



CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

Purpose Permit number:	CPS 8832/1
Permit Holder:	Shire of Goomalling
Duration of Permit:	From 29 May 2021 to 29 May 2036

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

Lot 121 on Deposited Plan 406131, Cunjardine

Goomalling-Meckering Road reserve (PINs 11719167, 11719169, 11719181, 11719183, 11719184), Cunjardine

Goomalling-Meckering Road reserve (PIN 11719186), Cunjardine and Hulongine

Goomalling-Meckering Road reserve (PIN 11719247), Hulongine

3. Clearing authorised

The permit holder must not clear more than 2.8 hectares of native vegetation within the area cross-hatched yellow in Figure 1A, Figure 1B, Figure 1C, Figure 1D and Figure 1E of Schedule 1.

4. Type of clearing authorised

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 29 May 2026.

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. Priority ecological community management

The permit holder must not clear more than 0.6 hectares of native vegetation representative of the ‘Eucalypt woodlands of the Western Australian Wheatbelt (Eucalypt Woodlands)’ ecological community.

9. Priority flora management

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 (Natural Area Holdings Pty Ltd, 2020a) within the area cross-hatched yellow in Figure 1A, Figure 1B, Figure 1C, Figure 1D and Figure 1E of Schedule 1
- (b) If demarcating of 20-metre buffers under condition 9(a) is not practical, engage an *environmental specialist* to demarcate all individuals of *priority flora* species identified (Natural Area Holdings Pty Ltd, 2020a) within the area cross-hatched yellow in Figure 1A, Figure 1B, Figure 1C, Figure 1D and Figure 1E of Schedule 1
- (c) The permit holder is not authorised to clear the *priority flora* species described in Table 1, or any other *priority flora*.

Table 1 - Priority flora identified within the application area (Natural Area Holdings Pty Ltd, 2020a)

ID	Taxon	Easting	Northing
1	<i>Acacia trinalis</i>	487136.871	6525492.059
2	<i>Acacia trinalis</i>	487158.059	6525445.241
3	<i>Acacia trinalis</i>	487027.951	6525709.656
4	<i>Acacia trinalis</i>	487191.472	6525305.830

5	<i>Acacia trinalis</i>	487191.126	6525302.150
6	<i>Acacia trinalis</i>	487184.127	6525343.435
7	<i>Acacia trinalis</i>	487030.299	6525718.603
8	<i>Acacia trinalis</i>	487189.195	6525342.997
9	<i>Acacia trinalis</i>	487032.986	6525710.328
10	<i>Acacia trinalis</i>	487034.803	6525710.235
11	<i>Acacia trinalis</i>	487186.174	6525337.887
12	<i>Acacia trinalis</i>	487186.644	6525344.326
13	<i>Acacia trinalis</i>	487186.713	6525340.235
14	<i>Acacia trinalis</i>	487186.523	6525338.934
15	<i>Acacia trinalis</i>	487191.176	6525312.965

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, Figure 1D and Figure 1E 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 *Calyptorhynchus 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 areas cross-hatched yellow in Figure 1A, Figure 1B, Figure 1C, Figure 1D and Figure 1E 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) For each suitably sized hollow for black cockatoo nesting that cannot be avoided, the permit holder must install an artificial black cockatoo nesting hollow.
- (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 artificial black cockatoo nest hollow(s) required by condition 10(g) of this permit:
 - (i) seven (7) hollows must be installed within the area cross-hatched green in Figure 3A of Schedule 1 (Crown Reserve 13322)
 - (ii) two (2) hollows must be installed within the area cross-hatched green in Figure 3B of Schedule 1 (Reserve 47896)
 - (iii) two (2) hollows must be installed within the area cross-hatched green in Figure 2C of Schedule 1 (Reserve 15442)

- (iv) must be designed and placed in accordance with the specifications detailed in Schedule 2; and
 - (v) must be monitored and maintained in accordance with the specifications detailed in Schedule 3, for a period of at least 10 years.
- (j) Within two months of clearing authorised under this permit within the areas cross-hatched yellow in Figure 1A, Figure 1B, Figure 1C, Figure 1D and Figure 1E of Schedule 1, 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 1994 (GDA94), 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 GDA94, 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* within the areas cross-hatched red in Figure 2A, Figure 2B and Figure 2C of Schedule 1 by:
 - (i) Deliberately *planting* native vegetation that will result in similar species composition, structure and density of native vegetation to the surrounding vegetation within the *offset sites*; and
 - (ii) Ensuring only *local provenance* seeds and propagating material area used to *revegetate* and *rehabilitate* the area.
- (c) Rip the *offset sites* 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 seven 10 x 10 metre quadrat monitoring sites across the *offset sites*:
 - (i) one (1) within Crown Reserve 4237
 - (ii) two (2) within Crown Reserve 13755
 - (iii) four (4) within Crown Reserve 15442
- (f) Conduct *pest animal* control

- (g) Fence the *offset sites*
- (h) Remove rubbish from the *offset sites*
- (i) Install a four-metre trafficable firebreak that complies with the Shire of Goomalling requirements around the interior perimeter fence of the *offset sites*
- (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 sites* by the end of the project maintenance period
- (l) Achieve the following completion criteria after the 5 year monitoring period for areas *revegetated* and *rehabilitated* under this Permit:

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 site</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 site</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 Wheatbelt Region Impact and Invasiveness Ratings list 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 ² 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 sites* 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 sites* 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.

12. Offset – Crown Reserves 15442

By 29 May 2022, the permit holder shall provide to the *CEO* a copy of the executed change in purpose of Crown Reserve 15442, Ucarty West, from ‘gravel’ to ‘conservation’.

13. Offset – Crown Reserves 13755

By 29 May 2022, the permit holder shall provide to the *CEO* a copy of the executed change in purpose of Crown Reserve 13755, Cunjardine, from ‘gravel’ to ‘conservation’.

PART III - RECORD KEEPING AND REPORTING

14. 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	<ul style="list-style-type: none"> (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 (GDA94), 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 6; (f) actions taken to minimise the risk of the introduction and spread of weeds and dieback in accordance with condition 7; and (g) the size of the area of Wheatbelt Woodland TEC cleared (in hectares) in accordance with condition 8 of this permit.
2.	In relation to flora management pursuant to condition 9	<ul style="list-style-type: none"> (a) the name and location of each threatened flora and/or priority flora species, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings; (b) actions taken to demarcate each priority flora species recorded and their relevant buffers; and

No.	Relevant matter	Specifications
		(c) actions taken to avoid the clearing of <i>priority flora</i> species.
3.	In relation to black cockatoo fauna management pursuant to condition 10	<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: 20px;">(i) the time and date that it was determined to be no longer occupied; and</p> <p style="padding-left: 20px;">(ii) a description of the evidence by which it was determined to be no longer occupied; and</p> <p>(a) 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 <i>revegetated</i> and <i>rehabilitated</i>, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 1994 (GDA94), expressing the geographical coordinates in Eastings and Northings or decimal degrees;</p> <p>(b) the date the fence and firebreak were installed and evidence of maintenance;</p> <p>(c) the date rubbish was removed from the <i>revegetation</i> and <i>rehabilitation</i> area;</p> <p>(d) pest animal and weed control measures undertaken;</p> <p>(e) a description of the <i>revegetation</i> and <i>rehabilitation</i> activities undertaken;</p> <p>(f) the size of the area <i>revegetated</i> and <i>rehabilitated</i> (in hectares);</p> <p>(g) the species composition, structure and density of <i>revegetation</i> and <i>rehabilitation</i>;</p> <p>(h) the number of plants and species installed</p> <p>(i) the assessment of the <i>revegetation</i> and <i>rehabilitation</i> against Criterion outlined in condition 11(l);</p> <p>(j) any remedial actions undertaken in accordance with condition 11(m); and</p> <p>(k) a copy of the environmental specialist's report.</p>

15. 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 14 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 29 February 2031, the permit holder must provide to the *CEO* a written report of records required under condition 14 of this Permit, where these records have not already been provided under condition 15(a) of this Permit.

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 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 <i>black cockatoo species</i> .
Black cockatoo species	means one or more of the following species: a) <i>Calyptorhynchus lateriosis</i> (Carnaby's cockatoo); b) <i>Calyptorhynchus baudinii</i> (Baudin's cockatoo); and/or c) <i>Calyptorhynchus banksii naso</i> (forest red-tailed black cockatoo).
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.
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.
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 CEO as a suitable environmental specialist.
EP act	<i>Environmental Protection Act 1986</i> (WA)
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 <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 sites	Means the areas cross-hatched red on Figure 2a, Figure 2b and Figure 2c 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.
Reference sites	Means: a) For Crown Reserves 4237, Hulongine and 13755, Cunjardine, the five 10m x 10m quadrat reference sites that were identified (Munns, 2018) along Patterson Rd verge within 150 meters of the <i>revegetation</i> and <i>rehabilitation area</i> to identify remnant native vegetation species composition and structure, condition, density and weed cover. b) For Crown Reserve 15442, Ucarty West, the area cross-hatched green in Figure 2c of Schedule 1.
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> ,

Term	Definition
	<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 11 of this Permit: “ <i>Shire of Goomalling – Offset Site Revegetation Plan – Goomalling- Meckering Road SLK 8.00-SLK21.31</i> (Natural Area Consulting Management Services, 2020b)”.
Weeds	means any plant – <ul style="list-style-type: none"> (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.

REFERENCES

- Natural Area Holdings Pty Ltd. (2020a). Additional information in relation to the clearing permit application CPS 8832/1 provided on behalf of the Shire of Goomalling. Received by the Department of Water and Environmental Regulation on 22 October 2020 (DWER Ref: A1946106).
- Natural Area Holdings Pty Ltd. (2020b). Revegetation management plan prepared in relation to the clearing permit application CPS 8832/1 on behalf of the Shire of Goomalling. Received by the Department of Water and Environmental Regulation on 3 May 2021 (DWER Ref: A2002143).
- Munns, R. (2018). *Offset Revegetation Plan for Clearing Permit CPS 7534/1 on Goomalling - Meckering Rd –from SLK 0.00 – 8.00*. Available at <ftp://ftp.dwer.wa.gov.au/permit/7534/>

END OF CONDITIONS


 Ryan Mincham
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Ryan Mincham
 MANAGER
 NATIVE VEGETATION REGULATION

