



CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

Purpose Permit number:	CPS 9352/1
Permit Holder:	Co-operative Bulk Handling Limited
Duration of Permit:	From 8 January 2024 to 8 January 2044

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 the construction of a rail siding and fixed loading facility.

2. Land on which clearing is to be done

Railway Reserve, PIN, Moora
Road Reserve, PIN 11709929, Moora
Lot 201 on Deposited Plan 59641, Moora
Lot 250 on Deposited Plan 65581, Moora

3. Clearing authorised

The permit holder must not clear more than 1.7 hectares of *native vegetation* within the area cross-hatched yellow in Figure 1 of Schedule 1.

4. Period during which clearing is authorised

The permit holder must not clear any *native vegetation* after 8 January 2029

PART II – MANAGEMENT CONDITIONS

5. 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.

6. 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;
- (c) restrict the movement of machines and other vehicles to the limits of the areas to be cleared;

7. Demarcation of the clearing area

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

- (a) demarcate the clearing area to avoid inadvertent removal of adjacent vegetation, including threatened flora species;
- (b) within one (1) month of installing the above demarcation, the permit holder must notify the CEO in writing that the demarcation has been completed.

8. Priority ecological community management

The permit holder must not clear more than 1.7 hectares of native vegetation representative of the 'Eucalypt woodlands of the Western Australian Wheatbelt (Eucalypt Woodlands)' ecological community.

9. Fauna management – black cockatoo habitat

- (a) Clearing must not be conducted within the *known breeding season*;
- (b) Prior to undertaking any clearing authorised under this permit within the areas cross-hatched yellow in Figure 1 of Schedule 1, the permit holder must engage a *fauna specialist* to conduct a survey of the permit area to identify *black cockatoo habitat tree/s* being utilised by *Zanda latirostris* (Carnaby's cockatoo).
- (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 9(b), 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 1 of Schedule 1 and that tree shows *evidence* of current breeding use by *black cockatoo species* under condition 9(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 9(e).

- (g) Within two (2) months of clearing authorised under this permit within the areas cross-hatched yellow in Figure 1 of Schedule 1, the permit holder must provide the results of the survey in a report to the *CEO*.
- (h) The survey report must include the following;
 - (i) the time(s) and date(s) of inspection(s) by the *fauna specialist*
 - (ii) a description of the *fauna specialist* inspection methods used
 - (iii) the location of the *black cockatoo habitat tree(s)* recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 2020 (GDA2020), expressing the geographical coordinates in Eastings and Northings or decimal degrees
 - (iv) the location of any *black cockatoo species* listed in condition 9(b), if identified, recorded using a GPS unit set to GDA2020, expressing the geographical coordinates in Eastings and Northings or decimal degrees
 - (v) the name and amount of each *black cockatoo species* identified
 - (vi) whether the *black cockatoo habitat tree/s* identified show current 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 of past breeding use was cleared.

10. Directional clearing

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

11. Offsets – Conservation covenant

By 8 January 2025, the permit holder must provide to the CEO a copy of a conservation covenant under section 30B of the *Soil and Land Conservation Act 1945* over the areas cross-hatched red in Figure 2A and 2B of Schedule 2 (Lot 4300 on Plan 30175 and Lot 1397 on Plan 125128 respectively) in accordance with the following conditions:

- (a) native vegetation in the area subject to the conservation covenant must not be cleared, other than for clearing required under the *Bush Fires Act 1954*;
- (b) the land subject to the conservation covenant shall not be used for the purpose of cultivation of crops or pasture, or for the de-pasturing of any stock; and
- (c) the conservation covenant is to apply in perpetuity and be registered on the title of the property.

12. Offset - Vegetation management - fencing

- (a) Within 12 months of the commencement date of the permit, the permit holder shall construct a fence enclosing the area cross-hatched red in Figure 2A and 2B of Schedule 2 (Lot 4300 on Plan 30175 and Lot 1397 on Plan 125128).
- (b) The fence must be designed to prohibit access of livestock and kangaroos into the offset sites.

13. Offset – Artificial black cockatoo nesting hollows

- (a) Within 12 months of the commencement date of the permit, the permit holder must install artificial black cockatoo nesting hollows in accordance with the following conditions:
 - (i) five (5) hollows must be installed within the area cross-hatched red in Figure 2A of Schedule 2 (Lot 4300)
 - (ii) must be designed and placed in accordance with the specifications detailed in Schedule 3; and
 - (iii) must be monitored and maintained in accordance with the specifications detailed in Schedule 3, for a period of at least 20 years.
- (b) Each artificial black cockatoo nesting hollow required by condition 13(a)(i) must be installed prior to commencement of the next black cockatoo *breeding season* following clearing of the related black cockatoo habitat tree(s).

14. Offset – revegetation - reference sites and baseline data

Within 12 months of the commencement date of the permit, the permit holder must:

- (a) Establish six (6) 5 x 5 metre *reference quadrats* within the *offset sites* in accordance with Section 8.3.1 of the *Offset Management Plan*
 - (i) Four (4) from vegetation units within Lot 4300 that meet Very Good (Keighery, 1994) condition
 - (ii) Two (2) from vegetation units within Lot 1397 that meet Excellent (Keighery, 1994) condition
- (b) Record the locations of the *reference quadrats* established under Condition 14(a) using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 2020 (GDA2020), expressing the geographical coordinates in Eastings and Northings;
- (c) Survey the *reference quadrats* established under Condition 14(a) for baseline data.

15. Within 12 months of the commencement date of the permit, the permit holder must implement and adhere to the rehabilitation and revegetation strategy stated in Section 8.0 of the *Offset Management Plan*, including but not limited to the following actions:

- (a) Commence *revegetation* and *rehabilitation* within the areas cross-hatched red in Figure 2A and Figure 2B of Schedule 2 by:
 - (i) deliberately *planting* native vegetation that will result in similar species composition, structure and density of native vegetation to the surrounding vegetation within *reference quadrats*; and
 - (ii) ensuring only *local provenance* seeds and propagating material are used to *revegetate* and *rehabilitate* the area.
- (b) Rip potential areas of compaction or obstruction within the *offset sites* to allow root penetration of seedlings;
- (c) Undertake weed control in accordance with Section 8.2.1 and 8.2.2 of the *Offset Management Plan*;
- (d) Establish thirteen (13) 5 x 5 metre monitoring quadrats within the *offset sites*:
 - (i) Six (6) within Lot 4300
 - (ii) Seven (7) within Lot 1397
- (e) Remove rubbish from the *offset sites*;

- (f) Install a firebreak that complies with the Shire of Moora requirements at the *offset sites*;
- (g) Undertake weed control activities on an ‘as needs’ basis to meet the rehabilitation completion criteria for weeds by the end of the project maintenance period;
- (h) Achieve the following completion criteria for each zone within Lots 4300 and 1397 depicted in Figure 2C and 2D of Schedule 2 after the 5 year monitoring period for areas *revegetated* and *rehabilitated* under this Permit and for the vegetation to be maintained for a period of two years from the date of the completion criteria having been met:

Lot 4300					
Item	Criterion	Objective / targets	Completion criteria for each zone and target areas		Monitoring
			Zone	Criterion	
1	Seedling survival	Planted seedlings survive	All zones and target areas	A minimum of 70 percent survival of planted seedlings in the monitoring quadrats	Twice a year in spring and autumn in the first two years and annually in the spring by an <i>environmental specialist</i> until completion criterion has been met and maintained for two years.
2a	Species richness – Dominant overstorey species.	For each target rehabilitation type and zone, the revegetation needs to maintain and / or improve species richness of the dominant overstorey species from the target <i>reference quadrats</i> .	Zone A WWTEC Cat A	Dominant species across Zone A and within the monitoring quadrats are at least 80 per cent of the average recorded at the <i>reference quadrats 1, 2 and 3</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).
			Zone A WWTEC Cat C	Dominant species across Zone A and within the monitoring quadrats are at least 60 per cent of the average recorded at the <i>reference quadrats 1,2 and 3</i> .	
			Zone B	Dominant species across Zone B and within the monitoring quadrats are at least 80 per cent of the average recorded at the <i>reference quadrat 4</i> .	
2b	Species richness – native species in each structural layer	For each target revegetation type, the revegetation needs to achieve similar species richness to the average recorded at the <i>reference quadrats</i> .	Zone A WWTEC Cat A	Native species in each structural layer across Zone A and within the monitoring quadrats are at least 80 per cent of the average recorded at the <i>reference quadrats 1, 2 and 3</i> .	Annually in spring by an <i>environmental specialist</i> until completion criterion has been met and maintained for two years (i.e. four successive monitoring events).
			Zone A WWTEC Cat C	Native species in each structural layer across Zone A and within the monitoring quadrats are at least 60 per cent of the average recorded at the <i>reference quadrats 1, 2 and 3</i> .	
			Zone B	Native species in each structural layer across Zone B and within the monitoring quadrats are at least 80 per cent of the average recorded at the <i>reference quadrat 4</i> .	
3a	Cover and density – stem/ha of the dominant overstorey species	For each target rehabilitation type, the revegetation needs to similar number of stems/ha of the dominant	Zone A WWTEC Cat A	Monitoring quadrats and overall rehabilitated sites contain minimum 80% of the number of stems/ ha of the dominant overstorey species found in the <i>reference quadrats 1,2 and 3</i> .	Annually by an <i>environmental specialist</i> until completion criterion has been met and maintained for two

Lot 4300					
Item	Criterion	Objective / targets	Completion criteria for each zone and target areas		Monitoring
			Zone	Criterion	
		overstorey species from the target <i>reference quadrats</i> .	Zone A WWTEC Cat C	Monitoring quadrats and overall rehabilitated sites contain minimum 60% of the number of stems/ ha of the dominant overstorey species found in the <i>reference quadrats</i> 1, 2 and 3.	years (i.e. three successive monitoring events).
			Zone B ATS community	Monitoring quadrats and overall rehabilitated sites contain minimum 80% of the number of stems/ ha of the dominant overstorey species found in the reference quadrat 4.	
3b	Cover and density – number of plants /ha in each structural layer.	For each target revegetation type, the revegetation needs to achieve a similarity in the number of plants / ha to the average record at the <i>reference quadrats</i> .	Zone A WWTEC Cat A	Minimum 80% of the number of plants / ha in each structural layer based on the reference quadrats 1, 2 and 3.	Annually by an <i>environmental specialist</i> until completion criterion has been met and maintained for two years (i.e. three successive monitoring events).
			Zone A WWTEC Cat C	Minimum 60% of the number of plants / ha in each structural layer based on the reference quadrats 1, 2 and 3.	
			Zone B	Minimum 80% of the number of plants / ha in each structural layer based on the reference quadrat 4.	
4a	Weeds	Weed cover is no greater than the baseline at <i>reference quadrats</i>	All zones	For each target rehabilitation type and zone, weed cover shall be no greater than the baseline recorded at the <i>reference quadrats</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).
4b	Weeds	No priority, high impact or highly invasive weeds present	All zones	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 spring by an <i>environmental specialist</i> until completion criterion has been met and maintained for two years (i.e. three successive monitoring events).
5	Bare ground	No more than 5 per cent greater than the baseline at the <i>reference quadrats</i>	All zones	For each target rehabilitation type and zone, the <i>rehabilitated area</i> must not have bare ground more than 5 per cent greater than the baseline recorded at the <i>reference quadrats</i>	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).
6	Gates and boundary fence	Gates and boundary fence to be in good condition with no obvious damage that will enable access by the general public, livestock and kangaroos.	Lot 4300		Annually until completion criteria 1 – 5 has been met.

Lot 1397					
Item	Criterion	Objective / targets	Completion criteria for each zone and target areas		Monitoring
			Zone	Criterion	
1	Seedling survival	Planted seedlings survive	All zones and target areas	A minimum of 70 percent survival of planted seedlings in the monitoring quadrats	Twice a year in spring and autumn in the first two years and annually in the spring by an <i>environmental specialist</i> until completion criterion has been met and maintained for two years.
2a	Species richness – Dominant overstorey species.	For each target rehabilitation type and zone, the revegetation needs to maintain and / or improve species richness of the dominant overstorey species from the target <i>reference quadrats</i> .	Zone C	Dominant species across Zone C and within the monitoring quadrats are at least 40 per cent of the baseline average recorded at the <i>reference quadrat 5</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).
			Zone D WWTEC Cat A	Dominant species across Zone D and within the monitoring quadrats are at least 80 per cent of the baseline average recorded at the <i>reference quadrat 5</i> .	
			Zone D WWTEC Cat C	Dominant species across Zone D and within the monitoring quadrats are at least 60 per cent of the baseline average recorded at the <i>reference quadrat 5</i> .	
			Zone E AcTS	Dominant species across Zone E and within the monitoring quadrats are at least 80 per cent of the baseline average recorded at the <i>reference quadrat 6</i> .	
2b	Species richness – native species in each structural layer	For each target revegetation type, the revegetation needs to achieve similar species richness of the average recorded at the <i>reference quadrats</i> .	Zone C	Native species in each structural layer across Zone C and within the monitoring quadrats, are at least 40 per cent of the baseline average recorded at the <i>reference quadrat 5</i> .	Annually in spring by an <i>environmental specialist</i> until completion criterion has been met and maintained for two years (i.e. four successive monitoring events).
			Zone D WWTEC Cat A	Native species in each structural layer across Zone D and within the monitoring quadrats, are at least 80 per cent of the baseline average recorded at the <i>reference quadrat 5</i> .	
			Zone D WWTEC Cat C	Native species in each structural layer across Zone D and within the monitoring quadrats, are at least 60 per cent of the baseline average recorded at the <i>reference quadrat 5</i> .	
			Zone E AcTS	Native species in each structural layer across Zone E and within the monitoring quadrats, are at least 80 per cent of the baseline average recorded at the <i>reference quadrat 6</i> .	

Lot 1397					
Item	Criterion	Objective / targets	Completion criteria for each zone and target areas		Monitoring
			Zone	Criterion	
3a	Cover and density – stem/ha of the dominant overstorey species	For each target rehabilitation type, the revegetation needs to similar number of stems/ha of the dominant overstorey species from the target <i>reference quadrats</i> .	Zone C	Monitoring quadrats and overall rehabilitated sites contain minimum 40% of the baseline number of stems/ ha of the dominant overstorey species found in the <i>reference quadrat 5</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).
			Zone D WWTEC Cat A	Monitoring quadrats and overall rehabilitated sites contain minimum 80% of the baseline number of stems/ ha of the dominant overstorey species found in the <i>reference quadrat 5</i> .	
			Zone D WWTEC Cat C	Monitoring quadrats and overall rehabilitated sites contain minimum 60% of the baseline number of stems/ ha of the dominant overstorey species found in the <i>reference quadrat 5</i> .	
			Zone E AcTS	Monitoring quadrats and overall rehabilitated sites contain minimum 80% of the baseline number of stems/ ha of the dominant overstorey species found in the <i>reference quadrat 6</i> .	
3b	Cover and density – number of plants /ha in each structural layer.	For each target revegetation type, the revegetation needs to achieve a similarity in the number of plants / ha to the average baseline record at the <i>reference quadrats</i> .	Zone C	Minimum 40% of the number of plants / ha in each structural layer based on the baseline recorded at <i>reference quadrat 5</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).
			Zone D WWTEC Cat A	Minimum 80% of the number of plants / ha in each structural layer based on the baseline recorded at <i>reference quadrat 5</i> .	
			Zone D WWTEC Cat C	Minimum 60% of the number of plants / ha in each structural layer based on the baseline recorded at <i>reference quadrat 5</i> .	
			Zone E AcTS	Minimum 80% of the number of plants / ha in each structural layer based on the baseline recorded at the <i>reference quadrat 6</i> .	
4a	Weeds	Weed cover is no greater than the baseline cover at <i>reference quadrats</i>	All zones	For each target rehabilitation type and zone, weed cover shall be no greater than the baseline cover recorded at the <i>reference quadrats</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).
4b	Weeds	No priority, high impact or highly invasive weeds present	All zones	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 spring by an <i>environmental specialist</i> until completion criterion has been met and maintained for two years (i.e. three

Lot 1397					
Item	Criterion	Objective / targets	Completion criteria for each zone and target areas		Monitoring
			Zone	Criterion	
					successive monitoring events).
5	Bare ground	No more than 5 per cent greater than the baseline at the <i>reference quadrats</i>	All zones	Rehabilitation type and zone, the <i>rehabilitated area</i> must not have bare ground more than 5 per cent greater than the baseline recorded at the <i>reference quadrats</i>	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).
6	Gates and boundary fence	Gates and boundary fence to be in good condition with no obvious damage that will enable access by the general public, livestock and kangaroos.	Entire offset site (Lot 1397)		Annually until completion criteria 1 – 5 has been met.

- (i) Undertake remedial action for areas *revegetated* and *rehabilitated* under condition 15 of this permit, where monitoring indicates that *revegetation/rehabilitation* has not met the completion criteria, outlined in condition 15(h) of this permit, including:
- (i) revegetate the area by deliberately *planting* native vegetation that will result in the minimum targets set out in condition 15(h) of this permit and ensuring only *local provenance* seeds and propagating material are used;
 - (ii) undertake further weed control activities; and
 - (iii) annual monitoring of the *revegetated* and *rehabilitated* areas by an *environmental specialist* until the completion criteria, outlined in condition 15(h) of this Permit are met.

PART III - RECORD KEEPING AND REPORTING

16. 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 2020 (GDA2020), expressing the geographical coordinates in Eastings and

No.	Relevant matter	Specifications
		<p>Northings;</p> <p>(c) the date that the area was cleared;</p> <p>(d) the size of the area cleared (in hectares);</p> <p>(e) actions taken to avoid, minimise, and reduce the impacts and extent of clearing in accordance with condition 5; and</p> <p>(f) actions taken to minimise the risk of the introduction and spread of <i>weeds</i> and <i>dieback</i> in accordance with condition 6;</p> <p>(g) actions taken to demarcate the clearing area in accordance with condition 7.</p>
2.	In relation to black cockatoo fauna management pursuant to conditions 9	<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>(i) the time and date that it was determined to be no longer occupied; and</p> <p>(ii) a description of the evidence by which it was determined to be no longer occupied; and</p> <p>(e) the time and date that the suitable <i>black cockatoo habitat tree</i> was cleared.</p>
3.	In relation to offset management, pursuant to conditions 11 to 15.	<p>(a) a copy of the relevant conservation covenant under section 30B of the <i>Soil and Land Conservation Act 1945</i> in accordance with condition 11;</p> <p>(b) evidence of fencing undertaken in accordance with condition 12;</p> <p>(c) the locations where the artificial nests are installed in accordance with condition 13, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 2020 (GDA2020), expressing the geographical coordinates in Eastings and Northings;</p> <p>(d) the date that the artificial nests were installed;</p> <p>(e) the location and size of <i>the reference quadrats</i> in accordance with condition 14 recorded using a GPS unit set to GDA2020, expressing the geographical coordinates in Eastings and Northings or decimal degrees;</p> <p>(f) at least two photographs of each <i>reference quadrat</i> and the date that the <i>reference</i></p>

No.	Relevant matter	Specifications
		<p><i>quadrat</i> baseline data is collected.</p> <p>(g) the baseline data recorded for the <i>reference quadrats</i>, including species richness, species density, vegetation structure, bare ground cover, weed cover and vegetation condition;</p> <p>(h) a description of the <i>revegetation</i> and <i>rehabilitation</i> activities undertaken each year, once commenced, outlined in a report produced by an <i>environmental specialist</i></p> <p>(i) the location and size of the areas <i>revegetated</i> and <i>rehabilitated</i> (in hectares) recorded using a GPS unit set to GDA2020, expressing the geographical coordinates in Eastings and Northings or decimal degrees</p> <p>(j) the date that <i>revegetation</i> and <i>rehabilitation</i> works began;</p> <p>(k) at least two photographs of the areas <i>revegetated/ rehabilitated</i> recorded annually at the same location each year;</p> <p>(l) the species composition, structure, density of the areas <i>revegetated/rehabilitated</i> recorded annually;</p> <p>(m) a description of the extent of bare ground cover, weed cover and vegetation condition of the areas <i>revegetated/ rehabilitated</i>, recorded annually;</p> <p>(n) a species list identifying those species <i>planted</i></p> <p>(o) the assessment of the <i>revegetation</i> and <i>rehabilitation</i> against criterion outlined in condition 15(h); any remedial actions undertaken in accordance with condition 15(i); and</p> <p>(p) a copy of the <i>environmental specialist</i> report and activities undertaken during monitoring; and</p> <p>(q) other actions taken in accordance with conditions 13, 14 and 15 of this permit.</p>

17. 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 16 of this permit; and
 - (ii) concerning activities done by the permit holder under this permit between 1 January to 31 December of the preceding calendar year.
- (b) If no clearing authorised under this permit has been undertaken, a written report confirming that no clearing under this permit has been undertaken, must be provided to the *CEO* on or before 30 June of each year.

- (c) Prior to 8 October 2043, the permit holder must provide to the *CEO* a written report of records required under condition 16 of this permit where these records have not already been provided under condition 17(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 at 130 centimetres from the base of the tree, of 50 centimetres or greater (or 30 centimetres or greater for <i>Eucalyptus salmonophloia</i> or <i>Eucalyptus wandoo</i>) that contain hollows suitable for breeding by black cockatoo species.
black cockatoo species	means one or more of the following species: (a) <i>Zanda lateriosis</i> (Carnaby's cockatoo); (b) <i>Zanda baudinii</i> (Baudin's cockatoo); and/or (c) <i>Calyptorhynchus banksii naso</i> (forest red-tailed black cockatoo).
black cockatoo specialist	means a <i>fauna specialist</i> who holds a tertiary qualification specialising in environmental science or equivalent, has a minimum of two years of work experience in black cockatoo species identification, surveys of black cockatoo and capture and handling of black cockatoo, and holds a valid fauna licence issued under the <i>Biodiversity Conservation Act 2016</i> .
CEO	Chief Executive Officer of the department responsible for the administration of the clearing provisions under the <i>Environmental Protection Act 1986</i> .
clearing	has the meaning given under section 3(1) of the EP Act.
condition	a condition to which this clearing permit is subject under section 51H of the EP Act.
dieback	means the effect of <i>Phytophthora</i> species on native vegetation.
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.
direct seeding	means a method of re-establishing vegetation through the establishment of a seed bed and the introduction of seeds of the desired plant species.
EP Act	<i>Environmental Protection Act 1986</i> (WA)
environmental specialist	means a person who holds a tertiary qualification in environmental science or equivalent and has a minimum of two (2) years work experience relevant to the type of environmental advice that an environmental specialist is required to provide under this permit, or who is approved by the CEO as a suitable environmental specialist.
evidence	means showing chew marks or scratchings on the habitat tree representative of the species being surveyed, the presence of the species entering or leaving the habitat tree, and/or the presence of chicks/young
fauna specialist	means a person who holds a tertiary qualification specialising in environmental science or equivalent, and has a minimum of 2 years work experience in fauna identification and surveys of fauna native to the region being inspected or surveyed, or who is approved by the CEO as a suitable fauna specialist for the bioregion, and who holds a valid fauna


Term	Definition
	licence issued under the Biodiversity Conservation Act 2016.
known breeding season	means the period from August and December when Carnaby's black cockatoo breeds in the region.
local provenance	means native vegetation seeds and propagating material from natural sources within 100 kilometres and the same IBRA subregion of the area cleared.
mulch	means the use of organic matter, wood chips or rocks to slow the movement of water across the soil surface and to reduce evaporation.
native vegetation	has the meaning given under section 3(1) and section 51A of the EP Act.
Offset Management Plan	Means the offset management plan which includes the rehabilitation and revegetation strategy for the offset sites relevant to this Permit, as provided in the document titled ' <i>Moora Rail Loading Enhancement Project. Offset Management Plan</i> ' (CBH Group, 2023), dated 5 December 2023.
offset sites	Means the area cross-hatched red on Figure 2A and 2B of Schedule 2
planting	means the re-establishment of vegetation by creating favourable soil conditions and planting seedlings of the desired species;
rehabilitate / rehabilitated/ rehabilitation	means actively managing an area containing native vegetation in order to improve the ecological function of that area.
reference quadrat (Lot 4300)	means a sample plot established for the purpose of data collection and monitoring vegetation characteristics, for example species composition, structure, density, foliage cover, vegetation condition (Keighery, 1994), weed species and extent, and extent of bare ground. Measurements from fixed reference quadrats or plots where biodiversity components are measured are used to set measurable completion criteria for revegetation projects. The <i>reference quadrats</i> at Lot 4300 contain the following values: <ul style="list-style-type: none"> (a) Suitable foraging and potential roosting and breeding habitat for Carnaby's black cockatoo (<i>Zanda latirostris</i>) (b) Vegetation representative of the 'Wheatbelt Woodlands of Western Australia' ecological community (c) Vegetation representative of the <i>Allocasuarina huegeliana</i> tall shrubland community (d) Vegetation in Very Good (Keighery, 1994) condition
reference quadrat (Lot 1397)	means a sample plot established for the purpose of data collection and monitoring vegetation characteristics, for example species composition, structure, density, foliage cover, vegetation condition (Keighery, 1994), weed species and extent, and extent of bare ground. Measurements from fixed reference quadrats or plots where biodiversity components are measured are used to set measurable completion criteria for revegetation projects. The <i>reference quadrats</i> at Lot 1397 contain the following values: <ul style="list-style-type: none"> (a) Vegetation representative of the 'Wheatbelt Woodlands of Western Australia' ecological community (b) Vegetation representative of the <i>Allocasuarina campestris</i> tall shrubland community (c) Vegetation in Excellent (Keighery, 1994) condition
weeds	means any plant – <ul style="list-style-type: none"> (a) that is a declared pest under section 22 of the <i>Biosecurity and</i>

Term	Definition
	<p><i>Agriculture Management Act 2007</i>; or</p> <p>(b) published in a Department of Biodiversity, Conservation and Attractions species-led ecological impact and invasiveness ranking summary, regardless of ranking; or</p> <p>(c) not indigenous to the area concerned.</p>

