GOVERNMENT OF
WESTERN AUSTRALIA

CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

PERMIT DETAILS

Area Permit Number: CPS 9089/1

File Number: DWERVT6794

Duration of Permit: From 8 October 2022 to 8 October 2034

PERMIT HOLDER

Humphrey Pty Ltd

LAND ON WHICH CLEARING IS TO BE DONE

Lot 4302 on Deposited Plan 229252, Quinninup

AUTHORISED ACTIVITY

The permit holder must not clear more than 5 hectares of *native vegetation* within the area cross-hatched yellow in Figure 1 of Schedule 1.

CONDITIONS

1. 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.

2. 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.

3. Directional clearing

The permit holder must conduct clearing activities in a slow, progressive manner toward the larger remnant patch to allow fauna to move into adjacent *native vegetation* ahead of the clearing activity.

4. Period during which clearing is authorised

The permit holder must not clear any native vegetation after the 8 October 2024.

5. Fauna management – western ringtail possums, chuditch, quokka and south-western brush-tailed phascogales

(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, including all trees, tree hollows and logs present, within 24 hours prior to, and for the duration of clearing, for the presence of western ringtail possum(s) (*Pseudocheirus occidentalis*), southwestern brush-tailed phascogales (*Phascogale tapoatafa*), chuditch (*Dasyurus geoffroii)* and quokka (*Setonix brachyurus).*

(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), quokka(s) and/or chuditch(s) individual has moved on from that area to adjoining *suitable habitat*; or

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

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

(d) Any south-western brush-tailed phascogale, chuditch or quokka individuals removed in accordance with condition 5(b)(ii) of this Permit must be allowed to disperse into adjacent vegetation or must be relocated by a *fauna specialist* to *suitable habitat*.

(e) Where fauna is identified under condition 5(a) of this Permit, the Permit Holder must provide the following records to the *CEO* as soon as practicable:

(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 1994/2020 (GDA94/2020), expressing the geographical coordinates in Eastings and Northings or decimal degrees;
(iv) the number of individuals removed and relocated;
(v) the date each individual was removed;
(vi) the method of removal;
(vii) the date each individual was relocated;
(viii) the location where each individual was relocated to, recorded using a GPS

unit set to GDA94/GDA2020, expressing the geographical coordinates in Eastings and Northings or decimal degrees; and

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

6. Fauna management – black cockatoo habitat

(a) Within 72 hours prior to undertaking any clearing authorised under this permit within the combined areas cross-hatched yellow on in Figure 1 of Schedule 1, the permit holder must engage a *fauna specialist* to inspect all *black cockatoo habitat trees* proposed to be cleared for *evidence* of current or past breeding use by *black cockatoo species* listed below:

(i) *Zanda latirostris* (Carnaby's cockatoo);
(ii) *Calyptorhynchus banksii naso* (forest red-tailed black cockatoo); and
(iii) *Zanda calyptorhynchus* (Baudin's cockatoo).

(b) Where *black cockatoo habitat tree/s* are identified under condition 6(a), the permit holder must engage a *fauna specialist* to map *black cockatoo habitat tree/s* within the permit area.

(c) Each *black cockatoo habitat tree* identified must be inspected by a *fauna specialist* for *evidence* of current or past breeding use by *black cockatoo species*.

(d) Where a *black cockatoo habitat tree* 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 immediately after the inspection.

(e) Where a *black cockatoo habitat tree* is identified within the combined areas cross-hatched yellow on Figure 1 of Schedule 1 and that tree shows *evidence* of current or past breeding use by *black cockatoo species* under condition 6(c), 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.

(f) Any *black cockatoo habitat tree* 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(e).

(g) For each *black cockatoo habitat tree* with *evidence* of current or past breeding use by *black cockatoo species* identified that cannot be avoided, the permit holder must install an artificial black cockatoo nest hollow.

(h) Each artificial black cockatoo nesting hollow required by condition 6(g) must be installed prior to commencement of any clearing activities otherwise authorised under this permit.

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

(i) be installed within the area cross-hatched red on Figure 2 of Schedule 1;
(ii) be designed and placed in accordance with the specifications detailed in Schedule 2; and
(iii) be monitored and maintained in accordance with the specifications detailed in Schedule 3, for a period of at least ten years.

(j) Within two months of clearing authorised under this permit within the combined areas cross-hatched yellow Figure 1 of Schedule 1, the permit holder must provide the results of the *fauna specialists* inspection to the *CEO*.

(k) The *fauna specialists* inspection report must include the following;

(i) the location of the *black cockatoo habitat tree(s)* recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994/2020(GDA94/GDA2020), expressing the geographical coordinates in Eastings and Northings or decimal degrees;
(ii) the name and amount of each fauna species identified;
(iii) whether the *black cockatoo habitat tree/s* identified show current or past use by black cockatoo species;
(iv) the methodology, used to survey the permit area;
(v) a photo of the black cockatoo habitat tree(s) identified; and
(vi) 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)*.

7. 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 Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994/2020 (GDA94/2020), 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); (e) actions taken to avoid, minimise, and reduce the impacts and extent of clearing in accordance with condition 1; (f) actions taken to minimise the risk of the introduction and spread of *weeds* and *dieback* in accordance with condition 2; (g) Actions taken in accordance with condition 3; and (h) actions taken to manage and mitigate impacts to fauna species in accordance with condition 5.

No.	Relevant matter	Specifications
2.	In relation to black cockatoo fauna management pursuant to conditions 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 (e) the time and date that the suitable *black cockatoo habitat tree* was cleared.

8. Reporting

The permit holder must provide to the *CEO* the records required under condition 7 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 habitat trees	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.
black cockatoo breeding trees	means black cockatoo habitat trees that exhibit evidence of current or past breeding use by black cockatoo species.
black cockatoo species	means one or more of the following species: (a) *Zanda latirostris (*Carnaby's cockatoo); (b) *Zanda Calyptorhynchus* (Baudin's cockatoo); and/or (c) *Calyptorhynchus banksii naso* (forest red-tailed black cockatoo).

Term	Definition
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.
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.
dieback	means the effect of *Phytophthora* species on native vegetation.
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.
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.
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.

