GOVERNMENT OF
WESTERN AUSTRALIA

CLEARING PERMIT

Granted under section 51E of the Environmental Protection Act 1986

Purpose Permit number:	CPS 11036/1
Permit Holder:	City of Kalamunda
Duration of Permit:	From 26 March 2026 to 26 March 2036

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

PART I – CLEARING AUTHORISED

1. Clearing authorised (purpose)

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

2. Land on which clearing is to be done

Canning Road Public Road Reserve (PIN 11159783), Carmel
Canning Road Public Road Reserve (PIN 11159784), Carmel
Canning Road Public Road Reserve (PIN 11159785), Carmel
Canning Road Public Road Reserve (PIN 11159787), Carmel
Canning Road Public Road Reserve (PIN 11166080), Carmel
Canning Road Public Road Reserve (PIN 11166081), Carmel
Canning Road Public Road Reserve (PIN 1166082), Carmel
Canning Road Public Road Reserve (PIN 11166083), Carmel
Canning Road Public Road Reserve (PIN 11427970), Carmel
Canning Road Public Road Reserve (PIN 11559689), Carmel
Canning Road Public Road Reserve (PIN 11632984), Carmel
Canning Road Public Road Reserve (PIN 11633015), Carmel
Canning Road Public Road Reserve (PIN 11633017), Carmel
Canning Road Public Road Reserve (PIN 11633024), Carmel
Canning Road Public Road Reserve (PIN 12406635), Carmel
Lot 602 on Deposited Plan 413218, Carmel

3. Clearing authorised

The permit holder must not clear more than 2.44 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 26 March 2031.

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; and

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

7. Fauna management – black cockatoo breeding habitat

(a) Prior to undertaking any clearing authorised under this permit within the areas cross-hatched yellow on Figure 1 of Schedule 1, the permit holder must engage a *fauna specialist* to inspect the *black cockatoo habitat tree* (ID 51) identified to contain a suitable black cockatoo breeding hollow within the location on Table 1 below, for *evidence* of current or past breeding use by *black cockatoo species*.

Table 1: Habitat tree containing the suitable black cockatoo hollow.

Tree	Tree species	Longitude	Latitude
51	*Corymbia calophylla* (marri)	116.0777681	32.027098

(b) Where no *evidence* of current or past use by *black cockatoo species* is identified in accordance with condition 7(a), that tree must only be cleared immediately after the inspection.

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

(d) If there is *evidence* of current breeding use by *black cockatoo species*, the tree must not be cleared whilst it is in use for that breeding season as determined by the *fauna specialist* under condition 7(c).

(e) The permit holder must install one (1) artificial black cockatoo nesting hollow to account for the loss of one (1) suitably sized hollow for black cockatoo nesting that cannot be avoided.

(f) The artificial black cockatoo nesting hollow required by condition 7(e) must be installed prior to commencement of the next black cockatoo breeding season following clearing of the related *black cockatoo habitat tree*.

(g) The artificial black cockatoo nest hollow(s) required by condition 7(e) of this permit must:

(i) be installed within 10 kilometres of the application area, following consultation with the Department of Biodiversity, Conservation and Attractions (DBCA).

(ii) be designed and placed in accordance with the specifications detailed in Schedule 2; and

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

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

(i) The fauna inspection report must include the following;

(i) the location of the black cockatoo habitat tree recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 2020 (GDA2020), expressing the geographical coordinates in Eastings and Northings or decimal degrees;

(ii) the name and amount of fauna species identified;

(iii) whether the *black cockatoo habitat tree* show current or past use by black cockatoo species;

(iv) the methodology, used to inspect the black cockatoo hollow;

(v) a photo of the *black cockatoo habitat tree*; and

(vi) a description of the *black cockatoo habitat tree*, including the:

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

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

8. Offset – revegetation and rehabilitation

(a) Within 24 months of commencing *clearing* authorised under this permit, at an *optimal time* and no later than 26 March 2033, the permit holder must *revegetate* the area cross-hatched red on Figure 2 of Schedule 1, by implementing and adhering to the *City of Kalamunda, Jorgensen Park Revegetation Plan, 2025* prepared by Natural Area Holdings Pty Ltd, including but not limited to the following actions:

(i) undertake best practice soil preparation techniques including ripping and mulching to promote plant survival;

(ii) deliberately *planting* and/or *direct seeding native vegetation* that will result in the minimum completion criteria detailed in Table 1 of Schedule 3 of this permit and ensuring only *local provenance* seeds and propagating material are used;

(iii) undertake *weed* control activities to achieve and maintain the minimum completion criteria specified on Table 1 of Schedule 3.

(iv) undertake monitoring of the areas *revegetated* and *rehabilitated* under condition 8 of this permit by an *environmental specialist* until the completion criteria listed in Table 1 of Schedule 3 have been met.

(b) The permit holder must undertake *remedial actions* for areas *revegetated* and *rehabilitated* , where monitoring indicates that the *revegetation* has not met the completion criteria specified in Table 1 of Schedule 3, including:

(i) *revegetate* and *rehabilitate* the area by deliberately *planting* and/or *direct seeding native vegetation* that will result in the minimum completion criteria detailed in Table 1 of Schedule 3 and ensuring only *local provenance* seeds and propagating material are used;

(ii) additional *weed* control activities;

(iii) annual monitoring of the *revegetated* and *rehabilitated* areas by an *environmental specialist*, until the completion criteria are met; and

(iv) where an *environmental specialist* has determined that the completion criteria, outlined in Table 1 Schedule 3 has been met, that determination shall be submitted to the *CEO* within three months of the determination being made by the *environmental specialist.*

PART III - RECORD KEEPING AND REPORTING

9. Records that must be kept

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

Table 1: Records that must be kept

No.	Relevant matter	Specifications
1.	In relation to the authorised clearing activities generally	(a) the species composition, structure, and density of the cleared area; (b) the location where the clearing occurred, recorded using a Global Positioning System (GPS) unit set to GDA2020, expressing the geographical coordinates in Eastings and Northings; (c) the date that the area was cleared; (d) the size of the area cleared (in hectares); (e) actions taken to avoid, minimise, and reduce the impacts and extent of clearing in accordance with condition 5; and (f) actions taken to minimise the risk of the introduction and spread of *weeds* and *dieback* in accordance with condition 6.
2.	In relation to black cockatoo fauna management pursuant to condition 7	(a) the time/s and date/s of inspection/s of the suitable *black cockatoo habitat tree* by the *fauna specialist*; (b) a description of the inspection methodology employed by the *fauna specialist*; (c) the species name of any fauna determined by the *fauna specialist* to be occupying the suitable *black cockatoo habitat tree*;

No.	Relevant matter	Specifications
		(d) where the suitable *black cockatoo habitat tree* is determined by the *fauna specialist* to be occupied by *black cockatoo species*: (i) the time and date that it was determined to be no longer occupied; and (ii) a description of the *evidence* by which it was determined to be no longer occupied; (iii) and the time and date that the suitable black cockatoo habitat tree was cleared.
3.	In relation to the installation of artificial black cockatoo nest hollows pursuant to condition 7	(a) the date that each artificial black cockatoo nest hollow was installed; (b) the total number of artificial hollows installed. (c) the location where each artificial black cockatoo nest hollow was installed recorded using a GPS unit set to GDA94, expressing the geographical coordinates in Eastings and Northings or decimal degrees; (d) a photo of each installed artificial black cockatoo nest hollow; (e) the dates each artificial black cockatoo nest hollow installed was monitored; (f) a description of the monitoring methods employed for each artificial black cockatoo nest hollow installed; (g) a description of the monitoring observations for each artificial black cockatoo nest hollow installed; (h) the date/s each artificial black cockatoo nest hollow installed was maintained; and (i) a description of the maintenance activities undertaken for each artificial black cockatoo nest hollow installed.
4.	In relation to the *revegetation* and *rehabilitation* of areas pursuant to condition 8	(a) a description of the revegetation and rehabilitation activities undertaken each year, once commenced, outlined in a report produced by an environmental specialist; (b) the location and size of the areas revegetated and rehabilitated (in hectares) recorded using a GPS unit set to GDA 2020, expressing the geographical coordinates in Eastings and Northings or decimal degrees; (c) the date that revegetation and rehabilitation works began; (d) the baseline data recorded for the area to be revegetated and rehabilitated, including species richness, species density, vegetation

No.	Relevant matter	Specifications
		structure and weed cover; (e) the species composition, structure, density of the areas revegetated and rehabilitated recorded annually; (f) results of annual monitoring against the completion criteria; (g) the date completion criteria area considered to have been met; and (h) any other actions in accordance with condition 8.

10. Reporting

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

(a) The permit holder must provide to the *CEO*, on or before 30 June of each calendar year, a written report containing:

(i) the records required to be kept under condition 9; and
(ii) records of activities done by the permit holder under this permit between 1 January and 31 December of the preceding calendar year.

(b) If no clearing authorised under this permit 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 calendar year.

(c) The permit holder must provide to the *CEO*, no later than 90 calendar days prior to the expiry date of the permit, a written report of records required under condition 9, where these records have not already been provided under condition 10(a).

DEFINITIONS

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

Table 2: Definitions

Term	Definition
black cockatoo species	means one or more of the following species: (a) *Calyptorhynchus lateriosis* (Carnaby's cockatoo); (b) *Calyptorhynchus baudinii* (Baudin's cockatoo); and/or (c) *Calyptorhynchus banksii naso* (forest red-tailed black cockatoo).
CEO	Chief Executive Officer of the department responsible for the administration of the clearing provisions under the *Environmental Protection Act 1986*.
clearing	has the meaning given under section 3(1) of the EP Act.
condition	a condition to which this clearing permit is subject under section 51H of the EP Act.

Term	Definition
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.
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.
fill	means material used to increase the ground level, or to fill a depression.
dieback	means the effect of *Phytophthora* species on native vegetation.
Direct seeding	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
department	means the department established under section 35 of the *Public Sector Management Act 1994* (WA) and designated as responsible for the administration of the EP Act, which includes Part V Division 3.
EP Act	*Environmental Protection Act 1986* (WA)
Local provenance	means native vegetation seeds and propagating material from natural sources within 25 kilometres and the same Interim Biogeographic Regionalisation for Australia (IBRA) subregion of the area cleared.
mulch	means the use of organic matter, wood chips or rocks to slow the movement of water across the soil surface and to reduce evaporation.
native vegetation	has the meaning given under section 3(1) and section 51A of the EP Act.
Optimal time	means the period between April and June
planting	means the re-establishment of vegetation by creating soil conditions and planting seedlings of the desired species
Remedial action/s	remedial action/s means for the purpose of this permit, any activity that is required to ensure successful re-establishment of understorey to its pre-clearing composition, structure and density, and may include a combination of soil treatments and revegetation.
revegetate/revegetated/	means the re-establishment of a cover of local provenance native
revegetation	vegetation in an area using methods such as natural regeneration, direct seeding and/or planting so that the species composition, structure and density is similar to pre-clearing vegetation types in that area.
rehabilitate/rehabilitated/ rehabilitation	means actively managing an area containing native vegetation in order to improve the ecological function of that area.
weeds	means any plant – (a) that is a declared pest under section 22 of the *Biosecurity and Agriculture Management Act 2007*; or (b) published in a Department of Biodiversity, Conservation

Term	Definition
	and Attractions species-led ecological impact and invasiveness ranking summary, regardless of ranking; or (c) not indigenous to the area concerned.

