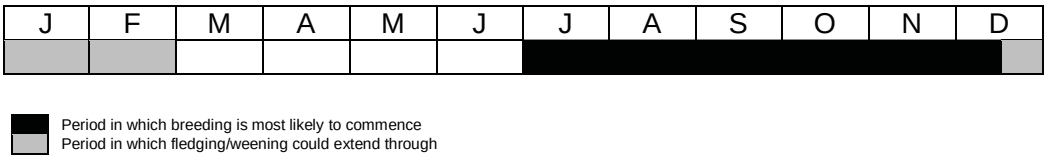
Status and Distribution: Carnaby's Black Cockatoo is listed as Scheduled 1 under the *WC Act* and as Endangered under the *EPBC Act*. Confined to the

south-west of Western Australia, north to the lower Murchison River and east to Nabawa, Wilroy, Waddi Forest, Nugadong, Manmanning, Durokoppin, Noongar (Moorine Rock), Lake Cronin, Ravensthorpe Range, head of Oldfield River, 20 km ESE of Condingup and Cape Arid; also casual on Rottnest Island (Johnstone and Storr 1998).

Habitat: Forests, woodlands, heathlands, farms; feeds on Banksia, Hakeas and Marri. Carnaby's Cockatoo has specific nesting site requirements. Nests are mostly in smoothed-barked eucalypts with the nest hollows ranging from 2.5 to 12m above the ground, an entrance from 23-30cm diameter and a depth of 0.1-2.5m (Johnstone and Storr, 1998).

Breeding occurs in winter/spring mainly in eastern forest and wheatbelt where they can find mature hollow bearing trees to nest in (Morcombe, 2003). Judging from records in the Storr-Johnstone Bird Data Bank, this species is currently expanding its breeding range westward and south into the Jarrah – Marri forest of the Darling Scarp and into the Tuart forests of the Swan Coastal Plain including the region between Mandurah and Bunbury. Carnaby's Black Cockatoo has been known to breed close to the town of Mandurah, as well as at Dawesville, Lake Clifton and Baldivis (pers. comm., Ron Johnstone, WA Museum) and there are small resident populations on the southern Swan Coastal Plain near Mandurah, Lake Clifton and near Bunbury. At each of these sites the birds forage in remnant vegetation and adjacent pine plantations (Johnstone 2008).

Carnaby's Black-Cockatoo lays eggs from July or August to October or November, with most clutches being laid in August and September (Saunders 1986). Birds in inland regions may begin laying up to three weeks earlier than those in coastal areas (Saunders 1977). The female incubates the eggs over a period of 28-29 days. The young depart the nest 10–12 weeks after hatching (Saunders 1977; Smith & Saunders 1986).



Likely presence in study area: Not observed during the survey period but foraging evidence found. Remnant vegetation represents foraging habitat. Potential to also breed in the area but probability of this occurring can be considered to be low. This species may also roost on site on occasions though no roost trees observed.

Potential impact of proposed development: Loss of foraging, breeding and roosting opportunities.

Masked Owl *Tyto novaehollandae novaehollandae*

Status and Distribution: Listed as Priority 3 by DPaW. Found north to Yanchep and east to Yealering, Gnowangerup and Albany, casual further north. Locally common in south west but generally uncommon (Johnstone and Storr 1998).

Habitat: Roosts and nests in heavy forest, hunts over open woodlands and farmlands (Morcombe 2004). Probably breeding in forested deep south west with some autumn–winter wanderings northwards (Johnstone and Storr 1998).

Likely presence in study area: Status on the site and in the general area difficult to determine. May frequent the area at times.

Potential impact of proposed development: Modification of potential foraging habitat and the loss of potential breeding and roosting opportunities.

Fork-tailed Swift *Apus pacificus*

Status and Distribution: The Fork-tailed Swift is listed as Schedule 3 under the *WC Act* and as migratory under the *EPBC Act* as migratory under the *EPBC Act 1999* and under international agreements to which Australia is a signatory. It is a summer migrant (Oct-Apr) to Australia (Morcombe 2004).

Habitat: Low to very high airspace over varied habitat from rainforest to semi desert (Morcombe 2003).

Likely presence in study area: It is potentially an occasional summer visitor to the study area but is entirely aerial and largely independent of terrestrial habitats.

Potential impact of proposed development: No impact on this species is anticipated.

Rainbow Bee-eater *Merops ornatus*

Status and Distribution: This species is listed as Schedule 3 under the *WC Act* and as migratory under the *EPBC Act* and under international agreements to which Australia is a signatory. The Rainbow Bee-eater is a common summer migrant to southern Australia but in the north they are resident (Morcombe 2003).

Habitat: Open Country, of woodlands, open forest, semi arid scrub, grasslands, clearings in heavier forest, farmlands (Morcombe 2004). Breeds underground in areas of suitable soft soil firm enough to support tunnel building.

Likely presence in study area: Common seasonal visitor to south west and likely to forage and roost in sections of the study area. Possibly breeds in some sections of the study area where sandier ground conditions are present though

population levels would not be significant as it usually breeds in pairs, rarely in small colonies (Johnstone and Storr 1998).

Potential impact of proposed development: Modification and/or loss of some habitat but impact will not be significant. This species can be expected to continue to utilise the area, as it does now, despite any future development.

Chuditch *Dasyurus geoffroii*

Status and Distribution: Listed as Scheduled 1 under the *WC Act* and as Vulnerable under the *EPBC Act.* Formerly occurred over nearly 70 per cent of Australia. The Chuditch now has a patchy distribution throughout the Jarrah forest and mixed Karri/Marri/Jarrah forest of southwest Western Australia. Also occurs in very low numbers in the Midwest, Wheatbelt and South Coast Regions with records from Moora to the north, Yellowdine to the east and south to Hopetoun.

Habitat: Chuditch are known to have occupied a wide range of habitats from woodlands, dry sclerophyll (leafy) forests, riparian vegetation, beaches and deserts. Riparian vegetation appears to support higher densities of Chuditch, possibly because food supply is better or more reliable and better cover is offered by dense vegetation. Chuditch appear to utilise native vegetation along road sides in the wheatbelt (CALM 1994). The estimated home range of a male Chuditch is over 15 km^2 whilst that for females is 3-4 km^2 (Sorena and Soderquist 1995).

Likely presence in study area: This species is known to persist in state forest and national park areas surrounding Collie and therefore it may frequent the study site.

Potential impact of proposed development: Loss of some potential habitat. Some possibility that individuals maybe killed or injured during clearing operations.

Numbat *Myrmecobius fasciatus*

Status and Distribution: Listed as Scheduled 1 under the *WC Act* (1950) and as Vulnerable under the *EPBC Act* (1999). Once occurred across much of arid and semi arid southern Australia, now restricted to a few remnant forests of Wandoo, Powderbark Wandoo or jarrah in South west WA (Menkhorst & Knight 2001). Rare, scattered. Found only at Dryandra, Perup and six other translocation sites (Van Dyck & Strahan 2008).

Habitat: Generally dominated by eucalypts that provide hollow logs and branches for shelter and termites for food (Van Dyck & Strahan 2008).

Likely presence in study area: Available evidence suggests this species is locally and regionally extinct.

Potential impact of proposed development: No impact on this species is anticipated.

Southern Brush-tailed Phascogale *Phascogale tapoatafa ssp*

Status and Distribution: Listed as Scheduled 1 under the *WC Act*. Present distribution is believed to have been reduced to approximately 50 per cent of its former range. Current document distribution is form Perth and south to Albany, west of Albany Highway. Occurs at low densities in the northern Jarrah forest. Highest densities occur in the Perup/Kingston area, Collie River valley, and near Margaret River and Busselton (DPaW information pamphlet). Records are less common from wetter forests.

Habitat: This subspecies has been observed in dry sclerophyll forests and open woodlands that contain hollow-bearing trees but a sparse ground cover. A nocturnal carnivore relying on tree hollows as nest sites. The home range for a female Brush-tailed Phascogale is estimated at between 20 and 70 ha, whilst that for males is given as twice that of females. In addition, they tend to utilise a large number (approximately 20) of different nest sites throughout their range (Soderquist, 1995).

Likely presence in study area: This species is known to persist in state forest and national park areas surrounding Collie and therefore it may frequent the study site.

Potential impact of proposed development: Loss of some potential habitat. Some possibility that individuals maybe killed or injured during clearing operations.

Southern Brown Bandicoot *Isoodon obesulus fusciventer*

Status and Distribution: Listed as Priority 5 by DPaW. Widely distributed in the south west from near Cervantes north of Perth to east of Esperance, patchy distribution through the Jarrah and Karri forest and on the Swan Coastal Plain, and inland as far as Hyden. Has been translocated to Julimar State Forest, Hills Forest Mundaring, Tutanning Nature Reserve, Boyagin Nature Reserve, Dongolocking Nature Reserve, Leschenault Conservation Park, and Karakamia and Paruna Sanctuaries (DPaW information pamphlet) and Nambung National Park (DPaW pers. coms.)

Habitat: Dense scrubby, often swampy, vegetation with dense cover up to one metre high, often feeds in adjacent forest and woodland that is burnt on a regular basis and in areas of pasture and cropland lying close to dense cover.

Populations inhabiting Jarrah and Wandoo forests are usually associated with watercourses. Quendas can thrive in more open habitat subject to exotic predator control (DPaW information pamphlet).

Likely presence in study area: Evidence of this species foraging in some sections of the study area observed.

Potential impact of proposed development: Loss of some potential habitat. Some possibility that individuals maybe killed or injured during clearing operations.

Western Ringtail Possum *Pseudocheirus occidentalis*

Status and Distribution: Listed as Scheduled 1 under the *WC Act* and as Vulnerable under the *EPBC Act.* Common in suitable habitat (de Tores 2008). The highest densities of this species are recorded in Peppermint habitat near Busselton area; relatively high densities are found in Jarrah/Marri forest at Perup (de Tores 2008).

The Western Ringtail Possum (WRP) has a restricted distribution in south-western Western Australia. Most known populations (natural and translocated) are now restricted to near coastal areas of the south west from the Dawesville area to the Waychinicup National Park. Inland, it is also known to be relatively common in a small part of the lower Collie River valley, the Perup Nature Reserve and surrounding forest blocks near Manjimup. It has also been recorded in stands of Peppermint near the Harvey River and in Jarrah/Marri forest near Collie; however, the long term persistence of the species in these areas is not confirmed (de Tores *et al* 2004). The Western Ringtail was formerly more widespread: in the 1970s it was known from Casuarina woodlands in the wheatbelt near Pingelly (south-east of Perth), and it is thought to have once occurred throughout much of south-western Western Australia (but not necessarily continuously distributed) (Maxwell *et al*. 1996; de Tores 2008).

The species is widespread and relatively common in vegetated remnants within the Swan Coastal Plain and along the Whicher Scarp between Bunbury and Busselton (G. Harewood per. obs.). The most northern known natural coastal population is centred on the Binningup townsite.