Term	Definition
Suitable habitat (south-western brush-tailed phascogale)	Suitable habitat for southwestern brush-tailed phascogale is typically characterised by dry sclerophyll forests and open woodlands that contain hollow-bearing trees but a sparse ground cover.
Suitable habitat (quokka)	Suitable habitat for the quokka includes forest, wood and wetland vegetation types. The most commonly occupied sites comprise jarrah (*Eucalyptus marginata*), marri (*Corymbia calophylla*), karri (*E. diversicolor*) or tingle (*E. jacksonii* or *E. guilfoylei*) forest and riparian habitats with a sedge dominated understorey
Suitable habitat (chuditch)	Suitable habitat for the chuditch includes jarrah (*Eucalyptus marginata*) forests and woodlands in the south-west corner of WA
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

JBurton

Jessica Burton

A/MANAGER

NATIVE VEGETATION REGULATION

Officer delegated under Section 20

of the Environmental Protection Act 1986

15 September 2022

SCHEDULE 1

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

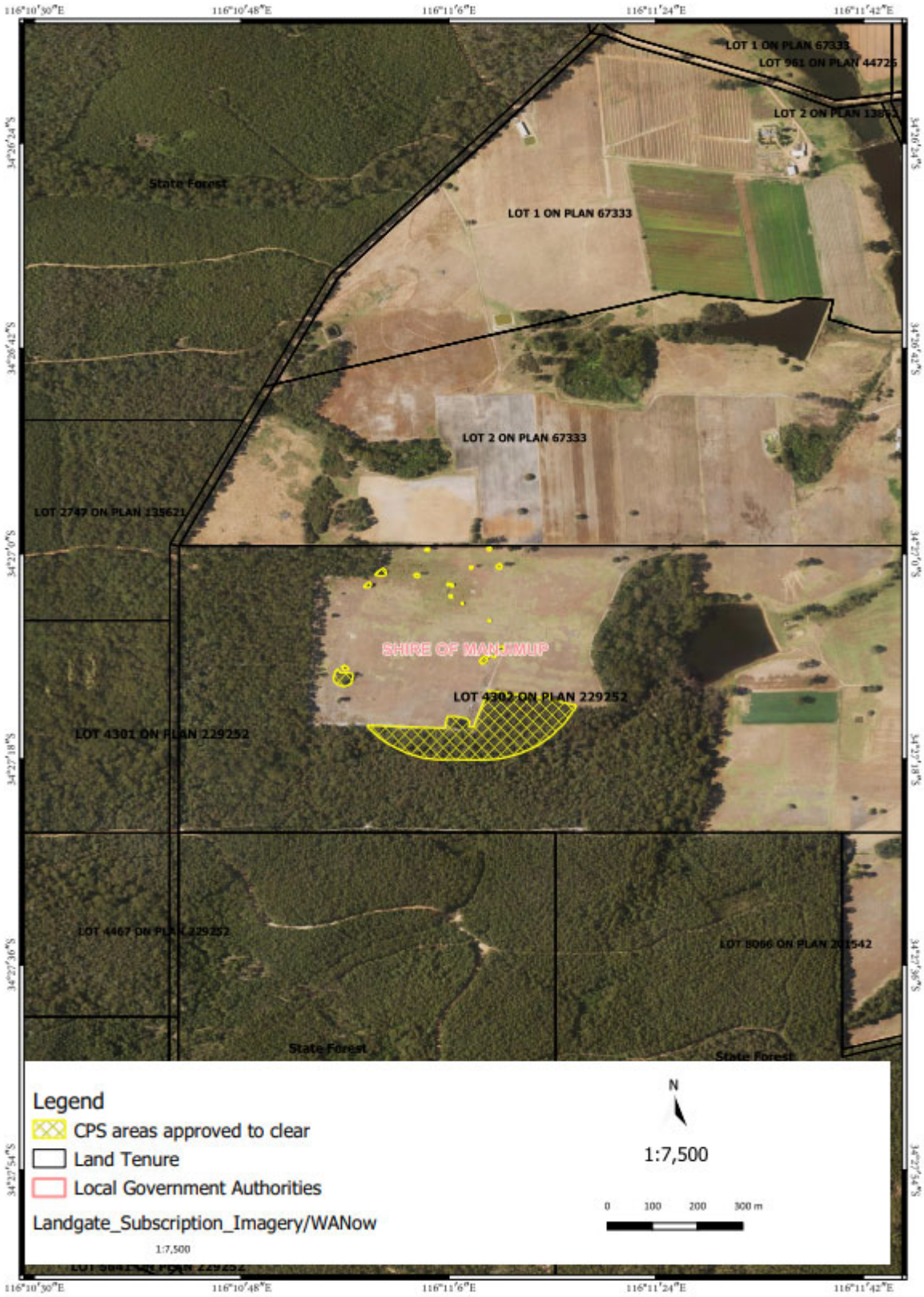


Figure 1: Map of the boundary of the area within which clearing may occur

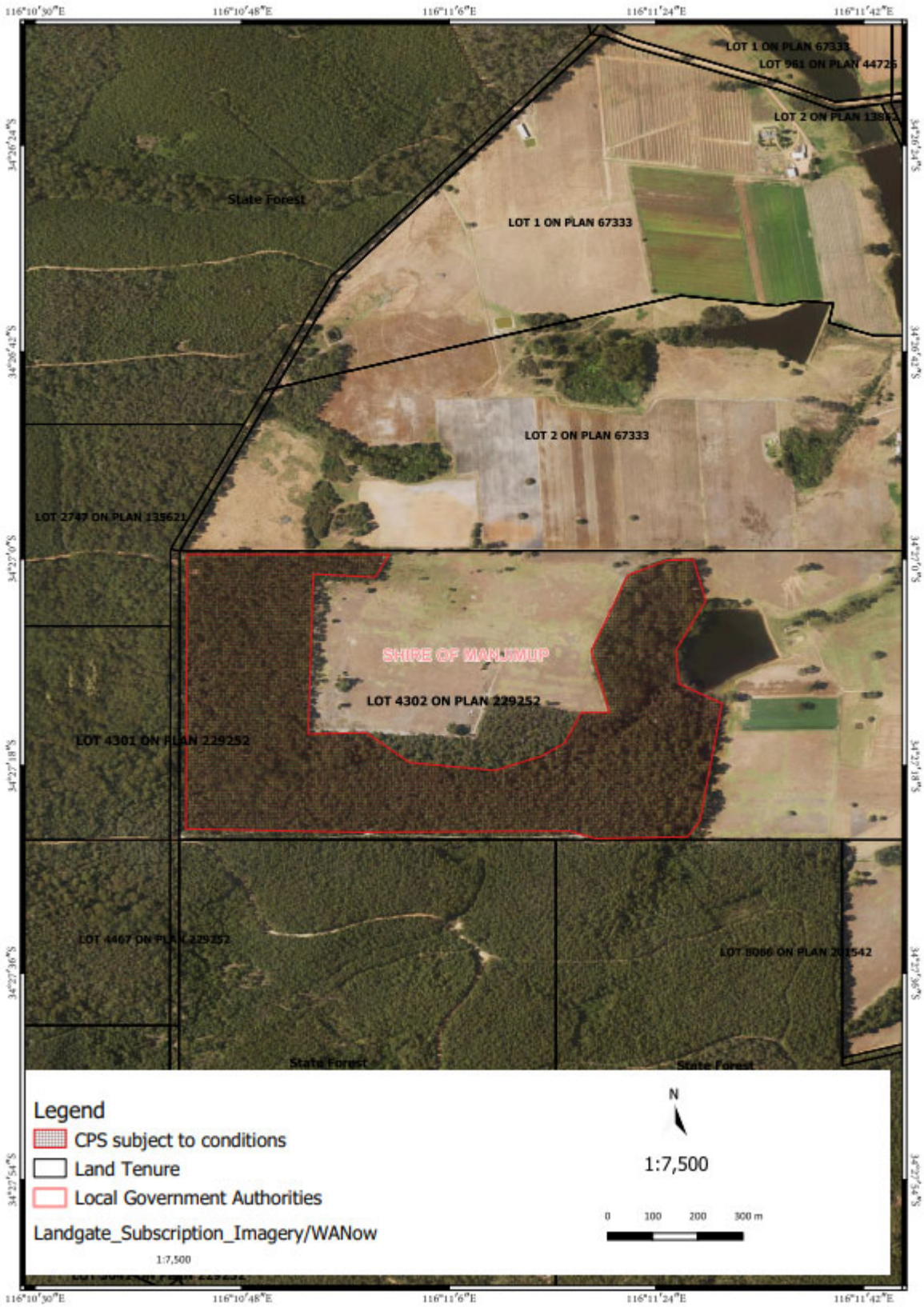


Figure 2: The boundary of the area within which the artificial black cockatoo nest hollow(s) required by condition 6(g) of this permit applies

SCHEDULE 2

How to design and place artificial hollows for Carnaby's Cockatoo






birdlife AUSTRALIA

WATER CORPORATION

WESTERN AUSTRALIAN museum

How to design and place artificial hollows for Carnaby's cockatoo

Artificial hollows can be used to help conserve the threatened Carnaby's cockatoo by enabling the cockatoos to breed in areas where natural hollows are limited.

A wide variety of artificial hollow designs have been used with mixed success. Evidence suggests that, while the hollow 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. Before using this information sheet to construct or install an artificial hollow, you should refer to the criteria listed in the separate information sheet; *When to use artificial hollows for Carnaby's cockatoo*.

This information sheet contains broad guidelines for the design and placement of artificial hollows for Carnaby's cockatoo.

Below are three examples of successful artificial hollows used by Carnaby's cockatoo for nesting. Artificial hollows made from a natural log with cut side entrance (left), white industrial pipe with top entrance (centre) and natural log with natural side entrance (right).



Photos by Christine Groom (left and right) and Rick Dawson (centre)

Walls

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

- Durable enough to withstand exposure to elements for an extended period of time (i.e. 20+ years).
- Able to simulate the thermal properties of a natural tree hollow.
- Not less than 380 mm in internal diameter.
- Preferably 1.2 m deep overall and 1m deep to top of substrate/nesting material.

Successful artificial hollows have been constructed from sections of salvaged natural hollow, black and white industrial pipe. When using non-natural materials care must be taken to ensure there are no toxic residues and that the materials are safe to ingest.

Base

The base of the artificial hollow must be;

- Able to support the adult and nestling(s).
- Durable enough to last the life of the nest.
- Free draining.
- At least 380 mm in diameter.
- Covered with 200 mm of sterile, dry, free draining 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 hardwood timber slab or marine ply (not chipboard or MDF). The base material must be cut to size to fit internally with sharp or rough edges ground away or curled inwards and fixed securely to the walls.

Carnaby's cockatoo eggs in an artificial hollow.
Photo by Rick Dawson

Entrance

The entrance of the artificial hollow must;

- Have a diameter of at least 270 mm).
- Preferably be top entry which will minimise use by non-target species.

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

Ladder

For artificial hollows made of non-natural materials, or of processed boards, it is necessary to provide a ladder to enable the birds to climb in and out of the hollow easily.

The ladder must be;

- Securely mounted to the inside of the hollow.
