GOVERNMENT OF
WESTERN AUSTRALIA

CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

PERMIT DETAILS

Area Permit Number: CPS 10358/1

File Number: DWERVT13705

Duration of Permit: From 22 July 2024 to 22 July 2036

PERMIT HOLDER

Green Grass (WA) Pty Ltd

LAND ON WHICH CLEARING IS TO BE DONE

Lot 888 on Deposited Plan 100980, Capel River

Lot 1089 on Deposited Plan 102595, Capel River

AUTHORISED ACTIVITY

The permit holder must not clear more than 108 native trees within the area cross-hatched yellow in Figure 1 of Schedule 1.

1. Period during which clearing is authorised

The permit holder must not clear any *native vegetation* after 22 July 2026.

2. Avoid, minimise, and reduce impacts and extent of clearing

In determining the *native vegetation* authorised to be cleared under this permit, the permit holder must apply the following principles, set out in descending order of preference:

(a) avoid the clearing of *native vegetation*;

(b) minimise the amount of *native vegetation* to be cleared; and

(c) reduce the impact of clearing on any environmental value.

3. Weed and dieback management

When undertaking any clearing authorised under this permit, the permit holder must take the following measures to minimise the risk of introduction and spread of *weeds* and *dieback*:

(a) clean earth-moving machinery of soil and vegetation prior to entering and leaving the area to be cleared;

(b) ensure that no known *dieback* or *weed*-affected soil, *mulch*, *fill*, or other material is brought into the area to be cleared; and

(c) restrict the movement of machines and other vehicles to the limits of the areas to be cleared.

4. Management of water resource quality

(a) The permit holder is authorised to clear native vegetation in *dry conditions* outside of the peak rainfall period of May to August.

5. Fauna management – western ringtail possums and south-western brush-tailed phascogale

(a) In relation to the area cross-hatched yellow in Figure 1 of Schedule 1, the permit holder must engage a *fauna specialist* to inspect that area immediately prior to, and for the duration of clearing activities, for the presence of western ringtail possum(s) (*Pseudocheirus occidentalis*) and south-western brush-tailed phascogale(s), (*Phascogale tapoatafa wambenger*)

(b) Clearing activities must cease in any area where fauna referred to in condition 5(a) are identified until either:

(i) the western ringtail possum(s) and/or south-western brush-tailed phascogale(s) individual(s) has moved on from that area to adjoining *suitable habitat*; or

(ii) the western ringtail possum(s) individual(s) has been removed by a *western ringtail possum specialist* and/or south-western brush-tailed phascogale(s) individual(s) has been removed by a *fauna specialist*.

(c) Any western ringtail possum(s) individual(s) removed in accordance with condition 5(b)(ii) must be relocated by a *western ringtail possum specialist* to a *suitable habitat*.

(d) Any south-western brush-tailed phascogale(s) individual(s) removed in accordance with condition 5(b)(ii) must be relocated by a *fauna specialist* to a *suitable habitat.*

(e) Where fauna is identified under condition 5(a), the permit holder must within 14 calendar days provide the following records to the *CEO*:

(i) the number of individuals identified;

(ii) the date each individual was identified;

(iii) the location where each individual was identified recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 2020 (GDA2020), expressing the geographical coordinates in Eastings and Northings or decimal degrees;

(iv) the number of individuals removed and relocated;

(v) the relevant qualifications of the *western ringtail possum specialist* and/or *fauna specialist* undertaking removal and relocation;

(vi) the date each individual was removed;

(vii) the method of removal;

(viii) the date each individual was relocated;

(ix) the location where each individual was relocated to, recorded using a GPS unit set to GDA2020, expressing the geographical coordinates in Eastings and Northings or decimal degrees; and

(x) details pertaining to the circumstances of any death of, or injury sustained by, an individual.

6. Fauna management -black cockatoo breeding habitat

(a) Within 72 hours prior to undertaking any clearing authorised under this permit within the areas cross-hatched yellow on Figure 1 of Schedule 1, the permit holder must engage a *fauna specialist* to inspect all *black cockatoo habitat trees/s* identified within the Targeted fauna Assessment (Harewood, 2023) for *evidence* of current or past breeding use by *black cockatoos.*

(b) Where a *black cockatoo habitat tree(s)* with no *evidence* of current or past use by *black cockatoo* species is identified in accordance with condition 6(a), that tree must only be cleared within 72 hours after the inspection.

(c) Where a *black cockatoo habitat tree* shows *evidence* of current or past breeding use by *black cockatoo* species under condition 6(a), and clearing of that tree cannot be avoided, that tree must be monitored by a *fauna specialist* to determine when it is no longer in use for that breeding season.

(d) Any *black cockatoo habitat tree(s)* with *evidence* of current breeding use by *black cockatoo* species must not be cleared whilst it is in use for that breeding season as determined by the *fauna specialist* under condition 6(c).

(e) For each suitably sized black cockatoo nesting hollow that cannot be avoided, the Permit Holder must install one artificial black cockatoo nesting hollow.

(f) Each artificial black cockatoo nesting hollow required by condition 6(e) must be installed prior to commencement of the next *black cockatoo* breeding season following clearing of the related *black cockatoo habitat tree(s).*

(g) The artificial black cockatoo nest hollow(s) required by condition 6(e) of this Permit must:

(i) be installed at a location identified by the Department of Biodiversity, Conservation and Attractions within 20 kilometres of the clearing area;

(ii) be designed and placed in accordance with the specifications details in Schedule 2 of this Permit; and

(iii) be monitored and maintained in accordance with the specifications detailed in Schedule 2 of this Permit, for a period of at least 10 years.

(h) Within two months of undertaking clearing authorised under this Permit, the Permit Holder must provide the results of the *fauna specialist's* inspection in a report to the *CEO*.

(i) The *fauna specialist's* inspection report must include the following;

(i) the time(s) and date(s) of inspection(s) by the *fauna specialist*;

(ii) a description of the *fauna specialist* inspection methods used;

(iii) the location of any fauna species listed in condition 6(a), if identified, recorded using a GPS unit set to GDA2020, expressing the geographical coordinates in Eastings and Northings or decimal degrees;

(iv) the name and number of each fauna species identified;

(v) whether the *black cockatoo habitat tree/s* identified show current or past use by black cockatoo species;

(vi) a photo of the *black cockatoo habitat tree(s)* identified;

(vii) a description of the *black cockatoo habitat tree(s)* identified, including the:

(A) species of *black cockatoo habitat tree(s)*; and

(B) condition of the *black cockatoo habitat tree(s)*

(viii) the time and date each *black cockatoo habitat tree* with *evidence* of current or past breeding use was cleared; and

(ix) the location of the artificial black cockatoo nesting hollow installed.

7. Offsets – conservation covenant

Within 24 months of undertaking clearing authorised under this permit, and no later than 22 July 2028, the permit holder must provide to the *CEO* a copy of a conservation covenant under section 30B of the *Soil and Land Conservation Act 1945*, for the protection and management of vegetation in perpetuity over the areas cross-hatched red in Figure 2 of Schedule 1.

8. Offsets - Revegetation

Within 12 months of undertaking clearing authorised under this permit, and no later than 22 July 2027, the permit holder must:

(a) For the area cross hatched green in Figure 3 of Schedule 1:

(i) undertake the *planting* of a minimum of 182 tubestock consisting of 50 individual *Agonis flexuosa* (peppermint), 50 individual *Eucalyptus marginata* (jarrah), 50 individual *Corymbia calophylla* (marri), and 32 individual *Eucalyptus rudis* (flooded gum).

(b) For the area cross hatched red in Figure 3 of Schedule 1:

(i) undertake the *planting* of a minimum of 60 tubestock consisting of 40 *Agonis flexuosa* (peppermint), 10 *Eucalyptus marginata* (jarrah), and 10 *Corymbia calophylla* (marri).

(c) ensure only *local provenance* species and propagating material are used to *revegetate* the area;

(d) ensure *planting* is undertaken at the *optimal time*;

(e) undertake *weed* control, infill *planting* and watering of *plantings* on an 'as needs' basis to ensure the success of *revegetation*;

(f) within 36 months of *planting* the trees in accordance with condition 7(a) and condition 7(b) of this permit:

(i) engage an *environmental specialist* to make a determination at the appropriate time that a minimum of 50 individuals of *Agonis flexuosa* (peppermint), 50 *Eucalyptus marginata* (jarrah), 50 individual *Corymbia calophylla* (marri), 32 individual *Eucalyptus rudis* (flooded gum) planted under condition 7(a) and minimum of 40 *Agonis flexuosa* (peppermint), 10 *Eucalyptus marginata* (jarrah), and 10 *Corymbia calophylla* (marri) planted under condition 7(b) will survive;

(ii) if the *environmental specialist* is unable to make a determination that a minimum of 50 individuals of *Agonis flexuosa* (peppermint), 50 individuals of *Eucalyptus marginata* (jarrah), 50 individual *Corymbia calophylla* (marri), 32 individual *Eucalyptus rudis* (flooded gum) planted under condition 7(a) and minimum of 40 *Agonis flexuosa* (peppermint), 10 *Eucalyptus marginata* (jarrah), and 10 *Corymbia calophylla* (marri) planted under condition 7(b) will survive, the permit holder must repeat the activities required by condition 7(f)(i) at the next appropriate time;

(iii) if the determination made by the *environmental specialist* under condition 7(e)(i) is that the minimum 50 individuals of *Agonis flexuosa* (peppermint), 50 individuals of *Eucalyptus marginata* (jarrah), 50 individual *Corymbia calophylla* (marri), 32 individual *Eucalyptus rudis* (flooded gum) planted under condition 7(a) and minimum of 40 *Agonis flexuosa* (peppermint), 10 *Eucalyptus marginata* (jarrah), and 10 *Corymbia calophylla* (marri) planted under condition 7(b) will not survive, the permit holder must plant additional *Agonis flexuosa* (peppermint), *Eucalyptus marginata* (jarrah), *Corymbia calophylla* (marri) and/or *Eucalyptus rudis* (flooded gum) species that will result in a minimum total of 90 individuals of *Agonis flexuosa* (peppermint), 60 individuals *Eucalyptus marginata* (jarrah), 60 individuals of *Corymbia calophylla* (marri) and 32 individual of *Eucalyptus rudis* (flooded gum) species as outlined in condition 7(a) and condition 7(b) persisting within the *revegetation areas*; and

(g) where additional *planting* of *Agonis flexuosa* (peppermint), *Eucalyptus marginata* (jarrah), *Corymbia calophylla* (marri) and *Eucalyptus rudis* (flooded gum) is undertaken in accordance with condition 7(e)(iii), the permit holder must repeat the activities required by condition 7(c), 7(d) and 7(e) of this permit.

9. Records that must be kept

The permit holder must maintain records relating to the listed relevant matters in accordance with the specifications detailed in Table 1.

Table 1: Records that must be kept

No.	Relevant matter	Specifications
1.	In relation to the authorised clearing activities generally	(a) the species composition, structure, and density of the cleared area; (b) the location where the clearing occurred, recorded using a GPS unit set to GDA2020,

No.	Relevant matter	Specifications
		expressing the geographical coordinates in Eastings and Northings; (c) the date that the area was cleared; (d) the size of the area cleared (in hectares); and (e) actions taken to avoid, minimise, and reduce the impacts and extent of clearing in accordance with condition 2; and (f) actions taken to minimise the risk of the introduction and spread of *weeds* and *dieback* in accordance with condition 3; (g) actions taken in accordance with condition 4; and (h) actions taken to manage and mitigate impacts to western ringtail possums and south-western brush-tailed phascogale in accordance with condition 5.
2.	In relation to black cockatoo fauna management pursuant to condition 6	(a) the time(s) and date(s) of inspection(s) of the suitable *black cockatoo habitat tree* by the *fauna specialist*; (b) a description of the inspection methodology employed by the *fauna specialist*; (c) the species name of any fauna determined by the *fauna specialist* to be occupying the suitable *black cockatoo habitat tree*; (d) where the suitable *black cockatoo habitat tree* is determined by the *fauna specialist* to be occupied by *black cockatoo* species: (i) the time and date that it was determined to be no longer occupied; and (ii) a description of the evidence by which it was determined to be no longer occupied; and (i) the time and date that the suitable *black cockatoo habitat tree* was cleared.
3.	In relation to the installation of artificial black cockatoo nest hollows pursuant to condition 6	(a) the date that each artificial black cockatoo nest hollow was installed; (b) the total number of artificial hollows installed. (c) the location where each artificial black cockatoo nest hollow was installed recorded using a GPS unit set to GDA2020, expressing the geographical coordinates in Eastings and Northings or decimal degrees;

No.	Relevant matter	Specifications
		(d) a photo of each installed artificial black cockatoo nest hollow; (e) the dates each artificial black cockatoo nest hollow installed was monitored; (f) a description of the monitoring methods employed for each artificial black cockatoo nest hollow installed; (g) a description of the monitoring observations for each artificial black cockatoo nest hollow installed; (h) the date/s each artificial black cockatoo nest hollow installed was maintained; and (i) a description of the maintenance activities undertaken for each artificial black cockatoo nest hollow installed.
4.	In relation to offset management, pursuant to condition 6	(a) the location and boundaries of the allocated 6.3 hectare offset areas within Lot 1089 on Deposited Plan 102595 and Lot 888 on Deposited Plan 100980, recorded using a GPS unit set to GDA 2020, expressing the geographical coordinates in Eastings and Northings; (b) a copy of the relevant conservation covenant under section 30B of the Soil and *Land Conservation Act 1945* in accordance with condition 6.
5.	In relation to *revegetation*, pursuant to condition 7	(a) the date *revegetation* activities commenced; (b) actions taken to undertake *planting* of 242 trees consisting of *Eucalyptus marginata* (jarrah), *Corymbia calophylla* (marri) *Eucalyptus rudis* (flooded gum) and *Agonis flexuosa* species; (c) *weed* control, watering and infill *planting* activities undertaken; (d) A copy of the environmental specialist's monitoring report and determination, pursuant to condition 7(f); and (e) the date(s) and description of any remedial actions undertaken where additional *planting* was required.

10. Reporting

The permit holder must provide to the *CEO* the records required under condition 9 of this permit when requested by the *CEO*.

DEFINITIONS

In this permit, the terms in Table 2 have the meanings defined.

Table 2: Definitions

Term	Definition
Black cockatoo	means one or more of the following species: (a) *Calyptorhynchus lateriosis* (Carnaby's cockatoo); (b) *Calyptorhynchus baudinii* (Baudin's cockatoo); and/or (c) *Calyptorhynchus banksii naso* (forest red-tailed black cockatoo).
black cockatoo habitat tree	means trees that have a diameter, measured at 130 centimetres from the base of the tree, of 50 centimetres or greater (or 30 centimetres or greater for Eucalyptus salmonophloia or Eucalyptus wandoo) that contain hollows suitable for breeding by black cockatoo species.
CEO	Chief Executive Officer of the department responsible for the administration of the clearing provisions under the *Environmental Protection Act 1986*.
clearing	has the meaning given under section 3(1) of the EP Act.
condition	a condition to which this clearing permit is subject under section 51H of the EP Act.
dieback	means the effect of *Phytophthora* species on native vegetation.
department	means the department established under section 35 of the *Public Sector Management Act 1994* (WA) and designated as responsible for the administration of the EP Act, which includes Part V Division 3.
dry conditions	means a period where there is no rain.
environmental specialist	means a person who holds a tertiary qualification in environmental science or equivalent, and has a minimum of two (2) years work experience relevant to the type of environmental advice that an environmental specialist is required to provide under this permit, or who is approved by the CEO as a suitable environmental specialist.
EP Act	*Environmental Protection Act 1986* (WA)
evidence	means showing chew marks or scratchings on the habitat tree representative of the species being surveyed, the presence of the species entering or leaving the habitat tree, and/or the presence of chicks/young.
fauna specialist	means a person who holds a tertiary qualification specialising in environmental science or equivalent, and has a minimum of 2 years work experience in fauna identification and surveys of fauna native to the region being inspected or surveyed, or who is approved by the *CEO* as a suitable fauna specialist for the bioregion, and who holds a valid fauna licence issued under the *Biodiversity Conservation Act 2016*.
fill	means material used to increase the ground level, or to fill a depression.
local provenance	means native vegetation seeds and propagating material from natural sources within 100 kilometres and the same IBRA subregion of the area cleared.
mulch	means the use of organic matter, wood chips or rocks to slow the movement of water across the soil surface and to reduce evaporation.
native vegetation	has the meaning given under section 3(1) and section 51A of the EP Act.
optimal time	Means the period from May to June

Term	Definition
planting	means the re-establishment of vegetation by creating favourable soil conditions and planting seedlings of the desired species.
revegetate/ed/ion	means the re-establishment of a cover of local provenance native vegetation in an area using methods such as natural regeneration, direct seeding and/or planting, so that the species composition, structure and density is similar to pre-clearing vegetation types in that area
revegetation areas	means the 2.42-hectare areas devoid of native vegetation within the area cross hatched green and red in Figure 3 of Schedule 1.
suitable habitat (south-western brush-taileded phascogale	means habitat known to support south-western brush-tailed phascogale within the known current distribution of the species. This often includes dry sclerophyll forests and open woodlands, with hollow-bearing trees (usually eucalypts) and sparse understorey
suitable habitat (western ringtail possum)	means habitat known to support western ringtail possums (*Pseudocheirus occidentalis*) within the known current distribution of the species, typically characterised by abundant foliage, presence of suitable nesting structures such as tree hollows, as well as high canopy cover and continuity. Known habitat includes peppermint (*Agonis flexuosa*) dominated woodlands, jarrah (*Eucalyptus marginata*) and marri (*Corymbia calophylla*) forests, riparian vegetation with a canopy of Bullich (*Eucalyptus megacarpa*) or flooded gum (*Eucalyptus rudis*), karri (*Eucalyptus diversicolor*) forests, sheoak (*Allocasuarina fraseriana*) dominated woodlands, and other stands of myrtaceous trees growing near swamps, watercourses or floodplains.
tubestock	refers to young plants that have been grown to the point where they are ready for planting out in the field (typically between 40-70mm in size).
weeds	means any plant – (a) that is a declared pest under section 22 of the *Biosecurity and Agriculture Management Act 2007*; or (b) published in a Department of Biodiversity, Conservation and Attractions species-led ecological impact and invasiveness ranking summary, regardless of ranking; or (c) not indigenous to the area concerned.
western ringtail possum specialist	means a *fauna specialist* who holds a tertiary qualification specialising in environmental science or equivalent, has a minimum of two years of work experience in western ringtail possum (*Pseudocheirus occidentalis*) identification, surveys of western ringtail possums and capture and handling of western ringtail possums, and holds a valid fauna licence issued under the *Biodiversity Conservation Act 2016*.

END OF CONDITIONS

Meenu Vitarana
MANAGER
NATIVE VEGETATION REGULATION

Officer delegated under Section 20
of the Environmental Protection Act 1986

27 June 2024

SCHEDULE 1

The boundary of the area authorised to be cleared is shown in the map below (Figure 1).