Habitat: The Western Ringtail Possum was once located in a variety of habitats including Coastal Peppermint, Coastal Peppermint-Tuart, Jarrah-Marri associations, Sheoak woodland, and eucalypt woodland and mallee. Coastal populations mostly inhabit Peppermint-Tuart associations with highest densities in habitats with dense, relatively lush vegetation. In these areas the main determinants of suitable habitat for WRPs appears to be the presence of *Agonis flexuosa* either as the dominant tree or as an understorey component of Eucalypt

forest or woodland (Jones *et al*. 1994a). Inland, the largest known populations occur in the Upper Warren area east of Manjimup (Wayne *et al* 2005). In this area the peppermint tree is naturally absent and jarrah-marri associations constitute the species refuge and foraging habitat. In areas where Peppermint is absent or rare WRPs have been observed feeding predominately on young Jarrah, *Nuytsia floribunda* and *Allocasuarina fraseriana* (G Harewood pers. obs.*).*

Likely presence in study area: Despite targeted searching for dreys, scats and individuals no evidence of this species within study area was found. This evidence and observations of vegetation structure and composition suggest that WRPs are either absent from the study or are present in low densities, at only a few locations. This is supported by the lack of observations of the species during other more detailed fauna surveys in the near vicinity (see Appendix B).

In general terms the vegetation appears largely unsuitable or at best marginal for WRPs to utilise. This is primarily based on the fact that the majority of the vegetation is dominated by young, relatively tall trees with an overall structure that lacks a significant density of midstorey vegetation/canopy and therefore connectivity between trees is compromised. This would make it difficult for WRPs to move through the vegetation without coming to ground.

Western Ringtails Possums are however known to occur in some areas of bushland surrounding Collie and therefore their presence within some sections of the study area, if only infrequently, cannot be discounted. They are most likely to be found utilising areas with the best quality midstorey vegetation (i.e. highest density and high species variation). WRPs also use hollows in trees and Grass Trees/Balga Bushes for daytime refuge and this should be taken into consideration during clearing operations.

Potential impact of proposed development: Loss of some potential though marginal habitat. Some possibility that individuals maybe killed or injured during clearing operations.

Quokka *Setonix brachyurus*

Status and Distribution: Listed as Scheduled 1 under the *WC Act* and as Vulnerable under the *EPBC Act*. Rare and restricted in south west W.A. from south of Perth to Two Peoples Bay. The distribution of the Quokka includes Rottnest and Bald Islands, and at least 25 known sites on the mainland, including Two Peoples Bay Nature Reserve, Torndirrup National Park, Mt Manypeaks National Park, Walpole-Nornalup National Park, and various swamp areas through the south-west forests from Jarrahdale to Walpole. As of 2008 there were nine known quokka populations in the Wellington National Park area (DEC 2008). One population, north of the Collie River, is considered to be the largest

in the northern jarrah forest, although numbers appear to be declining (DEC 2008).

Habitat: Mainland populations of this species are currently restricted to densely vegetated coastal heaths, swamps, riverine habitats including tea-tree thickets on sandy soils along creek systems where they are less vulnerable to predation. The species is nocturnal.

Likely presence in study area: There is no suitable habitat for this species within the study area.

Potential impact of proposed development: No impact on this species is anticipated.

Western Brush Wallaby *Macropus irma*

Status and Distribution: Listed as Priority 4 by DPaW. The Western Brush Wallaby is distributed across the south-west of Western Australia from north of Kalbarri to Cape Arid (DPaW information pamphlet nd).

Habitat: The species optimum habitat is open forest or woodland, particularly favouring open, seasonally wet flats with low grasses and open scrubby thickets. It is also found in some areas of mallee and heathland, and is uncommon in karri forest (DPaW information pamphlet nd).

Likely presence in study area: This species is relatively common in the Collie area and is likely to frequent sections of the study area at times.

Potential impact of proposed development: Loss of small areas of potential habitat.

Western False Pipistrelle *Falsistrellus mackenziei*

Status and Distribution: Listed as Priority 4 by DPaW. Listed as Vulnerable by the ICUN. Confined to south west W.A. south of Perth and east to the wheat belt. Most records from Karri forests but also recorded in wetter stands of jarrah and tuart and woodlands on the Swan Coastal Plain (Menkhorst and Knight 2001). Range appears to be contracting southwards, presumably due to drying climate.

Habitat: This species of bat occurs in high forest and coastal woodlands. It roosts in small colonies in tree hollows and forages at canopy level and in the cathedral-like spaces between trees.

Likely presence in study area: Potentially present with the study area when it is likely to forage and possibly roost given presence of suitable tree hollows.

Potential impact of proposed development: Loss/modification of foraging habitat and loss of potential roosting habitat (hollow trees).

DISCLAIMER

This fauna assessment report ("the report") has been prepared in accordance with the scope of services set out in the contract, or as otherwise agreed, between the Client and Greg Harewood ("the Author"). In some circumstances the scope of services may have been limited by a range of factors such as time, budget, access and/or site disturbance constraints. In accordance with the scope of services, the Author has relied upon the data and has conducted environmental field monitoring and/or testing in the preparation of the report. The nature and extent of monitoring and/or testing conducted is described in the report.

The conclusions are based upon field data and the environmental monitoring and/or testing carried out over a limited period of time and are therefore merely indicative of the environmental condition of the site at the time of preparing the report. Also it should be recognised that site conditions, can change with time.

Within the limitations imposed by the scope of services, the field assessment and preparation of this report have been undertaken and performed in a professional manner, in accordance with generally accepted practices and using a degree of skill and care ordinarily exercised by reputable environmental consultants under similar circumstances. No other warranty, expressed or implied, is made.

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The Author will not be liable to update or revise the report to take into account any events or emergent circumstances or facts occurring or becoming apparent after the date of the report.

Level 2 Flora and Vegetation Survey – Collie Motorplex, Collie

Prepared for
RPS Australia Asia Pacific

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Version	Purpose	Origin	Review	Review date	Ecoedge release approval	Issue date
v1		TB	R Smith	12 Nov 13		
v2		TB, RS	R Smith	13 Nov 13		
v3		TB, RS	R Smith, M Strang	03 Dec 13		
v4		TB, RS	M Strang	06 Dec 13		
Final Draft	Released for client review		Client	5 Feb 2014	M Strang	06 Dec 13
Final	Released to client				M Strang	5 Feb 2014

Executive Summary

Ecoedge was engaged by RPS to carry out a Level 2 flora and vegetation assessment over 62 ha in two separate areas, Area "A" of 20 ha and "B" of 42.7 ha adjacent to the Collie Motorplex racetrack. The study area was twice traversed on foot by two botanists; on 24th September and 30th October 2013. The vegetation survey was undertaken in accordance with EPA Guidance Statement 51 "Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia" (EPA, 2004).

One hundred and eighty one species of vascular flora were identified from within the study area, of which 10 are naturalised or planted non-native species. One of the naturalized species, *Echium plantagineum* (Patterson's Curse) is a Declared Plant under the *Agriculture and Related Resources Protection Act, 1976*. It is classified as P1 ("Introduction of the plant into, or movement of the plant within, an area is prohibited") and P3 ("Plant to be controlled by reduction in number or distribution of the plant or both").

No Declared Rare Flora, Priority Flora, listed threatened species pursuant to the *EPBC Act* 1999 or other flora of conservation significance were found in the study area.

Vegetation in the study area is representative of both the Collie (CI) and Muja (MJ) vegetation complexes, which are mapped as being present onsite. These were both classified as poorly conserved by Mattiske and Havel (2002), with 14.5% and 14.0%, respectively, of the current extent in conservation reserves. This falls just below the 15% target set by the EPA (2006).

Four native vegetation units were recognised in the study area plus one vegetation unit predominantly composed of planted exotic species. None of the vegetation units in the study area corresponds to a threatened or priority ecological community.

A quarter of the study area has been cleared, the remainder (46.8 ha) contains native vegetation of varying condition. The majority of the native vegetation in the study area (89%) was classified as "Very Good" condition – it is floristically diverse although the structure has been somewhat altered by past logging activities. The main cause of degradation has been partial clearing, dieback disease and planting of non-native species. Heavy grazing by kangaroos is also probably a factor.

A breakdown of vegetation condition for the two parts of the study area; Area A and Area B, is provided. The large majority of Area B (85.7%) is in "Very Good" condition, the remainder of being comprised of roads and road verges. Condition is much more varied in Area A almost half (48%) of which is cleared, however 40% was rated as "Good" or "Very Good" condition.

A detailed assessment of use of the study area by black cockatoos was beyond the scope of this study and only some general comments about sightings, habitat use and habitat suitability are made in this report.

Vegetation within the study area is dominated by healthy stands of Marri and Jarrah – both of these are important food sources for the Forest Red-tailed Black-Cockatoo (FRBC). This species was observed and heard in and near both Area A and Area B during the visits to the study area. Fruit of Marri trees that had been partially eaten by FRBC was observed in several places in Area B, particularly near the northern boundary, as well as along the track leading to Area B from Powerhouse Road. Fewer signs of foraging by black cockatoos were observed in Area A, perhaps because it is closer to the Motorplex racetrack.

Large eucalypts with dead branches that have potential for nesting hollow development were present in both Area A and B, but were probably most frequent in the northern part of Area A. Several hollows large enough to be used for nesting were observed in Area B. Area B has been heavily logged in places and in these areas there were fewer large trees (> 500m dbh) – however there were several groups of very large Marri trees (> 800 mm dbh) present along the unsealed track that runs north to south through this part of the study area.

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Statement of limitations

Reliance on Data

In the preparation of this report, Ecoedge has relied on data, surveys, analyses, designs, plans and other information provided by the Client and other individuals and organisations, most of which are referred to in the report. Unless stated otherwise in the report, Ecoedge has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report are based in whole or in part on the data, those conclusions are contingent upon the accuracy and completeness of the data. Ecoedge will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, unavailable, misrepresented or otherwise not fully disclosed to Ecoedge.

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The report has been prepared for the benefit of the Client and for no other party. Ecoedge assumes no responsibility and will not be liable to any other person or organisation for or in relation to any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report (including, without limitation, matters arising from any negligent act or omission of Ecoedge or for any loss or damage suffered by any other party relying on the matters dealt with or conclusions expressed in the report). Other parties should not rely upon the report or the accuracy or completeness of any conclusions, and should make their own enquiries and obtain independent advice in relation to such matters.

1 Introduction

Ecoedge was engaged by RPS in September 2013 to undertake a Level 2 vegetation and flora assessment over 62 ha of the Collie Motorplex site, a recreational motoring and sporting facility, which is situated approximately 11.5 km due south-east of the Collie town site. The Motorplex site covers approximately 349 hectares in total. Two separate areas, Area A comprising 20.0 ha and Area B comprising 42.7 ha are being considered as alternative sites for a planned redevelopment of the Motorplex.

The remnant vegetation requiring assessment totalled approximately 40 ha.

In 2008, GHD undertook a Flora and Fauna Survey within the vicinity of but not including the Survey Area. This survey included desktop and field investigations of the fauna and flora at the site with subsequent reporting on its significance (GHD, 2008).

GHD also undertook a Flora and Vegetation Survey within the vicinity of but not including the Survey Area in 2009. This survey included desktop and field investigations of the vegetation and flora at the site with subsequent reporting on the significance of the flora and vegetation (GHD, 2009).

In the current survey, the study area was visited on 24th September and 30th October 2013 to carry out the assessment. The vegetation survey was undertaken in accordance with EPA Guidance Statement 51, "Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia" (EPA, 2004).

This report compiles findings of the Level 2 Vegetation and Flora survey.

1.1 Scope and objectives

The project scope was to carry out a Level 2 vegetation and flora assessment to assess the floristic diversity and determine vegetation communities occurring in the Survey Area.