END OF CONDITIONS

REFERENCES

CBH Group (2023). *Moora Rail Loading Enhancement Project. Offset Management Plan*. Dated 5 December 2023. Information provided in relations to the clearing permit application CPS 9352/1. Received by the Department of Water and Environmental Regulation on 5 December 2023 (DWER Ref: DWERDT876568)


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Ryan Mincham
 MANAGER
 NATIVE VEGETATION REGULATION

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

6 December 2023

Schedule 1

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

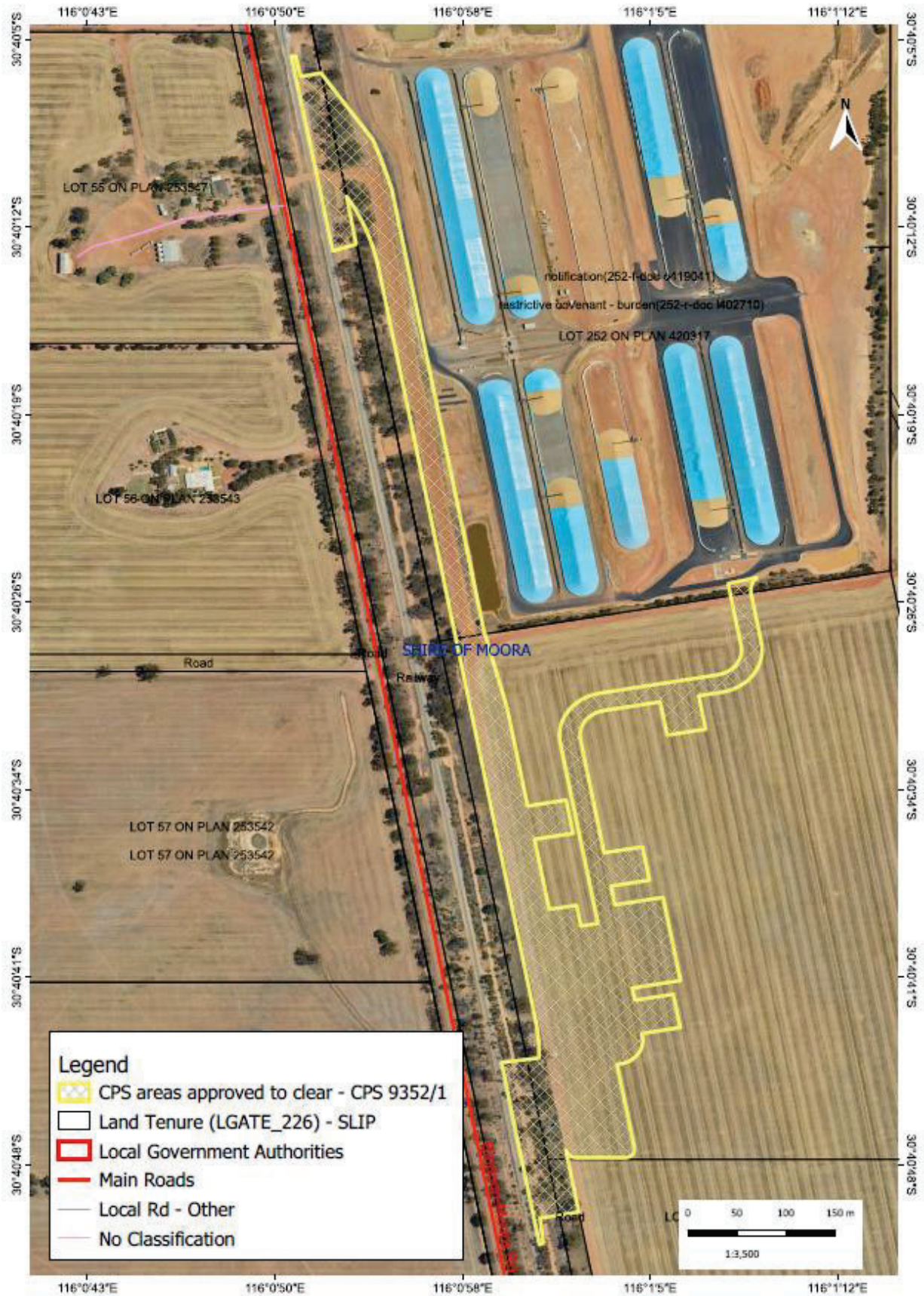


Figure 1: Map of the boundary of the area within which clearing may occur

Schedule 2

The boundary of the areas designated as offset sites are shown in the maps below (Figure 2A and Figure 2B).

The management zones for rehabilitation and revegetation of the offset sites are shown in Figure 2C and Figure 2D.



Figure 2A. Map of offset site on Lot 4300 on Plan 30175 to be placed under a conservation covenant and rehabilitated.



Figure 2B. Map of offset site on Lot 1397 on Plan 125128 to be placed under a conservation covenant and rehabilitated.



Figure 2C. The rehabilitation zones within Lot 4300

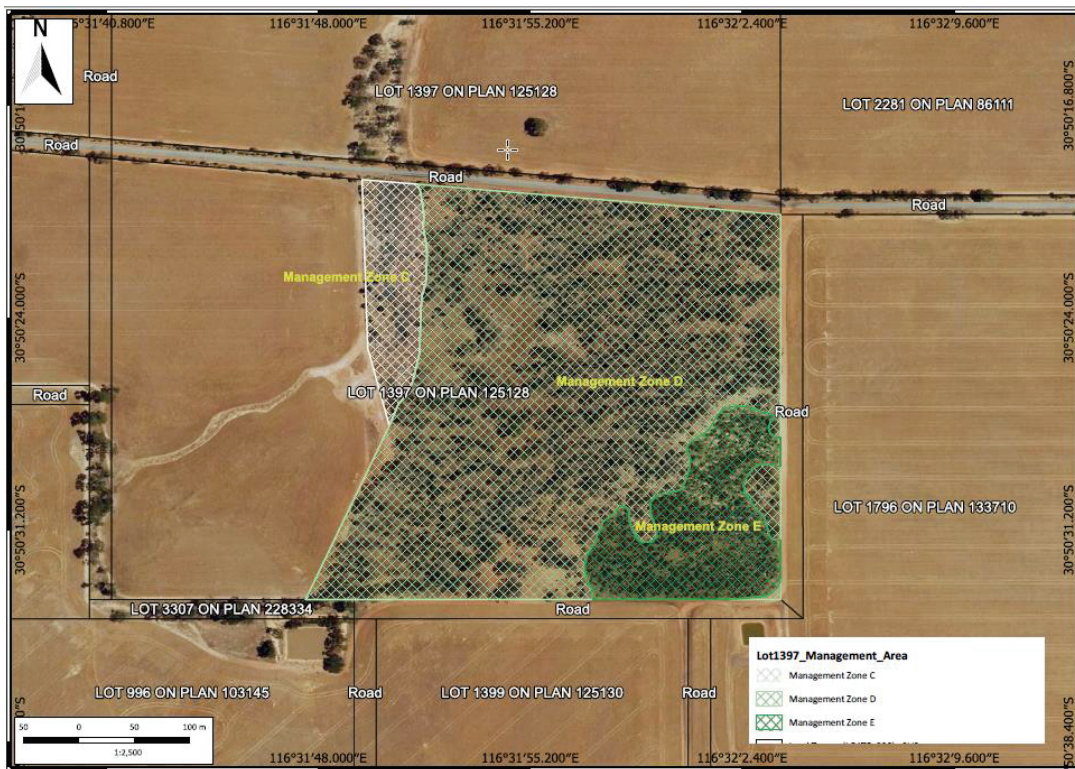


Figure 2D. The rehabilitation zones within Lot 1397

Schedule 3 – Fauna notes - Artificial hollows for Black Cockatoos

Artificial Hollows for Black Cockatoos

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

Artificial hollows can be used to help conserve these threatened black cockatoos by enabling them to breed in areas where natural hollows are limited. This Fauna Note provides advice on how to select an appropriate site, guidelines on how to design and place artificial hollows, and advice on how to maintain and monitor artificial hollows.

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

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

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

When to Use Artificial Hollows

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

Where do black cockatoos nest?

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

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

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



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

Photo: Rick Dawson

FAUNA NOTES – Artificial Hollows for Black Cockatoos

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

Is my site suitable for artificial hollows?

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

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

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

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

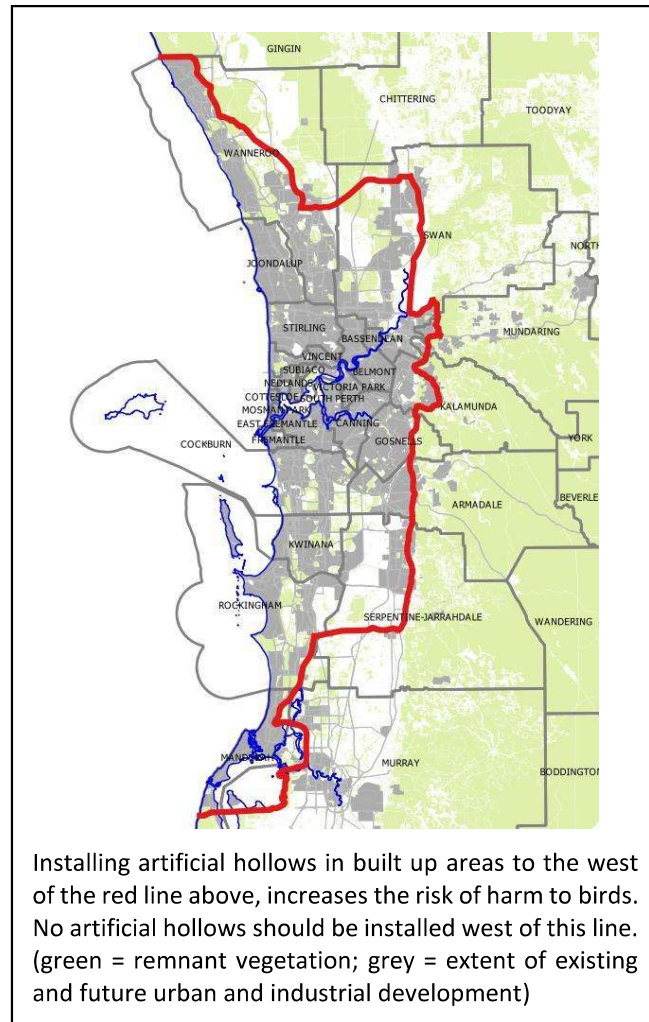


Table 1: Essential criteria for a site to be considered suitable for installation of artificial hollows, with alternative conservation actions suggested for each criterion that is not met.

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

FAUNA NOTES – Artificial Hollows for Black Cockatoos

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

How to Design and Place Artificial Hollows

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

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

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

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



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

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

Walls, size, base, and entrance design

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

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

Artificial hollows should be:

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

The base of the artificial hollow must be:

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

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

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

The entrance of the artificial hollow:

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

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

Adding ladders and sacrificial chewing posts

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

The ladder must be:

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

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

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

The sacrificial chewing posts must be:

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

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

Mounting and placement

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

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

FAUNA NOTES – Artificial Hollows for Black Cockatoos

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

Artificial hollows to be placed in trees require:

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

Artificial hollows must be mounted such that:

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

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

Safety

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

Monitoring and Maintaining Artificial Hollows

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

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

How do I monitor artificial hollows?

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

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

Monitoring of artificial hollows should consider and record:

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

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

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

Table 2: Techniques for monitoring artificial hollows

Technique	Description of Technique								
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 a hollow	The behaviour of parent birds around a hollow can indicate an approximate age of young in the nest.								
	<table border="1"> <thead> <tr> <th>Parent Behaviour</th> <th>Approximate Stage and Age of Young</th> </tr> </thead> <tbody> <tr> <td>Prospecting for hollow</td> <td>Unborn</td> </tr> <tr> <td>Male only seen out of hollow</td> <td>Egg or very young nestling (< 3 - 4 weeks)</td> </tr> <tr> <td>Both parents seen entering/exiting the hollow</td> <td>Nestling(s) has hatched (> 3 - 4 weeks)</td> </tr> </tbody> </table>	Parent Behaviour	Approximate Stage and Age of Young	Prospecting for hollow	Unborn	Male only seen out of hollow	Egg or very young nestling (< 3 - 4 weeks)	Both parents seen entering/exiting the hollow	Nestling(s) has hatched (> 3 - 4 weeks)
	Parent Behaviour	Approximate Stage and Age of Young							
	Prospecting for hollow	Unborn							
Male only seen out of hollow	Egg or very young nestling (< 3 - 4 weeks)								
Both parents seen entering/exiting the hollow	Nestling(s) has hatched (> 3 - 4 weeks)								
Observing feeding flocks	Flocks of all male birds can indicate that females are incubating eggs. When flocks are mixed it suggests the birds have either not laid yet or that the nestlings have hatched and no longer require brooding (approximately 3 - 4 weeks old).								
Tapping to flush female	When females are sitting on eggs they will usually respond to tapping or scraping at the base of their tree by appearing at the entrance or flying from the hollow opening. This is not a guarantee of breeding activity, but an indication that breeding is possibly occurring in the hollow. Tapping or scraping is best undertaken between 10 am - 3 pm when females will most likely to be sitting.								
Observing insect activity around a nest	Faecal matter produced by nestlings attracts insects, especially flies and ants. The type and number of these insects will help to indicate how old any nestlings present may be. Factors such as temperature and humidity will also affect insect activity and so observations of insect activity should only be used as supporting evidence for other indications of age/use. Blowflies around the entrance of a nest usually indicate that a death has occurred.								
Listening for nestling	With experience it is possible to determine if nestlings are present, and a broad estimate of age based on the type and volume of noises they make.								
Looking inside a 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 organize. Also keep in mind that it is important to limit disturbance to breeding birds. Special equipment is likely to be needed depending on the height and positioning of artificial hollows. There are also safety issues associated with ladder or rope climbing to reach nests to undertake observations.								

When do I monitor artificial hollows?

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

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

FAUNA NOTES – Artificial Hollows for Black Cockatoos

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

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

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

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

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

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

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

Monitoring Aim	Frequency of Visits	Monitoring Techniques
To determine possible use by black cockatoos	At least once during peak breeding season.	<ul style="list-style-type: none"> • Looking for signs of use (evidence of chewing) • Observing behaviour of adults around a hollow • Tapping or scraping to flush female • Listening for nestlings • Looking inside nest
To confirm use by black cockatoos	At least two visits during peak breeding season.	<ul style="list-style-type: none"> • Looking for signs of use (evidence of chewing) • Observing behaviour of adults around a hollow • Tapping or scraping to flush female • Listening for nestlings • Looking inside a nest <p>Observing breeding evidence from at least two of the techniques confirms use by black cockatoos.</p>
To determine nesting success by black cockatoos	Preferably fortnightly visits between July and December. As a minimum, at least 3 visits spread throughout breeding season.	<ul style="list-style-type: none"> • Observing insect activity around a nest • Listening for nestlings • Looking inside a nest <p>The presence of eggs or nestlings inside a nest will help to determine nesting success.</p>
To determine use by any species	As often as possible.	<p>As a minimum, inspection from the ground:</p> <ul style="list-style-type: none"> • Looking for signs of use <p>To confirm:</p> <ul style="list-style-type: none"> • Looking inside a nest
To determine maintenance requirements	At least every two years and preferably annually.	A basic maintenance check can be undertaken from the ground. Looking inside the nest using a telescopic pole with camera or mirror enables inspection of the sacrificial chewing posts and level of substrate/nesting material. A ladder or elevated work platform will be required for a comprehensive check, and to replace sacrificial chewing posts and carry out other maintenance.

How do I maintain artificial hollows?

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

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

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

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

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

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

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

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

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

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

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



Artificial hollow base needing repair.
Photo by Christine Groom

Maps of Black Cockatoo Breeding Range

FAUNA NOTES – Artificial Hollows for Black Cockatoos

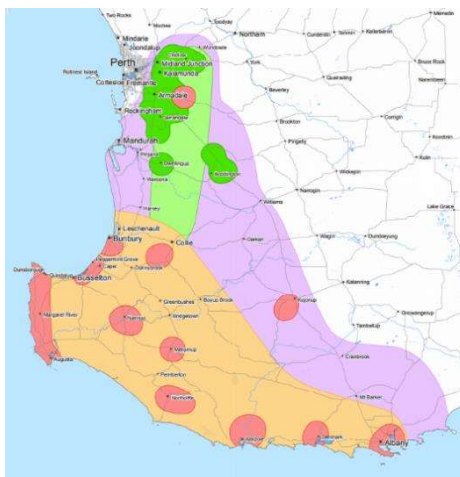


Image: [Commonwealth of Australia, 2011](#)

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

Artificial Hollows – best current design and installation specifications

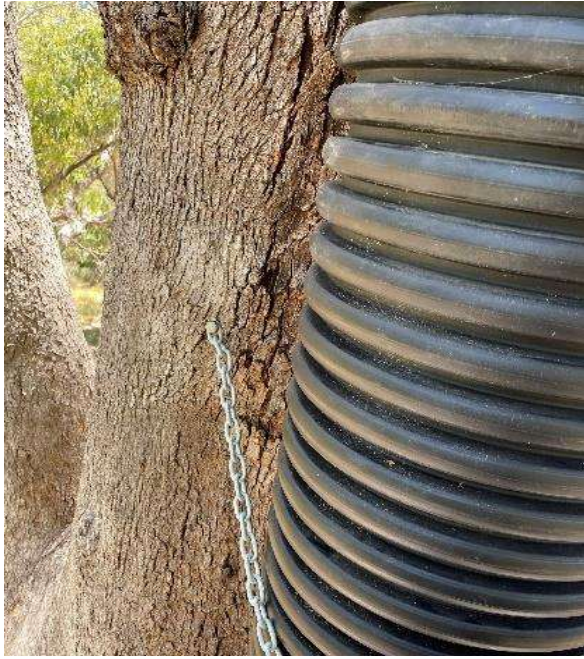
The specifications below outline the most recent detailed specifications for artificial hollow construction installation and maintenance. These would provide for a well-constructed and installed artificial hollow that is most likely to have an adequate lifespan (minimum 50-years). To ensure longevity,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

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

Artificial Hollow Construction Specifications

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

FAUNA NOTES – *Artificial Hollows for Black Cockatoos*



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



Left image shows the internal view, including substrate material placed on the floor to line the hollow, and the internal weld mesh ladder. Substrate material must be coarse, hard, wood chips at least 200 mm deep. Centre image shows one hard wood sacrificial post which is to fit and connect to the rim of the hollow by a hook screwed to the post to ensure it does not come loose, block the hollow or injure the occupants. Right image shows the hard plastic floor which is to be securely fixed with a minimum of 12 small drainage holes. Larger holes may result in the occupants chewing the base.

Monitoring and Maintaining Artificial Hollows

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

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

Further Reading

DBCA webpage and fauna profiles: [Black cockatoos](#)

Department information sheets: [Fauna Note – Corellas and other flocking cockatoos](#)

BirdLife Australia webpage and brochure: [Identify your Black cockatoo](#)

Western Australian Museum webpage and fact sheets: [Cockatoo Care](#)

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

Acknowledgements

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Last updated: 08 Feb 2023



Bilateral Assessment Clearing Permit Decision Report

This report has been prepared to fulfil the requirements of an accredited environmental assessment process between the Commonwealth and State governments, pursuant to a bilateral agreement established under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

This report is set out in four parts:

- Part 1: Application and site details;
- Part 2: Assessment against matters of national environmental significance (pursuant to the EPBC Act);
- Part 3: Assessment against the clearing principles (pursuant to the *Environmental Protection Act 1986* (EP Act)); and
- Part 4: References and databases

Part 1: Application and site details

1. Application details and outcome

1.1. Permit application details

Permit number:	CPS 9352/1
EPBC number:	2021/8894
Permit type:	Purpose permit
Applicant name:	Co-operative Bulk Handling Limited
Application received:	24 May 2021
Application area:	1.7 hectares (ha) of native vegetation within 9.59 ha of footprint
Purpose of clearing:	Construction of a rail siding and fixed loading facility
Method of clearing:	Mechanical clearing
Property:	Lot 8 on Deposited Plan 419100, Bindoon-Moora Road reserve (PIN 11709929) Unnamed rail reserve (PIN 1053262)
Location (LGA area/s):	Shire of Moora
Localities (suburb/s):	Moora

1.2. Description of clearing activities.

The applicant proposes to construct a new rail siding and fixed loading facility associated with the grain storage infrastructure as part of upgrades to the Co-operative Bulk Handling Limited (CBH) Grain Receiving Point, Moora. Upgrades to the rail siding and grain infrastructure are a component of the State significant Agricultural Supply Chain Initiative (ASCI) project that will deliver economic value for the grain industry in Western Australia. In order for construction of the proposed facilities to proceed, clearing of up to 1.7 hectares of native vegetation is required within a larger 9.59 hectare application area. The majority of the application area is devoid of native vegetation, comprising wheat fields. The applicant has proposed the larger application area as a contingency for any adjustment that may be required during the construction phase.

The 1.7 ha of native vegetation proposed to be cleared is contained within a single, contiguous area located immediately east of the existing railway. The vegetation is a part of a roadside corridor of remnant vegetation in an extensively cleared landscape (see Figure 1, Section 2.2) and is characterised as the Eucalypt Woodlands of the Western Australian Wheatbelt Ecological Community, listed as a Threatened Ecological Community (TEC) under the *Environment Protection and Biodiversity Conservation Act* (EPBC Act).

The applicant has avoided and minimised clearing for this project to the extent possible (see section 6).

1.3. Decision on application and key considerations

Decision:	Grant
Decision date:	6 December 2023
Decision area:	1.7 hectares (ha) of native vegetation, as depicted in Section 1.5, below.

1.4. Reasons for decision

An assessment against the clearing principles, planning instruments and other matters has been undertaken in accordance with section 51O of the *Environmental Protection Act 1986* (EP Act). The assessment identified that the proposed clearing is at variance with Principles (a), (b), (d) and (e) and is not likely to be at variance with the remaining Principles.

Taking into account the avoidance and minimisation measures, the Delegated Officer considers that the following significant residual impacts remain:

- Loss of 1.7 hectares of foraging habitat for Carnaby's black cockatoo
- Loss of 27 potential habitat trees, one of which contains a suitable breeding hollow for black cockatoos
- Loss of 1.7 hectares of significant remnant native vegetation in an area that has been extensively cleared
- Loss of 1.7 hectares of the Commonwealth listed 'Eucalypt Woodlands of the Western Australian Wheatbelt' TEC
- Loss of 1.7 hectares of native vegetation that is representative of an under represented vegetation association
- Cumulative loss of native vegetation in the local area that has been extensively cleared.

Consistent with the Western Australian Environmental Offset Policy (2011) and WA Environmental Offsets Guidelines (2014), and pursuant to section 51(2)(b) of the EP Act, to mitigate the significant residual impacts described above, the Permit Holder is required to provide an environmental offset that counterbalances the significant residual impacts in accordance with the offsets calculator.

It is considered that fauna management conditions imposed on the permit will adequately mitigate impacts to Carnaby's black cockatoos which may be actively breeding within the application area. The implementation of appropriate hygiene management actions will adequately mitigate the risk of impacts to remaining adjacent portions of the Wheatbelt Woodlands TEC, the Carnaby's black cockatoo habitat, under-represented vegetation associations and native vegetation providing functional value as an ecological corridor.

Given the above, the Delegated Officer considers measures to avoid/minimise clearing, fauna management, dieback and weed management conditions and offset conditions will be necessary to manage, mitigate and offset the environmental impacts of the proposed clearing.

