



## CLEARING PERMIT

*Granted under section 51E of the Environmental Protection Act 1986*

<b>Purpose Permit number:</b>	CPS 9307/2
<b>Permit Holder:</b>	Shire of Goomalling
<b>Duration of Permit:</b>	From 7 July 2023 to 7 July 2038

The permit holder is authorised to clear native vegetation subject to the following conditions of this permit.

### **PART I – CLEARING AUTHORISED**

#### **1. Clearing authorised (purpose)**

The permit holder is authorised to clear native vegetation for the purpose of road widening.

#### **2. Land on which clearing is to be done**

Calingiri-Goomalling Road reserve (PINs 11502043, 11720387, 11720392, 11720390, 3702293, 11731752, 11722008, 11731751, 11429894)

#### **3. Clearing authorised**

The permit holder must not clear more than 4.56 hectares of native vegetation within the combined areas cross-hatched yellow in Figure 1a, Figure 1b, Figure 1c and Figure 1d of Schedule 1.

#### **4. Type of clearing authorized**

This permit authorises the permit holder to clear native vegetation for the activities described in condition 1 of this permit to the extent that the permit holder has the power to carry out works involving clearing for those activities under the *Local Government Act 1995* or any other written law.

#### **5. Period during which clearing is authorised**

The permit holder must not clear any native vegetation after 7 July 2028.

### **PART II – MANAGEMENT CONDITIONS**

#### **6. 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.

## 7. 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.

## 8. Flora management -*Priority Flora*

Prior to undertaking any clearing authorised under this Permit, the permit holder must:

- (a) Engage an *environmental specialist* to demarcate 20-metre buffers of all *priority flora* species identified and listed in Table 1, within the combined area cross-hatched yellow in Figure 1a, Figure 1b, Figure 1c and Figure 1d of Schedule 1.
- (b) If demarcating of 20-metre buffers under condition 8(a) is not practical, engage an *environmental specialist* to demarcate all individuals of *priority flora* species listed in Table 1, within the combined area cross-hatched yellow in Figure 1a, Figure 1b, Figure 1c and Figure 1d of Schedule 1.
- (c) The permit holder is not authorised to clear the *priority flora* species described in Table 1.
- (d) The permit holder must engage an *environmental specialist* to undertake a pre-clearance flora survey within the combined area cross-hatched yellow in Figure 1a, Figure 1b, Figure 1c and Figure 1d of Schedule 1, prior to the commencement of clearing for any other *priority flora* within the application area. The permit holder is not authorised to clear any *priority flora* species.

Table 1 - Priority flora identified within the application area.

ID	Taxon	Easting	Northing
1	<i>Eucalyptus sargentii</i> subsp. <i>onesis</i> .	465037.4194	6553571.893
2	<i>Eucalyptus sargentii</i> subsp. <i>onesis</i> .	465045.8536	6553572.245
3	<i>Eucalyptus sargentii</i> subsp. <i>onesis</i> .	465044.7774	6553556.813
4	<i>Eucalyptus sargentii</i> subsp. <i>onesis</i> .	465044.6931	6553553.936
5	<i>Eucalyptus sargentii</i> subsp. <i>onesis</i> .	465044.2851	6553528.684
6	<i>Eucalyptus sargentii</i> subsp. <i>onesis</i> .	465051.4189	6553472.833

- (e) Within two months of undertaking any clearing authorised under this permit within the combined areas cross-hatched yellow on Figure 1a, Figure 1b, Figure 1c and Figure 1d of Schedule 1, the permit holder must provide the results of the *priority flora* survey in a report to the *CEO*.

## 9. Flora management – *Threatened flora*

- (a) Prior to undertaking any clearing authorised under this permit, the permit holder must engage an *environmental specialist* to conduct a pre-clearance habitat assessment of the combined areas cross-hatched yellow in Figure 1a, Figure 1b, Figure 1c and Figure 1d of Schedule 1 to identify *critical habitat* for the *threatened flora*, *Acacia ataxiphylla* subsp. *magna* and *Caladenia drakeoides*, listed under the *Biodiversity Conservation Act 2016*.

- (b) Where *critical habitat* for *Acacia ataxiphylla* subsp. *magna* and *Caladenia drakeoides*, is identified under condition 9(a), the permit holder must not cause or allow clearing of the identified *critical habitat*.
- (c) If the permit holder is unable to avoid the clearing of *critical habitat* identified under condition 9(a) for *Acacia ataxiphylla* subsp. *magna* and *Caladenia drakeoides*, the permit holder must engage an *environmental specialist* to conduct a *spring targeted flora survey* of the permit area to determine the presence or absence of *Acacia ataxiphylla* subsp. *magna* and *Caladenia drakeoides*.
- (d) Where *threatened flora* are identified under condition 9(c), the permit holder must not cause or allow:
  - (i) clearing within 50 metres of the identified *threatened flora*; and
  - (ii) clearing of the identified *threatened flora*.
- (e) Within two months of undertaking any clearing authorised under this permit, the permit holder must provide the results of the pre-clearance habitat assessment and/or *spring targeted flora survey*, in a report to the CEO.
- (f) If any *threatened flora* are identified within the combined areas cross-hatched yellow on Figure 1a, Figure 1b, Figure 1c and Figure 1d of Schedule 1, the *spring targeted flora survey* report must include the following:
  - (i) the location of *Acacia ataxiphylla* subsp. *magna* and *Caladenia drakeoides* identified under condition 9(c), either as the location of individual plants, or where this is not practical, the area extent of the population and an estimate of the number of plants, 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;
  - (ii) the methodology used to survey the permit area.

## 10. Fauna management – black cockatoo habitat

- (a) Prior to undertaking any clearing authorised under this permit within the areas cross-hatched yellow in Figure 1a, Figure 1b, Figure 1c and Figure 1d of Schedule 1, the permit holder must engage a *fauna specialist* to conduct a *fauna survey* of the permit area to identify *black cockatoo habitat tree/s* being utilised by *Zanda lateriosis* (Carnaby’s cockatoo).
- (b) Where black cockatoo habitat tree/s are identified under condition 10(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 10(a), that tree must only be cleared immediately after the inspection.
- (e) Where a *black cockatoo habitat tree* is identified within the combined area cross-hatched yellow in Figure 1a, Figure 1b, Figure 1c and Figure 1d of Schedule 1 and that tree shows *evidence* of current or past breeding use by *black cockatoo species* under condition 10(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 10(e).