The objectives of the flora and vegetation survey for the study area were to:

- conduct an assessment of flora and vegetation values within the study area;
- conduct a review of other literature to summarise the values of flora and vegetation significance in the project area;
- review the documented flora and vegetation of significance, based on DEC and / or Department of Parks and Wildlife records (databases);
- conduct a field assessment to:
    - identify the vascular flora species present;

    - determine the presence or absence of Declared Rare Flora (DRF), Priority Flora, EPBC Act Listed Flora or Significant Species;
- define and spatially map vegetation communities; (achieved through the installation of two x 100 m^2 floristic quadrats and a number of floristic releves)
    - define and spatially map vegetation condition;
- Assess the extent and suitability of the vegetation as exsisting and/or potential feeding, nesting and roosting habitat for Carnaby's, Baudin's and Forest Red-tailed Black Cockatoos
- prepare a report that summarises the findings of the desktop and field assessments

1.2 Biogeographic region

The Survey Area is located within the Southern Jarrah Forest (JF2) sub-region of the Jarrah Forest Bioregion as defined in the Interim Biogeographical Regionalisation for Australia (IBRA) (Australian Government, 2009).

1.3 Site location and features

The Survey Area is situated approximately 11.5 km south-east of the Collie town site (**Figure 1**).

The Survey Area is situated on the Darling Plateau within the Western Darling Range Zone. Elevation falls from approximately 230 m above sea level (ASL) in the east to approximately 220 m in the west.

The entire Survey Area is located in State forest number 4 on a lease held by Motoring South West Incorporated. According to the Shire of Collie Town Planning Scheme 5, the Collie Motorplex is currently zoned as 'Parks and Recreation'.

1.4 Geology

The site is situated on the Darling Plateau within the Western Darling Range Zone (WDRZ) geomorphological and geological unit as defined in Tille (1996).

The Western Darling Range Zone is a deeply dissected undulating lateritic plateau overlying crystalline rocks (e.g. granite and gneiss). Major river systems have cut into the plateau to form deep, steep sided valleys and expose fresh rock. Three soil-landscape systems containing 24 subsystems have been identified and mapped within this zone (Tille, 1996).

Within the WDRZ the Survey Area occurs on the Coalfields System (**Figure 2**):

Coalfields System: The Coalfields system is dominated by broad, lateritic divides with gravels and sands (Collie Subsystem). In between these are broad tracts of swampy terrain (Cardiff Subsystem) and shallow, minor valleys with swampy floors (Stockton Subsystem). The Collie

River has formed shallow valleys with well drained flats (Muja Subsystem). The Coalfields System overlies Permian sedimentary basins containing coal (Tille, 1996).

Soil Mapping Units occurring within the Survey Area are presented in **Table 1.**

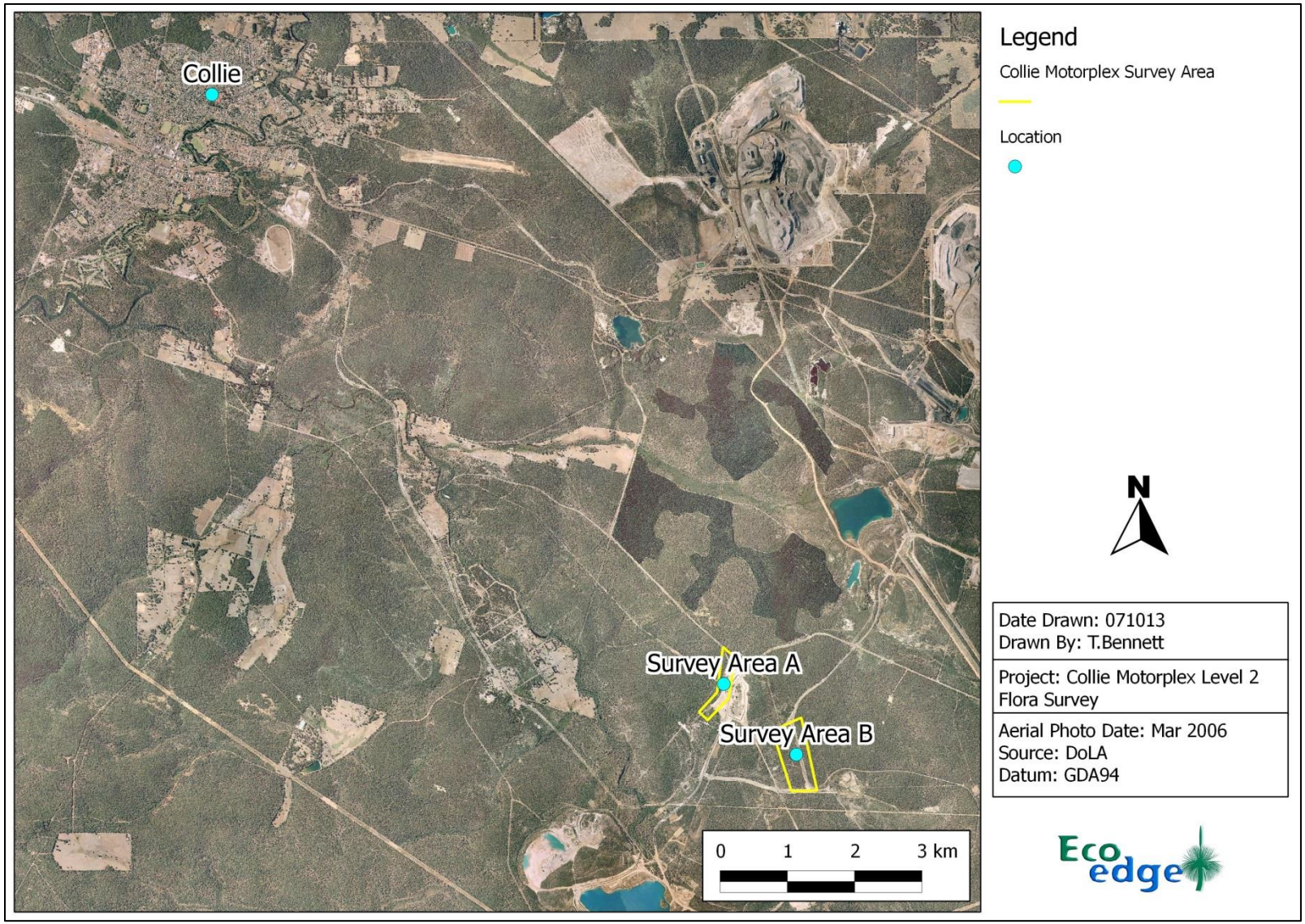

Figure 1. Aerial Photograph showing location of Survey Area

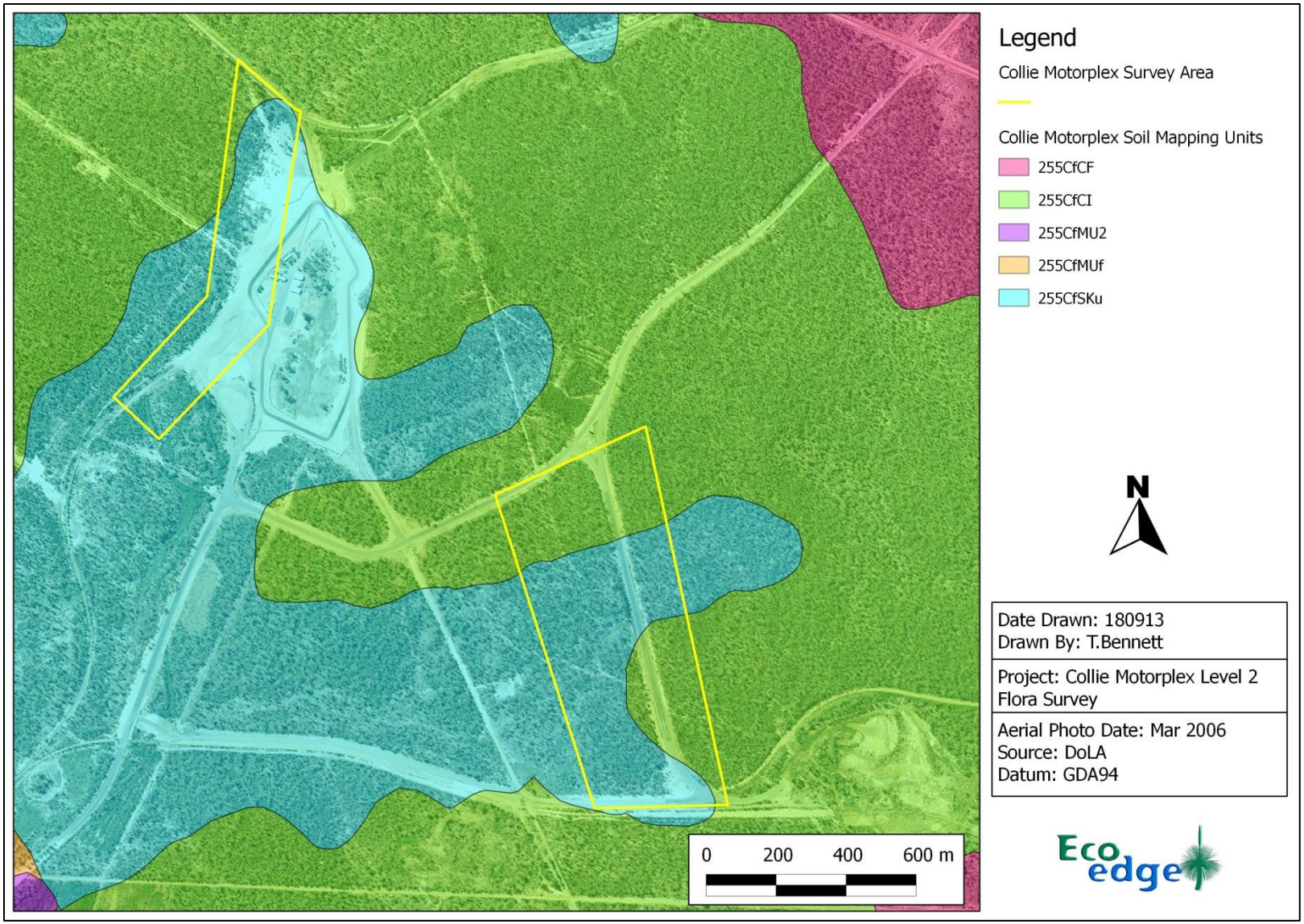

Figure 2. Soil landscapes occurring within the Survey Area

Soil Mapping Unit	Description	Supports Remnant Vegetation (Yes/No)
255CfSKu	Shallow, upstream, minor valleys with sands and gravels. The valley floor is usually narrower than the downstream valleys.	Yes
255CfCl	Consists of broad lateritic divides with deep sands and sandy gravels	Yes

Table 1. Soil Mapping Units occurring within the Survey Area (Tille, 1996).

1.5 Vegetation

The Survey Area supports approximately 40 ha of remnant vegetation, 10.4 ha in Area A and 36.6 ha in Area B.

Vegetation complexes on the Darling Scarp and Plateau were mapped for the purposes of the Regional Forest Agreement by Mattiske and Havel (1998). This classification system emphasises the relationships between underlying geology and plant communities.

The upslope part of Area A is mapped as the Collie (CI) vegetation complex (7.4 ha) and the remainder (3 ha) comprising the lower, damp areas, as the Muja (MJ) complex. All of Area B is mapped as the Collie (CI) vegetation complex (**Figure 3**).

These two complexes are described below:

- **Collie (CI)** - Open forest of *Eucalyptus marginata* subsp. *marginata-Corymbia calophylla-Allocasuarina fraseriana* on gravelly-sandy upland soils in the subhumid zone.
- **Muja (MJ) -** Open woodland of *Melaleuca preissiana-Banksia littoralis-Banksia ilicifolia* with some *Eucalyptus patens* on moister sites, *Banksia* spp. on drier sites of valley floors in the subhumid zone.