2. Site Information

2.1. Site Characteristics

Site characteristic	Details
Local context	<p>The application area is part of a corridor of roadside vegetation in the extensively cleared wheatbelt region of Western Australia and is surrounded by road and railway corridors which are actively in use.</p> <p>Spatial data indicates the local area (10-kilometre radius from the centre of the area proposed to be cleared) retains approximately 9.39 per cent (3,237.49 hectares) of the pre-European native vegetation cover. The native vegetation within the application area represents approximately 0.05 per cent of the remnant native vegetation in the local area.</p>
Vegetation description	<p>Flora and vegetation surveys of the application area were undertaken on 5 June 2020 (Level 1 flora survey and black cockatoo habitat assessment, Eco Logical (2020a)) and 30 September 2020 (detailed and targeted flora and vegetation survey, basic fauna survey and targeted black cockatoo habitat assessment (ELA, 2020b)). These surveys identified vegetation types within the application area as:</p> <ul style="list-style-type: none">• EsIW: <i>Eucalyptus salmonphoia</i> and <i>Eucalyptus loxophleba</i> Woodland• EcG: <i>Eucalyptus camaldulensis</i> scattered trees on Grassland


Site characteristic	Details
	<ul style="list-style-type: none"> EwW: <i>Eucalyptus wandoo</i> Woodland <p>EsW type of vegetation comprises the majority of the vegetation (see Figure 1). The vegetation description and species lists are included under Appendices A and D respectively.</p>  <p>Vegetation types</p> <ul style="list-style-type: none"> Cleared EcG EsW EwW Planted treeline

Figure 1: Vegetation mapping of the application area (Eco Logical, 2021a)

Site characteristic	Details
	<p>The vegetation is consistent with the mapped vegetation type Victoria Plains 142 (Shepherd et al., 2002), which is described as medium woodland; York gum & Salmon gum.</p> <p>The mapped vegetation type retains approximately 12.44 per cent of the original extent within the Avon Wheatbelt subregion (Government of Western Australia, 2019).</p>
Vegetation condition	<p>Flora surveys within the application area indicate the vegetation is in 'very good' to 'completely degraded' (Keighery, 1994) condition (Eco Logical 2020a, 2020b & 2021a).</p> <p>Completely degraded: The structure of the vegetation is no longer intact and the area is completely or almost completely without native species</p> <p>to</p> <p>Degraded: Basic vegetation structure severely impacted by disturbance; scope for regeneration but not to a state approaching Good condition without intensive management</p> <p>to</p> <p>Good: Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and/or grazing.</p> <p>to</p> <p>Very good: Vegetation structure altered, with obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and/or grazing.</p>

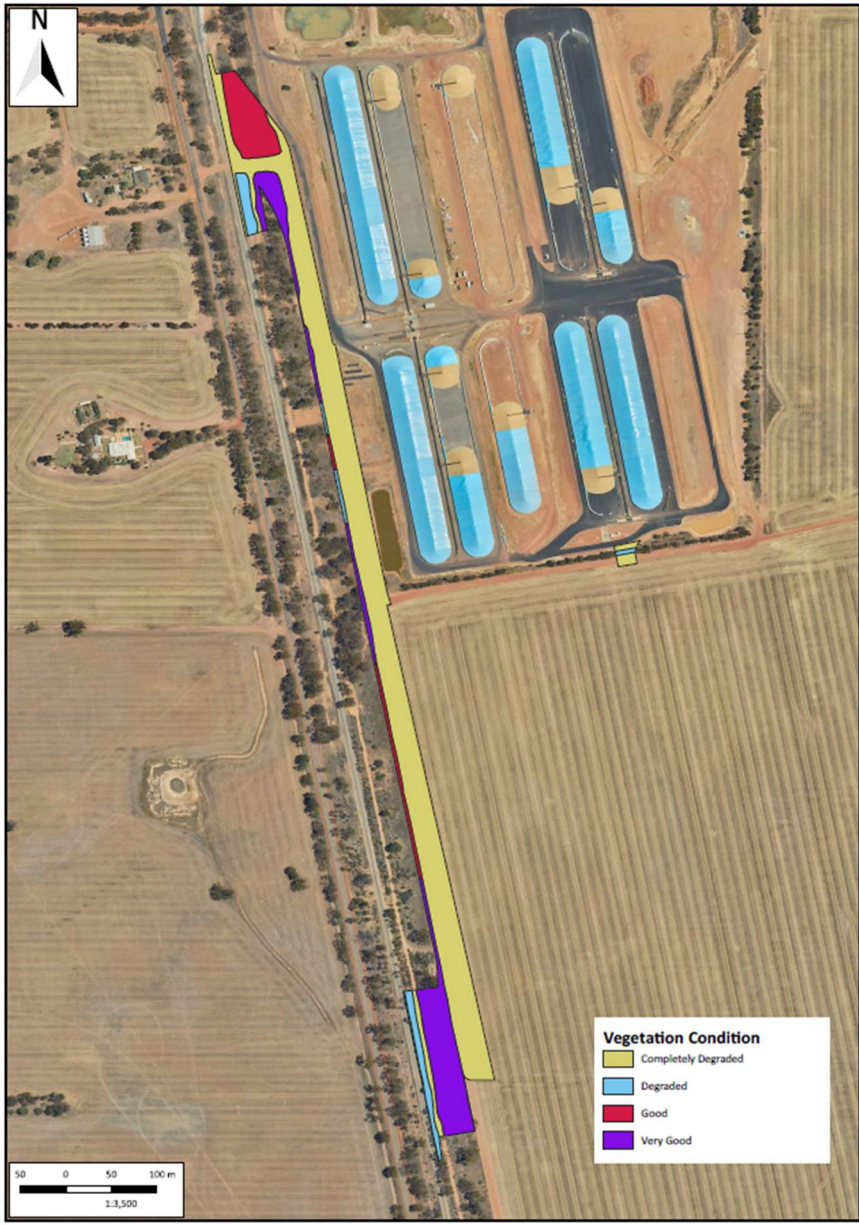
Site characteristic	Details
	 <p>Vegetation Condition</p> <ul style="list-style-type: none"> Completely Degraded Degraded Good Very Good

Figure 2: Vegetation condition within the survey area (Eco Logical, 2020b)

Soil description	<p>The soil is mapped as Ranfurly 1 subsystem described as alluvial plain of Moore River; loamy earths, clays and minor sandy earths (Schoknecht et al., (2004).</p> <p>Detailed site-specific soil descriptions were determined during geotechnical investigations of the site.</p> <p><u>Northern Widening of Main Access Road at Marshalling Area (TP01 & TP02)</u></p> <ul style="list-style-type: none"> - Silty Sand (SM): fine to coarse grained, brown becoming yellow brown, with about 20% non-plastic fines, dry, present from ground surface and extending to depths ranging from 0.5m to 0.7m; overlying - Sandy Clay (CI-CH): generally medium to high plasticity, mottled variable shades of grey, brown and red-brown, about 40% to 50% fine to coarse sand, dry to moist, extending to depths ranging from 1.6m to 2.5m; overlying - Silty Sand (SM) (TP01 only): fine to coarse grained, orange-brown, about 20% to 30% non-plastic fines, dry, extending to a depth of 2.0m. <p><u>Northern Widening of Main Access Road near Weighbridge (TP03 & TP04)</u></p>
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Site characteristic	Details
	<ul style="list-style-type: none"> - Silty Sand (SM): fine to coarse grained, brown becoming yellow brown, with about 20% non-plastic fines, dry, present from ground surface and extending to depths ranging from 0.3m to 0.4m; overlying - Sandy Clay (CH): high plasticity, dark brown becoming mottled white, about 40% to 50% fine to coarse grained sand, fines content increasing with depth, moist, hard, extending to depths ranging from 1.0m to 1.5m; overlying - Clay (CH): high plasticity, dark brown, with fine to coarse grained sand, moist, extending to the maximum investigated depth of 2.0m. <p><u>Proposed E-Pit near Existing Southern Basin (TP10 & TP14)</u></p> <ul style="list-style-type: none"> - Silty Sand (SM): fine to coarse grained, dark grey brown becoming red-brown, about 15% non-plastic fines, dry to moist, present from ground surface to depths ranging from 1.8m to 2.0m; overlying - Sand (SP-SM): fine to coarse grained, yellow brown, with non-plastic fines, wet, extending to depths ranging from 2.5m to 3.0m. <p><u>Near Existing North-east Basin (TP13)</u></p> <ul style="list-style-type: none"> - Uncontrolled fill: Organic Clayey SAND (SC): fine to coarse grained, dark grey brown, about 20% to 30% low plasticity fines, with interbedded layers of grass, dry, extending to a depth of 1.5m. <p><u>Remainder of Site – New Access Roads and Future Bulkheads</u></p> <ul style="list-style-type: none"> - Silty Sand (SM): fine to coarse grained, dark grey brown, becoming yellow brown, about 15% to 20% non-plastic fines, trace rootlets in upper 0.1m, dry, typically medium dense to dense, occasionally desiccated and hard, present from ground surface and extending to depths ranging from 0.2m to 1.0m; overlying - Clayey Sand/Sandy Clay (SC-CH): fine to coarse grained, about 30% to 40% low to high plasticity fines, varying between grey-brown, red-brown and yellow-brown, dry to moist, stiff, extending to depths ranging from 0.8m to 1.8m; overlying - Sandy Clay (CI-CH): medium to high plasticity, typically dark brown to grey-brown, speckled white or mottled red-brown and grey, about 30% to 60% fine to coarse grained sand, dry to moist, typically stiff, extending to depths ranging from 2.5m to 2.7m. <p>(Galt Geotechnics, 2020; McDowall Affleck, 2020)</p>

2.2. Site Map

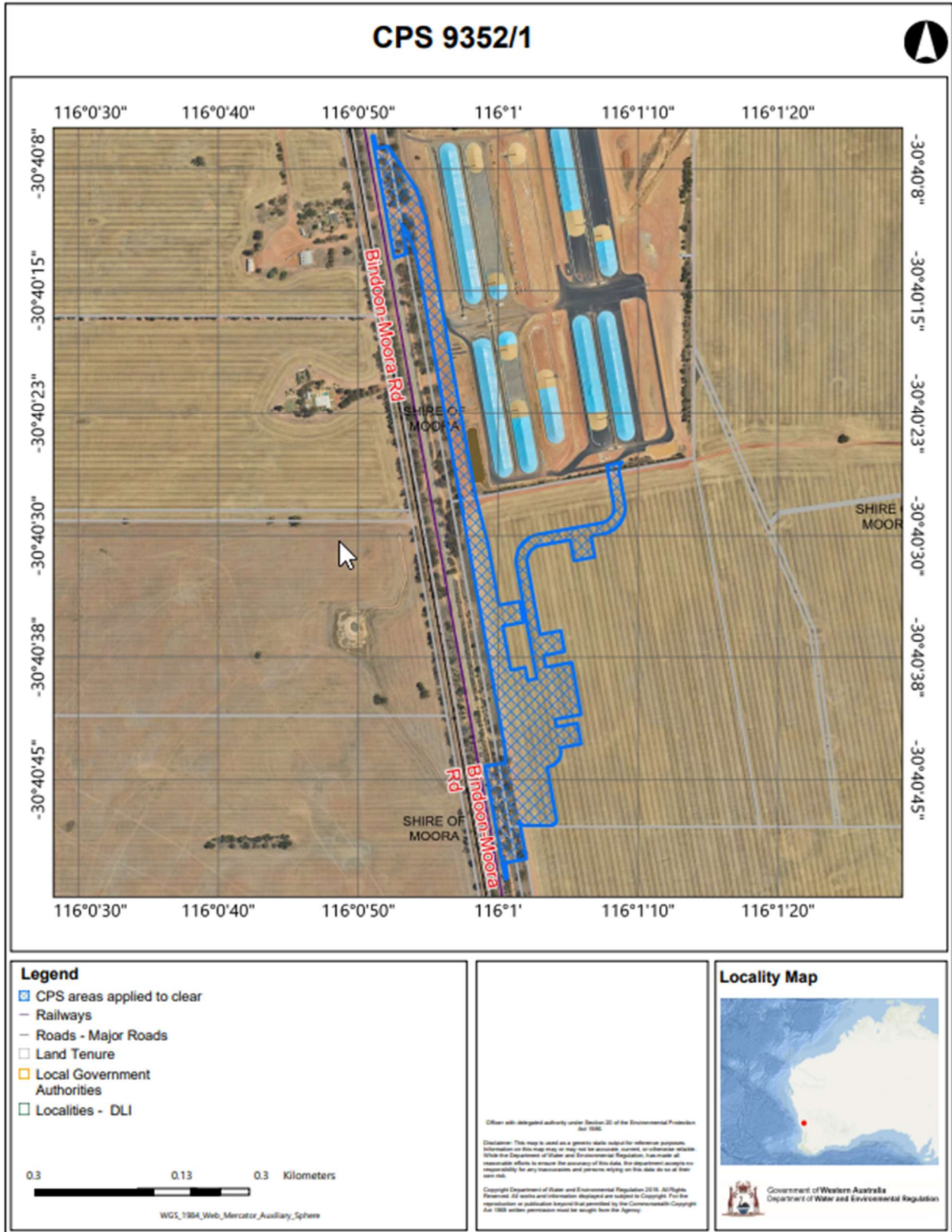


Figure 3: Application area hatched blue.

Part 2: Assessment against matters of national environmental significance

3. Description of controlling provision(s)

The proposed action was referred to the Department of Agriculture, Water and Environment (DAWE), now the Department of Climate Change, Energy, the Environment and Water (DCCEEW), on 4 March 2021 (EPBC reference: 2021/8894) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and was determined to be a controlled action on 6 April 2021. The Native Vegetation Clearing Permit (NVCP) application was submitted to the Department of Water and Environmental Regulation (DWER) on 24 May 2021 for assessment under the bilateral agreement provision between the Commonwealth and Western Australian governments.

Based on the information in the referral, the proposed action is likely to have a significant impact on the following species and ecological communities listed under the EPBC Act:

- Eucalypt Woodlands of the Western Australian Wheatbelt (Critically Endangered)
- Carnaby's black cockatoo (*Zanda latirostris*) (Endangered)

Eucalypt Woodlands of the Western Australian Wheatbelt

The Approved Conservation Advice for Eucalypt Woodlands of the WA Wheatbelt TEC (Department of the Environment, 2015) described (WA Wheatbelt Woodlands) as vegetation dominated by a complex mosaic of eucalypt species with a tree or mallet form over an understorey that is highly variable in structure and composition. The trees typically are spaced, and the canopy is relatively open. There can be localised variation in vegetation structure as a consequence of disturbance, for instance fire, or change in site characteristics that allows for gaps in tree canopy cover, a higher density of trees e.g. dense sapling regrowth, or change in the nature of the understorey.

The WA Wheatbelt Woodlands ecological community is endemic to south-western WA. It occupies a transitional zone between the wetter forests associated with the Darling Range and the southwest coast, and the low woodlands, mallee and shrublands of the semi-arid to arid interior. The understorey beneath the woodland tree canopy is highly variable in both structure and composition across the wheatbelt. The highly biodiverse nature of the wheatbelt landscape, where the composition of plant species can vary markedly from patch to patch, means it is difficult to prepare a comprehensive list of plant species for the WA Wheatbelt Woodland ecological community.

Condition categories recognise that patches of an ecological community can differ in their quality, and that some patches have undergone sufficient degradation. Condition thresholds provide guidance on when a patch of an ecological community retains sufficient conservation values to be considered a 'Matter of National Environmental Significance', as defined under the EPBC Act.

Key diagnostic criteria:

A patch of the WA Wheatbelt Woodland must show the following key diagnostic characteristics:

- The distribution of the ecological community is limited to these IBRA bioregions and subregions:
 - Avon Wheatbelt - subregions AVW01 Merredin and AVW02 Katanning;
 - Mallee - MAL02 Western Mallee only; and
 - Jarrah Forest – outlying patches in the eastern parts of JAF01 Northern Jarrah Forests and JAF02 Jarrah Forests adjacent to the Avon Wheatbelt, that are off the Darling Range, and
 - receive less than 600 mm mean annual rainfall. They are effectively an extension of the Avon Wheatbelt landscape in that they comprise areas subject to similar climate, landscape and threats.
- The structure of the ecological community is a woodland in which the minimum crown cover of the tree canopy in a mature woodland is 10% (crowns measured as if they are opaque).
- The key species of the tree canopy are species of Eucalyptus as identified in Table 1, below. These are species that typically have a single trunk. One or more of the tree species in Table 1 are dominant or co-dominant within a patch of the ecological community. If other species are present in the tree canopy (e.g. species in Table 2 or other taxa) then these collectively do not occur as dominants in the tree canopy.
- A native understorey is present but is of variable composition, being a combination of grasses, other herbs and shrubs, as specified in Table 2, below.

Table 1. Tree canopy species of the WA Wheatbelt Woodlands ecological community.

One or more of these species are dominant or co-dominant within a given patch of the ecological community (Department of the Environment, 2015)

Scientific name	Common name/s
<i>Eucalyptus accedens</i>	powder-bark; powder-bark wandoo
<i>Eucalyptus aequioperta</i>	Welcome Hill gum
<i>Eucalyptus alipes</i>	Hyden mallet

<i>Eucalyptus astringens</i> subsp. <i>astringens</i>	brown mallet
<i>Eucalyptus capillosa</i>	wheatbelt wandoo
<i>Eucalyptus densa</i> subsp. <i>densa</i>	narrow-leaved blue mallet
<i>Eucalyptus extensa</i>	yellow mallet
<i>Eucalyptus falcata</i>	silver mallet
<i>Eucalyptus gardneri</i> subsp. <i>gardneri</i>	blue mallet
<i>Eucalyptus goniocarpa</i>	Lake King mallet
<i>Eucalyptus kondininensis</i>	Kondinin blackbutt
<i>Eucalyptus longicornis</i>	red morrel
<i>Eucalyptus loxophleba</i> subsp. <i>loxophleba</i>	York gum
<i>Eucalyptus melanoxyton</i>	black morrel
<i>Eucalyptus mimica</i> subsp. <i>continens</i>	hooded mallet
<i>Eucalyptus mimica</i> subsp. <i>mimica</i>	Newdegate mallet
<i>Eucalyptus myriadena</i>	small-fruited gum; blackbutt
<i>Eucalyptus occidentalis</i>	flat-topped yate
<i>Eucalyptus ornata</i>	ornamental silver mallet; ornate mallet
<i>Eucalyptus recta</i>	Mt Yule silver mallet; Cadoux mallet
<i>Eucalyptus rudis</i> subsp. <i>rudis</i>	flooded gum
<i>Eucalyptus salicola</i>	salt gum; salt salmon gum
<i>Eucalyptus salmonophloia</i>	salmon gum
<i>Eucalyptus salubris</i>	gimlet
<i>Eucalyptus sargentii</i> subsp. <i>sargentii</i>	salt river gum
<i>Eucalyptus singularis</i>	ridge-top mallet
<i>Eucalyptus spathulata</i> subsp. <i>spathulata</i>	swamp mallet
<i>Eucalyptus spathulata</i> subsp. <i>salina</i>	Salt River mallet
<i>Eucalyptus urna</i>	merrit
<i>Eucalyptus wandoo</i> subsp. <i>pulverea</i>	wandoo
<i>Eucalyptus wandoo</i> subsp. <i>wandoo</i>	wandoo

Table 2. Associated canopy species that may be present within the ecological community but are not dominant or co-dominant. The list is not comprehensive and presents the more common taxa encountered. (Department of the Environment, 2015)

Scientific name	Common name/s
<i>Acacia acuminata</i>	jam
<i>Allocasuarina huegeliana</i>	rock sheoak
<i>Corymbia calophylla</i>	marri
<i>Eucalyptus annulata</i>	prickly-fruited mallee
<i>Eucalyptus arachnaea</i> subsp. <i>arachnaea</i>	black-stemmed mallee
<i>Eucalyptus arachnaea</i> subsp. <i>arrecta</i>	black-stemmed mallet
<i>Eucalyptus armillata</i>	flanged mallee
<i>Eucalyptus calycogona</i> subsp. <i>calycogona</i>	square-fruited mallee
<i>Eucalyptus camaldulensis</i> subsp. <i>arida</i>	river red gum
<i>Eucalyptus celastroides</i> subsp. <i>virella</i>	wheatbelt mallee
<i>Eucalyptus cylindriflora</i>	Goldfields white mallee
<i>Eucalyptus decipiens</i>	redheart; moit
<i>Eucalyptus drummondii</i>	Drummond's mallee
<i>Eucalyptus eremophila</i>	sand mallee
<i>Eucalyptus erythronema</i> subsp. <i>erythronema</i>	red-flowered mallee
<i>Eucalyptus erythronema</i> subsp. <i>inornata</i>	yellow-flowered mallee
<i>Eucalyptus eudesmioides</i>	Kalbarri mallee
<i>Eucalyptus flocktoniae</i> subsp. <i>flocktoniae</i>	Flockton's mallee
<i>Eucalyptus gittinsii</i> subsp. <i>illucida</i>	northern sandplain mallee
<i>Eucalyptus incrassata</i>	ridge-fruited mallee
<i>Eucalyptus kochii</i> subsp. <i>plenissima</i>	Trayning mallee
<i>Eucalyptus leptopoda</i> subsp. <i>leptopoda</i>	Merredin mallee; Tammin mallee

<i>Eucalyptus loxophleba</i> subsp. <i>gratae</i>	Lake Grace mallee
<i>Eucalyptus loxophleba</i> subsp. <i>lissophloia</i>	smooth-barked York gum
<i>Eucalyptus loxophleba</i> subsp. <i>supralaevis</i>	blackbutt York gum
<i>Eucalyptus macrocarpa</i>	mottlecah
<i>Eucalyptus marginata</i>	jarrah
<i>Eucalyptus moderata</i>	redwood mallee
<i>Eucalyptus obtusiflora</i>	Dongara mallee
<i>Eucalyptus olivina</i>	olive-leaved mallee
<i>Eucalyptus orthostemon</i>	diverse mallee
<i>Eucalyptus perangusta</i>	fine-leaved mallee
<i>Eucalyptus phaenophylla</i>	common southern mallee
<i>Eucalyptus phenax</i> subsp. <i>phenax</i>	white mallee
<i>Eucalyptus pileata</i>	capped mallee
<i>Eucalyptus platypus</i> subsp. <i>platypus</i>	moort
<i>Eucalyptus polita</i>	Parker Range mallet
<i>Eucalyptus sheathiana</i>	ribbon-barked mallee
<i>Eucalyptus sporadica</i>	Burngup mallee
<i>Eucalyptus subangusta</i> subsp. <i>subangusta</i>	grey mallee

The understorey may comprise of bare to sparse understorey, a ground layer of forbs and/or graminoids, a mixture of shrubs from several genera and species, chenopod-dominated flora, or a range of salt tolerant species that dominate the understorey in locations that are more saline. Some patches may have a cover of samphire (*Tecticornia* spp.). While some areas may be naturally saline, in many cases increased salinity has arisen as a consequence of disturbance and is now a major threat.

The recommended minimum buffer zone for the ecological community is 40 metres from the edge of a patch as determined from the outer edge of the tree canopy. The buffer takes into account that the roots of several WA woodland eucalypt species, e.g. salmon gum, can spread a considerable distance from the central trunk. A larger buffer zone may be applied, where practical, to protect patches that are of particularly high conservation value, or if patches are downslope of drainage lines, a source of eutrophication or other important hydrologic features.

The areas considered critical to the survival of the WA Wheatbelt Woodland ecological community covers all patches that meet the key diagnostic characteristics and condition thresholds for the ecological community, plus the buffer zones, particularly where this comprises surrounding native vegetation. This is because this ecological community occurs in a landscape that has been very heavily cleared and modified, and now exists as mostly very small and highly fragmented patches.

To conserve the TEC, the Conservation Advice recommends the avoidance and restriction of the following activities:

- Further clearance and fragmentation of the ecological community, especially of:
 - High quality eucalypt woodland sites (as per the condition thresholds). Do not allow such patches to be further reduced below the size thresholds;
 - Components identified as particularly threatened, such as threatened and priority ecological communities recognised in WA; and
 - Woodland sites known to be habitat for threatened species or species that are uncommon in the relevant IBRA subregion or catchment.
- Extensive disturbances to native vegetation, hydrology or soil structures in and around the ecological community, especially in landscapes prone to erosion, salinity and waterlogging. For instance, apply buffer zones as per the advice, control run-off and avoid significant hydrological changes and eutrophication by minimising impacts from developments and activities in and around the ecological community.
- Removal of large trees that have hollows, regardless of whether trees are living or dead.

With regard to any proposals involving offsets for such a complex and diverse ecological community as the WA Wheatbelt Woodlands, the aims should be to:

- increase the area, condition and ecological function of the woodlands, e.g. by improving connectivity, diversity and other habitat values;
- match sites as far as this is possible, for instance the same or similar type of woodland community/sub-community as per Harvey and Keighery (2012) or similar Beard vegetation association.
- extend protection to otherwise unprotected sites. This may include sites that presently fall outside the condition criteria but can reasonably be restored to a better, more intact condition; and
- manage and protect offset areas in perpetuity in areas dedicated for conservation purposes. Introducing grazing to intact and high quality sites of the ecological community, at least those that occur west of the agricultural clearing line. Consider opportunities to reduce existing grazing pressure, e.g. through fencing.

Carnaby's black cockatoo

Carnaby's black cockatoo (*Zanda latirostis*) is endemic to the southwest of Western Australia. The Carnaby's black cockatoo is Endangered under the EPBC Act and is a Matter of National Environmental Significance (MNES) (DOE, 2013). Currently, the overall population trend for all 3 black cockatoo species including the Carnaby's black cockatoo is declining and is expected to continue to decline (Garnett & Baker 2021 in DAWE, 2022).

Carnaby's black cockatoo preferred habitat is remnant native eucalypt woodlands, especially those of salmon gum (*Eucalyptus salmonophloia*) and wandoo (*E. wandoo*), and in shrubland or kwongan heathland dominated by plants of the Proteaceae family. It also occurs in forests containing marri, jarrah, karri (*E. diversicolor*) and tuart (*E. gomphocephala*) (Department of Parks and Wildlife, 2013).

The Carnaby's black cockatoo breeds between late July and December in the inland wheatbelt region of its distribution, in areas receiving between 300 and 750 millimetres of annual average rainfall (Saunders, 1974). During the non-breeding season (January to July) the majority of the birds move to the higher rainfall coastal regions of their range including the midwest coast, Swan Coastal Plain and south coast (Saunders, 1980; Saunders, 1990; Berry, 2008; Johnstone *et al.*, 2011). There has been an apparent expansion in the breeding range to include areas further west and south since the middle of last century with a more rapid increase into the jarrah (*E. marginata*) and marri (*Corymbia calophylla*) forests of the southwest (Johnstone and Storr, 1998; Johnstone *et al.*, 2011). This expansion in breeding range is due to threatening processes such as clearing of breeding habitat and competition for suitable breeding hollows.

Carnaby's black cockatoo night roosts are usually located in the tallest trees of an area, and near both food supply and surface water (DAWE 2020; Le Roux (2017)). Flocks will use different night roosts, often for weeks, or until the local food supply is exhausted. Flocks show some fidelity to night roosts with sites used in most years to access high-quality feeding sites. However, not all night roosts are used in every year (DPaW 2013).

Carnaby's black cockatoo nests in large hollows in tall, living or dead eucalypts. It nests most commonly in smooth-barked wandoo and salmon gum but has also been recorded breeding in red morrel (*E. longicornis*), York gum (*E. loxophleba*), tuart, flooded gum (*E. rudis*), swamp yate (*E. occidentalis*), gimlet (*E. salubris*) and marri, and are said to nest in any species of eucalypt with a suitable hollow (Department of Parks and Wildlife, 2013).

Black cockatoos, including the Carnaby's black cockatoo, forage over a large area, feeding on a variety of native and introduced (exotic and non-WA) vegetation species. Not all suitable native vegetation will produce good foraging resources each year, so black cockatoos will vary their foraging strategy depending upon availability. Black cockatoos rely upon the availability of foraging resources across their range, particularly when birds need to build condition after breeding and are teaching juveniles where foraging resources are located. Lack of foraging resources increases the likelihood that birds won't regain condition after breeding, won't breed again the following season, and that juveniles won't survive to become part of the adult population. Food resources within the range of breeding sites and roost sites are critical to sustain populations, and foraging resources are therefore viewed in the context of known breeding and night roosting sites, particularly within 12 kilometres of an impact area (DAWE, 2022). Connecting patches of vegetation between foraging resources, breeding habitat and night roosting habitat are therefore essential to enable black cockatoos to access resources across their range. Therefore, remnant patches of vegetation are considered important in maintaining black cockatoo habitat connectivity across the landscape.