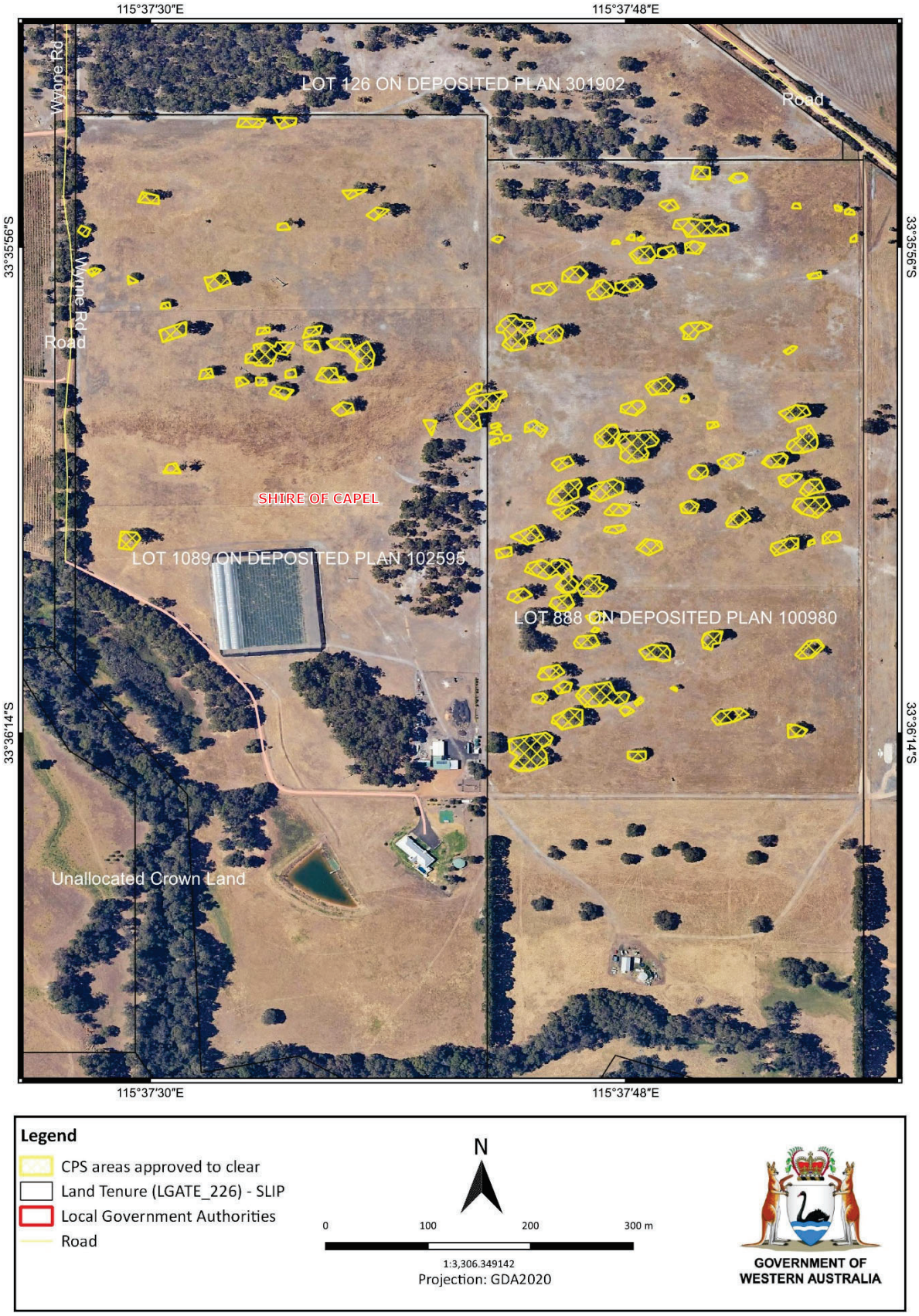


Figure 1: Map of the boundary of the area within which clearing may occur

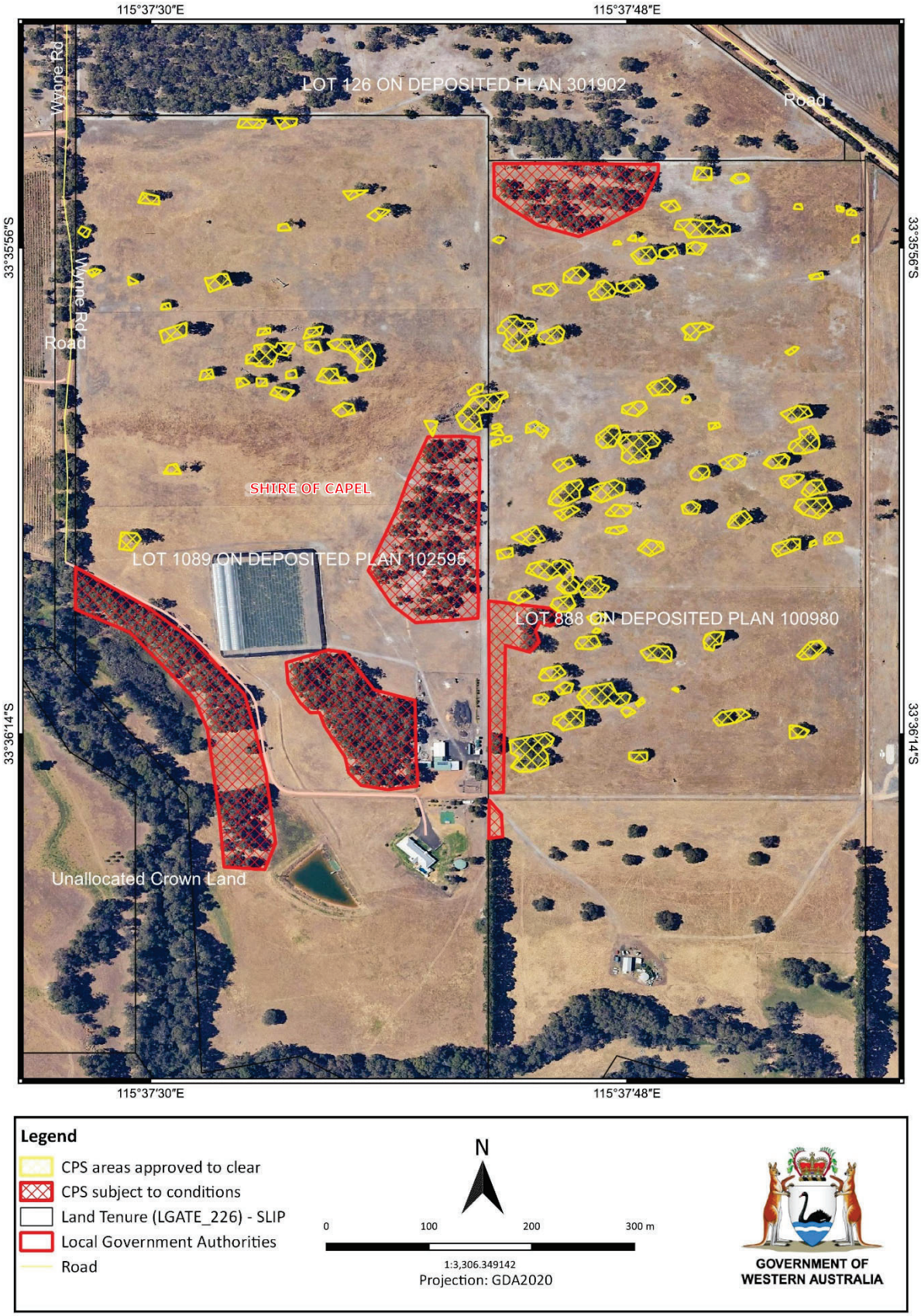


Figure 2: Map of the boundary within which offset condition 7 (conservation covenant) apply (cross-hatched in red)

Figure 3: Map of the boundary areas cross-hatched green within which revegetation offset conditions apply and area cross-hatched red within which western ringtail possum specific revegetation offset conditions apply.

SCHEDULE 2

Fauna note – artificial hollows for black cockatoos

Department of Biodiversity, Conservation and Attractions
GOVERNMENT OF WESTERN AUSTRALIA

FAUNA NOTES

Artificial Hollows for Black Cockatoos

There are three species of threatened black cockatoos in the southwest of Western Australia (WA): Baudin's cockatoo *Zanda baudinii* (previously *Calyptorhynchus baudinii*), Carnaby's cockatoo *Zanda latirostris* (previously *Calyptorhynchus latirostris*) and forest red-tailed black cockatoo *Calyptorhynchus banksii naso.* Some of the main threats to the three species include nest hollow shortages due to ongoing and extensive habitat loss and degradation, lack of recruitment of new hollow bearing trees, and competition with galahs, corellas, and feral European honey bees.

Carnaby's cockatoo nestlings in an artificial hollow. Note this chewing post will require replacement following breeding. Photo: Rick Dawson

Artificial hollows can be used to help conserve these threatened black cockatoos by enabling them to breed in areas where natural hollows are limited. This Fauna Note provides advice on how to select an appropriate site, guidelines on how to design and place artificial hollows, and advice on how to maintain and monitor artificial hollows. The information presented here is based on experience with Carnaby's cockatoo which have many examples of successful use of artificial hollows and forest red-tailed black cockatoo which have a few known examples of use. However, to date there are no records of Baudin's cockatoo using artificial nest hollows.

Sometimes a site may not be suitable for artificial hollows. This Fauna Note includes options for alternative conservation actions that are important to the conservation of black cockatoos and can also be used to complement the placement of artificial hollows.

It is important to remember that the retention of both old and dead trees (stags) that have suitable hollows for black cockatoos is crucial for breeding, and natural replacement of hollow bearing trees for future breeding is vital for the long-term survival of the species. The installation of artificial hollows should not be used to justify the removal of natural hollow-bearing trees.

When to Use Artificial Hollows

Artificial hollows may be useful at sites where natural hollows are a limiting resource. However, cockatoos may not always use artificial hollows, for example if provided in non-traditional nesting areas. Artificial hollows that are installed within 2 km of current breeding sites are regularly taken up. There are ways to select sites for artificial hollows that will increase the chance that they will be used and that birds will be able to successfully raise chicks.

Where do black cockatoos nest?

Black cockatoos nest in the hollows of mature trees in uncleared or remnant Eucalypt woodland or forest, as well as in remnant paddock trees. Trees may take more than 120 years to develop hollows that are a suitable size, and cockatoos use hollows in both living and dead trees. Refer to the maps at the end of this document for the known breeding range of the three species of black cockatoo.

Carnaby's cockatoos generally breed in Wandoo and Salmon Gum in the Wheatbelt, Marri in forested areas, and Tuart along the Swan Coastal Plain. They are also known to nest in Jarrah, Flooded Gum, York Gum, Gimlet, Powderbark Wandoo, and Karri.

Baudin's cockatoos generally nest in Jarrah, Marri, and Karri in densely forested areas. They are also known to nest in hollows in Wandoo and Tuart.

The breeding habitat for forest red-tailed black cockatoos is in uncleared forest or remnant patches of old Marri. They are also known to nest in Karri, Wandoo, Bullich, Blackbutt, Tuart, and Jarrah.

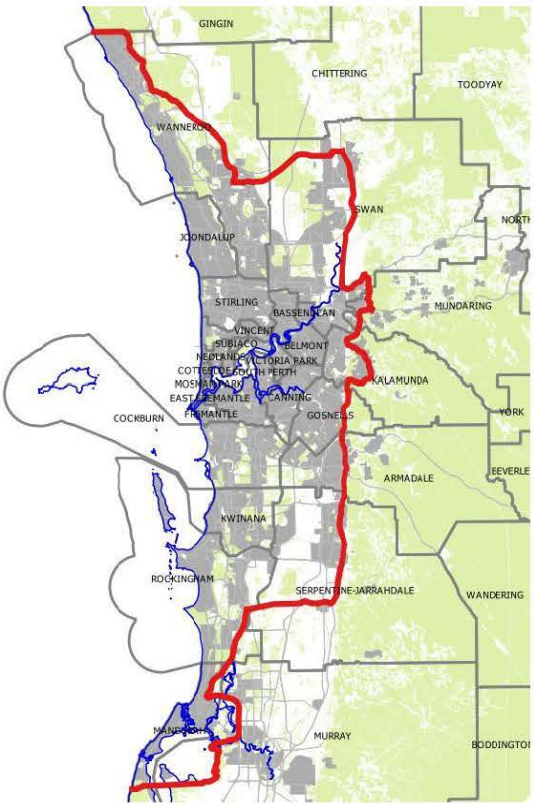
Is my site suitable for artificial hollows?

It is recommended that artificial hollows be used in known nesting areas where there has been a decrease in the availability of natural nesting hollows. Trials have shown that Carnaby's cockatoo and forest red-tailed black cockatoos will nest in artificial hollows if installed in suitable areas and are of a satisfactory design. However, putting up artificial hollows may not be the best way to help black cockatoos in your area.

Indeed, attracting birds to attempt to breed in unsuitable areas may result in increased risk of harm to adult birds or their chicks. The installation of artificial hollows in built up and urbanized areas of the metropolitan Perth and Peel regions, and other urban centres in the southwest is not recommended and should not be undertaken. This is due to the increased risk in this area, including car strike to young inexperienced birds, attack by predators such as Australian ravens and pets, and in highly urbanised and cleared areas there may not be sufficient food resource for the adults to successfully raise chicks).

To decide if your site is suitable for artificial hollows you need to consider five essential criteria (Table 1). If your site does not match all criteria, you may wish to consider alternative conservation actions including:

- protecting habitat by fencing and/or rabbit and stock control to encourage regeneration of native vegetation;
- controlling competitive species such as galahs, corellas and feral bees that may occupy hollows;
- repairing old and damaged natural nesting hollows;
- providing access to fresh water;
- revegetating with preferred food species and nesting trees; and/or
- creating linkages of vegetation between nesting and feeding areas.



Installing artificial hollows in built up areas to the west of the red line above, increases the risk of harm to birds. No artificial hollows should be installed west of this line. (green = remnant vegetation; grey = extent of existing and future urban and industrial development)

Table 1: Essential criteria for a site to be considered suitable for installation of artificial hollows, with alternative conservation actions suggested for each criterion that is not met.

1.	**The site is Eucalypt woodland or forest within the known breeding range of the species**	
	Important consideration	Carnaby's cockatoos tend to nest in Wandoo and Salmon Gum in the Wheatbelt, Marri in forested area and Tuart along the Swan Coastal Plain. Baudin's cockatoos generally nest in Jarrah, Marri, and Karri and forest red-tailed black cockatoos usually nest in Marri.
	Alternative conservation actions	If the site is not within the known current breeding range of black cockatoos, then it is unlikely that the installation of artificial hollows will attract the birds to the site. However, black cockatoos are highly mobile species that also require habitat for feeding and roosting which means that it is important to protect and manage habitat visited by the cockatoos by fencing, and carrying out other management, such as rabbit and stock control, to retain existing habitat, and to encourage regeneration of native vegetation. It is also important to revegetate areas within the breeding and non-breeding areas with preferred food species, and to create linkages of vegetation to assist the movement of the birds through the landscape.
2.	**Breeding by Black cockatoos is known or suspected at the site. There must also be evidence that a lack of suitable available tree hollows is preventing breeding that would otherwise occur in the area.**	

	Important consideration	If the lack of available hollows is due to nest competitors such as galahs, western long-billed corellas or feral bees then any attempt to install artificial hollows must be accompanied by efforts to deter or control these competitors. Alternatively, successful control of competitors may mean that artificial hollows are not needed.
	Alternative conservation actions	If sufficient suitable natural hollows are available in an area, then there is no need to install artificial hollows. This overcomes the need for ongoing maintenance of unnecessary artificial hollows. If breeding is already occurring at the site and there are plenty of available hollows, efforts can be redirected towards caring for existing or future nesting hollows. This may involve repairing old or damaged nesting hollows by covering cracks, removing debris blocking access to hollows or replacing rotted wood in the hollow so that the depth of the nest floor is manageable for the birds. Future hollows can be protected by preventing compaction of ground around trees, fencing and/or rabbit and stock control to encourage regeneration to produce future nesting trees, fire management, and the strategic pruning of limbs to prevent limbs breaking and tearing open hollows. Efforts can also be aimed at enhancing the success of existing breeding by revegetating with preferred food and nesting species, as well as creating linkages of suitable vegetation and fresh water between nesting and feeding areas. If breeding is not occurring at the site despite hollows being available, then there may be a range of factors making the site unsuitable for breeding. These factors must be identified and addressed before breeding can resume in the area (if at all possible). Lack of sufficient food could be the cause, and this can be addressed by revegetating with preferred food species and increasing connectivity in the landscape. To compile a list of plant species suitable for revegetation at your site, refer to the document *Plants Used by Carnaby's Black Cockatoo* available on the Department of Biodiversity, Conservation and Attractions (DBCA) black cockatoo webpage.
3.	**The artificial hollows can be located in close proximity to adequate feeding areas – within a 12 km radius.**	
	Important consideration	Feeding areas commonly contain proteaceous species such as banksias (including dryandras) and hakeas. A list of food plants can be obtained by use of the document *Plants Used by Carnaby's Black Cockatoo*.
	Alternative conservation actions	If the site is not close to adequate food, then the black cockatoos will not be able to successfully raise young. Cockatoos require sufficient food close to nesting areas in order to be able to forage during the day and return to feed nestlings. Existing feeding habitat close (within 12km) to breeding areas can be protected by fencing and/or undertaking rabbit and stock control to encourage regeneration of native vegetation. The amount of feeding habitat in an area can be increased by planting or revegetating with preferred food species.
4.	**The hollows are placed in secure locations and the owner/manager of these areas is supportive and willing to provide the necessary long-term security and annual maintenance for the entire time that the artificial hollow will be in place.**	
	Important consideration	For advice on the monitoring and maintenance requirements, please refer to the section on how to monitor and maintain artificial hollows.
	Alternative conservation actions	Artificial hollows can be subject to nest robbing and vandalism. It is highly recommended that artificial hollows are not put in exposed or easily accessible areas such as road verges unless they are above 8m and placed on the side of trees away from roads. If the site is considered at high risk of nest robbing or vandalism then alternative actions to assist the conservation of the species are recommended including: revegetation, fencing, repairing old or damaged natural nesting hollows and planting vegetation linkages to connect nesting and feeding areas.
5.	**A suitable artificial hollow design is used.**	
	Important consideration	For greatest chance of success, please refer to the sections below on how to design and place artificial hollows.
	Alternative conservation actions	If an alternative design is proposed, it is recommended that Department of Biodiversity, Conservation and Attractions, BirdLife Australia, or WA Museum are contacted to discuss and approve design.

How to Design and Place Artificial Hollows

A wide variety of artificial hollow designs have been previously used with mixed success. Evidence suggests that, while artificial hollows must meet some basic requirements, other factors such as proximity to existing breeding areas may be more important in determining the success of artificial hollows.

Successful artificial hollows have been constructed from sections of salvaged natural hollows, or black and white industrial pipe. Research results show that the most effective artificial hollows are made of plastic culvert pipe which is readily available, durable, light, cheap, and easy to install and maintain (see right picture below). When using non-natural materials care must be taken to ensure there are no toxic residues, and that the materials are safe to ingest.

Below are three examples of successful artificial hollows that have been used by black cockatoos for nesting:

- natural log with cut side entrance (left);
- white industrial pipe with top entrance (centre); and
- DBCA recommended polypropylene pipe design (right)



Photo: Christine Groom (left), Rick Dawson (centre and right)

The notes below provides general guidance on design and construction of artificial hollows for black cockatoos. Additional specifications are provided at the end of this Fauna Note which outline current best practice and may be considered recommendations for minimum requirements.

Walls, size, base, and entrance design

The walls of the artificial hollow need to be constructed from a material that is:

- durable enough to withstand exposure to elements for at least 20 years; and
- able to simulate the thermal properties of a natural tree hollow.

Artificial hollows should be:

- not less than 375 mm in internal diameter; and
- preferably 1200 mm deep overall with 200 mm of substrate/nesting material covering the base.

The base of the artificial hollow must be:

- securely fixed to the walls and able to support the weight of an adult and nestling(s);
- durable enough to last the life of the nest, and survive chewing by cockatoos;
- free draining;

- at least 375 mm in diameter; and
- covered with 200 mm of sterile, dry, free draining substrate/nesting material such as charcoal, hardwood woodchips or wood debris. Do not use saw dust or fibre products that will retain moisture.

Example materials that could be used for artificial hollow bases include heavy duty stainless steel, galvanised or treated metal (e.g. Zincalume®), thick hard plastic, thick hardwood timber slab or marine ply (not chipboard or MDF). The base material must be cut to fit internally with sharp or rough edges ground away or curled inwards, be fixed securely to the walls and have small drainage holes.

The entrance of the artificial hollow:

- must have a diameter of at least 375 mm; and
- preferably be top entry which will minimise use by non-target species.

Top entry hollows are less attractive to nest competitors such as feral bees, galahs and corellas. Side entry hollows have been successful in areas where feral bees, galahs and corellas are not competitors.

Adding ladders and sacrificial chewing posts

For artificial hollows made of non-natural materials, or of processed boards, it is necessary to provide a ladder to enable the birds access to the hollow, and sacrificial chewing posts so that birds can chew material, and so that non-target species can exit the hollow. The post can also assist in providing further material to the substrate, however research has shown that not all posts are heavily chewed.

The ladder must be:

- securely mounted to the inside of the hollow;
- made from an open heavy wire mesh with a mesh size of 30 - 50 mm (such as WeldMesh™); or heavy chain; and
- reach to, or below the level of substrate/nesting material.

If using mesh for the ladder, the width will depend on the curvature of the nest walls. A minimum width of about 60 - 100 mm is recommended.

Do not use material for ladders that the birds can chew, including galvanised metal because the birds may grip or chew the ladder, and ingest harmful compounds.

The sacrificial chewing posts must be:

- made of untreated hardwood such as Jarrah, Marri or Wandoo;
- thick enough to satisfy the birds' needs between maintenance visits;
- extended beyond the top of the hollow as an aid to see whether the nest is being used and reach to the floor of the hollow;
- placed on the inside of the hollow; and
- attached in such a way that they are easy to replace (e.g. a hook over the top of hollow or can slide in/out of a pair of U-bolts fitted to the side of the hollow).

It is recommended that at least one chewing post is provided. Posts 70 x 50 mm have been used but require monitoring at least every second breeding season when the nest is active and replacing when found to be no longer reaching the nesting material or otherwise significantly chewed. Birds do vary in their chewing habits, and therefore the frequency at which the chewing posts require replacement will also vary.

Mounting and placement

It is important that artificial hollows are placed where they will be accessible for future monitoring and maintenance, but preferably not conspicuous to the general public.

The height at which artificial hollows should be placed is variable, between 4 - 8m for Carnaby's cockatoo, and the average height of natural hollows in dominant tree species in the area is a good guide. If located in an area that the general public cannot access, such as a private property, the hollows can be placed as low as 4 m from the ground so that they are easily accessible by ladder. If located in an area where the general public are allowed access, hollows should be placed at least 8 m high (i.e. higher than most ladders) and on the side of the tree away from public view to reduce the chance of interference or poaching.

Black cockatoos show no preference for aspect of natural hollows. However, it may still be beneficial to place artificial hollows facing away from prevailing weather and where they receive the most shade and protection.