In 2001, the Commonwealth of Australia stated National Targets and Objectives for Biodiversity Conservation, which recognised that the retention of 30%, or more, of the pre-clearing extent of each ecological community was necessary if Australia's biological diversity was to be protected (Environment Australia, 2001). This level of recognition is in keeping with the targets set in the Environmental Protection Authority (EPA)s Position Statement on the 'Environmental protection of native vegetation in Western Australia: clearing of native vegetation, with particular reference to the agricultural area' (EPA, 2000). With regard to conservation status, the EPA has set a target of 15% of pre-European extent for each ecological community to be protected in a comprehensive, adequate and representative reserve system (EPA, 2006).

Both the Collie (CI) and Muja (MJ) vegetation complexes have been classified as poorly conserved by Mattiske and Havel (2002), with 14.5% and 14.0%, respectively, of the then extent in conservation reserves. This falls just below the 15% target set by the EPA (2006).

However, the total remaining area of the Collie (CI) complex is 71% of the pre-European extent and the Muja (MJ) is 51%; thus both are close to or above the minimum 30% of pre-clearing extent for retention of the National Targets and Objectives for Biodiversity Conservation (Environment Australia, 2001).

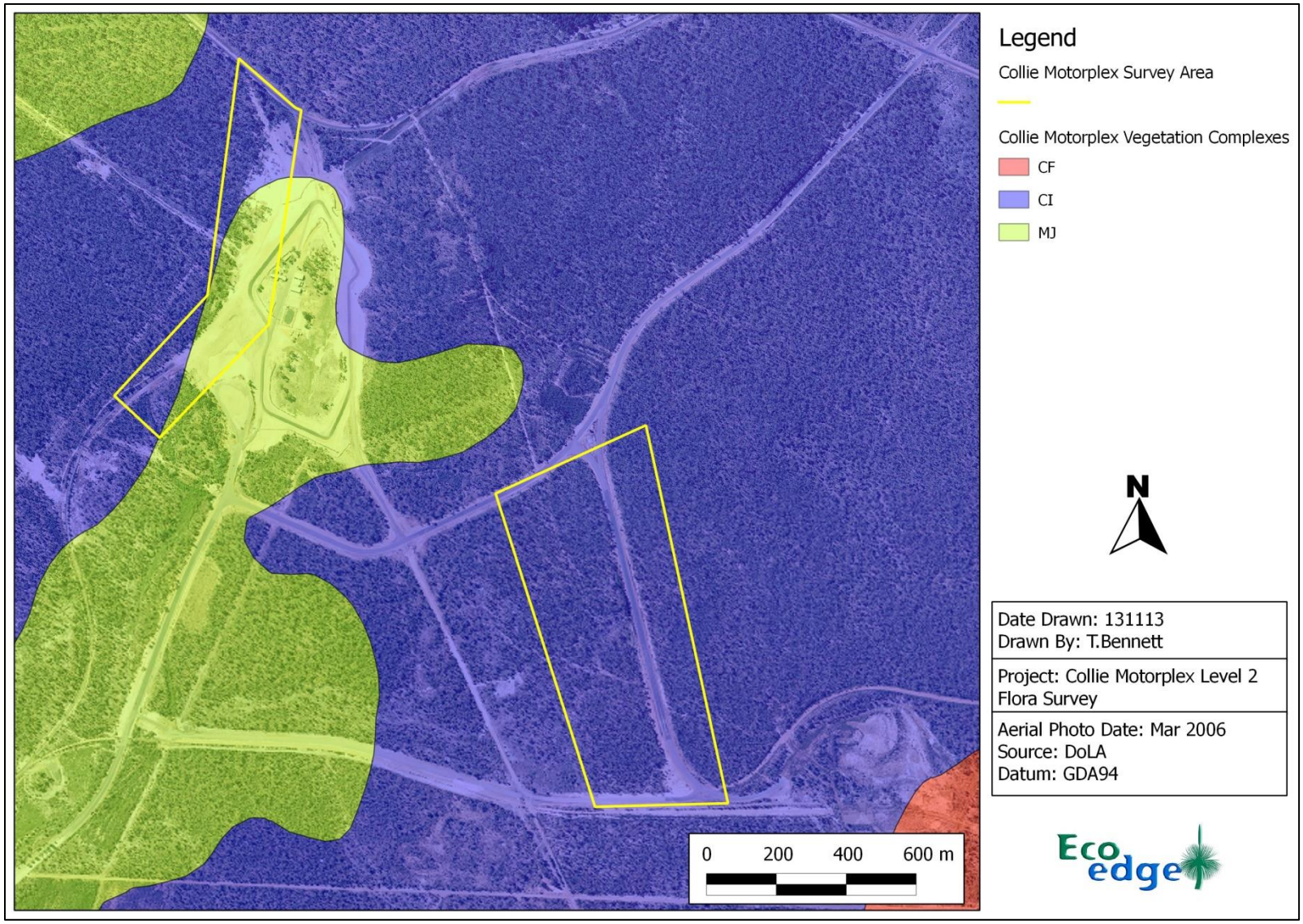

Figure 3. Vegetation complexes within the Survey Area

1.6 Threatened and Priority Ecological Communities

Ecological communities are defined by Western Australia's Department of Parks and Wildlife (DPaW, previously the Department of Environment and Conservation (DEC)) as "...naturally occurring biological assemblages that occur in a particular type of habitat. They are the sum of species within an ecosystem and, as a whole, they provide many of the processes which support specific ecosystems and provide ecological services." (DEC, 2010a).

A threatened ecological community (TEC) is one which is found to fit into one of the following categories; 'presumed totally destroyed', 'critically endangered', 'endangered' or 'vulnerable' (DEC, 2012a). Possible threatened ecological communities that do not meet survey criteria are added to DPaW's Priority Ecological Community Lists under Priorities 1, 2 and 3. Ecological Communities that are adequately known, are rare but not threatened, or meet criteria for Near Threatened, or that have been recently removed from the threatened list, are placed in Priority 4. These ecological communities require regular monitoring. Conservation Dependent ecological communities are placed in Priority 5 (DPaW, 2013d). Threatened Ecological Communities can also be listed under the Environment Protection and Biodiversity Conservation Act 1999 (*EPBC Act*) (Department of Sustainability, Environment, Water, Population and Communities (SEWPaC, 2010a).

A DEC data search for threatened or priority ecological communities known to occur within 5 km of the Study Area was undertaken (DEC, 2013a). A Protected Matters Search Tool query for communities listed under the *EPBC Act* (1999) occurring within a 10 km radius of the Study Area was also undertaken (Department of Sustainability, Environment, Water, Population and Communities (SEWPaC), 2012c).

No threatened or priority ecological communities are known to occur within or in the vicinity of the Survey Area.

The complete Protected Matters Search Tool results are included in **Appendix 1.**

1.7 Threatened and Priority Flora

Species of flora and fauna are defined as Declared Rare (Threatened) or Priority conservation status where their populations are restricted geographically or threatened by local processes. The DEC recognises these threats of extinction and consequently applies regulations towards population and species protection.

Rare Flora species are gazetted under Subsection 2 of Section 23F of the *Wildlife Conservation Act* (1950) (*WC Act*) and therefore it is an offence to 'take' or damage rare flora without Ministerial approval. Section 23F of the *WC Act* 1950-1980 defines 'to take' as "… to gather,

pick, cut, pull up, destroy, dig up, remove or injure the flora or to cause or permit the same to be done by any means."

Priority Flora are under consideration for declaration as 'rare flora', but are in need of further survey (Priority One to Three) or require monitoring every 5-10 years (Priority Four). **Table 2** presents the categories of Declared Rare and Priority Flora as defined by the *WC Act* (DPaW 2013e).

Threats of extinction of species are also recognised at a Federal Government level and are categorised according to the *EPBC Act*, 1999 (SEWPaC, 2012a).

CONSERVATION CODE	CATEGORY
R	Taxa which have been adequately searched for and are deemed to be in the wild either rare, in danger of extinction, or otherwise in need of special protection and have been gazetted as such.
P1	Taxa which are known from one or a few (generally <5) populations which are under threat, either due to small population size, or being on lands under immediate threat. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.
P2	Taxa which are known from one or a few (generally <5) populations, at least some of which are not believed to be under immediate threat. Such taxa are under consideration for declaration as 'rare flora', but are in urgent need of further survey.
P3	Taxa which are known from several populations, and the taxa are not believed to be under immediate threat (i.e. not currently endangered), either due to the number of known populations (generally >5), or known populations being large, and either widespread or protected. Such taxa are under consideration for declaration as 'rare flora', but are in need of further survey.
P4	Taxa which are considered to have been adequately surveyed and which, whilst being rare (in Australia), are not currently threatened by any identifiable factors. These taxa require monitoring every 5-10 years.

Table 2. Definitions of Declared Rare and Priority List flora

Under the *EPBC Act* (1999) a species may be listed in one of six categories; the definitions of these categories are summarised in **Table 3**.

Threatened or Priority flora occurring within 10 km of the Survey Area (DPaW, 2013b) generated from a DEC data search and a Naturemap data search are listed in **Table 4**. Taxa listed under the *EPBC Act* (based on results of the Protected Matters Search Tool query (SEWPaC, 2013)) are listed in **Appendix 1**.

CATEGORY	DEFINITION
Extinct (Ex)	A native species is eligible to be included in the ***extinct*** category at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.
Extinct in the Wild (ExW)	A native species is eligible to be included in the extinct in the wild category at a particular time if, at that time (a) it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or (b) it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
Critically Endangered (CE)	A native species is eligible to be included in the critically endangered category at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
Endangered (E)	A native species is eligible to be included in the endangered category at a particular time if, at that time (a) it is not critically endangered; and (b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
Vulnerable (V)	A native species is eligible to be included in the vulnerable category at a particular time if, at that time (a) it is not critically endangered or endangered; and (b) it is facing a high risk of extinction in the wild in the medium term future, as determined in accordance with the prescribed criteria.
Conservation Dependent (CD)	A native species is eligible to be included in the conservation dependent category at a particular time if, at that time, the species is the focus of a specific conservation program, the cessation of which would result in the species becoming vulnerable, endangered or critically endangered within a period of 5 years.