Under the EPBC Act, actions with significant impact on Carnaby's black cockatoo will require a referral to and approval from the minister. A referral is likely to be required if an action results in the following impact (DAWE, 2022):

- the loss of breeding habitat.
- the loss of one or more known or suitable nesting trees
- the loss of a known night roosting site
- the loss of equal to or greater than 1 hectare of high-quality foraging habitat. Note that this is determined using the foraging quality scoring tool within the Referral Guideline, which is based on the foraging potential, connectivity, proximity to breeding, proximity to night roosting of the vegetation.

The overall decline in the population of Carnaby's black cockatoo is attributed to the loss and fragmentation of habitat as a result of clearing of native vegetation (Saunders, 1990; Johnstone and Storr, 1998; Saunders and Ingram, 1998; Garnett *et al.*, 2011). The recovery plan for the Carnaby's notes that the reversal of threats, which includes loss of habitat, is required before significant increases in their population can occur (Department of Parks and Wildlife, 2013)

The recovery plan indicates that the limiting factor to population growth is adult and chicks' survival which relates to availability of food resources and breeding hollows. Consequently, the protection, management and increase of the

breeding and feeding habitat is a critical requirement for the conservation of the species (Department of Parks and Wildlife, 2013).

The recovery plan identifies habitat critical to the survival of Carnaby's black cockatoos as follows:

- the eucalypt woodlands that provide nest hollows used for breeding, together with nearby vegetation that provides feeding, roosting and watering habitat that supports successful breeding;
- woodland sites known to have supported breeding in the past and which could be used in the future, provided adequate nearby food and/or water resources are available or are re-established; and
- in the non-breeding season, the vegetation that provides food resources as well as the sites for nearby watering and night roosting that enable the cockatoos to effectively utilise the available food resources (Department of Parks and Wildlife, 2013).

The Wheatbelt contains open woodlands including York Gum (*E. loxophleba*), Wandoo (*E. wandoo*), Salmon Gum (*E. salmonophloia*) and Flooded Gum (*E. rudis*) used by Carnaby's black cockatoo for breeding. This region extends north of the traditional Wheatbelt area, where York Gum and Kwongan heath foraging resources are accessed by Carnaby's black cockatoo. Some parts of this region include breeding habitat for Baudin's Cockatoo and the Forest Red-tailed Black-cockatoo on the eastern margins of the Jarrah forest, and some areas meet the definition for the Eucalypt Woodlands of the Western Australia Wheatbelt ecological community, which is listed as Critically Endangered under the EPBC Act list of threatened ecological communities. All areas of breeding habitat are critical to black cockatoos, as are the associated foraging areas that support breeding. Vegetation in this region is fragmented and represented poorly in reserves (DAWE, 2020).

4. Summary of impacts

The application area contains 1.7 ha of vegetation in Good to Very Good (Keighery, 1994) condition comprising mostly of *E. salmonophloea*, *E. loxophleba*, and *E. wandoo*. The vegetation meets the diagnostic characteristics of the Eucalypt Woodlands of the WA Wheatbelt TEC (Wheatbelt Woodlands TEC) as prescribed by the Approved Conservation Advice for the TEC. The condition ranges from Good to Very Good (Keighery, 1994) with the Commonwealth referral indicating these patches meet the condition threshold for Category A (roadside patch width being >5m; excellent to very good condition). Based on the Department of the Environment Matters of National Environmental Significance Significant Impact Guidelines 1.1 (the Guidelines) (DoE 2013), the impacts from the proposed clearing are considered significant.

Carnaby's black cockatoo

The application area is within the northern edge of the vagrant range of the Vulnerable Forest Red-tailed Black Cockatoo (*Calypthornchus banksii naso*). There are no records of Forest Red-tailed cockatoo within twelve kilometres of the application area and the sub-species is very unlikely to occur within the application and local areas. Consequently, impacts of the proposed clearing on the Forest Red-tailed cockatoo are not assessed in this report.

As discussed in Section 3, impacts on black cockatoo habitat must be assessed in terms of breeding habitat, night roosting habitat, and foraging habitat. Black cockatoos will generally forage up to 12 kilometres from their nest, located in a known nesting tree during the breeding season (DSEWPac, 2012; DAWE, 2022, DPaW 2013). They rely on this proximity of foraging resources to known nesting trees to successfully raise chicks. Following breeding, they will flock in search of food, usually within six kilometres of a night roost (DSEWPac 2012; DPaW 2013) but may range up to 20 kilometres though in some cases, foraging distances can be greater. (DAWE, 2022). Black cockatoos rely upon the availability of night roosting habitat in proximity to foraging resources and rely on access to watering points in selecting night roost sites, with roost sites usually within 2 km of a watering point (DAWE, 2022).

The application area contains 1.7 hectares of Carnaby's black cockatoo foraging habitat and 27 potential breeding habitat trees, one of which contains a suitable hollow for nesting. The application area is within the feeding and breeding range of Carnaby's black cockatoo. A significant roosting site with large flocks of Carnaby's is recorded approximately 18 km northwest of the application area.

Breeding

In terms of breeding, despite the historical and extensive clearing in the Wheatbelt, Carnaby's black cockatoos tend to nest in Wandoo and Salmon Gum in the region (DBCA, 2021). The Department of Biodiversity, Conservation and Attractions (DBCA) has noted that due to extensive clearing throughout the birds historical breeding range, certain areas, including the locality of the application area, have become significant to the persistence of the species, due to access to suitable hollows, proximity to food resources (within 12 km of nesting sites), and access to water (within 2 km of nesting sites).

Within 12 km of the application area, a total of 183 breeding hollows have been identified, ninety-six of which are confirmed and natural hollows (see Table 3) (DBCA, 2022). Figure 4 depicts the available water resources and the distribution of breeding hollows within 12 km and 20 km radius of the application area.

Forty-two percent (42%) of the confirmed hollows have recorded multiple breeding records, of which 77% of records are attributed to artificial hollows (including natural/artificial hollows), highlighting the reliance of breeding in the area on the artificial hollows. Of the natural hollows listed in Table 3, DBCA (2021) noted that over 50% of them occur in dead, senescing or severely compromised trees that the hollows are more prone to collapse or loss. It is important to note that the majority of these trees occur along roadsides which are highly degraded (increased weed incursion, soil compaction, no species recruitment).

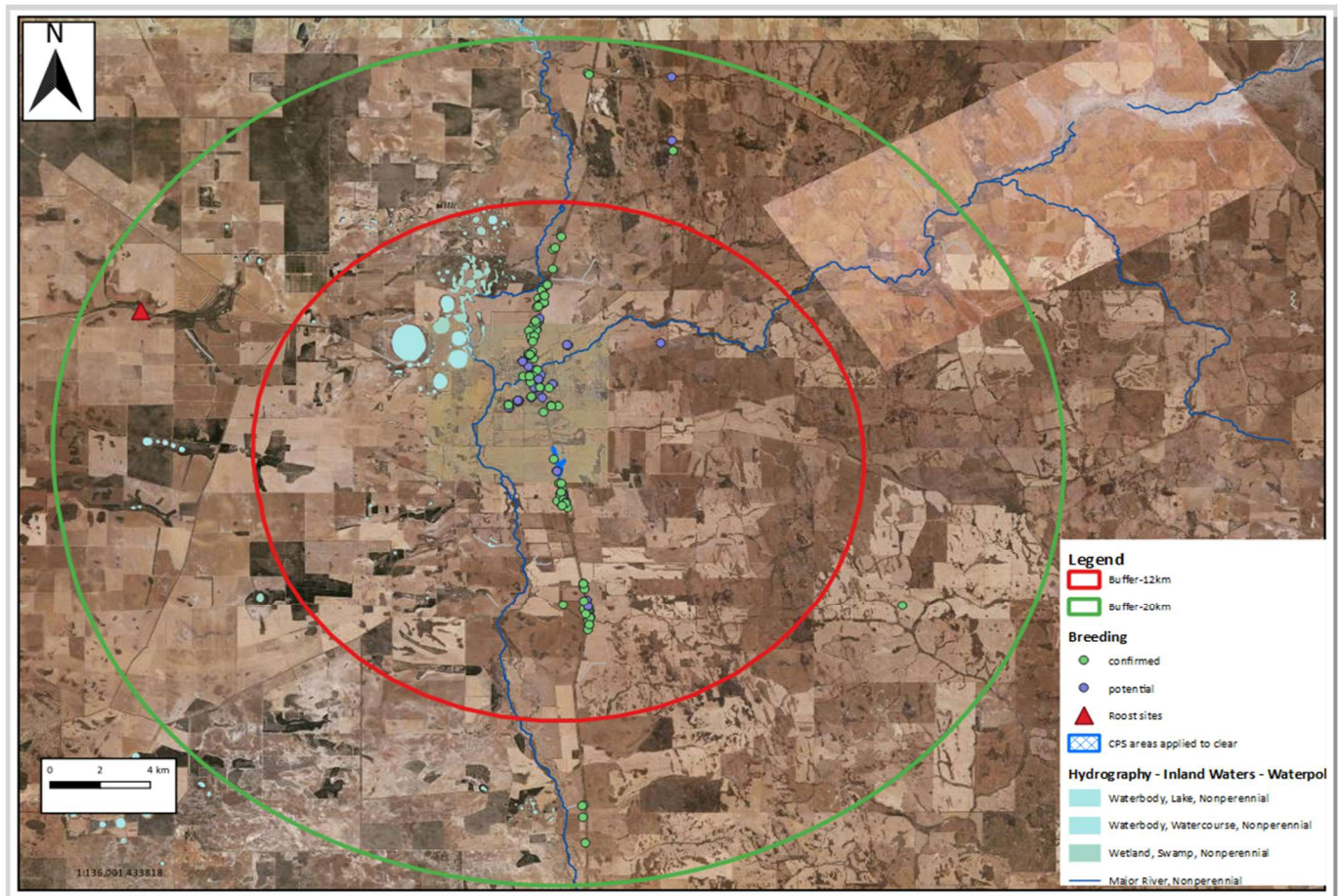


Figure 4. Identified breeding hollows and roosting site within 12 and 20 km of the application area. Breeding hollows are concentrated along the road and near water sources (*WTBC_breeding_data_restricted data set*, DBCA (2020)).

Table 3. Known Carnaby’s black cockatoo hollows within 12 km of application area (*WTBC_breeding_data_restricted (2020) data set*).

Hollow type	Potential hollows	Confirmed hollows	Total hollows	Distance of confirmed hollow (closest) to application area (m)	Confirmed hollows with multiple years nesting observed (2001-2020)
Artificial	16	32	48	2,017.61	24
Natural	35	96	131	92.99	27
Natural / Artificial		4	4	4,628.67	4
Total	51	132	183		55

Of the 27 potential breeding trees proposed to be clear, one has a suitable hollow for breeding by Carnaby black cockatoo. Although the majority of the trees may not currently support breeding or contain hollows of suitable size and condition for black cockatoos, it is important to note that trees take more than 120 years to develop hollows of

suitable size (DBCA, 2023) for breeding. Noting the significance of the local area to the persistence of the species, the highly disturbed nature of the surrounding area, health and condition of the existing breeding trees in the area, the reliance of artificial hollows and that black cockatoos tend to breed in the next available hollows in the proximity of current or used hollows, the vegetation within the application area is critical to the persistence of the Carnaby's black cockatoo. Within the context of the recovery plans for the Carnaby's black cockatoo, preservation of trees with a range of hollows sizes and suitability, ages and maturity including those yet to form hollows, is important to ensure a succession plan to conserve the Carnaby's black cockatoo breeding habitat. Given the above, the removal of 27 potential breeding trees has significant impact on the maintenance and conservation of Carnaby's black cockatoo within the species, local and regional contexts.

Foraging

The application area contains 1.7 hectares of vegetation which comprises of tree species preferred by the Carnaby's black cockatoo for feeding. The vegetation, however, contains low density of the foraging species (10% foliage cover of foraging tree species), on which basis the vegetation within the application area is considered to be low quality for foraging. Foraging debris was identified in a survey in 2019 (ELA, 2020)

The recovery plan indicates that the limiting factor to population growth is adult and chicks' survival which relates to availability of food resources near to breeding hollows. Sufficient food close to nesting areas (~12 km) is required for breeding birds to be able to forage and return to feed nestlings, particularly during the breeding seasons. If the nesting area is not close enough to adequate food or water supplies, Carnaby's black cockatoos will not be able to successfully raise young. The area surrounding the proposed clearing site meets the vital criteria to rear young, in terms of proximity to food, water and hollows. Moora is a known key breeding area for Carnaby's black cockatoo (DBCA, 2021). Although the vegetation is of low quality for foraging by the Carnaby's black cockatoo, noting its proximity to key breeding and roosting sites and within the context of extensively cleared and fragmented native vegetation of the Wheatbelt region, the vegetation proposed to be cleared comprises a significant foraging habitat to support the breeding of Carnaby's black cockatoo. The removal of vegetation within the application area would contribute to the cumulative loss of foraging habitat for the Carnaby's black cockatoo.

The vegetation within the application area also forms an integral part of an ecological linkage which is important for bird movement. Carnaby's black cockatoos migrate back and forth from the Swan Coastal Plain, where they feed during the summer, to the Wheatbelt, where they breed in tree hollows during the winter. The clearing of this patch of vegetation will have implications for the movement of Carnaby's black cockatoo across the region.

Given the above, the removal of vegetation within the application area will have a significant impact on feeding and potential breeding habitat for Carnaby's black cockatoo, as well vegetation which is important for the migration of Carnaby's black cockatoo.

5. Public consultation

The proposed action was advertised on the Department website on 2 August 2021 with a 21-day submission period. One public submission was received in relation to this application (Submission, 2021).

The applicant has advised that stakeholder consultation has been undertaken with the following:

- Shire of Moora
- Department of Water and Environmental Regulation
- Department of Biodiversity, Conservation and Attractions
- Department of Planning, Lands and Heritage
- Main Roads Western Australia
- Department of Primary Industries and Regional Development
- The Yued people as part of the Noongar claimants of the Yued Native Title Claim area (WC1998/070), Southern Noongar Claim (WC1996/109), and the Single Noongar Claim (Area 1) WC2003/006 (Archae-aus, 2021).

6. Avoidance, mitigation and offsets

6.1. Avoidance and minimisation

The applicant has proposed a larger 9.59-hectares application area to allow flexibility in the final location of works and infrastructure. Information from the flora and fauna surveys of ELA (2020a and 2020b) influenced the location and design layout as far as practicable. The applicant had acquired the adjacent cleared/degraded paddock to the south of the current receival site to locate the rail siding and loading facility (now part of Lot 8), which enable the location of works and infrastructure within the already cleared area. However, given the site constraints such as the existing internal storage areas and railway infrastructure, it was not practicable to avoid all native vegetation. The proposed clearing of native vegetation within the indicative footprint will not exceed 1.7 ha.

The final project design and site has resulted in:

- a reduction of clearing of the Eucalypt Woodlands of the Western Australian Wheatbelt ecological community from 7.45 ha to 1.9 ha, and then further reduced to 1.7 ha;
- a reduction of impacts to native vegetation from 2.7 ha to 1.7 ha;
- a reduction of impacts to black cockatoo potential breeding trees from 39 to 27, with only one of those trees containing a hollow over 100 mm in diameter;
- a reduction in impact to black cockatoo foraging habitat from 2.7 ha to 1.7 ha; and
- avoidance of all individuals of the Threatened flora species *Eremophila scaberula* and *Eremophila glabra subsp. chlorella* identified in the proximity of the project (ELA, 2019)

6.2. Alternatives considered

The proposed project location was decided after consideration of alternatives by the applicant. The following alternatives were considered (CBH, 2021)

Upgrading the existing loadout: This option was ruled out as it would require a larger amount of clearing, and result in higher community impact, loss of amenity and disruption to road and rail services due to road and rail closures due to the requirement to significantly change the rail configuration. This is compounded by the proximity and configuration of surrounding roads and the presence of an Aboriginal heritage area (ID 27960) to the north of the Project.

Mainline Loading: This option was not considered viable due to the increased safety risks associated with the option. This decreases scheduling flexibility and adds a constraint into the network with increased safety risks. For example, personnel would be required to access the mainline to perform hygiene tasks, exposing them to greater safety risks associated with the rail. It would also require many shunts to swap the locomotives to the other end of the train including a few propulsions (which requires someone to walk in front of the train). These shunts would also be required in the townsite block level crossings introducing additional safety hazards. Furthermore, there is an increased risk of grain settling within the ballast of the mainline.

Short Siding: This option was ruled out due to inherent safety risks from propelling and shunting wagons. It would also block the mainline for the entirety of the out-loading process (approximately five hours) without any way to efficiently stabilise the wagons off the mainline. Because of the shunting required to swap the locomotives to the other end of the train, the turnaround time at site for this option would be approximately one hour longer than for the 'single' or 'double' siding options. Additionally, the siding would not be long enough to serve as a passing loop, thereby negating one of the key aims of the project. Similarly, to the mainline loading option, there is a decrease in scheduling flexibility and this option would add another constraint to the network.

Half Siding: This option was ruled out because as the train loads it would foul the mainline for the duration of the loading (approximately four hours). If required, loading can be paused, and the train stabled, to allow another train to pass before loading is resumed. This option is not optimal due to the delay in loading when a second train is required to pass.

Double siding - This option should minimise the time required for the train spent on site and provide flexibility to load more than one train per day at Moora if required. However, this option is ruled out because it requires much larger amount of clearing of native vegetation to make room for the double siding.

6.3. Environmental Management

The applicant has prepared a Construction Environmental Management Plan (CEMP) which describes how the impacts of activities related to the construction phase of the project will be managed to reduce potential direct and indirect impacts on the environment (CBH, 2023a). The CEMP includes:

- vegetation protection strategies with areas of vegetation to be retained clearly demarcated with star pickets, coloured tape, bunting, or fencing;
- inductions for clearing personnel to be made aware of the requirement to protect native vegetation;
- washing down all clearing machinery prior to entering and leaving the site;
- managing the movement of soils and plant material to ensure dieback disease is not introduced into surrounding vegetated areas;
- ensuring that no dieback or weed-affected soil, mulch or fill is brought into the clearing area;
- ensuring that construction personnel participate in an environmental induction toolbox session to be made aware that native flora and fauna are protected under the *Biodiversity Conservation Act 2016* and of the measures to be implemented to prevent undue environmental harm;
- clearing to be conducted outside the known breeding season of the Carnaby's black cockatoo to avoid any disturbance to nesting birds;
- any fauna injured during construction to be taken to a designated veterinary clinic or an appropriate wildlife carer nominated by DBCA;

- if hydrocarbons are to be temporarily stored, they will be contained within portable bunds with a spill response kit located in close proximity to any refuelling locations; and
- dust management actions including the identification of watering capabilities and practices for dust management during and after clearing.

6.4 Offset

Significant residual impact

The Delegated Officer was satisfied that the applicant has undertaken reasonable measures to avoid and minimise potential impacts of the proposed clearing on environmental values. After consideration of avoidance and mitigation measures, it was determined that the following significant residual impacts remain:

- Loss of 1.7 ha of native vegetation that provides suitable foraging and potential breeding habitat for Carnaby's black cockatoos
- Loss of 1.7 ha of native vegetation that is representative of the Wheatbelt Woodlands Threatened Ecological Community (TEC)
- Loss of 1.7 ha of native vegetation that is significant remnant within an extensively cleared landscape
- Loss of 1.7 ha of native vegetation that is representative of an under-represented vegetation association (Victoria Plains 142)
- Cumulative loss of native vegetation in the local area that has been extensively cleared.

An environmental offset to counterbalance the significant residual impacts is required. In accordance with the Government of Western Australia's *Environmental Offsets Policy* and *Environmental Offsets Guidelines* and the EPBC Act 1999 Environmental Offset Policy 2012, these significant residual impacts have been addressed through the conditioning of environmental offset requirements. The nature and suitability of the offset provided is summarised as follows:

Offset suitability

In its consideration of a suitable offset proposal to counterbalance the impacts of the proposed clearing, DWER (NVR) sought advice from DBCA. This advice identified that an offset site for the impact of the Moora project on Carnaby's black cockatoo should:

- be in 'Good' or better condition;
- be located within 20 kilometres of the application area;
- be relatively large at greater than five hectares;
- have favourable edge-to-area ratios (e.g. be square rather than long and narrow);
- have vegetated linkages to other conservation reserves.

With regard to any proposals involving offsets for the WA Wheatbelt Woodlands TEC, the Approved Conservation Advice for the TEC states that the aims should be to:

- increase the area, condition and ecological function of the woodlands, e.g. by improving connectivity, diversity and other habitat values;
- match sites as far as this is possible, for instance the same or similar type of woodland community/sub-community as per Harvey and Keighery (2012) or similar Beard vegetation association;
- extend protection to otherwise unprotected sites. This may include sites that presently fall outside the condition criteria but can reasonably be restored to a better, more intact condition; and to manage and protect offset areas in perpetuity in areas dedicated for conservation purposes.

The Proposed Offset Sites

The applicant proposed to offset the above residual impacts by managing and improving the quality of native vegetation, TEC, black cockatoo foraging and breeding habitat on Lot 4300 on Plan 30175, Moora in the Shire of Moora (Lot 4300) and Lot 1397 on Plan 125128, Lake Hinds in the Shire of Wongan Ballidu (Lot 1397). Both properties will be afforded in perpetuity protection through conservation covenants executed under section 30B of the *Soil and Land Conservation Act 1945*.

Lot 4300 contains the following values:

- Freehold, owned by CBH. CBH has lodged the application with DPIRD to place it under a conservation covenant
- Zoned Industrial

- 40 m from impact site
- 13.69 ha of native vegetation in a Degraded to Very Good (Keighery, 1994) condition (approximately 82% in Very Good condition)
- Significant remnant of native vegetation within an extensively cleared landscape;
- 8.56 ha of moderate value habitat for foraging by the Carnaby's black cockatoos, and 3.34 ha of low value foraging habitat
- 32 potential habitat trees (*E. salmonophloia* and *E. loxophleba*) with DBH greater than 300 mm and 500 mm respectively
- 8.36 ha of Wheatbelt Woodlands TEC, of which 6.76 ha is of Category A and 1.6 ha of Category C
- Value as a steppingstone for fauna movement as well as breeding, roosting and foraging habitat
- Within 12 km of key breeding sites (confirmed, natural and artificial) for the Carnaby's black cockatoo
- Within 18 km of a key roosting site
- Close proximity to water sources required for the maintenance of local Carnaby's black cockatoo populations
- Vegetation considered representative of the Victoria Plains 142 vegetation association.

Lot 1397 contains the following values:

- Freehold, subdivided from a larger land holding which include a condition to be conserved in perpetuity.
- Zoned rural
- 52 km south-east of impact site
- 17.26 ha of native vegetation in a Degraded to Excellent (Keighery, 1994) condition, mostly in Good to Excellent condition
- Significant remnant of native vegetation within an extensively cleared landscape
- 13.79 ha of Wheatbelt Woodland TEC, comprising of 8.433 ha of Category A and 5.355 ha of Category C Wheatbelt Woodland TEC. Category A and C TEC at this Lot corresponds with EsIW type of vegetation identified at the impact site.
- Vegetation considered representative of the Victoria Plains 142 vegetation association.

CPS 9532/1 - Offset sites - Context Map

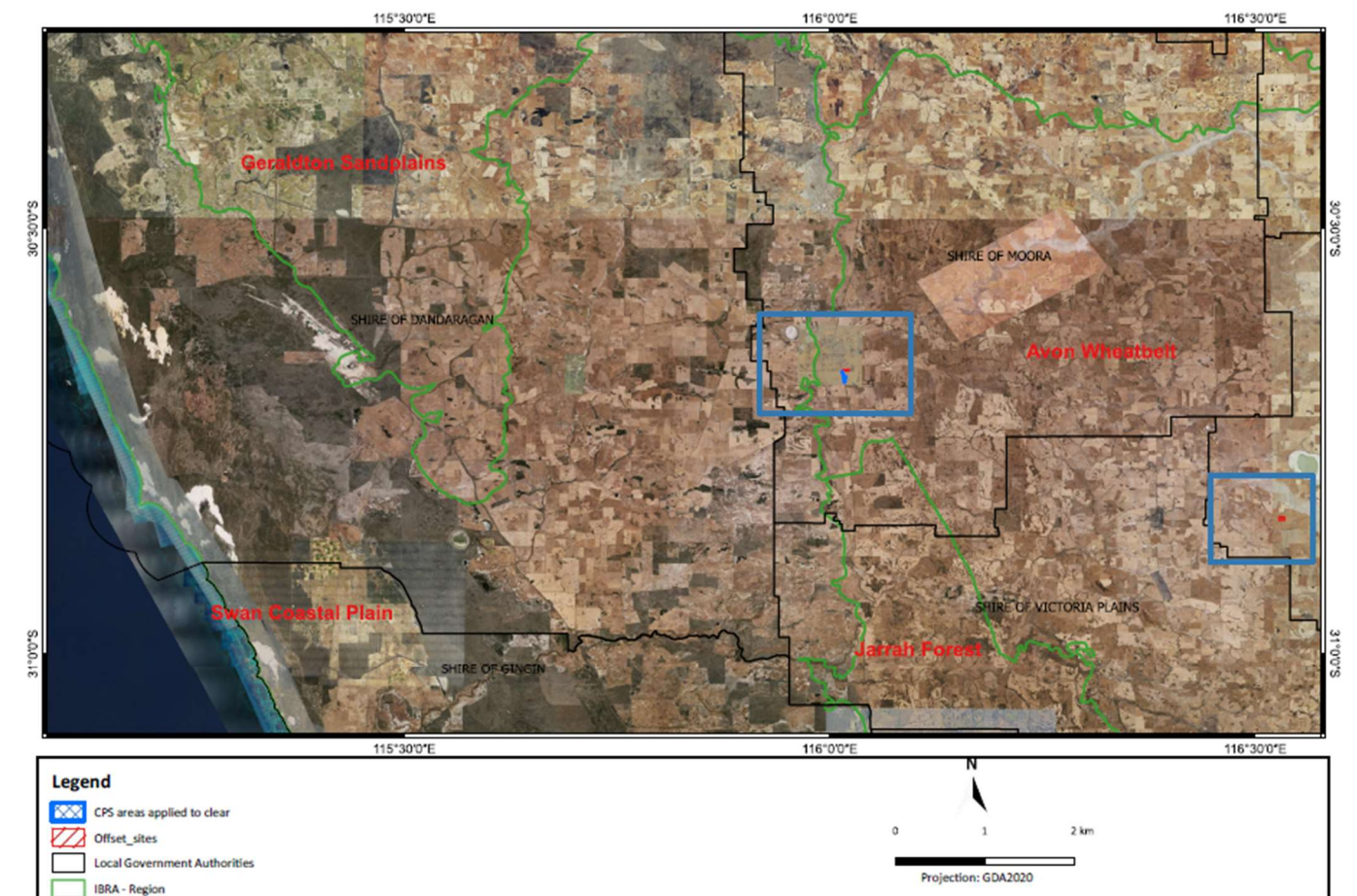


Figure 5. The context map of the offset sites



Figure 6. Map of offset site on Lot 4300 on Plan 30175 to be placed under a conservation covenant. This site is within 40 m of the proposed clearing area.