- (g) The permit holder must install a total of five (5) artificial black cockatoo nesting hollows as calculated by the WA offset metric calculator, to account for the loss of four (4) suitably sized hollows for black cockatoo nesting that cannot be avoided.
- (h) Each artificial black cockatoo nesting hollow required by condition 10(g) must be installed prior to commencement of the next black cockatoo breeding season following clearing of the related *black cockatoo habitat tree(s)*.
- (i) In relation to the total of five (5) artificial black cockatoo nest hollow(s) required by condition 10(g) of this permit:
  - (i) five (5) hollows must be installed within the area cross-hatched green in Figure 2 of Schedule 1 (Reserve 15442);
  - (ii) must be designed and placed in accordance with the specifications detailed in Schedule 2; and
  - (iii) must be monitored and maintained in accordance with the specifications detailed in Schedule 2, for a period of at least 10 years.
- (j) Within two months of clearing authorised under this permit, the permit holder must provide the results of the *fauna survey* in a report to the *CEO*.
- (k) The *fauna survey* 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 the *black cockatoo habitat tree(s)* 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 location of any fauna species listed in condition 10(a), if identified, recorded using a GPS unit set to GDA2020, expressing the geographical coordinates in Eastings and Northings or decimal degrees;
  - (v) the name and amount of each fauna species identified;
  - (vi) whether the *black cockatoo habitat tree/s* identified show current or past use by black cockatoo species;
  - (vii) a photo of the *black cockatoo habitat tree(s)* identified; and
  - (viii) 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)*
  - (ix) the time and date each *black cockatoo habitat tree* with evidence of current or past breeding use was cleared.

## 11. Offset – Revegetation

Within 12 months of the commencement of clearing, the permit holder must implement and adhere to the *Revegetation plan*, including but not limited to the following actions:

- (a) Retain the vegetative material and topsoil removed by clearing authorised under this Permit and stockpile the vegetative material and topsoil in an area that has already been cleared;
- (b) Commence *revegetation* and *rehabilitation* of 6.6 hectares which includes *revegetation* of 287 individual plants of known black cockatoo foraging species at minimum, within the areas cross-hatched red in Figure 2 of Schedule 1 by:
  - (i) laying the vegetative material and topsoil retained under condition 11(a) within 18 months of its removal within the *offset site*.

- (ii) deliberately planting *native vegetation* that will result in similar species composition, structure and density of native vegetation to the surrounding vegetation within the *offset site*; and
  - (iii) ensuring only *local provenance* seeds and propagating material are used to *revegetate* and *rehabilitate* the area;
- (c) Rip the *offset site* to remove any areas of compaction or other obstruction that could prevent root penetration of seedlings;
  - (d) Undertake weed control in accordance with Section 4.3.2 of the *Revegetation plan*;
  - (e) Establish twelve 10 x 10 metre quadrat monitoring sites across the *offset site*.
  - (f) Conduct *pest animal* control;
  - (g) Ensure the fence of the *offset site* is in a suitable condition;
  - (h) Remove rubbish from the *offset site*;
  - (i) Maintain a four-metre trafficable firebreak that complies with the Shire of Goomalling requirements around the interior perimeter fence of the *offset site* on an ongoing basis;
  - (j) Water planted vegetation between November and March during the first two years following planting;
  - (k) Undertake weed control activities on an 'as needs' basis to maintain a minimum 80 per cent weed free state of the *offset site* by the end of the project maintenance period;
  - (l) Achieve the following completion criteria no later than within a 5-year monitoring period for areas *revegetated* and *rehabilitated* under this Permit and for the vegetation to be maintained for a period of two years from the date of the completion criteria having been met.

Item	Criterion	Completion targets	Completion criteria	Monitoring
1a	Species richness	Return dominant overstorey species present at <i>reference sites</i> .	For each target revegetation type, the revegetation needs to support the dominant overstorey species from the target <i>reference sites</i> .	Annually in spring by an <i>environmental specialist</i> until completion criterion has been met and maintained for two years (i.e. three successive monitoring events).
1b	Species richness	Minimum of 60 per cent of native species in each structural layer returned, based on <i>reference sites</i> .	For each target revegetation type, the revegetation needs to achieve a minimum species richness of at least 60 per cent of the average recorded at the <i>reference sites</i> .	Annually in spring by an <i>environmental specialist</i> until completion criterion has been met and maintained for two years (i.e. three successive monitoring events).
2a	Cover and density	Minimum of 60 per cent of stems/ha for dominant overstorey species returned based on <i>reference sites</i> .	For each target revegetation type, the revegetation needs to support 60 per cent of stems/ha of the dominant overstorey species from the target <i>reference sites</i> .	Annually by an <i>environmental specialist</i> until completion criterion has been met and maintained for two years (i.e. three successive monitoring events).
2b	Cover and density	Minimum of 60 per cent of plants /ha in each structural layer returned, based on <i>reference sites</i> .	For each target revegetation type, the revegetation needs to achieve a minimum species richness of at least 60 per cent of the average record at the <i>reference sites</i> .	Annually by an <i>environmental specialist</i> until completion criterion has been met and maintained for two years (i.e. three successive monitoring events).
3a	Weeds	Weed cover is no greater than at <i>reference sites</i> .	For each target revegetation type, the revegetation needs a weed cover no greater than that recorded at the targeted <i>reference sites</i> .	Annually in winter/spring by an <i>environmental specialist</i> until completion criterion has been met and maintained for two years (i.e. three successive monitoring events).
3b	Weeds	No priority, high impact or highly invasive weeds present	No weeds present that are listed as Priority Alert, High Impact or Rapid invasiveness on the DBCA <a href="#">Wheatbelt Region Impact and Invasiveness Ratings list</a> as updated from time to time.	Annually in winter/spring by an <i>environmental specialist</i> until completion criterion has been met and maintained for two years (i.e. three successive monitoring events).
4	Bare ground	No more than 5 per cent greater than at the <i>reference sites</i> .	For each target revegetation type, the <i>offset sites</i> must not have more than 30m <sup>2</sup> of bare ground.	Annually in Summer by an <i>environmental specialist</i> until completion criterion has been met and maintained for two years (i.e. three successive monitoring events).
5	Gates and boundary fence	Gates and boundary fence to be in good condition with no obvious damage that will enable the entry of fauna, including rabbits and/or kangaroos into the <i>rehabilitation</i> area.	N/A	Annually by an <i>environmental specialist</i> until completion criteria 1 – 4 has been met.

- (m) Undertake remedial action for areas *the offset site* where monitoring indicated that revegetation has not met the completion criteria, outlined in condition 11(l) of this permit, including:
- (i) revegetate the area by deliberately *planting native vegetation* that will result in the minimum target set out in condition 11(l) of this permit and ensuring only *local provenance* seeds and propagating material are used;
  - (ii) undertake further weed control activities;
  - (iii) undertake further watering activities; and
  - (iv) annual monitoring by an *environmental specialist* of *the offset site* following the three years of biannual monitoring outlined in condition 11(l), until the completion criteria, outline in condition 11(l) of this Permit are met.