Table 3. Categories of Threatened Species (Environment Protection and Biodiversity Conservation Act 1999)

Species	*WC Act* status (*EPBC Act* status in brackets)	Flowering	Description	Habitat
Acacia cuneifolia	P4	Jul - Oct	Erect or straggly shrub, 1-3 m high. Flowers yellow.	Sand, clay or loam over granite. Granite outcrops & hills, rocky watercourses.
Acacia semitrullata	P4	May – Oct	Slender, erect, pungent shrub, (0.1-) 0.2-0.7 (-1.5) m high. Flowers cream, white.	White/grey sand, sometimes over laterite, clay. Sandplains, swampy areas.
Adenanthos cygnorum subsp. *chamaephyton*	P3	Jul – Jan	Prostrate, mat-forming, non-lignotuberous shrub, to 0.3 m high. Flowers white, cream, pink, green.	Grey sand, lateritic gravel.
Caladenia lodgeana	T (CE)	Oct	Tuberous, perennial, herb. Flowers white.	Black loam.
Caladenia sp. Collie	T			
Calothamnus graniticus subsp. *leptophyllus*	P4	Jun - Aug	Erect, multi-stemmed shrub, 1-2 m high. Flowers red.	Clay over granite, lateritic soils. Hillsides.
Calothamnus rupestris	P4	Jul – Dec	Erect, compact or spreading shrub or tree (occasionally), 0.9-4 m high. Flowers pink-red.	Gravelly skeletal soils. Granite outcrops & rocks, hillsides.
Calytrix pulchella	P3	Aug – Nov	Shrub, 0.3-0.7(-1) m high. Flowers pink.	Grey or white sand over laterite. Ridges, flats.
Eryngium sp. Ferox	P3	Nov	Erect, open tuberous, herb, 0.1–0.3 m high. Flowers green.	Grey to brown loamy to sandy clay, brown cracking clay. Winter-wet flats, swamps, dried claypans, ridges.
Eucalyptus rudis subsp. *cratyantha*	P4	Jul – Sep	Tree, 5-20 m high, bark rough, box-type. Flowers white.	Loam. Flats, hillsides.
Grevillea prominens	P3	Sep - Oct	Spreading shrub, 0.5–1.7 m high, 0.3-1 m wide. Flowers cream, white.	Gravelly loam. Along creeklines
Grevillea rara	T (EN)	Oct	Dense, prickly shrub, to 2 m high. Flowers white, pink.	Lateritic loam. Creeklines.

Species	*WC Act* status (*EPBC Act* status in brackets)	Flowering	Description	Habitat
Grevillea ripicola	P4	Jan or Mar –Apr or Nov –Dec	Spreading, much-branched, non-lignotuberous shrub, 0.6-2(-3) m high, to 4 m wide. Flowers red, orange.	Sandy clay, clay or gravelly loam. Swampy flats, granite outcrops, along watercourses.
Hemigenia rigida	P1	Aug – Dec or Jan	Upright or spreading shrub, 0.1-0.6(-1) m high. Flowers blue-purple/violet.	Sandy soils, lateritic gravelly soils. Hillslopes, granite outcrops, flats, ironstone ridges.
Jacksonia velveta	T (EN)	Dec	Open, upright, sometimes sprawling shrub, to 1.9 m high. Flowers yellow-orange.	Brown gravelly loam, dry grey sand, ironstone. Slight hillslopes, ridges.
Lasiopetalum cardiophyllum	P4	Aug - Jan	Erect, multi-stemmed shrub, 0.2–0.5 m high. Flowers pink.	Lateritic gravelly soils, sandy clay. Flats, hillslopes.
Leucopogon extremus	P2	Sep – Oct	Low spreading shrub to 40 cm high x 70 cm wide, corolla greenish white.	Seasonally wet areas.
Logania sylvicola	P2	Aug - Sep	Spreading, compact shrub to 40 cm x 50 cm. Inflorescence more or less pendant. Flowers cream.	Mid slopes. Dry brown gravelly, sandy loam over laterite.
Meeboldina thysanantha	P3	Dec	Rhizomatous, perennial, herb (rush-like), 0.4-1 m high. Flowers brown.	Sand. Swamps.
Millotia tenuifolia var. *laevis*	P2	Sep - Oct	Ascending to erect annual, herb, 0.02-0.1 m high. Flowers yellow.	Granite or laterite soils.
Pultenaea skinneri	P4	Jul - Sep	Slender shrub, 1-2 m high. Flowers yellow, orange, red.	Sandy or clayey soils. Winter-wet depressions.
Sphaerolobium benetectum	P2	Oct - Nov	Slender, caespitose shrub, 0.2-1 m high, to 0.45 m wide. Flowers pink & red & yellow.	White gravelly sandy clay, sandy loam, granite, laterite. Ridges, swamps, undulating rises.

Species	*WC Act* status (*EPBC Act* status in brackets)	Flowering	Description	Habitat
Stylidium acuminatum subsp. *acuminatum*	P1	Oct – Dec or Jan	Rosetted perennial, herb, Leaves oblanceolate. Inflorescence racemose. Flowers yellow.	Clayey sand over laterite. Hillslopes, ridges and valleys. Eucalypt forest, open woodland, Agonis shrubland.
Stylidium lepidum	P3	Oct - Nov	Spreading, rosetted perennial, herb, ca 0.05 m high, forming densely packed colonies. Flowers pink, orange.	Gravelly sand or loam, clay. Winter-wet depressions.
Stylidium rhipidium	P3	Oct - Nov	Slender annual, herb, ca 0.05 m high. Flowers white.	Sandy soils. Wet creek flats, swamps, granite outcrops.
Synaphea hians	P3	Jul - Nov	Prostrate or decumbent shrub, 0.15-0.6 m high, to 1 m wide. Flowers yellow.	Sandy soils. Rises.
Synaphea petiolaris subsp. *simplex*	P2	Sep - Oct	Tufted shrub, 0.1–0.6 m high. Flowers yellow.	Sandy soils. Flats, winter-wet areas.
Tetratheca parvifolia	P3	Oct	Small shrub, 0.2-0.3 m high. Flowers pink.	Jarrah, woodland, wandoo woodland, gravelly soils.
Thysanotus unicupensis	P2		Erect perennial dwarf shrub, height to 15 cm, width to 11 cm. Flowers purple.	Jarrah - Marri forest
Verticordia attenuata	P3	Dec - May	Shrub, 0.4–1 m high. Flowers pink.	White or grey sand. Winter-wet depressions

Table 4. List of Declared Rare and Priority List flora known to occur within 10 km of the survey area.

Not all of the species listed in **Table 4** are likely to occur within the survey area, based on an assessment of their preferred habitats. Most of them would have been flowering at the time of survey. Of those that were unlikely to be flowering all are identifiable in the absence of flowers except perhaps for *Eryngium* sp. Ferox.

1.8 Ecological Linkages

Ecological linkages were defined in Molloy *et al*. (2009) in their report on the South West Regional Ecological Linkages (SWREL) Project as;

"*A series of (both contiguous and non-contiguous) patches which, by virtue of their proximity to each other, act as stepping stones of habitat which facilitate the maintenance of ecological processes and the movement of organisms within, and across, a landscape*."

The Molloy *et al*. (2009) report is the result of collaboration between the Western Australian Local Government Association's *South West Biodiversity Project* and the DEC's *Swan Bioplan* to provide a tool for the identification of ecological linkages and guidance for the protection of linkages through planning policy documents.

It is stressed in the above report, that the proximity value of an ecological linkage is not intended to replace the need to consider the other biodiversity conservation values of a patch of remnant vegetation. Regional Ecological Linkages link protected patches of regional significance by retaining the best (condition) patches available as stepping stones for flora and fauna between regionally significant areas. This increases the long-term viability of all the constituent areas (Molloy *et al*., 2009).

The *South West Regional Ecological Linkages Technical Report* (Molloy *et al*., 2009) identifies a regional ecological linkage axis line passing within 1.3 km to the west of the Area A and approximately 2.19 km west of Area B in vegetation that is contiguous with that contained with the Study Area (**Figure 4**). As a result, all patches of remnant vegetation within the Study Area are assigned to proximity category '1a', which is the highest category, and effectively means that the vegetation with the Study Area directly forms part of the ecological linkage.

While there is no statutory basis for regional ecological linkages identified through the SWREL project, the importance of ecological linkages has been recognised as an environmental policy consideration in EPA and Planning policy over the last decade (EPA, 2009 and references therein). In its statement regarding the SWREL Project, the EPA stated that even though Ecological Linkages are just one measure of the conservation values of a patch of remnant vegetation it expected 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 the landscape function and core linkage significance of a patch in supporting the maintenance of ecological linkage (EPA, 2009).

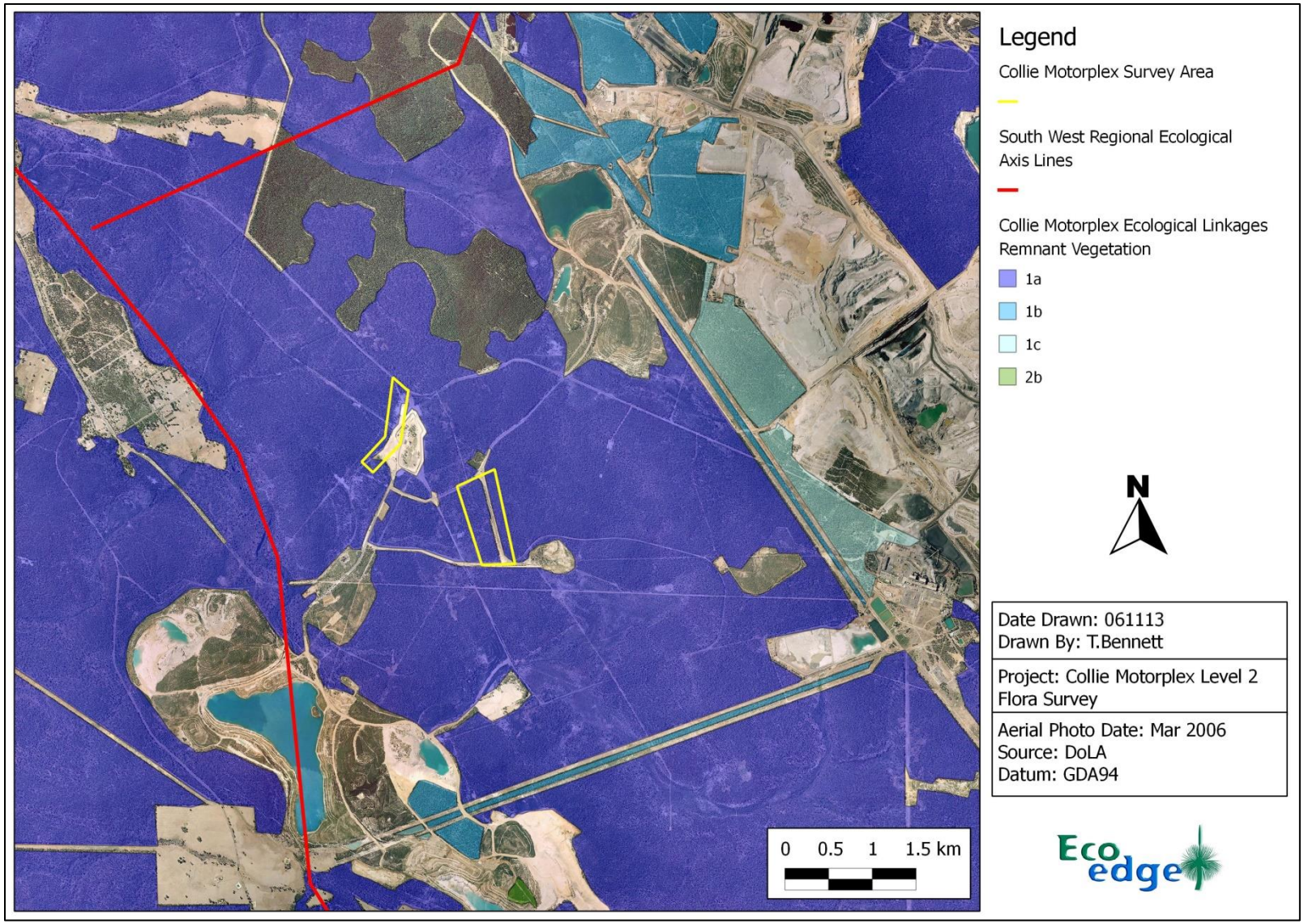

Figure 4. Ecological linkages passing near to the Survey Area

2 Methods

2.1 Survey Methodology

The study area was traversed on foot by a senior botanist (Russell Smith) and a field botanist (Tiffany Bennett) on two occasions to carry out the assessment, viz. 24th September and 30th October 2013. The vegetation survey was undertaken in accordance with EPA Guidance Statement 51 "Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia" (EPA, 2004). Methods used for the four main components of the field assessment are described below.