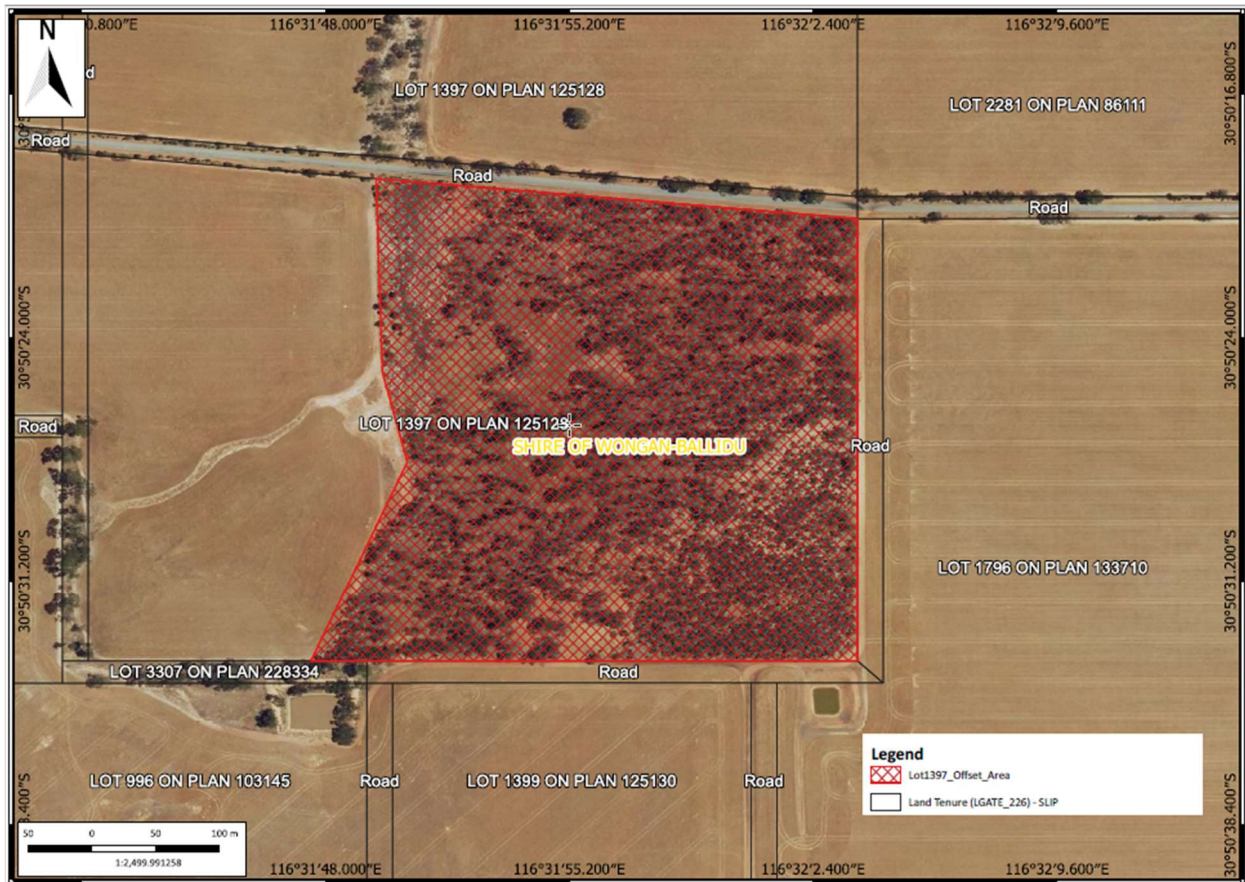


Figure 7. Map of offset site on Lot 1397 on Plan 125128 to be placed under a conservation covenant. This site is 52 km south-east of the impact site and within the same bioregion.

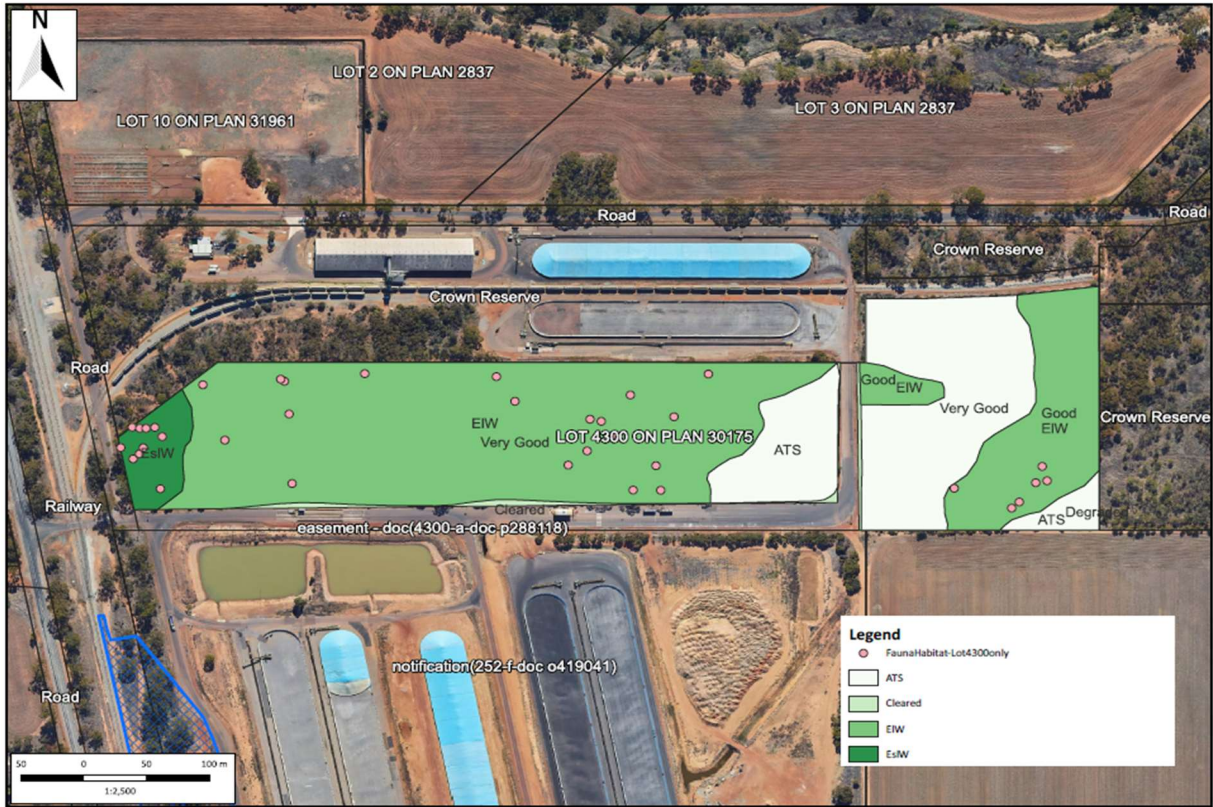


Figure 8. Lot 4300 comprises of native vegetation in predominantly Good to Very Good (Keighery, 1994) condition and 32 potential Carnaby's black cockatoo habitat trees (pink dots) within patches of vegetation identified as EsIW and EIW (ELA, 2023)



Figure 9. Lot 4300 contains the Wheatbelt Woodlands TEC Category A and C (ELA, 2023)

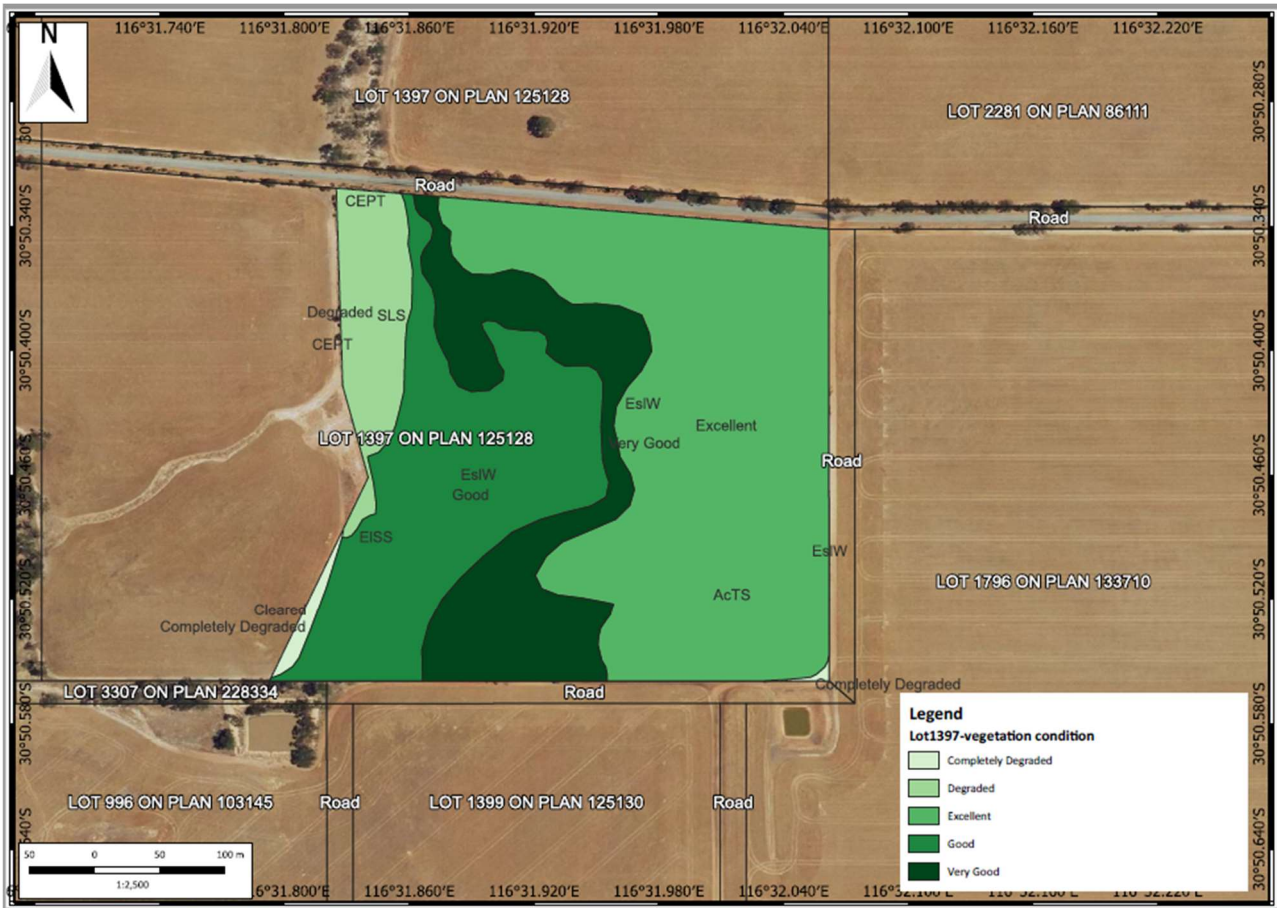


Figure 10. Lot 1397 comprises of vegetation units similar to the impact site mostly in Very Good and Excellent (Keighery, 1994) condition (ELA, 2023)

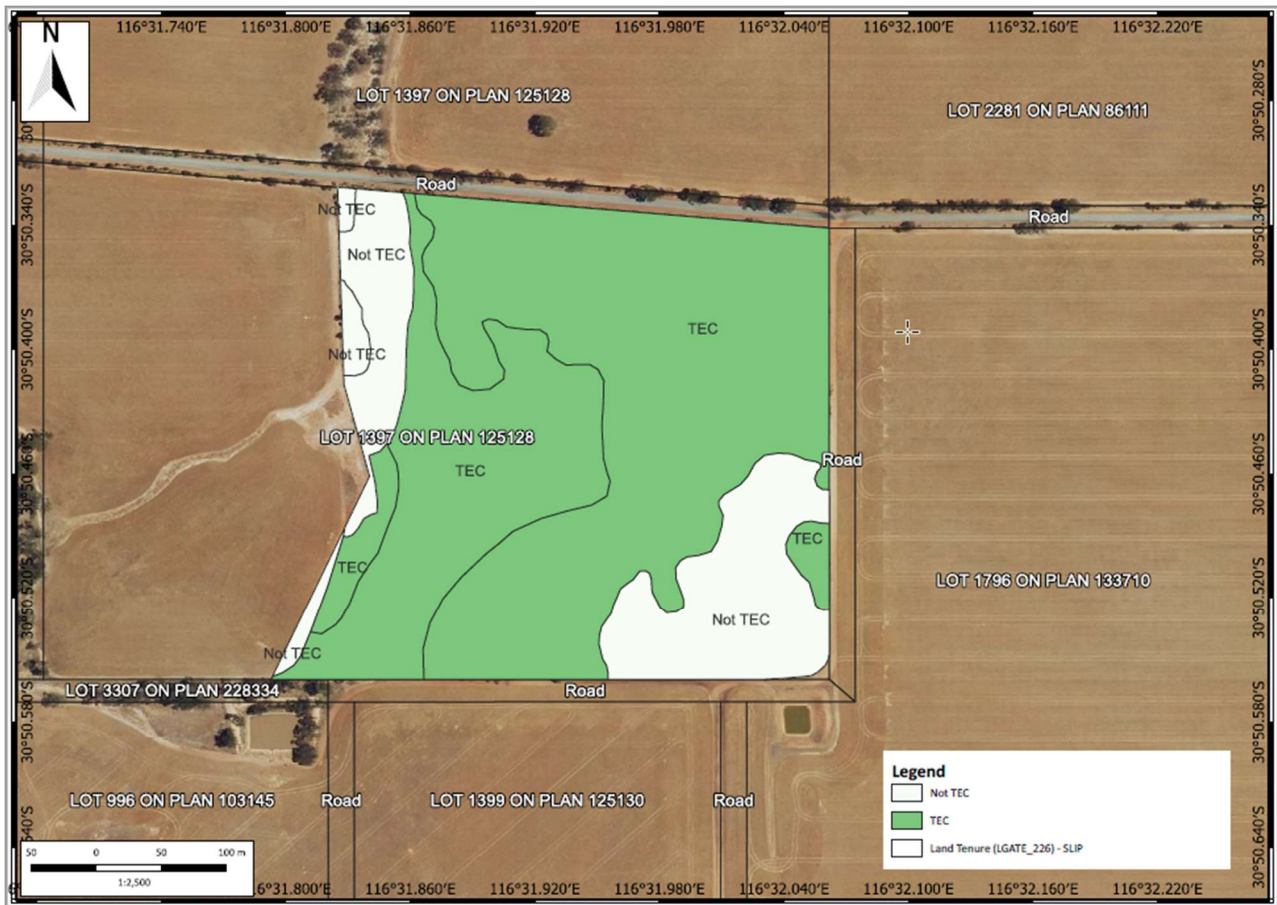


Figure 11. Lot 1397 contains the Wheatbelt Woodlands TEC (ELA, 2023)

It has been identified that despite the environmental values which currently exist, both of the offset sites are subject to the following threats:

- Clearing of vegetation and fragmentation of vegetation into smaller, disconnected patches
- Interactions with humans
- Invasive species – including weeds
- Grazing
- Salinity
- Fire
- Dieback

Offset management plan

In addition to placing Lot 4300 and Lot 1397 under a conservation covenant, CBH proposed a management plan for the offset.

The objectives of the offset management are as follows:

- Install five artificial nesting boxes (ANB) at Lot 4300
- Manage the ANBs at Lot 4300 to ensure breeding opportunities for black cockatoos are maintained
- Improve the quality of Carnaby's black cockatoo foraging habitat at Lot 4300.
- Improve the condition of the Wheatbelt Woodland Threatened Ecological Community (WWTEC) at Lot 4300 and Lot 1397
- Improve the condition of the remnant native vegetation at Lot 4300 and Lot 1397, that being within an extensively cleared landscape.

A detailed Rehabilitation and Revegetation Plan for the offset sites was submitted by CBH (CBH, 2023b). The document provides details about the area, activities, objectives and completion criteria for the rehabilitation and revegetation plan are summarised in the attached document. The completion criteria will be conditioned on the permit as a component of the environmental offset requirements.

Offset adequacy.

In accordance with the Government of Western Australia's *Environmental Offsets Policy* and *Environmental Offsets Guidelines* and the *EPBC Act 1999 Environmental Offset Policy 2012*, the significant residual impacts have been addressed through the conditioning of environmental offset requirements. DWER assessment and offset calculation indicates the following:

- The proposed offset management plan for Lot 4300 and Lot 1397, combined, will address 100% of the SRI to Carnaby's black cockatoo under Western Australia's *Environmental Offsets Policy* and *the EPBC 1999 Act Offset Policy 2012* with the addition of a revegetation management plan for Zone C - degraded area (1.12 ha) of offset site 1397.
- The proposed offset management plan for Lot 4300 and Lot 1397, combined, provide 100% offsets for the SRI on the Wheatbelt Woodland Threatened Ecological Community (WWTEC)
- The proposed offset management plan for Lot 4300 will address 100% SRI on the Victoria Plains 142 vegetation association under the Western Australia's *Environmental Offsets Policy* and *Environmental Offsets Guidelines*

A summary of the offset calculations which meet both the Western Australia's *Environmental Offsets Policy* and *the EPBC 1999 Act Offset Policy 2012* requirements is provided in Appendix C.



Figure 12. The rehabilitation zones within Lot 4300

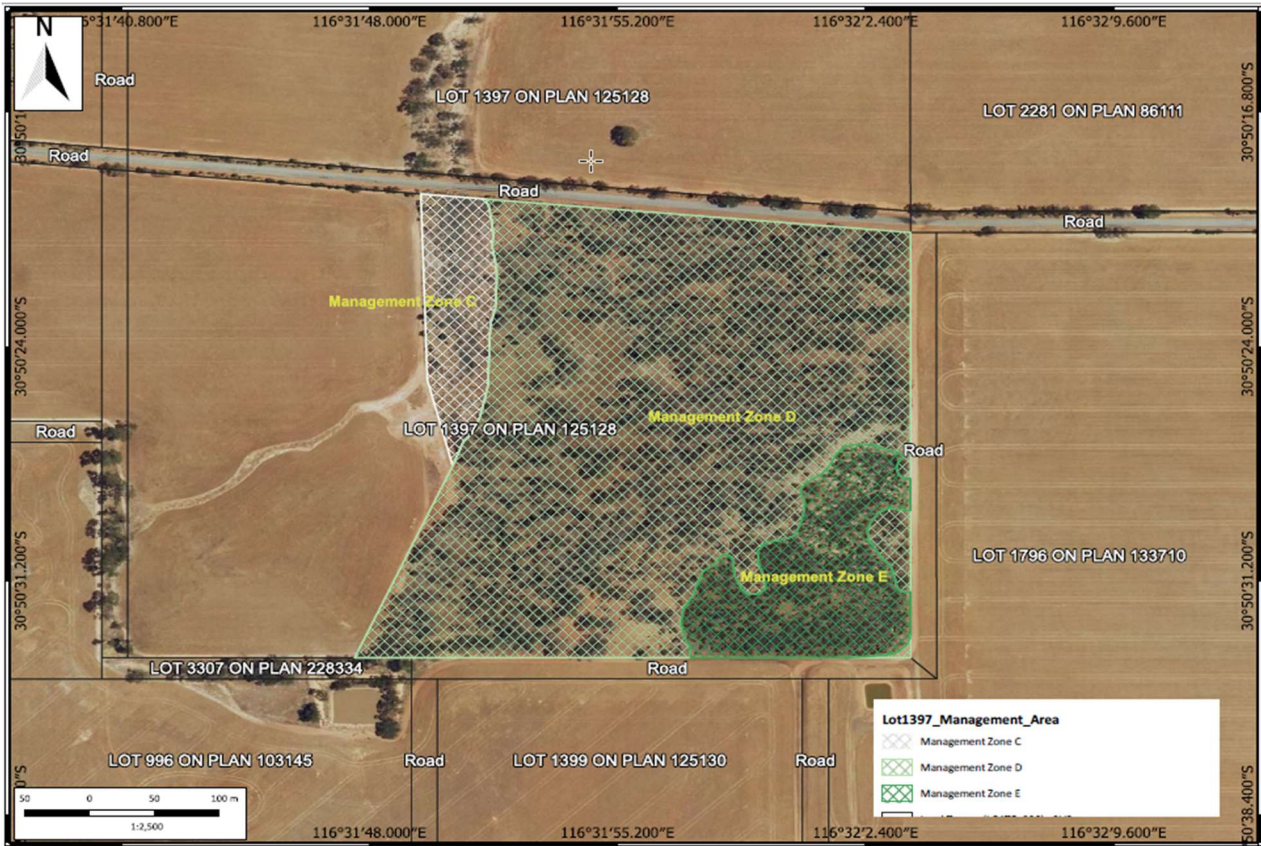


Figure 13. The rehabilitation zones within Lot 1397.

7. Other relevant considerations

Economic and Social Factors

Co-operative Bulk Handling Limited (CBH) (the Applicant) is a West Australian based agricultural co-operative owned and controlled by approximately 3700 West Australian grain growing businesses. The core purpose of CBH is to sustainably create and return value to grain growers.

In 2018, the WA Department of Transport commenced work on developing a 10-to-15-year plan for agricultural industries in the southwest of Western Australia. The resulting strategy was referred to as the Revitalising Agricultural Region Freight Strategy (RARF) and was released in mid-2020. It identified and prioritised approximately 130 infrastructure projects that would make freight more productive, efficient and safe (CBH, 2021).

In late 2020, the Department of Transport lodged a submission called the Agricultural Supply Chain Initiative (ASCI) seeking Federal funding for the projects identified in the RARF. In March 2021 the Western Australian Government made a commitment to fund \$22 million towards four of the rail sidings identified in the RARF that were prioritised as 'high-priority', including CBH's Moora Depot associated with this application. Subsequently, the Federal Government has committed \$160 million to ASCI Package 1, and the WA Government increased its pledge from \$22 million to \$40 million – a total of \$200 million (CBH, 2021).

The applicant proposes to develop a new 'single' siding and batch weigher, as part of the upgrades to the CBH Grain Receive Site at Moora. The Moora project includes the construction of a new 'single' rail siding and access track on the eastern side and parallel to Bindoon-Moora Road, two new crossovers over the rail siding to reconnect Findlater St, a new drainage basin, a Fixed Rail Loading (FRL) facility, internal access roads, and topsoil stockpiles. The Project is required to cater for growing quantities of grain receivals in the Moora region and surrounding catchments, driven by improved farming techniques and higher yielding seed varieties. The reliance on rail reduces trucking movements on both Local and State government roads and the reliance on trucking capacity and operating costs for CBH. Therefore, the financial burden on Local and State governments to maintain road access and improve road user safety is reduced. Specifically, the Project is anticipated to provide the following benefits:

- Improve rail loading facility and siding cost
- Improve safety by eliminating rail-road interactions and significantly reducing the amount of shunting required and by reducing trucks on road from a significant shift in out-loading to rail;
- Reduce the loading time at Moora from 11 hours to 4 hours, therefore reducing the Port-to-Port cycle from 24 hours to approximately 17 hours;
- Allow easy stabling (i.e. holding train wagons on standby) off the mainline to facilitate train passing if required;
- Improve on-site capability and capacity to load two trains per day;
- Improve wagon-filling accuracy to prevent underloading (and overloading)
- Increase export revenue
- Improve residential amenity by relocating the Fixed Rail Loading Facility away from nearby dwellings (CBH, ELA, 2021)
- Reduction in environmental externalities including emissions and noise and
- Road maintenance cost saving

Applicant's Environmental History

CBH Engineering Pty Ltd have previously held several clearing permits including CPS 3751/1, CPS 3752/1 and CPS 9445/1. CPS 3751/1 and CPS 9445/1 required environment offsets.

The Department has not recorded any compliance issues relating to these clearing permits, with CBH Engineering Pty Ltd or with Co-operative Bulk Handling Limited. It is noted that the applicant has engaged several qualified environmental consultants to assist in applying for this clearing permit (Eco Logical Australia, GHD, 360 Environmental, Invertebrate Solutions, Galt Geotechnics, Golder Associates Pty Ltd and McDowall Affleck).