### **PART III - RECORD KEEPING AND REPORTING**

#### **12. 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 2.

**Table 2: Records that must be kept**

<b>No.</b>	<b>Relevant matter</b>	<b>Specifications</b>
1.	In relation to the authorised clearing activities generally	<ul style="list-style-type: none"> <li>(a) the species composition, structure, and density of the cleared area;</li> <li>(b) the location where the clearing occurred, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 2020 (GDA2020), expressing the geographical coordinates in Eastings and Northings;</li> <li>(c) the date that the area was cleared;</li> <li>(d) the size of the area cleared (in hectares);</li> <li>(e) actions taken to avoid, minimise, and reduce the impacts and extent of clearing in accordance with condition 6; and</li> <li>(f) actions taken to minimise the risk of the introduction and spread of <i>weeds</i> and <i>dieback</i> in accordance with condition 7.</li> </ul>
2.	In relation to flora management pursuant to condition 8 and 9.	<ul style="list-style-type: none"> <li>(a) copy of the pre-clearance habitat assessment report in accordance with condition 9;</li> <li>(b) actions taken to avoid the clearing of <i>critical habitat</i> for <i>threatened flora</i> <i>Acacia ataxiphylla</i> subsp. <i>magna</i> and <i>Caladenia drakeoides</i>.</li> <li>(c) the name and location of each <i>priority/threatened</i> flora species, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 2020 (GDA2020), expressing the geographical coordinates in Eastings and Northings;</li> <li>(d) actions taken to demarcate each <i>priority/threatened</i> flora species recorded and their relevant buffers;</li> <li>(e) actions taken to avoid the clearing of</li> </ul>

No.	Relevant matter	Specifications
		<p><i>priority/threatened flora</i> species.</p> <p>(f) copy of the results from the <i>priority</i> and <i>threatened flora</i> survey.</p>
3.	In relation to black cockatoo fauna management pursuant to condition 10 of this permit	<p>(a) the time(s) and date(s) of inspection(s) of the suitable <i>black cockatoo habitat tree</i> by the <i>fauna specialist</i>;</p> <p>(b) a description of the inspection methodology employed by the <i>fauna specialist</i>;</p> <p>(c) the species name of any fauna determined by the <i>fauna specialist</i> to be occupying the suitable <i>black cockatoo habitat tree</i>;</p> <p>(d) where the suitable <i>black cockatoo habitat tree</i> is determined by the <i>fauna specialist</i> to be occupied by <i>black cockatoo species</i>:</p> <p style="padding-left: 40px;">(i) the time and date that it was determined to be no longer occupied; and</p> <p style="padding-left: 40px;">(ii) a description of the evidence by which it was determined to be no longer occupied; and</p> <p>(e) the time and date that the suitable <i>black cockatoo habitat tree</i> was cleared.</p>
4.	In relation to the <i>revegetation</i> and <i>rehabilitation</i> areas pursuant to condition 11 of this permit	<p>(a) the location of any areas revegetated and rehabilitated, 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;</p> <p>(b) the number of black cockatoo foraging species planted;</p> <p>(c) the date the fence and firebreak were installed and evidence of maintenance;</p> <p>(d) the date rubbish was removed from the <i>revegetation</i> and <i>rehabilitation</i> area;</p> <p>(e) pest animal and weed control measures undertaken;</p> <p>(f) a description of the <i>revegetation</i> and <i>rehabilitation</i> activities undertaken;</p> <p>(g) the size of the area <i>revegetated</i> and <i>rehabilitated</i> (in hectares);</p> <p>(h) the species composition, structure and density of <i>revegetation</i> and <i>rehabilitation</i>;</p> <p>(i) the number of plants and species installed;</p> <p>(j) the assessment of the <i>revegetation</i> and <i>rehabilitation</i> against criterion outlined in condition 11(l);</p> <p>(k) any remedial actions undertaken in accordance with condition 11(m); and</p> <p>(l) a copy of the environmental specialist's report.</p>



### 13. Reporting

- (a) The Permit Holder must provide to the *CEO* on or before 30 June of each year, a written report:
- (i) of records required under condition 12 of this Permit; and
  - (ii) concerning activities done by the Permit Holder under this Permit between 1 January and 31 December of the preceding calendar year.
- (b) If no clearing authorised under this Permit was undertaken between 1 January to 31 December of the preceding calendar year, a written report confirming that no clearing under this permit has been carried out, must be provided to the *CEO* on or before 30 June of each year.
- (c) Prior to 7 April 2038, the permit holder must provide to the *CEO* a written report of records required under condition 12 of this Permit, where these records have not already been provided under condition 13(a) of this Permit.

## DEFINITIONS

In this permit, the terms in Table 3 have the meanings defined.

**Table 3: Definitions**

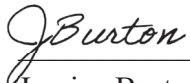
Term	Definition
Black cockatoo habitat trees	means trees that have a diameter measured over bark at 130 centimetres from the base of the tree of 50 centimetres or greater (or 30 centimetres or greater for <i>Eucalyptus salmonophloia</i> or <i>Eucalyptus wandoo</i> ) that contain hollows suitable for breeding by black cockatoo species.
Black cockatoo species	means one or more of the following species: <i>Zanda latirostris</i> (Carnaby's cockatoo); <i>Zanda Calyptorhynchus</i> (Baudin's cockatoo); and/or <i>Calyptorhynchus banksii naso</i> (Forest red-tailed black cockatoo).
Botanist	means a person who holds a tertiary qualification specialising in environmental science or equivalent, and has a minimum of two (2) years work experience in Western Australian flora identification and undertaking flora surveys native to the bioregion being inspected or surveyed, or who is approved by the CEO as a suitable environmental specialist for the bioregion, and who holds a valid flora licence issued under the <i>Biodiversity Conservation Act 2016</i> .
CEO	Chief Executive Officer of the department responsible for the administration of the clearing provisions under the <i>Environmental Protection Act 1986</i> .
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.
Critical habitat ( <i>Acacia ataxiphylla</i> subsp. <i>magna</i> )	The critical habitat for <i>Acacia ataxiphylla</i> subsp. <i>magna</i> comprises the area of occupancy of known populations; similar habitat within 200 metres of known populations; corridors of remnant vegetation that link populations and additional nearby occurrences of similar habitat that do not currently contain the species but may have done so and may be suitable for translocations
Critical habitat ( <i>Caladenia drakeoides</i> )	Critical habitat for <i>C. drakeoides</i> is defined in the Interim Recovery Plan as the area of occupancy of known populations; similar habitat within 200 metres (m) of known populations; corridors of remnant vegetation that link populations; additional nearby occurrences of similar habitat that are not known to contain the species but may have done so in the past and may be suitable for translocations; and local catchment areas for the surface and ground waters that provide habitat for the species.
Department	means the department established under section 35 of the <i>Public Sector Management Act 1994</i> (WA) and designated as responsible for the administration of the EP Act, which includes Part V Division 3.
Dieback	means the effect of <i>Phytophthora</i> species on native vegetation.