- Made from an open heavy wire mesh such as WeldMesh™ with mesh size of 30 - 50 mm, or heavy chain.

Do not use:

- A material that the birds can chew.
- Galvanized because the birds may grip or chew the ladder and ingest harmful compounds.

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.

Sacrificial chewing posts

For artificial hollows made of non-natural materials, or of processed boards, it is necessary to provide sacrificial chewing posts. The birds chew material to prepare a dry base on which to lay their egg(s).

The sacrificial chewing posts must:

- Be made of untreated hardwood such as jarrah, marri or wandoo
- Be thick enough to satisfy the birds' needs between maintenance visits.
- Extend beyond the top of the hollow as an aid to see whether the nest is being used.
- Be placed on the inside of the hollow.
- Be attached in such a way that they are easy to replace e.g. 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 two posts are provided. Posts 70 x 50 mm have been used, but require replacing at least every second breeding season when the nest is active. Birds do vary in their chewing habits and therefore the frequency at which the chewing posts require replacement will also vary.

Bottom of an artificial hollow showing ladder that is fixed to the wall and a chewed sacrificial post which is 200 mm from the floor.

Photo by Rick Dawson

Mountings

The artificial hollows must be mounted such that:

- The fixings used will last the duration of the nest e.g. galvanized bracket or chain fixed with galvanized coach screws.
- It is secured by more than one anchor for security and stability.
- It is positioned vertically or near vertically.

Placement

Sites should be chosen within current breeding areas and where they can be monitored, but preferably not conspicuous to the general public. It is important that artificial hollows are placed where they will be accessible for future monitoring and maintenance. For more detail refer to the separate information sheet; *When to use artificial hollows for Carnaby's cockatoo*.

The height at which artificial hollows should be placed is variable. The average height of natural hollows in dominant tree species in the area is a good guide. Natural hollows used by Carnaby's cockatoos have been recorded as low as 2 m above the ground. If located on private property the hollows can be placed lower to the ground so they are accessible by ladder or a rope and pulley system can be used. Where public access is possible artificial hollows should be placed at least 7 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.

Carnaby's cockatoo 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

If necessary, artificial hollows may be placed on poles, but this may result in excessive exposure to sun during very hot weather. When erected on poles there should be"

- A hinge at the bottom of the pole that can be secured when the pole is in the upright position.
- Access for a vehicle to assist raising the pole.

Safety

Care needs to be taken when placing artificial hollows to ensure safety is considered at all times. Artificial hollows are heavy and require lifting and manoeuvring into position up to 7 m above the ground.

Maintenance and monitoring

Once artificial hollows have been placed they require monitoring and maintenance to ensure they continue to be useful for nesting by Carnaby's cockatoo. It is important to monitor artificial hollows to determine use by Carnaby's cockatoo, other native species as well as pest species. By undertaking monitoring the success of the design and placement of artificial hollows can be determined and areas for improvement identified for future placement of artificial hollows.

Monitoring can also assess whether any maintenance is required. Without regular maintenance artificial hollows are unlikely to achieve their objective (that is, they will fail to provide nesting opportunities for threatened cockatoos). Therefore it is important to continue a regime of regular maintenance while the artificial hollow is required. It may be several (to many) decades until a natural replacement hollow is available.

For further advice on monitoring and maintenance of artificial hollows please refer to the separate information sheet; *How to monitor and maintain artificial hollows for Carnaby's cockatoo*.