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

6 May 2021

Schedule 1

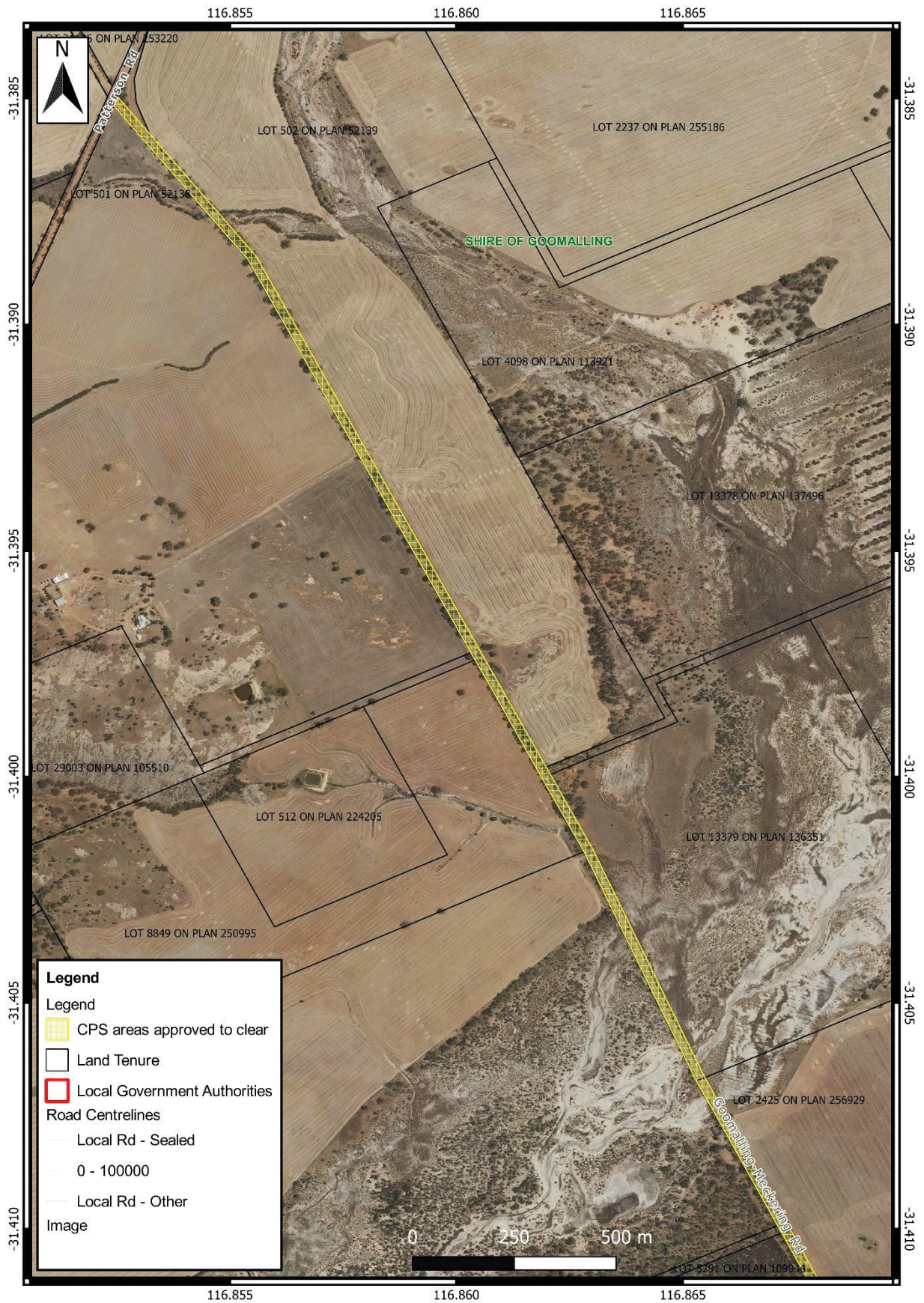


Figure 1A: Map of the boundary of the area (cross-hatched yellow) within which clearing may occur

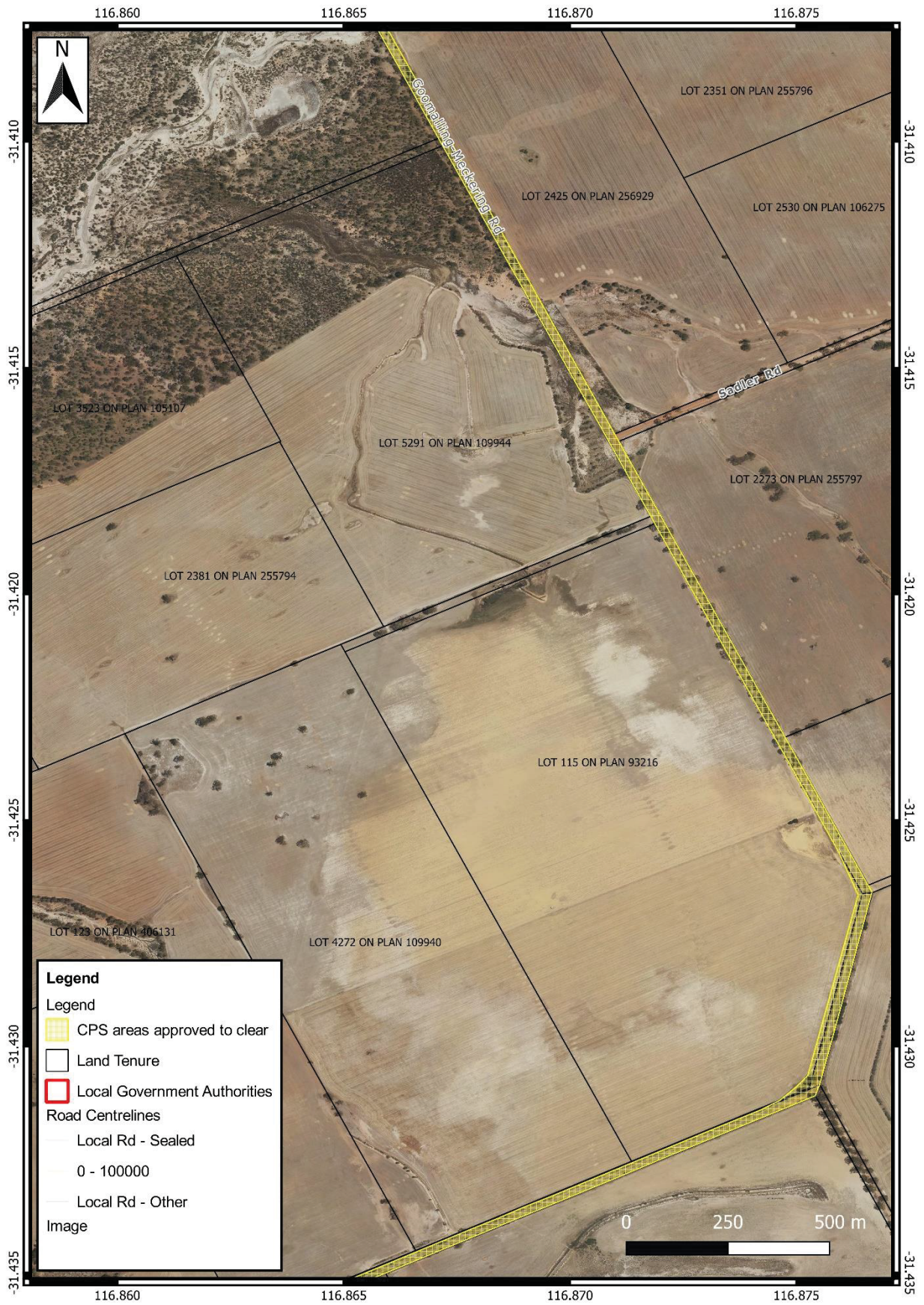


Figure 1B: Map of the boundary of the area (cross-hatched yellow) within which clearing may occur

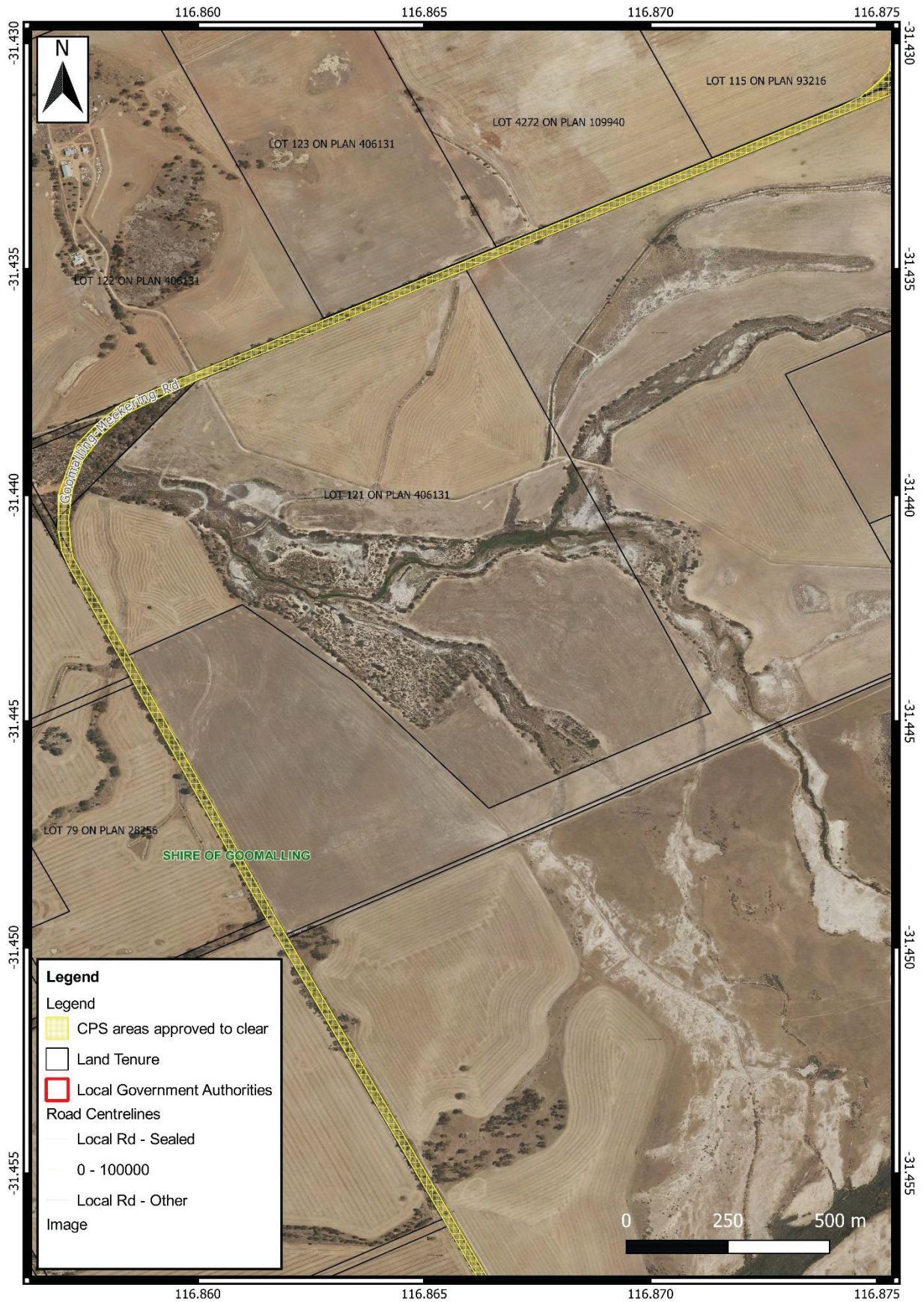


Figure 1C: Map of the boundary of the area (cross-hatched yellow) within which clearing may occur