Term	Definition
Direct seeding	means a method of re-establishing vegetation through establishment of a seed bed and the introduction of seeds of the desired plant species.
Environmental specialist	means a person who holds a tertiary qualification in environmental science or equivalent and has 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 <i>CEO</i> as a suitable environmental specialist.
EP act	<i>Environmental Protection Act 1986 (WA)</i>
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 <i>CEO</i> as a suitable fauna specialist for the bioregion, and who holds a valid fauna licence issued under the <i>Biodiversity Conservation Act 2016</i> .
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 Interim Biogeographic Regionalisation for Australia (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.
Offset site	Means the areas cross-hatched red on Figure 2 of Schedule 1.
Optimal time	means the period from April to June for undertaking <i>planting</i> and <i>seeding</i> .
Pest animal	Animals that are known to impact the survival of revegetation/rehabilitation i.e. rabbits.
Planting	means the re-establishment of vegetation by creating favourable soil conditions and planting seedlings of the desired species.
Priority flora	means those plant taxa described as priority flora classes 1, 2, 3, or 4 in the Department of Biodiversity, Conservation and Attractions <i>Threatened and Priority Flora List for Western Australia</i> (as amended from time to time).
Reference sites	Means: a) For Crown Reserves 15442, Goomalling, the four 10m x 10m quadrat reference sites that were identified (CPS 8832/2, 2021) along Berring Rd located immediately west of the <i>revegetation</i> and <i>rehabilitation area</i> to identify remnant native vegetation species composition and structure, condition, density and weed cover.
Regeneration	means revegetation that can be established from in situ seed banks contained either within the topsoil or seed-bearing mulch.
Rehabilitate, rehabilitated and rehabilitation	means actively managing an area containing native vegetation in order to improve the ecological function of that area using methods such as natural <i>regeneration</i> , <i>direct seeding</i> and/or <i>planting</i> , so that the species composition, structure and density is similar to pre-clearing vegetation types in that area.
Revegetation plan	Means plan developed by the permit holder for the <i>revegetation</i> and <i>rehabilitation</i> of a site in accordance with condition 9 of this Permit: “ <i>Shire of Goomalling – Offset Site Revegetation Plan – Calingiri- Goomalling Road SLK 0.00-SLK30.32</i> ”.
Targeted flora spring survey	means a field-based investigation, including a review of established literature, of the biodiversity of flora and vegetation of the permit area, focusing on habitat suitable for flora species that are being targeted and carried out during the optimal period to identify those species. Where target flora are identified in the permit area, the survey must also include a minimum of a 10 metre radius of the surrounding areas to place the permit area into local context.
Threatened flora	means those plant taxa listed as threatened flora under the <i>Biodiversity Conservation Act 2016</i> .
Weeds	means any plant –

Term	Definition
	(a) that is a declared pest under section 22 of the <i>Biosecurity and Agriculture Management Act 2007</i> ; 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.

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**END OF CONDITIONS**




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Jessica Burton

A/MANAGER

NATIVE VEGETATION REGULATION

*Officer delegated under section 20  
of the Environmental Protection Act 1986*

18 January 2024

### Schedule 1: Plans 9307/2

The boundary of the area authorised to be cleared is shown in the maps below (Figure 1a, Figure 1b, Figure 1c and Figure 1d).