END OF CONDITIONS

Meenu Vitarana
MANAGER
NATIVE VEGETATION REGULATION

Officer delegated under Section 20
Of the Environmental Protection Act 1986

27 February 2026

Schedule 1

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

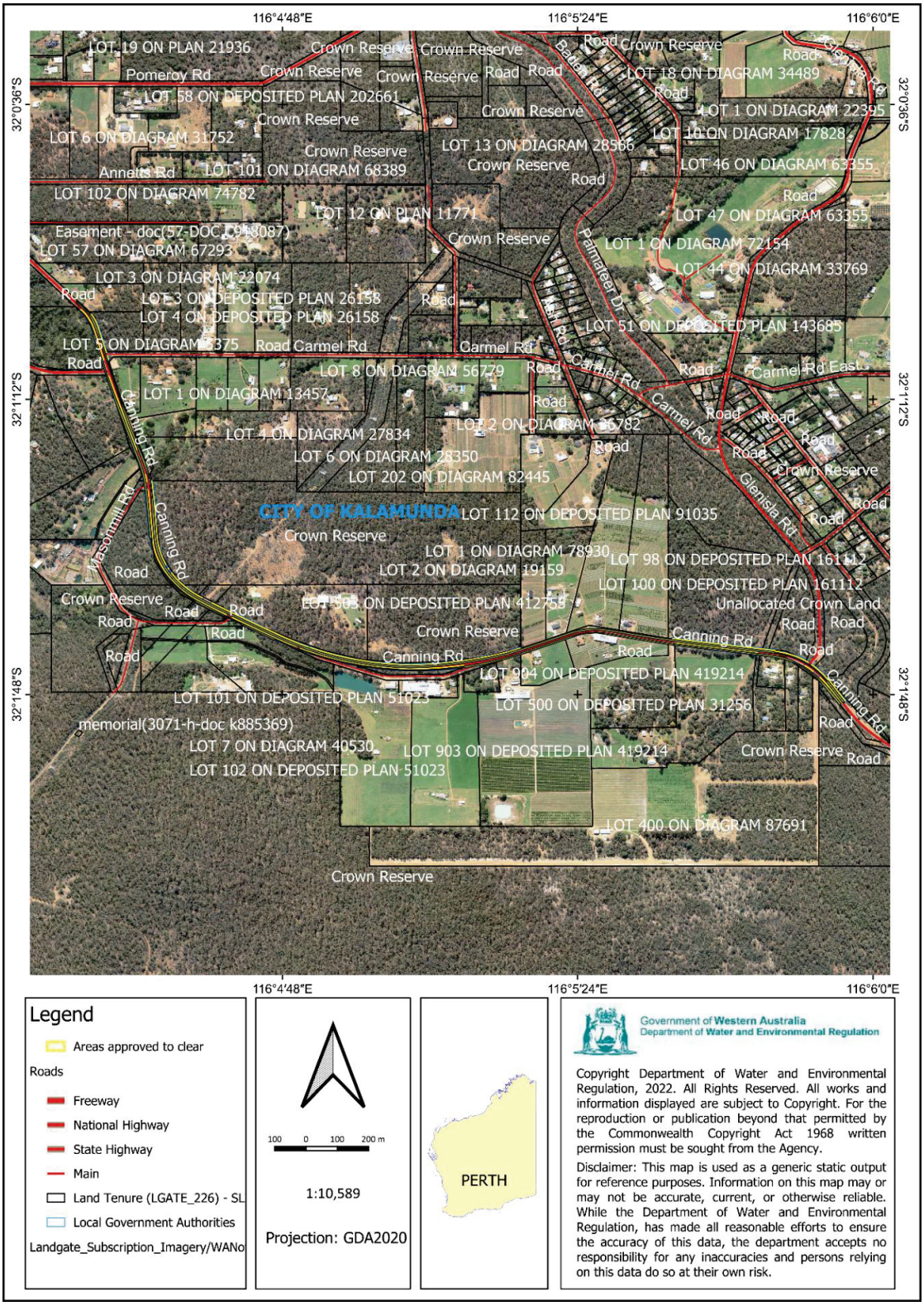


Figure 1: Map of the boundary of the area within which clearing may occur.

The boundary of the offset revegetation and rehabilitation areas, subject to condition 8, are shown in the map below (Figure 2)

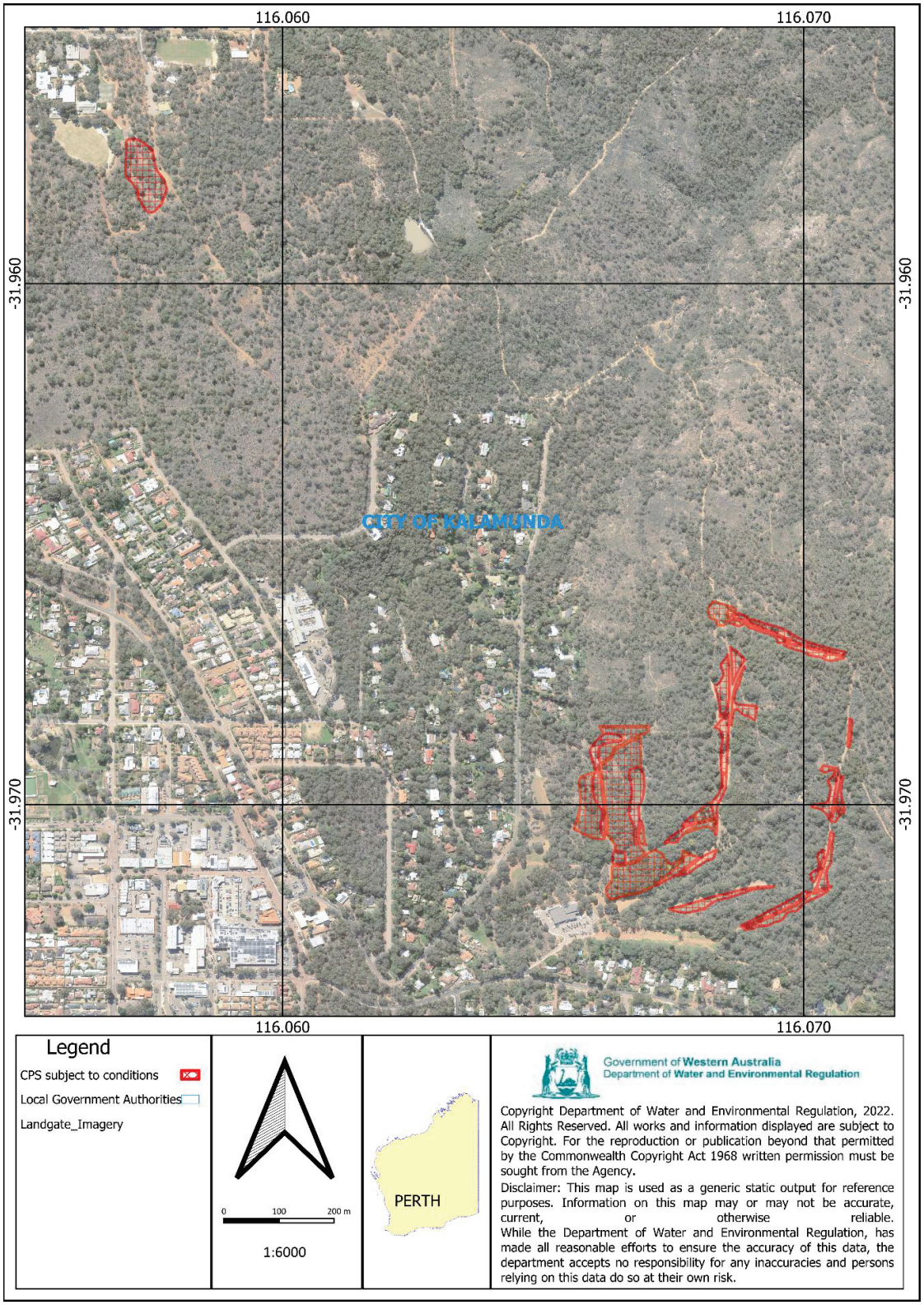


Figure 2: The area cross-hatched red indicates the offset areas subject to condition 8.

Schedule 2

Fauna Note – Artificial Hollows for Black Cockatoos

Department of Biodiversity, Conservation and Attractions
GOVERNMENT OF WESTERN AUSTRALIA

FAUNA NOTES

Artificial Hollows for Black Cockatoos

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

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

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

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

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

When to Use Artificial Hollows

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

Where do black cockatoos nest?

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

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

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

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

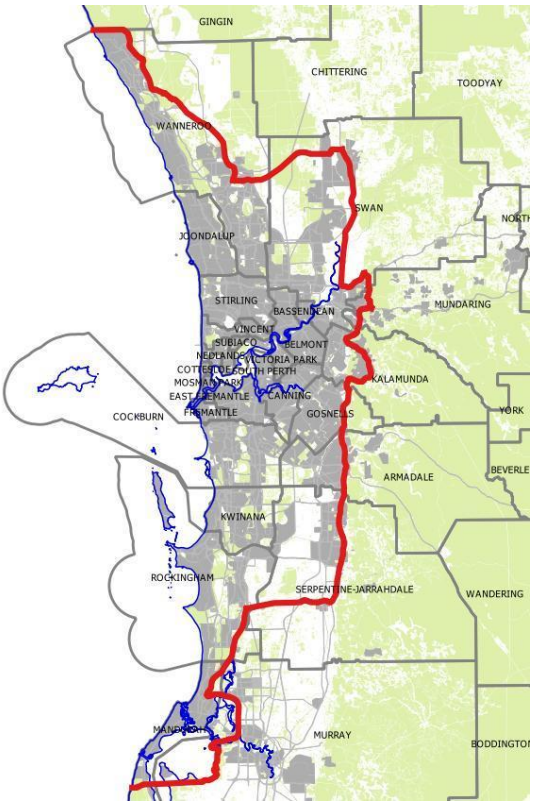
Is my site suitable for artificial hollows?

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

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

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

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



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

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

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

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

How to Design and Place Artificial Hollows

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

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

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

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

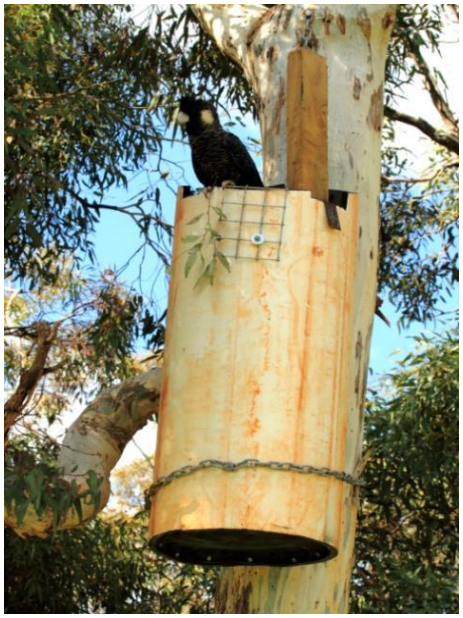




Photo: Christine Groom (left), Rick Dawson (centre and right)

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

Walls, size, base, and entrance design

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

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

Artificial hollows should be:

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

The base of the artificial hollow must be:

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

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

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

The entrance of the artificial hollow:

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

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

Adding ladders and sacrificial chewing posts

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

The ladder must be:

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

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

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

The sacrificial chewing posts must be:

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

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

Mounting and placement

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

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

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

Artificial hollows to be placed in trees require:

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

Artificial hollows must be mounted such that:

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

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

Safety

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

Monitoring and Maintaining Artificial Hollows

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

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

How do I monitor artificial hollows?

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

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

Monitoring of artificial hollows should consider and record:

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

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

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

Table 2: Techniques for monitoring artificial hollows

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

When do I monitor artificial hollows?

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

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

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

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

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

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

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

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

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

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

How do I maintain artificial hollows?