Carnaby's cockatoo female prospecting an artificial hollow.
Photo by Rick Dawson

Example fixing for artificial hollow
Photo by Christine Groom

Acknowledgements

This information sheet is a joint initiative of Birdlife Australia, the Western Australian Museum and the Department of Parks and Wildlife. Many individuals have contributed to its preparation. Special acknowledgement is made for the contributions of Ron Johnstone from the WA Museum, Alan Elliott from the Serpentine-Jarrahdale Land care Centre and Denis Saunders. This updated version was compiled by Rick Dawson Department of Parks and Wildlife).

Other information sheets in the series: Artificial hollows for Carnaby's cockatoo

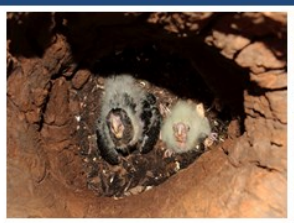
- *How to design and place artificial hollows for Carnaby's cockatoo*
- *How to monitor and maintain artificial hollows for Carnaby's cockatoo*

Information sheets available on the *Saving Carnaby's cockatoo* webpage:
http://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-animals/208-saving-carnaby-s-cockatoo

SCHEDULE 3

How to monitor and maintain artificial hollows for Carnaby's Cockatoo



How to monitor and maintain artificial hollows for Carnaby's cockatoo

It is important to monitor and maintain artificial hollows after they have been erected. Monitoring ensures that the effectiveness of the artificial hollow can be determined. It also means that problems with pest species or any maintenance requirements can be identified and resolved.

Without regular maintenance, artificial hollows are likely to fail to achieve their objective (that is, they will fail to provide nesting opportunities for threatened cockatoos). Therefore it is important to continue a regime of regular maintenance while the artificial hollow is required. It may be several (to many) decades until a natural replacement hollow is available.

Monitoring should be undertaken in order to detect:

- Use by Carnaby's cockatoo
- Maintenance requirements
- Use by other native species
- Use by pest species (e.g. feral bees, galahs, corellas etc.)

Carnaby's cockatoo female prospecting an artificial hollow.
Photo by Rick Dawson

How do I monitor artificial hollows?

Before undertaking monitoring of artificial hollows for Carnaby's cockatoo it is recommended that you seek advice from BirdLife Australia, the WA Museum or the Department of Parks and Wildlife. It is also important to contact Parks and Wildlife, Wildlife Licensing Section, to determine if a scientific licence is required (wildlifelicensing@dpaw.wa.gov.au).

Monitoring artificial hollows requires keen observation and naturalist skills. It is often not possible to observe evidence of breeding directly (i.e. nestlings or eggs) and inferences must be made based on observation. There are many techniques available to monitor artificial hollows. A combination of several is likely to achieve the best results.

Looking for signs of use

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.

Observing parent behaviour around the hollow

The behaviour of parent birds around a hollow will indicate an approximate age of young in the nest.

Parent behaviour	Approximate age/stage of young
Prospecting for hollow	Unborn
Male only seen out of hollow	Egg or very young nestling (< 3 - 4 weeks)
Both parents seen entering/exiting the hollow	Nestling(s) have hatched (> 3 - 4 weeks)

Observing feeding flocks

Flocks of all male birds indicate that the 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).

Tapping

When females are sitting on eggs they will usually respond to tapping at the base of their tree (or pole) by appearing at the entrance or flying from the hollow opening. This is not a guarantee of breeding activity, but an indication that it is possibly occurring in the hollow.

Observing insect activity around nest

The faecal matter produced by nestlings in a nest attracts insects, especially flies and ants. The type and number of these insects will help 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 a nest usually indicate that a death has occurred.

Listening for nestlings

With experience it is possible to determine if one or two nestlings are present and a broad estimate of age based on the type and loudness of noises they make.

Looking inside the nest

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 organise. 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 options to reach nests to undertake observations.

How often should 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 used and frequency.

How do I maintain artificial hollows?

Artificial hollows require maintenance to ensure they continue to have the greatest chance of them being used by Carnaby's cockatoos. Periodic maintenance checks should be undertaken at least every two years, preferably annually. These checks should be undertaken prior to the breeding season which is between July and January with breeding occurring later in this period in southern areas. It is important to maintain a regime of regular maintenance as long as the artificial hollow is required. It may take several (to many) decades until a natural replacement hollow is available.

Maintenance checks should assess the following as a minimum:

- Condition of chewing posts (if present)
- Condition of attachment points
- Condition of hollow bases
- Stability of tree or pole used to mount the artificial hollow

Artificial hollow base needing repair.
Photo by Christine Groom

Repairing hollows

Any problems identified during maintenance checks should be addressed, and any repairs required done, as soon as possible. If breeding is currently occurring, maintenance may need to be delayed if it is likely to disturb the parents or nestling. Likely maintenance needs include replacement of chewing posts (frequently) or nest bases (occasionally) and repairing of any cracks (infrequently). 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.

For artificial hollows known to be used, spare chewing posts should be taken into the field when undertaking maintenance checks.

Monitoring of artificial hollows:

Monitoring aim	Frequency of visits	Monitoring techniques
To determine possible use by Carnaby's cockatoo	At least once during peak breeding season (i.e. between September and December)	• Observing behaviour of adults around hollow • Tapping to see if female will flush from hollow (best undertaken between 10am and 3pm when females most likely to be sitting) • Listening for nestlings • Looking for evidence of chewing • Looking inside nest
To confirm use by Carnaby's cockatoo	At least two visits during peak breeding season (i.e. between September and December)	To observe at least two of the following: • Breeding behaviour of adults around hollow or evidence of chewing • Female flushed from hollow • Noises from nestlings in hollow Or to observe: • Nestlings or eggs in nest
To determine nesting success by Carnaby's cockatoo	The more visits, the better. Preferably fortnightly visits between July and December. As a minimum, at least 3 visits spread throughout breeding season.	• Looking inside nest to observe eggs or nestlings.
To determine use by any species	As often as possible.	• Inspection from ground as a minimum. • Looking inside nest for detailed observations.
To determine maintenance requirements	At least every two years and preferably annually if hollow fitted with sacrificial chewing posts, can be longer if without.	• A basic maintenance check can be undertaken from the ground. A ladder or elevated work platform will be required for a comprehensive check and to replace sacrificial chewing posts

Acknowledgements

This information sheet is a joint initiative of Birdlife Australia, the Western Australian Museum and the Department of Parks and Wildlife. Many individuals have contributed to its preparation. The updated version was compiled by Rick Dawson (Department of Parks and Wildlife) with assistance from Denis Saunders.

Other information sheets in the series: Artificial hollows for Carnaby's cockatoo

- *How to design and place artificial hollows for Carnaby's cockatoo*
- *How to monitor and maintain artificial hollows for Carnaby's cockatoo*

Information sheets available on the *Saving Carnaby's cockatoo* webpage:
http://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-animals/208-saving-carnaby-s-cockatoo

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 9089/1
Permit type:	Area permit
Applicant name:	Humphrey Pty Ltd
Application received:	23 October 2020
Application area:	5 hectares of native vegetation
Purpose of clearing:	Installing a centre pivot irrigation system
Method of clearing:	Mechanical
Property:	Lot 4302 on Deposited Plan 229252
Location (LGA area/s):	Shire of Manjimup
Localities (suburb/s):	Manjimup

1.2. Description of clearing activities

Much of the vegetation proposed to be cleared is within a large patch with additional scattered and smaller isolated areas (see Figure 1, Section 1.5). Agricultural land is located on the north and northeast of the property but generally there is a large amount of remnant vegetation within the local area (10 km radius from the centre of the application area).