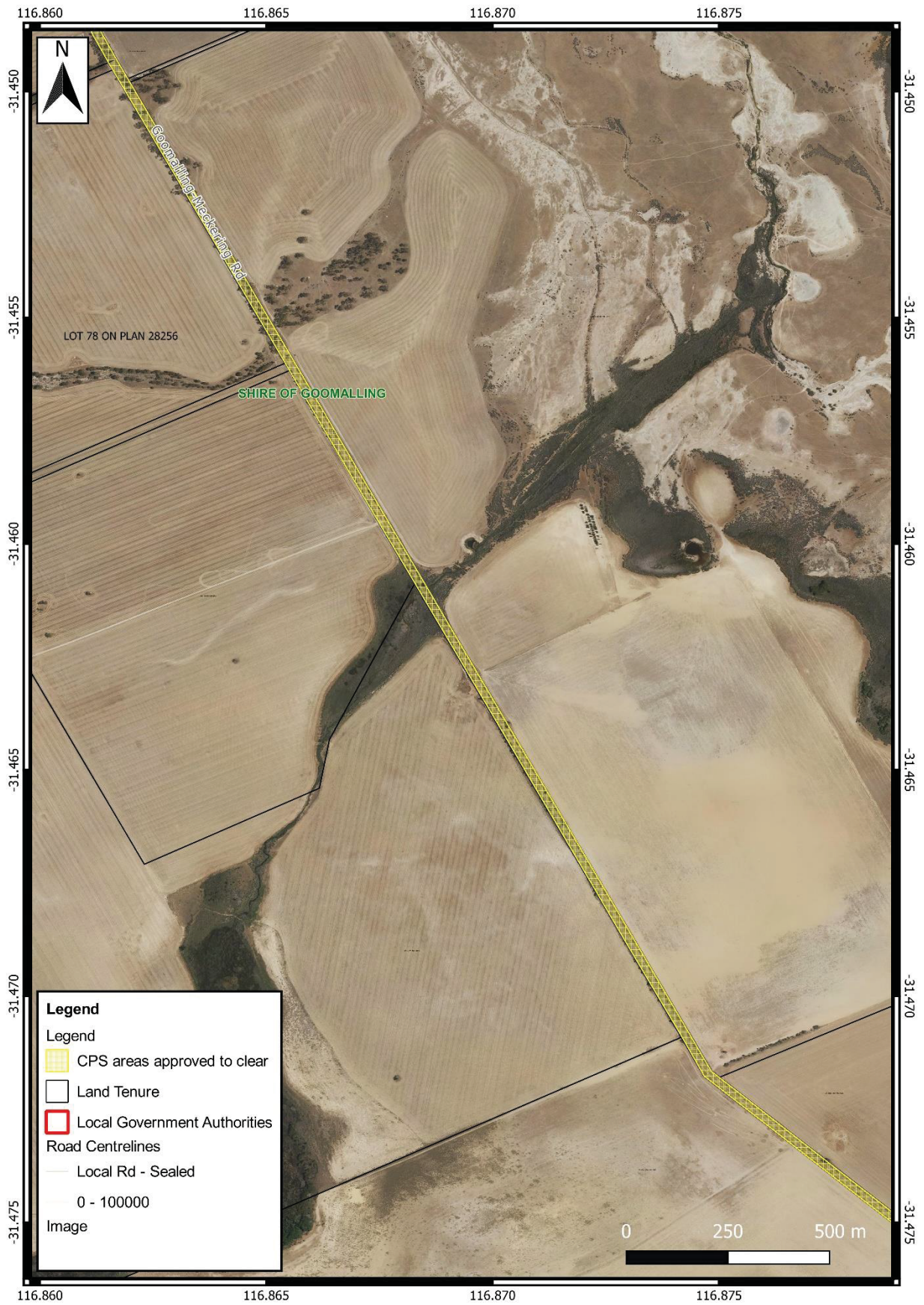


Figure 1D: Map of the boundary of the area (cross-hatched yellow) within which clearing may occur

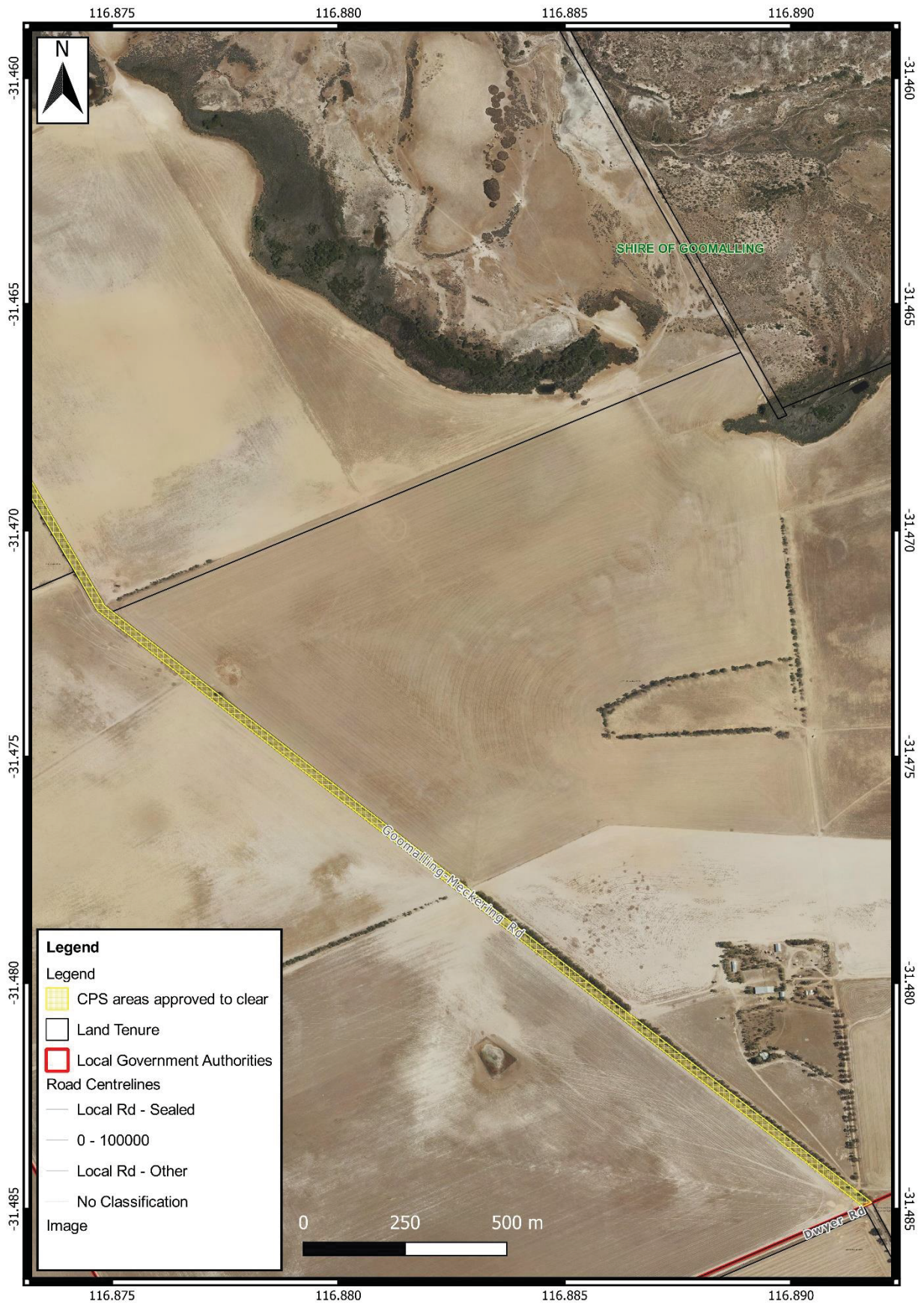


Figure 1E: Map of the boundary of the area (cross-hatched yellow) within which clearing may occur



Figure 2A: Map of the boundary of the area cross-hatched red which will be revegetated in accordance with the offset conditions of this permit



Figure 2B: Map of the boundary of the area cross-hatched red which will be revegetated in accordance with the offset conditions of this permit



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

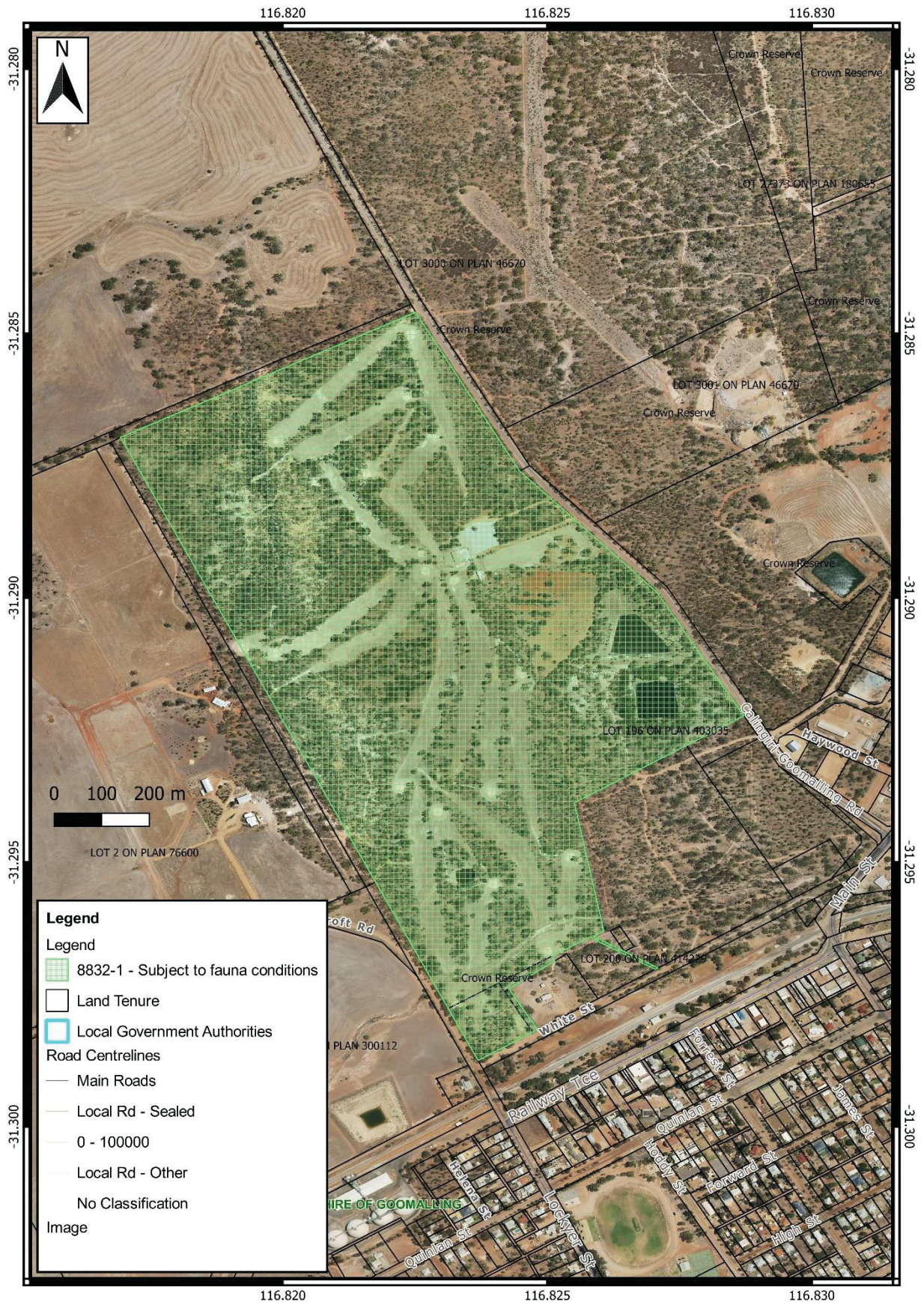


Figure 3A: Map of the boundary of the area within installation of seven (7) artificial black cockatoo nesting hollows must occur