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

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

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

Artificial hollow base needing repair.
Photo by Christine Groom

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

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

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

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

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

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

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

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

Maps of Black Cockatoo Breeding Range

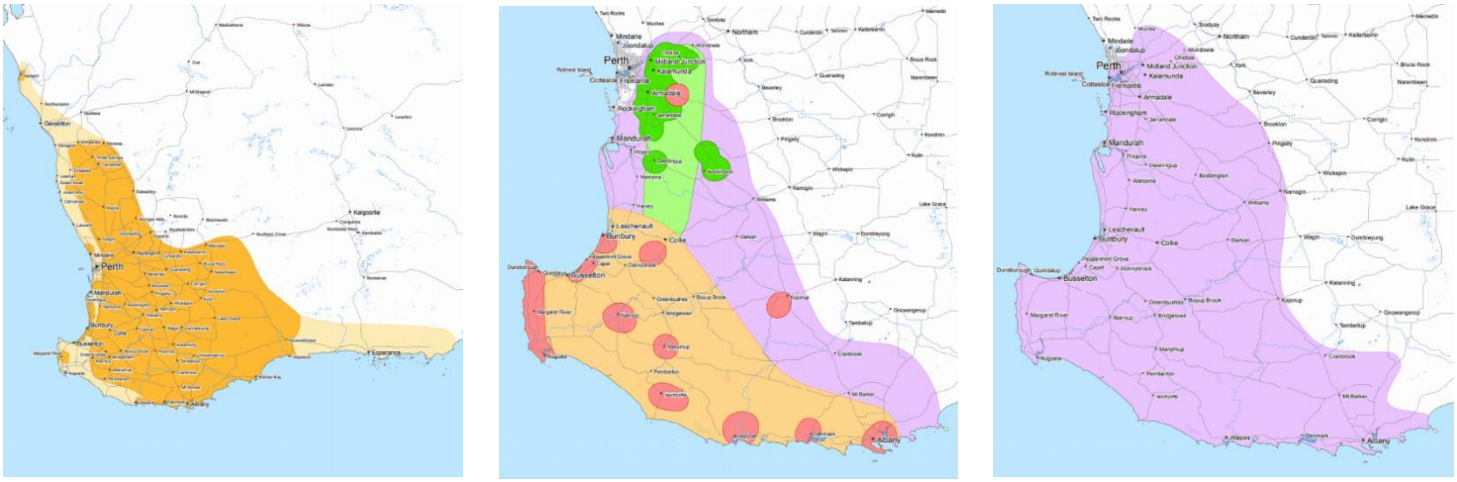


Image: Commonwealth of Australia, 2011

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

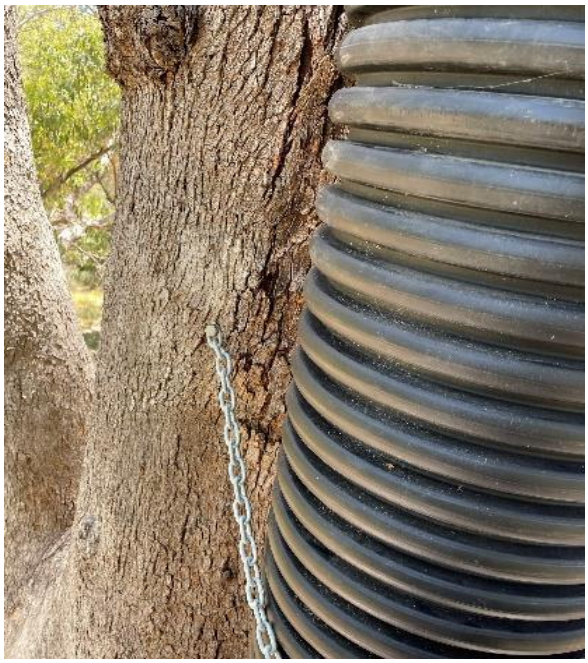
Artificial Hollows – best current design and installation specifications

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

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

Artificial Hollow Construction Specifications

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



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

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

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

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

Monitoring and Maintaining Artificial Hollows

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

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

Further Reading

DBCA webpage and fauna profiles: Black cockatoos

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

BirdLife Australia webpage and brochure: Identify your Black cockatoo

Western Australian Museum webpage and fact sheets: Cockatoo Care

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

Acknowledgements

This Fauna Note is a joint initiative of the Department of Biodiversity, Conservation and Attractions, Birdlife Australia, and the Western Australian Museum. Many individuals have contributed to its preparation, including members of the department's Carnaby's cockatoo and forest black cockatoo recovery teams, with significant contributions from Rick Dawson (DBCA Research Associate), Ron Johnstone (WAM), Alan Elliot (Serpentine-Jarrahdale Landcare Centre), and Denis Saunders (CSIRO). This document was prepared by David Mitchell, Geoff Barrett, Kim Williams, Rebecca Bloomfield, Amie Raycraft, Brooke Richards, Teagan Johnston and Martin Dziminski.

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Disclaimer

Last updated: 08 Feb 2023

Schedule 3

Table 1: Completion Criteria for Condition 8

Criterion	Completion Criteria	Recommended Target
Vegetation Condition	Vegetation condition is in a good or better condition.	Vegetation condition is in a good or better condition.
Species Richness	Minimum of 60 % of native species, based on reference site.	A minimum of 26 native species.
Species Density	Minimum of 60 % of cover in each structural layer returned, based on reference site.	A minimum of 23 % native coverage in the upper structural layer. A minimum of 19 % native coverage in the middle structural layer. A minimum of 22 % native coverage in the lower structural layer.
Black Cockatoo Habitat	Minimum of 10 % of cover of black cockatoo foraging species	Minimum of 10 % of cover of black cockatoo foraging species
Weed	Weed cover is no greater than 5 %.	Weed cover is no greater than 5 %
Weed	No woody weeds, declared pests or Weeds of National Significance presence.	No woody weeds, declared pests or Weeds of National Significance presence.
Bare Ground	Bare ground cover is no greater than 10 %.	Bare ground cover is no greater than 10 %
Rubbish	Site is clean and free of rubbish	Site is clean and free of rubbish
Erosion	No erosion is present within the site.	No erosion is present within the site.

Government of Western Australia
Department of Water and Environmental Regulation

Clearing Permit Decision Report

1 Application details and outcome

1.1. Permit application details

Permit number:	CPS 11036/1
Permit type:	Purpose permit
Applicant name:	City of Kalamunda
Application received:	16 April 2025
Application area:	2.44-hectare of native vegetation
Purpose of clearing:	Road upgrade
Method of clearing:	Mechanical
Property:	Canning Road Public Road Reserve (PIN 11159783) Canning Road Public Road Reserve (PIN 11159784) Canning Road Public Road Reserve (PIN 11159785) Canning Road Public Road Reserve (PIN 11159787) Canning Road Public Road Reserve (PIN 11166080) Canning Road Public Road Reserve (PIN 11166081) Canning Road Public Road Reserve (PIN 1166082) Canning Road Public Road Reserve (PIN 11166083) Canning Road Public Road Reserve (PIN 11427970) Canning Road Public Road Reserve (PIN 11559689) Canning Road Public Road Reserve (PIN 11632984) Canning Road Public Road Reserve (PIN 11633015) Canning Road Public Road Reserve (PIN 11633017) Canning Road Public Road Reserve (PIN 11633024) Lot 602 on Deposited Plan 413218
Location (LGA area/s):	Carmel
Localities (suburb/s):	City of Kalamunda

1.2. Description of clearing activities

The vegetation proposed to be cleared is contained within a single contiguous area (see Figure 1, Section 1.5). The proposal is to clear 3.72 hectares of native vegetation within multiple road parcels along the canning road reserve, for the purpose of road upgrades.

The application was revised during the assessment from 3.72 hectares to 2.44 hectares to avoid and minimise environmental impacts (see Section 3.1 for further details).

1.3. Decision on application

Decision:	Granted
Decision date:	27 February 2026
Decision area:	2.44 hectares of native vegetation, as depicted in Section 1.5, below.

1.4. Reasons for decision

This clearing permit application was submitted, accepted, assessed and determined in accordance with sections 51E and 51O of the *Environmental Protection Act 1986* (EP Act). The Department of Water and Environmental Regulation (DWER) advertised the application for 21 days and no submissions were received.

In making this decision, the Delegated Officer had regard for:

- the site characteristics (see Appendix A A),
- relevant datasets (see Appendix F.1),
- the findings of flora, vegetation and fauna survey's (see Appendix E),
- the clearing principles set out in Schedule 5 of the EP Act (see Appendix B),
- relevant planning instruments and any other matters considered relevant to the assessment (see Section 3).

The delegated officer also took into consideration the applicants proposed avoidance and mitigation measures (see Section 3.1) and that the purpose of the clearing is for the road upgrades to improve road safety.

The assessment identified that the proposed clearing will result in loss of approximately 2.03 ha of foraging habitat for all three species of black cockatoos, including one potential breeding tree containing one suitable hollow.

After consideration of the available information, as well as the applicant's avoidance and mitigation measures (see Section 3.1), the Delegated Officer determined that the impacts to conservation significant flora were not significant and can be managed via appropriate management measures conditioned on the permit. However, impacts to black cockatoo foraging habitat remain significant even after the application of avoidance and minimisation measures, and that this impact constitutes a significant residual impact.

The Delegated Officer considered the extent of environmental impacts, the necessity for clearing, and the applicant's adherence to the mitigation hierarchy, and determined that it was appropriate to grant a clearing permit requiring management measures and an adequate environmental offset.

The applicant has provided an adequate environmental offset, consistent with the Government of Western Australia's *Environmental Offsets Policy* (2011) and *Environmental Offsets Guidelines* (2014), to counterbalance the significant residual impacts of the proposed clearing. The offset involves rehabilitation of 6.74 ha of native vegetation that provides suitable habitat for forest red-tailed black cockatoo, Baudin's black cockatoo and Carnaby's black cockatoo. The suitability of the offset is summarised in Section 4.

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

- undertake avoid and minimise measures to reduce the impacts and extent of clearing,
- take hygiene steps to minimise the risk of the introduction and spread of weeds and dieback,
- inspect the habitat tree with a suitable hollow for signs of use by black cockatoos, delay clearing if breeding activity are detected until fledgelings have fled, and install an artificial nest box to mitigate the loss of one suitable nest hollow, and
- Revegetate approximately 3.67 ha of vegetation in a degraded or completely degraded condition to a good or better condition, by deliberately planting native vegetation that results in similar species composition, structure and density of native vegetation surrounding the offset site.