The applicant has advised that:

"CBH takes its obligation under environmental legislation seriously. The only recorded breach of policy by the Proponent was in 2019, where the Proponent received a modified penalty under the provisions of the Environmental Protection (Unauthorised Discharges) Regulations 2004 for a single event where grain dust from ship loading activities was observed settling on Cockburn Sound. CBH worked constructively with DWER to implement improvements around ship loading and berth hygiene to resolve the matter, which was reported and disclosed in the Annual Report for that year." (Eco Logical, 2021b)

Part 3: Assessment against the clearing principles

8. Assessment of application against clearing principles

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

Proposed clearing is at variance to this Principle

The native vegetation within the application area represents a high level of biological diversity at a niche, local and regional scale. The vegetation is representative of an under-represented vegetation association (Victoria Plains 142; 12.44 per cent remaining) in an extensively cleared landscape (9.39 per cent remaining). The vegetation is in 'Very Good' to 'Good' (Keighery, 1994) condition (Eco Logical, 2021a) and is representative of threatened WA Wheatbelt Woodlands ecological community and includes foraging and potential breeding habitat for black cockatoos (Eco Logical, 2020a, 2020b & 2021a). Based on this information, the proposed clearing is at variance with this principle.

Evidence

- The local area (10-kilometre radius from the edge of the application area) retains approximately 9.39 per cent of the pre-European native vegetation extent and the vegetation within the application area is predominately (1.54 hectares) in very good to good (Keighery, 1994) condition (Eco Logical, 2021a).
- The application area is mapped as Beard vegetation association Victoria Plains 142 described as 'Medium woodland; York gum and Salmon gum'. This vegetation association has 12.44% of its pre-European extent remaining in the Avon Wheatbelt subregion (GoWA 2019).
- Surveys of the application area identified the vegetation to be EsIW: *Eucalyptus salmonophloia* and *E. loxophleba* Woodland which is consistent with the diagnostic criteria for the Eucalypt Woodlands of the Western Australian Wheatbelt (Wheatbelt Woodlands) ecological community (listed as a priority ecological community by DBCA) and listed as a threatened ecological community under the EPBC Act Eco Logical, 2021a, 2020a & 2020b).
- *Zanda latirostris* (Carnaby's black cockatoo), listed as Endangered (EN) under the EPBC Act and BC Act, were observed flying over the survey area during the field survey.
- A habitat assessment of the vegetation within the application area identified 27 potential habitat trees for black cockatoos, of which one contained a hollow suitable for breeding (see Appendices C and G). The application area includes 1.7 hectares of low-quality foraging habitat for black cockatoos (Eco Logical, 2021a).

Assessment

The application contains vegetation with significant conservation and habitat values. Being a part of significant remnant vegetation in an extensively cleared region and a representative of the remnant Victoria Plains 142 vegetation communities, the vegetation proposed to be cleared floristically represents significant biodiversity at the local and regional levels. Impacts of clearing on the significant remnant vegetation is assessed in detail under Principle (e). In addition, the application area is close to one population of *Eremophila glabra* subsp. *chlorella* (endangered under the BC Act) and several populations of *Eremophila scaberula* (T).

The vegetation proposed to be cleared is also identified as a Wheatbelt Woodlands TEC (discussed in Principle (d)). The TEC is protected to maintain its biodiversity and function (DoE, 2015). Removal of this vegetation therefore will have an impact on the biodiversity.

The application area contains foraging and potential nesting habitat for conservation significant fauna including the Carnaby's black cockatoo and Inland western rosella. The assessment of impact of clearing on the fauna species is discussed under Principle (b). The vegetation proposed to be cleared comprises a significant part of the ecological corridor for the Carnaby's black cockatoo known to be breeding the local area. The proposed clearing area supports faunal diversity at the local and regional contexts, and will have a significant impact on biodiversity.

Summary

Based on the evidence and assessment above, the vegetation within the application area is critical to the maintenance of biodiversity at the local and regional level. Clearing of native vegetation within the application area is likely to result in significant residual impacts to biodiversity at a local and regional scales and is at variance to this principle.

(b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna.

Proposed clearing is at variance with this Principle

Available database indicates that twelve (12) conservation significant fauna species have been recorded from within 10 km of the application area, with the Carnaby's black cockatoo (EN) being recorded from within the application area.

Table 4. Records of conservation significant fauna species within 10 km of the application area

Fauna species	Conservation status	Number of records	Year of last record	Closest distance to application area (km)	Suitable habitat (Y/N)
<i>Calidris acuminata</i> (Sharp-tailed sandpiper)	MI	1	0	4.15	N
<i>Calidris melanotos</i> (pectoral sandpiper)	MI	1	1973	4.10	N
<i>Calyptorhynchus banksii naso</i> (forest red-tailed black cockatoo)	VU	1	1966	2.52	Y
<i>Zanda latirostris</i> (Carnaby's black cockatoo)	EN	96	2016	0.00	Y
<i>Dasyurus geoffroyi</i> (chuditch, western quoll)	VU	3	1996	0.48	N
<i>Falco peregrinus</i> (peregrine falcon)	OS	1	2002	4.09	Y
<i>Hydromys chrysogaster</i> (water-rat, rakali)	P4	2	1931	3.20	N
<i>Idiosoma dandaragan</i> (Dandaragan Plateau shield-backed trapdoor spider)	P2	4	1954	3.97	Y
<i>Oxyura australis</i> (Blue-billed duck)	P4	1	1917	9.47	N
<i>Platycercus icterotis xanthogenys</i> (western rosella (inland))	P4	1	1979	5.36	Y
<i>Rostratula australis</i> (Australian painted snipe)	EN	1	1923	9.47	Y
<i>Thinornis rubricollis</i> (Hooded plover, hooded dotterel)	P4	4	1961	4.15	N

A fauna survey and assessment has been performed in support of the application (ELA, 2020b). The assessment indicated that of the listed conservation significant fauna species, *Zanda latirostris* (Carnaby's black cockatoo), *Falco peregrinus* (Peregrine Falcon, OS), *Platycercus icterotis xanthogenys* (western rosella (inland)), and *Idiosoma dandaragan* (Dandaragan Plateau shield-back trapdoor spider - P2) are the most likely to occur in the application area and vicinity. Subsequently, an invertebrate and short-range endemic (SRE) fauna assessment and survey was carried out in support of the application (Moulds, 2021). It has been assessed that the application area contains suitable habitat for the mygalomorph spider *Idiosoma nigrum* (shield-back trapdoor spider - Threatened) and *Idiosoma dandaragan* (Dandaragan Plateau shield-backed trapdoor spider – P2). The targeted survey, however, did not identify the trapdoor spiders or other SRE's within the application area.

The Peregrine falcon may fly over and utilise the vegetation in the application area in its migration. Given the bird's migratory nature and large range in addition to the availability of suitable habitat nearby, the application area is unlikely to comprise a significant habitat for the falcon.

As its name suggests, the Inland Western Rosella (*Platycercus icterotis xanthogenys*) is an inland subspecies of the nominate Western Rosella (*Platycercus icterotis icterotis*). The nominate *icterotis* is found in high rainfall areas in the southwest, whereas the inland subspecies (*xanthogenys*), listed as a Priority 4 species by the DBCA, occurs in the drier wheatbelt eucalypt and sheoak woodlands and shrubland, especially those containing Wandoo (*E. wandoo*), Salmon Gum (*E. salmonophloia*), tall mallee and Rock Sheoak (*Allocasuarina huegeliana*) (Higgins, 1999). Western Rosellas nest in a hollow limb or tree trunk, usually one metre or more deep, and breed from August to December. One of the trees within the application area was assessed by ELA (2020b) as containing a suitable hollow for Carnaby's black cockatoo. As the Inland Western Rosella is a much smaller bird, the habitat tree assessed with a hollow is likely to provide breeding opportunities for the species. The targeted fauna survey over the application area, however, did not identify the presence of Western Rosella at the time of the survey.

Suitable habitat for Carnaby's black cockatoo occurs within the application area, with Carnaby's black cockatoos observed flying over the survey area during field survey (ELA, 2020b)

As assessed under principle (a) above, the native vegetation within the application area includes 1.7 ha of suitable foraging habitat for black cockatoos and 27 potential habitat trees, one of which includes a hollow suitable for black cockatoo nesting. The application area is significant as a remnant of native vegetation within an extensively cleared landscape and therefore provides significant ecological function to local and regional fauna populations. Based on

the information above, the native vegetation within the application area is part of, and necessary for the maintenance of significant habitat for conservation significant fauna. The proposed clearing is at variance to this principle.

Evidence

- The local area (10-kilometre radius from the edge of the application area) retains approximately 9.39 per cent of the pre-European native vegetation extent and the vegetation within the application area is predominately (1.54 hectares) in very good to good (Keighery, 1994) condition (Eco Logical, 2021a).
- The application area is mapped as Beard vegetation association Victoria Plains 142 described as 'Medium woodland; York gum and Salmon gum'. This vegetation association has 12.44% of its pre-European extent remaining in the Avon Wheatbelt subregion (GoWA 2019).
- *Zanda latirostris* (Carnaby's black cockatoo), listed as Endangered (EN) under the EPBC Act and BC Act, were observed flying over the survey area during the field survey.
- A habitat assessment of the vegetation within the application area identified 27 potential habitat trees for black cockatoos, of which one contained a hollow suitable for breeding. The application area includes 1.7 hectares of low-quality feeding habitat for black cockatoos (Eco Logical, 2021a).
- Spatial data for black cockatoos indicates that there are 109 breeding records within 6 km north of the application area, 3 breeding records adjacent (west) of the application area and 30 breeding records within 6 km south of the application area.

Assessment

Impacts to Carnaby's black cockatoo are outlined under principle (a) above, as well as in the assessment of the potential impacts on Matters of National Environmental Significance in Part 2, Section 3 and 4.

The Roadside Conservation Committee (RCC) aims "to coordinate and promote the conservation and effective management of rail and roadside vegetation for the benefit of the environment and the people of Western Australia." The RCC identify transport corridor remnants as having special environmental significance as they provide a transect of what the natural landscape looked like prior to broadscale clearing (RCC, 2000). The application area is located within an extensively cleared landscape and is representative of a long linear corridor as described by the RCC.

Local and regional connectivity has a variety of well documented benefits including;

- movement of flora and fauna through disturbed landscapes
- increasing immigration into isolated patches (maintaining species richness and diversity and the potential persistence of the patch)
- facilitating ecological function and ecosystem services
- providing transitional and primary habitat (DEC, 2006)

Environment impact assessment of ecological linkages considers a range of factors such as fauna species usage, life-history, characteristics, ecological processes (Poiani et al. 2000) and scale. Reconstruction of ecological corridors is difficult and therefore best practice conservation advice is to prioritise identification, protection and maintenance (Bennett 1999). Research has identified that narrow corridors may only be suitable for rapid movements (Hess and Fischer 2001) with poorly designed narrow corridors acting as sinks due to high edge effects (Henein and Merriam 1990).

Given the extent of clearing within the local area, remnant native vegetation within long linear transport corridors is likely to provide the best available dispersal routes for locally occurring fauna. Based on this information, the vegetation within the application area is locally and regionally significant as part of an ecological corridor.

Summary

The vegetation within the application area includes critical foraging and breeding habitat for black cockatoo's and is significant as an ecological linkage in an extensively cleared landscape. Based on the evidence and assessment above, the proposed clearing is at variance to this principle.

(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 to this Principle

A flora and vegetation survey (ELA, 2020a) and a targeted survey (ELA, 2020b) considered 98 conservation significant flora species as possibly occurring within the application area and vicinity. The June 2020 survey (ELA, 2020a) recorded *Eremophila scaberula* (Threatened) and *E. glabra* subsp. *chlorella* (Threatened) from within the survey area. Subsequently, the project area was designed to be sited outside of the identified Threatened flora species occurrences. The application area is therefore void of Threatened flora species listed

under the BC Act. However, the application area is within the recommended 50 metre buffer to a known population of *E. glabra* subsp. *chlorella* (endangered under the BC Act).

Evidence

- According to DBCA's TPFL and WA Herbarium datasets, records of four threatened flora species occur within a 10 kilometre radius of the application area; *Acacia cochlocarpa* subsp. *cochlocarpa*, *Eremophila glabra* subsp. *chlorella*, *Eremophila scaberula* and *Hemiandra gardneri*.
- As discussed under principle (a), one population of *Eremophila glabra* subsp. *chlorella* (endangered under the BC Act) occurs within 50 metres of the application area.
- The application area and the *Eremophila glabra* subsp. *chlorella* population are separated by a 28-metre cleared area associated with the existing railway infrastructure.

Assessment

The application area was selected to avoid and minimise clearing and indirect impacts to *E. glabra* (Threatened) populations recorded during the June 2020 survey (ELA, 2020a) in the central portion of the survey area, occurring on both sides of the railway line. A population of *E. glabra* is recorded within 28 metres of the application area. While the recommended buffer of 50 metres around threatened flora species cannot be achieved, no individuals of this population will be directly impacted by the proposal and the portion of the application area nearest to the identified *E. glabra* population is mostly void of vegetation and clearing in the area would be limited. Demarcating the project and clearing area could avoid inadvertent removal of adjacent vegetation including the threatened flora species. The existing railway line and the Bindoon-Moora Road to the west of the population are also more likely to have impact on the populations due to edge effects. The proposed clearing is not likely to further degrade the condition of the populations or significantly alter the likely persistence of the population at this location.

Summary

The vegetation within the application area does not include threatened flora under the BC Act. Based on the evidence and assessment above, the proposed clearing is not likely to be at variance to this principle.

(d) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community.

Proposed clearing is at variance to this Principle

A flora and vegetation survey followed by a targeted survey have identified the native vegetation within the application area as the Eucalypt Woodlands of the Western Australian Wheatbelt Threatened Ecological Community listed under the EPBC Act (ELA, 200a & 200b). Assessment of the potential impacts of the proposed clearing on Matters of National Environmental Significance are discussed under Part 2, Section 3 and 4, as well as Part 3 Principle (a).

Based on this information, the proposed clearing is at variance to this principle.

(e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.

Proposed clearing is at variance to this Principle

The vegetation within the application area is predominately in Very Good to Good (Keighery, 1994) condition, is representative of under-represented vegetation association 142 (12.44 per cent), has a high level of biological diversity at a local and regional scale, includes critical habitat for black cockatoos, includes Wheatbelt Woodlands PEC/TEC and is within an extensively cleared area. The vegetation also comprises long linear transport corridors within the extensively cleared region, which provides dispersal routes for locally occurring fauna, hence, contributing to significant ecological linkage function. Therefore, the proposed clearing is at variance to this principle.

Evidence

- The local area (10-kilometre radius of the application area) retains approximately 9.39 per cent of the pre-European native vegetation extent and the vegetation within the application area is predominately (1.54 hectares) in very good to good (Keighery, 1994) condition (ELA, 2021a).
- The application area is mapped as Beard vegetation association Victoria Plains 142 described as 'Medium woodland; York gum and Salmon gum'. This vegetation association has 12.44% of its pre-European extent remaining in the Avon Wheatbelt subregion (GoWA 2019).
- Surveys of the application area identified the vegetation to be EsIW: *Eucalyptus salmonophloia* and *E. loxophleba* Woodland which is consistent with the diagnostic criteria for the Eucalypt Woodlands of

the Western Australian Wheatbelt (Wheatbelt Woodlands) ecological community (listed as a priority ecological community under the BC Act and listed as a threatened ecological community under the EPBC Act (ELA, 2021a, 2020a & 2020b).

- *Zanda latirostris* (Carnaby's black cockatoo), listed as Endangered (EN) under the EPBC Act and BC Act, were observed flying over the survey area during the field survey.
- A habitat assessment of the vegetation within the application area identified 27 potential habitat trees for black cockatoos, of which one contained a hollow suitable for breeding. The application area includes 1.7 hectares of low-quality feeding habitat for black cockatoos (ELA, 2021a).

Assessment

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 vegetation within the application area is mapped as under-represented vegetation association Victoria Plains 142 (12.44 per cent). Clearing of the vegetation within the application area would therefore be inconsistent with these objectives.

The majority of the application area (1.54 hectares) is in Very Good to Good (Keighery, 1994) condition (Eco Logical, 2021a), contains significant foraging and potential breeding habitat for the conservation significant black cockatoos, is part of an ecological linkage and comprises of a Commonwealth listed TEC, therefore the native vegetation is considered to be a significant remnant.

The local area has been extensively cleared and retaining 9.39 per cent of the pre-European extent of native vegetation.

Summary

Based on the evidence and assessment, the application area is significant as a remnant and within an extensively cleared area. Therefore, the proposed clearing is at variance to this principle.

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

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

There are no mapped wetlands or watercourses within the application area. The vegetation within the application area does not include any vegetation growing in, and in association with, a wetland or watercourse (ELA, 2021a).

The closest natural surface water expression is Yagdena Brook which is approximately 750m south of the application area. Watercourses in the local area are tributaries to the Moore River.

Two detention basins (north of the application area and adjacent to the rail siding) are used to capture site runoff. The applicant has advised that a third is detention basin is proposed to be installed adjacent to the fixed rail facility (ELA, 2021b).

Based on the information available the proposed clearing is not likely to be at variance to this principle.

(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 at variance to this Principle

The application area is mapped as having greater than 70 per cent flood, waterlogging and phosphorus export risk. Mean annual rainfall and evaporation are approximately equivalent within the application area and the site is relatively flat. The applicant has installed two detention basins and plans to construct a third to capture site run off. Given there is existing infrastructure to manage excess water at the site, it is not likely that the proposed clearing will cause appreciable land degradation as a result of excess water.

The application area occurs within an extensively cleared area which is prone to salinity issues. The area is mapped as having 30-50 per cent moderate to high salinity risk. Removal of deep-rooted perennial native vegetation reduces the draw down on the water table causing the water table to rise and dissolve salts held in the soil. This increase in dissolved salts creates saline growing environments and can in turn impact surrounding native vegetation which is not salt tolerant. Based on this information, the proposed clearing may cause land degradation through the cumulative reduction in draw down of the water table.

Evidence

- The mapped soil type 256Ra which is described as alluvial plain of Moore River; loamy earths, clays and minor sandy earths.
- The application area is mapped as having the following land degradation risks (Table 5).

Table 5: Land degradation risk of mapped soil type.

Risk categories	
Wind erosion	<3% of map unit has a high to extreme wind erosion risk
Water erosion	<3% of map unit has a high to extreme water erosion risk
Salinity	30-50% of map unit has a moderate to high salinity risk or is presently saline
Subsurface Acidification	50-70% of map unit has a high subsurface acidification risk or is presently acid
Flood risk	>70% of the map unit has a moderate to high flood risk
Water logging	>70% of map unit has a moderate to very high waterlogging risk
Phosphorus export risk	>70% of map unit has a high to extreme phosphorus export risk

- The soils of the application area are comprised of Cainozoic-aged alluvial soils described as clay, silt and sand, and associated with the Moore River catchment and its tributaries (GSWA, 1982). These soils consist of poorly drained, fine-textured, yellow mottled soils, that become more alkaline at depth (McArthur, 2004)
- Topography of the site is an undulating plateau ranging in elevation between 200 and 210 metres above sea level from the west to the east respectively
- Average annual rainfall and average evapotranspiration are both mapped as 500 millimetres.
- The local area (10 kilometre radius from the edge of the application area) retains approximately 9.39 per cent of the pre-European native vegetation extent and the vegetation within the application area is predominately (1.54 hectares) in very good to good (Keighery, 1994) condition (Eco Logical, 2021a)
- Two detention basins (north of the application area and adjacent to the rail siding) are used to capture site runoff. The applicant has advised that a third is detention basin is proposed to be installed adjacent to the FRL facility (Eco Logical, 2021a).

Assessment

The application area is in an extensively cleared landscape where salinity continues to be a regional issue. Spatial data suggests that the application area is within a map unit with 30-50% having a moderate to high salinity risk or being presently saline. Dryland salinisation is a well-known disturbance of low-lying areas or areas with shallow groundwater table levels throughout the wheatbelt (DPIRD 2023). Typical signs of salinisation include declining health or death of existing vegetation, replacement of vegetation with salinity tolerant species and expansion of areas of soil surface featuring damp soils and salt crusting or staining. The vegetation health and species assemblage over the application area and surrounds, however, do not indicate the occurrence of salinity issues in the area (ELA, 2019, ELA 2023). Given the absence of salinity indicators, it is unlikely that the application area is currently saline or having a high risk of salinity. The proposed removal of 27 deep rooted trees is unlikely to result in an appreciable land degradation due to increased salinity.

Spatial data suggests there is a significant risk of land degradation in this map unit relating to flooding, waterlogging and phosphorus export. Given the rainfall and evapotranspiration rates within the application area

are roughly equivalent, it is likely that these risks are associated with infrequent rainfall events. The application area will be used for rail siding infrastructure, including road access to the siding. Given there are existing surface water management features at the site, and taking into account that soils will not be left bare, land degradation relating to excess water at the location is unlikely to be appreciable or long-term.

Summary

Based on the evidence and assessment above, clearing is unlikely to result in appreciable or long-term land degradation at the local level. Therefore, the proposed clearing is not likely to be at variance with this principle.

(h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.

Proposed clearing is not likely at variance to this Principle

There are no areas managed for conservation within the application area. The closest area managed for conservation is a Department of Biodiversity, Conservation and Attractions Reserve (R 28710) located approximately 400 metres north of the application area.

Evidence

- The closest conservation area is approximately 400m north of the application area, adjacent to the railway reserve, and is managed for the conservation of flora.

Assessment

The application area is connected to the conservation area through the ecological linkage occurring on the roadsides. The proposed clearing, therefore, may indirectly impact the environmental values of these conservation areas through degradation and fragmentation of the ecological corridor connected to these conservation areas. However, given the distance between the application area and the conservation site, the proposed clearing is considered unlikely to directly impact any native vegetation within nearby conservation areas.

Summary

Based on the evidence and assessment above, the proposed clearing is not likely to impact on the condition and function of conservation areas within the local area.

(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 to this Principle

The proposed clearing does not intercept any perennial or non-perennial surface water features and will not intercept groundwater. The clearing of deep-rooted native trees within the application area may reduce the draw down on the water table and may contribute to a cumulative increase in salinity in the local area. However, given the absence of any salinity indicators over the application area, as discussed in Principle (g), the clearing is unlikely to lead to an appreciable and long-term increase in groundwater salinity within the local context.

Evidence

- There are no mapped wetlands or watercourses within the application area;
- The vegetation within the application area does not include any vegetation growing in, and in association with, a wetland or watercourse (ELA, 2021a);
- The mapped soil type 256Ra which is described as alluvial plain of Moore River; loamy earths, clays and minor sandy earths;
- The application area is mapped as having several land degradation risks (see Table 5 under principle (g))
- The vegetation health and species assemblage over the application area and surrounds do not indicate the occurrence of salinity issue;
- The soils of the are comprised of Cainozoic-aged alluvial soils described as clay, silt and sand, and associated with the Moore River catchment and its tributaries (GSWA, 1982). These soils consist of poorly drained, fine-textured, yellow mottled soils, that become more alkaline at depth (McArthur, 2004);
- Topography of the site is an undulating plateau ranging in elevation between 200 and 210 metres above sea level from the west to the east respectively;
- Average annual rainfall and average evapotranspiration are both mapped as 500 millimetres.
- The local area (10 kilometre radius of the application area) retains approximately 9.39 per cent of the pre-European native vegetation extent and the vegetation within the application area is predominately (1.54 hectares) in very good to good (Keighery, 1994) condition (Eco Logical, 2021a);
- The application area is not within a Public Drinking Water Source Area or *Country Areas Water Supply Act 1947* area;

- The application area is within the Gingin *Rights in Water Irrigation Act 1914* Groundwater Area;
- Three existing basins are associated with this project. Basin 2 is located east of the proposed bulk heads, this basin was constructed to accommodate flow from the emergency storage in 2018. Basin 1 to the west of the bulk heads contains a permanent water body due to low infiltration rates and high-water table. Basin 4 to the southwest of the bulk heads contains a permanent water body due to low infiltration rates and high-water table, this basin is at capacity;
- CBH has applied guidelines as the basis for the stormwater management design within the site and engaged expert consultants to design sufficient surface water management infrastructure to accommodate the proposed development within the application area (Galt Geotechnics, 2020; Golder, 2021 and McDowall Affleck, 2020).

Assessment

Clearing of native vegetation within the application area will expose soils prone to low infiltration and will increase water runoff in the local area. Estimations provided by McDowall Affleck (2020) identified a decrease in surface roughness from 0.035 (pre-clearing vegetated surfaces) to 0.022 for open channels post-clearing. This reduction in surface roughness is equivalent to a change in flow rate from 0.19 to 0.86 10-year coefficient of runoff. CBH guidelines require stormwater infrastructure to account for a 1 in 20-year coefficient therefore the mitigation measures proposed as part of this development are sufficient to cover the expected increase in flow rate, as well as provide a buffer for unexpected flows. The Department is satisfied that the applicant has taken appropriate steps to mitigate the increase flow of surface water expected as a result of clearing and that there is no long-term risk to water quality from this proposal.

The cumulative removal of native vegetation from extensively cleared landscapes may contribute to the ongoing increase in saline affected soils within the local area and the region. However, as assessed under principle (g), salinity indicators are not present over the application area and surround. It has been assessed that the removal of 27 deep-rooted native trees is unlikely to significantly increase groundwater levels locally and increase impacts of salinity at this location.

Summary

Based on the evidence and assessment above, in addition to the management plan proposed by the applicant to address the potential impact due to surface runoff, the proposed clearing is unlikely to result in appreciable and long-term deterioration in the quality of ground and surface water at the site. Given this, the proposed clearing is not likely to be at variance with this principle.

(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 to this Principle

As assessed under principle (g) and (i), the proposed clearing is likely to increase surface water flow within the application area. Mitigation actions proposed will result in the increase in surface water flow being restricted to the project area. The proposed clearing is not likely to cause or exacerbate the incidence or intensity of flooding outside of the project area.

Given the above, the proposed clearing is not likely to be at variance with this Principle.

9. Planning instruments and other relevant matters.

The application area is within the Gingin *Rights in Water Irrigation Act 1914* Groundwater Area. No impacts to groundwater are expected as a result of this proposal and no additional approvals are required under the RIWI Act for this project to proceed.