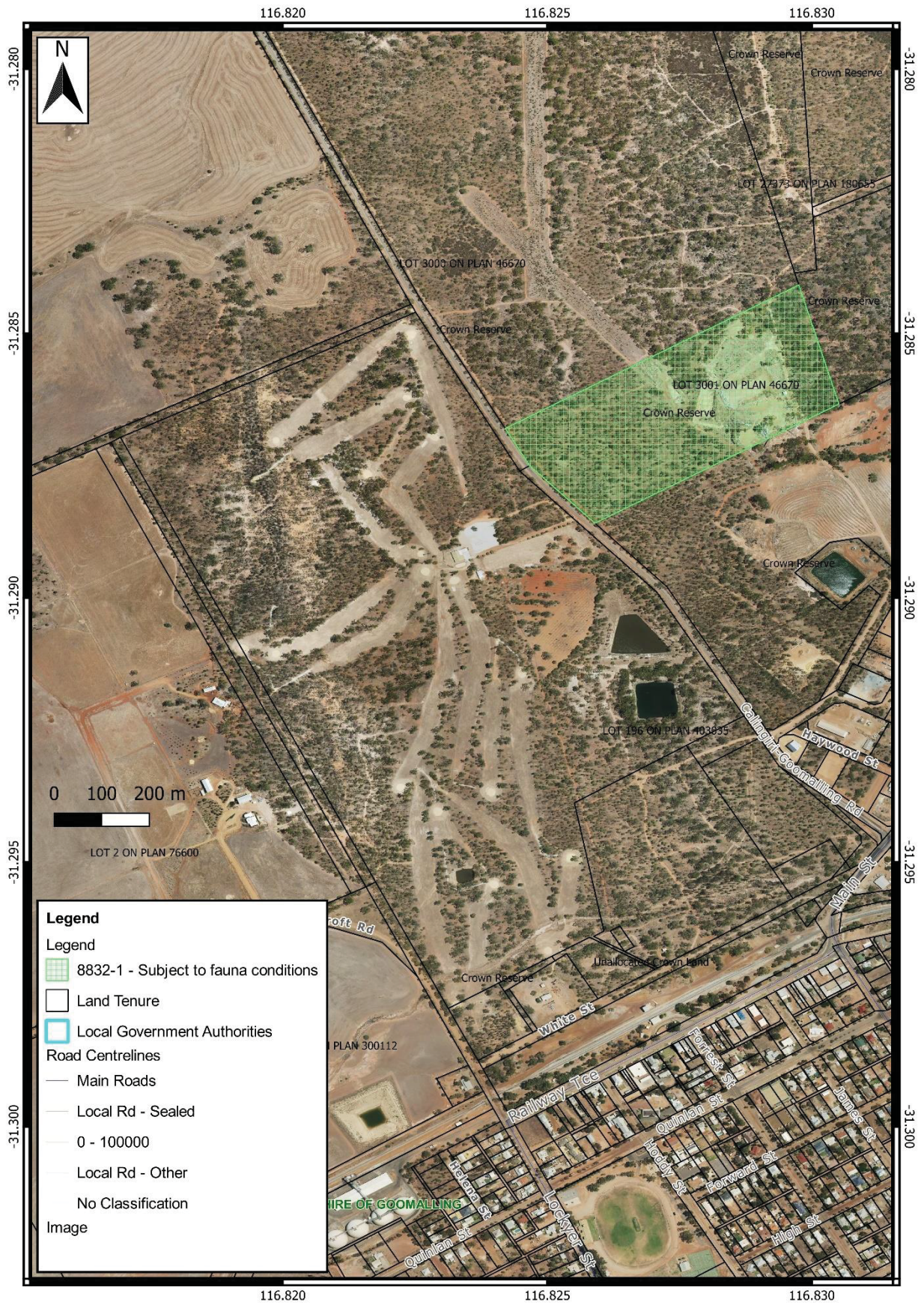


Figure 3B: Map of the boundary of the area within installation of two (2) artificial black cockatoo nesting hollows must occur

Schedule 2 – How to design and place artificial hollows for Carnaby’s cockatoo

Artificial hollows for Carnaby's cockatoo



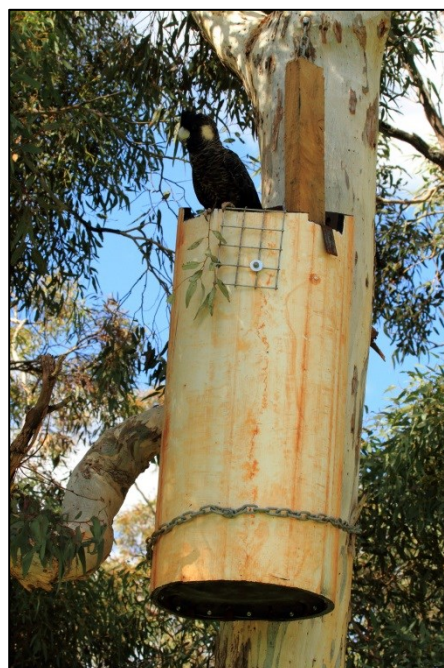
How to design and place artificial hollows for Carnaby's cockatoo

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. Zinalume ®), 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

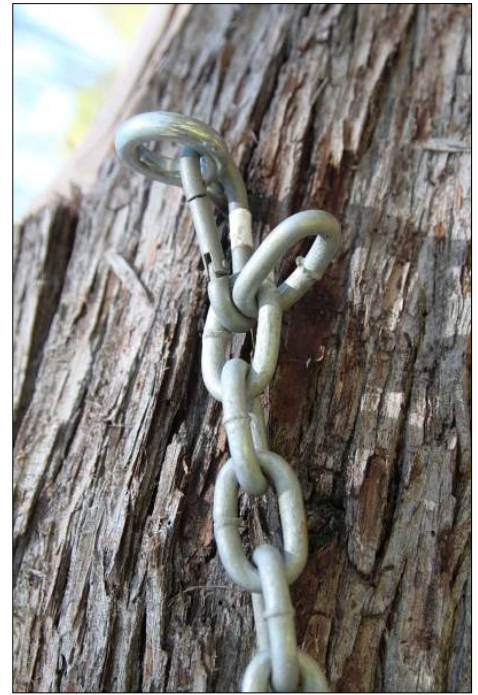
Once artificial hollows have been placed they require monitoring and maintenance to ensure they continue to be useful for nesting by Carnaby's cockatoo. It is important to monitor artificial hollows to determine use by Carnaby's cockatoo, other native species as well as pest species. By undertaking monitoring 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

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 (wildlifelicencing@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)	<ul style="list-style-type: none"> • 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)	<p>To observe at least two of the following:</p> <ul style="list-style-type: none"> • Breeding behaviour of adults around hollow or evidence of chewing • Female flushed from hollow • Noises from nestlings in hollow <p>Or to observe:</p> <ul style="list-style-type: none"> • 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.	<ul style="list-style-type: none"> • Looking inside nest to observe eggs or nestlings.
To determine use by any species	As often as possible.	<ul style="list-style-type: none"> • 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.	<ul style="list-style-type: none"> • 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

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Decision Report

1. Application details

1.1. Permit application details

Permit application No.: 8832/1
Permit type: Purpose Permit

1.2. Applicant details

Applicant's name: Shire of Goomalling
Application received date: 4 March 2020

1.3. Property details

Property: Goomalling-Meckering Road reserve (PINs 11719167, 11719169, 11719181, 11719183, 11719184, 11719186 and 11719247)
Lot 121 on Deposited Plan 406131
Local Government Authority: Shire of Goomalling
Localities: Hulongine and Cunjardine

1.4. Application

Clearing Area (ha)	Revised clearing area (ha)	Method of Clearing	Purpose category:
4.7 in a 27.1 clearing footprint	2.8 in a 27.1 clearing footprint	Mechanical Removal	Road construction or upgrades

1.5. Decision on application

Decision on Permit Application: Granted
Decision Date: 6 May 2021

Reasons for Decision:

The clearing permit application has been assessed against the clearing principles, planning instruments and other matters in accordance with section 51O of the *Environmental Protection Act 1986* (EP Act). It has been concluded that the proposed clearing is at variance with principle (a), (b), (e) and (f), may be at variance with principle (h) and is not likely to be at variance with the remaining principles.

The Delegated Officer considered the following:

- avoidance, minimisation and mitigation actions implemented by the applicant. The Delegated Officer determined that all reasonable measures, which would minimise the need for clearing, were undertaken.
- the proposed clearing includes vegetation growing in association with a watercourse and wetland. The Delegated Officer determined that no significant impacts to the environmental values of the waterbodies are expected given the minimal extent of the proposed clearing over a larger, linear clearing footprint.
- a state listed priority ecological community (PEC) is mapped within some portions of the application area. The Delegated Officer determined that the environmental impact can be adequately mitigated through limiting the extent of clearing within this PEC.
- the application area contains suitable nesting habitat for conservation significant fauna species. The Delegated Officer determined that this environmental impact can be adequately mitigated through a fauna management condition which requires the applicant to install artificial nesting boxes.
- the proposed clearing will result in the loss of native vegetation considered significant as a remnant in an extensively cleared landscape and native vegetation which supports fauna movement across the landscape. Based on the calculation consistent with the *Environment Protection and Biodiversity Conservation Act 1999* Offset Calculator, and in accordance with the WA Environmental Offsets Policy (2011) and WA Environmental Offsets Guidelines (2014), the Delegated Officer determined that revegetation and protection of 5.11 hectares of native vegetation will adequately address the impacts to these environmental values.
- findings of the flora surveys within the nominated revegetation areas and nearby vegetation (areas identified as reference sites). Based on these findings, the Delegated Officer established completion criteria for the required revegetation which were added to the clearing permit. The Delegated Officer determined that the choice of species selected for revegetation was appropriate based on soil type, landscape position and site history, and therefore, all actions that would maximise the revegetation success had been undertaken.
- individuals of priority flora occur along Goomalling – Meckering Road reserve. The Delegated Officer imposed a flora management condition on the permit which does not authorise the applicant to clear any individuals of priority flora, requires demarcation of priority flora and prevents any clearing within 20 metres of demarcated individuals.

- the Shire has received confirmation of financial resources for the project from Main Roads Western Australia for the financial year 2021/2022.

The Delegated Officer considered that the impacts of the proposed clearing are unlikely to have any long-term adverse impacts on the environmental values in the local area and that offset, flora, fauna and PEC management, as well as weed and dieback management practices will mitigate any potential impacts.

2. Site Information

Clearing Description The original application proposed to clear up to 4.7 hectares (ha) of native vegetation within a 27.1 ha footprint within Goomalling-Meckering Road reserve (PINs 11719167, 11719169, 11719181, 11719183, 11719184, 11719186, 11719247, 11719266), Lot 115 on Diagram 93216 and Lot 121 on Deposited Plan 406131, Hulongine and Cunjardine, for the purpose of road widening (Figure 1).

The proposed widening is to increase the width of the western side of the road by an additional 3.5 metres along a 13.34 kilometre stretch of road (SLK 8.00 – 21.34). The applicant advised that 3.5 metres was applied for, however, only 2 to 3 metres will be required. The additional area was included in the application to allow more flexibility. The applicant also advised that the clearing will occur on the western side of the road as there is an existing pipeline along the eastern boundary of the road reserve.

The proposed clearing is the second stage of the road widening within the Goomalling-Meckering Road. A clearing permit for the first stage (SLK 0.00 – 8.00) was granted under CPS 7534/1 in February 2019 subject to conditions requiring weed management measures and the implementation of an offset.

Biological surveys The applicant commissioned Natural Area Holdings Pty Ltd (Natural Area) to conduct a flora and vegetation survey within the clearing footprint (hereafter referred to as the Flora survey). The Flora survey was conducted on 16 and 17 September 2019 and included the following works (Natural Area, 2020a):

- installing three quadrats per vegetation type, recording landform, soil complex, leaf litter and the abundance of each species within the quadrat;
- determining native and non-native flora species present;
- opportunistically sighting or viewing evidence of fauna species;
- recording vegetation condition and type; and
- undertaking a targeted search for conservation significant flora likely to be present within the application area.

The flora survey noted that despite some limitations, such as availability of herbarium records or information on flora species provided on some databases, 80 to 90 per cent of species within the existing road have been identified (Natural Area, 2020a).

A review of the Flora survey (Natural Area, 2020) noted that the methodology of the survey was in accordance with the Environmental Protection Authority's (EPA) *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment*.

Vegetation Description The application area occurs within the 'Katanning' Interim Biogeographic Regionalisation for Australia (IBRA) bioregion, and is mapped as the following Beard vegetation associations (Shepherd et al., 2001):

- 142, described as medium woodland; York gum and salmon gum;
- 694, described as shrublands; scrub-heath on yellow sandplain *Banksia-Xylomelum* alliance in the Geraldton Sandplain and Avon-Wheatbelt Regions;
- 988, described as succulent steppe with thicket; *Melaleuca thyooides* over samphire; and
- 1049, described as medium woodland; wandoo, York gum, salmon gum, morrel & gimlet.

The Flora survey mapped the application area as comprising of three vegetation types as detailed in Table 1 (Natural Area, 2020).

Table 1 - Vegetation types recorded in the application area (Natural Area, 2020).