Artificial hollows to be placed in trees require:

- accessibility of the tree for a vehicle, elevated work platform or cherry picker;
- a section of trunk 2 - 3 m long suitable for attaching the hollow; and
- fitted on the side where the most shade can be obtained.

Artificial hollows must be mounted such that:

- the fixings used will last the duration of the nest e.g. galvanized bracket or chain and fixed with galvanized coach screws;
- it is secured by more than one anchor for security and stability;
- it is positioned vertically or near vertically; and
- where possible living trees are to be used to provide shade.

Artificial hollows should not be placed in the open on poles, as this may result in excessive exposure to sun during very hot weather.

Safety

Care needs to be taken when placing artificial hollows to ensure human safety is paramount.

Monitoring and Maintaining Artificial Hollows

It is important to monitor and maintain artificial hollows after they have been erected to ensure their effectiveness and so that problems with pest species or maintenance requirements can be identified and resolved. This will ensure the artificial hollow continues to provide opportunities to be used and that birds will be able to successfully raise chicks

Without regular maintenance, artificial hollows are likely to fail to achieve their objective to provide safe nesting opportunities for threatened black cockatoos. Therefore, it is important to continue a regime of regular maintenance for however long the artificial hollow is required. It may be several (to many) decades until a natural replacement hollow is available. Artificial hollows erected as a condition of development to offset the loss of natural hollows may be required to be available and maintained for the life of the development approval.

How do I monitor artificial hollows?

Before undertaking monitoring of artificial hollows for black cockatoos, it is recommended that you seek advice from the Department of Biodiversity, Conservation and Attractions, BirdLife Australia, or the WA Museum. It is also important to contact the Department's Wildlife Licensing Section, to determine if a lawful authority required (https://www.dbca.wa.gov.au/licences-permits).

Monitoring artificial hollows requires keen observation, and naturalist skills. It is often not possible to observe direct evidence of breeding (i.e. nestlings or eggs) and therefore inferences must be made based on other observations. It is also important to limit disturbance to breeding birds. There are many techniques available to monitor artificial hollows, and a combination of several is likely to achieve the best results (***Table 2***).

Monitoring of artificial hollows should consider and record:

- the condition of the tree, hollow fixings and general hollow condition;
- condition and connection of sacrificial chewing posts, ladder and substrate/nesting material inside hollow;
- any use by black cockatoos and nature of activity (adult birds, chewing, eggs, chicks etc.)
- details of use by non-target species (native or pest);
- identify any problems with pest species or maintenance requirements; and
- maintenance actions undertaken to resolve any problems.

The information collected from monitoring should be written down and reported. There are standard fauna report forms available on the Department's website (https://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-animals) that can be used to record the details of your sighting. Alternatively, if you are

frequently monitoring a larger number of artificial hollows, you can put the details into a spreadsheet or use the black cockatoo monitoring forms available on the DBCA website. Records should be submitted to the Department by emailing fauna.data@dbca.wa.gov.au. The Department will put the records into the Threatened and Priority Fauna Database, and it will be used to inform conservation and management decisions. Any other opportunistic sightings of Threatened and Priority species can also be reported via the same email.

Table 2: Techniques for monitoring artificial hollows

<table>
<tr><th>Technique</th><th>Description of Technique</th></tr>
<tr><td>Looking for signs of use</td><td>Cobwebs covering the entrance to the hollow will indicate that the hollow has not been used recently. This would also apply to other light debris that may have fallen to cover the opening partially. Signs of recent use or interest in the hollow include evidence of chewing.</td></tr>
<tr><td>Observing parent behaviour around a hollow</td><td>The behaviour of parent birds around a hollow can indicate an approximate age of young in the nest.
<table>
<tr><th>Parent Behaviour</th><th>Approximate Stage and Age of Young</th></tr>
<tr><td>Prospecting for hollow</td><td>Unborn</td></tr>
<tr><td>Male only seen out of hollow</td><td>Egg or very young nestling (< 3 - 4 weeks)</td></tr>
<tr><td>Both parents seen entering/exiting the hollow</td><td>Nestling(s) has hatched (> 3 - 4 weeks)</td></tr>
</table></td></tr>
<tr><td>Observing feeding flocks</td><td>Flocks of all male birds can indicate that females are incubating eggs. When flocks are mixed it suggests the birds have either not laid yet or that the nestlings have hatched and no longer require brooding (approximately 3 - 4 weeks old).</td></tr>
<tr><td>Tapping to flush female</td><td>When females are sitting on eggs they will usually respond to tapping or scraping at the base of their tree by appearing at the entrance or flying from the hollow opening. This is not a guarantee of breeding activity, but an indication that breeding is possibly occurring in the hollow.
Tapping or scraping is best undertaken between 10 am - 3 pm when females will most likely to be sitting.</td></tr>
<tr><td>Observing insect activity around a nest</td><td>Faecal matter produced by nestlings attracts insects, especially flies and ants. The type and number of these insects will help to indicate how old any nestlings present may be. Factors such as temperature and humidity will also affect insect activity and so observations of insect activity should only be used as supporting evidence for other indications of age/use. Blowflies around the entrance of a nest usually indicate that a death has occurred.</td></tr>
<tr><td>Listening for nestling</td><td>With experience it is possible to determine if nestlings are present, and a broad estimate of age based on the type and volume of noises they make.</td></tr>
<tr><td>Looking inside a nest</td><td>This can be achieved either with the aid of a telescopic pole and camera or mirror, or with the use of a ladder or other climbing equipment. This method can obtain the most detailed monitoring information for artificial hollows. However, it is also the most time consuming and difficult to organize. Also keep in mind that it is important to limit disturbance to breeding birds. Special equipment is likely to be needed depending on the height and positioning of artificial hollows. There are also safety issues associated with ladder or rope climbing to reach nests to undertake observations.</td></tr>
</table>

When do I monitor artificial hollows?

The minimum frequency of monitoring, and the techniques used will be determined by the aims of the monitoring, and the resources available. It is important to limit disturbance to breeding birds, and this should be considered when determining the techniques, frequency, and timing of monitoring (Table 3).

Breeding by the three southwest black cockatoos varies, and the timing of monitoring of artificial hollows should accommodate the breeding of the likely target species. The Commonwealth Department of Climate Change, Energy,

the Environment and Water (DCCEEW) Species Profile and Threats Database (SPRAT) database records the breeding periods of each of the species as:

- Carnaby's cockatoo - July to November (with peak between August to September)
- Baudin's cockatoo - October to January
- Forest red-tailed black cockatoo - every month, with peaks in April to June and August to October

The age of Carnaby's cockatoo nestlings can be determined by using the following publication:

Saunders, D. A., Dawson, R. and Nicholls, A. O. (2015). Aging nestling Carnaby's cockatoo, *Calyptorhynchus latirostris*, and estimating the timing and length of the breeding season. *Nature Conservation* **12:** 27-42 http://dx.doi.org/10.3897/natureconservation.12.4863

This document provides a series of photographs to illustrate changes in size and plumage of nestlings over the 10–11 weeks of the nestling period which can be used to estimate the approximate age of Carnaby's cockatoo nestlings, up to about nine weeks, by comparing appearance with the nestlings illustrated in the photographs.

Any monitoring that involving disturbance or handling of black cockatoos, requires lawful authority (https://www.dbca.wa.gov.au/licences-permits). Such activity requires specialist skills and authorisation under the *Biodiversity Conservation Act 2016*.

Table 3: Recommended frequency for monitoring artificial hollows, as determined by the aim of the monitoring

Monitoring Aim	Frequency of Visits	Monitoring Techniques
To determine possible use by black cockatoos	At least once during peak breeding season.	• Looking for signs of use (evidence of chewing) • Observing behaviour of adults around a hollow • Tapping or scraping to flush female • Listening for nestlings • Looking inside nest
To confirm use by black cockatoos	At least two visits during peak breeding season.	• Looking for signs of use (evidence of chewing) • Observing behaviour of adults around a hollow • Tapping or scraping to flush female • Listening for nestlings • Looking inside a nest Observing breeding evidence from at least two of the techniques confirms use by black cockatoos.
To determine nesting success by black cockatoos	Preferably fortnightly visits between July and December. As a minimum, at least 3 visits spread throughout breeding season.	• Observing insect activity around a nest • Listening for nestlings • Looking inside a nest The presence of eggs or nestlings inside a nest will help to determine nesting success.
To determine use by any species	As often as possible.	As a minimum, inspection from the ground: • Looking for signs of use To confirm: • Looking inside a nest
To determine maintenance requirements	At least every two years and preferably annually.	A basic maintenance check can be undertaken from the ground. Looking inside the nest using a telescopic pole with camera or mirror enables inspection of the sacrificial chewing posts and level of substrate/nesting material. A ladder or elevated work platform will be required for a comprehensive check, and to replace sacrificial chewing posts and carry out other maintenance.

How do I maintain artificial hollows?

Natural hollows used by black cockatoos are typically present for many decades and if artificial hollows are expected to provide a similar role, then they will require maintenance to ensure they continue to function as potential nesting locations for black cockatoos for the long term.

In many cases artificial hollows are required as a condition of development to offset loss of natural hollows, in which case State and Commonwealth offset policy expects that the artificial hollows continue to provide that function for the duration of the impact (or alternatively the expected period of time the natural hollow would have persisted, or the life of the environmental approval). As part of establishing artificial hollows the responsibility and regime for long term monitoring and maintenance should also be established.

Periodic maintenance checks should be undertaken at least every two years, preferably annually, for as long as the artificial hollow is required. Maintenance actions should be completed prior to the breeding season.

Artificial hollow base needing repair.
Photo by Christine Groom

Any problems identified during monitoring or maintenance checks should be addressed as soon as possible and will require similar specialist skills and equipment as used in installation. If breeding is currently occurring, maintenance may need to be delayed if it is likely to disturb the parents or nestling. Maintenance concerns regarding the security of attachment points or the stability of the tree or pole should be addressed as a priority for safety reasons. Likely maintenance includes:

- replacement of sacrificial chewing posts (frequently);
- top-up or replacement of nesting substrate to ensure it reaches the ladder and chewing posts (occasionally);
- replacement of nest bases (occasionally);
- repair or replacement of attachment points (infrequently); and/or
- repair of any cracks to wooden hollows (infrequently).

For artificial hollows known to be used, spare chewing posts should be taken into the field when undertaking maintenance checks as these are likely to need replacement.

Artificial hollows are likely to need to be completely replaced after many years, and other circumstances may require the relocation of artificial hollows (e.g. if the tree they are in becomes damaged).

Applying this guidance to forest red-tailed black cockatoo and Baudin's cockatoo

The information presented here is based on experience with Carnaby's cockatoo, for which many examples of successful use of artificial hollows exist, and forest red-tailed black cockatoo for which a few known examples of use exist. However, to date there are no records of Baudin's cockatoo using artificial nest hollows.

A definite reason for this lack of use is not yet known but may relate to the location of artificial hollows installed to date (few or none placed in Baudin's cockatoo breeding sites where breeding is occurring and natural hollows are limiting) or design or installation issues, such as hollows not being installed high enough in tall forest canopy.

Before deciding to install artificial hollows for forest red-tailed black cockatoo or Baudin's cockatoo, it is recommended that you discuss your proposal with, and/or seek advice from, the Department of Biodiversity, Conservation and Attractions, BirdLife Australia, or the WA Museum.

Maps of Black Cockatoo Breeding Range

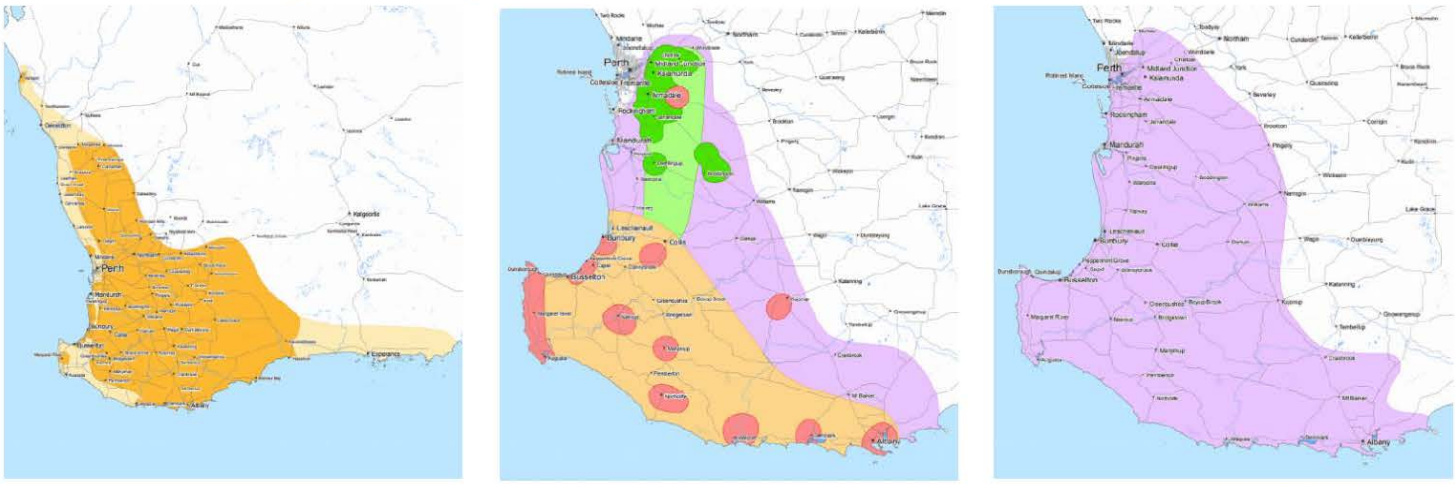


Image: Commonwealth of Australia, 2011

The maps show the modelled distributions of Carnaby's cockatoo (left), Baudin's cockatoo (centre) and forest red-tailed black cockatoo (right). For Baudin's cockatoo, the breeding range is indicated by the red (known breeding areas) and yellow (predicted breeding range), and for Carnaby's cockatoo, the breeding range is indicated by the orange.

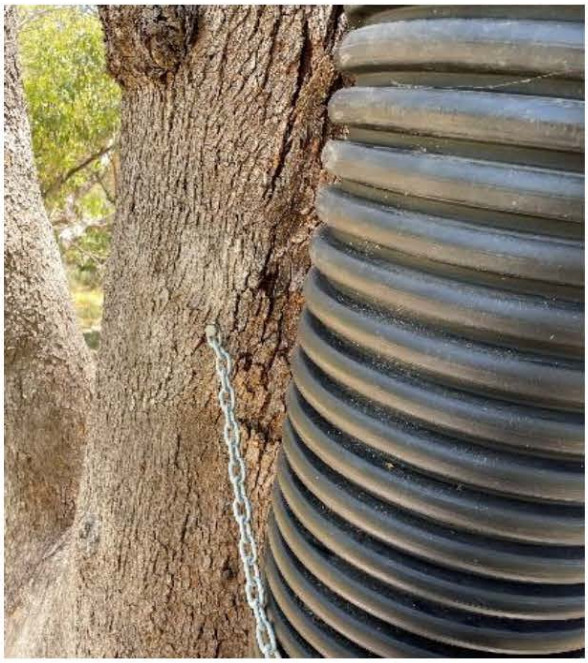
Artificial Hollows – best current design and installation specifications

The specifications below outline the most recent detailed specifications for artificial hollow construction installation and maintenance. These would provide for a well-constructed and installed artificial hollow that is most likely to have an adequate lifespan (minimum 50-years). To ensure longevity, regular maintenance will be required on the nesting material, sacrificial post, and removal of debris from the hollow.

It is highly recommended that any artificial hollows installed as a condition of environmental approval (for example where the artificial hollow is expected to provide benefit for a long period), or installed on DBCA managed lands would meet these specifications as a minimum.

Artificial Hollow Construction Specifications

Dimensions:	internal diameter 375mm (430 mm external), 1200 mm in height, and installed a minimum of 4 m above ground on private property and 8 m on public land.
Pipe material:	Fifty-year UV rated culvert pipe (polypropylene material used with corrugated outer wall and thin inner sleeve. Recommended brand or similar: The 'Vinidex StormPRO' pipes are twin wall, corrugated, polypropylene pipes for non-pressure stormwater and drainage applications, which meet all the requirements for artificial hollows.
Chain:	6 mm galvanised (not zinc plated). The hollows will be attached to the tree by chain and fixed by 4 points.
Fixings:	Galvanised M10 coach screws four x 75 mm. Two on the weight bearing chain at the top and one each side of the hollow.
Ladder:	50 x 50 mm square galvanised weldmesh 4mm thick.
Chewing posts:	Untreated Jarrah, Marri or Wandoo that meet requirements in "Adding ladders and sacrificial chewing posts" above.



Artificial hollow design, the fixing method, and the sacrificial chewing post extending above the hollow rim. Left image shows the side chains that are to be at a 30-degree upwards angle to allow the hollow to move up the tree as the tree grows. Right image shows the top weight bearing fixing which is to be 100 mm above the hollow to allow upwards movement.

Left image shows the internal view, including substrate material placed on the floor to line the hollow, and the internal weld mesh ladder. Substrate material must be course, hard, wood chips at least 200 mm deep.

Centre image shows one hard wood sacrificial post which is to fit and connect to the rim of the hollow by a hook screwed to the post to ensure it does not come loose, block the hollow or injure the occupants.

Right image shows the hard plastic floor which is to be securely fixed with a minimum of 12 small drainage holes. Larger holes may result in the occupants chewing the base.

Monitoring and Maintaining Artificial Hollows

It is important to continue a regime of regular maintenance for however long the artificial hollow is required. Artificial hollows erected as a condition of development to offset the loss of natural hollows may be required to be available and maintained for the life of the development approval. As part of establishing artificial hollows the responsibility and regime for long term monitoring and maintenance should also be established.

Periodic maintenance checks should be undertaken at least every two years, preferably annually, for as long as the artificial hollow is required. Maintenance actions should be completed prior to the breeding season.

Further Reading

DBCA webpage and fauna profiles: Black cockatoos

Department information sheets: Fauna Note – Corellas and other flocking cockatoos

BirdLife Australia webpage and brochure: Identify your Black cockatoo

Western Australian Museum webpage and fact sheets: Cockatoo Care

Saunders DA et al. (2022) Artificial nesting hollows for the conservation of Carnaby's cockatoo *Calyptorhynchus latirostris*: definitely not a case of erect and forget. Pacific Conservation Biology doi:10.1071/PC21061

Acknowledgements

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Disclaimer

Last updated: 08 Feb 2023

Government of Western Australia
Department of Water and Environmental Regulation

Clearing Permit Decision Report

1. Application details and outcome

1.1. Permit application details

Permit number:	CPS 10358/1
Permit type:	Area permit
Applicant name:	Green Grass (WA) Pty Ltd
Application received:	13 September 2023
Application area:	108 native trees (revised)
Purpose of clearing:	Horticulture expansion
Method of clearing:	Mechanical
Property:	Lot 888 on Deposited Plan 100980 and Lot 1089 on Deposited plan 102595
Location (LGA area/s):	Shire of Capel
Localities (suburb/s):	Capel River

1.2. Description of clearing activities

The vegetation proposed to be cleared is to selectively clear 108 trees within Lot 888 on Deposited Plan 100980 and Lot 1089 on Deposited plan 102595, Capel River (see Figure 1, Section 1.5).

The application was revised during the assessment process, in response to the draft offset. The changes included a reduction in the application area from 115 native trees to 108 to exclude known western ringtail possum habitat (See Appendix A for more information).

1.3. Decision on application

Decision:	Granted
Decision date:	27 June 2024
Decision area:	108 native trees, as depicted in Section 1.5, below.

1.4. Reasons for decision

This clearing permit application was submitted, accepted, assessed and determined in accordance with sections 51E and 51O of the *Environmental Protection Act 1986* (EP Act). The Department of Water and Environmental Regulation (DWER) advertised the application for 21 days and two submissions were received. Consideration of matters raised in the public submissions is summarised in Appendix B.

In making this decision, the Delegated Officer had regard for the site characteristics (see Appendix C), relevant datasets (see Appendix I.1), the findings of a fauna survey, the clearing principles set out in Schedule 5 of the EP Act (see Appendix D), relevant planning instruments and any other matters considered relevant to the assessment (see Section 3). The Delegated Officer also took into consideration that the proposed clearing for horticulture will be a significant development for the locality and will provide job opportunities for the local community. Further, the land of the proposed clearing is zoned as Priority Agriculture under the Shire of Capel's current planning scheme and the proposed horticulture is consistent with the planning framework (see section 3.3).

The assessment identified that the proposed clearing will result in:

- The loss of 108 trees consisting of:
  - moderate to high quality foraging habitat and potential future breeding habitat (5 trees with small hollows, not currently of suitable breeding size, 72 trees with a diameter at breast height (DBH) of greater than 500mm) for all three species of black cockatoos,
  - suitable western ringtail possum habitat,
  - remnant vegetation in an extensively cleared landscape representative of the Abba and Swan vegetation complexes.
- potential impacts to ecological linkages across the landscape
- potential land degradation in the form of wind erosion and eutrophication.