1.3. Decision on application

Decision:	Granted
Decision date:	15 September 2022
Decision area:	5 hectares of native vegetation, 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 no submissions were received.

In making this decision, the Delegated Officer had regard for the site characteristics (see Appendix A), and relevant datasets (see Appendix F.1). The clearing principles set out in Schedule 5 of the EP Act (see Appendix B), relevant planning instruments and any other matters considered relevant to the assessment (see Section 3).

The assessment identified that the proposed clearing will result in:

- the loss of native vegetation that is suitable habitat for a number of conservation fauna species recorded within the local area; and
- the potential introduction and spread of weeds into adjacent vegetation, which could impact on the quality of the adjacent vegetation and its habitat values.

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After consideration of the available information, as well as the applicant's minimisation and mitigation measures (see Section 3.1), the Delegated Officer determined the proposed clearing is unlikely to have long-term adverse impacts on fauna values and can be minimised and managed to unlikely lead to an unacceptable risk to fauna values. The applicant has suitably demonstrated avoidance and minimisation measures.

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
- undertake slow, progressive one directional clearing to allow terrestrial fauna to move into adjacent habitat ahead of the clearing activity
- fauna inspection and management conditions to avoid impacts to individuals that may be present at the time of clearing.

1.5. Site map

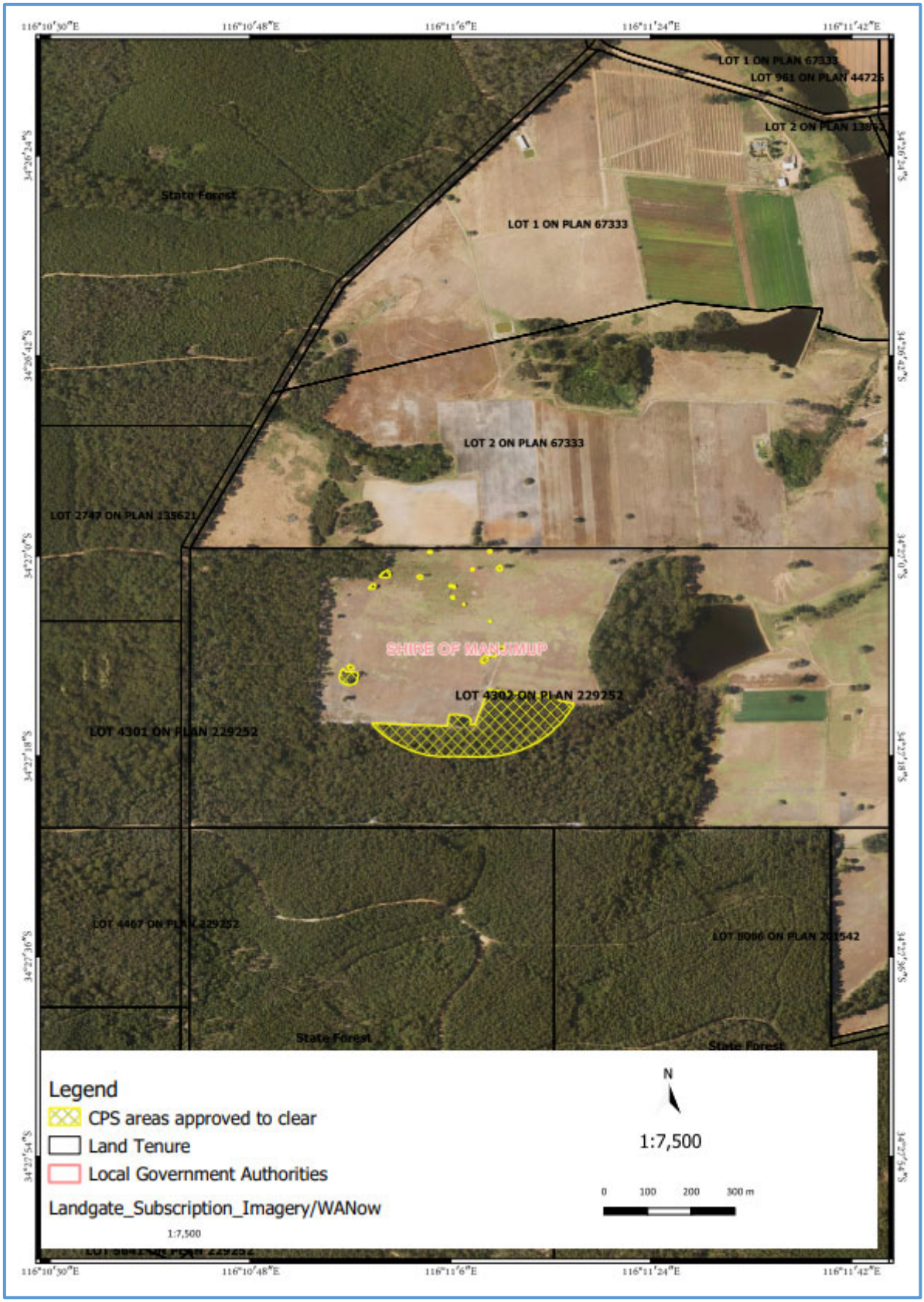

Figure 1 Map of the application area

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 polluter pays principle
- 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)
- *Country Areas Water Supply Act 1947* (WA) (CAWS Act)
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)
- *Soil and Land Conservation Act 1945* (WA)

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)

3 Detailed assessment of application

3.1. Avoidance and mitigation measures

Evidence was submitted by the applicant, demonstrating that the design and placement of the centre pivot mostly covers previously cleared areas. The Delegated Officer was satisfied that the applicant has made a reasonable effort to avoid and minimise potential impacts of the proposed clearing on environmental values.

Additionally, much of the remaining vegetation within Lot 4302 on Deposited Plan 229252 is subject to an Agreement to Reserve (ATR) which notes the following:

- Agreement to Reserve to retain and protect 53.396 hectares of native vegetation.
- Subject to sections 30B and 30C of the *Soil and Land Conservation Act 1945*, the Agreement to Reserve is to have effect in perpetuity.
- An Agreement to Reserve registered on Certificate of Title by Memorial binds each person successively becoming an owner or occupier of the land.
- The area of land described above is to be adequately fenced to exclude all classes of livestock and be managed in such a way as to retain and promote the growth of native vegetation.
- Subject to any necessary approvals from relevant authorities, and in accordance with any written law, clearing is permitted within the areas described above for boundary fence lines and firebreaks.
- Subject to any necessary approvals from relevant authorities, silviculture thinning is permitted in accordance with an approved forest management plan.
- Memorial as per Department of Water and Environmental Regulation, Conditions of Clearing Permit 9089/1.