During the visits to the study area, a comprehensive list of native and many non-native vascular flora was compiled. Taxa not able to be identified with certainty in the field were photographed, and in a few cases collected, for later identification. Taxonomy and conservation status was checked against the WA Herbarium Census of WA Plants Database (WACENSUS) (DPaW, 2013). The Declared Rare Flora and Priority Flora known to occur within a 5 km distance of the study area (**Table 4**) were targeted during the search.

In order collect detailed information on vegetation composition within the study area, two 10 m x 10 m floristic quadrats were installed and data was collected from them using methods consistent with those used in the Swan Coastal Plain Survey (Gibson *et al*. 1994). The quadrats were placed in patches of the least degraded vegetation in the study area so as to best sample the range of different communities or soil-landforms. One quadrat was placed in Area A and one in Area B (**Figure 5**).

The following information was recorded for each quadrat:

- Each corner was marked by a steel fence dropper
- A GPS coordinate for the centre of the quadrat
- A description of the quadrat, including:
    - Soil colour and texture at 5 cm
    - Landscape position
    - Type and percentage surface rock
    - Litter and Logs/Debris cover (%)
    - A list of all vascular plant taxa together with a cover/abundance estimate
    - A photograph of the quadrat from the SW and NE corner

As well as taxa that occurred in the floristic quadrats, species found opportunistically outside the quadrats but within the Study Area were recorded with the aim of compiling a complete list of vascular flora.

In addition to the floristic quadrats, information regarding the dominant species, vegetation structure and vegetation condition was recorded at 34 unmarked assessment points or releves situated in remnant vegetation in the study area. Vegetation condition was scored according to the method of Keighery (1994) (**Table 5**). Using both the quadrat data and information from the releves together with recent aerial photography, vegetation community types were defined and described using a structural method based on that used by Muir (1977) and Aplin (1979). These vegetation community types and vegetation condition were mapped over the study area.

During the initial survey, general observations were made on the suitability of vegetation in the study area as black cockatoo habitat (DSEWPC, 2012d).

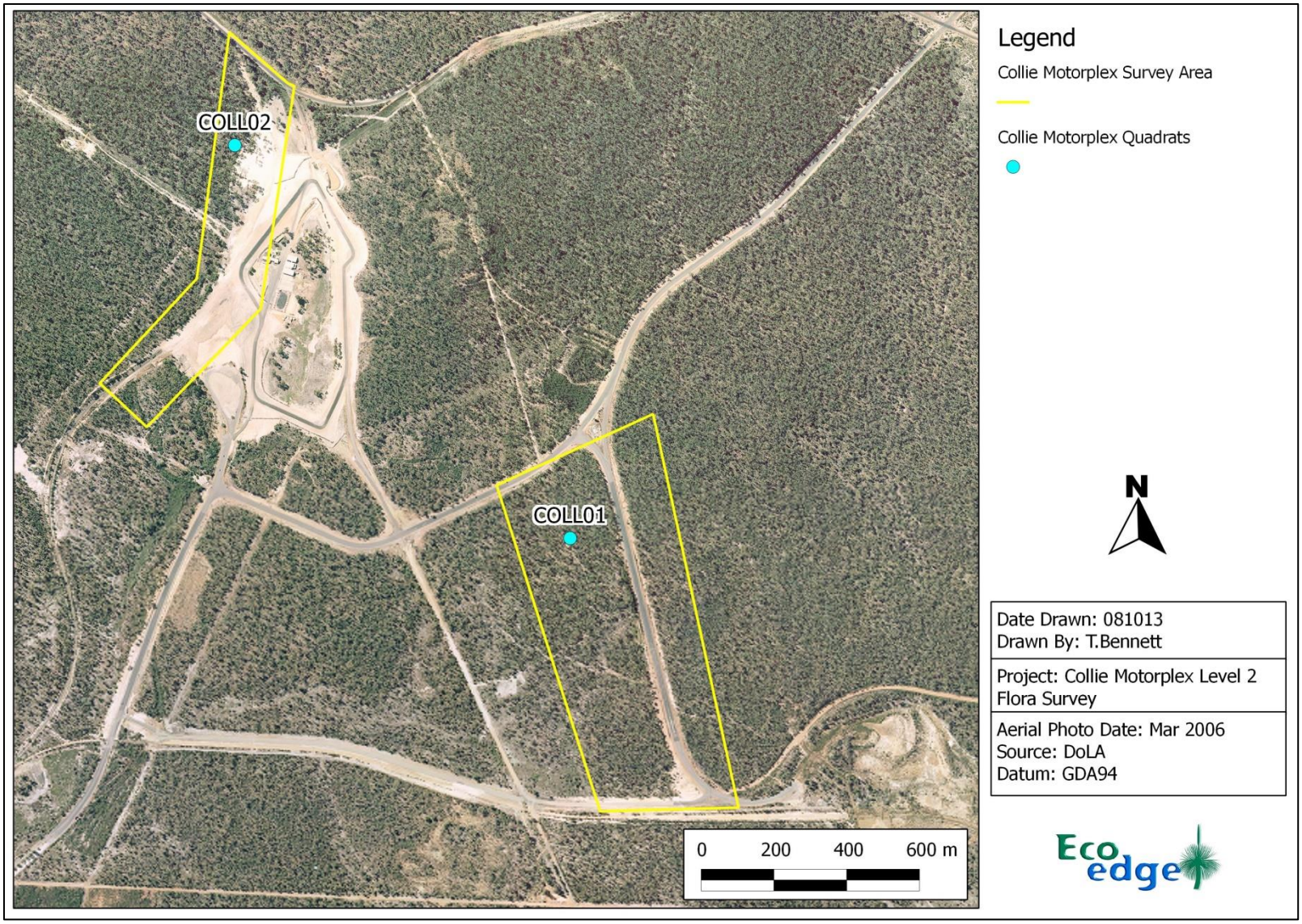

Figure 5. Floristic quadrat locations in the Survey Area

SCORE	DESCRIPTION
Pristine	Pristine or nearly so, no obvious signs of disturbance.
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.
Very Good	Vegetation structure altered, obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
Completely Degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as “parkland cleared’ with the flora comprising weed or crop species with isolated native trees or shrubs.

Table 5. Vegetation Condition Scale developed by Keighery (1994).

2.2 Survey Limitations

The limitations of this survey are outlined in **Table 6**.

Aspect	Constraint	Comment
Scope	No	The survey scope was prepared in consultation with the stakeholders and was designed to comply with EPA requirements.
Proportion of flora identified	Negligible	The survey was carried out over September/October - a period which experience has shown to be the prime flowering time for flora in southern Western Australia. It is estimated that 90-95% of species in the remnant vegetation were identified.
Availability of contextual information	Minor/Somewhat	Apart from the broadscale vegetation complex mapping by Mattiske and Havel (1998) there have been relatively few vegetation surveys in the Collie Basin. Two surveys that do provide some contextual information are GHD (2008) and GHD (2009) – which were carried out in the nearby Shotts Industrial Park.
Completeness of the survey	Negligible	All areas of remnant vegetation were visited and traversed on foot. Further assessments outside the spring season and extra floristic quadrats would add to the completeness of the survey but probably only marginally affect the conclusions presented.
Climate	Negligible	September rainfall in this part of south western Australia was substantially above the long-term average - overall it is considered that rainfall had negligible effect on flowering in the Study Area.
Access Problems	No	All parts of the Study Area were easily accessible.
Site Effects	Somewhat	As noted in Section 4 the study area has previously been subject to partial clearing; this and past fires and infestation by *Phytophthora cinnamomi* have caused some change to vegetation structure and composition.
Competency and experience of consultants	No	The senior botanist Russell Smith has 20 years' experience of flora surveys in the south west of Western Australia.

Table 6. Limitations of the Survey.

3 Results and Discussion

3.1 Flora

One hundred and eighty species of vascular flora were identified from within the study area, of which 10 are naturalised or planted non-native species (**Appendix 2**). The Fabaceae family was the most well represented with 26 species, followed by the Orchidaceae (17 species), Myrtaceae and Proteaceae (16 species each). One of the naturalised species, *Echium plantagineum* (Patterson's Curse) is a Declared Plant under the *Agriculture and Related Resources Protection Act, 1976* (DAFWA, 2011). It is classified as P1 ("Introduction of the plant into, or movement of the plant within, an area is prohibited") and P3 ("Plant to be controlled by reduction in number or distribution of the plant or both").

No Declared Rare Flora (DPaW, 2013g), Priority Flora (DPaW, 2013c), Threatened species pursuant to the *EPBC Act* or other flora of conservation significance were found in the study area.

Data for the two floristic quadrats is presented in **Appendix 3**. Species richness was low to average for for 100m^2 quadrats in open forest in south-western Australia at 34 taxa (Quadrat COLL01) and 46 taxa (COLL02) (Keighery *et al*., 2008 and references cited therein).

3.2 Vegetation Units

Four native vegetation units were recognised in the study area plus one vegetation unit predominantly composed of planted exotic species. The distribution of these vegetation units is shown in **Figure 6** and the native vegetation units are described below.

> Vegetation Unit A: Open Forest of Jarrah (*Eucalyptus marginata*) and *Allocasuarina fraseriana* with occasional Marri (*Corymbia calophylla*) over Low Open Woodland of *Banksia grandis* and *Persoonia longifolia* over Shrubland of *Xanthorrhoea preissii* over Low Shrubland of *Bossiaea ornata*, *Hakea ruscifolia*, *Hibbertia hypericoides*, *Styphelia tenuiflora* and *Xanthorrhoea gracilis* on shallow grey gravelly sand often with exposed laterite.
>
> Vegetation Unit B: Open Forest of Jarrah (*Eucalyptus marginata*) and *Allocasuarina fraseriana* with occasional Marri (*Corymbia calophylla*) over Very Low Open Woodland of *Persoonia longifolia* and *Xylomelum occidentale* over Shrubland/Low shrubland of *Acacia extensa*, *Bossiaea eriocarpa*, *B. ornata*, *Macrozamia riedlei*, *Xanthorrhoea preissii* and *X. gracilis* (with *Hypocalymma angustifolium* in damper areas) on grey-brown loamy sands.

Vegetation Unit C: Woodland of Jarrah (*Eucalyptus marginata*) and *Nuytsia floribunda* with *Melaleuca preissiana* in damper areas over Open Low Woodland of *Xylomelum occidentale* over Shrubland/Low Shrubland of *Acacia extensa*, *Adenanthos obovatus*, *Hibbertia vaginata*, *Kunzea glabrescens* and *Xanthorrhoea preissii* on grey-brown loamy sand. (This vegetation unit was only found in Area A).

Vegetation Unit D: Open forest of Jarrah (*Eucalyptus marginata*) and Marri (*Corymbia calophylla*) and sometimes *Allocasuarina fraseriana* over Shrubland/Low Shrubland of *Acacia browniana*, *Banksia dallanneyi*, *Bossiaea eriocarpa*, *B. ornata*, *Hakea lissocarpha*, *Hibbertia hypericoides* and *Xanthorrhoea gracilis* on gravelly grey-brown sandy loam (with exposed laterite) or grey-brown sandy loam.