After consideration of the available information, as well as the applicant's avoidance and mitigation measures (see Section 3.1), the Delegated Officer determined that some of the impacts of the proposed clearing, including the potential to facilitate the introduction of weeds and dieback and the land degradation risks, can be minimised and managed to unlikely lead to unacceptable risk to environmental values and the impacts to water quality can be managed through permit conditions. The impacts to black cockatoo foraging, western ringtail possum habitat as well as, the impacts to the extensively cleared Abba and Swan vegetation complexes remains significant after the application of avoidance and minimisation measures.

The Delegated Officer determined that, on balance, it was appropriate to grant the clearing permit subject to an adequate environmental offset being provided to counterbalance the significant residual impacts, consistent with the *WA Environmental Offsets Policy* (2011) and the *WA Environmental Offsets Guidelines* (2014). The Delegated Officer determined the following measures were sufficient to counterbalance the significant residual impacts of the proposed clearing:

- the revegetation of 1.82 hectares of bare ground within a 4.48 hectares pocket of vegetation of good quality vegetation, to overall improve the quality to very good condition through planting of jarrah (*Eucalyptus marginata),* marri (*Corymbia calophylla),* flooded gum (*Eucalyptus rudis)* and peppermint (*Agonis flexuosa*) species,
- the planting of 0.6 hectares of western ringtail possum specific habitat (peppermint, jarrah and marri) to create a habitat corridor to connect pockets of suitable habitat, and
- conserve at total of 6.3 hectares (inclusive of the above revegetation) in perpetuity through conservation covenant.

The Delegated Officer decided to grant a clearing permit subject to conditions to:

- avoid, minimise to reduce the impacts and extent of clearing,
- take hygiene steps to minimise the risk of the introduction and spread of weeds,
- management of water resource quality through avoidance of clearing during peak rainfall periods and clearing in only dry conditions,
- fauna management; western ringtail possum and south-western brush-tailed phascogale, fauna specialist pre-clearance inspection and presence during clearing,
- Offset through conservation covenant, and
- Offset through revegetation.

1.5. Site map

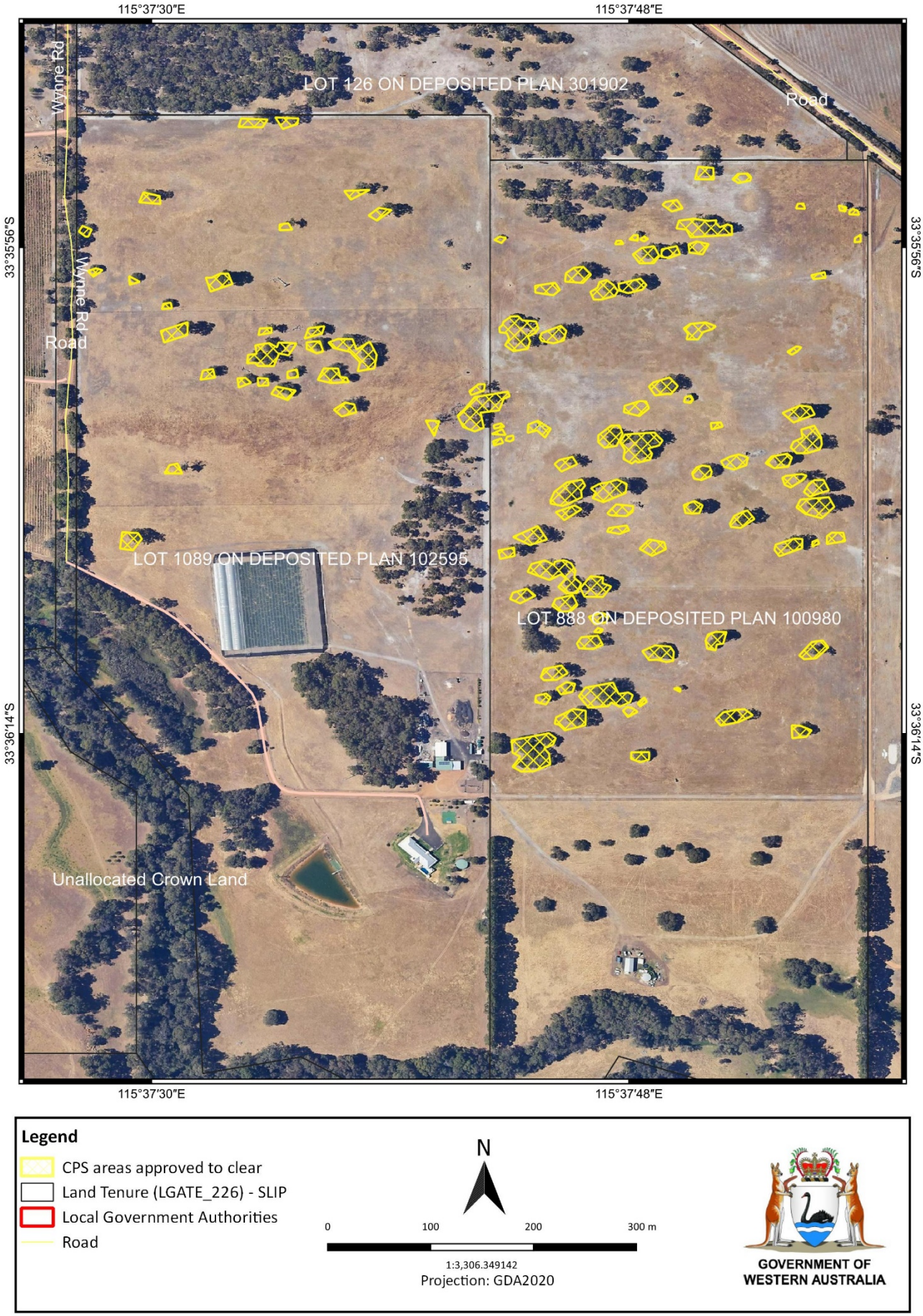


Figure 1: Map of the application area. The area crosshatched yellow indicates the area authorised to be cleared under the granted clearing permit.

2. Legislative context

The clearing of native vegetation in Western Australia is regulated under the EP Act and the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* (Clearing Regulations).

In addition to the matters considered in accordance with section 51O of the EP Act (see Section 1.4), the Delegated Officer has also had regard to the objects and principles under section 4A of the EP Act, particularly:

- the precautionary principle
- the principle of intergenerational equity
- the principle of the conservation of biological diversity and ecological integrity.

Other legislation of relevance for this assessment include:

- *Biodiversity Conservation Act 2016* (WA) (BC Act)
- *Conservation and Land Management Act 1984* (WA) (CALM Act)
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)
- *Planning and Development Act 2005* (WA) (P&D Act)
- *Soil and Land Conservation Act 1945* (WA)

Relevant policies considered during the assessment include:

- *Environmental Offsets Policy* (2011)

The key guidance documents which inform this assessment are:

- *A guide to the assessment of applications to clear native vegetation* (DER, December 2013)
- *Procedure: Native vegetation clearing permits* (DWER, October 2019)
- *Environmental Offsets Guidelines* (August 2014)
- Technical guidance – *Terrestrial Fauna Surveys for Environmental Impact Assessment* (EPA, 2016)

3. Detailed assessment of application

3.1. Avoidance and mitigation measures

Evidence was submitted by the applicant, demonstrating avoidance and mitigation measures including:

- Clearing only to the extent necessary, selecting scattered paddock trees over denser remnant vegetation,
- All earthmoving and ground engaging equipment will be inspected and cleaned of vegetation, mud and soil prior to entry and exit of the impact area,
- Clearing flag and mark out the trees to be cleared,
- During clearing, a qualified fauna expert will be present to direct clearing operators, ensuring fauna to safely mobilise to adjacent areas, and
- Check all potential trees suitable for fauna prior to clearing.

After consideration of avoidance and mitigation measures, it was determined that an offset to counterbalance the significant residual impacts to western ringtail possum habitat, habitat of three species of black cockatoo and native vegetation that is a significant remnant in an extensively cleared landscape was necessary. In accordance with the Government of Western Australia's *Environmental Offsets Policy* (2011) and *Environmental Offsets Guidelines* (2014), these significant residual impacts have been addressed through the conditioning of environmental offset requirements on the permit. The nature and suitability of the offset provided are summarised in Section 4.

3.2. Assessment of impacts on environmental values

In assessing the application, the Delegated Officer has had regard for the site characteristics (see Appendix C) and the extent to which the impacts of the proposed clearing present a risk to biological, conservation, or land and water resource values.

The assessment against the clearing principles (see Appendix D) identified that the impacts of the proposed clearing present a risk to biological values (fauna), significant remnant vegetation, land and water resources. The consideration of these impacts, and the extent to which they can be managed through conditions applied in line with sections 51H and 51I of the EP Act, is set out below.

3.2.1.Biological values (Fauna) - Clearing Principles (a) and (b)

Assessment

Within the local area (10 kilometre radius) 22 conservation significant fauna species are mapped. Of these, seven are likely to occur within the application area given the presence of suitable habitat features, the distance to the

nearest mapped record as well as the number of recorded sightings within the local area. The species likely to occur include:

- Baudins cockatoo (*Calyptorhynchus baudinii),*
- Carnaby's Cockatoo (*Calyptorhynchus latirostris),*
- Forest red-tailed black cockatoo (*Calyptorhynchus banksii naso*),
- Masked owl (*Tyto novaehollandiae novaehollandiae),*
- South-western brush-tailed phascogale (*Phascogale tapoatafa wambenger*),
- Western brush wallaby (*Notamacropus irma),* and*;*
- Western ringtail possum (*Pseudocheirus occidentalis*).

Black cockatoos

Within Western Australia two black cockatoo species, Carnaby's (*Zanda latirostris*) and Baudin's (*Zanda baudinii*) are listed as endangered under the EPBC Act (1999), and one; the forest red-tail black cockatoo (*Calyptorhynchus banksii naso*), is listed as vulnerable. Black cockatoos are long-lived, slow-breeding birds which display strong pair bonds and nest within tree hollows. They forage over a large area, feeding on a variety of native and introduced plant species depending on source availability (DCCEEW, 2022). Black cockatoos will forage up to 12 kilometres from their nest locations during the breeding season and up to 20 kilometres from known roost sites outside of the breeding season. Night roost sites are typically within two kilometres from reliable watering points and remnant patches of vegetation are considered important in maintaining black cockatoo habitat connectivity across the landscape (DCCEEW, 2022). Within the local area there are three known roost sites; with the closest located approximately six kilometres from the application area, and one known breeding area located approximately seven kilometres from the application area.

The application area is situated within the known distribution of all three black cockatoo species and occurs within the Swan Coastal Plain bioregion. The application area is also located approximately two kilometres from the jarrah forest bioregion which is also a significant bioregion for the three species given the forests provide suitable breeding habitat. Within these two bioregions, jarrah (*Eucalyptus marginata)* and marri (*Corymbia calophylla)* trees are significant to black cockatoos for foraging, roosting, and breeding. The application area consists of jarrah, marri, peppermint trees (*Agonis flexuosa*) and flooded gum (*Eucalyptus rudis*) all of which are species utilised by black cockatoo. The Capel River runs adjacent to the application area along the south-western border of the property, given the river is a perennial, the water source may contribute as an important watering point for black cockatoos which utilise the application area.

The fauna assessment survey (Harewood, 2023) submitted as supporting evidence for the application, indicated suitable foraging and possible breeding habitat was to occur within the application area. The survey identified a small amount of foraging evidence including chewed marri fruits consistent with Carnaby's cockatoo and forest red-tail black cockatoo foraging. The survey also concluded that quality foraging habitat is mainly defined as areas containing marri, as the other species present within the application area would only attribute to a very small portion of foraging habitat (Harewood, 2023). The application area was also assessed for suitable breeding habitat, and concluded three species (marri, jarrah, and flooded gum) occur within the application area and are considered suitable species for breeding, subject to a suitable size of a 500 millimetres diameter at breast height (DBH) or greater and suitable hollows occurring within the individual trees. The survey concluded 72 trees within the surveyed area consisted of a DBH greater than 500 millimetres, of which 67 did not consist of any hollow of any size, five trees consisted of hollows, however, were concluded to be unsuitable for nesting given the small size, unsuitable orientation and/or low height from the ground. It is to be noted that hollow identification occurred at ground level during the survey, therefore it is likely hollows may have been missed if they were not observable from the ground and suitable hollow characteristics may also be limited when observing from the ground. Given black cockatoos use several different night roosts throughout the year due to changing patterns of food and water resources (DCCEEW, 2022) while there was no evidence of roosting during the survey, it was concluded the application area may consists of suitable night roosting habitat (Harewood, 2023).

Given the above the application area contains suitable foraging habitat for all three black cockatoo species and therefore, the clearing of 108 trees of suitable foraging habitat is likely to impact all three species of black cockatoo. While there is no evidence of night roosting to occur within the application area, noting the close proximity to a permeant water source the application area does provide roosting value, however noting the proximity to two state forests it is likely better quality roosting habitat is to occur outside of the application area. While 72 trees within the application area consist of a DBH greater than 500 millimetres there are no suitable breeding hollows for black cockatoos and therefore the application area does not presently contain suitable breeding habitat for any of the three black cockatoo species. Noting the significant residual impacts of the proposed clearing on black cockatoo foraging habitat, an offset is required to counterbalance the significant residual impacts.

Western ringtail possum

The western ringtail possum (*Pseudocheirus occidentalis*) is a small arboreal nocturnal marsupial listed as critically endangered under the BC Act, and EPBC Act. According to the western ringtail possum recovery plan (DCCEEW, 2017), habitat critical to the species survival is not well understood and is therefore based on observations of where western ringtail possums are most commonly recorded. There are three key management zones; the swan coastal plain, southern forest and south coast zones, which are known to currently or previously support large numbers of the species. The common themes of these management zones include habitats which are high in nutrient foliage availability for food, suitable structure for protection and nesting as well as canopy continuity to avoid and escape predation and other threats. Other important characteristics include vegetation communities with long unburnt mature remnants of peppermint woodlands; with high canopy continuity and high foliage nutrients, jarrah /marri forests and woodlands; with limited anthropogenic disturbance, coastal heath, myrtaceous heaths and shrublands, *Eucalyptus megacarpa* dominated riparian zones and karri forest. There are a number of threatening processes impacting the western ringtail possum including; habitat loss and fragmentation, introduced predators, climate change, timber harvesting, fire, hollow competition, habitat tree decline and disease (DCCEEW, 2017).

Within the local area 272 mapped records of the western ringtail possum occur, with the nearest record mapped 380 metres from the application area, located within the bushland associated with the Capel River. While the application area consists of isolated trees and groves over a parkland cleared landscape, suitable habitat for western ringtail possums occurs including suitable foraging and resting habitat. The diet of western ringtail possums almost predominately relies upon peppermint foliage, however, when unavailable marri and jarrah will be used as an alternative food source (DCCEEW, 2017); these species are all present within the application area. The western ringtail possum constructs dreys for diurnal resting and also rely upon tree hollows for nesting. A survey of the application area identified a single drey and evidence of scats within two locations associated with a number of closely placed peppermint trees in the southern section of the application area. The survey concluded the application area is likely to support one or two western ringtail possum individuals which have moved from the denser more suitable habitat bordering the Capel River. During the black cockatoo assessment of the application area five hollows were identified of which two are located adjacent to the identified drey and scats. While these hollows are not confirmed to be used as diurnal resting or breeding habitat, they do provide habitat value to the western ringtail possums in the area and noting the recovery plan any habitat where western ringtail possums occur naturally is considered critical and worthy of protection (DPaW, 2017).

Although there is better quality habitat for the western ringtail possum adjacent to the Capel River, the survey concluded western ringtail possums do occur within the proposed clearing. While the application area is unlikely to support a large population of western ringtail possums, the trees proposed to be cleared do provide critical habitat for the western ringtail possum, and therefore the group of trees consisting of the identified drey was excluded from the application area during the assessment. It was determined that an offset is required for the reminder of the western ringtail possum habitat being impacted as a condition of the permit to counterbalance the significant residual impacts of the clearing.

Masked owl

The masked owl (*Tyto novaehollandiae novaehollandiae*) is relatively unknown and listed as a priority three species under the BC Act. The masked owl is territorial and inhabits forests, woodlands, timbered waterways and open country associated with these areas. They specifically require tall trees with suitable hollows for nesting and roosting with adjacent areas for foraging. The owl will forage in the early hours of the night for small mammals including rodents, rabbits, bandicoots, possums, reptiles, birds and insects (Australian Museum, 2020). Within the local 10 kilometre area, there are two records of the masked owl with the closest observation approximately nine kilometres from the application area. The masked owl also utilises tree hollows for breeding, while the targeted fauna survey of the application area did not identify the masked owl to occur within the application area, a number of hollows and tall trees are present which may provide appropriate habitat for breeding and foraging.

While this species is still relatively unknown, given the habitat features present within the application area, it is likely for the masked owl to occur, although given the species is highly mobile the clearing is unlikely to significantly impact the species or the conservation status.

South-western brush-tailed phascogale

The south-western brush-tailed phascogale (*Phascogale tapoatafa wambenger*) is a nocturnal arboreal *Dasyurid*, associated with dry sclerophyll forests and open woodlands that contain hollow-bearing trees, characterised by high canopy cover and connectivity (DEC, 2012c). The brush-tail phascogale is an opportunistic hunter predominately preying upon insects, small mammals, birds and lizards. Similar to black cockatoos, the western ringtail possum and the masked owl, the brush-tail phascogale also relies upon tree hollows for nesting during the breeding season and commonly compete with the western ringtail possum for hollow space (DEWHA, 2009).

Available databases show 16 records of the south-western brushtail phascogale to occur within the local area, with the closest record occurring 2.58 kilometres from the application area. The application area contains suitable habitat trees of which with five contain hollows as identified during the black cockatoo survey (Harewood, 2023). While these hollows were deemed unsuitable size for use by black cockatoo species it is unclear from the report whether the hollows provide suitability for other fauna species (Harewood, 2023). In the absence of a targeted survey for Southwestern brush-tailed phascogale and noting the presence of hollow-bearing jarrah and marri trees, it is considered the application area may provide habitat for this species. However, given the patchy nature of the canopy cover observed from aerial imagery and the site photos provided (Harewood, 2019; Appendix G), it is considered unlikely to provide significant habitat for south-western brush-tailed phascogale.

It is noted that vegetation to the southwest of the application area contains marri-jarrah woodland in very good condition. It is considered that this area is likely to provide better suited habitat for the southwestern brush-tailed phascogale, the application area may be used for dispersal between patches of remnant vegetation and are considered likely to occur.

Given the application area contains suitable habitat for the southwestern brush-tailed phascogale it is likely for the species to occur. To further mitigate the impacts to the species a fauna management condition is implemented on the permit.

Western brush wallaby

The western brush wallaby (*Notamacropus irma*) is a mostly diurnal macropod, distributed across the south-west of Western Australia from north of Kalbarri to Cape Arid. The optimum habitat is open forest or woodland, particularly favouring open, seasonally wet flats with low grasses for optimal grazing and open scrubby thickets. It is also found in some areas of mallee and heathland, and is uncommon in karri forest (DBCA, 2012). Within the local area there are 16 mapped records with the closest individuals mapped approximately 2.58 kilometres from the application area.

Noting the proposed clearing is to selectively clear individual trees, it is unlikely the clearing to impact the western brush wallaby given they do not forage on the tree species identified within the application area and, the area is not critical for the survival of the species. It is likely the application area is primarily used for connectivity between better quality habitat. The proposed clearing is unlikely to impact the western brush wallaby.

Conclusion

Based on the above assessment, the proposed clearing will result in the clearing of 108 native trees of good quality western ringtail possum habitat, 108 native trees of good quality black cockatoo foraging habitat, as well as suitable foraging and nesting habitat for the southwestern brush-tailed phascogale, and provide a stepping stone for fauna movement across the landscape.

For the reasons set out above, it is considered that the impacts of the proposed clearing on black cockatoos and western ringtail possums can be managed through an offset, conserved under conservation covenant which includes infill planting to improve the overall condition of the vegetation within the offset areas (refer to section 4). To mitigate the impacts to the south-western brush-tailed phascogale a fauna management condition is implemented on the permit.

Conditions

To address the above impacts, the following management measures will be required as conditions on the clearing permit:

- avoid and minimise clearing, to minimise the direct impacts to native vegetation,
- fauna management (western ring-tailed possum and south -western brush-tailed phascogale) – to ensure that a fauna specialist is present on site while the proposed clearing occurs,
- offset – conservation of a total of 6.3 hectares of vegetation in perpetuity under section 30B of the *Soil and Land Conservation Act 1945,*
- revegetate 1.82 hectares of bare ground within a 4.48 hectare footprint area using *Eucalyptus marginata* (jarrah), *Corymbia calophylla* (marri), *Agonis flexuosa* (peppermint) and *Eucalyptus rudis* (flooded gum), and

- revegetate 0.6 hectares with species specifically used by western ringtail possum habitat and provide connectivity using *Agonis flexuosa* (peppermint), *Eucalyptus marginata* (jarrah) and *Corymbia calophylla* (marri).