Vegetation type	Description	Extent in the clearing footprint (ha)	Extent in the clearing footprint (%)
Eucalyptus woodland	<i>Eucalyptus</i> woodland dominated by <i>Eucalyptus loxophleba</i> subsp. <i>loxophleba</i> and <i>Eucalyptus salmonophloia</i> , over <i>Acacia acuminata</i> and <i>Acacia saligna</i> , with an understory of <i>Atriplex semibaccata</i> , <i>Rhagodia drummondii</i> and <i>Enchylaena</i> spp., over mixed herbs and weeds	21.6	79.8
Mixed low woodland	Mixed low woodland dominated by <i>Leptospermum erubescens</i> and <i>Allocasuarina campestris</i> , over an understory of <i>Dianella revoluta</i> and <i>Austrostipa</i> spp. with mixed herbs and weeds	3.3	12.2
Samphire open low heath	Samphire Open Low Heath dominated by <i>Tecticornia</i> spp., <i>Rhagodia drummondii</i> and <i>Frankenia</i> sp., over <i>Cotula cotuloides</i> , <i>Triglochin mucronate</i> and mixed herbs and weeds	2.2	8.00
Total		27.1	100.00

Vegetation Condition

The condition of the vegetation within the application area is considered to range from very good Keighery, 1994) to completely degraded (Keighery, 1994) condition. (Natural Area, 2020a). The condition of the vegetation was determined by the Flora survey (Natural Area, 2020a).

Table 2 - Vegetation condition recorded in the application area (Natural Area, 2020).

Vegetation Condition	Description (Keighery, 1994)	Extent in the clearing footprint (ha)	Extent in the clearing footprint (%)
Very good	Vegetation structure altered; obvious signs of disturbance	1.57	5.8
Good	Structure significantly altered by multiple disturbance; retains basic structure/ability to regenerate	6.69	24.65
Degraded	Structure severely disturbed; regeneration to good condition requires intensive management	10.24	37.8
Completely degraded	No longer intact, completely/almost completely without native species	8.60	31.75
Total		27.1	100.00

Soil type

Four land subsystems as detailed in Table 3 are mapped within the application area (Schoknecht et al., 2004).

Table 3 - Mapped land subsystems in the application area (Schoknecht et al., 2004).

Mapped soil subsystem	Description (Schoknecht et al., 2004)	Extent in the clearing footprint (ha)	Extent in the clearing footprint (%)
Greenhills York Subsystem (256GhYO)	Areas of soils derived from freshly exposed rock. This unit is typified by the red soils of the Avon Valley but also includes areas of similar, but often greyer and lighter textured soils to the east of the valley	12.2	45
Cunderdin subsystem (256PsCU)	Yellow aeolian sand with patches of white sand and some areas of sand over gravel	10.84	40
Greenhills Ewerts Phase 1 (256GhES1)	Hillslopes containing sand and loamy sand over yellowish clay soils, with some gravel ridges, and some heavier soils that often occur immediately below a breakaway	2.71	10
Goomalling Mortlock Subsystem (256GoMO)	Valley floors of the Mortlock River and other similar creeks that predominantly contain sand over yellow-ish clay soils. Prone to salinity and waterlogging	1.35	5
Total		27.1	100

Comments

The local area is considered a 10 kilometre radius from the perimeter of the application area.

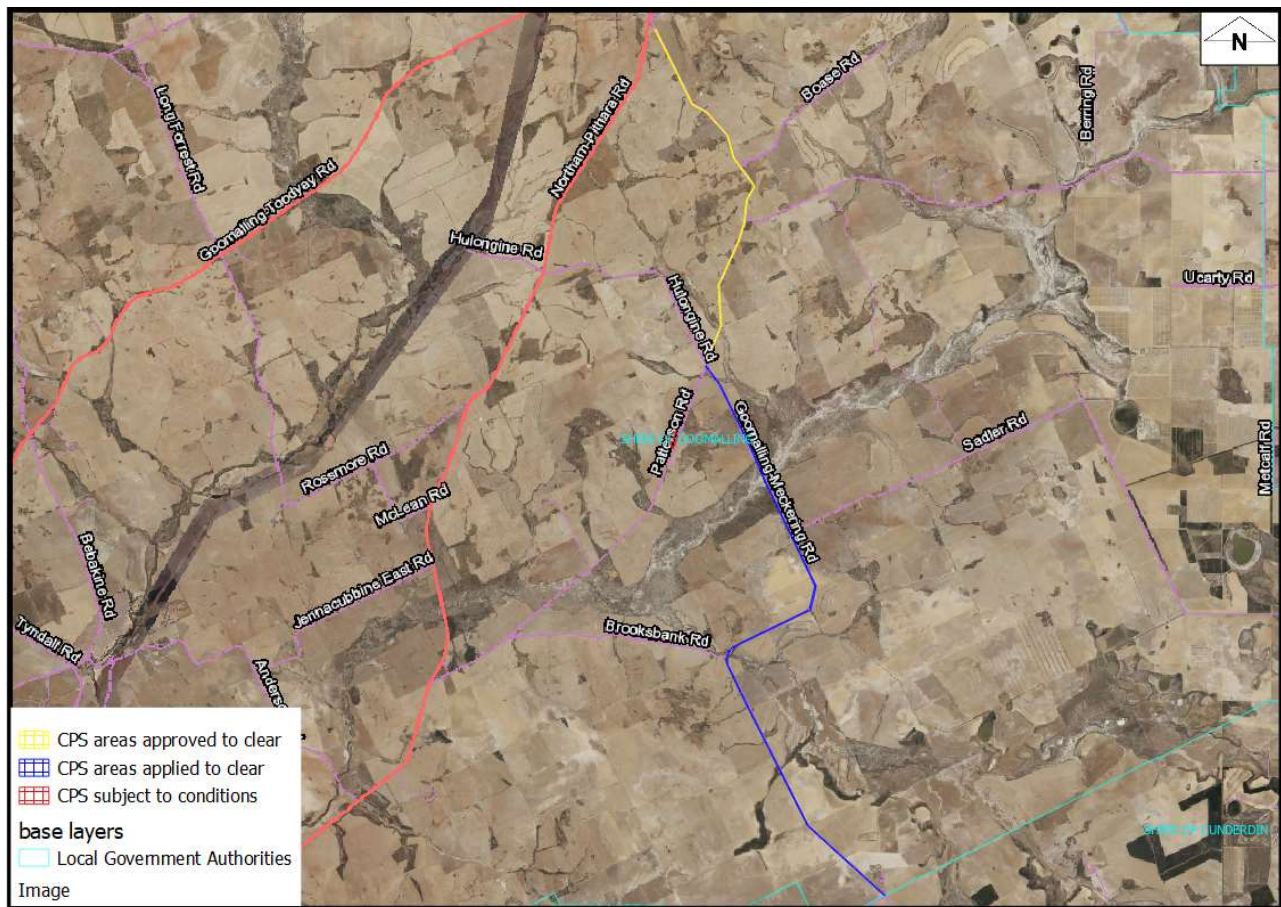


Figure 1 - Application area cross-hatched blue, previously approved area in Goomalling-Meckering road cross-hatched yellow



Figure 2a - Eucalyptus woodland



Figure 2b - Mixed low woodland

Figures 2a-b - Representative photos of the vegetation within the application area (Natural Area, 2020a)

3. Minimisation and mitigation measures

In relation to whether alternatives have been considered that would avoid or minimise the need for clearing, the applicant has advised that options were limited due to clearing occurring within a designated road reserve. Clearing was required to occur on the western side of the road as there is an existing pipeline along the eastern boundary of the road reserve. Where possible, the application committed to retaining individual trees (Applicant, 2020a).

On 24 June 2020, DWER wrote to the applicant advising that the proposed clearing had the potential to impact on Eucalypt woodlands of the Western Australian Wheatbelt (Eucalypt Woodlands) (Wheatbelt Woodland) threatened ecological community (TEC), fauna habitat values within the application area, native vegetation significant in an extensively cleared landscape, priority flora species, namely *Acacia trinalis* (Priority (P)1) and *Banksia horrida* (P3), and native vegetation that contributes to ecological linkages.

The applicant subsequently commissioned Natural Area to undertake an additional survey of the application area. The applicant also reduced the application area by shifting the centreline by 0.5 metre in towards the verge with the least amount of native vegetation and avoiding some of the larger trees within the revised application area. The trees that will be retained will be clearly marked to minimise the potential indirect impacts of the clearing activities (Applicant, 2020b). These activities resulted in mitigating the environmental impacts to the above listed environmental values through:

- a reduction of approximately 40 per cent in the amount of clearing proposed (from 4.7 hectare to 2.8 hectares)
- the retention of approximately 1.9 hectares of native vegetation considered as significant in an extensively cleared landscape which contributes to an ecological linkage
- the retention of eight of fifteen *A. trinalis* identified within the Goomalling-Meckering Road reserve
- the retention of 11 trees containing hollows.

On 16 November 2020, DWER wrote to the applicant advising that the proposed clearing still had the potential to cause significant impacts on *A. trinalis* at a local, as well as regional level (Department of Biodiversity, Conservation and Attractions (DBCA), 2020a). To mitigate these impacts, the applicant proposed to collect seeds of this species, propagate new plants and plant them in the identified offset sites (Applicant, 2020c). This approach was not supported by DBCA due to limited confidence in the success of the propagation (DBCA, 2020b). Taking this into consideration, the applicant committed to avoiding clearing of all individuals of *A. trinalis* identified within the application area and their respective 20-metre buffers. Where retaining buffers will not be practical due to the locations of individual plants in the proximity of the existing road, the applicant will engage an environmental specialist to demarcate all priority flora species within the application area prior to any clearing.

The following assessment is the preliminary assessment of the original area of 4.7 hectares. Section 5 outlines the modifications made by the applicant and the consideration of the variances made in response to these modifications.

4. Assessment of application against clearing principles, planning instruments and other relevant matters

(a) Native vegetation should not be cleared if it comprises a high level of biodiversity.

Proposed clearing may be at variance with this Principle

Conservation significant flora

According to available databases, three threatened and 10 priority flora species have been recorded within the local area. Threatened flora are further discussed under Principle (c). Based on the similarities in soil and vegetation types within which these flora species have been recorded and those found within the application area, it was determined that nine flora species detailed in Table 4 may occur within the application area.

Table 4 - Potential priority flora species occurring within the application area

Taxon	Conservation status	Notes (WA Herbarium, 1998)	Total number of known records	Spatial distribution (km ²)	Number of records in the local area	Closest record from the application area (km)
<i>Acacia campylophylla</i>	P3	Associated with low heath and shrub, usually with <i>Allocasuarina</i> sp., <i>Daviesia</i> sp., <i>Acacia</i> sp., <i>Grevillea</i> sp., <i>Banksia</i> sp., <i>Gastrolobium spinosum</i> ; flowering period July to August	44	11,200	1	2.63
<i>Acacia trinalis</i>	P1	Chenopod scrubland or low heat, usually associated with <i>Acacia</i> sp., <i>Hakea</i> sp., <i>Casuarina obesa</i> , <i>Grevillea</i> sp., <i>Atriplex</i> sp.; flowers September	21	24,000	2	Within the application area
<i>Banksia horrida</i>	P3	Mixed heath and scrub, associated with <i>Eucalyptus</i> sp., <i>Allocasuarina</i> sp., <i>Acacia</i> sp., other <i>Banksia</i> sp., <i>Grevillea</i> sp.; flowers April to August	38	11,480	0	13.6
<i>Cryptandra beverleyensis</i>	P3	Associated with <i>Eucalyptus</i> woodland, usually with wandoo and/or salmon gum, sometimes over scrub including <i>Acacia</i> sp., <i>Melaleuca</i> sp., <i>Verticordia</i> sp.; usually observed on shallow valley floors	16	6,270	1	5.42
<i>Frankenia glomerata</i>	P4	Often observed on edges of salt lakes or on flood plains; associated with shrubland including <i>Tecticornia</i> sp., <i>Melaleuca</i> sp., chenopods, <i>Hakea</i> sp.; flowers November	68	371,000	1	9.30
<i>Grevillea roycei</i>	P3	Low woodland over shrubland, associated with <i>Allocasuarina</i> sp., <i>Banksia</i> sp., <i>Grevillea</i> sp., often over sedges; flowers August to October	23	4,615	2	3.40
<i>Lepidosperma</i> sp. <i>Meckering</i> (R. Davis WW 27-32)	P3	Associated with <i>Eucalyptus</i> woodland sometimes <i>Allocasuarina</i> woodland, usually with wandoo, York gum or salmon gum, over <i>Acacia</i> sp., <i>Daviesia</i> sp., <i>Grevillea</i> sp. Flowering time unknown	5	2,820	1	0.09
<i>Millotia tenuifolia</i> var. <i>laevis</i>	P2	Typically associated with <i>Eucalyptus</i> woodland, either wandoo or jarrah/marri depending on region, often over <i>Banksia</i> sp., <i>Allocasuarina</i> sp., <i>Melaleuca</i> sp., <i>Adenanthos</i> sp.; flowers September to October	13	15,710	1	9.7