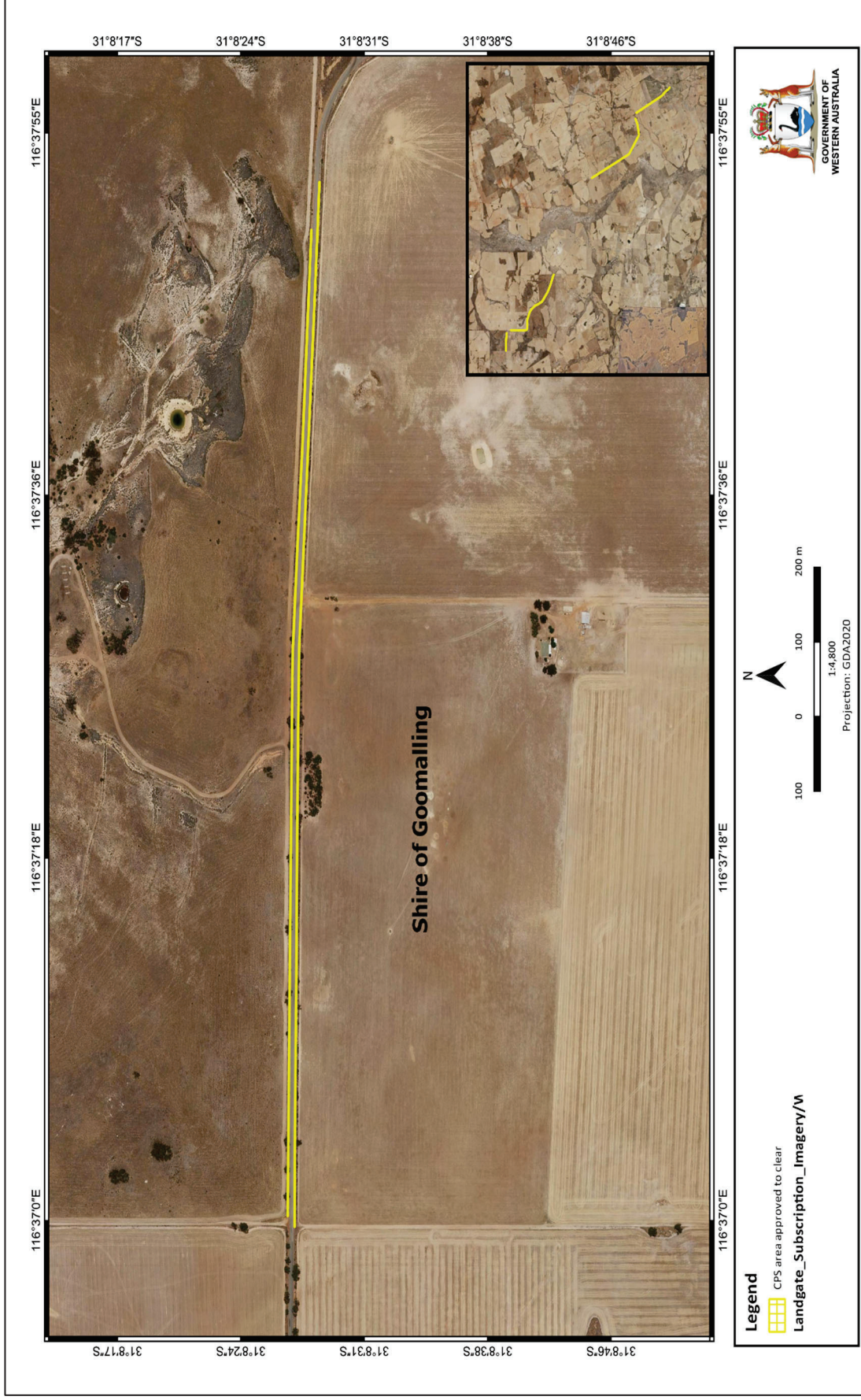


Figure 1a: Map of the boundary of the area within which clearing may occur

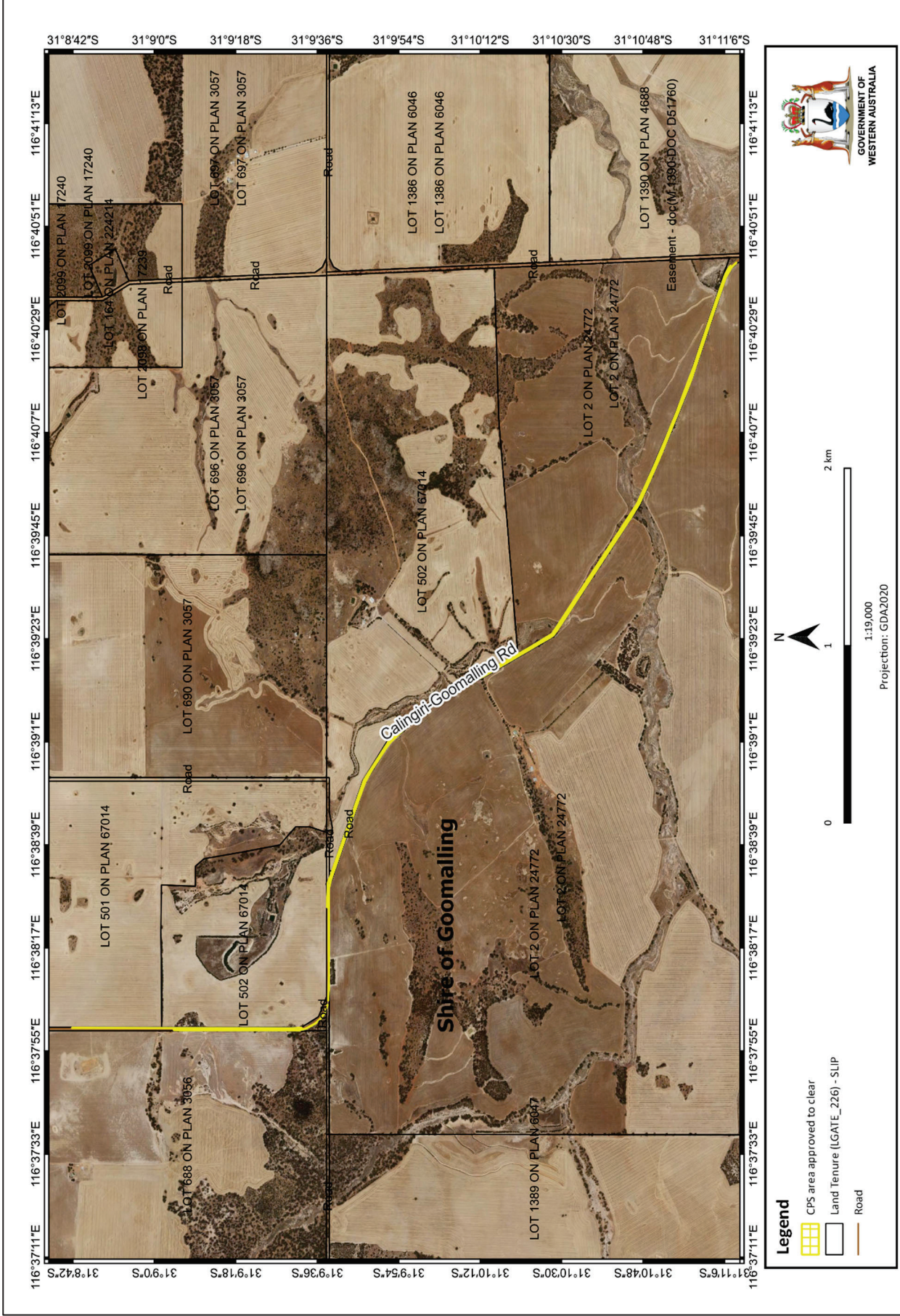


Figure 1b: Map of the boundary of the area within which clearing may occur

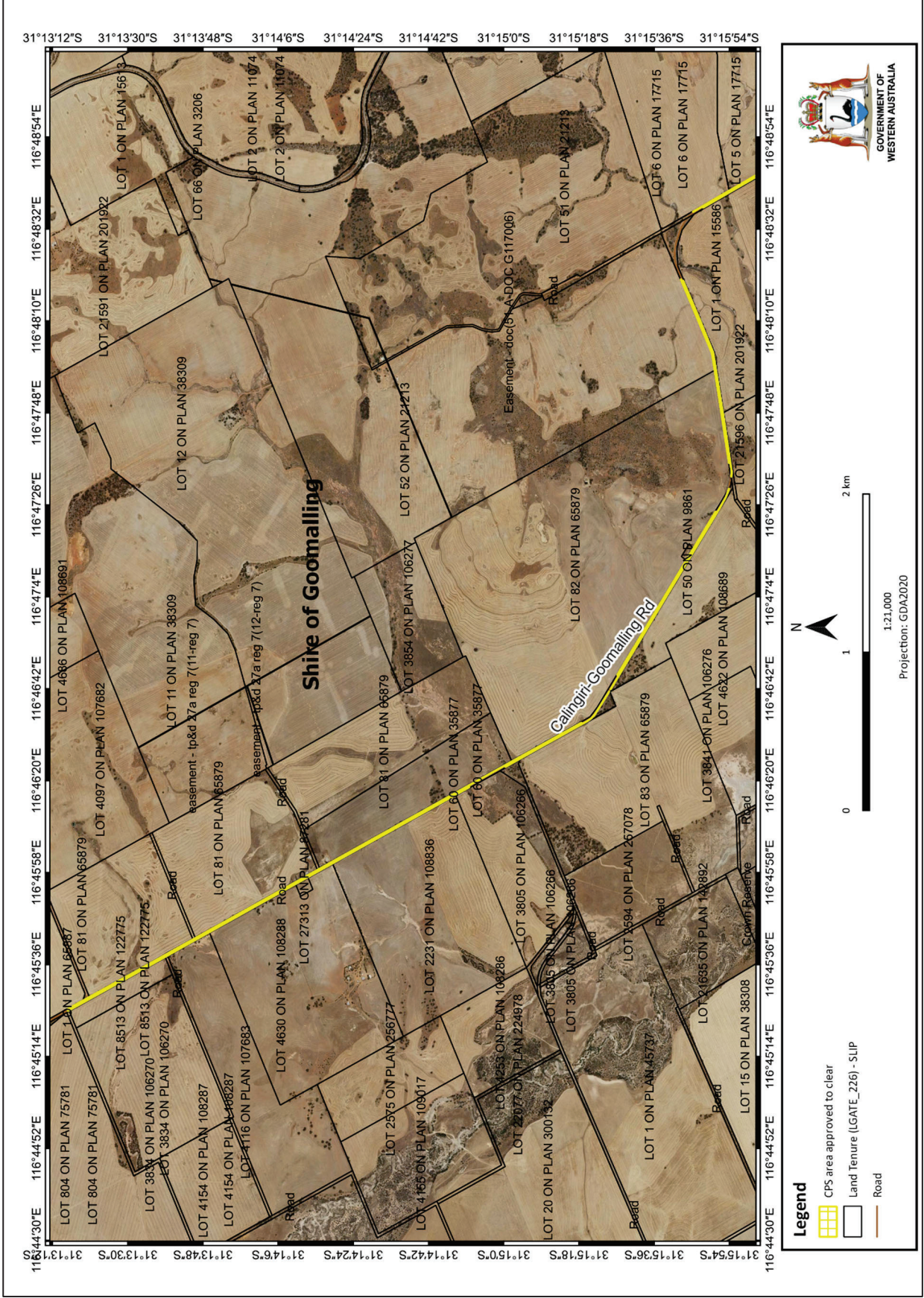


Figure 1c: Map of the boundary of the area within which clearing may occur

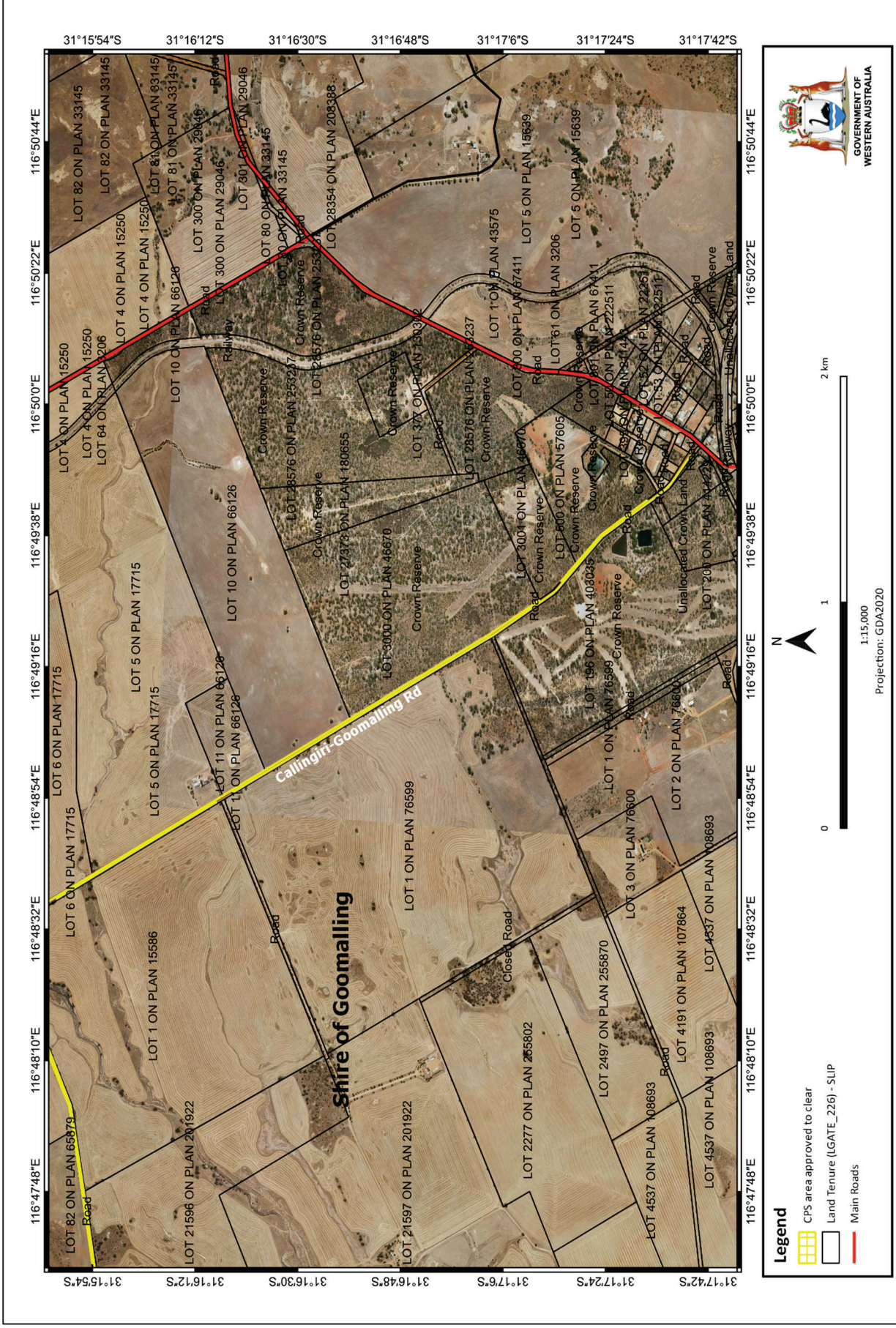


Figure 1d: Map of the boundary of the area within which clearing may occur



**Figure 2: Map of the boundary of the area cross-hatched red which will be revegetated in accordance with the offset condition of this permit. The area cross-hatched green indicates the area where installation of five (5) artificial black cockatoo nesting hollows must occur.**



**Schedule 2: How to design, monitor and maintain artificial hollows for Carnaby's cockatoo**

## 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.

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.

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### 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.



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

Photo: Rick Dawson

## FAUNA NOTES – Artificial Hollows for Black Cockatoos

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.