3.2.2.Environmental value (significant remnant vegetation) - Clearing Principles (e)

Assessment

The national objectives and targets for biodiversity conservation in Australia has a target to prevent clearing of ecological communities with an extent below 30 per cent of that present pre-1750, below which species loss appears to accelerate exponentially at an ecosystem level (Commonwealth of Australia, 2001). The application area is located within the Swan Coastal Plain IBRA which currently retains 38.62 per cent of the pre-European vegetation extent (Commonwealth of Australia, 2019b)

At a local scale, the application area is mapped within two vegetation complexes: the Abba (30) and Swan (33) complex. The Abba complex retains only 6.54 per cent of its pre-European extent and is described as a mixture of open forest of *Corymbia calophylla* (Marri) - *Eucalyptus marginata* (Jarrah) - banksia species and woodland of marri with minor occurrences of *Corymbia haematoxylon* (Mountain Marri). Woodland of *Eucalyptus rudis* (Flooded Gum) and Melaleuca species along creeks and on flood plains (Government of Western Australia, 2019). Approximately 29.5 percent of the application area is mapped as the Abba complex, and the vegetation proposed to be cleared is representative of this complex.

While the Swan complex retains 13.57 per cent of its pre-European extent and is described as; fringing woodland of *Eucalyptus rudis* (Flooded Gum) - *Melaleuca rhaphiophylla* (Swamp Paperbark) with localised occurrence of low open forest of *Casuarina obesa* (Swamp Sheoak) and *Melaleuca cuticularis* (Saltwater Paperbark) (Government of Western Australia, 2019). Of the vegetation proposed to be cleared, 70.5 percent of the application area is mapped as the Swan complex. While the application area consists of only upper canopy, this canopy cover does consist of flooded gum, while other remnant vegetation on the property identified within the fauna survey also indicates vegetation present is representative of the Swan complex (Harewood, 2023).

Although the vegetation complexes of the application area retain an extent less than the 30 per cent threshold, the overall extent of native vegetation within the local area (10 kilometres radius of the application area) retains approximately 38.67 per cent native vegetation cover and is consistent with the national targets (Commonwealth of Australia, 2001). This local vegetation extent above the 30 per cent threshold, is mostly attributed to three large state forests located to the east and southeast of the proposed clearing. While the local extent is above the threshold, the immediate area surrounding the application area, consists of very little remnant vegetation as the landscape is occupied by extensive agricultural practices, this is evident in aerial imagery.

Ecological linkage

Within fragmented landscapes the maintenance of linkages or connected patches of remnant vegetation is important for ecological function and for maintaining biodiversity. These linkages facilitate the movement of animals, seeds and pollen while also assisting in providing resilience to disturbances (DEC, 2010). Remnant vegetation can contribute to both local and regional ecological linkage.

The application area is located adjacent to the South West regional ecological linkage (SWREL) (37) which follows the Capel River, traversing the landscape from the southeast to the coast, northwest of the application area. This east/west linkage, is an important linkage of the region as it connects different landforms and ecological units, as well as contributing to the persistence of fauna which require seasonal resources availability from different ecosystems within the landscape. This SWERL also consist of an extensive contiguous waterway of the Capel River (DEC, 2010). While the application area is not located within this linkage, it does however contribute to a north/south local linkage of the Shire of Capel Special Control Area SCA8 which links the Capel River SWREL (37) to the Weld Road Reserve. Given this the removal of 108 native trees in an already fragmented landscape is likely to further reduce this local linkage, therefore further isolating remanent vegetation pockets.

Conclusion

Based on the above assessment, the proposed clearing will result in a further reduction to the Abba and Swan vegetation complexes, as well as further reducing local linkage between Weld road and the Capel river, which connects to the regional ecological linkage. Given the clearing contributes to a further decline in two vegetation complexes and impact local linkage value, an offset is required to counterbalance the significant residual impacts of the clearing.

The proposed clearing and associated clearing activities also have the potential to introduce and/or spread weeds and dieback into the surrounding vegetation which may lead to further loss in the quality of vegetation.

Conditions
To address the above impacts, the following management measures will be required as conditions on the clearing permit:

- avoidance and minimisation to reduce the impacts and extent of clearing.
- weed and dieback management will be required as a condition of the clearing permit to mitigate impacts remnant vegetation,
- offset – conservation of a total of 6.3 hectares of vegetation in perpetuity under section 30B of the *Soil and Land Conservation Act 1945,*
- revegetate a 1.82 hectares of bare ground within a 4.48 hectare footprint area using *Eucalyptus marginata* (jarrah), *Corymbia calophylla* (marri), *Agonis flexuosa* (peppermint) and *Eucalyptus rudis* (flooded gum), and
- revegetate 0.6 hectares with species specifically used by western ringtail possum habitat and provide connectivity using *Agonis flexuosa* (peppermint), *Eucalyptus marginata* (jarrah) and *Corymbia calophylla* (marri).

3.2.3.Land and water resources (Land degradation) - Clearing Principles (g)

Assessment

The soil of the application area is mapped as a single unit: Bassendean B1a phase. This unit is described as landforms of extremely low to very low relief dunes, undulating sandplains, and discrete sand rises, with soils of deep bleached grey sands with an intensely coloured yellow b horizon occurring within one metre of the surface and vegetation dominated by marri and jarrah (DPIRD, 2023).

The Department of Primary Industries and Regional Development (DPIRD) undertook a site inspection on 14 November 2023 and concluded that the mapped soil unit has a high risk of wind erosion and eutrophication due to the poor phosphorus retention capacity of the grey sandy soil which dominates the upper soil profile.

The applicant has demonstrated measures to reduce the risk of wind erosion through including ground covers within the orchard as well as enclosing the orchards in netting which will further reduce the risk of wind erosion. While the area is of high risk of eutrophication due to poor water and nutrient retention properties of the soil and the proximity to the Capel River, the applicant has demonstrated planned management to include drip irrigation, ground covers and mulching between the orchard rows (refer to Appendix H). Through ensuring adequate ground coverage within the orchard and the remaining paddocks, the movement of sediment is reduced (DPIRD, 2023).

Conclusion
Based on the above assessment, while the soil type is susceptible to wind erosion and eutrophication the applicant has demonstrated appropriate measures to mitigate the risks and therefore the clearing is unlikely to cause significant land degradation risks.

Conditions
To address the impacts of eutrophication, the following management measures will be required as conditions on the clearing permit:

- Clear vegetation outside of peak rainfall period (May to August) and only in dry conditions to avoid mobilisation of sediment into the Capel River.

3.2.4.Water resources (wetlands and water quality) - Clearing Principles (f) and (i)

Assessment

The application area is mapped as a multiple use palusplain wetland (UFI 15809). Palusplain wetlands are found in low-lying areas, often associated with river valleys or coastal plains and characterised by seasonal or permanent waterlogging which is crucial in maintaining ecological balance. These systems are influenced by both surface water; including rivers and streams as well as groundwater systems, and the water level fluctuates based on rainfall, tides and other hydrological factors (DBCA, 2017). The Swan Coastal Plain encompasses diverse ecosystems of wetlands which are managed and evaluated through the Department of Biodiversity Conservation and Attractions (DBCA). These systems are categorised as one of three categories: conservation, resource enhancement or multiple use (DBCA, 2017). Given the application area has been historically disturbed through agricultural activities, wetland UFI

15809 has been assigned the management category of multiple use. The proposed clearing is considered to be growing in association with a wetland.

Noting both Lot 888 on Deposited Plan 100980 and Lot 1089 on Deposited Plan 102595 are historically parkland cleared and only retains an upper canopy of grouped and isolated trees, it is unlikely the clearing will have a significant impact on the environmental value of this wetland.

Given the topography and the proximity to the Capel River it is likely sediment from the clearing may be mobilised into the Capel River and associated tributaries during heavy rainfall events and due to wind erosion. The movement of sediment into the Capel River would therefore deteriorate water quality (DWER, 2023). The applicant has demonstrated measures post clearing and for the final land use to mitigate water quality deterioration, including planting an understory of ryegrass and clover to avoid sediment disturbance in rainfall events, irrigating the understory during the drier seasons to avoid bare ground as well as yearly water quality monitoring and analysis, however no mitigation measures were provided during the clearing process for sediment mobilisation. Although RIWI advice (DWER, 2023) recommended a sediment management plan to be provided, the department considered the applicants submission of mitigation measures along with an implemented condition to authorise clearing only during dry periods and avoid peak rainfall of May to August, as sufficient to mitigate the impacts to water quality.

Conclusion

Based on the above assessment, the proposed clearing is unlikely to significantly impact the environmental value of the wetland system. The assessment also determined, without appropriate mitigation measures during the clearing it is possible for sediment mobilisation to occur into the Capel River, if clearing was to occur during heavy rainfall events and/ or outside of dry conditions. Sediment mobilisation would therefore result in deterioration of the water quality of the Capel River and associated tributaries. While the assessment is specific to the clearing of the vegetation rather than the final land use, the applicant has demonstrated management measures to mitigate water quality deterioration during the management of the final land use.

Conditions

To address the above impacts, the following management measures will be required as conditions on the clearing permit:

- Clear vegetation outside of peak rainfall period (May to August) and only in dry conditions to avoid mobilisation of sediment into the Capel River.

3.3. Relevant planning instruments and other matters

The Shire of Capel advised DWER that there are no additional Shire policy instruments which may apply to this proposal as of present, given the Shire is still in the process of developing local planning policy framework to determine whether there is a need for development approval. The Shire advised the land of the proposed clearing is zoned as Priority Agriculture under the Shire's current planning scheme and the proposed horticulture is consistent with the zoning. Additionally, the property lies within Special Control Area SCA8 – Ecological linkage due to the proximity to the Capel River. The objective of the control area is to assist in management and protection of biodiversity and significant ecological linkages. The Shire raised concerns that the proposed clearing would destroy the existing limited north-south wildlife corridor between Capel River and Weld road, therefore proposed if the clearing were to be granted, a native tree corridor should be planted along the properties eastern boundary to retain the integrity of the ecological linkage. The department considered the Shires comment whilst determining an appropriate offset (see Section 4).

The application area occurs within the Capel River System Surface Water Area and the Busselton-Capel Groundwater Area and is subject to water licensing requirements under *Rights in Water and Irrigation Act 1914* (RIWI Act). DWER's Regional Delivery – Busselton, advised that, at the time of submitting the clearing permit application, the applicant held a valid licence to take water under the RIWI Act. The licence allows the applicant to take 800,000 kilolitres per annum from the Busselton-Capel resource for horticultural purposes, and is valid until December 2028 (DWER, 2023). The Busselton District provided concerns that the proposed clearing may potentially impact water quality of the Capel River and tributaries. The district advised that caution should be taken during clearing to minimise the mobilisation of sediments from disturbed areas, to the immediate down stream environments during heavy rainfall events, by ensuring all areas effected by the clearing works are appropriately stabilised. It was recommended that a Sediment Management Plan is prepared by the applicant to assist with detailing the contingency measures that will be taken to minimise the risk of erosion and sediment run off (see section 3.2.4).

No Aboriginal sites of significance have been mapped within the application area. It is the permit holder's responsibility to comply with the *Aboriginal Heritage Act 1972* (WA) and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

4. Suitability of offsets

Through the detailed assessment outlined in Section 3.2 above, the Delegated Officer has determined that the following significant residual impacts remain after the application of the avoidance and mitigation measures summarised in Section 3.1. These include the loss of 108 trees, which is equivalent to 1.08 hectares of native vegetation that provide:

- high quality western ringtail possum habitat,
- high quality foraging habitat for three species of black cockatoos, and
- native vegetation considered a significant remnant of two vegetation complexes, the Abba and Swan complex within an extensively cleared landscape and vegetation which provides an important ecological linkage function.

The applicant initially proposed an environmental offset consisting of conserving in perpetuity of 8.8 hectares of native vegetation spread across six patches within Lot 888 on Deposited Plan 100980 and Lot 1089 on Deposited plan 102595. The department considers this proposal was not adequate as it still resulted in a net loss, and required strengthening of the proposed offset via local revegetation options. To result in an overall net gain in vegetation as well as maintain ecological linkage within the property, the offset was strengthened through revegetation as well as conservation in perpetuity through conservation covenant of the revegetation areas.

The department has undertaken a revised offset calculation using the offsets metric in accordance with the WA Environmental Offset Policy (2011) and Offset Guidelines (2014) to determine that the following offset is required to fully counterbalance the proposed clearing;

- the revegetation of 1.82 hectares of bare ground within a 4.48 hectares area through infill planting of a minimum of 182 native trees (to be a mixture of marri, jarrah, peppermint and flooded gum), to achieve an overall very good quality, of which at least 1.22 hectares would provide suitable western ringtail possum habitat and the entire area would provide suitable black cockatoo foraging habitat.
- The revegetation of 0.6 hectares of bare ground through the planting of a corridor of suitable western ringtail possum habitat including a minimum of 60 trees of Peppermint, jarrah and marri.
- A total of 6.3 hectares (inclusive of both revegetation areas) to be conserved in perpetuity through conservation covenant.

The combined revegetation of areas (5.08 hectares) will be subject to management measures to ensure the long-term survival of the trees including; ongoing infill planting, weeding, watering and monitoring by an environmental specialist. These revegetation areas are to be conserved in perpetuity.

The justification for the values used in the offset calculation is provided in Appendix F.

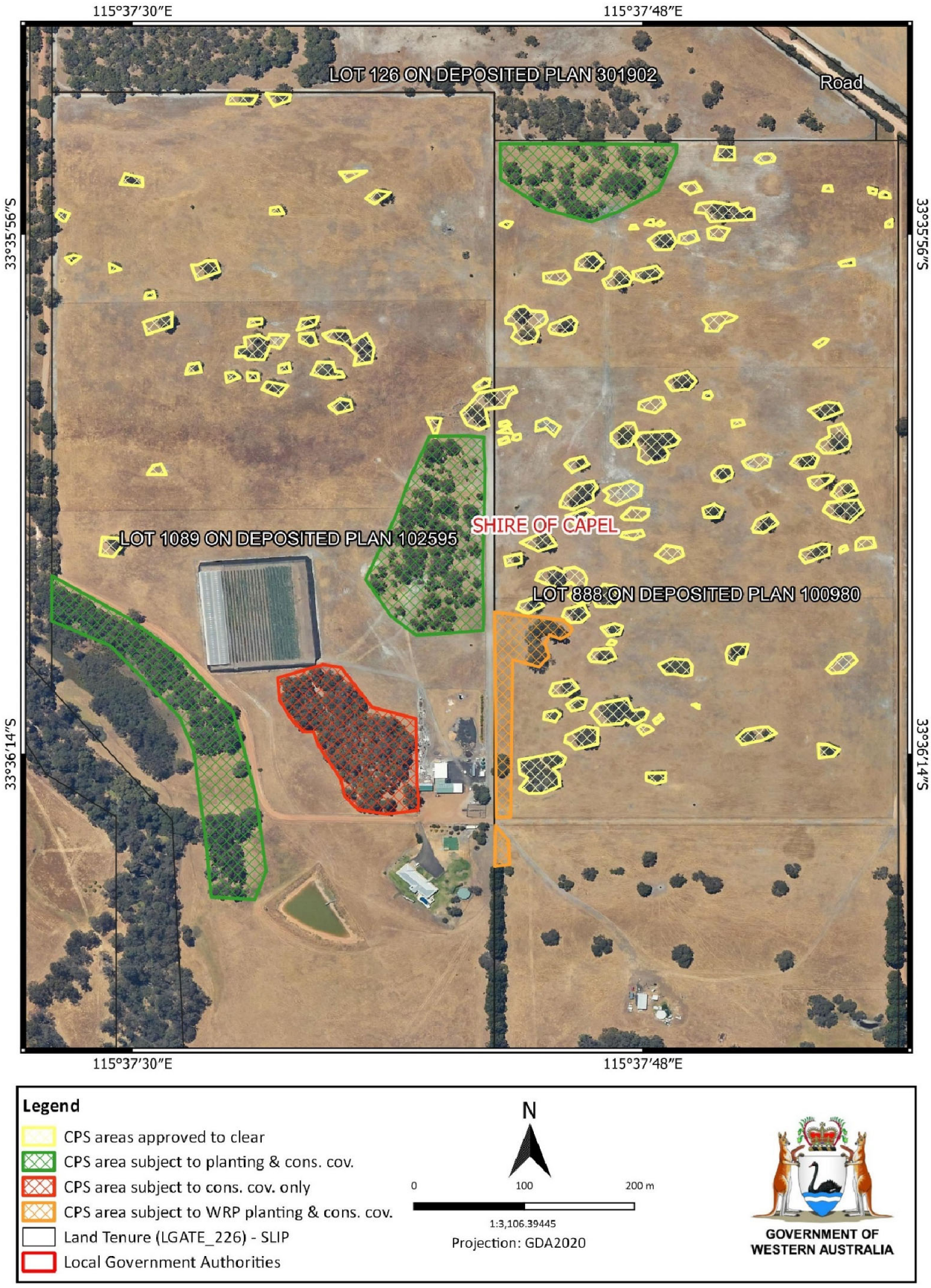


Figure 2: Map of the application area and the areas subject to offset conditions on the granted permit.

End

Appendix A. Additional information provided by applicant

During the assessment, the applicant responded to a request for further information on the following (see below).

Request for information	Further information provided
Further avoidance and mitigation measures for the impacts to: • Three species of black cockatoos, • South-western brush-tailed phascogale • Western ringtail possums • Ecological linkage value in an extensively cleared landscape	Initially, no further avoidance and mitigation measures were provided by the applicant. However, during offsets discussion, given the presence of a western ringtail possum drey, the application area was reduced from 115 to 108 native trees; to exclude identified western ringtail possum habitat from the application area.
Identify a suitable offset.	The applicant provided areas which were proposed to be retained in the application and confirmed in the response to the request for further information, these areas were to be placed under conservation covenant. This however was further refined to align with the significant residual impacts identified during the assessment (see section 4)
Mitigation of land degradation risks: It is noted that the assessment of the Office of the Soil and Land Conservation Commissioner indicated that the risk of land degradation is unlikely to increase provided that good management practices are implemented. This would be similar to current practises at the existing orchard of jujube trees comprising of a surrounding net structure, full ground cover between rows, drip irrigation and the use of mulch. As well as conducting soil sample testing once a year to monitor the soil fertility. DWER request confirmation that these proposed management measure to reduce land degradation risks are to be implemented to the areas proposed to be cleared once the horticulture operation is established.	The applicant confirmed that Green Grass will to apply land management measure to prevent land degradation (see section 3.2.3 and 3.2.4).

Appendix B. Details of public submissions

DWER advertised the application on 20 October 2023 for 21 days. A total of two public submissions were received (Submission 2023a, 2023b). refer to the table below for a summary of the submissions

Details of public submissions (Submission, 2023a, 2023b) and DWER's consideration of matters raised.

Summary of comments	Consideration of comment
<u>Paddock Trees</u> The proposed clearing will remove important paddock trees, which provide important habitat for a wide range of species and also provide connectivity in a landscape of patchy remnant vegetation. These paddock trees also reduce salinity and erosion as well as providing habitat for protected species such as Carnaby's cockatoo. Along the Capel River paddock trees are limited and this site is only one of several lots with a significant amount of remaining mature paddock trees.	DWER's assessment determined that the proposed clearing is at variance to clearing principle (b) and (e) and constitutes a significant residual impact that requires offsetting. DWER's assessment on the impacts to significant fauna this is summarised in *Assessment of impacts on environmental values* (see Section 3.2). DWER assessment of land degradation resulting from the proposed clearing is outlined in Assessment of impacts on environmental values (see Section 3.2).
<u>Agriculture zoning</u>	As a part of DWER's assessment, the Shire of Capel was contacted to provide comment on the proposed

Summary of comments	Consideration of comment
The property is zoned for primary agricultural purposes. A sustainable use of the property would be to allow the agricultural purpose to work concurrently with the existing trees without removal creating a balance of economic and environmental benefit. Whilst the purpose is consistent with the zoning, the clearing does not follow the local Shires Planning Strategy to retain balance with economical development and the environmental protection.	clearing and to confirm the clearing aligns with the Shires local town planning scheme, planning policies, biodiversity guidelines and whether planning approvals is required (see Section 3.3). The department considered the Shires Planning Strategy whilst determining an appropriate offset and required the applicant to undertake planting of a native tree corridor to retain the integrity of the ecological linkage.
<u>Regional Ecological Linkage</u> The application area is in close proximity to a regional ecological linkage of the Capel River corridor, which connects Swan Coastal Plain vegetation to the Jarrah Forest. Vegetation adjacent to this corridor given the fragmented landscape is likely provides important stepping stones, and possible breeding or refuge particularly for black cockatoos.	DWERs assessment identifying the impacts to ecological linkage is summarised in Assessment of impacts on environmental values (see Section 3.2). The proposed revegetation will mitigate impacts to the clearing of linkage values.
<u>Avoidance and Mitigation</u> Inadequate avoidance and mitigation was provided within the application. No justification for clearing habitat associated with the western ringtail possum drey or the extent of the clearing. No reasonable consideration of other sites, where there are significantly fewer mature trees is provided. The supplementary avoidance and mitigation information is a misrepresentation as it states in one paragraph “the footprint contains 112 scattered large trees comprising high value foraging resources, 5 with obvious hollows.” Then in the next states “clearing footprint has been specifically designed to avoid any areas which provide improved black cockatoo habitat.	The avoidance and mitigation commitments employed by the applicant is summarised under *Avoidance and mitigation measures* (see Section 3.1). DWER’s assessment of the avoidance and mitigation measures against the mitigation hierarchy determined significant residual impacts remained and an offset was required, this is summarised in *Suitability of Offsets* (see Section 4). Further, DWER considered the public benefit of the clearing, and while the proposal was for a private horticultural development, the applicant advised that it was a significant development for the locality and will provide job opportunities for the local community.
<u>Vegetation retention and infill planting</u> The proposed 8.8 ha of vegetation retention with infill planting would overall produce a net loss of vegetation given the areas of retention proposed already contain a significant canopy and there is limited space for appropriate infill planting. No area of infill planting was provided in order to calculate actual positive gains. The submission also noted despite the application stating it would enhance linkages, only one minor linkage would be created, with two larger areas remaining isolated and the plan does not take into account hollow bearing trees take almost 200 years to establish suitable habitat.	DWERs assessment revised this vegetation retention and infill planting proposal and strengthened the offset through infill planting, planting of a central corridor as well as conservation in perpetuity of all offset areas. While the application area contains hollow bearing trees, none are at a suitable size to be utilised by black cockatoos. The permit requires the permit holder to inspect all habitat trees prior to clearing and to install artificial nest hollows for any trees with hollows showing evidence of use. Some smaller tree hollows may provide habitat for western ringtail possum and south-western brush-tailed phascogale, however the limited canopy connectivity due to the parkland cleared state of the application area indicates that they are less likely to be utilised by western ringtail possums and phascogales.