Scholtzia halophila subsp. mortlockensis	P3	Low woodland or scrub, associated with <i>Eucalyptus</i> sp., <i>Allocasuarina</i> sp., <i>Melaleuca</i> sp., <i>Hakea</i> sp., <i>Grevillea</i> sp., <i>Casuarina</i> sp. Flowers September to November	16	1,000	1	8.35
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The Flora survey (Natural Area, 2020) confirmed the presence of two conservation significant flora species, namely *Acacia trinalis* (P1) and *Banksia horrida* (P3). *A. trinalis* was recorded as two individuals in the northern portion of the application area. A further review of the current databases identified two additional individuals of this flora species within the application area. However, the Flora survey (Natural Area, 2020) did not identify these individuals, although the survey was conducted in September which is the optimal flowering period (WA Herbarium, 1998) for *A. trinalis*. Taking this into consideration, *A. trinalis* is known from two populations in the local area and both populations might be impacted by the proposed clearing. In addition, a single plant of *Banksia horrida* was found within the mixed low woodland vegetation type. According to available databases, there is no other record of this flora species within the local area. Given this, the proposed clearing may have a significant impact on the local extents of the two priority flora species.

There was a *Frankenia* species found within three quadrats of the Samphire open low heath vegetation type which could not be identified down to species level. *Frankenia glomerata* (P4) has a preferred soil type of white sand (WA Herbarium, 1998). All three quadrats the *Frankenia* sp. was recorded in had light brown silty clay or sand. Considering this, the Flora survey concluded with a high level of confidence that the identified species is not *Frankenia glomerata* (Natural Area, 2020).

The applicant will be required to avoid clearing within 20 metres of the priority flora recorded. Should impacts to identified occurrences be unavoidable, taking into account that the priority flora species identified within the application area have limited known distributions with a number of recordings representing range extensions, additional targeted surveys beyond the application area will be required to further quantify and provide context for local and regional impacts on these species.

Conservation significant fauna

As detailed under Principle (b), the application area is not likely to provide significant habitat for any conservation significant fauna species.

However, aerial imagery indicates that the application area functions as an ecological linkage between areas of remnant vegetation in the local area and is likely to facilitate landscape connectivity and contribute to fauna dispersal between larger isolated bushland fragments in an extensively cleared landscape. While it is noted that the proposed clearing will occur on the western side of the road, given the context of the landscape, it is considered that the application area may be important for the movement of fauna species within the local and broader region.

Threatened and Priority Ecological Communities

According to available databases, two sections of the application area with a combined area of approximately 0.47 ha occur within a mapped occurrence of the Wheatbelt Woodland TEC.

This community is federally listed as a Critically Endangered TEC under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and is listed as Priority 3 priority ecological community (PEC) by DBCA.

The Flora survey concluded that the proposed clearing is not likely to have an impact on the Wheatbelt Woodland TEC as the middle and understorey associated with this TEC were absent and the dominant vegetation condition was degraded (Keighery, 1994) or completely degraded (Keighery, 1994) (Natural Area, 2020).

However, the Flora survey (Natural Area, 2020) mapped approximately 0.046 and 0.572 hectares of *Eucalyptus* woodland vegetation type in the proposed clearing area in very good (Keighery, 1994) and good (Keighery, 1994) condition respectively. Noting this, the understorey of this vegetation type which comprises *Atriplex semibaccata*, *Rhagodia drummondii* and *Enchylaena* spp., over mixed herbs and weeds (Natural Area, 2020) and that the width of the native understorey within the road reserve appears to be wider than five metres, which is the minimum patch width that applies to meet the threshold of the Wheatbelt Woodland TEC on roadside verges (Department of the Environment, 2020), the proposed clearing may impact Wheatbelt Woodland TEC.

Further justification of why the observed vegetation (Natural Area, 2020) does not meet the definition of this TEC is required.

Weed and dieback

The disturbance caused by the proposed clearing may impact adjacent native vegetation through an increase of weeds and dieback. Weed and dieback management practices will assist in mitigating this risk.

(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.

Proposed clearing may be at variance with this Principle

According to available databases, there are no records of conservation significant fauna species within the local area (DBCA, 2007).

The Flora survey (Natural Area, 2020) recorded a total of five vertebrate fauna species (four birds and one reptile) within the application area, with no conservation significant species identified nor indicators of their presence. A review of the flora species identified noted that few species are preferred by Carnaby's cockatoo as food source (Natural Area, 2020). The fauna survey did not quantify the area of fauna habitat within the application area.

Carnaby's cockatoo is classified as Endangered under both the *Biodiversity Conservation Act 2016* (BC Act) and the EPBC Act. This fauna species forages on the seeds, nuts and flowers of a large variety of plants including Proteaceous species (*Banksia*, *Hakea* and *Grevillea*), as well as *Allocasuarina* and *Eucalyptus* species, *Corymbia calophylla* and a range of introduced species (Valentine and Stock, 2008). The absence of a sufficient number and variety of flora species used for foraging along with the largely degraded nature of the site suggests that impacts to Carnaby's cockatoo foraging habitat is unlikely (Natural Area, 2020).

Foraging habitat for black cockatoos within 7 kilometres of a breeding site is important to adequately support breeding pairs, and individual night roosting sites need food and water within 6 kilometres (EPA, 2019). Overlapping foraging ranges within 12 kilometres also support roosting sites and maintain habitat connectivity and movement across the landscape (EPA, 2019).

The application area is not located within the mapped confirmed breeding area for Carnaby's cockatoo and according to available databases, there are no confirmed breeding points within the local area. The closest confirmed breeding tree is located approximately 45 kilometres north of the application area. In addition, there are no confirmed roosting sites for black cockatoos that occur within the local area. Given this, the application area is not likely to provide significant foraging habitat for black cockatoos breeding or roosting.

As detailed under Principle (a), aerial imagery indicates that the application area functions as an ecological linkage between areas or remnant vegetation. While it is noted that the proposed clearing is limited to the maximum width of 3.5 metres on the western side of the application area, given the context of the landscape, it is considered that the application area may be important for the survival of fauna species within the local and broader region.

(c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora.

Proposed clearing is not likely to be at variance with this Principle

According to available databases, three threatened flora species as shown in Table 5 have been recorded within the local area.

Table 5 - Potential threatened flora species occurring within the application area

Taxon	Notes (WA Herbarium, 1998)	Total number of known records	Spatial distribution (km ²)	Number of records in the local area	Closest record from the application area (km)
<i>Caladenia drakeoides</i>	Shrubland usually associated with <i>Melaleuca</i> sp. and <i>Acacia</i> sp., sometimes with York gum, <i>Hakea</i> sp., <i>Caladenia</i> sp., <i>Callistemon</i> sp.; flowers September to October; often around watercourses, salt lakes or seasonally damp flats	45	19,250	1	9.24
<i>Grevillea christineae</i>	Low Eucalyptus woodland or open shrubland, usually with flooded gum, York gum or wandoo over <i>Acacia</i> sp., <i>Melaleuca</i> sp., <i>Allocasuarina</i> sp., <i>Hakea</i> sp., <i>Eremophila</i> sp.; flowers August to September	37	10,300	4	9.05
<i>Verticordia hughanii</i>	Associated with heath of <i>Banksia</i> sp., <i>Acacia</i> sp., <i>Melaleuca</i> sp., <i>Allocasuarina</i> sp.; flowers December; often near salt lakes	11	300	2	1.86

The Flora survey (Natural Area, 2020) did not identify any threatened flora species within the application area. Considering this, the vegetation within the application area is not likely to include, or be necessary for the continued existence of, any threatened flora taxa.

(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.

Proposed clearing is not likely to be at variance with this Principle

According to available databases, there are no state listed TECs recorded within the local area. The Flora survey (Natural Area, 2020) did not identify any state listed TECs within the application area.

(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.

Proposed clearing is at variance with this Principle

The national objectives and targets for biodiversity conservation in Australia has a target to prevent clearance of ecological communities with an extent below 30 per cent of that present pre-1750, below which species loss appears to accelerate exponentially at an ecosystem level (Commonwealth of Australia, 2001).

The application area is located within the Avon Wheatbelt IBRA bioregion which retains approximately 18.51 per cent of its pre-European vegetation extent (Government of Western Australia, 2018). As detailed in Table 6 below, the Beard vegetation associations 142, 694, 988 and 1049 mapped over the application area retain approximately 26, 19, 30 and 7 per cent of their pre-European vegetation extent within the Avon Wheatbelt Bioregion respectively.

Table 6 - Remnant vegetation statistics (Government of Western Australia, 2019)

	Pre-European (ha)	Current Extent (ha)	Remaining (%)	Current Extent in DBCA Managed Lands (ha)	Extent remaining in DBCA Managed Lands (proportion of Pre-European extent) (%)
IBRA Bioregion*					
Avon Wheatbelt	9,517,109.95	1,761,187.42	18.51	174,980.68	2.42
Beard vegetation association*					
142	787,948.47	208,347.17	26.44	8,177.57	1.13
694	346,493.81	67,461.89	19.47	32,056.44	9.33
988	96,635.23	29,324.55	30.35	4,448.28	5.66
1049	833,384.77	56,618.34	6.79	3,375.83	0.43
Local Area remnant vegetation					
10 kilometre radius	56,758.03	5,622.34	9.91	-	-

The local area retains approximately 10 per cent vegetation cover (approximately 5622.93 ha), on which basis the application area represents approximately 0.08 per cent of the remaining vegetation within the local area. The proposed clearing would reduce the extent of native vegetation within the local area to 5,618.23 ha.

Noting the local area retains approximately 10 per cent native vegetation, the application area is considered to be within an extensively cleared area. In addition, noting the vegetation mapped during the Flora survey (Natural Area, 2020), it is considered that the application area contains vegetation that is representative of mapped Beard vegetation associations 142 and 1049 which retain approximately 26.44 and 6.79 per cent of remnant vegetation respectively.

While Beard vegetation association 694, described as shrublands; scrub-heath on yellow sandplain *Banksia-Xylomelum* alliance in the Geraldton Sandplain and Avon-Wheatbelt Regions (Shepherd et al., 2001), has been extensively cleared, the application area is dominated by Eucalyptus woodland and mixed low woodland dominated *Leptospermum erubescens* and *Allocasuarina campestris*, and therefore, the vegetation in the application area is not considered truly representative of this vegetation type.

The application area contains two individuals of *Acacia trinalis* (P1) and an individual of *Banksia horrida* (P3), and also provides an ecological linkage between areas of remnant vegetation in the local area that is likely to facilitate landscape connectivity and contribute to fauna dispersal between larger isolated bushland fragments in an extensively cleared landscape. Given this, the vegetation within the application area is considered to be significant as a remnant with an extensively cleared area.

To counterbalance the significant residual impacts the proposed clearing will have on the native vegetation remaining within the local area, an offset will be required.

(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.