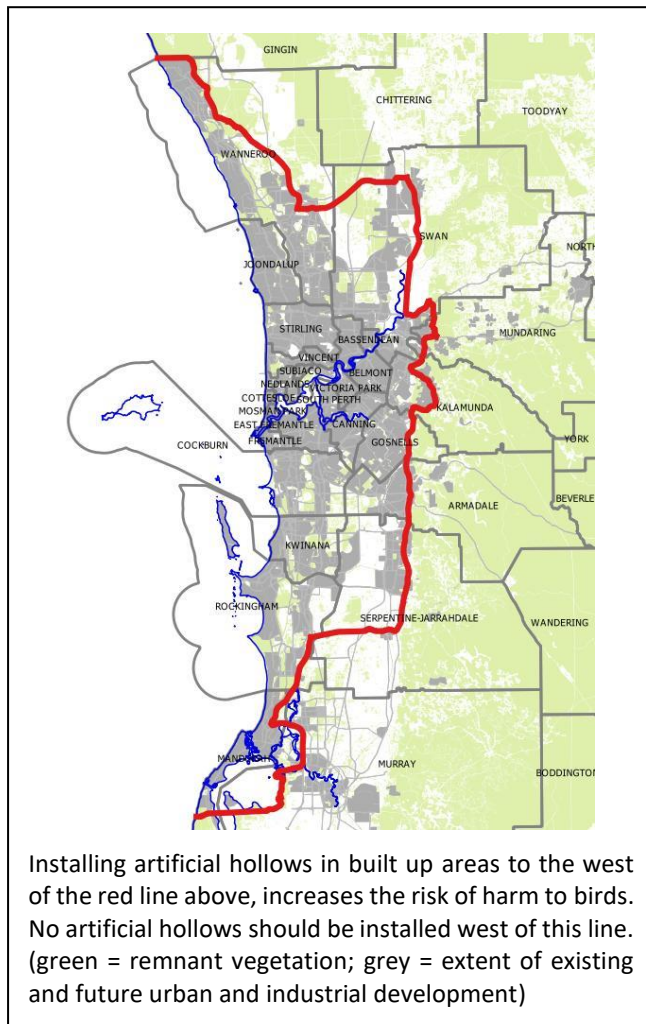
### Is my site suitable for artificial hollows?

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.



**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.	<b>The site is Eucalypt woodland or forest within the known breeding range of the species</b>	
	<i>Important consideration</i>	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.
	<i>Alternative conservation actions</i>	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.	<b>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.</b>	

## FAUNA NOTES – Artificial Hollows for Black Cockatoos

	<i>Important consideration</i>	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.
	<i>Alternative conservation actions</i>	<p>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.</p> <p>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.</p> <p>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.</p> <p>To compile a list of plant species suitable for revegetation at your site, refer to the document <a href="#">Plants Used by Carnaby's Black Cockatoo</a> available on the Department of Biodiversity, Conservation and Attractions (DBCA) <a href="#">black cockatoo webpage</a>.</p>
3.	<b>The artificial hollows can be located in close proximity to adequate feeding areas – within a 12 km radius.</b>	
	<i>Important consideration</i>	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 <a href="#">Plants Used by Carnaby's Black Cockatoo</a> .
	<i>Alternative conservation actions</i>	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.	<b>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.</b>	
	<i>Important consideration</i>	For advice on the monitoring and maintenance requirements, please refer to the section on how to monitor and maintain artificial hollows.
	<i>Alternative conservation actions</i>	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.	<b>A suitable artificial hollow design is used.</b>	
	<i>Important consideration</i>	For greatest chance of success, please refer to the sections below on how to design and place artificial hollows.
	<i>Alternative conservation actions</i>	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)

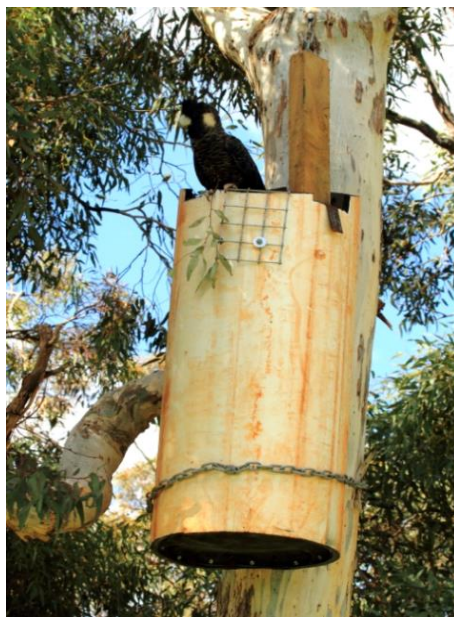


Photo: Christine Groom (left), Rick Dawson (centre and right)

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;

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- 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. Zinalume®), 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.

## FAUNA NOTES – Artificial Hollows for Black Cockatoos

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

## FAUNA NOTES – Artificial Hollows for Black Cockatoos

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](http://www.dbca.wa.gov.au). Records should be submitted to the Department by emailing [fauna.data@dbca.wa.gov.au](mailto: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**

Technique	Description of Technique								
<b>Looking for signs of use</b>	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.								
<b>Observing parent behaviour around a hollow</b>	<p>The behaviour of parent birds around a hollow can indicate an approximate age of young in the nest.</p> <table border="1"> <thead> <tr> <th>Parent Behaviour</th> <th>Approximate Stage and Age of Young</th> </tr> </thead> <tbody> <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 (&lt; 3 - 4 weeks)</td> </tr> <tr> <td>Both parents seen entering/exiting the hollow</td> <td>Nestling(s) has hatched (&gt; 3 - 4 weeks)</td> </tr> </tbody> </table>	Parent Behaviour	Approximate Stage and Age 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) has hatched (> 3 - 4 weeks)
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<b>Observing feeding flocks</b>	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).								
<b>Tapping to flush female</b>	<p>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.</p> <p>Tapping or scraping is best undertaken between 10 am - 3 pm when females will most likely be sitting.</p>								
<b>Observing insect activity around a nest</b>	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.								
<b>Listening for nestling</b>	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.								
<b>Looking inside a nest</b>	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.								