Summary of comments	Consideration of comment
<u>Black cockatoos</u> Concerns expressed regarding limitations to the provided targeted fauna survey for black cockatoos including: • the survey was a singular occurrence of one season, and it occurred outside of the Carnaby's breeding season, • potential hollows were only inspected from a distance and externally without a scope, and; • the survey did not specifically reference Baudin's cockatoo, even though the site is within the distribution for the species. The application area contributes to a significant loss of habitat and the mitigation actions fail to contribute to a net gain in suitable habitat required to maintain this species. "It is a misnomer and not an adequate measure using (vegetation) condition as an indicator of fauna value. The supporting information section 5.5 states that "despite evidence of these species presence being found and based on the Generally degraded nature of the vegetation present it is considered unlikely that the survey area represents habitat of significance to any species of fauna known to frequent the general area: (p10)". The submission is concerned this conclusion within the context of the landscape is inaccurate, inconsistent and under-rates fauna value.	DWERs assessment identifying the impacts to biological values of fauna including black cockatoos is summarised in Assessment of impacts on environmental values (see Section 3.2). Irrespective of the fauna survey being conducted as a singular occurrence, DWERs assessment considered additional information including records in surrounding areas, as well as site context in determining the impacts of the proposed clearing on Carnaby's cockatoo. DWER considered the proposed clearing would impact high quality foraging habitat for all three species of black cockatoos, including Baudin's cockatoo and an offset was required to counterbalance the impacts to all three species of black cockatoos. While the fauna survey noted it as a limitation that the hollows were inspected only from below ground, noting only 5 trees contained hollows and available photography indicate these trees are not likely to be suitable for black cockatoo nesting. However, as a precautionary approach, the permit has been conditioned to inspect all hollow bearing trees prior to clearing. As indicated above, DWER's assessment didn't consider the vegetation consider in determining the impacts of the proposed clearing on black cockatoos. Refer Appendix F.2 for DWERs justification of impacts present, which considered site context and the 'quality' of the habitat present.
<u>Foraging habitat calculation</u> The supplementary information states that the footprint contains very small, (less than 0.1ha) area of quality foraging habitat for black cockatoos, however this is vastly underestimated given 69 marri and 8 jarrah are over 500mm DBH. The supplementary information states that 14,580ha of better quality habitat is present within 10km within secure tenure. This fails to consider the importance of stepping stone vegetation in a highly cleared landscape, the site is in proximity to a regional ecological linkage, very few lots remaining locally with native mature paddock trees and the limited extent of the two vegetation complexes.	DWERs assessment identifying the impacts to biological values of fauna including black cockatoos is summarised in *Assessment of impacts on environmental values* (see Section 3.2). DWERs assessment considered the significant residual impact of the clearing was 1.08 hectares of high quality foraging habitat for black cockatoos, not 0.1 hectares as stated in the fauna survey report. DWERs assessment also acknowledged that the application area provides stepping stone vegetation and linkage values and considered it as a significant residual impact that requires offsetting, along with impacts to black cockatoo foraging habitat.
<u>Western Ringtail Possum</u> Whilst acknowledging that "most of survey area represents unsuitable habit", the site supports small number of WRP that includes a drey and potentially breeding individuals. One of the primary threats to the WRP is habitat destruction and fragmentation. This proposal contributes directly to this. While this may not be a self-sustaining population in itself, it would form part of a self sustaining population bordering the Capel River. It is stated that the vegetation proposed for retention "represents good quality WRP habitat" however no signs of WRP were found in these	DWERs assessment identifying the impacts to biological values of fauna including western ringtail possums is summarised in *Assessment of impacts on environmental values* (see Section 3.2). DWERs assessment considered the significant residual impact of the clearing was 1.08 hectares of 'high' quality habitat for western ringtail possum that required offsetting. Refer Section 4 and Appendix F.1 for further details.

Summary of comments	Consideration of comment
locations, highlighting the current location is the preferred site, and the importance of retaining the vegetation containing the drey and other signs of use. Given the WRP is critically endangered and research suggests there is a 92% likelihood the WRP will be extinct within 20 years if action is not taken to protect populations and habitat. Given this habitat should be excluded from clearing and further enhanced.	
<u>Water for horticulture expansion</u> Concerns whether a water license has been obtained or whether a current license is suitable.	DWER's assessment ensured an appropriate water license has been obtained this is summarised in *Relevant planning instruments and other matters* (See section 3.3)
<u>At variance with EPA Position Statement 2</u> The application area is situated within an extensively cleared landscape with both the Abba and Swan complexes which the area is situated on retains less than 30% vegetation retention. This was not considered in the application. Indicating an existing high level of clearing of these complexes and inadequate protection of remaining vegetation. Further removal of native vegetation in this complex would further reduce the extent. While the application area comprises largely mature trees without understory, the trees of this size, represent important structural and functional elements in the landscape. The application would only be environmentally acceptable against this position statement if the clearing area was reduced to retain more mature trees with larger areas of vegetation in this lot retained and improved.	DWERs assessment identifying the impacts to significant remnant vegetation is summarised in *Assessment of impacts on environmental values* (see Section 3.2). An offset is required to counterbalance the significant residual impact to remnant vegetation, which is summarised in *Suitability of Offsets* (see Section 4) and under Appendix F.3.
<u>Cumulative Impacts</u> Cumulative impacts of this application in context of previous clearing and other pressures must be considered. The importance of this was noted recently in the WA State Application Tribunal by DR Willey who emphasises the importance of adopting a more holistic perspective to prevent serious environmental consequences (p11-12 Hutchings and Shire of Augusta Margaret river [2023] WASAT 96). This application represents a significant clearing in terms of number and extent of trees comprising significant habitat, close to ecological linkages in a highly cleared and fragmented landscape, with limited extent of vegetation complexes. The further incremental loss of native vegetation at the local scale, can be detrimental when considered on a cumulative basis. While necessary at times to balance competing economic, social, cultural and environmental factors, the cumulative impact of the removal of vegetation in the southwest of WA, and in the Shire of Capel, should result in a need to minimise clearing of any kind in the future,	DWER's assessment of the cumulative impacts of native vegetation clearing was considered in accordance with 'A guide to the assessment of applications to clear native vegetation' (DER, 2013), in regard to significant remnant vegetation and native vegetation extent under clearing principle (e). DWER's assessment identifying the impacts to significant remnant vegetation is summarised in *Assessment of impacts on environmental values* (see Section 3.2).
<u>Fauna Management</u> The fauna management plan contains several issues including:	Fauna management conditions have been applied to the permit, requiring a qualified fauna specialist to inspect the trees immediately prior to and during the clearing. Refer to Assessment of impacts on

Summary of comments	Consideration of comment
• Vehicle cannot stay on designated roads to facilitate the clearing given there is limited tracks around the boundary and centre of the property, • It is not appropriate to discourage fauna through housekeeping as a mitigation measure given the site already contains conservation significant fauna, • The management measure to check suitable breeding tree is contradictory to statements claiming there is no suitable nesting habitat for black cockatoos. Ideally no clearing should be undertaken during the spring to early summer to avoid breeding seasons however it is to be noted that forest red tail cockatoos may breed all year. • The management measure to avoid clearing a tree containing an active nest until the fledglings have left des not align with the importance of retaining breeding trees and a permit should not be granted in the first place if black cockatoo nests are present.	environmental values (see Section 3.2) and condition 5 and 6 of the clearing permit.
<u>Recommendations</u> • An adequate retention of other vegetation on the lot, re-planting and possibly a contribution to conservation outcomes elsewhere should be enforced • Provide more accurate area of high quality black cockatoo foraging habitat • Provide more information on water requirements and licensing, • Complete a second season and more appropriate cockatoo breeding survey, • Preference for selection of another site where there are few significant habitat paddock trees, noting the application is at variance to the EPA position statement 2, • Amend the clearing footprint to reduce the number and extent of significant trees only in a core area • Retain and protect the location of WRP drey and habitat trees with a suitable buffer • Increased area of retention and connectivity of other vegetation on site • Ensure conserved areas are actively managed over time to avoid degradation.	DWERs assessment has addressed these recommendations during the assessment of the application, refer to *Suitability of offset* (Section 3.3 and 4).
The proposed clearing will impact black cockatoo species as they feed on the remnant vegetation within the area, as well as ring tail possums and brushtail possums which occur within the bushland along the Capel River. The submission requests an offset is to occur or replanting the number of trees removed.	DWER's assessment identified the proposed clearing will result in impacts to significant habitat for three black cockatoo species, western ringtail possums and south-western brushtail phascogales. DWER's assessment of the impacts is summarised in *Assessment of Impacts on environmental values* (see Section 3.2). DWER also determined an offset to counterbalance the significant residual impacts of these species was required (see Section 4)

Appendix C. Site characteristics

C.1. Site characteristics

Characteristic	Details
Local context	The area proposed to be cleared is a 108 isolated native trees situated on a parkland cleared property within the intensive land use zone of Western Australia and is surrounded by existing agriculture and parkland cleared properties. The Capel River is situated at the southern end of the property. The proposed clearing area contributes to an local linkage, is a small isolated remnant in a highly cleared landscape. Spatial data indicates the local area (10-kilometre radius from the centre of the area proposed to be cleared) retains approximately 38.67 per cent of the original native vegetation cover.
Ecological linkage	The proposed clearing is mapped within the south west regional ecological linkage (37) which is associated with the Capel River situated at the south west of the property. This regional linkage traverses the Capel River from in a south easterly direction from the coast. Locally the application area also contributes to a north-south wildlife corridor between the Capel River and Weld Road.
Conservation areas	The proposed clearing is not mapped within a conservation area. Within the local area there are 10 conservation areas with the closest located 1.8 kilometres from the application area.
Vegetation description	The aerial imagery and provided survey indicate the vegetation within the proposed clearing area consists of cleared pasture with scattered and sparse groves of trees including jarrah, marri, flooded gum and peppermint. The full survey descriptions and maps are available in Appendix G. This is inconsistent with the mapped vegetation type(s): • Swan Complex (33), which is described as Fringing woodland of *Eucalyptus rudis* (Flooded Gum) - *Melaleuca rhaphiophylla* (Swamp Paperbark) with localised occurrence of low open forest of *Casuarina obesa* (Swamp Sheoak) and *Melaleuca cuticularis* (Saltwater Paperbark). (Government of Western Australia, 2019) • Abba Complex (30), which is described as a mixture of open forest of *Corymbia calophylla* (Marri) - *Eucalyptus marginata* (Jarrah) - Banksia species and woodland of *Corymbia calophylla* (Marri) with minor occurrences of *Corymbia haematoxylon* (Mountain Marri). Woodland of *Eucalyptus rudis* (Flooded Gum) - Melaleuca species along creeks and on flood plains. *The mapped vegetation types retain approximately 6.54 per cent of the original extent of the Abba Complex and 13.57 per cent of the Swan Complex (Government of Western Australia, 2019).*
Vegetation condition	Photographs within the supplied survey (Harewood, 2023) indicate the vegetation within the proposed clearing area is in Degraded to completely degraded condition (Keighery, 1994–condition, described as: • 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 very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and/or 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 The full Keighery (1994) condition rating scale is provided in Appendix E. The full survey descriptions and mapping] are available in Appendix G.

Characteristic	Details
Climate and landform	The climate experienced in the area is Mediterranean, with dry, hot summers and cool, wet winters. According to the Bureau of Meteorology (Cape Naturaliste, Station ID 009603, 2024): • average annual rainfall is 657.9 mm, with the majority falling between May and August • average maximum temperatures range from 16.9 °C in winter to 30.3 °C in summer • average minimum temperatures range from 7 °C in winter to 14.7 °C in summer.
Soil description	The soil is mapped as Bassendean phase (212Bs_B1a) which is described as extremely low to very low relief dunes, undulating sandplain and discrete sand rises with deep bleached grey sands with an intensely coloured yellow B horizon occurring within 1 m of the surface; marri and jarrah dominant.
Land degradation risk	The application area is subject to a high risk of subsurface acidification and wind erosion, a moderate risk of phosphorus export and a low risk of water erosion, waterlogging, salinity and flooding.
Waterbodies	The desktop assessment and aerial imagery indicated that the application area is mapped as a multiple use palusplain wetland and 970 metres to the southeast of the clearing area is a conservation category palusplain wetland. The Capel River also occurs 150 metres to the south west.
Hydrogeography	The application area is mapped within the Capel River surface water and irrigation area and the Busselton-Capel groundwater area. Groundwater salinity is mapped at 500-1000 TDS mg/L
Flora	Within the local area (10 kilometre radius) there are 80 conservation significant species mapped. Of these 23 are threatened, nine are priority 1(P1), six are P2, 29 are P3 and 13 are P4. And the nearest mapped record occurs 1.21 kilometres from the application area.
Ecological communities	There are no ecological communities mapped within the application area however the local area consists of 12 different threatened and priority ecological communities with the nearest patch; Banksia Woodland of the Swan Coastal Plain is mapped 1.5 kilometres from the application area.
Fauna	Within the local area (10 kilometre radius) 24 species of conservation significant fauna have been identified, with the nearest record mapped 380 metres from the application area.

C.2. Vegetation extent

	Pre-European extent (ha)	Current extent (ha)	Extent remaining (%)	Current extent in all DBCA managed land (ha)	Current proportion (%) of pre-European extent in all DBCA managed land
IBRA bioregion*					
Swan Coastal Plain	1,501,221.93	579,813.47	38.62	222,916.97	14.85
Vegetation complex					
Abba Complex (30)	50,892.78	3,326.20	6.54	183.20	0.36
Swan Complex (33)	15,194.13	2,062.03	13.57	140.58	0.93

	Pre-European extent (ha)	Current extent (ha)	Extent remaining (%)	Current extent in all DBCA managed land (ha)	Current proportion (%) of pre-European extent in all DBCA managed land
Local area					
10km radius	34,013.18	13,152.18	38.67	-	-

*Government of Western Australia (2019a)

**Government of Western Australia (2019b)

C.3. Fauna analysis table

With consideration for the site characteristics set out above, relevant datasets (see Appendix I.1), and targeted fauna survey information, impacts to the following conservation significant fauna required further consideration.

Species name	Conservation status	Suitable habitat features ? [Y/N]	Suitable vegetation type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
Calyptorhynchus baudinii	EN	Y	Y	6.55	7	Y
Calyptorhynchus latirostris	EN	Y	Y	4.65	75	Y
Calyptorhynchus banksii naso	VU	Y	Y	5.94	7	Y
Tyto novaehollandiae novaehollandiae	P3	Y	Y	8.87	2	N
Phascogale tapoatafa wambenger	CD	Y	y	2.58	16	N
Notamacropus irma	P4	Y	Y	7.47	13	N
Pseudocheirus occidentalis	CR	Y	Y	0.38	272	Y

T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, P: priority

C.4. Land degradation risk table

Risk categories	*Land Unit 1*
Wind erosion	H1: 50-70% of map unit has a high to extreme wind erosion risk
Water erosion	L1: <3% of map unit has a high to extreme water erosion risk
Salinity	L1: <3% of map unit has a high to extreme salinity risk
Subsurface Acidification	H2: >70% of map unit has a high subsurface acidification risk or is presently acid
Flood risk	L1: <3% of the map unit has a moderate to high hazard
Water logging	L1: <3% of map unit has a high to extreme water erosion risk
Phosphorus export risk	M2: 30-50% of map unit has a high to extreme phosphorus export risk

Appendix D. Assessment against the clearing principles

Assessment against the clearing principles	Variance level	Is further consideration required?
Environmental value: biological values		
Principle (a): *"Native vegetation should not be cleared if it comprises a high level of biodiversity."* Assessment: The application area is unlikely to contain locally or regionally significant flora or assemblages of plants, and does not consist of vegetation representative of any Priority Ecological Communities, however, does consist of habitat suitable for conservation significant fauna.	At variance	Yes *Refer to Section 3.2.1, above.*
Principle (b): *"Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna."* Assessment: The area proposed to be cleared contains significant habitat for several conservation significant fauna species.	At variance	Yes *Refer to Section 3.2.1, above.*
Principle (c): *"Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora."* Assessment: The area proposed to be cleared is unlikely to contain suitable habitat for flora species listed as threatened under the BC Act.	Not likely to be at variance	No
Principle (d): *"Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community."* Assessment: The area proposed to be cleared is not mapped as a threatened ecological community and does not contain species that can indicate a threatened ecological community.	Not likely to be at variance	No .

Assessment against the clearing principles	Variance level	Is further consideration required?
Environmental value: significant remnant vegetation and conservation areas		
Principle (e): *"Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared."* Assessment: The extent of the mapped vegetation types is inconsistent with the national objectives and targets for biodiversity conservation in Australia. The vegetation proposed to be cleared is considered to be part of an ecological linkage in the local area.	At variance	Yes *Refer to Section 3.2.2, above.*
Principle (h): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area."* Assessment: Given the distance to the nearest conservation area, the proposed clearing is not likely to have an impact on the environmental values of nearby conservation areas.	Not likely to be at variance	No
Environmental value: land and water resources		
Principle (f): *"Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland."* Assessment: The application area is located within a palusplain multiple use wetland (UFI 15809); therefore it may contain vegetation that is considered growing in or in association with an environment associated with a wetland or watercourse.	May be at variance	Yes *Refer to Section 3.2.4, above.*
Principle (g): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation."* Assessment: The mapped soils highly susceptible to wind erosion and subsurface acidification and a moderate risk of phosphorus export. Noting the extent and location of the application area with the condition of the vegetation, the proposed clearing is unlikely to have an significant impact on land degradation.	May be at variance	Yes *Refer to Section 3.2.3, above.*
Principle (i): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water."* Assessment: Given the application area is mapped as a multiple use wetland, mapped within a surface water and groundwater area and is also located within 150 metres of the Capel River, the proposed clearing may impact surface or groundwater quality.	May be at variance	Yes *Refer to Section 3.2.4, above.*
Principle (j): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding."* Assessment: The mapped soils and the topographic contours in the surrounding area do not indicate the proposed clearing is likely to contribute to increased incidence or intensity of flooding	Not likely to be at variance	No

Appendix E. Vegetation condition rating scale

Vegetation condition is a rating given to a defined area of vegetation to categorise and rank disturbance related to human activities. The rating refers to the degree of change in the vegetation structure, density and species present in relation to undisturbed vegetation of the same type. The degree of disturbance impacts upon the vegetation's ability to regenerate. Disturbance at a site can be a cumulative effect from a number of interacting disturbance types.

Considering its location, the scale below was used to measure the condition of the vegetation proposed to be cleared. This scale has been extracted from:

Keighery, B.J. (1994) *Bushland Plant Survey: A Guide to Plant Community Survey for the Community*. Wildflower Society of WA (Inc). Nedlands, Western Australia.

Measuring vegetation condition for the South West and Interzone Botanical Province (Keighery, 1994)

Condition	Description
Pristine	Pristine or nearly so, no obvious signs of disturbance.
Excellent	Vegetation structure intact, with disturbance affecting individual species; weeds are non-aggressive species.
Very good	Vegetation structure altered, with obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and/or 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/or 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 very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and/or 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.