The ATR is an amendment to a previous version. The mapped differences can be seen in Appendix E.

3.2. Assessment of impacts on environmental values

In assessing the application, the Delegated Officer has had regard for the site characteristics (see Appendix A) 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 B) identified that the impacts of the proposed clearing present a risk to fauna species and adjacent vegetation. 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 (flora and fauna) - Clearing Principles (a) (b) (c)

Assessment

According to available databases, nine conservation flora species have been recorded within the local area. Of these species, six have an association with wetlands and/or creeks and a further species has an association with granite outcrops, these habitats are absent from the application area. Noting the preferred habitat and mapped soil types and vegetation types, it is considered the following species may have habitat preferences present within the application area:

- *Tetratheca exasperate* (P3)
- *Actinotus repens* (P3)

Priority 3 species are described as species that are known from several locations, and the species do not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat (DBCA, 2020). Noting this and the extent of vegetation remaining which is also likely to provide suitable habitat for the species listed above, the proposed clearing is not likely to impact on these species at a local or regional level and is not likely to impact the conservation status of the species.

According to available databases, several fauna species have been recorded within the local area and may be present within the application area

- *Cacatua pastinator pastinator* (Muir's corella)
- *Calyptorhynchus banksii naso* (Forest red-tailed black cockatoo)
- *Zanda Calyptorhynchus* (Baudin's cockatoo)
- *Dasyurus geoffroii* (Chuditch)
- *Isoodon fusciventer (quenda)*
- *Leipoa ocellata* (malleefowl)
- *Macrotis lagotis* (Bilby)
- *Myrmecobius fasciatus* (numbat)
- *Notamacropus irma (*Western brush wallaby)
- *Phascogale tapoatafa wambenger* (South-western brush-tailed phascogale)
- *Pseudocheirus occidentalis* (Western ringtail possum)
- *Setonix brachyurus* (Quokka)

While the application area is part of an extensively vegetated area with vast habitat available for the species listed above, consideration is given to the loss of breeding habitat for the avian species and the presence of arboreal and terrestrial species at the time of clearing.

Avian species

Muir's Corella nest in hollows of dead or alive eucalypt species with nesting trees within forested areas, woodland remnants, or as lone trees in paddocks. The species may compete with bees and other cockatoo species for the use of hollows and the loss of hollows is identified as a key threat for the species (Department of Environment and Conservation, 2008). The species is known from a small area near Manjimup of which also appears to cover the application area.

The application area is within the mapped distribution of Baudin's cockatoo, the core distribution of forest red-tail black cockatoo and within the likely breeding area for Carnaby's cockatoo, although no records of Carnaby's cockatoo are located within the local area and only two records of forest red-tail black cockatoo occur within the local area. There is one record of breeding by cockatoos within the local area which is approximately 6.5 kilometres from the application area. Noting this and the vegetation type recorded within a site inspection (DPIRD, 2021) as jarrah, marri, and karri forest, the vegetation within the application area forms part of the foraging habitat for this breeding site. Analysis of the remnant vegetation concludes that there is 39,962 hectares of native vegetation within a 12-kilometre radius of the breeding site, of which 39,386 hectares is within DBCA tenure.

No roosting sites have been recorded within the local area but there are records within an extended range with the closest roosting site being approximately 14 kilometres from the application area.

No surveys have been completed to determine the presence or absence of hollows within the application area. A major contributor to the decline in population of black cockatoos is the loss of breeding habitat containing suitable

breeding hollows in proximity to foraging habitat. Given this, conditions of a permit to clear require pre-clearance surveys and additional measures.

Arboreal species

The application area is considered suitable to contain habitat for Western ringtail possum and south-western brush-tailed phascogale noting that the application area contains a large portion of vegetation that has a connected canopy, is near sources of water (including a man made dam). Analysis of records of western ringtail possum within the local area indicate the application area is within the expected home range for individuals of this species noting that individuals have a home range of less than 5 hectares. While the surrounding areas provide extensive habitat for the species, individuals could be impacted if present at the time of clearing. The application area is not within an extensively cleared area and much habitat remains for these species however management measures are required to avoid impacts to individuals.

Terrestrial species

Although suitable habitat for the following species is located within the application area, the following species are not considered likely to occur given the low number of historical records within the local area:

- *Leipoa ocellata* (malleefowl)
- *Macrotis lagotis* (Bilby)
- *Myrmecobius fasciatus* (numbat)

The quokka is known from mainland populations with the application area being within the southern forest sub-population. The mainland population is within high rainfall areas including areas of jarrah, marri and karri forest that generally have a thick understory and area close to water sources. It is considered that the application area may provide habitat for the species. The local area provides a large amount of habitat for the species, but individuals of the species could be impacted if present at the time of clearing.

The National Recovery Plan for Chuditch notes the species use a range of habitats including forest, mallee shrublands, woodland and desert. The densest populations have been found in riparian jarrah forest. Chuditch require adequate numbers of suitable den and refuge sites (horizontal hollow logs or earth burrows) and sufficient prey biomass (large invertebrates, reptiles, and small mammals) to survive. They can travel long distances and have large home ranges, and even at their most abundant, chuditch are generally present in low numbers. For this reason, they require habitats that are of a suitable size and not excessively fragmented (Department of Environment and Conservation, 2012). Noting there are six recordings of the species within the local area and the habitat preferences of the species, it is considered the application area provides habitat for the species. While significant amount of connected habitat remains within the local area, impacts to individuals may occur if present at the time of clearing.

Both quenda and Western brush wallaby have been recorded within the local area within habitats like that of the application area. Noting the condition and density of the majority of the application area, it is considered that the application area provides habitat for these species.

Conclusion

Based on the above assessment, the proposed clearing will result in native vegetation which may comprise habitat for conservation significant fauna. While the loss of habitat for the fauna species is not considered significant due to the amount of similar vegetation within the local area including the amount of vegetation within conservation areas, individuals could be impacted if present at the time of clearing.

Additionally, the loss of a suitable breeding tree could be detrimental for species of cockatoo if being utilised at the time of clearing.

The applicant may have notification responsibilities under the EPBC Act for impacts to Baudin's black cockatoo, Carnaby's cockatoo, and forest red-tailed black cockatoo and their habitats, as set out in the EPBC Act and the Referral Guideline for 3 WA threatened black cockatoo species (DAWE, 2022). The applicant has been advised to contact the federal Department of Climate Change, Energy, Environment and Water (DCCEW) to discuss EPBC Act referral requirements.

Conditions

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

- Fauna management (black cockatoo breeding habitat)

- Fauna inspection and relocation conditions
- Slow progressive clearing in the direction of the remnant vegetation
- Weed and dieback conditions

3.2.2. Land and water resources (land degradation) - Clearing Principle (g)

Assessment

An inspection from representatives of Department of Primary Industries and Regional Development noted that water erosion, phosphorus loss and wind erosion are potential risks of the soil types. The report provided from the inspection also noted that the risk of land degradation is unlikely to increase with the clearing of native vegetation and therefore the proposed clearing is not at variance with this Principle.