1.5. Site maps

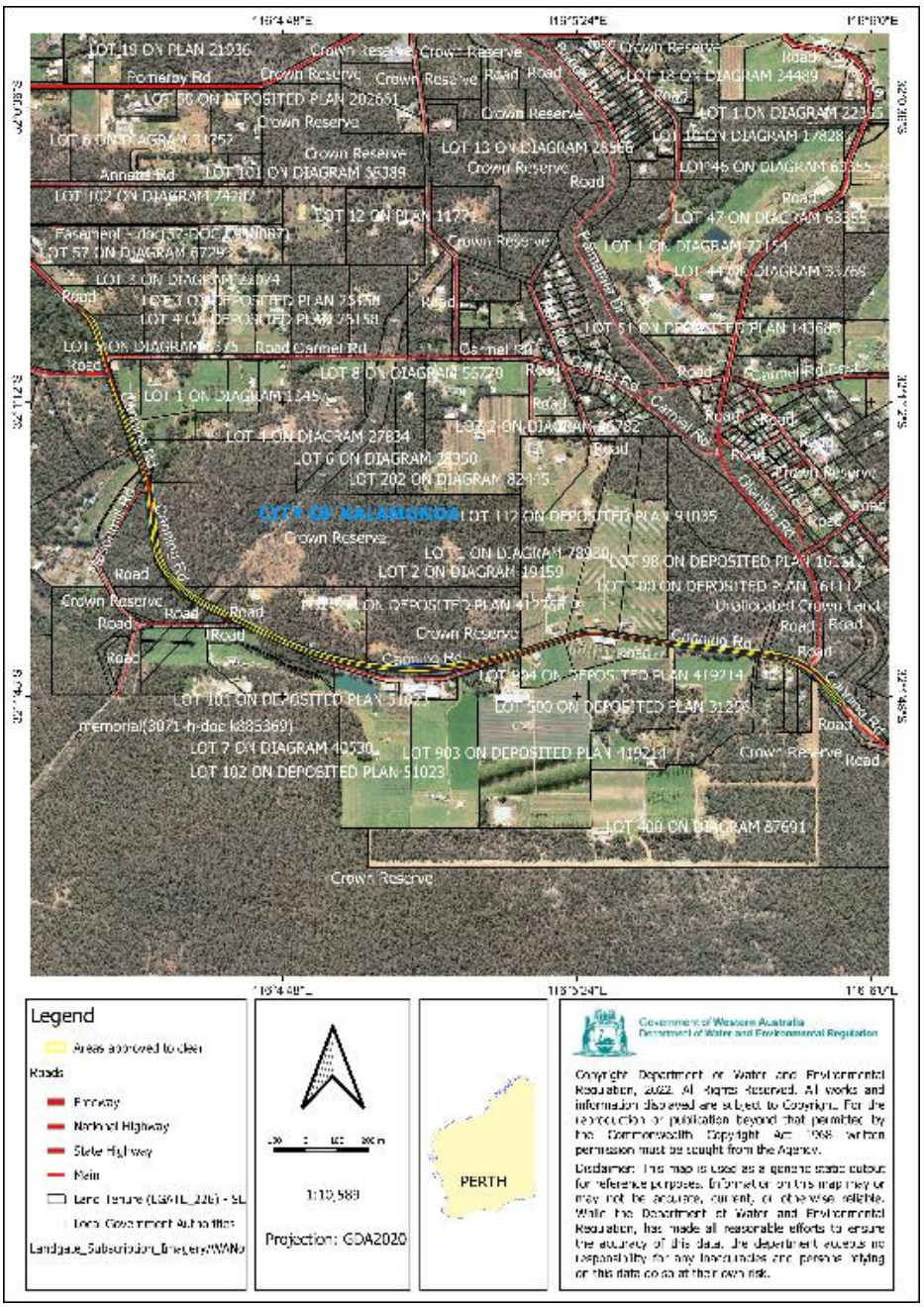

Figure 1: Map of the application area the area crosshatched yellow indicates the area authorised to be cleared under the granted clearing permit.

2 Legislative context

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

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

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

Other legislation of relevance for this assessment include:

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

Relevant policies considered during the assessment include:

- *Environmental Offsets Policy* (2011)

The key guidance documents which inform this assessment are:

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

3 Detailed assessment of application

3.1. Avoidance and mitigation measures

Avoidance

The City of Kalamunda (the City) implemented a range of avoidance measures by reducing the proposed clearing area from 3.72 hectares to 2.44 hectares.

Avoidance measures include the following:

- potential suitable habitat trees were avoided where the design of the road could suitably be redesigned without comprising the safety of the intended final use.
- one potential habitat tree, ID 60, determined to have suitable hollow characteristics for black cockatoo breeding, will be avoided in the final project design.
- the final project design does not impact any naturally occurring priority flora species within the survey area
- the location of the priority flora adjacent to the application area will be flagged out to mitigate any direct or indirect impacts to the clearing.
- the final project is in majority degraded to completely degraded condition vegetation.

Mitigation

The city provided the following avoidance measures:

- a construction and environmental management plan will be developed by the City, including environmental impact mitigation measures such as weed control, dieback hygiene, dust suppression and tree protection during construction activities.
- clearing works are to be staged and are to be directional.
- clearing is to be conducted toward adjacent native vegetation in a slow manner to allow fauna to move into the adjacent vegetation.
- during clearing, an approved fauna spotter is to be onsite to assist with the relocation of any displaced fauna species.
- all hollows will be inspected for native fauna occupancy prior to felling
- During felling and clearing, an approved fauna spotter is to be onsite to assist with the relocation of any displaced fauna species.

The Delegated Officer was satisfied that the applicant has made a reasonable effort to avoid and minimise potential impacts of the proposed clearing on environmental values.

After consideration of avoidance and mitigation measures, it was determined that an offset was necessary to counterbalance the significant residual impacts to black cockatoo foraging habitat. In accordance with the Government of Western Australia's *Environmental Offsets Policy* and *Environmental Offsets Guidelines*, these significant residual impacts have been addressed through the conditioning of environmental offset requirements on the permit. The nature and suitability of the offset provided are summarised in Section 4.

3.2. Assessment of impacts on environmental values

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

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

3.2.1. Biological values (fauna) - Clearing Principle (a) and (b)

Assessment

Fauna:
A fauna likelihood assessment was undertaken based on:

- the preferred habitat and vegetation types of conservation significant fauna species recorded within the local area (12 kilometre radius from the application area);
- site characteristics (see Appendix A.1); and
- known species distribution.

A total of 32 conservation significant fauna species have been recorded within the local area. A review of site characteristics and habitat preferences of these species (see Appendix A) identified that the application area may provide suitable habitat for the following ten species:

- *Calyptorhynchus banksii naso* (forest red-tailed black cockatoo);
- *Platycercus icterotis xanthogenys* (western rosella – inland);
- *Bettongia penicillata ogilbyi* (woylie, brush-tailed bettong);
- *Dasyurus geoffroii* (chuditch, western quoll);
- *Isoodon fusciventer* (quenda, south-western brown bandicoot);
- *Notamacropus irma* (western brush wallaby);
- *Phascogale tapoatafa wambenger* (south-western brush-tailed phascogale); and
- *Setonix brachyurus* (quokka).

Of these species, the following three black cockatoo species were considered likely to occur within the application area:

- *Zanda latirostris* (Carnaby's cockatoo; endangered);
- *Zanda baudinii* (Baudin's cockatoo; endangered); and
- *Calyptorhynchus banksii naso* (forest red-tailed black cockatoo; vulnerable).

Black cockatoos

Black cockatoo habitat can be categorised into three functional components: foraging, breeding and roosting habitat. Black cockatoos typically forage within 12 kilometres of an active breeding site and within approximately six kilometres of night roost sites, although they may travel distances of 20 kilometres or more when necessary (Commonwealth of Australia, 2022). Foraging habitat is therefore assessed primarily within 12 kilometres of known breeding or roosting sites.

The application area occurs within the modelled breeding range of Carnaby's cockatoo and within the forest red-tailed black cockatoo distribution zone. The application area also occurs within the mapped distribution of all three black cockatoo species.

The Canning Road Environmental Assessment (Natural Area, 2025) and Biological Survey (Natural Area, 2024) recorded forest red-tailed black cockatoos within the application area during field surveys.

Breeding habitat

Black cockatoos nest in hollows of live and dead trees, including *Corymbia calophylla* (marri), *Eucalyptus marginata* (jarrah), *Eucalyptus diversicolor* (karri) and other *Eucalyptus* species (Commonwealth of Australia, 2022). Breeding habitat includes trees that contain suitable hollows or trees of a sufficient diameter at breast height to develop hollows, generally greater than or equal to 50 centimetres (Commonwealth of Australia, 2022).

Spatial data indicate that there are 13 records of natural breeding hollows and two records of artificial breeding hollows for white-tailed black cockatoo species within 12 kilometres of the application area. The nearest breeding hollow record is approximately 6.7 kilometres north of the application area. Within 25 kilometres of the application area, there are 10 records of potential breeding hollows and one confirmed breeding hollow, with the closest record located approximately 20 kilometres east of the application area.

Of the 48 potential habitat trees proposed to be cleared, two were identified as containing hollows, with one hollow assessed as having characteristics suitable for use by black cockatoos (Natural Area, 2025). The applicant advised that they can avoid one of the hollow bearing trees, but advised that the other tree cannot be avoided (City of Kalamunda, 2025b)

The applicant advised that due to the proximity to a major road (Canning Road), these trees are unlikely to support breeding activities due to disturbance from traffic, with the adjacent remnant vegetation to the site likely to provide more suitable breeding habitat. The City will ensure that all hollows are inspected for native fauna occupancy prior to felling. If nesting birds species are found, including eggs or chicks, they are to be left in situ until chicks have fully fledged (Natural Area, 2025). This requirement has been conditioned on the clearing permit.

Foraging habitat

Foraging habitat requirements differ between the three black cockatoo species:

- **Baudin's cockatoo:** primarily feeds on marri seeds, flowers, nectar and grubs, as well as proteaceous trees and shrubs, other native seeds, introduced fruits, insects and insect larvae.
- **Carnaby's cockatoo:** feeds on seeds, flowers and nectar of proteaceous species (including *Banksia*, *Hakea* and *Grevillea* species), eucalypts and *Callistemon*, as well as seeds of introduced species, insects and insect larvae.
- **Forest red-tailed black cockatoo:** primarily feeds on seeds of marri and jarrah, with additional food sources including *Allocasuarina* cones and fruits of *Persoonia longifolia* and *Corymbia haematoxylon*.

Habitat assessment determined moderate to good value foraging habitat for black cockatoo species within the application area, consisting of marri and jarrah woodland with Banksia species in very good condition. The survey area was determined to have a foraging quality score of 8 for the red-tailed black cockatoo and a score of 10 for Carnaby's cockatoo and Baudin's cockatoo. Evidence of foraging activity was recorded across the site, including feeding debris beneath potential habitat trees (Natural Area, 2024).

Roosting habitat

Black cockatoos utilise a wide range of native and non-native trees for roosting across various land-use types. Roost trees are typically tall (greater than 25 metres), with a relatively thick trunk (approximately 1 metre diameter at breast height) and moderate foliage density (Le Roux, 2017).

Available spatial data indicate that 69 roost sites occur within a 12 kilometre radius of the application area, with the closest known roost located approximately 60 metres from the application area. Roosting typically occurs in trees located near water sources and within areas of quality foraging habitat (Commonwealth of Australia, 2022). The application area is surrounded by water sources. Noting this, the tall trees within the application area are likely to provide roosting habitat for all three species of black cockatoos.

Other fauna

The vegetation within the application area is not considered to provide significant habitat for other conservation significant fauna species listed in Appendix A.4. This is due to:

- the linear and narrow nature of the application area, which comprises isolated trees along an existing road corridor;
- the lack of a dense understorey;

- the extent and condition of the vegetation present;
- the availability of extensive areas of adjacent vegetation providing suitable habitat and refuge; and
- the absence of impacts on habitat connectivity as a result of the proposed clearing.

Ecological linkage

The application area forms a small component of Perth regional ecological linkage 139, which connects with Kalamunda National Park linkages 138 and 140. While the application area contributes to local landscape connectivity, the proposed clearing will not sever or substantially impair the function of this ecological linkage. Connectivity will be maintained through the presence of adjacent conservation reserves and surrounding remnant vegetation.

Conclusion

Based on the above assessment, the application area provides important foraging and roosting habitat for black cockatoo species and contributes to ecological connectivity for fauna moving between larger remnants of native vegetation within the local area.

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As such, the loss of 2.03 hectares of native vegetation suitable for black cockatoo foraging habitat constitutes a significant residual impact to fauna values. Accordingly, environmental offsets are required to counterbalance this impact in accordance with the mitigation hierarchy and the *Environmental Offsets Policy*.

Conditions

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

- Avoidance and minimisations measures.
- A fauna specialist to be present to inspect trees and monitor clearing and to take steps as specified in the permit conditions if black cockatoo species are present during the clearing.
- Provision of offset (Section 4) for the significant residual impacts of the loss of 2.03 hectare of native vegetation suitable for black cockatoo foraging habitat.

3.2.2. Biological values (Flora) - Clearing Principles (a) and (c)

Assessment

Flora:

A flora likelihood assessment was undertaken based on the following information:

- the preferred habitat, vegetation types and known distribution of conservation significant flora species recorded within the local area (10 kilometre radius from the application area); and
- site-specific characteristics identified during the field survey.

The flora survey identified three vegetation types within the survey area:

- *Eucalyptus marginata* and *Corymbia calophylla* woodland;
- *Banksia sessilis* shrubland; and
- introduced herbland.

Vegetation condition within the survey area ranged from completely degraded to very good.