Appendix F. Offset calculator value justification

F.1. Western ringtail possum habitat – Retention of vegetation via a conservation Covenant

WA Environmental Offsets Calculator
Rationale for scores used in the offset calculator

Calculation	Score (Area)	Rationale
Conservation significance		
Description	Western ringtail possum habitat	The canopy cover calculated as 1.08 ha (100m2 x 108). As Western Ringtail Possum (WRP) are arboreal, the canopy cover area has been used for the offset calculations. The targeted fauna assessment by G. Harewood (Harewood, 2023) identified that the application area provides habitat for western ringtail possums, a drey and scats at two locations were identified within the application area. The drey has been excluded from the application area
Type of environmental value	Species (Flora/Fauna)	Western ringtail possum habitat
Conservation significance of environmental value	Rare/threatened species – critically endangered	Western Ringtail Possum are listed as a critically endangered fauna species under the Commonwealth EPBC Act and state BC Act.
Landscape-level value impacted	Yes/no	Yes - South West Regional Ecological Linkages 37 (Capel River corridor) and Shire of Capel Special Control Area SCA8 – Regional Ecological Linkages runs to the south of the application area. This is a thin strip of riparian vegetation bordering the Capel River. The application area vegetation creates a linkage between this and the Weld road, road reserve.

Significant impact		
Description	Western ringtail possum habitat	There are 272 records of WRP in the local area with the closest being approximately 380 metres. The application area contains suitable habitat (*Agonis flexuosa*). Evidence of Western Ringtail Possums was recorded (1 drey and 2 locations of scats) within the application area however the cluster of trees associated with the drey has been excluded from the application area.
Significant impact (hectares) / Type of feature	1.08	The Fauna survey (Harewood, 2023) indicates that most of the application area has been parkland cleared for livestock grazing and consists of pasture/bare ground with scattered trees including marri (*Corymbia calophylla*) jarrah (*Eucalyptus marginata*), flooded gum (*Eucalyptus rudis*) and peppermint (*Agonis flexuosa*). The application area contains 108 trees which is estimated as 1.08 hectares. Note the application area has been reduced from an original 115 trees to 108 through excluding five trees associated with the identified drey and two trees near the drey to be incorporated in a proposed connectivity corridor
Quality (scale) / Number	7.00	The overstorey is considered to provide significant habitat for WRP, noting the presence of preferred tree species, number of records within the local area, location within the landscape and evidence of use of a small number of WRPs on site.
Rehabilitation credit		
N/A		No rehabilitation within the application area is proposed.
Offset		
Description	Conservation covenant retention of vegetation area	The department proposed conservation covenant of a good quality patch of dense vegetation consisting of suitable WRP habitat. The applicant is proposing to fence the area and provide minor weed control.
Proposed offset (area in hectares)	1.22	1.22 hectares of good quality WRP habitat conserved in perpetuity would counterbalance the proposed clearing by 18.8% for this environmental value.
Current quality of offset site / Start number (of type) of feature)	8.00	The offset site largely comprises a mixture of marri dominated woodland over pasture, jarrah/marri/banksia woodland, and marri/flooded gum/peppermint woodland. While the area appears to be in a very good condition and is better than the application area, the offset site is expected to provide similar WRP habitat values to the application area, noting that this area was not specifically surveyed, and evidence of WRP use not confirmed. This patch appears in better quality than the other areas and was therefore given a quality score of very good
Future quality WITHOUT offset (scale) / Future number WITH offset	8.00	The offset site is currently zoned as Priority Agriculture. It is not expected that the quality of the WRP habitat within the offset site will change in the absence of the offset.
Future quality WITH offset (scale) / Future number with offset	8.00	The offset site will be placed under a conservation covenant and the vegetation condition will remain the same for an extended period post offset.
Time until ecological benefit (years)	1.00	One year to conserver in perpetuity
Confidence in offset result (%)	0.9	There is a high level of confidence that the future quality with and without offset will remain the same.
Duration of offset implementation (maximum 20 years)	20.00	The offset site will be conserved in perpetuity under a Soil and Land Conservation Act 1945 conservation covenant. Therefore, the maximum of 20 years for this field is applied.
Time until offset site secured (years)	1.00	It is expected that the conservation covenant would be in place within 1 year, noting the proposed offset site is on land owned by the applicant.
Risk of future loss WITHOUT offset (%)	20.0%	The offset site is currently zoned Priority Agriculture. Therefore, there is a moderate risk that the offset site could be developed in the future.
Risk of future loss WITH offset (%)	5.0%	The future conservation (in perpetuity) of the offset site would result in a substantial increased security and substantially reduce the risk of loss. The risk of catastrophic events (fire, dieback, etc.) remain.
Offset ratio (Conservation area only)	N/A	
Landscape level values of offset?	N/A	

F.2. Western ringtail possum habitat – Retention of vegetation with infill planting

WA Environmental Offsets Calculator
Rationale for scores used in the offset calculator

Calculation	Score (Area)	Rationale
Conservation significance		
Description	Western ringtail possum habitat	The canopy cover calculated as 1.08 ha (100m2 x 108). As Western Ringtail Possum (WRP) are arboreal, the canopy cover area has been used for the offset calculations. The targeted fauna assessment by G. Harewood (Harewood, 2023) identified that the application area provides habitat for western ringtail possums, a drey and scats at two locations were identified within the application area. The drey has been excluded from the application area
Type of environmental value	Species (Flora/Fauna)	Western ringtail possum habitat
Conservation significance of environmental value	Rare/threatened species – critically endangered	Western Ringtail Possum are listed as a critically endangered fauna species under the Commonwealth EPBC Act and state BC Act.
Landscape-level value impacted	Yes/no	Yes - South West Regional Ecological Linkages 37 (Capel River corridor) and Shire of Capel Special Control Area SCA8 – Regional Ecological Linkages runs to the south of the application area. This is a thin strip of riparian vegetation

		bordering the Capel River. The application area vegetation creates a linkage between this and the Weld road, road reserve.
Significant impact		
Description	Western ringtail possum habitat	There are 272 records of WRP in the local area with the closest being approximately 380 metres. The application area contains suitable habitat (*Agonis flexuosa*). Evidence of Western Ringtail Possums was recorded (1 drey and 2 locations of scats) within the application area however the cluster of trees associated with the drey has been excluded from the application area.
Significant impact (hectares) / Type of feature	1.08	The Fauna survey (Harewood, 2023) indicates that most of the application area has been parkland cleared for livestock grazing and consists of pasture/bare ground with scattered trees including marri (*Corymbia calophylla*) jarrah (*Eucalyptus marginata*), flooded gum (*Eucalyptus rudis*) and peppermint (*Agonis flexuosa*). The application area contains 108 trees which is estimated as 1.08 hectares. Note the application area has been reduced from an original 115 trees to 108 through excluding five trees associated with the identified drey and two trees near the drey to be incorporated in a proposed connectivity corridor
Quality (scale) / Number	7.00	The overstorey is considered to provide significant habitat for WRP, noting the presence of preferred tree species, number of records within the local area, location within the landscape and evidence of use of a small number of WRPs on site.
Rehabilitation credit		
N/A		No rehabilitation within the application area is proposed.
Offset		
Description	Retention of vegetation with infill planting	The department proposes to revegetate three patches of moderate to good quality patches of vegetation consisting of suitable WRP habitat to overall improve the quality of the vegetation and to conserve the areas in perpetuity. The applicant is proposing to fence the area and provide minor weed control.
Proposed offset (area in hectares)	4.48	Infill planting and conservation in perpetuity of 4.48 hectares of WRP habitat would counterbalance the proposed clearing by 79% for this environmental value.
Current quality of offset site / Start number (of type) of feature	7.00	The offset revegetation sites largely comprises a mixture of marri dominated woodland over pasture, jarrah/marri/banksia woodland, and marri/flooded gum/peppermint woodland bordering the Capel River and providing connectivity throughout the site. While these generally areas appear to be in a better condition than the application area, the offset site is expected to provide similar WRP habitat values to the application area, noting that these areas weren't specifically surveyed, and evidence of WRP use not confirmed.
Future quality WITHOUT offset (scale) / Future number WITH offset	7.00	The offset site is currently zoned as Priority Agriculture. It is not expected that the quality of the WRP habitat within the offset site will change in the absence of the offset.
Future quality WITH offset (scale) / Future number with offset	8.00	The offset site will increase in quality with the revegetation and be placed under a conservation covenant.
Time until ecological benefit (years	17.00	It will take at least 17 years for the revegetation to overall increase the quality of the offset area.
Confidence in offset result (%)	0.8	There is a high level of confidence that the future quality of the revegetation of the offset will improve.
Duration of offset implementation (maximum 20 years)	20.00	The offset site will be conserved in perpetuity under a Soil and Land Conservation Act 1945 conservation covenant. Therefore, the maximum of 20 years for this field is applied.
Time until offset site secured (years)	1.00	It is expected that the conservation covenant would be in place within 1 year, noting the proposed offset site is on land owned by the applicant.
Risk of future loss WITHOUT offset (%)	20.0%	The offset site is currently zoned Priority Agriculture. Therefore, there is a moderate risk that the offset site could be developed in the future.
Risk of future loss WITH offset (%)	5.0%	The future conservation (in perpetuity) of the offset site would result in a substantial increased security and substantially reduce the risk of loss. The risk of catastrophic events (fire, dieback, etc.) remain.
Offset ratio (Conservation area only)	N/A	
Landscape level values of offset?	N/A	

F.3. Western ringtail possum habitat – Planting a corridor of suitable habitat

WA Environmental Offsets Calculator
Rationale for scores used in the offset calculator

Calculation	Score (Area)	Rationale
Conservation significance		
Description	Western ringtail possum habitat	The canopy cover calculated as 1.08 ha (100m2 x 108). As Western Ringtail Possum (WRP) are arboreal, the canopy cover area has been used for the offset calculations. The targeted fauna assessment by G. Harewood (Harewood, 2023) identified that the application area provides habitat for western ringtail possums, a drey and scats at two locations were identified within the application area. The drey has been excluded from the application area
Type of environmental value	Species (Flora/Fauna)	Western ringtail possum habitat
Conservation significance of environmental value	Rare/threatened species – critically endangered	Western Ringtail Possum are listed as a critically endangered fauna species under the Commonwealth EPBC Act and state BC Act.
Landscape-level value impacted	Yes/no	Yes - South West Regional Ecological Linkages 37 (Capel River corridor) and Shire of Capel Special Control Area SCA8 – Regional Ecological Linkages runs to the south of the application area. This is a thin strip of riparian vegetation bordering the Capel River. The application area vegetation creates a linkage between this and the Weld road, road reserve.
Significant impact		
Description	Western ringtail possum habitat	There are 272 records of WRP in the local area with the closest being approximately 380 metres. The application area contains suitable habitat (*Agonis flexuosa*). Evidence of Western Ringtail Possums was recorded (1 drey and 2 locations of scats) within the application area however the cluster of trees associated with the drey has been excluded from the application area.
Significant impact (hectares) / Type of feature	1.08	The Fauna survey (Harewood, 2023) indicates that most of the application area has been parkland cleared for livestock grazing and consists of pasture/bare ground with scattered trees including marri (*Corymbia calophylla*) jarrah (*Eucalyptus marginata*), flooded gum (*Eucalyptus rudis*) and peppermint (*Agonis flexuosa*). The application area contains 108 trees which is estimated as 1.08 hectares. Note the application area has been reduced from an original 115 trees to 108 through excluding five trees associated with the identified drey and two trees near the drey to be incorporated in a proposed connectivity corridor
Quality (scale) / Number	7.00	The overstorey is considered to provide significant habitat for WRP, noting the presence of preferred tree species, number of records within the local area, location within the landscape and evidence of use of a small number of WRPs on site.
Rehabilitation credit		
N/A		No rehabilitation within the application area is proposed.
Offset		
Description	Planting a corridor WRP suitable habitat	The applicant proposed the planting of a corridor (0.6 hectares) of WRP suitable habitat through the centre of the property linking the central revegetation area with the Capel River
Proposed offset (area in hectares)	0.6	Planting of 0.6 WRP habitat species to create a corridor and link the remnant pockets of vegetation with the Capel River vegetation. This 0.6 hectares contributes 9% to counterbalance this environmental value. Combined with the offset in F.1 and F.2 the significant residual impacts of this environmental value are adequately counterbalanced (18.8% + 79% + 9% = 106.8%).
Current quality of offset site / Start number (of type) of feature)	1.00	The 0.6 hectare area contains predominately bare ground and includes the cluster of trees associated with the WRP Drey and 2 mature peppermint. While these trees are considered good quality the overall area consists of only ground covers and therefore the start value is 1.
Future quality WITHOUT offset (scale) / Future number WITH offset	1.00	The offset site is currently zoned as Priority Agriculture. It is not expected that the quality of the WRP habitat within the offset site will change in the absence of the offset.
Future quality WITH offset (scale) / Future number with offset	4.00	The offset site will increase in quality with the revegetation and be placed under a conservation covenant.
Time until ecological benefit (years	17.00	It will take at least 17 years for the revegetation to overall increase the quality of the offset area.
Confidence in offset result (%)	0.8	There is a high level of confidence that the future quality of the revegetation of the offset will improve.
Duration of offset implementation (maximum 20 years)	20.00	The offset site will be conserved in perpetuity under a Soil and Land Conservation Act 1945 conservation covenant. Therefore, the maximum of 20 years for this field is applied.
Time until offset site secured (years)	1.00	It is expected that the conservation covenant would be in place within 1 year, noting the proposed offset site is on land owned by the applicant.
Risk of future loss WITHOUT offset (%)	20.0%	The offset site is currently zoned Priority Agriculture. Therefore, there is a moderate risk that the offset site could be developed in the future
Risk of future loss WITH offset (%)	5.0%	The future conservation (in perpetuity) of the offset site would result in a substantial increased security and substantially reduce the risk of loss. The risk of catastrophic events (fire, dieback, etc.) remain
Offset ratio (Conservation area only)	N/A	

Landscape level values of offset?	N/A

F.4. Black cockatoo foraging – Retention of vegetation via a conservation Covenant

WA Environmental Offsets Calculator
Rationale for scores used in the offset calculator

Calculation	Score (Area)	Rationale
Conservation significance		
Description	Black cockatoo foraging habitat	Application has been amended to 104 trees. The canopy cover calculated as 1.04 ha (100m2 x 104). The Targeted fauna assessment by G. Harewood (Harewood, 2023) identified that the application area provides habitat for black cockatoos. Foraging debris attributed to Carnaby's black cockatoo was recorded.
Type of environmental value	Species (Flora/Fauna)	Three species of black cockatoo habitat
Conservation significance of environmental value	Rare/threatened species – critically endangered	Carnaby's cockatoo and Baudin's cockatoo are listed as endangered under the BC Act (state) and EPBC Act (federal). Forest red-tail black cockatoo is listed as vulnerable.
Landscape-level value impacted	Yes/no	Yes - South West Regional Ecological Linkages 37 (Capel River corridor) and Shire of Capel Special Control Area SCA8 – Regional Ecological Linkages runs to the south of the application area. This is a thin strip of riparian vegetation bordering the Capel River. The application area vegetation creates a linkage between this and the Weld Road, road reserve.
Significant impact		
Description	Black cockatoos	Clearing of 1.04 ha of moderate/high quality foraging habitat for three black cockatoo species.
Significant impact (hectares) / Type of feature	1.04	The Fauna survey (Harewood, 2023) indicates that most of the application area has been parkland cleared for livestock grazing and consists of pasture/bare ground with scattered trees including marri (*Corymbia calophylla*) jarrah (*Eucalyptus marginata*), flooded gum (*Eucalyptus rudis*) and peppermint (*Agonis flexuosa*), which provide suitable foraging habitat for black cockatoo. The canopy cover from the 104 trees is estimated as 1.04 hectares.
Quality (scale) / Number	7.00	One confirmed breeding location of black cockatoo's has been recorded within 12 km. Three roost sites have been recorded within the local area, the closest is within 6 km. The trees to be removed including marri (Corymbia calophylla) jarrah (Eucalyptus marginata) and peppermint (Agonis flexuosa), which are all know foraging species of Carnaby's black cockatoo. Foraging debris attributed to Carnaby's black cockatoo was recorded. The application area is close to the Capel River which provides a drinking water source for this species.
Rehabilitation credit		
N/A		
Offset		
Description	Conservation covenant retention of vegetation area with no infill planting	Conservation covenant of a good quality patch of dense vegetation, consisting of suitable black cockatoo habitat. The applicant is proposing to fence the area and provide weed control.
Proposed offset (area in hectares)	1.22	The department proposes conservation in perpetuity of 1.22 hectares of black cockatoo habitat would counterbalance the proposed clearing by 19.9% for this environmental value. The remaining offset will consist of revegetation of three areas which are to be conserved in perpetuity (refer calculation in F.5).
Current quality of offset site / Start number (of type) of feature)	8.00	The offset site largely comprises a mixture of marri dominated woodland over pasture, jarrah/marri/banksia woodland, and marri/flooded gum/peppermint woodland bordering the Capel River. While these generally areas appear to be in a better condition than the application area, the offset sites is expected to provide similar black cockatoo foraging values to the application area
Future quality WITHOUT offset (scale) / Future number WITH offset	8.00	The offset site is currently zoned as Priority Agriculture. It is not expected that the quality of the black cockatoo habitat within the offset site will change in the absence of the offset.
Future quality WITH offset (scale) / Future number with offset	8.00	The offset site will be placed under a conservation covenant and the vegetation condition will remain the same for an extended period post offset.
Time until ecological benefit (years)	1.00	One year to conserver in perpetuity
Confidence in offset result (%)	0.9	There is a high level of confidence that the future quality with and without offset will remain the same.
Duration of offset implementation (maximum 20 years)	20.00	The offset site will be conserved in perpetuity under a Soil and Land Conservation Act 1945 conservation covenant. Therefore, the maximum of 20 years for this field is applied.
Time until offset site secured (years)	1.00	It is expected that the conservation covenant would be in place within 1 year, noting the proposed offset site is on land owned by the applicant.
Risk of future loss WITHOUT offset (%)	20.0%	The offset site is currently zoned Priority Agriculture. Therefore, there is a moderate risk that the offset site could be developed in the future.
Risk of future loss WITH offset (%)	5.0%	The future conservation (in perpetuity) of the offset site would result in a substantial increased security and substantially reduce the risk of loss. The risk of catastrophic events (fire, dieback, etc.) remain.
Offset ratio (Conservation area only)	N/A	

Landscape level values of offset?	N/A

F.5. Black cockatoo foraging – Retention of vegetation with infill planting

WA Environmental Offsets Calculator
Rationale for scores used in the offset calculator

Calculation	Score (Area)	Rationale
Conservation significance		
Description	Black cockatoo foraging habitat	Application has been amended to 104 trees. The canopy cover calculated as 1.04 ha (100m2 x 104). The Targeted fauna assessment by G. Harewood (Harewood, 2023) identified that the application area provides habitat for black cockatoos. Foraging debris attributed to Carnaby's black cockatoo was recorded.
Type of environmental value	Species (Flora/Fauna)	Three species of black cockatoo habitat
Conservation significance of environmental value	Rare/threatened species – critically endangered	Carnaby's cockatoo and Baudin's cockatoo are listed as endangered under the BC Act (state) and EPBC Act (federal). Forest red-tail black cockatoo is listed as vulnerable.
Landscape-level value impacted	Yes/no	Yes - South West Regional Ecological Linkages 37 (Capel River corridor) and Shire of Capel Special Control Area SCA8 – Regional Ecological Linkages runs to the south of the application area. This is a thin strip of riparian vegetation bordering the Capel River. The application area vegetation creates a linkage between this and the Weld Road, road reserve.
Significant impact		
Description	Black cockatoos	Clearing of 1.04 ha of moderate/high quality foraging habitat for three black cockatoo species.
Significant impact (hectares) / Type of feature	1.04	The Fauna survey (Harewood, 2023) indicates that most of the application area has been parkland cleared for livestock grazing and consists of pasture/bare ground with scattered trees including marri (*Corymbia calophylla*) jarrah (*Eucalyptus marginata*), flooded gum (*Eucalyptus rudis*) and peppermint (*Agonis flexuosa*), which provide suitable foraging habitat for black cockatoo. The canopy cover from the 104 trees is estimated as 1.04 hectares.
Quality (scale) / Number	7.00	One confirmed breeding location of black cockatoo's has been recorded within 12 km. Three roost sites have been recorded within the local area, the closest is within 6 km. The trees to be removed including marri (Corymbia calophylla) jarrah (Eucalyptus marginata) and peppermint (Agonis flexuosa), which are all know foraging species of Carnaby's black cockatoo. Foraging debris attributed to Carnaby's black cockatoo was recorded. The application area is close to the Capel River which provides a drinking water source for this species.
Rehabilitation credit		
N/A		
Offset		
Description	Retention of vegetation areas with infill planting	Revegetate three patches of moderate to good quality vegetation consisting of suitable black cockatoo habitat to overall improve the quality of the vegetation and to conserve the areas in perpetuity. The applicant is proposing to fence the area and provide weed control.
Proposed offset (area in hectares)	4.48	Conservation in perpetuity of 4.48 hectares of black cockatoo habitat would mitigate the proposed clearing by 105.1% for this environmental value. Along with the offset under F.4, the overall offset will mitigate the significant residual impacts for this environmental value by more than 100% per cent.
Current quality of offset site / Start number (of type) of feature)	7.00	The offset sites largely comprise a mixture of marri dominated woodland over pasture, jarrah/marri/banksia woodland, and marri/flooded gum/peppermint woodland bordering the Capel River. While these generally areas appear to be in a better condition than the application area, the offset sites is expected to provide similar black cockatoo foraging values to the application area.
Future quality WITHOUT offset (scale) / Future number WITH offset	7.00	The offset site is currently zoned as Priority Agriculture. It is not expected that the quality of the black cockatoo habitat within the offset site will change in the absence of the offset.
Future quality WITH offset (scale) / Future number with offset	8.00	The offset site will increase in quality with the revegetation and be placed under a conservation covenant.
Time until ecological benefit (years)	17.00	It will take at least 17 years for the revegetation to overall increase the quality of the offset area.
Confidence in offset result (%)	0.8	There is a high level of confidence that the future quality with and without offset will remain the same.
Duration of offset implementation (maximum 20 years)	20.00	The offset site will be conserved in perpetuity under a Soil and Land Conservation Act 1945 conservation covenant. Therefore, the maximum of 20 years for this field is applied.
Time until offset site secured (years)	1.00	It is expected that the conservation covenant would be in place within 1 year, noting the proposed offset site is on land owned by the applicant.
Risk of future loss WITHOUT offset (%)	20.0%	The offset site is currently zoned Priority Agriculture. Therefore, there is a moderate risk that the offset site could be developed in the future.
Risk of future loss WITH offset (%)	5.0%	The future conservation (in perpetuity) of the offset site would result in a substantial increased security and substantially reduce the risk of loss. The risk of catastrophic events (fire, dieback, etc.) remain.
Offset ratio (Conservation area only)	N/A	