Vegetation Units A, B and D are similar to the "Jarrah – Marri– Sheoak Open Forest" and Unit C has similarities to the "*Melaleuca preissiana – Taxandria linearifolia –Kunzea glabrescens* Low Woodland" vegetation types of the Shotts Industrial Park located several kilometres to the west of the study area (GHD, 2008).

3.3 Vegetation Condition

A quarter of the study area has been cleared, the remainder (46.8 ha) contains native vegetation of varying condition (**Figure 7**). The majority of the native vegetation in the study area (89%) was classified as "Very Good" condition – it is floristically diverse although the structure has been somewhat altered by past logging activities. A small portion of the remnant vegetation was classified as "Good" (6.3%) or "Degraded" (4.7%). The main cause of degradation in these areas has been partial clearing, dieback disease and planting of non-native species. Heavy grazing by kangaroos is also probably a factor.

A breakdown of vegetation condition for the two parts of the study area; Area A and Area B, is given in **Table 7**, below. The large majority of Area B (85.7%) is in "Very Good" condition, the remainder of being comprised of roads and road verges. Condition is much more varied in Area A, almost half (48%) of which is cleared, however almost 40% is in "Good" or "Very Good" condition.

Category	Area A (ha)	Area B
Very Good	5.1 (25.5%)	36.6 (85.7%)
Good	2.9 (14.5%)	-
Degraded	2.3 (11.5%)	-
Cleared	9.6 (48.0%)	6.1 (14.3%)
Total	**20.0 (100.%)**	**42.7 (100.0%)**

Table 7. Comparison of vegetation condition within Area A and Area B.

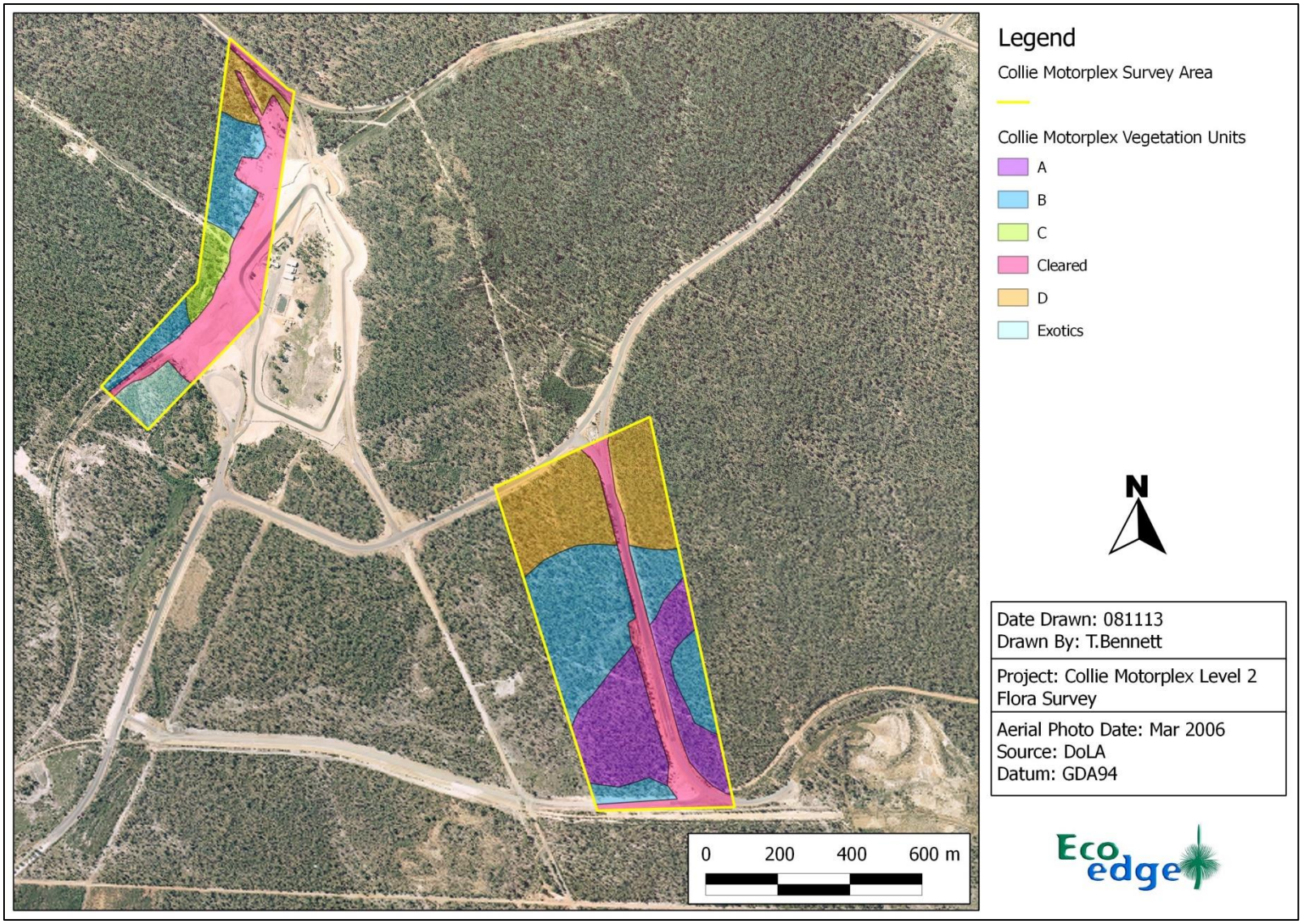

Figure 6. Vegetation Units of the Survey Area

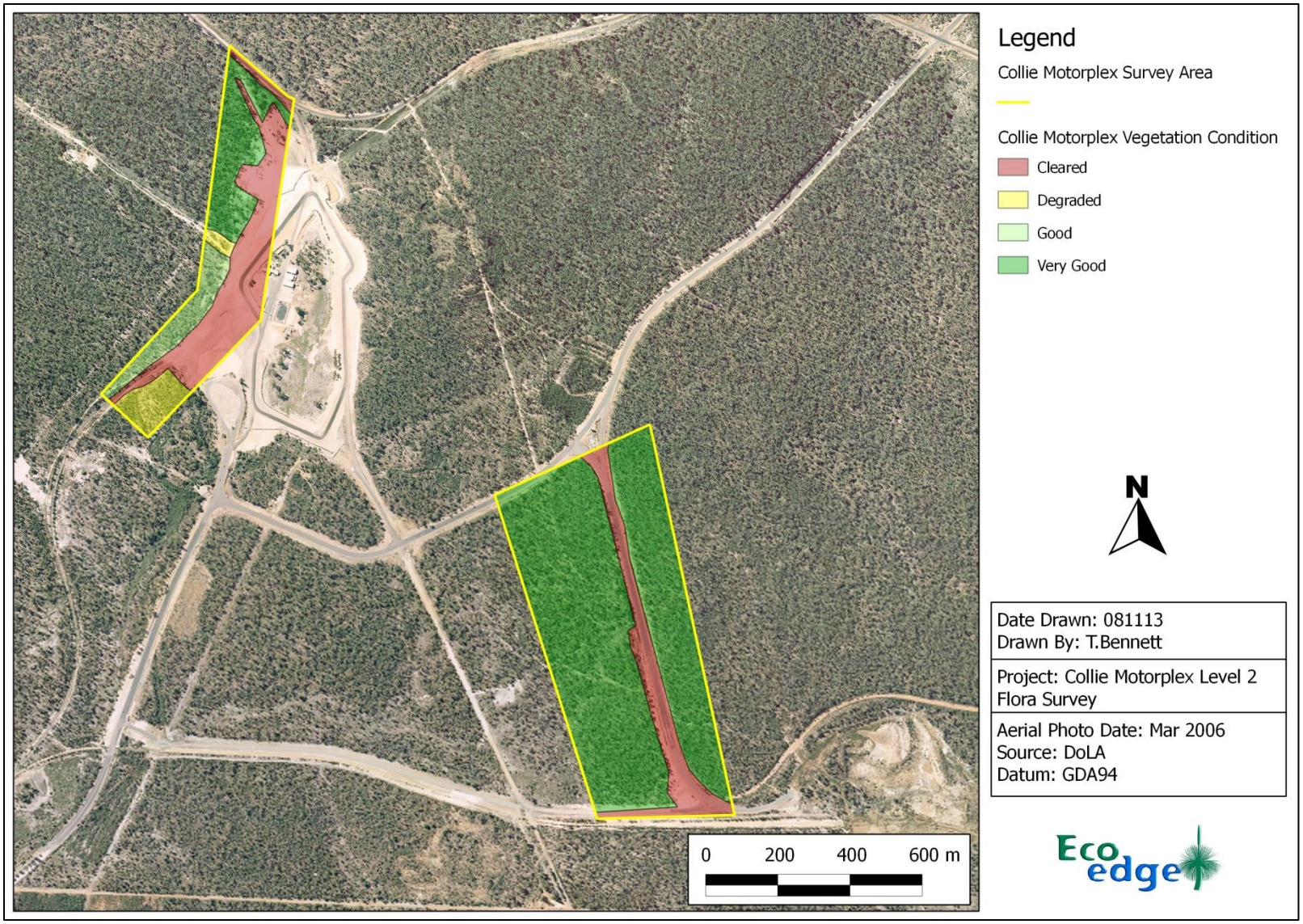

Figure 7. Vegetation condition of the Survey Area

3.4 Floristic Values of the Study Area

Vegetation in the study area is representative of both the Collie (CI) and Muja (MJ) vegetation complexes, which are mapped as being present onsite (**Figure 3**). As stated in Section 1.5, these were both classified as poorly conserved by Mattiske and Havel (2002), with 14.5% and 14.0%, respectively, of the current extent in conservation reserves. This falls just below the 15% target set by the EPA (2006). The total remaining area of Collie (CI) is 71% of the pre-European area and that of Muja (MJ) is 51%.

None of the vegetation units in the study area correspond to a threatened or priority ecological community (DPaW, 2013f, 2013h).

3.5 Black Cockatoo Habitat in the Study Area

Three species of black cockatoo are known to occur in the Collie area (Johnstone *et al*., 2010) and potentially use the study area for feeding, roosting or nesting. These are the Long-billed (Baudin's) Black-Cockatoo (*Calyptorhynchus baudinii*), the Short-billed (Carnaby's) Black-Cockatoo (*C. latirostris*) and the Forest Red-tailed Black-Cockatoo (*C. banksii naso*). All three cockatoo species are protected under both Federal and State legislation and are considered to be of very high conservation significance.

Forest Red-tailed Black Cockatoo primarily feeds on Marri (*Corymbia calophylla*) and Jarrah (*Eucalyptus marginata*) seeds. Baudin's Black-Cockatoo primarily feeds on Marri. Carnaby's Black-Cockatoo feeds on a broader range of plants, including proteaceous trees and heath (e.g. *Banksia*, *Dryandra*, *Hakea*, *Grevillea*), eucalypt trees, and introduced or plantation trees (e.g. *Pinus* spp.). Potential nesting habitat comprises hollow-bearing trees greater than 500 mm DBH, with hollows present, and with hollow diameter greater than 100 mm (Bancroft and Bamford, 2011).

A detailed assessment of use of the study area by black cockatoos was beyond the scope of this study and only some general comments about sightings, habitat use and habitat suitability are made in this report.