Likelihood of conservation significant flora

A total of 96 conservation significant flora species have been recorded within the local area (10 kilometre radius of the application area). A review of site characteristics, soil types and habitat preferences of these species (see Appendix A) identified that the application area may provide suitable habitat for the following taxa:

- *Grevillea olivacea* (olive grevillea);
- *Grevillea thelemanniana* (spider-net grevillea);
- *Stylidium striatum* (fan-leaved triggerplant); and
- *Pimelea rara* (summer pimelea).

Survey results

The Canning Road Environmental Assessment (Natural Area, 2025) and Biological Survey (Natural Area, 2024) identified three conservation significant flora species within the survey area:

- *Grevillea olivacea* (Priority 4);
- *Grevillea thelemanniana* (critically endangered); and
- *Stylidium striatum* (Priority 4).

The flora survey was undertaken in October 2024, which was outside the optimal flowering period for *Pimelea rara* (December to January). However, the survey was sufficient to identify the majority of conservation significant flora taxa predicted by the desktop assessment.

Stylidium striatum (Fan-leaved triggerplant) P4

The flora survey (Natural Area, 2024) recorded 72 *Stylidium striatum* within the survey area with 12 individuals recorded within the proposed clearing and 60 records immediately adjacent to the proposed clearing (one to two metres away). The survey concluded that these are cultivated species and have been planted, therefore not considered conservation significant and are not a naturally occurring population.

Grevillea thelemanniana (Spider Net Grevillea) CR

The desktop assessment identified 56 records within 10 km with two records within a landscaped verge (Natural Area, 2024), both records immediately adjacent to the proposed clearing (less than 0.3 metres away). The Florabase map indicates a community of *Grevillea thelemanniana* close to Ellis Brook Reserve, which is within 10 kilometres of the application area. The survey concluded that these are cultivated species and have been planted, were not within their known distribution.

Grevillea olivacea (Olive Grevillea) P4

The flora survey (Natural Area, 2024) recorded five Grevillea olivacea within a landscaped verge, with two individuals recorded within the proposed clearing and three records immediately adjacent to the proposed clearing (one to four metres away). The survey concluded that these are cultivated species and have been planted, therefore not considered conservation significant. and are not a naturally occurring population.

Pimelea rara P4

The flora survey undertaken by Natural Area (2024) did not record any individuals of *Pimelea rara* within the application area. Although the species was not flowering at the time of the survey, *Pimelea rara* is a perennial shrub with vegetative characteristics that allow identification to at least genus level in the absence of flowers (Natural Area, 2024).

The desktop assessment identified 69 records of *Pimelea rara* within a 10 kilometre radius of the application area. Of these, two records occur within landscaped road verge vegetation immediately adjacent to the proposed clearing footprint, approximately 140 metres and 4 metres from the application area, respectively.

Conclusion

Advice from the Department of Biodiversity, Conservation and Attractions (DBCA) was considered in relation to conservation significant flora within and adjacent to the application area.

DBCA advised that the individuals of *Grevillea olivacea* and *Grevillea thelemanniana* recorded within the application area are likely cultivated. *Grevillea olivacea* is native to the Jurien Bay region, while *G. thelemanniana* is naturally restricted to the vicinity of the Brixton Street Wetlands. DBCA advised that the removal of two cultivated individuals of *G. thelemanniana* is not likely to be significant at a local, regional or species level and that authorisation under section 40 of the *Biodiversity Conservation Act 2016* is not required for cultivated flora (DBCA, 2025).

Stylidium striatum is currently known from four locations within the Jarrah Forest, comprising nine sub-populations. While DBCA does not have an accurate estimate of the total population size, herbarium records indicate the species is locally common, with some records documenting more than 1,000 individuals. The application area occurs within the known distribution of the species, with the nearest record from 2022 located at the junction of Pickering Brook Road and Canning Road, indicating the population extends along the road corridor. DBCA advised that the loss of 12 individuals is unlikely to be significant at a local, regional or species scale. While indirect impacts from the proposal and ongoing road use may affect the remaining 60 individuals recorded in close proximity to the application area and may be locally significant, such impacts are not expected to be significant at a regional or species level (DBCA, 2025).

DBCA advised that the presence of *Pimelea rara* within the application area cannot be discounted. The area has not been surveyed for this species since 1997–1998, and the current survey was undertaken outside the species' flowering period (December to January). The application area overlaps three known sub-populations of *P. rara* (sub-populations 15, 51 and 30), which previously recorded a combined total of 230 individuals. DBCA advised that further survey during the flowering period would provide greater certainty regarding potential impacts. If the species were found to occur and a significant number of individuals were proposed to be taken, the loss of three sub-populations would be considered locally significant. However, as *P. rara* is known from multiple locations throughout the Jarrah Forest, occurs over a broad range extending beyond Mandurah, and is commonly found in large numbers including within conservation tenure, any impacts are unlikely to be significant at a regional or species level (DBCA, 2025).

Based on the above advice and assessment, the proposed clearing is unlikely to result in significant impacts to flora values at a regional or species level. Accordingly, the delegated officer determined that the proposed clearing will not result in a significant residual impact to biological values, and that environmental offsets are not required to address impacts to threatened flora.

Conditions

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

- Avoidance and minimisations measures.
- Weed and dieback management.

3.3. Relevant planning instruments and other matters

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

4 Suitability of offsets

Through the detailed assessment outlined in Section 3.2 above, the Delegated Officer has determined that the following significant residual impacts remain after the application of the avoidance and mitigation measures summarised in Section 3.1, which includes the loss of approximately 2.03 ha of foraging habitat for all three species of black cockatoos, including one potential breeding trees containing suitable hollow.

To counterbalance the above impacts, the applicant proposed an environmental offset consisting of revegetation approximately 6.74 hectares of vegetation in a degraded to good condition with native vegetation that is similar species composition, structure, and density of surrounding native vegetation to provide habitat for black cockatoos' species. These include:

- **Revegetation of 2.83 hectares** within **Jorgensen Park**, 2 Crescent Road, Kalamunda (Reserve 50554), incorporating primary foraging plant species suitable for all three black cockatoo species (revegetation area map attached). The reserve is currently vested for conservation and recreation, and no change to vesting is proposed or required.
- **Rehabilitation of 2.96 hectares** within **Jorgensen Park**, 2 Crescent Road, Kalamunda (Reserve 50554), incorporating primary foraging plant species suitable for all three black cockatoo species (rehabilitation area map attached). No change to vesting is proposed or required.
- **Rehabilitation of 0.73 hectares** within **Ledger Road Reserve – Park, Recreation and Community Centre** (Reserve 27154), incorporating primary foraging plant species suitable for all three black cockatoo species (rehabilitation area map attached). While the current vesting is Park, Recreation and Community Centre and there are no current plans to reclassify the reserve for conservation, the City has noted this may be considered in the future.

The offset will be implemented over a duration of 20 years and conserved in perpetuity. This offset will provide increased connectivity and black cockatoo foraging habitat locally over the medium to long term. Conditions were imposed on the clearing permit to reflect this.

The Delegated Officer considers that this adequately counterbalances the significant residual impacts listed above. The justification for the values used in the offset calculation is provided in Appendix D.

End

Appendix A. Site characteristics

A.1. Site characteristics

Characteristic	Details
Local context	The area proposed to be cleared is a 2.44-hectare linear area of roadside native vegetation in the intensive land use zone of Western Australia. Spatial data indicates the local area (10-kilometre radius from the centre of the area proposed to be cleared) retains approximately 62.95 per cent of the original native vegetation cover (see Appendix A.2)
Ecological linkage	The application area forms a small part of the Perth regional ecological linkage 139, this linkage joins with Kalamunda National Park linkage 138 and 140. The proposed clearing of the application area will not sever or severely impact the function of this ecological linkage.
Conservation areas	No bush forever sites are recorded within the proposed clearing area or directly adjacent to the proposed clearing area.
Vegetation description	The biological survey (Natural Area, 2024) indicates the vegetation within the proposed clearing area consists of three vegetation types, including *Eucalyptus marginata* and *Corymbia calophylla* woodland and, *Banksia sessilis* shrubland, and introduced herbland. The full survey descriptions and maps are available in Appendix E. Mattiske and Havel (1998) have described the mapped vegetation complexes within the application area as Yarragil 1: Open Forest of *Eucalyptus marginata subsp. marginata-Corymbia calophylla* on slopes with mixtures of Eucalyptus patens and *Eucalyptus megacarpa* on the valley floors in humid and subhumid zones. The mapped vegetation type retains approximately 61.09 per cent of the original extent (Government of Western Australia, 2019).
Vegetation condition	An Environmental Impact Assessment provided by the City (Natural Area, 2025), indicates the vegetation within the proposed clearing area is primarily in completely degraded condition with approximately 0.64 hectares recorded in a good or very good condition (Keighery, 1994) condition. The full Keighery (1994) condition rating scale is provided in Appendix C. The full survey descriptions and mapping are available in Appendix E.
Climate and landform	The climate is classified as Mediterranean, with dry, hot summers and cool, wet winters (BOM, 2023). • average rainfall is 759.7 mm per year, with the majority falling between May and August • average maximum temperature ranges from 18 in July to 32 in February • average minimum temperature ranges from 8.1 in July and August to 17.6 in February The application area two landforms including: • Darling Scarp (225Dp): very gentle to moderately inclined concave side slope. Moderately well drained yellow duplex soils and yellow and brown massive earths and gravels. • Darling Scarp (225Dp DW2): very gentle to gently undulating terrain (<10%) with well drained, shallow to moderately deep gravelly brownish sands, overlaying lateritic duricrust.

<table>
<tr><th>Characteristic</th><th>Details</th></tr>
<tr><td>Soil description</td><td>Mapped soil types (Schoknecht et al, 2013) include:
Yarragil 1 Phase: Very gentle to moderately inclined concave sideslopes. Moderately well drained yellow duplex soils and yellow and brown massive earths and gravels. Woodland of E. wandoo, E. marginata, E. Accedens. Casuarina obesa on salt affected areas.
Yarragil 4 Phase: Valley floors with some poorly drained mottled yellow duplex soils and gentle lower slopes with moderately well to well drained loamy and sandy earths, gravels and duplex soils. Low woodland of E. wandoo, E. marginata and Acacia spp.</td></tr>
<tr><td>Land degradation risk</td><td>The degradation risk factors mapped over the application area are detailed below:<table><tr><th></th><th>255DpYG1</th><th>255DpYG4</th><th>255DpDW2</th></tr><tr><td>Wind erosion</td><td>L2</td><td>M1</td><td>H2</td></tr><tr><td>Water erosion</td><td>L2</td><td>L1</td><td>L1</td></tr><tr><td>Salinity risk</td><td>L2</td><td>L1</td><td>L1</td></tr><tr><td>Phosphorous export</td><td>M1</td><td>L2</td><td>L1</td></tr><tr><td>Waterlogging</td><td>M2</td><td>L1</td><td>L1</td></tr><tr><td>Subsurface acidification</td><td>H2</td><td>H2</td><td>H2</td></tr><tr><td>Flooding</td><td>M1</td><td>L1</td><td>L1</td></tr></table>Key<table><tr><td>L1</td><td>Low</td><td><3%</td><td>of the map has a high to extreme risk</td></tr><tr><td>L2</td><td>Low</td><td>3-10%</td><td>of the map has a high to extreme risk</td></tr><tr><td>M1</td><td>Medium</td><td>10-30%</td><td>of the map has a high to extreme risk</td></tr><tr><td>M2</td><td>Medium</td><td>30-50%</td><td>of the map has a high to extreme risk</td></tr><tr><td>H1</td><td>High</td><td>50-70%</td><td>of the map has a high to extreme risk</td></tr><tr><td>H2</td><td>High</td><td>>70%</td><td>of the map has a high to extreme risk</td></tr></table></td></tr>
<tr><td>Waterbodies</td><td>The desktop assessment and review of available aerial imagery indicate that the application area is located approximately 50 metres from a Geomorphic wetland. No direct overlap between the application area and the wetland was identified.</td></tr>
<tr><td>Hydrogeography</td><td>The application area is mapped within the Gingin Groundwater Area Groundwater Areas, proclaimed under the Rights in Water and Irrigation Act 1914 (the RIWI Act). The groundwater salinity of the application area is mapped at 500-1000 total dissolved solids milligrams per litre.</td></tr>
<tr><td>Flora</td><td>A total of 96 conservation significant flora have been recorded within the local area (within 10 km of the site) with four of which are found on the same soil type as the application area.</td></tr>
<tr><td>Ecological communities</td><td>A total of 14 Priority and Threatened Ecological Communities are recorded in the local area (within 10 km of the site) with no threatened or priority ecological communities recorded within the application area. The desktop assessment identified that the closest mapped occurrence of a state or federally listed threatened ecological community is 3.5 km away from the application area.</td></tr>
<tr><td>Fauna</td><td>Within 12 km of the site, there are 32 fauna species considered significant for conservation, with 10 of these recorded in the application area. 69 Carnaby cockatoo roosts have been mapped within a 12 km radius, but no roosts were found inside the application area.</td></tr>
</table>