Landscape level values of offset?	N/A

F.6. Significant remnant vegetation – Conservation covenant

WA Environmental Offsets Calculator
Rationale for scores used in the offset calculator

Calculation	Score (Area)	Rationale
Conservation significance		
Description	1.04 ha of vegetation in good to degraded condition within an extensively cleared area	Clearing of native vegetation in an extensively cleared landscape with Abba complex and Swan Complex only retaining 13.57 % and 6.54 % of their pre-European vegetation extent respectively. Within the 5km radius, only 23.13 % of remnant vegetation remains.
Type of environmental value	Vegetation/habitat	Clearing of native vegetation with <30% extent remaining in the local area
Conservation significance of environmental value	Terrestrial native vegetation complex - <30% extent remaining in the bioregion	As above
Landscape-level value impacted	Yes/no	Yes - South West Regional Ecological Linkages 37 (Capel River corridor) and Shire of Capel Special Control Area SCA8 – Regional Ecological Linkages runs to the south of the application area. This is a thin strip of riparian vegetation bordering the Capel River. The application area vegetation creates a linkage between this and the Weld Road reserve.
Description	1.04ha of vegetation in good to degraded condition within an extensively cleared area	Clearing of 1.04 ha of significant native vegetation in an extensively cleared landscape consisting of 2 vegetation complexes which are below national standards.
Significant impact (hectares) / Type of feature	1.04	Clearing of native vegetation with <30% extent remaining in the local area. The canopy cover from the 104 trees is estimated as 1.04 hectares.
Quality (scale) / Number	4.00	The Fauna survey (Harewood, 2023) indicates that most of the application area has been parkland cleared for livestock grazing and consists of pasture/bare ground with scattered trees including marri (Corymbia calophylla) jarrah (Eucalyptus marginata), flooded gum (Eucalyptus rudis) and peppermint (Agonis flexuosa), which provide suitable foraging habitat for black cockatoos and western ringtail possums.
Rehabilitation credit		
N/A		
Offset		
Description	Conservation covenant retention of vegetation area	Conservation covenant of a good quality patch of dense vegetation consisting. The applicant will fence the area and provide weed control.
Proposed offset (area in hectares)	1.22	Conservation in perpetuity of 1.22 hectares of native vegetation would counterbalance the proposed clearing by 19.9% for this environmental value. The remaining counterbalance will consist of revegetation of three areas which are to be conserved in perpetuity.
Current quality of offset site / Start number (of type) of feature	8.00	The offset site largely comprises a mixture of marri dominated woodland over pasture, jarrah/marri/banksia woodland, and marri/flooded gum/peppermint woodland bordering the Capel River. While these generally areas appear to be in a better condition than the application area, the offset sites is expected to provide similar black cockatoo foraging values to the application area
Future quality WITHOUT offset (scale) / Future number WITH offset	8.00	The offset site is currently zoned as Priority Agriculture. It is not expected that the quality of the vegetation within the offset site will significantly increase or decrease, in the absence of the offset.
Future quality WITH offset (scale) / Future number with offset	8.00	The offset site will be placed under a conservation covenant and the vegetation condition will remain the same for an extended period post offset.
Time until ecological benefit (years)	1.00	One year to conserver in perpetuity
Confidence in offset result (%)	0.9	There is a high level of confidence that the future quality with and without offset will remain the same.
Duration of offset implementation (maximum 20 years)	20.00	The offset site will be conserved in perpetuity under a Soil and Land Conservation Act 1945 conservation covenant. Therefore, the maximum of 20 years for this field is applied.
Time until offset site secured (years)	1.00	It is expected that the conservation covenant would be in place within 1 year, noting the proposed offset site is on land owned by the applicant.
Risk of future loss WITHOUT offset (%)	20.0%	The offset site is currently zoned Priority Agriculture. Therefore, there is a moderate risk that the offset site could be developed in the future.
Risk of future loss WITH offset (%)	5.0%	The future conservation (in perpetuity) of the offset site would result in a substantial increased security and substantially reduce the risk of loss. The risk of catastrophic events (fire, dieback, etc.) remain.
Offset ratio (Conservation area only)	N/A	
Landscape level values of offset?	N/A	

F.7. Significant remnant vegetation – Retention of vegetation and infill planting

WA Environmental Offsets Calculator
Rationale for scores used in the offset calculator

Calculation	Score (Area)	Rationale
Conservation significance		
Description	1.04 ha of vegetation in good to degraded condition within an extensively cleared area	Clearing of native vegetation in an extensively cleared landscape with Abba complex and Swan Complex only retaining 13.57 % and 6.54 % of their pre-European vegetation extent respectively. Within the 5km radius, only 23.13 % of remnant vegetation remains.
Type of environmental value	Vegetation/habitat	Clearing of native vegetation with <30% extent remaining in the local area
Conservation significance of environmental value	Terrestrial native vegetation complex - <30% extent remaining in the bioregion	As above
Landscape-level value impacted	Yes/no	Yes - South West Regional Ecological Linkages 37 (Capel River corridor) and Shire of Capel Special Control Area SCA8 – Regional Ecological Linkages runs to the south of the application area. This is a thin strip of riparian vegetation bordering the Capel River. The application area vegetation creates a linkage between this and the Weld Road reserve.
Description	1.04ha of vegetation in good to degraded condition within an extensively cleared area	Clearing of 1.04 ha of significant native vegetation in an extensively cleared landscape consisting of 2 vegetation complexes which are below national standards.
Significant impact (hectares) / Type of feature	1.04	Clearing of native vegetation with <30% extent remaining in the local area. The canopy cover from the 104 trees is estimated as 1.04 hectares.
Quality (scale) / Number	4.00	The Fauna survey (Harewood, 2023) indicates that most of the application area has been parkland cleared for livestock grazing and consists of pasture/bare ground with scattered trees including marri (Corymbia calophylla) jarrah (Eucalyptus marginata), flooded gum (Eucalyptus rudis) and peppermint (Agonis flexuosa), which provide suitable foraging habitat for black cockatoos and western ringtail possums.
Rehabilitation credit		
N/A		
Offset		
Description	Retention of vegetation with infill planting	Revegetate three patches of moderate to good quality patches of vegetation consisting of vegetation representative of the Swan and Abba complexes to overall improve the quality of the vegetation and to conserve the areas in perpetuity. The applicant is proposing to fence the area and provide weed control.
Proposed offset (area in hectares)	4.48	Infill planting and conservation in perpetuity of 4.48 hectares native vegetation that is representative of both the Swan and Abba complexes would counterbalance the proposed clearing by 196.9% for this environmental value.
Current quality of offset site / Start number (of type) of feature	7.00	The offset site largely comprises a mixture of marri dominated woodland over pasture, jarrah/marri/banksia woodland, and marri/flooded gum/peppermint woodland bordering the Capel River. While these generally areas appear to be in a better condition than the application area, the offset sites is expected to provide similar black cockatoo foraging values to the application area
Future quality WITHOUT offset (scale) / Future number WITH offset	7.00	The offset site is currently zoned as Priority Agriculture. It is not expected that the quality of the vegetation within the offset site will significantly increase or decrease, in the absence of the offset.
Future quality WITH offset (scale) / Future number with offset	8.00	The offset site will increase in quality with the revegetation and be placed under a conservation covenant.
Time until ecological benefit (years)	17.00	It will take at least 17 years for the revegetation to overall increase the quality of the offset area.
Confidence in offset result (%)	0.8	There is a high level of confidence that the future quality of the revegetation of the offset will improve.
Duration of offset implementation (maximum 20 years)	20.00	The offset site will be conserved in perpetuity under a Soil and Land Conservation Act 1945 conservation covenant. Therefore, the maximum of 20 years for this field is applied.
Time until offset site secured (years)	1.00	It is expected that the conservation covenant would be in place within 1 year, noting the proposed offset site is on land owned by the applicant.
Risk of future loss WITHOUT offset (%)	20.0%	The offset site is currently zoned Priority Agriculture. Therefore, there is a moderate risk that the offset site could be developed in the future.
Risk of future loss WITH offset (%)	5.0%	The future conservation (in perpetuity) of the offset site would result in a substantial increased security and substantially reduce the risk of loss. The risk of catastrophic events (fire, dieback, etc.) remain.
Offset ratio (Conservation area only)	N/A	
Landscape level values of offset?	N/A	

Appendix G. Fauna Survey Excerpt

Targeted Fauna Assessment – Lot 888 and Lot 1089 Wynne Road Capel (Harewood, 2023)

A fauna assessment was primarily undertaken to document black cockatoo habitat and to determine the possible presence of western ringtail possums and conservation significant fauna. The assessment included a literature review and a daytime reconnaissance survey which was conducted by a qualified zoologist on 12 August 2023.

Key findings

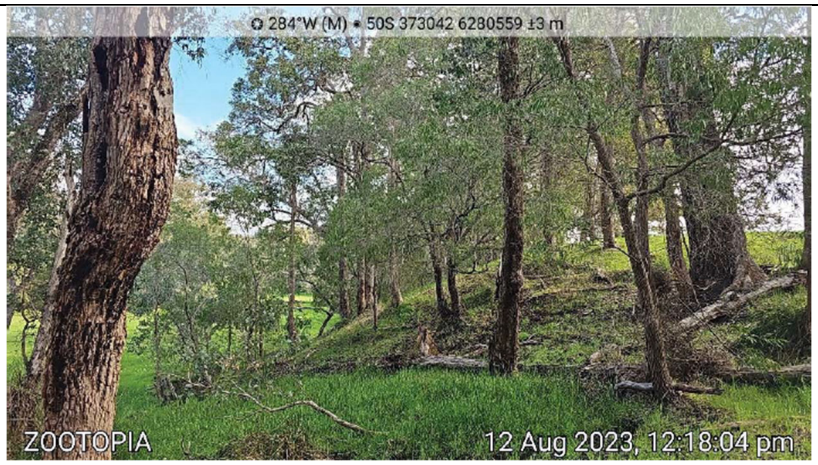
Majority of the survey area has been totally cleared for livestock grazing and consists of pasture/bare ground with widely scattered trees including marri, jarrah, flooded gum and peppermint. The two areas proposed for vegetation retention within the surveyed area consists of denser remnant vegetation. The northern area consists of marri dominated woodland over grassland and the southern area is more diverse with jarrah, marri, banksia and WA Christmas tree. (refer to Table 1 for examples of fauna habitat within the survey area)

The broad scale fauna habitats present are all totally degraded and therefore does not generally represent habitat of significance and is unlikely to support diverse fauna assemblages. The black cockatoo habitat tree assessment identified 72 trees within the survey area with a diameter at breast height (DBH) greater than 50 centimetres. 67 of these did not contain hollows of any size and the remaining five contained apparent and obvious hollows, which were assessed as being small and unsuitable for black cockatoo nesting (see Figure 2). Foraging habitat is defined as small areas containing marri and no roosting evidence was observed during the survey (see Table 2).

Evidence of western ringtail possums were observed within the survey area in the form of a single drey and two locations containing scats (see Figure 3). The evidence found suggests the area supports a small number of western ringtail possums individuals, which have possibly moved from the denser habitat bordering the Capel River, and is therefore unlikely to support a self-sustaining population.

Table 1: Examples of fauna habitat within the surveyed area

Fauna Habita Description	Example Images
Cleared pasture with scattered/sparse groves of trees (jarrah, marri, flooded gums and peppermint) Makes up most of the survey area proposed for development	
Marri dominated woodland over grassland/bare ground. Proposed area of retention in northern section of the survey area.	
Jarrah, marri, candlestick banksia and WA Christmas tree woodland. Proposed area of retention in southern section of survey area.	
Planted non endemic eucalyptus. Proposed areas of retention outside of survey area in south.	

Marri, flooded gum and peppermint woodland bordering Capel River. Proposed areas of retention outside of survey area in south.	

Forging Evidence Description	**Example Images**
Marri fruits- foraging activity attributed to the Carnaby's black cockatoo	
Marri fruits- foraging activity attributed to the forest red-tail black cockatoo	

Survey Limitations

No seasonal sampling was carried out as part of the fauna assessment and the conclusions are based upon field data collected over a limited period of time and are therefore indicative of the environmental conditions of the site at the time of the field assessment, and it is to be noted that the site conditions change with time. The lack of observational data on some species should not necessarily be taken as an indication that a species is absent from the site or does not utilise it for some purpose at times.

The hollows identified during the survey were only observed from ground level and therefore the full characteristics were not fully evident. Given this is it also likely hollow may have been missed as not all hollows can be determined from ground level.

Figure 2: Habitat trees greater than 50cm DBH

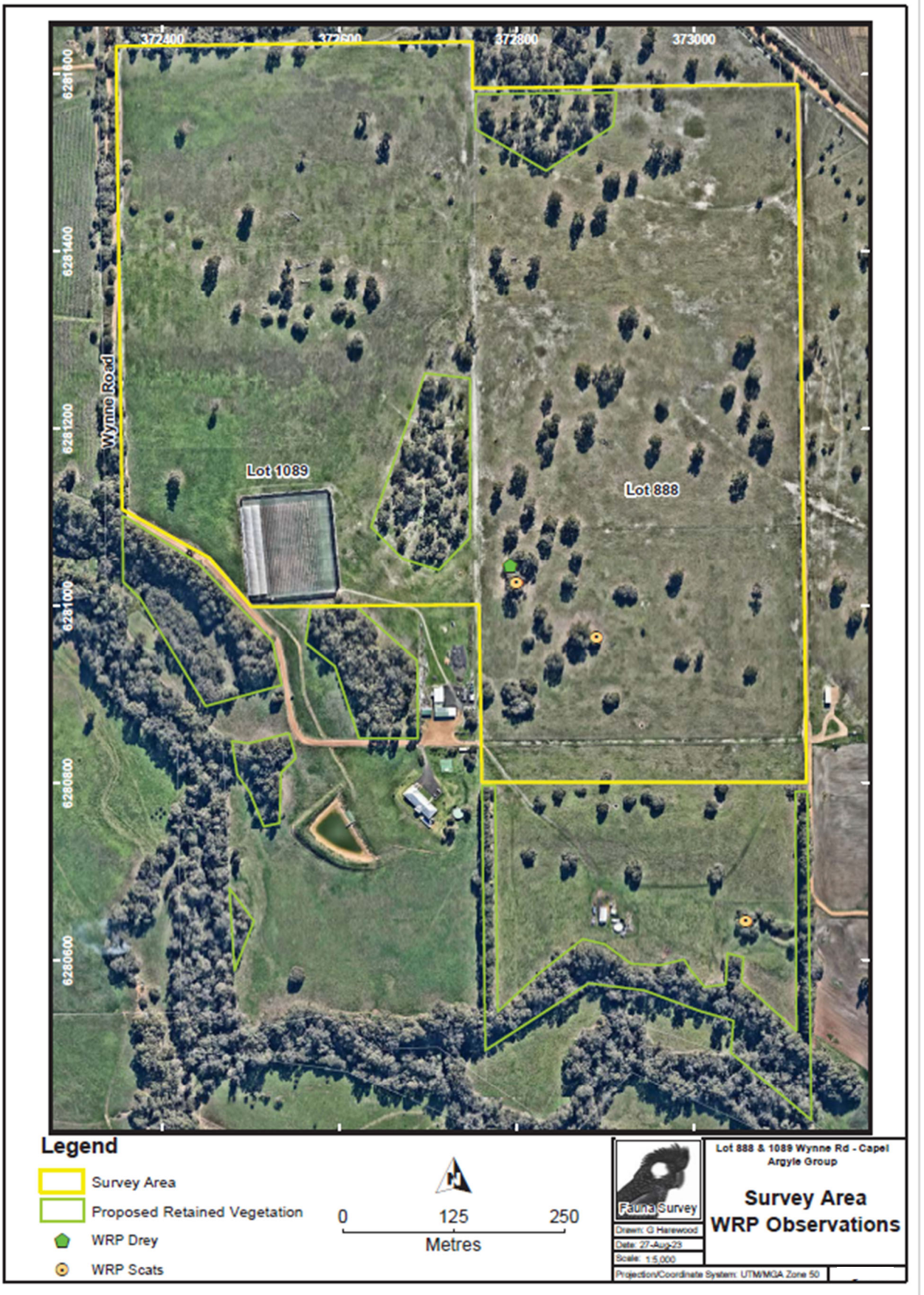


Figure 3: Western ringtail possum survey area.

Appendix H. Applicants Land and Soil Fertility Management Measures

Land and Soil fertility management in a Kiwifruit orchard.

Monitoring of soils fertility is conducted, with multiple samples across the planted area, taken at a minimum of once per year in late May, this sample is analysed with a focus on pH, Micro Nutrient, Macro Nutrient and Organic matter. Leaf samples are also taken from the vine in late spring to monitor vine health and nutrient uptake from the soil.

Farming Processes to improve soil fertility include.

- pH management to allow even nutrient availability and uptake, with either Elemental Sulphur or Lime.
- Macro Nutrients applied via granular application.
- Macro, Micro Nutrients, Seaweed, Humic acid liquids applied by Irrigation and or Folia spraying.
- Compost applied per year at a rate of 25-50 m2 per ha
- Under story planted with Ryegrass and clovers, continually mowed returning organic matter to the soil.
- Organic material pruned off the vine is mulched in the row adding to the organic matter content.
- Irrigation application that also encourage the under story to continually grow over summer improving soil.
- Compaction management including weather, soil conditions, and aeration processes of soil.
- Water quality is monitored yearly with analysis and managed accordingly.

(Green Grass, 2023c).

Appendix I. Sources of information

I.1. GIS databases

Publicly available GIS Databases used (sourced from www.data.wa.gov.au):

- 10 Metre Contours (DPIRD-073)
- Aboriginal Heritage Places (DPLH-001)
- Cadastre (LGATE-218)
- Cadastre Address (LGATE-002)
- Contours (DPIRD-073)
- DBCA – Lands of Interest (DBCA-012)
- DBCA Legislated Lands and Waters (DBCA-011)
- Directory of Important Wetlands in Australia – Western Australia (DBCA-045)
- Environmentally Sensitive Areas (DWER-046)
- Flood Risk (DPIRD-007)
- Groundwater Salinity Statewide (DWER-026)
- Hydrography – Inland Waters – Waterlines
- Hydrological Zones of Western Australia (DPIRD-069)
- IBRA Vegetation Statistics
- Imagery
- Local Planning Scheme – Zones and Reserves (DPLH-071)
- Native Title (ILUA) (LGATE-067)
- Offsets Register – Offsets (DWER-078)
- Pre-European Vegetation Statistics
- Public Drinking Water Source Areas (DWER-033)
- Ramsar Sites (DBCA-010)
- Regional Parks (DBCA-026)
- Remnant Vegetation, All Areas
- RIWI Act, Groundwater Areas (DWER-034)
- RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037)
- Soil Landscape Land Quality – Flood Risk (DPIRD-007)
- Soil Landscape Land Quality – Phosphorus Export Risk (DPIRD-010)
- Soil Landscape Land Quality – Subsurface Acidification Risk (DPIRD-011)
- Soil Landscape Land Quality – Water Erosion Risk (DPIRD-013)
- Soil Landscape Land Quality – Water Repellence Risk (DPIRD-014)
- Soil Landscape Land Quality – Waterlogging Risk (DPIRD-015)
- Soil Landscape Land Quality – Wind Erosion Risk (DPIRD-016)
- Soil Landscape Mapping – Best Available
- Soil Landscape Mapping – Systems
- Wheatbelt Wetlands Stage 1 (DBCA-021)

Restricted GIS Databases used:

- ICMS (Incident Complaints Management System) – Points and Polygons
- Threatened Flora (TPFL)
- Threatened Flora (WAHerb)
- Threatened Fauna
- Threatened Ecological Communities and Priority Ecological Communities
- Threatened Ecological Communities and Priority Ecological Communities (Buffers)

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