One submission was received during the advertisement period. The matters raised in the submission have been addressed in the assessment above, some of which are reflected in the conditions of the Permit. The summary of the submission and the Department's consideration is provided in Table 6.

Table 6. Issues raised in the public submission

Summary of comments / suggestion (Submission, 2021)	Consideration of comment
Clarification of areas of TEC affected	The extent of Wheatbelt Woodland TEC affected is 1.7 ha, as discussed in Section 3 and 4 of this report. The loss of the TEC is counterbalanced with the offset provided at Lot 4300 and Lot 1397, as discussed in Section 6.4.
Impacts on black cockatoo habitats	
Clarification of the actual number of trees with hollows affected	Twenty seven (27) potential habitat trees will be removed by the clearing. Only one of these trees contain a hollow suitable for nesting by Carnaby's black cockatoo. No evidence of previous use was noted within this hollow. This is discussed in Section 4 of this report.
Any offset should consider the opportunity for provision of a nearby cockatoo foraging area.	The offset site for Carnaby's black cockatoo is near to a cockatoo foraging and breeding area. This is discussed in Section 6.4.
The construction period should avoid the breeding season for Carnaby's black cockatoo.	The permit conditions require that clearing is conducted outside of the breeding season for Carnaby's black cockatoo.
Impacts on Threatened flora species	
The number of individuals of threatened plants to be directly affected.	No Threatened or Priority flora species will be removed by the clearing. This is discussed in Section 8 (Principle (c)).
A buffer of 50 m should be retained around the population of threatened flora.	The application area and the nearest <i>Eremophila glabra</i> subsp. <i>chlorella</i> (T) population are separated by a 28-metre cleared area associated with the existing railway infrastructure. This is addressed in Section 8 (Principle 9c)). The permit conditions require the demarcation of the clearing area to avoid inadvertent clearing of native vegetation, including Threatened flora species outside the clearing boundary.
Avoidance and minimisation of impact and offset	
The potential for rationalisation and reduction of the construction envelope. The project clearing envelope should be modified to avoid significant environmental values within and adjacent to the project area	The Department is satisfied that the application area and the construction envelope were selected and designed to avoid impact on any Threatened and Priority flora and minimise environmental impacts to the extent possible. This is addressed in Section 6.1 of the report.
The overall offset requirement to minimise the impact of this project on the significant environmental values in and around the project area.	The offset provided by the applicant address all significant residual impacts. This is addressed in Section 1, 2, and 6 of the report. The permit conditions require implementation of the offset.

An Aboriginal heritage survey (archaeological and ethnographic) was performed for the Moora Project (Archae- aus, 2021). The Yued people as part of the Noongar claimants of the Yued Native Title Claim area (WC1998/070), Southern Noongar Claim (WC1996/109), and the Single Noongar Claim (Area 1) WC2003/006 were consulted on 9 of September 2021, with the participation of both Archae- aus Pty Ltd and CBH personnel.

The assessment took place in accordance with the Noongar Standard Heritage Agreement (NSHA). The archaeological survey did not result in the identification of any Aboriginal archaeological sites or materials evident on the ground surface. Ethnographic survey did not result in the identification of any ethnographic sites within the survey area.

Part 5: References and databases

10. GIS datasets

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

- Aboriginal Heritage Places (DPLH-001)
- Cadastre Address (LGATE-002)
- Contours (DPIRD-073)
- DBCA – Lands of Interest (DBCA-012)
- DBCA Legislated Lands and Waters (DBCA-011)
- Directory of Important Wetlands in Australia – Western Australia (DBCA-045)
- Environmentally Sensitive Areas (DWER-046)
- Flood Risk (DPIRD-007)
- Groundwater Salinity Statewide (DWER-026)
- IBRA Vegetation Statistics
- Local Planning Scheme – Zones and Reserves (DPLH-071)
- Regional Parks (DBCA-026)
- Soil and Landscape Mapping – Best Available

Restricted GIS Databases used:

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

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Appendix A – Surveys of the application area

Eco Logical Australia (ELA) was engaged by CBH Group (CBH) to conduct a Reconnaissance and Targeted flora and vegetation survey and a Level 1 fauna survey and black cockatoo habitat assessment of a 3.3 kilometre (km) portion of rail reserve adjacent to the Moora CBH Depot, which included the application area, in June 2020 (ELA, 2020a). Based on the results of the June 2020, the survey area was modified to avoid an identified population of *Eremophila scaberula* (Endangered under the EPBC Act and Critically Endangered under the BC Act). Subsequently, ELA undertook a Detailed and Targeted flora and vegetation survey, Basic fauna survey and Targeted black cockatoo habitat assessment within the modified survey area in September 2020 (ELA, 2020b). All surveys were in accordance with the EPA Technical Guidance (EPA, 2016a and 2016b)

A. June 2020 Flora and Fauna Survey (ELA, 2020a)

The survey of the June 2020 covers 22.3 hectares in area size. The scope of works includes:




- Undertake a desktop assessment to identify the potential occurrence of any conservation listed flora and fauna species listed under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), State Biodiversity Conservation Act 2016 (BC Act) and by the Department of Biodiversity, Conservation and Attractions (DBCA);
- Undertake a Targeted survey for conservation listed flora and fauna species identified from the desktop assessment as possibly occurring within the survey area;
- Undertake a Reconnaissance vegetation survey to describe dominant vegetation communities, with respect to dominant species, structure and overall condition;
- Undertake a Level 1 fauna survey and targeted black cockatoo habitat assessment.



Figure 14. The survey area of June 2020 survey (ELA, 2020a)

Results

Vegetation types and conditions within application area

Photo	Code and Description	Total area (ha)	Percentage of survey area
	Code: EsIW <i>Eucalyptus salmonophloia</i> and <i>E. loxophleba</i> Woodland (8-16m, 25-40% cover) over <i>Exocarpos sparteus</i> , <i>Acacia lineolata</i> subsp. <i>lineolata</i> , <i>Grevillea biternata</i> , <i>Rhagodia preissii</i> and <i>Dianella revoluta</i> mid-shrubland (1-2m, 15-25% cover), over Annual grasses (indeterminate), <i>Austrostipa elegantissima</i> , <i>Sclerolaena diacantha</i> and <i>Lomandra sp.</i> low shrubland/grassland (0.3m, 5-20% cover).	11.7	51.5
	Code: EwW <i>Eucalyptus wandoo</i> Woodland (10-14m, 30% cover) <i>Hakea preissii</i> , <i>Grevillea biternata</i> , <i>Rhagodia preissii</i> and <i>Dianella revoluta</i> mid-shrubland (1-2m, 15-25% cover), over Annual grasses (indeterminate), <i>Austrostipa elegantissima</i> , <i>Sclerolaena diacantha</i> , <i>Acanthocarpus canaliculatus</i> and <i>Lomandra sp.</i> low shrubland/grassland (0.3m, 5-20% cover).	0.8	3.5
	Code: EcG Scattered <i>Eucalyptus camaldulensis</i> trees (10-12m, 5%) over <i>Hakea preissii</i> tall very open shrubland (3-5m, 5-10% cover) over <i>Acacia saligna</i> , <i>A. leptospermoides</i> subsp. <i>leptospermoides</i> , <i>Grevillea biternata</i> , <i>Allocasuarina campestris</i> and <i>Rhagodia preissii</i> mid shrubland (1-2m, 15-30% cover) over <i>Eragrostis curvula</i> tall grassland (1m 20-50% cover).	1.4	6.2

Vegetation conditions recorded within the survey area are presented in the table below.

Table 6. Vegetation conditions recorded over the survey area

Condition (Keighery, 1974)	Total area (ha)	Percentage of total area
Very Good	9.0	39.6
Good	3.6	15.9
Degraded	2.6	11.5
Completely Degraded	7.5	33.0
Total	22.7	1000

Conservation significant flora

Eremophila scaberula was recorded within Vegetation Community EsIW: *Eucalyptus salmonophloia* and *E. loxophleba*. This species had finished flowering at the time of the field survey, with old flowering material found on individual plants.



Figure 15. Populations of *Eremophila scaberula* (T) within the survey area (ELA, 2020a)

TEC/PEC

Vegetation types EsIW: *Eucalyptus salmonophloia* and *E. loxophleba* Woodland and EwW: *Eucalyptus wandoo* Woodland, have species composition and structure comprising elements that indicate the likely presence of the

Eucalypt Woodlands of the Western Australian Wheatbelt TEC, as indicated in the Department of Environment (DoE) Approved Conservation Advice (including listing advice) for the Eucalypt Woodlands of the Western Australian Wheatbelt (DoE 2015). This assessment is based on the following key diagnostic characteristics for the TEC:

- The distribution of the ecological community is within the Avon Wheatbelt IBRA region;
- The structure of the ecological community is a woodland in which the minimum crown cover of the tree canopy in a mature woodland is 10%;
- The key species of the tree canopy are species of *Eucalyptus* as identified in Table 2a of the Approved Conservation Advice document (DoE 2015). These are species that typically have a single trunk; and
- A native understorey is present but is of variable composition, being a combination of grasses, other herbs and shrubs.

Vegetation community EcG, although species composition and structure comprises elements that indicate the potential presence of the TEC, may not meet the criteria due to the dominance of the weedy grass *Eragrostis curvula* in the understorey.

Fauna and black cockatoo assessment

Based on the availability of suitable habitat and close proximity of recent records, the following fauna species were considered likely to utilise or inhabit the survey area:

- *Zanda* (previously *Calyptorhynchus*) *latirostris* (Carnaby's black cockatoo, listed as Endangered under the EPBC Act and BC Act);
- *Egernia stokesii* subsp. *badia* (Western Spiny-tailed Skink; listed as EN under the EPBC Act and as Vulnerable [VU] under the BC Act);
- *Idiosoma nigrum* (Shield-backed Trapdoor Spider; listed as VU under the EPBC Act and as EN under the BC Act);
- *Falco peregrinus* (Peregrine Falcon; listed as Other specially protected species under the BC Act);
- *Idiosoma dandaragan* (Dandaragan Plateau Shield-backed Trapdoor Spider; listed as P2 by DBCA); and
- *Platycercus icterotis* subsp. *xanthogenys* (Western Rosella; listed as P4 by DBCA).

Foraging habitat for Carnaby's black cockatoo was present at the time of survey, as follows:

Foraging quality	Justification	Extent within the survey area	% of survey area
Poor	Low density of species suitable for foraging by black cockatoos (i.e. foliage cover of suitable species 10-20%) and presence of food sources at only one stratum (i.e. canopy)	13.9	61.2
Nil	Cleared area or no suitable vegetation present	8.8	38.8
Total		22.7	100

The black cockatoo breeding habitat assessment identified 337 potentially suitable breeding trees within the survey area comprising 303 *Eucalyptus salmonophloia* (Salmon Gum), 12 *Eucalyptus loxophleba* (York Gum), 12 Stag trees (unidentifiable) and 10 *Eucalyptus wandoo*. Of these, 34 contained potentially suitable hollows over 100 mm in diameter. The remaining potentially suitable breeding trees contained no hollows, or no suitable hollows.

B. September 2020 Detailed Flora, fauna and black cockatoo assessment and survey (ELA, 2020b)

This survey was performed over a smaller area than the June 2020 survey after the avoidance of the *E. scaberula* (T) communities. The new survey area is depicted in Figure 13 below. The September 2020 survey represents a spring survey that would allow for better opportunistic flora sampling as well as fauna.

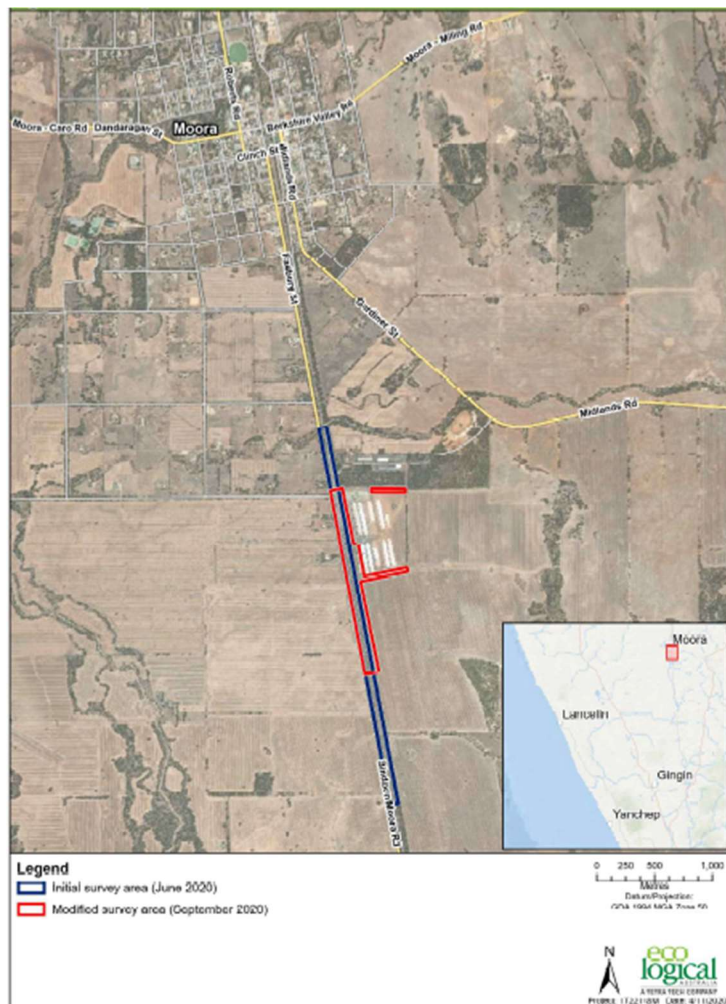


Figure 16. The September 2020 survey area

Results

Vegetation types and conditions

Three vegetation communities were mapped across the survey area, covering a total area of 9.4 ha (42.69%). The remainder of the survey area comprises cleared areas (12.26 ha; 55.67%) and planted tree line (0.35 ha; 1.64%). Vegetation within the survey area ranged from Excellent to Completely Degraded condition, with the majority of vegetation classed as being in Completely Degraded condition (11.59 ha; 52.63% of the survey area).

Flora and conservation significant flora

A total of 110 flora species were recorded within the survey area from both quadrats and opportunistic collections, including 84 native and 26 introduced (weed) species. One conservation significant species, *Eremophila glabra* subsp. *chlorella* (Endangered under the BC Act) was recorded within the survey area, from one population of seven individuals. Of the 98 conservation listed flora species identified as possibly occurring within the survey area, 30 were considered as having the potential to occur based on availability of suitable habitat and proximity to previous records. No Declared Pests under the *Biosecurity and Agriculture Management Act 2007* or Weeds of National Significance were recorded in the survey area.

Threatened / Priority Ecological Community

An assessment has been undertaken utilising the key diagnostic characteristics of the Wheatbelt Woodlands TEC (DoE 2015). This key diagnostic assessment has concluded that 7.45 ha of vegetation (related to vegetation communities EsIW and EwW) delineated within the survey area is characterised as representing the Eucalypt woodlands of the Western Australian Wheatbelt TEC (and subsequently, the associated State listed PEC). These areas are mapped in Figure 19 below.

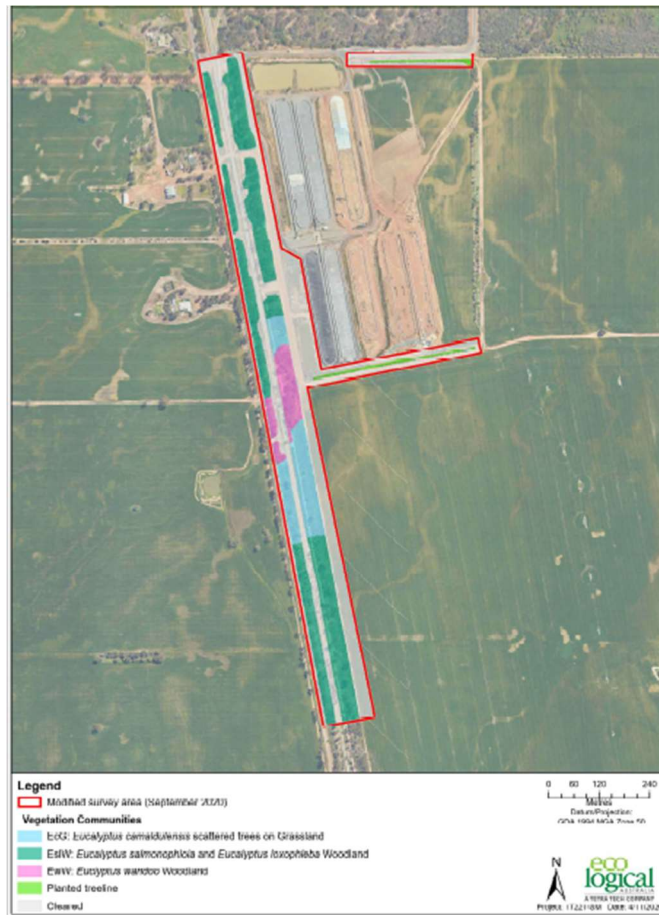


Figure 17. Vegetation types within the September 2020 survey area (ELA, 2020b)

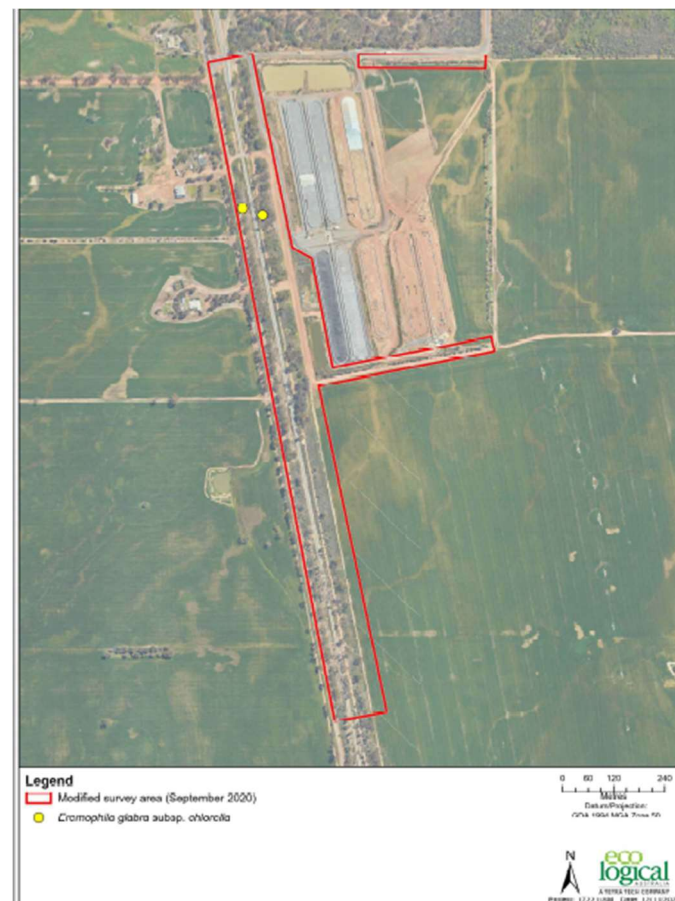


Figure 18. Communities of *E. glabra* within the survey area (ELA, 202b)

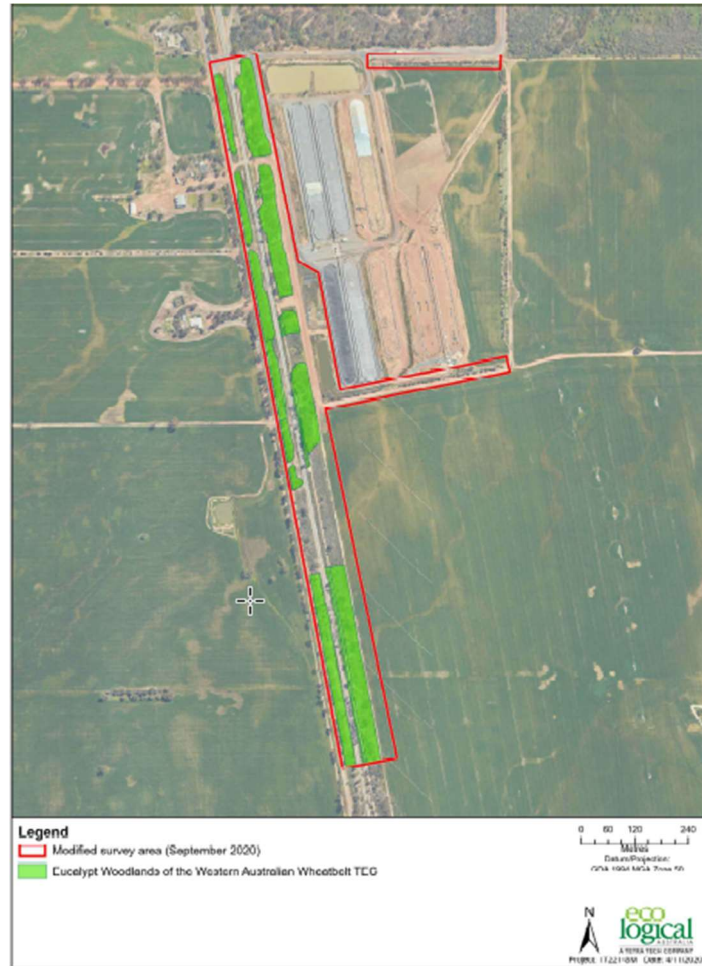


Figure 19. The Wheatbelt Woodlands of WA TEC / PEC identified within the survey area (ELA, 2020b).

Fauna survey and black cockatoo assessment

One natural fauna habitat was recorded within the survey area: Open Salmon Gum, Wandoo, York Gum woodland over open shrubland and grassland on clay loam. This habitat covers 42.69% (9.4 ha) of the survey area. The remainder of the survey area was cleared (12.26 ha; 55.68%) and planted tree line (0.36 ha; 1.64%) (Figure 14).

Black cockatoo foraging habitat in poor quality is identified within the survey area. The definition and extent of this foraging habitat is as follows:

Foraging quality	Justification	Extent within the survey area	% of survey area
Poor	Low density of species suitable for foraging by black cockatoos (i.e. foliage cover of suitable species 10-20%) and presence of food sources at only one stratum (i.e. canopy)	9.40	42.69
Nil	Cleared area or no suitable vegetation present	12.62	57.31
Total		22.02	100

Although its native vegetation is now rated as low-quality foraging habitat, some past evidence of black cockatoo foraging was observed within the survey area (i.e. signs of foraging on infructescence).

The black cockatoo breeding habitat assessment identified 186 potentially suitable breeding trees within the survey area (by DBH); comprising of 151 *Eucalyptus salmonophloia* (Salmon Gum); 15 *Eucalyptus loxophleba* (York Gum); 14 *Eucalyptus wandoo*; one *Eucalyptus camaldulensis*; and Five stags. All species have the potential to provide suitable roosting habitat for black cockatoos (SEWPaC 2012). Of these, 15 contained potentially suitable hollows over 100 mm in diameter (Figure 17). The remaining potentially suitable breeding trees contained no hollows, or no suitable hollows.

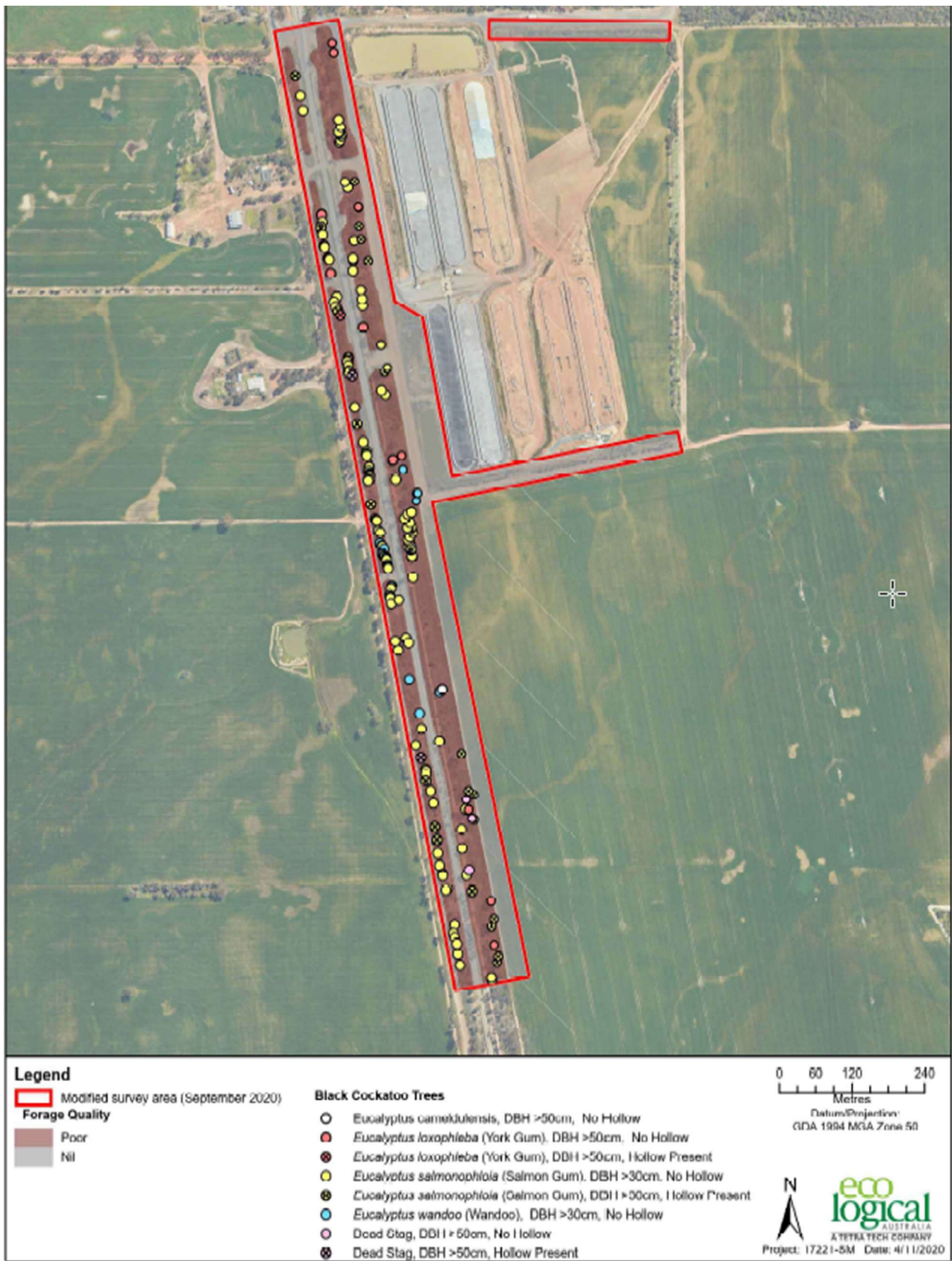


Figure 20. Map of the Carnaby's black cockatoo foraging habitat and potential habitat trees from the September 2020 survey (ELA, 2020b)

Appendix B. Surveys of offset sites

CBH commissioned consultants to perform biological surveys to identify the flora, fauna and environmental values of Lot 4300 on Deposited Plan 30175, Moora, and Lot 1397 on Deposited Plan 125128. The surveys were intended to assess the Lots' suitability to offset the residual significant impacts resulted from the proposed clearing.