A.2. Vegetation extent

	Pre-European extent (ha)	Current extent (ha)	Extent remaining (%)	Current extent in all DBCA managed land (ha)	Current proportion (%) of pre-European extent in all DBCA managed land
IBRA bioregion*					
Jarrah Forest	4506660.25	2399838.15	53.25	69.74	37.14
Vegetation complex					
Mattiske vegetation complex 2018	80202.95	64927.06	80.95	59063.57	73.64
Local area					
Swan Coastal Plain 10km radius**	37814.49	23103.92	61.09	-	-

*Government of Western Australia (2018)

**Government of Western Australia (2024)

A.3. Flora analysis table

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

Species name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Suitable soil type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
Grevillea olivacea (Olive Grevillea)	P4	N	N	N	0	5	Y
Grevillea thelemanniana (Spider Net Grevillea)	T/CR	N	N	N	0.002	56	Y
Stylidium striatum (Fan-leaved Triggerplant)	P4	Y	Y	Y	0	72	Y
Pimelea rara (Summer Pimelea)	P4	Y	Y	Y	0.004	69	N

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

A.4. Fauna analysis table

Species name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
Birds						
Calyptorhynchus banksii naso (Forest red-tailed black cockatoo)	VU	Y	Y	0	120	Y
Platycercus icterotis xanthogenys (western rosella-inland)	P4	Y	Y	1.8	1	Y
Zanda baudinii (Baudin's cockatoo)	EN	Y	Y	0	110	Y
Zanda latirostris (Carnaby's cockatoo)	EN	Y	Y	0	604	Y
Mammals						
Bettongia penicillata ogilbyi (woylie, brush-tailed bettong)	CR	Y	Y	3.3	3	Y
Dasyurus geoffroii (chuditch, western quoll)	VU	Y	Y	0.3	57	Y
Isoodon fusciventer (Quenda, southwestern brown bandicoot)	P4	Y	Y	0.3	1832	Y
Notamacropus irma (western brush wallaby)	P4	Y	Y	2.2	15	Y
Phascogale tapoatafa wambenger (south-western brush-tailed phascogale, wambenger)	CD	Y	Y	0.2	53	Y
Setonix brachyurus (quokka)	VU	Y	Y	2.1	4	Y

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

A.5. Ecological community analysis table

Community name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Suitable soil type? [Y/N]	Distance of closest record to application area (km)	Number of known records (total)	Are surveys adequate to identify? [Y, N, N/A]
Central Northern Darling Scarp Granite Shrubland Community	P4	N	N	Y	3.7	4	Y

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

A.6. Land degradation risk table

Risk categories	*Land Unit 1*
Wind erosion	M1: 10-30% of the map unit has a high to extreme hazard
Water erosion	L2: 3-10% of the map unit has a very high to extreme hazard
Salinity	L2: 3-10% of the map unit has a moderate or high hazard or is presently saline
Subsurface Acidification	M2: 30-50% of the map unit has a high susceptibility
Flood risk	L1: <3% of the map unit has a moderate to high hazard
Water logging	L2: 3-10% of the map unit has a moderate to very high to risk
Phosphorus export risk	L2: 3-10% of the map unit has a high to extreme hazard

Appendix B. Assessment against the clearing principles

Assessment against the clearing principles	Variance level	Is further consideration required?
Environmental value: biological values		
Principle (a): *"Native vegetation should not be cleared if it comprises a high level of biodiversity."* Assessment: *The application area contains regionally significant vegetation including significant foraging habitat for black cockatoo species*	At variance	Yes *Refer to Section 3.2.1, above.*
Principle (b): *"Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna."* Assessment: The area proposed to be cleared contains significant foraging habitat for Carnaby's cockatoo, Baudin's cockatoo, and forest red-tailed black cockatoo, as well as suitable nesting tree.	At variance	Yes *Refer to Section 3.2.1, above.*
Principle (c): *"Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora."* Assessment: The area proposed to be cleared may contain number of flora species listed under the BC Act.	Not likely to be at variance	Yes *Refer to Section 3.2.2, above.*
Principle (d): *"Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community."* Assessment: The area proposed to be cleared is not likely to contain species that can indicate a threatened ecological community.	Not likely to be at variance	No
Environmental value: significant remnant vegetation and conservation areas		
Principle (e): *"Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared."* Assessment: The extent of the mapped vegetation type is inconsistent with the national objectives and targets for biodiversity conservation in Australia. The vegetation proposed to be cleared is considered to be part of a significant ecological linkage in the local area.	Not likely to be at variance	No
Principle (h): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area."* Assessment: Given the distance to the nearest conservation area and reserves, and the nature of the proposed clearing. The proposed clearing is	Not likely to be at variance	No

Assessment against the clearing principles	Variance level	Is further consideration required?
not likely to have an impact on the environmental values of adjacent or nearby conservation areas.		
Environmental value: land and water resources		
Principle (f): *"Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland."* Assessment: One nonperennial water course and geomorphic wetland is recorded adjacent to the application area, The method and targeted nature of the proposed clearing is unlikely to impact watercourse and wetland values.	Not likely to be at variance	No
Principle (g): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation."* Assessment: The mapped soils were highly susceptible to subsurface acidification with some soils also highly susceptible to wind erosion and compaction risk. Noting the build-up nature of the surrounding areas and noting clearing is proposed adjacent to an existing road, any land degradation impacts are likely to be short-term.	Not likely to be at variance	No
Principle (i): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water."* Assessment: One nonperennial water course and a geomorphic wetland is recorded adjacent to the application area, The method and targeted nature of the proposed clearing, is unlikely to impact surface or ground water quality.	Not likely to be at variance	No
Principle (j): *"Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding."* Assessment: The mapped soils within the application area have a low risk of waterlogging and flooding.	Not at variance	No

Appendix C. Vegetation condition rating scale

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

Considering its location, the scale below was used to measure the condition of the vegetation proposed to be cleared. This scale has been extracted from Keighery, B.J. (1994) *Bushland Plant Survey: A Guide to Plant Community Survey for the Community*. Wildflower Society of WA (Inc). Nedlands, Western Australia.

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

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

Condition	Description
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and/or grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and/or grazing.
Completely degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

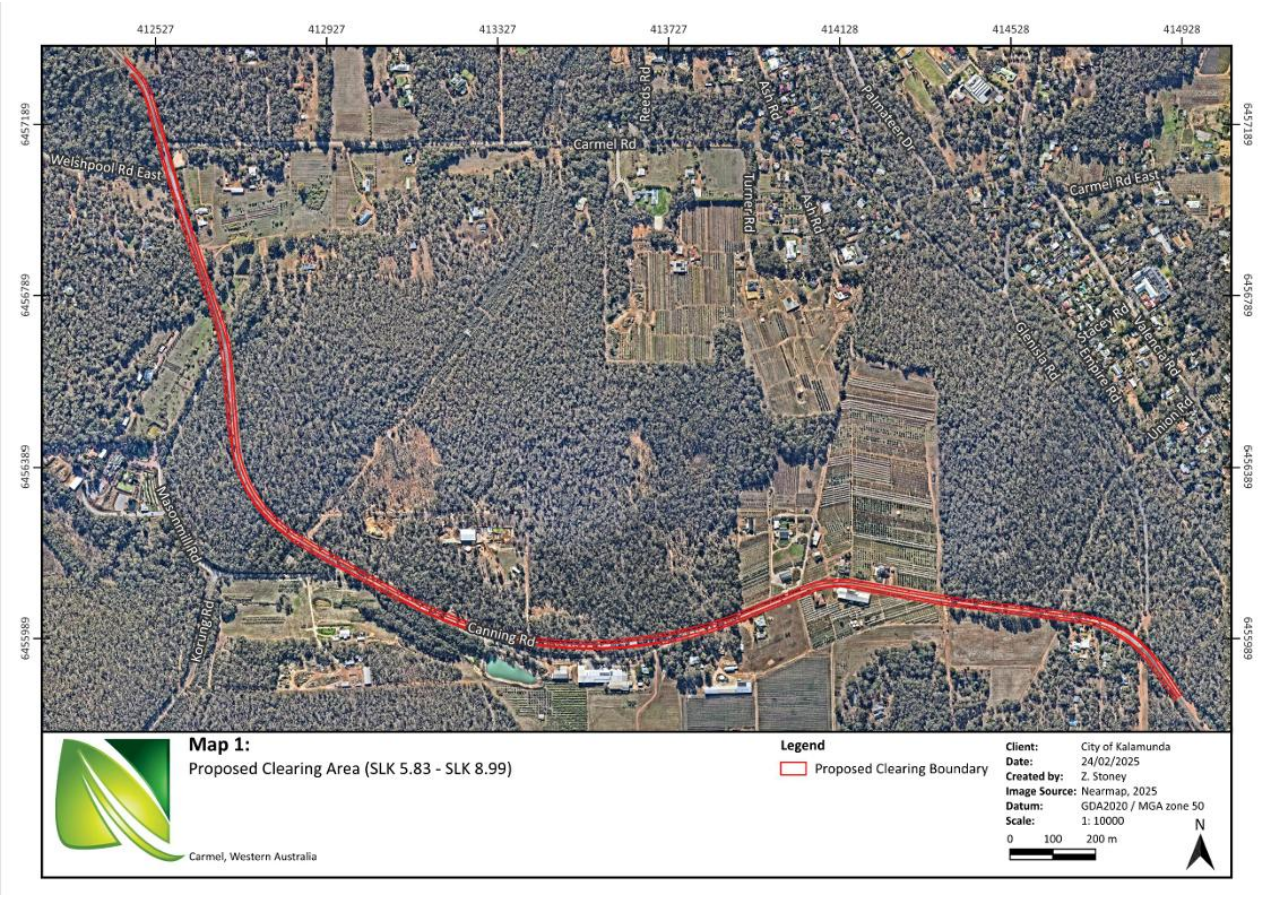
Appendix D. Offset calculator value justification