Proposed clearing is at variance with this Principle

The application area crosses over the mapped boundaries of a number of tributaries of Mortlock River (Figure 3). In addition, the application area is immediately adjacent to the following Wheatbelt Wetlands Stage 1 flat type wetlands:

- Mortlock_A002_a09_a06 (ID 18143);
- Mortlock_A002_a09_a05 (ID 21608);
- Mortlock_A002_a09_a05_a2 (ID 19210);
- Mortlock_A002_a09_a05_a1 (ID 21639);
- Mortlock_A002_a09_a05_a02 (ID 23319); and
- Mortlock_A002_a09_a05_a01 (ID 21911).

The Flora survey noted these areas are most likely only seasonally inundated (Natural Area, 2020).

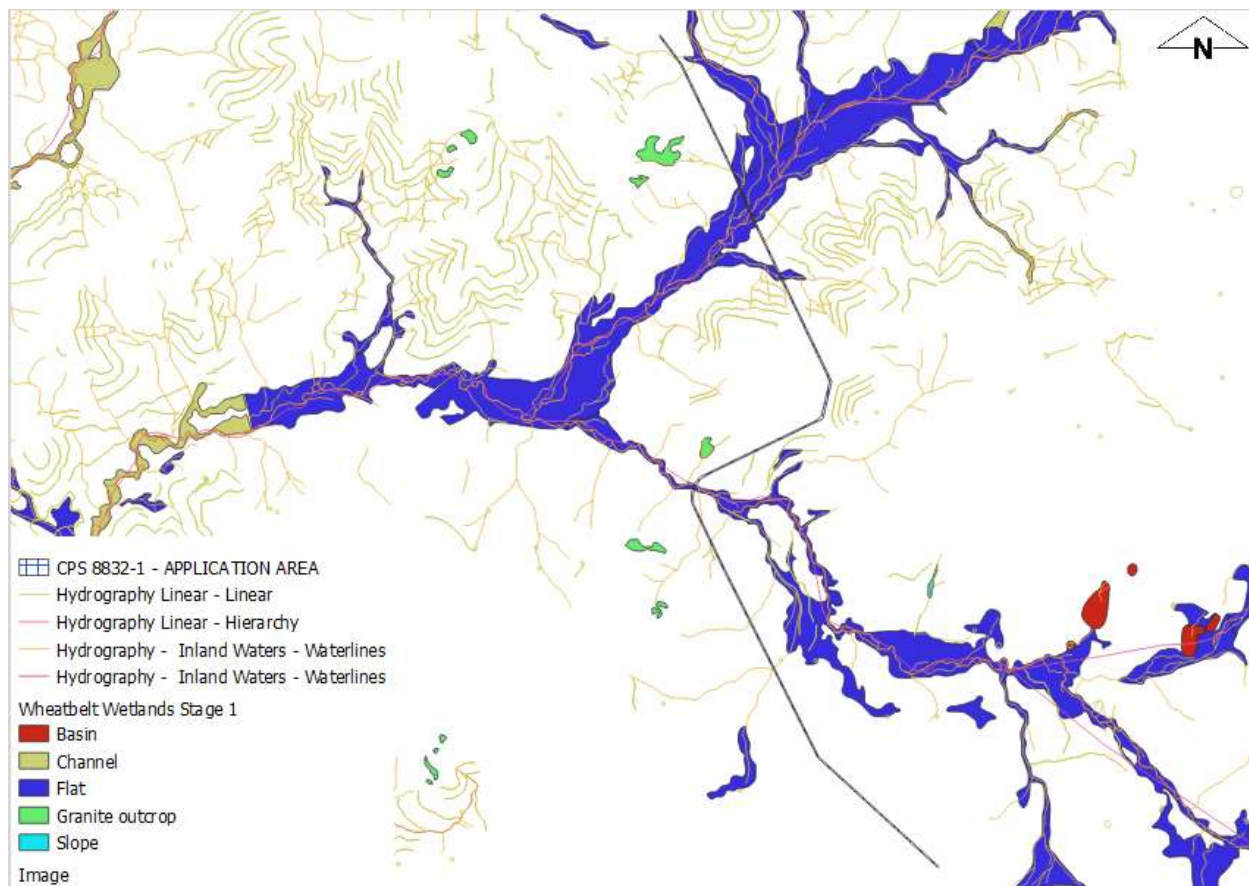


Figure 3 - Watercourses and Wetlands in respect to the application area

No distinctive riparian vegetation was identified in the application area, but the Flora survey identified riparian vegetation species within the application area (Natural Area, 2020). Given this, the vegetation proposed to be cleared is growing in, or in association with a watercourse or wetland, and therefore, the proposed clearing is at variance with this principle.

Noting that the proposed clearing will be limited to no more than 3.5 metres along one side of the existing road and that approximately 70 per cent of the vegetation in the application area is in a degraded (Keighery, 1994) to a completely degraded (Keighery, 1994) condition, the proposed clearing is not likely to have a significant impact upon riparian vegetation.

There is a risk of weeds and dieback spreading into the riparian vegetation within mapped wetlands and the applicant will be required to adhere to weed and dieback management measures (as conditioned on the clearing permit) to minimise this risk.

(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.

Proposed clearing is not likely to be at variance with this Principle

Primary soils within the application area are mapped by the Department of Primary Industries and Regional Development (DPIRD) (2020). The four mapped soils within the application area are Greenhills York Subsystem (256GhYO) (approximately 45 per cent), Cunderdin subsystem (256PsCU) (approximately 40 per cent), Greenhills Ewerts Phase 1 (256GhES1) (approximately 10 per cent), and Goomalling Mortlock Subsystem (256GoMO) is (approximately 5 per cent) (discussed further under Section 2).

The majority of the application area is mapped at low risk of land degradation resulting from water erosion, salinity, flooding, waterlogging and phosphorus export (DPIRD, 2020). Considering this, the condition of the vegetation, extent of the proposed clearing and the shape of the application area whereby clearing would be limited to a 3.5 metre along the western side of the application area, the proposed clearing is not likely to cause appreciable land degradation.

Within the areas of wetlands, the application area is mapped at high risk of flooding and waterlogging (DPIRD, 2020). However, noting that that the extent of the proposed clearing will result in the loss of a maximum of 1.4 ha of riparian vegetation scattered along the a 27 ha linear footprint, it is unlikely that the proposed clearing will result in appreciable land degradation from flooding or waterlogging in these areas.

(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.

Proposed clearing may be at variance with this Principle

According to available databases, the closest conservation area is an unnamed DBCA managed nature reserve (Class A, ID 4659) located approximately 4.9 kilometres west of the application area. This reserve is conserved for the purpose of conservation

of flora and fauna. Given the distance and separation from this conservation area, it is unlikely that the proposed clearing will result in direct impacts to this conservation estate.

As detailed under Principle (a) and (b), aerial imagery indicates that the application area functions as an ecological linkage between areas of remnant vegetation in the landscape. While only one of these conservation areas occurs within the local area, given the extent to which the local area, and bioregion have been previously cleared, the application area may contribute towards fauna dispersal between these conservation areas, and the proposed clearing may therefore impact on the environmental values of these areas.

(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.

Proposed clearing is not likely to be at variance with this Principle

According to available databases, the application area is mapped within a proclaimed Surface Water Area and intersects a non-perennial tributary of Mortlock River. Proposed clearing may increase turbidity and sedimentation of surface water if water is present in this tributary at the time of the proposed clearing. However, noting that the proposed clearing will result in the loss of a maximum of 1.4 ha of riparian vegetation scattered along a 27 ha footprint, and the non-perennial nature of the watercourse, it is not likely that the proposed clearing will result in significant long-term impacts to surface water quality.

According to available databases, the application area is not within a proclaimed Groundwater Area. While groundwater salinity is mapped between 14,000 – 35,000 milligrams per litre total dissolved solids which is considered to be highly saline (Mayer, Ruprecht & Bari, 2005), the proposed clearing is limited to a total of 4.7 ha within a linear 27 ha footprint, where some adjacent roadside vegetation will be retained. Noting this, and approximately 70 per cent of the application area is in a degraded (Keighery, 1994) to a completely degraded (Keighery, 1994) condition, the proposed clearing is not likely to result in deterioration in the quality of groundwater quality in the form of salinity.

(j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.

Proposed clearing is not likely to be at variance with this Principle

Although flooding and waterlogging risk is high around the areas that intersect seasonally inundated flats, rainfall within the application area is low (400 millimetres per annum) and the majority of remaining area is mapped as a low risk of flooding and waterlogging. Further, noting that the proposed clearing will result in the loss of 4.7 ha scattered along a linear 27 ha footprint, that some areas are subject to seasonal inundation and that approximately 70 per cent of the application area is in a degraded (Keighery, 1994) to a completely degraded (Keighery, 1994) condition, the proposed clearing is not likely to cause, or exacerbate, the incidence or intensity of flooding.

Planning instruments and other relevant matters.

No Aboriginal sites of significance have been mapped within the application area.

The clearing permit application was advertised on the DWER website on 28 April 2020 with a 21 day submission period. No public submissions have been received in relation to this application.

The application area intersects two privately owned properties; Lot 115 on Diagram 93216 (Lot 115) and Lot 121 on Deposited Plan 406131 (Lot 121). While no clearing of native vegetation will occur on Lot 115, four native trees will be cleared on Lot 121. DWER advised the applicant that a decision on the application may be deferred until Lot 121 is amalgamated into the Goomalling – Meckering Road reserve in accordance with Section 56 of the *Land Administration Act 1997*.

On 8 September 2020, Western Australian Planning Commission (WAPC) advised the Shire that it was prepared to endorse a deposited plan for Lot 121 in accordance with the plan submitted (Applicant, 2021a). The Shire was given three years to submit a deposited plan.

On 12 February 2021, the applicant advised that an application for new title for the subdivided portion of Lot 121 was submitted to Landgate. The subdivided portion was given a title Lot 71 on Deposited Plan 419563 (Applicant, 2021b).

5. Consideration of variances following applicant's submissions/further information

Principle (a)

The proposed clearing is at variance with this Principle

Priority flora

The additional survey conducted by Natural Area (2020b) identified 15 individuals of *Acacia trinalis* (P1) within the Goomalling-Meckering Road reserve and the neighbouring property. Of these, seven individuals were within the revised clearing area. A single occurrence of *Banksia horrida* identified during the initial flora survey (Natural Area, 2020a) was not identified. The survey concluded that the individual might have died or was accidentally destroyed (Natural Area, 2020b).

To determine the level of impacts of the proposed clearing of seven individuals of *A. trinalis*, DWER undertook a review of the DBCA databases available at the time of the assessment and sought advice from DBCA. The review indicated that the species is known from 21 populations spread across approximately 24,000 km². DBCA (2020a) advised that removing 47 per cent of

individuals would have a significant impact on the local population of this species. In addition, given the Shire of Goomalling is located in the centre for the species distribution, the impact was also considered to be significant at the regional level (DBCA, 2020a).

To mitigate these impacts, the applicant proposed collecting seeds from this species, germinating replacement plants and planting them within the identified offset sites (Applicant, 2020c). These mitigation measures were not supported by DBCA who advised that given the limited confidence in successful translocation, an in-site conservation strategy is a preferred measure (DBCA, 2020b).

Subsequently, the applicant inspected the application area to identify further avoidance and minimisation actions. Following the site visit, the applicant (2020d) committed to avoiding all *A. trinalis* identified within the application area and retaining 20-metre buffers for all individuals. Due to the location of some individuals in the close proximity of the existing road, where the 20-metre buffers cannot be retained, the Shire has committed to engaging an environmental specialist to demarcate all individuals of *A. trinalis* ahead of the clearing activity to minimise any potential impacts on this flora species (Applicant, 2020d).