The following surveys were carried out over Lot 4300:

- *Moora Grain Receival Site – Biological Assessment* (360 Environmental, December 2019)
- *Moora Offset Site Investigation Wheatbelt Woodland TEC and Black Cockatoo* (GHD, 2022)
- *Lot 4300 Moora Further Ecological Studies* (ELA, May 2023)

Surveys relevant to Lot 1397 are as follows:

- *Moora Offset Site Investigation Wheatbelt Woodland TEC and Black Cockatoo* (GHD, 2022)
- *Lot 1397 Waddington-Wongan Hills Rd Detailed Flora and Vegetation Survey Phase One* (ELA, 2023).

Survey findings are summarised as the offset values of the Lots and presented in Section 6.4.

Appendix C. Summary of the Offset Calculations under the EPBC 1999 Act Offset Policy 2012 and the Western Australia's Environmental Offset Policy

EPBC Offset Metrix for the Carnaby's black cockatoo

Lot 4300

Field Name	Description	Justification for value used
<i>IUCN Criteria</i>	The IUCN criteria for the value being impacted	Endangered - In accordance with the WA Offsets Guideline and EPBC Legal status and Documentation for Carnaby's Cockatoo, the threat status is selected as 'Endangered'. http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=87737 accessed 30 May 2022.
<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	1.7 - Based on biological surveys of the application area, the entire application area is considered to be suitable foraging habitat for Carnaby's black cockatoo. Based on this determination the area impacted was selected as 1.7 hectares.
<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.	6 - A quality score of 6 was selected as an average quality score for the entire application area. This is based on biological surveys and expert advice from DBCA regarding the combination of vegetation condition, site context and habitat attributes. The surveys of the application area identified 1.7 hectares of foraging and potential nesting habitat, 27 potential habitat trees with one containing a suitable breeding hollow for black cockatoos. Advice from DBCA emphasised the significance of the Moora region for breeding black cockatoos and that a large proportion of existing breeding hollows in the local area were stags (with less than 5 years life span estimated) or artificial hollows (noting some are not maintained annually). The vegetation patch is connected to nearby remnant vegetation and habitats; and provide dispersal habitat for BC. Considering the above, within the context of the local and regional's low and declining native vegetation extent, the impacted area is of high value. However, the foraging value of the vegetation is low due to the low foliage cover (10%) and significant edge effect (being linear and narrow in formation). An overall habitat quality of 6 has been agreed on by both DWER and DCCEEW.
<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 - In accordance with the WA Offsets Procedure, the offset value (i.e. offset area requirement when using area mode) is calculated using a 20-year time period, which represents the foreseeable future over which loss is averted. This includes where the offset is in perpetuity. Given the applicant proposes to apply a conservation covenant to the selected offset area, a value of 20 was selected for this calculation.

<p><i>Time until ecological benefit (habitat/community) or Time horizon (features/individuals)</i></p>	<p>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</p>	<p>10 - the time until ecological benefit is selected at 10 years to include the time afforded to the applicant to secure a conservation covenant and install the artificial nest boxes with an associated monitoring and maintenance program. It will be conditioned on the permit that within 12 months of the approval, evidence must be provided to the Department that the offset site has had a conservation covenant applied and the nests are properly installed and monitored. The land is currently owned by the applicant and arrangements and process for covenanting have been discussed, and it is expected that a conservation covenant will be complete within 12 months. Program associated with artificial nests installation and monitoring, fencing, weed controls, rubbish removal and infill planting, are expected to take longer.</p> <p>This is consistent with the How to Use the Offsets Assessment Guide Section 2 (E).</p>
<p><i>Start area (habitat/community) or Start value (features/individuals)</i></p>	<p>The area of habitat/community or number of features/individuals proposed to offset the impacts</p>	<p>8.29- The proponent proposed to use the nearby Lot 4300 (40 m from the impact area) to offset the SRI on the Carnaby's. Lot 4300 which contains 8.57 ha of Eucalypt woodlands comprising <i>E. salmonophloia</i>, <i>E. loxophleba</i> trees identified as having a Moderate foraging value for the Carnaby's. The vegetation types in this woodland (Eslw and Elw) are comparable to the vegetation in the impact area (Eslw) and in similar condition or better. Based on the calculation, 8.29 ha of the 8.57 ha Eucalypt woodlands at the Lot is required to address 100% of the SRI.</p>
<p><i>Start quality (habitat/community)</i></p>	<p>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</p>	<p>6 - A quality score of 6 was selected as an average quality score for the entire offset area on Lot 4300. This is based on biological surveys and expert advice from DBCA regarding the combination of vegetation condition, site context and habitat attributes. The surveys of Lot 4300 identified that the vegetated area on the lot comprises of 8.36 ha of Eucalypt woodlands comprising of <i>E. salmonophloia</i> and <i>E. loxophleba</i> trees (vegetation type Eslw and Elw) and 3.39 ha of Allocasuarina woodland (vegetation type ATS). The Eucalypt woodlands (Eslw and Elw) is comparable to the vegetation in the impact area (Eslw) and in similar condition or better. Although Allocasuarina woodlands can provide secondary foraging, only the Eucalypt woodlands is considered in this calculation for they are representative of the impact area and provide better foraging with a foliage cover of between 20 to 40%. The Eucalypt woodlands on Lot 4300 also contains 32 potential habitat trees. The vegetation patch is connected to nearby remnant vegetation and provide dispersal habitat for BC. Lot 4300 is also large (more than 5 ha in area) with favourable edge to area ratio. Considering the above, within the context of the local and regional's low and declining native vegetation extent, the impacted area is of high value. However, due to the lack of evidence of foraging by the Carnaby's, the lack of hollows and the identified threatening processes at Lot 4300, the habitat value of the vegetation is scored an overall value of 6. This score has been agreed on by has been agreed on by both DWER and DCCEEW.</p>
<p><i>Future quality without offset (habitat/community) or Future value without offset (features/individuals)</i></p>	<p>The predicted future quality score (habitat/community) or value (features/individuals) of the proposed offset site without the offset</p>	<p>6 - It is considered that the quality of the native vegetation may decrease slightly over the next 20 years without the security and management actions of the offset due to ongoing native vegetation degradation processes in the wheatbelt including weed invasion and fragmentation, or other land degradation factors. However, the decrease is considered insignificant that its habitat quality will be at least similar to its current state.</p>
<p><i>Future quality with offset (habitat/community) or Future value with offset (features/individuals)</i></p>	<p>The predicted future quality score (habitat/community) or value (features/individuals) of the proposed offset site with the offset</p>	<p>7 - a quality score of 7 was selected to reflect the improvement over 20 years as a result of the applicant's commitment to secure the land with a covenant, install and maintain 5 artificial breeding nests, manage and control weeds, and infill planting with foraging species improve foliage cover. Within the next 20 years, the old stags in the local area currently containing breeding nests will deplete their values. With the protection and on-ground management measures, the habitat trees and artificial nests in the offset site are expected to provide alternative breeding sites and better quality foraging habitat in comparison to the surrounding that the values of this site for the conservation of BC will be at least as high as the current impact site's.</p>
<p><i>Risk of loss (%) without offset (habitat/community)</i></p>	<p>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</p>	<p>20%. Without the offset, the site could be lost to future development or other activities. Lot 4300 is zoned industrial and adjacent to an industrial facility (the CBH depot). In accordance with the Draft Offset Procedure, the risks to Rural properties most commonly range from 15-20%, whereas that of the urban (private freehold land) ranges from 20-80%.</p>

<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	5% Securing the land parcel with a conservation covenant should reduce the risk of loss to 5%. The risk of catastrophic events (fire, dieback etc.) remain. DWER understands that DCCEEW's guidance on RoL that the site is 0% because it is regulated (requiring an assessment and offset under any legislation). However, DWER considers a risk of loss to an environment value is always present that it is more conservative to use a risk of no less than 5% in the calculation of the offset requirement.
<i>Confidence in result (%) – risk of loss (habitat/community)</i>	The capacity of measures to mitigate risk of loss of the proposed offset site	80% - According to the Offsets Guidelines, for offsets of area of habitat, the confidence in result relates to change in habitat quality and averted loss. The land is currently owned by the applicant and arrangements and process for covenanting have been discussed, and it is expected that a conservation covenant will be complete within 12 months. Therefore, there is high confidence that the loss is averted.
<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)	80% - the offset includes programs proposed to address the threatening processes (weed & dieback, grazing, rubbish dumping, salinity). For the change of habitat quality, the confidence in result captures the certainty of the successful installation of artificial nesting hollows and rehabilitation of the Good to Very Good vegetation with moderate quality foraging habitat.
<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% - automatically calculated for black cockatoo offset only, based on estimated figures (in red) above.

EPBC Offset Matrix for the Wheatbelt Eucalypts Woodlands of WA TEC

Lot 4300

Field Name	Description	Justification for value used
<i>IUCN Criteria</i>	The IUCN criteria for the value being impacted	Critically Endangered - In accordance with the WA Offsets Guideline and EPBC Legal status and Documentation for Eucalypt Woodlands of the Western Australian Wheatbelt accessed from http://www.environment.gov.au/cgi-bin/sprat/public/publiclookupcommunities.pl on 30 May 2022.
<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	1.7 ha - Based on biological surveys of the application area, the entire application area is considered to meet the diagnostic criteria of Eucalypt Woodlands of the Western Australian Wheatbelt threatened ecological community (TEC) - Category A. Based on this, the area impacted was determined to be 1.7 hectares. The impacted area will be offset across two properties; Lots 4300 and Lot 1397. This metric is for the portion on Lot 4300.
<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.	6 A quality score of 6 was selected as an average quality score for the entire application area. This is based on biological surveys and expert advice from DBCA regarding the combination of vegetation condition and site context. Surveys of the application area noted 1.6 hectares of the application area was consistent with the diagnostic criteria for Eucalypt Woodlands of the Western Australian Wheatbelt TEC. In reviewing the remaining 0.1 hectares excluded by the surveys, the Department, in accordance with the Approved Conservation advice, determined the remaining 0.1 hectares should be included as it is a connected patch in a roadside. The Approved Conservation advice notes; "The width here is based on the native understorey component rather than width of the tree canopy. Some allowance must be made for small breaks or variations in native species cover along linear patches. Given the generally open nature of the tree canopy and some understorey structures, a break in the continuity of native vegetation cover of 50 metres or more, is likely to indicate that separate patches are present. An exception is for main, often bitumen-covered, roads that bisect otherwise continuous vegetation; most local government roads in the wheatbelt have a road reserve of 20 metres. In these cases, native vegetation along either side of the road is considered to be a separate patch." The 1.7-hectare application area is therefore considered to be one continuous patch impacted by the clearing proposal. The Approved Conservation advice for this TEC recognises the highly fragmented and cleared nature of this TEC and therefore that all occurrences of this TEC are critical to its persistence. The condition ranges from good to very good with the Commonwealth referral indicating these patches meet the condition threshold for Category A (roadside patch width being >5m; excellent to very good condition).

<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 - In accordance with the WA Offsets Procedure The offset value (i.e. offset area requirement when using area mode) is calculated using a 20-year time period, which represents the foreseeable future over which loss is averted. This includes where the offset is in perpetuity. Given the applicant proposes to apply a conservation covenant to the selected offset area, a value of 20 was selected for this calculation.
<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	5 - the time until ecological benefit is selected at 5 years as it is the maximum time afforded to CBH to place the land to a conservation covenant and execute the on-ground management actions to improve vegetation quality. It has been conditioned on the permit that within 12 months of the approval, evidence must be provided to the Department that the offset site has had a conservation covenant applied.
<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	8.36 - The entire 8.36 ha of TEC Category A and C in Good or better condition (Keighery, 1994) with foliage cover due to indicative species between 10-40% as identified by the survey (ELA, 2023) on Lot 4300 is utilised as the offset. Map of the selected offset site and information regarding its vegetation composition is provided
<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	6- The offsets site is expected to be, where possible, 'like for like'. The Survey of Lot 4300 (ELA, 2023) indicated that 8.36 ha of the Lot contains the TEC Category A and C in Good to Very Good condition and is close to the impact area. The threatening processes identified in this area includes human access, grazing, weeds and salinity, although salinity threat is considered insignificant. The assigned score of 6 is agreed on by both DWER and DCCEEW.
<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	6 - It is considered that the quality of the community may decrease slightly over the next 20 years without the security and management actions of the offset due to ongoing native vegetation degradation processes in the wheatbelt including weed invasion. However, the decline is expected to be insignificant.
<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	7- a quality score of 7 was selected to reflect the improvement over 20 years as a result of the applicant's commitment to secure the land with a covenant, fencing to limit access, removal of rubbish, management and control of weeds, and infill planting with species representative of the TEC to improve foliage cover.
<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	20% The property is zoned Industrial. Without the offset, the site could be lost to future development or other activities, particularly given its proximity to current industrial premises. In accordance with the Draft Offset Procedure, the risks to Rural properties most commonly range from 15-20%, whereas that of the urban (private freehold land) ranges from 20-80%. The risk of loss for Industrial properties is considered higher than that of Rural properties, as such a RoL of 20% is selected.
<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	5% Securing the land parcel with a conservation covenant should reduce the risk of loss to 5% (low risk). The risk of catastrophic events (fire, dieback etc.) remain. DWER noted DCCEEW's guidance on RoL which would assign an RoL of 0% to this parcel of land because it is regulated (requiring an assessment and offset under any legislation). However, DWER considers that there is always a risk of loss to an environment value that a risk of no less than 5% is more conservative.
<i>Confidence in result (%) – risk of loss (habitat/community)</i>	The capacity of measures to mitigate risk of loss of the proposed offset site	80% - According to the Offsets Guidelines, for offsets of area of habitat attributes the components of confidence in result relates to change in habitat quality and averted loss. The land is currently owned by the applicant and arrangements and process for covenanting have been discussed, and it is expected that a conservation covenant will be complete within 12 months. Therefore, the confidence that the loss is averted is high.

<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)	80% - The offset includes programs proposed to address the threatening processes (weed & dieback, grazing, rubbish dumping, salinity). For the change of habitat quality, the confidence in result captures the certainty of the successful management of the Lot and rehabilitation of the Good to Very Good vegetation within patches of TEC Category A and C. Given the current condition of the TEC patches within the offset site and the proposed program provided by the applicant (ELA, 2023), the confidence that the program will be successful is high.
<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)	46.64% automatically calculated for TEC offset only, based on estimated figures (in red) above.

Lot 1379

Field Name	Description	Justification for value used
<i>IUCN Criteria</i>	The IUCN criteria for the value being impacted	Critically Endangered - In accordance with the WA Offsets Guideline and EPBC Legal status and Documentation for Eucalypt Woodlands of the Western Australian Wheatbelt accessed from http://www.environment.gov.au/cgi-bin/sprat/public/publiclookupcommunities.pl on 30 May 2022.
<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	1.7 ha Based on Biological Surveys of the application area, the entire application area is considered to meet the diagnostic criteria of Eucalypt Woodlands of the Western Australian Wheatbelt. Based on this, the area impacted was selected as 1.7 hectares. Surveys of the application area noted 1.6 hectares of the application area was consistent with the diagnostic criteria for Eucalypt Woodlands of the Western Australian Wheatbelt. In reviewing the remaining 0.1 hectares excluded by the surveys. The Department, in accordance with the Approved Conservation advice, determined the remaining 0.1 hectares should be included as it is a connected patch in a roadside. The Approved Conservation advice notes; "The width here is based on the native understorey component rather than width of the tree canopy. Some allowance must be made for small breaks or variations in native species cover along linear patches. Given the generally open nature of the tree canopy and some understorey structures, a break in the continuity of native vegetation cover of 50 metres or more, is likely to indicate that separate patches are present. An exception is for main, often bitumen-covered, roads that bisect otherwise continuous vegetation; most local government roads in the wheatbelt have a road reserve of 20 metres. In these cases, native vegetation along either side of the road is considered to be a separate patch." The 1.7 hectare application area is therefore considered to be one continuous patch impacted by the clearing proposal.
<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.	6 - A quality score of 6 was selected as an average quality score for the entire application area. This is based on biological surveys and expert advice from DBCA regarding the combination of vegetation condition and site context. The Approved Conservation advice for this TEC recognises the highly fragments and cleared nature of this TEC and therefore that all occurrences of this TEC are critical to its persistence. The condition ranges from good to very good with the Commonwealth referral indicating these patches meet the condition threshold for Category A (roadside patch width being >5m; excellent to very good condition).
<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 - In accordance with the WA Offsets Procedure The offset value (i.e. offset area requirement when using area mode) is calculated using a 20-year time period, which represents the foreseeable future over which loss is averted. This includes where the offset is in perpetuity. This is also in accordance with the Offsets Guidelines under the EPBC Act. Given the applicant proposes to apply a conservation covenant to the selected offset area, a value of 20 was selected for this calculation.

<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	15 - the time until ecological benefit is selected at 15 years as it is the maximum time afforded CBH to subdivide and place the land to a conservation covenant; and execute the on-ground management actions to address the threatening processes and improve the vegetation condition. The management actions include activities to halt the worsening salinity problems in and around the Lot, for which a detailed management actions plan is provided. It has been conditioned on the permit that within 12 months of the approval, evidence must be provided to the Department that the offset site has had a conservation covenant and onsite management action plan in place.
<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	13.79 ha - Lot 1397 is measuring 17.26 ha in size in Degraded to Excellent condition. Of the vegetated area, 13.79 is identified as Wheatbelt Woodland TEC, comprising of 8.433 ha Category A and 5.355 ha Category C of the TEC. The Category A TEC area corresponds with vegetation type Eslw, similar to the type of vegetation at impact site, in Excellent condition. Vegetation in Category C TEC area also corresponds with vegetation type Eslw, but in Good condition, with the lower stratum being dominated by chenopod species. Rehabilitation and infill planting in both Category A and C TEC in this Lot with deep rooted vegetation including the Eucalypt species is expected to increase the quality of the vegetation and help address the salinity issue in the long term.
<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	6 - The offsets site is expected to be, where possible, 'like for like'. The vegetation in the Category A TEC within Lot 1397 is identified as Eslw, comprising of <i>E. salmonopholia</i> , <i>E. loxophleba</i> and <i>E. wandoo</i> , similar to that of impact site (ELA, 2023). The survey identified the vegetation in this patch of TEC as in Good to Excellent condition (Keighery, 1994) without significant sign of threat from salinity. The vegetation is also contained in a large continuous patch of vegetation, with favourable edge to area ration. Although it is located 52 km from the impact site, and relatively isolated without significant connection with other remnant, the Lot provide the offset values for the TEC. In addition, this remnant vegetation within an area that has been extensively cleared has a high value that protecting it would be beneficial to the environment. As such, a start quality score of 6 is given.
<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	6 - It is considered that the quality of the community may decrease slightly over the next 20 years without the security and management actions of the offset due to ongoing native vegetation degradation processes in the wheatbelt including weed invasion. However, the decline is expected to be insignificant.
<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	7 - On-ground management has been proposed as part of the offset, to at least maintain or improve the current vegetation condition and thus the site's quality is considered unlikely to decline beyond its current quality over the next 20 years. A conservation covenant will reduce the risk in decline in quality as a result of clearing for exempt purposes and allow broader-scale threat management to occur. The proposed on-site management program including weed control, infill planting, would maintain and improve the quality of the vegetation.
<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	15% - In accordance with the Draft Offset Procedure Rural properties most commonly range from 15-20%, urban (private freehold land) ranges from 20-80%. Without offset, the site could be lost to future development, agricultural exemptions, or other activities. Protecting it under a covenant averts such risk. This is consistent with the Guidelines provided with the Offsets assessment guide.
<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	5% Securing the land parcel with a conservation covenant should reduce the risk of loss to 5% (low risk). The risk of catastrophic events (fire, dieback etc.) remain. DWER noted DCCEEW's guidance on RoL which would assign an RoL of 0% to this parcel of land because it is regulated (requiring an assessment and offset under any legislation). However, DWER considers that there is always a risk of loss to an environment value that a risk of no less than 5% is more conservative.

<i>Confidence in result (%) – risk of loss (habitat/community)</i>	The capacity of measures to mitigate risk of loss of the proposed offset site	80% - According to the Offsets Guidelines, for offsets of area of habitat attributes the components of confidence in result relates to change in habitat quality and averted loss. For the averted loss component, confidence in result captures the level of effectiveness of the covenant to mitigate the risk of loss of the site. The land will be purchased by the applicant and arrangements and process for covenanting have been discussed, and it is expected that a conservation covenant will be complete within 1 years. Therefore, the confidence in result in very high.
<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)	80% - For the change of habitat quality, the confidence in result captures the certainty of the successful management of the site to avoid decline in quality and improve it. The rehabilitation and offset management plans provided details that ensure the success of the program.
<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)	54.58% automatically calculated based on estimated figures (in red) above. This value complements the value provided by offset at Lot 4300.

WA Offset Metrix for the SRI on significant remnant Victoria Plain Vegetation Lot 4300

Environmental value to be offset		
<i>Calculation/Element</i>	<i>Score (Area)</i>	<i>Rationale</i>
Conservation significance		
Description	The application area is mapped as Beard vegetation association Victoria Plains 142 described as 'Medium woodland; York gum and Salmon gum'. This vegetation association has 12.44% of its pre-European extent remaining in the Avon Wheatbelt subregion (GoWA 2019).	Mapping of the application area identifies Beard Vegetation association Victoria Plains 142 covering the application area. This vegetation association has 12.44% remaining in the Avon Wheatbelt subregion
Type of environmental value	Vegetation/Habitat	Victoria Plain 142 vegetation association
Conservation significance of environmental value	Terrestrial native vegetation complex - <30% extent remaining in the bioregion	Victoria Plain 142 vegetation remnant native vegetation type retains 12.44% of its original cover.
Landscape-level value impacted	Yes	
Significant impact		
Description	Clearing of 1.7 ha of under representation Victoria Plain 142 vegetation (12.44% remains) in an extensively cleared area.	Clearing of 1.7 ha of under representation Victoria Plain 142 vegetation (12.44% remains) in an extensively cleared area.
Significant impact (hectares) / Type of feature	1.70	The loss of 1.7 ha of underrepresented Victoria Plain 142 vegetation (12.44% remains) from an extensively cleared area.
Quality (scale) / Number	6.00	Vegetation impacted are in Degraded to Very Good (Keighery) condition, mostly Good condition with significant edge effect (being linear and narrow in formation)
Rehabilitation credit		
Description	No on-site revegetation and rehabilitation is proposed	No on-site revegetation and rehabilitation is proposed
Proposed rehabilitation (area in hectares)	0.00	

Current quality of rehabilitation site / Start number (of type of feature)	0.00	
Future quality WITHOUT rehabilitation (scale) / Future number WITHOUT rehabilitation	0.00	
Future quality WITH rehabilitation (scale) / Future number WITH rehabilitation	0.00	
Time until ecological benefit (years)	0.00	
Confidence in rehabilitation result (%)	0	
Offset		
Description	An offset comprising of acquisition, conservation and onsite management of a land parcel containing the Victoria Plain 142 vegetation type is proposed.	Offset comprises of a rehabilitation program that includes protection of the offset site with a conservation covenant, fencing, weed and rubbish removals and revegetation program to improve vegetation condition at Lot 4300, Moora
Proposed offset (area in hectares)	6.05	The area of vegetation (Very Good condition) set aside as an offset. Area calculated by the calculator
Current quality of offset site / Start number (of type of feature)	6.00	The vegetation in the offset area is in Good to Very Good condition. The score given is an average value.
Future quality WITHOUT offset (scale) / Future number WITHOUT offset	6.00	The condition of vegetation is expected to remain the same, or could potentially decline without the offset. However, the change is expected to be minimal
Future quality WITH offset (scale) / Future number WITH offset	7.00	With protection, fencing, weed management, infill planting if required, the vegetation condition and value will improve.
Time until ecological benefit (years)	5.00	Time required to secure the land and place it under the Conservation Covenant. On-ground management activities including infill planting, weed control and fencing will commence immediately after the commencement of the authorised clearing until the completion criteria are met.
Confidence in offset result (%)	80.0%	Offset management plan is provided by the applicant. It details risk assessments and measures to address the risks, and programs to ensure success and sustainability of the offset. This results in the high confidence.
Duration of offset implementation (maximum 20 years)	20.00	The applicant is committed to manage the land and offset management outcome for a long time.
Time until offset site secured (years)	1.00	The covenanting of the land is already in process and can be completed within a year.
Risk of future loss WITHOUT offset (%)	20.0%	The area is zoned "Industrial". Risk of loss associated with this type of land is approximately between 15-20%
Risk of future loss WITH offset (%)	5.0%	With the level of protection afforded by the offset to the land, the risk of loss with offset is lowered to the minimum 5%, which include risks associated with natural disaster
Offset ratio (Conservation Area only)	N/A	
Landscape level values of offset?	N/A	