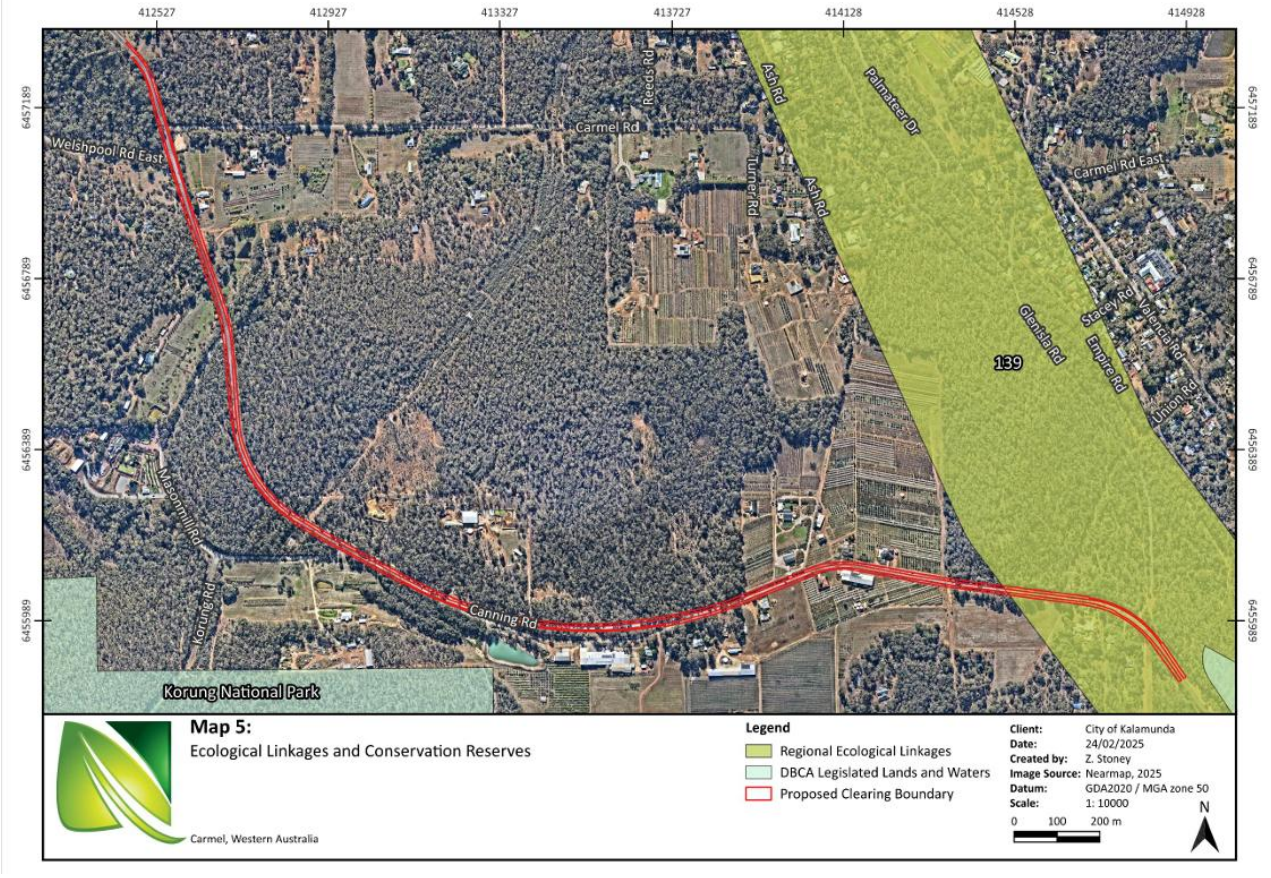
Offset calculation and justification for significant residual impact to black cockatoo

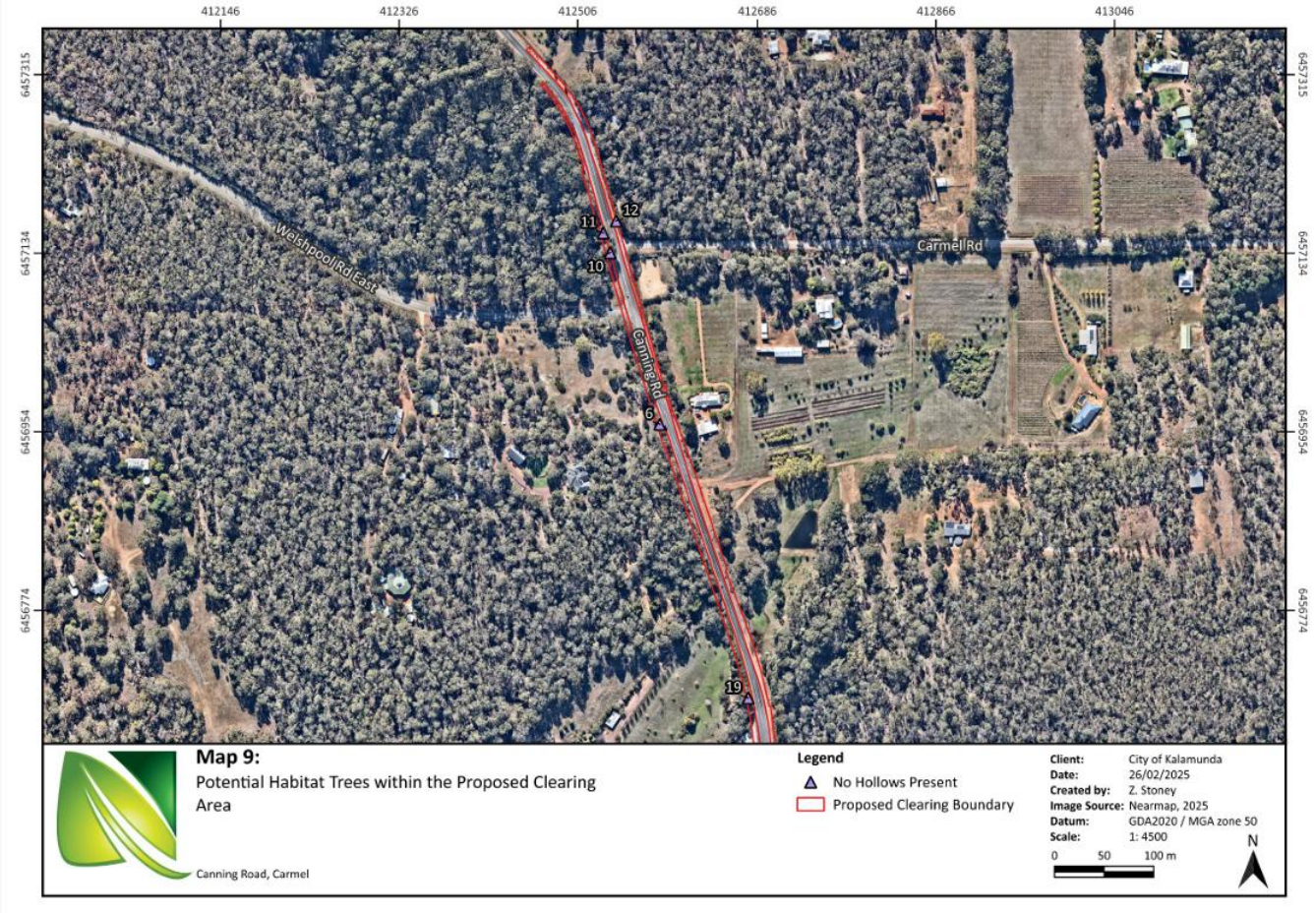
Calculation	Score (Area)	Rationale
Conservation significance		
Description	Black cockatoo foraging habitat	Application area contains significant foraging habitat for Carnaby's cockatoo (*Calyptorhynchus latirostris*), forest redtailed black cockatoo (*Calyptorhynchus banksia* subsp. *naso*) and Baudin's cockatoo (*Calyptorhynchus baudinii*), as well as potential future breeding habitat.
Type of environmental value	Species (flora/fauna)	Supporting foraging habitats for all three species of black cockatoos.
Conservation significance of environmental value	Rare/threatened species - endangered	Carnaby's and Baudin's cockatoo are listed as Endangered and forest-red tailed black cockatoo is listed as Vulnerable under both the EPBC Act and BC Act.
Landscape level value impacted	Yes/No	No
Significant impact		
Description	Black cockatoo foraging habitat	Quality foraging habitat was identified within the application area.
Significant impact (hectares)	2.03	Based on information available from the supporting information the proposed clearing comprises 2.03 ha of suitable foraging habitat for all three species of black cockatoos
Quality (scale)	7	Habitat assessment determined moderate to good value foraging habitat for black cockatoo species within the application area, located in close proximity to known breeding and roosting habitat. Consists of Marri and Jarrah woodland with Banksia species in very good condition. The black cockatoo rating scale provided by the applicant placed the vegetation at an 8 for red tails and 10 for both species of white tails.

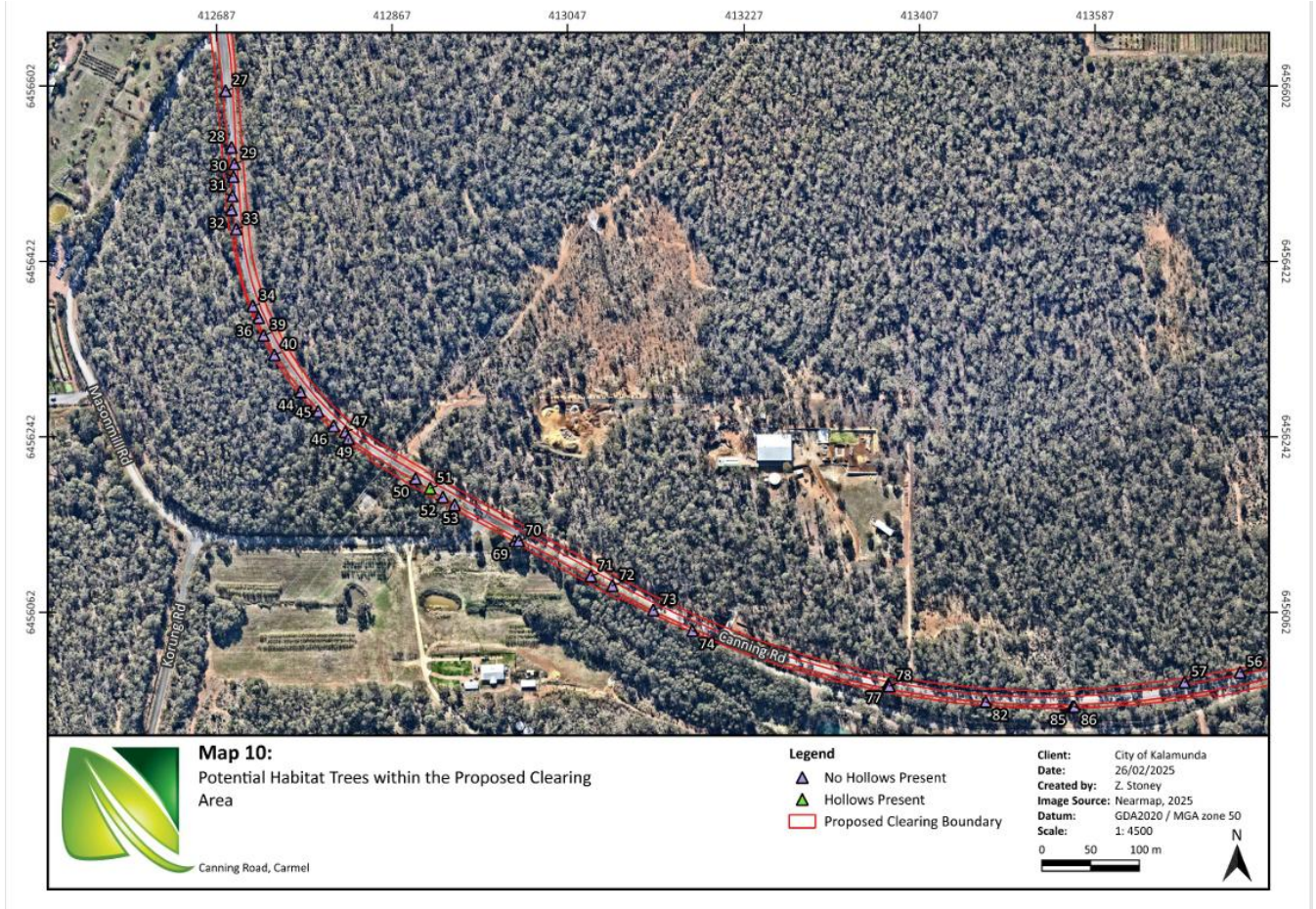
Calculation	Score (Area)	Rationale
Rehabilitation credit		
N/A	N/A	Onsite revegetation will not be taking place.
Offset		
Description	Revegetation and Rehabilitation	2.83 ha of revegetation with no canopy cover, 2.96, and 0.73 ha of infill planting within the areas containing open canopy cover
proposed offset (area in hectares)	6.52	The area required to be revegetated 2.83 ha with 3.69 ha of infilling.
Current quality of offset site	1	Area for revegetation
	3	Area for rehabilitation
Future quality WITHOUT offset	0 and 3	The quality of the offset site is not likely to change without revegetation/rehabilitation.
Future quality WITH offset	6	Assuming revegetation and rehabilitation will be undertaken in accordance with appropriate land preparation measures and completion criteria.
Time until ecological benefit (years)	16	It is assumed that the benefits of revegetation of black cockatoos foraging habitat will be available after 16 years.
Confidence in offset result (%)	80	There is a moderate level of confidence that the offset will achieve the predicted result.
Duration of offset implementation (maximum 20 years)	20	The offset will be implemented in perpetuity. The maximum value of 20 years has been applied.
Time until offset site secured (years)	1	It is assumed that the revegetation and rehabilitation offset site will be secured within 1 years of clearing, when the revegetation and rehabilitation has begun to establish
Risk of future loss WITHOUT offset (%)	10	It is assumed that the proposed offset site is vested for purposed of recreation and conservation and activities conducted on the land will be consistent with the purpose of the reserve
	15	It is assumed that the proposed offset site is vested for purposed of Parks, Recreation and Community Centre and there is some risk of loss associated with activities that can occur within vested area.
Risk of future loss WITH offset (%)	10	The vesting of the park will remain the same.
	15	The changing in reserve vesting from recreation (or similar) to conservation would result in a increased security and will reduce the risk of loss.