3.3. Relevant planning instruments and other matters

Other relevant authorisations required for the proposed land use include:

- Licence to abstract water under the *Rights in Water and Irrigation Act 1914*.
- Permit to interfere with bed and banks under the *Rights in Water and Irrigation Act 1914*.

The Shire of Manjimup advised that local government approvals are not required, and that the proposed clearing is consistent with the Shire's Local Planning Scheme No.4 as 'Priority Agriculture'.

Advice was received related to the ATR on the property and requirements under *the Country Areas Water Supply Act 1947.* This was reviewed once the final ATR had been modified with the conditions of the ATR was deemed acceptable.

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.

End

Appendix A. Site characteristics

A.1. Site characteristics

Characteristic	Details
Local context	The area proposed to be cleared is part of an expansive tract of native vegetation in the extensive land use zone of Western Australia. It is adjacent to conservation areas on two sides and horticultural areas. Spatial data indicates the local area (10-kilometre radius from the centre of the area proposed to be cleared) retains approximately 85 per cent of the original native vegetation cover.
Ecological linkage	The application area is location approximately 1.7 kilometres of a mapped linkage, the South West Regional Ecological Linkage which is aligned with the Warren River.
Conservation areas	Lot 4302 on Deposited Plan 229252 is bound by conservation areas on the south and the west. The conservation estate to the south is the Warren State Forest and Quinninup Plantation (Conservator of Forests) to the west. Conservation estate represents the majority o the vegetation within the local area.
Vegetation description	Photographs provided by the applicant and information received from a site visit (DPIRD, 2021) indicate the vegetation within the proposed clearing area consists of a jarrah, marri, and karri forest with dense understory. Representative photos are available in Appendix D. This is consistent with the mapped vegetation type: • Crowea, CRb, which is described as Tall open forest of Corymbia calophylla-Eucalyptus diversicolor on upper slopes with Allocasuarina decussata-Banksia grandis on upper slopes in hyperhumid and perhumid zones. The mapped vegetation type retains approximately 86 per cent of the original extent *(Government of Western Australia, 2019).*
Vegetation condition	Photographs provided by the applicant indicate the vegetation within the proposed clearing area is in good to degraded (Keighery, 1994) condition, described as: • Good: Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it • Degraded: Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management The full Keighery (1994) condition rating scale is provided in Appendix C. Representative photos are available in Appendix D.
Climate and landform	The annual average rainfall (taken from Manjimup) is approximately 986 millimetres. The mapped contours indicate the area slopes toward the north.
Soil description	The soil is mapped within the following two soil types: • Crowea (Dwalganup), brown duplex Phase: Brown gravelly duplex soils and red earths; karri-marri forest. • Bevan Subsystem (Dwalganup): Broad, gently sloping (3-15%) divides on laterite, soils are sandy gravels and loamy gravels.
Land degradation risk	The mapped soil types have a high risk of subsurface acidification and a moderate to high risk of wind erosion. The remaining degradation risks are considered low.
Waterbodies	The desktop assessment and aerial imagery indicated that the closest waterbody to the application area is a minor non-perennial watercourse located approximately 150 meters from the application area.

Characteristic	Details
Hydrogeography	The application area is within the Warren River and Tributaries area under the *Rights in Water and Irrigation Act 1914* and within the Warren River Water Reserve area under the *Country Areas Water Supply Act 1947*.
Flora	According to available databases, there are nine conservation significant flora species within the local area including two Priority 2 species, four Priority 3 species, one Priority 4 species and two threatened species.
Ecological communities	There are no mapped ecological communities within the local area. The closest mapped ecological community is a Priority 1 Ecological Community 'Open Jarrah Forrest and woodland developed on a young, exposed quartzite on Ridge Road'
Fauna	According to available databases, 18 conservation significant species have been recorded within the local area. The most frequent occurring are species of cockatoos which include records identified as Baudin's cockatoo and 'white-tailed black cockatoo' which could be either Baudin's or Carnaby's cockatoo.

A.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*					
Warren	35,867.03	24,029.98	67.00	20,257.96	56.48
Vegetation complex					
Crowea, CRb**	52,753.26	45,425.07	86.11	43,135.87	81.77
Local area					
10km radius			~85	-	-

*Government of Western Australia (2019a)

**Government of Western Australia (2019b)

A.3. Flora analysis table

With consideration for the site characteristics set out above, relevant datasets (see Appendix F.1), impacts to the following conservation significant flora required further consideration.

Species name	Conservation status	Suitable habitat features ? [Y/N]	Suitable vegetation type? [Y/N]	Suitable soil 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]
Cardamine paucijuga	2	N	Y	Y	5	10	N/A
Eryngium sp. Lake Muir (E. Wittwer 2293)	2	N	Y	N	5.3	4	N/A
Hemigenia microphylla	3	N	Y	N	5.3	25	N/A
Schoenus natans	4	N	Y	N	5.3	66	N/A
Tetratheca exasperata	3	Y	Y	N	6.2	14	N
Kennedia glabrata	3	N	Y	Y	6.7	36	N/A
Placynthium nigrum	T	N	Y	N	7.4	9	N/A

Species name	Conservation status	Suitable habitat features ? [Y/N]	Suitable vegetation type? [Y/N]	Suitable soil 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]
Actinotus repens	3	Y	Y	N	9.3	33	N
Caladenia christineae	T	N	Y	N	9.3	58	N/A

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

A.4. Fauna analysis table

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 ion local area	Are surveys adequate to identify? [Y, N, N/A]
Cacatua pastinator pastinator (Muir's corella)	CD	Y	Y	7.6	1	N
Calyptorhynchus banksii naso (Forest red-tailed black cockatoo)	VU	Y	Y	7.4	2	N
Calyptorhynchus baudinii (Baudin's cockatoo)	EN	Y	Y	8.6	8	N
Dasyurus geoffroii (Chuditch)	VU	Y	Y	3.5	6	N
Galaxiella munda (mud minnow)	EN	N	N	6.1	4	N/A
Galaxiella nigrostriatal (Black-stripe minnow)	EN	N	N	6.1	3	N/A
Hydromys chrysogaster (Water-rat)	P4	N	N	3	6	N/A
Isoodon fusciventer (quenda)	P4	Y	Y	7.4	3	N
Leipoa ocellata (malleefowl)	VU			5.2	2	N
Lepidogalaxias salamandroides (Salamanderfish)	EN	N	N	6.2	2	N/A
Macrotis lagotis (Bilby)	VU	Y	Y	9.2	1	N
Myrmecobius fasciatus (numbat)	EN	Y	Y	1.4	1	N
*Notamacropus irma (*Western brush wallaby)	P4	Y	Y	3.0	1	N
Phascogale tapoatafa wambenger (South-western brush-tailed phascogale)	CD	Y	Y	7.7	5	N
Pseudocheirus occidentalis (Western ringtail possum)	CR	Y	Y	1.8	6	N
Setonix brachyurus (Quokka)	VU	Y	Y	5	14	N
Spicospina flammocaerulea (sunset frog)	VU	N	N	3.0	1	N/A