In assessing whether the proposed 20-metre buffers were adequate, the Delegated Officer considered the following:

- the known distribution of *Acacia trinalis* and its conservation status
- the high likelihood of *A. trinalis* occurring within the application area
- the low likelihood of inadvertent clearing of any individuals of *A. trinalis* given the Shire (as conditioned on the clearing permit):
 - is required to demarcate all individuals of *A. trinalis* where 20-metre buffers are not practical
 - is not authorised to clear any individuals of *A. trinalis*.

Based on the above, the Delegated Officer considered that imposing the above measures on the clearing permit will result in a low likelihood of *Acacia trinalis* individuals being disturbed by the proposed clearing activities.

Ecological communities

The Flora survey identified that some areas of native vegetation scattered along the larger clearing footprint were representative of Wheatbelt Woodland TEC (Natural Area, 2020b). To minimise the impacts to this TEC, the applicant reduced the width of the proposed clearing to approximately 2 – 2.5 metres. Natural Area (2020b) quantified that the proposed clearing will impact on approximately 0.6 ha of Wheatbelt Woodland TEC. Noting that the areas proposed to be cleared are parts of larger remnants of this TEC and that the proposed clearing will be limited to several narrow, linear strips spread across a larger footprint, the proposed clearing is not likely to have significant impacts on this ecological community.

The applicant's actions to minimise the impacts on priority flora species and the Wheatbelt Woodland TEC have been acknowledged. However, the Delegated Officer noted that all vegetation in the application area is considered significant as a remnant of native vegetation in an extensively cleared landscape, provides significant habitat for conservation significant fauna and contributes to the fauna movement across the landscape. Therefore, the Delegated Officer determined that the proposed clearing is at variance with Clearing Principle (a).

Principle (b)

The proposed clearing is at variance with this Principle

The Flora survey (Natural Area, 2020b) confirmed that the initial application area included 231 trees and 499 shrubs. This extent was reduced by 118 trees/shrubs. During the survey, 21 trees containing hollows were observed with no evidence of use by black cockatoos (Natural Area, 2020b). The survey report noted that several of the observed hollows were too small to be used by black cockatoos (Natural Area, 2020b). Of the observed trees, a total of 10 trees with a combined total of 11 suitable sized hollows for black cockatoo nesting were considered unavoidable.

In relation to the ecological linkage function, the applicant has mitigated the impacts to ecological linkages by reducing the application area by approximately 40 per cent. However, given that the local area retains approximately 10 per cent of its original extent and that the vegetation proposed to be cleared is important for the survival of fauna species on both a local and broader regional scale, the proposed clearing is at variance with Clearing Principle (b).

The Shire has committed to installing 11 artificial black cockatoo nesting hollows to counterbalance the loss of suitable sized hollows for Carnaby's cockatoo nesting.

Principle (e) – at variance

The proposed clearing is at variance with this Principle

The application area comprises a federally listed TEC, suitable habitat for Carnaby's cockatoo, vegetation considered important for fauna movement and the extent of remnant vegetation within the local area is inconsistent with the national targets and objectives. Therefore, the revised application area is considered significant as a remnant of native vegetation within an extensively cleared landscape.

To counterbalance the above impacts, the Shire has committed to revegetating areas outside the application area.

Having re-assessed the revised application area, the proposed clearing is at variance with principles (a), (b), (e) and (f). The assessment against the remaining clearing principles remains unchanged following the reduction in the application area.

6. Offset

Based on the findings of the assessment, the Delegated Officer has determined that the following residual impacts remain after the application of avoidance, minimisation and mitigation measures summarised in Section 3:

- Loss of 2.8 hectares of native vegetation considered significant in an extensively cleared landscape
- Loss of suitable nesting habitat for Carnaby's cockatoo (*Calyptorhynchus latirostris*), comprising 10 trees with 11 suitable sized hollows.

To counterbalance the above impacts, the Shire (2020e) has submitted an offset proposal that involves:

- Revegetation of a portion of Crown Reserve 4237 vested for the purpose of 'conservation' located approximately 1.3 kilometres west of the application area
- Revegetation of a portion of Crown Reserve 15442 vested for the purpose of 'gravel' located approximately 14 kilometres northeast of the application area
- Revegetation of a portion of Crown Reserve 13755 vested for the purpose of 'gravel' located approximately 12 kilometres southwest of the application area.
- Installation of artificial black cockatoo nesting hollows within Crown Reserves 15442, 13322 and 47896
- Changing the purpose of Crown Reserve 15442 and 13755 from 'gravel' to 'conservation'.

The locations of the proposed offsets sites are shown on Figure 4.



Figure 4 - Locations of the identified offset sites

In assessing whether the proposed offset is adequately proportionate to the significance of the environmental values being impacted, a calculation using the EPBC Act offsets calculator was undertaken. The calculation indicates that the revegetation

offset of approximately 5.11 hectares of native vegetation in good condition (Figures 5a – 5c) is sufficient to adequately address the impacts of the proposed clearing.

On 3 May 2021, the Shire submitted a revegetation plan for the nominated revegetation areas. The plan was prepared by a botanist based on biological surveys conducted at the optimal time for the bioregion (Applicant, 2021c). The findings of the surveys and the revegetation objectives have been incorporated in the completion criteria imposed on the clearing permit.

To counterbalance the loss of suitable sized black cockatoo nesting hollows, the Delegated Officer considered that an installation of seven, two and two artificial nesting boxes within Crown Reserves 13322, 47896 and 15442, respectively, is sufficient to counterbalance the significant residual impacts to Carnaby's cockatoo. The Delegated Officer has determined it appropriate that the majority of the boxes be installed within Reserve 13322 as the reserve:

- is closer to the application area than the Reserves 47896 and 15442
- is closer to a known roosting site than the Reserves 47896 and 15442
- contains more native vegetation within a 6-kilometre buffer measured from the perimeter of the reserve than the Reserves 47896 and 15442
- has been selected for inclusion of artificial nesting hollows in keeping with conservation activities (Applicant, 2020e).

The Delegated Officer considered that the above offsets adequately counterbalance the significant residual impacts of the proposed clearing and they are consistent with the WA Environmental Offsets Policy (2011).



Figure 5a - Crown Reserve 13755. The area cross-hatched red (Approximately 1.41 ha) indicates the area which will be revegetated in accordance with the offset conditions on the permit.



Figure 5b - Crown Reserve 4237. The area cross-hatched red (Approximately 0.6 ha) indicates the area which will be revegetated in accordance with the offset conditions on the permit. The remaining balance of the reserve is subject to offset conditions of Clearing Permit CPS 7534/1



Figure 5c - Crown Reserve 15442. The area cross-hatched red (Approximately 3.1 ha) indicates the area which will be revegetated in accordance with the offset conditions on the permit. The area cross-hatched green indicates the area where two black cockatoo nesting hollows must be installed



Figure 5d - Crown Reserves 13322 and 47896. The areas cross-hatched green indicate where seven and two artificial black cockatoo nesting hollows must be installed, respectively

Table 7 shows the justification for the values used in the offset calculation.

Table 7 - Justification of the values used in the offset calculation

Field Name	Description	Justification for value used
<i>IUCN Criteria</i>	The IUCN criteria for the value being impacted	0% - Impacting on vegetation within an extensively cleared landscape, and not on a specific conservation significant species.
<i>Area of impact (habitat/community) or Quantum of impact (features/individuals)</i>	The area of habitat/community impacted or number of features/individuals impacted	2.8 hectares – The extent of the application area.
<i>Quality of impacted area (habitat/community)</i>	The quality score for area of habitat/community being impacted - a measure of how well a particular site supports a particular threatened species or ecological community and contributes to its ongoing viability	4 - The vegetation is largely in a degraded condition, which is consistent with much of the roadside vegetation within the Shire. The application area contains 0.6 hectares of Wheatbelt Woodland TEC, riparian vegetation and is important as an ecological linkage within an extensively cleared landscape.

<i>Time over which loss is averted (habitat/community)</i>	This describes the timeframe over which changes in the level of risk to the proposed offset site can be considered and quantified	20 - The offset site will be conserved in perpetuity under a conservation covenant. 20 years is the maximum value associated with this field.
<i>Time until ecological benefit (habitat/community) or Time horizon (features/individuals)</i>	This describes the estimated time (in years) that it will take for the main benefit of the quality (habitat/community) or value (features/individuals) improvement of the proposed offset to be realised	10 - It is assumed that the environmental values obtained from revegetation will not be evident until 10 years post revegetating.
<i>Start area (habitat/community) or Start value (features/individuals)</i>	The area of habitat/community or number of features/individuals proposed to offset the impacts	5.11 hectares - A revegetation area of this size would be required to adequately offset the loss of native vegetation considered significant in an extensively cleared landscape
<i>Start quality (habitat/community)</i>	The quality score for the area of habitat/community proposed as an offset - a measure of how well a particular site supports a particular threatened species or ecological community and contributes to its ongoing viability	1 - It is assumed that an area in completely degraded condition (and a quality value of 1) could be revegetated.
<i>Future quality without offset (habitat/community) or Future value without offset (features/individuals)</i>	The predicted future quality score (habitat/community) or value (features/individuals) of the proposed offset site without the offset	1 - It is assumed that the potential revegetation area would maintain its completely degraded condition should no revegetation and ongoing management occur.
<i>Future quality with offset (habitat/community) or Future value with offset (features/individuals)</i>	The predicted future quality score (habitat/community) or value (features/individuals) of the proposed offset site with the offset	4 - It is assumed that the potential revegetation, if undertaken successfully, could improve the condition of the vegetation to a largely good condition.
<i>Risk of loss (%) without offset (habitat/community)</i>	This describes the chance that the habitat/community on the proposed offset site will be completely lost (i.e. no longer hold any value for the protected matter of concern) over the foreseeable future without an offset	30% - The offset sites are reserved for a purpose of 'gravel'. Therefore, it is assumed that there is a reasonable risk that the reserve could be developed in accordance with the current purpose.
<i>Risk of loss (%) with offset (habitat/community)</i>	This describes the chance that the habitat/community on the proposed offset site will be completely lost (i.e. no longer hold any value for the protected matter of concern) over the foreseeable future with an offset	10% - The revegetation area, with a conservation covenant over it, should reduce the risk of loss to 10%. The risk of catastrophic events (fire, dieback etc.) remain.
<i>Confidence in result (%) – risk of loss (habitat/community)</i>	The capacity of measures to mitigate risk of loss of the proposed offset site	90% - there is a high level of confidence that the covenant will mitigate the risk of loss.
<i>Confidence in result (%) – Change in quality (habitat/community) or Change in value (features/individuals)</i>	The level of certainty about the successful achievement of the proposed change in quality (habitat/community) or value (features/individuals)	70% - With a comprehensive revegetation plan and ongoing management measures, there is a relatively high level of confidence that the offset site would improve from a completely degraded to good condition.
<i>% of impact offset</i>	% of the significant residual impact that would be offset by the proposed offset (note: the offset calculations combined should equate to 100% for each residual impact)	100% - Obtained through the input of variables explained above.

7. References

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- Applicant. (2020c). Additional supporting documents provided in relation to clearing permit application CPS 8832/1. Received by DWER on 24 November 2020. DWER Ref: A1962650.
- Applicant. (2020d). Additional supporting documents provided in relation to clearing permit application CPS 8832/1. Received by DWER on 8 February 2021. DWER Ref: A1979187.
- Applicant. (2020e). Additional supporting documents provided in relation to clearing permit application CPS 8832/1. Received by DWER on 30 October 2020. DWER Ref: A1948605.
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Publicly available GIS Databases used (sourced from www.data.wa.gov.au):

- Aboriginal Heritage Places (DPLH-001)
- Cadastre Address (LGATE-002)
- 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)
- IBRA Vegetation Statistics
- Local Planning Scheme – Zones and Reserves (DPLH-071)
- Regional Parks (DBCA-026)
- Reserves LGATE - 227
- Soil and Landscape Mapping – Best Available

Restricted GIS Databases used:

CPS 8832/1, 6 May 2021

- 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)