Vegetation within the study area is dominated by healthy stands of Marri and Jarrah – as stated above both of these are important food sources for the Forest Red-tailed Black-Cockatoo (FRBC). This species was observed and heard in and near both Area A and Area B during the visits to the study area. Fruit of Marri trees that had been partially eaten by FRBC was observed in several places in Area B, particularly near the northern boundary, as well as along the track leading to Area B from Powerhouse Road. Fewer signs of foraging by black cockatoos were observed in Area A, perhaps because it is closer to the Motorplex racetrack.

Large eucalypts with dead branches that have potential for nesting hollow development were present in both Area A and B, but were probably most frequent in the northern part of Area A. Several hollows large enough to be used for nesting were observed in Area B. Area B has been heavily logged in places and in these areas there were fewer large trees (> 500m dbh) – however there were several groups of very large Marri trees (> 800 mm dbh) present along the unsealed track that runs north to south through this part of the study area.

Photographs of suitable habitat trees and nesting hollows in the study area are presented below (**Figure 8**).

Figure 8. Trees with potential for hollow development in Area A (left), Area B (centre) and a large tree hollow in Area B (right)

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Appendix 1 Protected Matters Search Tool (Attachment)

Appendix 2 List of all Vascular Flora Species

FAMILY NAME	LATIN NAME	NATURALISED
Apiaceae	*Apium prostratum*	
	Xanthosia candida	
	Xanthosia huegelii	
	Xanthosia singuliflora	
Araliaceae	*Hydrocotyle callicarpa*	
	Trachymene pilosa	
Asparagaceae	*Chamaescilla corymbosa*	
	Lomandra hermaphrodita	
	Lomandra sericea	
	Thysanotus multiflorus	
	Thysanotus patersonii	
	Thysanotus tenellus	
	Thysanotus thyrsoideus	
Asteraceae	*Arctotheca calendula*	*
	Craspedia variabilis	
	Gamochaeta calviceps	*
	Helichrysum luteoalbum	
	Hypochaeris glabra	*
	Lagenophora huegelii	
	Millotia tenuifolia	
	Podolepis gracilis	
	Rhodanthe citrina	
	Senecio quadridentatus	
	Siloxerus humifusus	
	Trichocline spathulata	
	Ursinia anthemoides	*
Boraginaceae	*Echium plantagineum*	*
Campanulaceae	*Isotoma hypocrateriformis*	
Casuarinaceae	*Allocasuarina fraseriana*	
Celastraceae	*Stackhousia monogyna*	
	Tripterococcus brunonis	
Colchicaceae	*Burchardia congesta*	
Cyperaceae	*Cyathochaeta avenacea*	
	Lepidosperma gracile	
	Lepidosperma leptostachyum	
	Lepidosperma squamatum	
	Lepidosperma tenue	
	Mesomelaena tetragona	
	Tetraria capillaris	
Dennstaedtiaceae	*Pteridium esculentum*	
Dilleniaceae	*Hibbertia amplexicaulis*	
	Hibbertia commutata	

FAMILY NAME	LATIN NAME	NATURALISED
Dilleniaceae	*Hibbertia diamesogenos*	
	Hibbertia hypericoides	
	Hibbertia notibractea	
	Hibbertia racemosa	
	Hibbertia stellaris	
	Hibbertia vaginata	
Droseraceae	*Drosera erythrorhiza*	
	Drosera glanduligera	
	Drosera huegelii	
	Drosera marchantii subsp. marchantii	
	Drosera pallida	
	Drosera stolonifera	
Elaeocarpaceae	*Platytheca galioides*	
	Tetratheca hirsuta	
Ericaceae	*Astroloma ciliatum*	
	Astroloma pallidum	
	Leucopogon australis	
	Leucopogon capitellatus	
	Styphelia tenuiflora	
Fabaceae	*Acacia applanata*	
	Acacia celastrifolia	
	Acacia extensa	
	Acacia lateriticola	
	Acacia melanoxylon	*
	Acacia nervosa	
	Acacia pulchella	
	Acacia saligna	
	Acacia stenoptera	
	Acacia urophylla	
	Bossiaea eriocarpa	
	Bossiaea ornata	
	Daviesia decurrens	
	Daviesia incrassata	
	Daviesia preissii	
	Gastrolobium capitatum	
	Gompholobium confertum	
	Gompholobium knightianum	
	Gompholobium marginatum	
	Gompholobium tomentosum	
	Hovea chorizemifolia	
	Hovea trisperma	
	Kennedia coccinea	
	Kennedia prostrata	

FAMILY NAME	LATIN NAME	NATURALISED
Fabaceae	*Mirbelia dilatata*	
	Sphaerolobium medium	
Goodeniaceae	*Dampiera linearis*	
	Lechenaultia biloba	
	Scaevola calliptera	
	Velleia trinervis	
Haemodoraceae	*Anigozanthos bicolor*	
	Anigozanthos manglesii	
	Conostylis aculeata	
	Conostylis pusilla	
	Conostylis serrulata	
	Haemodorum spicatum	
Haloragaceae	*Glischrocaryon aureum*	
Hemerocallidaceae	*Caesia micrantha*	
	Dianella revoluta	
Iridaceae	*Patersonia occidentalis*	
	Patersonia pygmaea	
Juncaceae	*Juncus pallidus*	
Lamiaceae	*Hemiandra pungens*	
Lindsaeaceae	*Lindsaea linearis*	
Loganiaceae	*Logania serpyllifolia*	
Loranthaceae	*Nuytsia floribunda*	
Malvaceae	*Thomasia macrocarpa*	
Myrtaceae	*Astartea scoparia*	
	Babingtonia camphorosmae	
	Calothamnus lateralis	
	Calothamnus pallidifolius	
	Calothamnus quadrifidus	
	Calytrix flavescens	
	Corymbia calophylla	
	Eucalyptus citriodora	
	Eucalyptus marginata	
	Hypocalymma angustifolium	
	Kunzea glabrescens	
Myrtaceae	*Kunzea recurva*	
	Melaleuca incana	
	Melaleuca preissiana	
	Pericalymma ellipticum	
	Rinzia fumana	
Orchidaceae	*Caladenia flava* subsp. *flava*	
	Caladenia macrostylis	
	Caladenia pectinata	
	Caladenia reptans subsp. *reptans*	

FAMILY NAME	LATIN NAME	NATURALISED
Orchidaceae	*Caladenia splendens*	
	Cyanicula sericea	
	Disa bracteata	*
	Diuris longifolia	
	Drakaea livida	
	Elythranthera brunonis	
	Elythranthera emarginata	
	Paracaleana nigrita	
	Pterostylis barbata	
	Pterostylis recurva	
	Pyrorchis nigricans	
	Thelymitra cornicina	
	Thelymitra crinita	
Oxalidaceae	*Oxalis glabra*	*
Phyllanthaceae	*Poranthera huegelii*	
Poaceae	*Aira caryophyllea*	*
	Neurachne alopecuroidea	
	Rytidosperma setaceum	
	Tetrarrhena laevis	
	Vulpia myuros	*
Proteaceae	*Adenanthos obovatus*	
	Banksia bipinnatifida	
	Banksia dallanneyi	
	Banksia grandis	
	Banksia sessilis	
	Conospermum capitatum	
	Grevillea quercifolia	
	Hakea lissocarpha	
	Hakea ruscifolia	
	Hakea undulata	
	Isopogon crithmifolius	
	Persoonia longifolia	
	Petrophile linearis	
	Stirlingia simplex	
	Synaphea damopsis	
	Xylomelum occidentale	
Restionaceae	*Desmocladus fasciculatus*	
	Loxocarya cinerea	
Rhamnaceae	*Trymalium ledifolium*	
Rubiaceae	*Opercularia apiciflora*	
	Opercularia hispidula	
Rutaceae	*Boronia crenulata*	
	Boronia spathulata	

FAMILY NAME	LATIN NAME	NATURALISED
Stylidiaceae	*Levenhookia pusilla*	
	Stylidium amoenum	
	Stylidium brunonianum	
	Stylidium ciliatum	
	Stylidium crassifolia	
Thymelaeaceae	*Pimelea suaveolens*	
Xanthorrhoeaceae	*Xanthorrhoea gracilis*	
	Xanthorrhoea preissii	
Zamiaceae	*Macrozamia riedlei*	

Appendix 3 Quadrat Data

QUADRAT: COLLØ1
LOCATION: Collie Motorplex, Collie
NORTHING: 6299937 m N; EASTING: 0430492 m E
LANDSCAPE POSITION: Upper slope
SOIL: Grey brown loamy sand with gravel
CONDITION: Very Good

LATIN NAME	COVER
Acacia applanata	1
Acacia nervosa	1
Astroloma pallidum	1
**Aira caryophyllea*	1
Banksia bipinnatifida	1
Banksia dallanneyi	1
Bossiaea ornata	3
Caladenia flava subsp. *flava*	1
Chamaescilla corymbosa	1
Conostylis aculeata	1
Corymbia calophylla	2
Craspedia variabilis	2
Dampiera linearis	1

Desmocladus fasciculatus	1
Drosera huegelii	1
Drosera erythrorhiza	1
Drosera platystigma	1
Eucalyptus marginata	4
Hakea lissocarpha	1
Hibbertia diamesogenos	1
Hibbertia hypericoides	3
Hydrocotyle callicarpa	1
Lagenophora huegelii	2
Lomandra sericea	1
Platytheca galioides	1
Stylidium brunonianum	1
Tetraria capillaris	1
Thelymitra cornicina	1
Trachymene pilosa	1
Trichocline spathulata	1
Trymalium ledifolium	1
Xanthorrhoea gracilis	1
Xanthorrhoea preissii	2
Xanthosia candida	1

COLLØ1 – SW corner

COLLØ1 – NE corner

QUADRAT: COLLØ2
LOCATION: Collie Motorplex, Collie
NORTHING: 6301017 m N; EASTING: 0429571 m E
LANDSCAPE POSITION: Lower slope
SOIL: Grey brown loamy sand
CONDITION: Very good

LATIN NAME	COVER
Acacia applanata	1
Acacia extensa	2
Acacia pulchella	1
Astartea scoparia	1
**Aira caryophyllea*	1
Babingtonia camphorosmae	1
Banksia bipinnatifida	1
Bossiaea eriocarpa	2
Bossiaea ornata	2
Caladenia reptans subsp. *reptans*	1
Chamaescilla corymbosa	1
Conostylis pusilla	1
Corymbia calophylla	1
Craspedia variabilis	1
Cyanicula sericea	1
Cyathochaeta avenacea	1

Daviesia incrassata	1
Daviesia preissii	1
Desmocladus fasciculatus	1
**Disa bracteata*	1
Drosera marchantii subsp. *marchantii*	1
Eucalyptus marginata	4
Helichrysum luteoalbum	1
Hibbertia amplexicaulis	1
Hibbertia hypericoides	3
Hovea chorizemifolia	1
Hypocalymma angustifolium	1
Isotoma hypocrateriformis	1
**Hypochaeris glabra*	1
Lagenophora huegelii	1
Levenhookia pusilla	1
Millotia tenuiflora	1
Neurachne alopecuroidea	1
Persoonia longifolia	1
Podolepis gracilis	1
Rhodanthe citrina	1
Stylidium brunonianum	1
Tetraria capillaris	1
Thysanotus tenellus	1
Thysanotus thyrsoideus	1
LATIN NAME	**COVER**
Trachymene pilosa	1
Trymalium ledifolium	1
**Vulpia myuros*	1
Xanthorrhoea preissii	2
Xylomelum occidentale	2

COLLØ2 – SW corner

COLLØ2 – NE corner