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

A.5. Land degradation risk table

Risk categories	Crowea (Dwalganup), brown duplex Phase	Bevan Subsystem (Dwalganup)
Wind erosion	50-70% of map unit has a high to extreme wind erosion risk	>70% of map unit has a high to extreme wind erosion risk
Water erosion	3-10% of map unit has a high to extreme water erosion risk	3-10% of map unit has a high to extreme water erosion risk
Salinity	<3% of map unit has a moderate to high salinity risk or is presently saline	<3% of map unit has a moderate to high salinity risk or is presently saline
Subsurface Acidification	>70% of map unit has a high subsurface acidification risk or is presently acid	>70% of map unit has a high subsurface acidification risk or is presently acid
Flood risk	<3% of the map unit has a moderate to high hazard	<3% of the map unit has a moderate to high flood risk
Water logging	<3% of map unit has a moderate to very high waterlogging risk	<3% of map unit has a moderate to very high waterlogging risk
Phosphorus export risk	10-30% of map unit has a high to extreme phosphorus export risk	10-30% of map unit has a high to extreme phosphorus export risk

Appendix B. 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 area proposed to be cleared does not contain locally or regionally significant flora, fauna, habitats, assemblages of plants.	Not likely to be 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 may contain foraging, roosting, breeding, habitat for conservation significant fauna.	May be 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 habitat for flora species listed under the BC Act.	Not likely to be at variance	Yes *Refer to Section 3.2.1, above.*
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 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 type and the native vegetation in the local area is consistent with the national objectives and targets for biodiversity conservation in Australia. The vegetation proposed to be cleared is not considered to be part of a significant ecological linkage in the local area.	Not at variance	No
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: Given no water courses or wetlands are recorded within the application area, the proposed clearing is unlikely to impact on- or off-site hydrology and water quality.	Not likely to be at variance	No
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 are moderately to highly susceptible to wind erosion and highly susceptible to subsurface acidification and low risk to other forms of land degradation	May be at variance	Yes *Refer to Section* 3.2.2, 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 no water courses or wetlands are recorded within the application area, the proposed clearing is unlikely to impact surface or ground water quality.	Not likely to be at variance	No
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 topographic contours in the surrounding area do not indicate the proposed clearing is likely to contribute to increased incidence or intensity of flooding. Given no watercourses or wetlands are recorded within the application area, the proposed clearing is unlikely to contribute to waterlogging.	Not likely to be at variance	No

Appendix C. 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 D. Photographs of the vegetation

Photograph of vegetation within the applciation area (Humphrey, 2020)

Photograph of vegetation within the applciation area (Humphrey, 2020)

Photograph of vegetation within the applciation area (Humphrey, 2020)

Appendix E. Maps of Agreement to Reserve

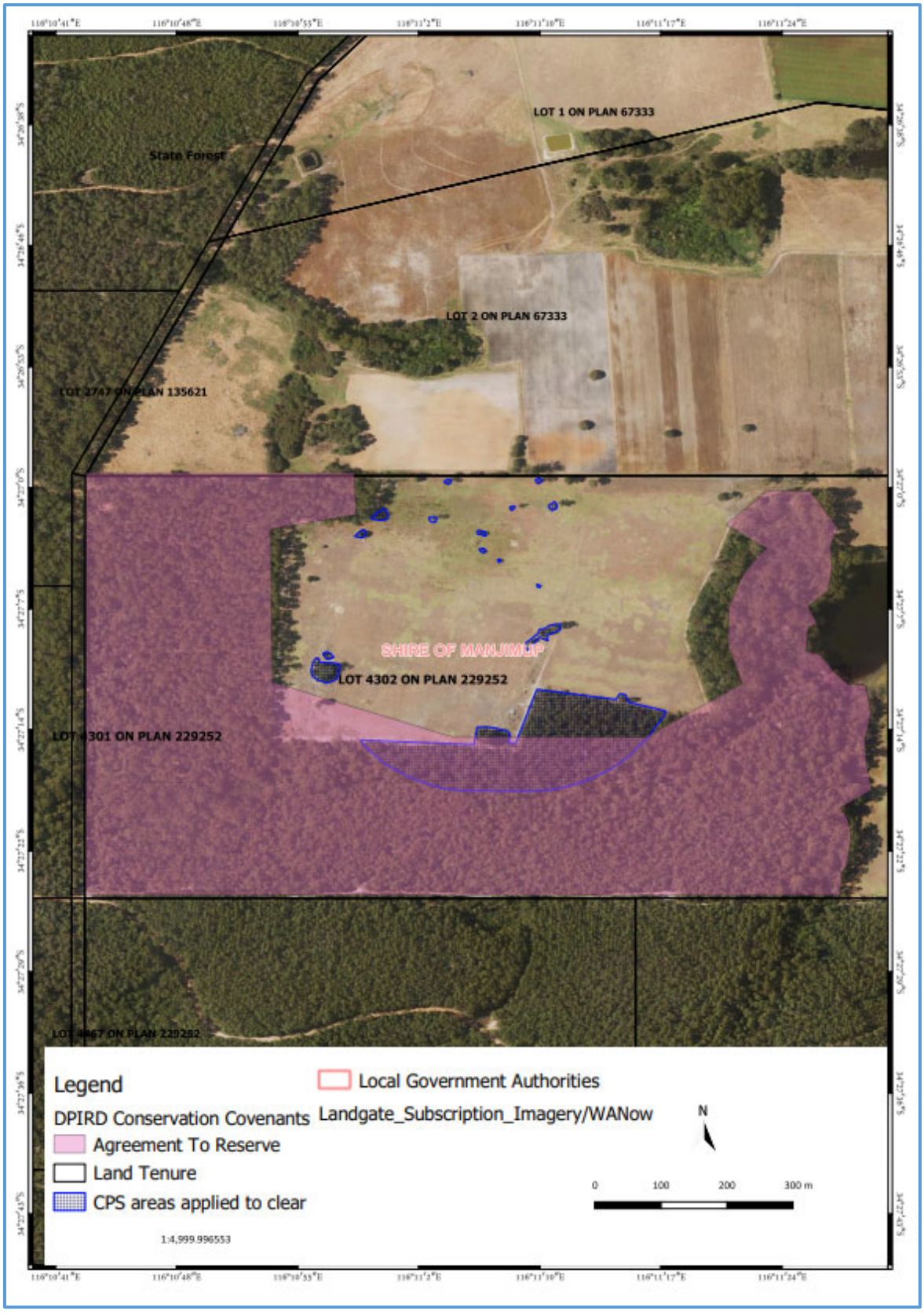

Figure 2 Map of the previous Agreement to Reserve

Figure 3 Map of the current Agreement to Reserve

Appendix F. Sources of information

F.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)
- 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

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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