### 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,



## FAUNA NOTES – Artificial Hollows for Black Cockatoos

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.	<ul style="list-style-type: none"> <li>• Looking for signs of use (evidence of chewing)</li> <li>• Observing behaviour of adults around a hollow</li> <li>• Tapping or scraping to flush female</li> <li>• Listening for nestlings</li> <li>• Looking inside nest</li> </ul>
To confirm use by black cockatoos	At least two visits during peak breeding season.	<ul style="list-style-type: none"> <li>• Looking for signs of use (evidence of chewing)</li> <li>• Observing behaviour of adults around a hollow</li> <li>• Tapping or scraping to flush female</li> <li>• Listening for nestlings</li> <li>• Looking inside a nest</li> </ul> <p>Observing breeding evidence from at least two of the techniques confirms use by black cockatoos.</p>
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.	<ul style="list-style-type: none"> <li>• Observing insect activity around a nest</li> <li>• Listening for nestlings</li> <li>• Looking inside a nest</li> </ul> <p>The presence of eggs or nestlings inside a nest will help to determine nesting success.</p>
To determine use by any species	As often as possible.	<p>As a minimum, inspection from the ground:</p> <ul style="list-style-type: none"> <li>• Looking for signs of use</li> </ul> <p>To confirm:</p> <ul style="list-style-type: none"> <li>• Looking inside a nest</li> </ul>
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.

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

## FAUNA NOTES – Artificial Hollows for Black Cockatoos

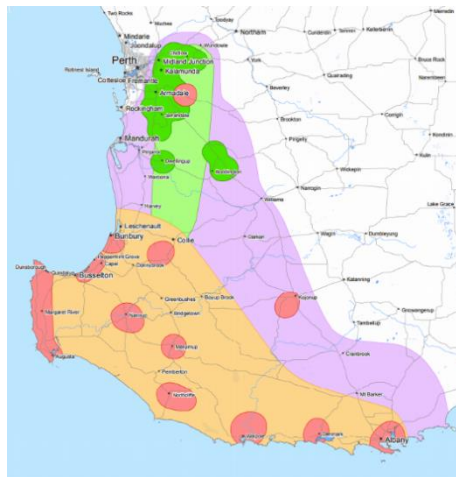


Image: [Commonwealth of Australia, 2011](#)

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.

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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 coarse, 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](https://doi.org/10.1071/PC21061)

## Acknowledgements

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# Clearing Permit Decision Report

## 1. Application details and outcome

### 1.1. Permit application details

Permit number:	CPS 9307/2
Permit type:	Purpose permit
Applicant name:	Shire of Goomalling
Purpose of clearing:	Widening of the existing road carriageway
Property:	Calingiri-Goomalling Road reserve (PINs 11502043, 11720387, 11720392, 11720390, 3702293, 11731752, 11722008, 11731751, 11429894)
Location (LGA area/s):	Shire of Goomalling Goomalling and Karranadgin

### 1.2. Description of clearing activities

The vegetation proposed to be cleared is within a long, linear strip of the Calingiri-Goomalling Road reserve. The proposal involves the clearing of up to 4.56 hectares of native vegetation within a 70.89-hectare footprint along Calingiri-Goomalling Road reserve. The vegetation types within the application area are Eucalyptus Woodland and Samphire Open Low Heath.

### Decision on application and key considerations

Decision:	Granted
Decision date:	18 January 2024
Decision area:	4.56 hectares of native vegetation

### 1.3. Reasons for decision

On 14 June 2023, the Department of Water and Environmental Regulation (DWER) determined to grant Clearing Permit CPS 9307/1 to authorise the Shire of Goomalling to clear up to 4.56 hectares of native vegetation for the purpose of widening of the existing road carriageway.

One appeal was lodged against the conditions of Clearing Permit CPS 9307/1, covering five grounds of appeal as per the Appeal Convenor's report.

This clearing permit amendment gives effect to the Minister for Energy; Environment; Climate Action's (Minister) determination to allow the appeal in part (Appeal number: 022 of 2023). The Minister determined that:

- Condition 9 be amended to ensure that the Permit Holder must undertake either a pre-clearance spring survey or a pre-clearance habitat assessment of the authorised clearing area, to identify critical habitat for *Caladenia drakeoides* as defined in Interim Recovery Plan No. 141; and
- If a pre-clearance habitat assessment identifies critical habitat for *Caladenia drakeoides*, the Permit Holder is not authorised to clear the critical habitat unless a pre-clearance spring survey confirms the presence or absence of the threatened flora.

The Delegated Officer has taken the above into consideration and decided to grant an amended clearing permit in accordance with the Minister's determination. The Delegated Officer amended the existing condition 9 on the permit to reflect the Minister's recommendation.

## 2. Assessment of application

### 2.1. Assessment

This amendment is the result of an appeal determination made by the Minister regarding the conditions of Clearing Permit CPS 9307/1. As a result of the appeal determination, condition 9 of the Clearing Permit has been modified.

The appellant raised concerns in regards to the impacts the proposed clearing may have on *Caladenia drakeoides* and its habitat. The appellant stated that more than one survey is required to determine species absence as they do not flower annually. *Caladenia drakeoides* is associated with margins of salt lakes in seasonally moist sands, usually in shrubland including *Melaleuca* spp., *Acacia* spp., *Hakea* spp., *Callistemon* spp., *Baeckea* spp., *Crassula* spp., *Goodenia* spp., and *Pterostylis* spp (WA Herbarium 2008-).

Critical habitat for *C. drakeoides* is defined in the Interim Recovery Plan as the area of occupancy of known populations; similar habitat within 200 metres (m) of known populations; corridors of remnant vegetation that link populations; additional nearby occurrences of similar habitat that are not known to contain the species but may have done so in the past and may be suitable for translocations; and local catchment areas for the surface and ground waters that provide habitat for the species.

The Minister agreed with the concerns raised by the appellant in regard to the above matter and agreed with the DWER's revised assessment of the impact to flora *Caladenia drakeoides* which found that an additional survey for this species is likely to be required to confirm its presence with the Permit area. The Minister requested that to provide greater confidence, a pre-clearance habitat assessment should be undertaken to identify critical habitat for this species, and that this habitat should be avoided. The Minister further advised that if the habitat assessment finds that critical habitat occurs within the Permit area and if the clearing of critical habitat is unable to be avoided, then the Permit Holder must undertake an additional spring survey to confirm that the species is either present or absent. Consistent with condition 9(b) of the existing clearing permit, clearing within 50 metres of threatened flora is not authorised to be cleared.

### 2.2. Relevant planning instruments and other matters

The assessment against planning instruments and other matters is unchanged and can be found in the Decision Report prepared for Clearing Permit CPS 9307/1.

**End**

## Appendix A - References and databases

### 1. References

Department of Water and Environmental Regulation (DWER) (2023) Purpose permit and decision report: CPS 9307/1 [Index of /permit/9307/Permit \(dwer.wa.gov.au\)](https://www.dwer.wa.gov.au/index-of/permit/9307/Permit)

Office of the Appeals Convenor (2023) Report to the Minister for Environment – Appeal against conditions of Clearing Permit CPS 9307/1, Calingiri-Goomalling Road reserve, Shire of Goomalling– Clearing Permit CPS 9307/1.