Appendix E. Biological survey information excerpts

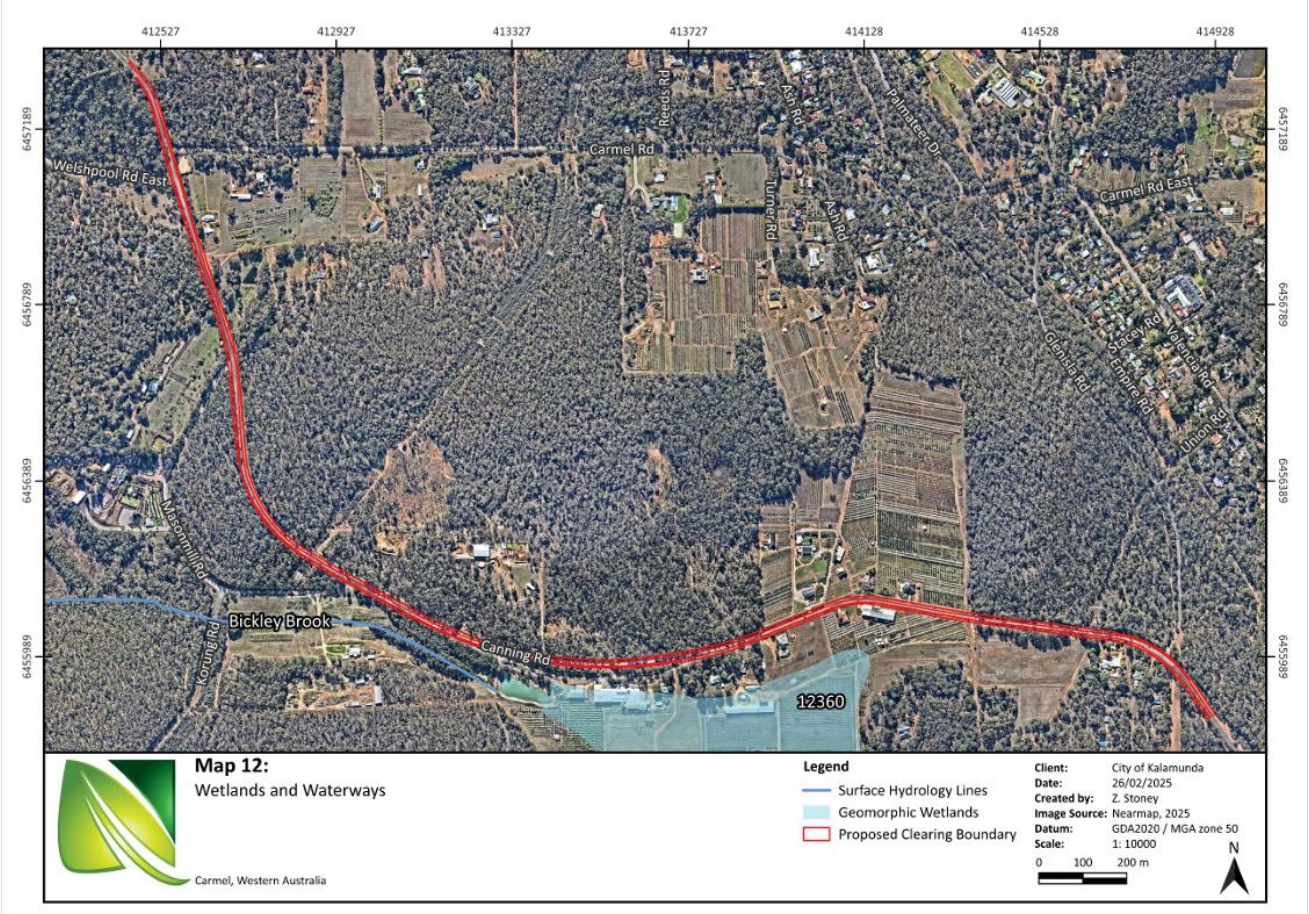





412146
412326
412506
412686
412866
413046
6457315
6457134
6456954
6456774
Welshpool Rd East
Canning Rd
Carmel Rd
11
12
10
6
19
Map 9:
Potential Habitat Trees within the Proposed Clearing Area
Canning Road, Carmel
Legend
No Hollows Present
Proposed Clearing Boundary
Client: City of Kalamunda
Date: 26/02/2025
Created by: Z. Stoney
Image Source: Nearmap, 2025
Datum: GDA2020 / MGA zone 50
Scale: 1: 4500
0 50 100 m
N


412687
412867
413047
413227
413407
413587
6456602
6456422
6456242
6456062
Masonmill Rd
Korung Rd
Canning Rd
27
28
29
30
31
32
33
34
36
39
40
44
45
46
47
49
50
51
52
53
69
70
71
72
73
74
77
78
82
85
86
57
56
Map 10:
Potential Habitat Trees within the Proposed Clearing Area
Canning Road, Carmel
Legend
No Hollows Present
Hollows Present
Proposed Clearing Boundary
Client: City of Kalamunda
Date: 26/02/2025
Created by: Z. Stoney
Image Source: Nearmap, 2025
Datum: GDA2020 / MGA zone 50
Scale: 1: 4500
0 50 100 m
N


413768
413948
414128
414308
414488
414668
414848
6456258
6456078
6455898
6455718
Empire Rd
Glentsla Rd
Canning Rd
56
113
111
110
107
106
100
97
99
Map 11:
Potential Habitat Trees within the Proposed Clearing Area
Canning Road, Carmel
Legend
No Hollows Present
Hollows Present
Proposed Clearing Boundary
Client: City of Kalamunda
Date: 26/02/2025
Created by: Z. Stoney
Image Source: Nearmap, 2025
Datum: GDA2020 / MGA zone 50
Scale: 1: 4500
0 50 100 m
N


412527
412927
413327
413727
414128
414528
414928
6457189
6456789
6456389
6455989
Welshpool Rd East
Carmel Rd
Reeds Rd
Ash Rd
Palmateer Dr
Turner Rd
Carmel Rd East
Glentsla Rd
Stacey Rd
Valerie Rd
Empire Rd
Union Rd
Wasconmill Rd
Koruna Rd
Bickley Brook
Canning Rd
12360
Map 12:
Wetlands and Waterways
Carmel, Western Australia
Legend
Surface Hydrology Lines
Geomorphic Wetlands
Proposed Clearing Boundary
Client: City of Kalamunda
Date: 26/02/2025
Created by: Z. Stoney
Image Source: Nearmap, 2025
Datum: GDA2020 / MGA zone 50
Scale: 1: 10000
0 100 200 m
N

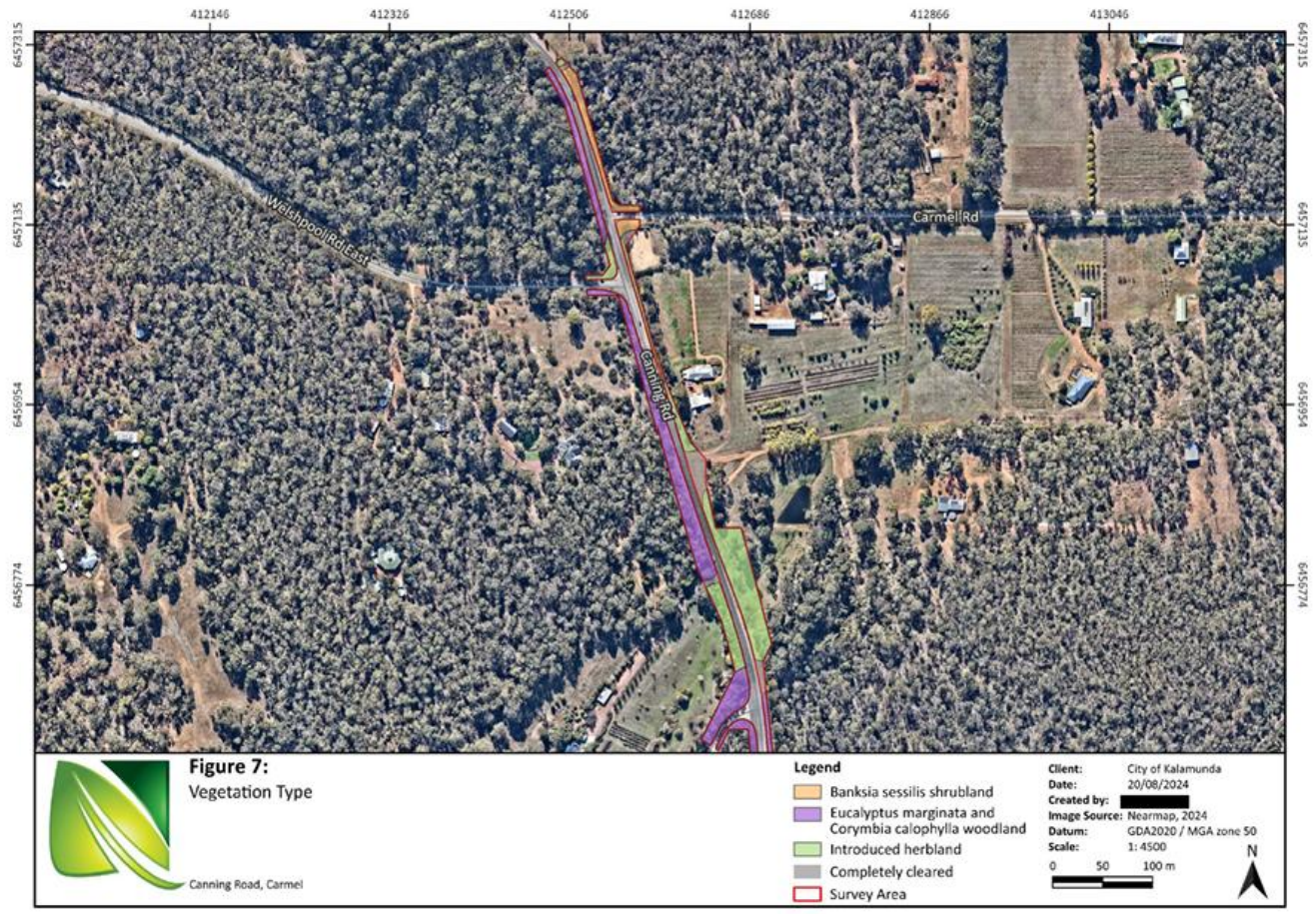


Figure 7:
Vegetation Type
Canning Road, Carmel

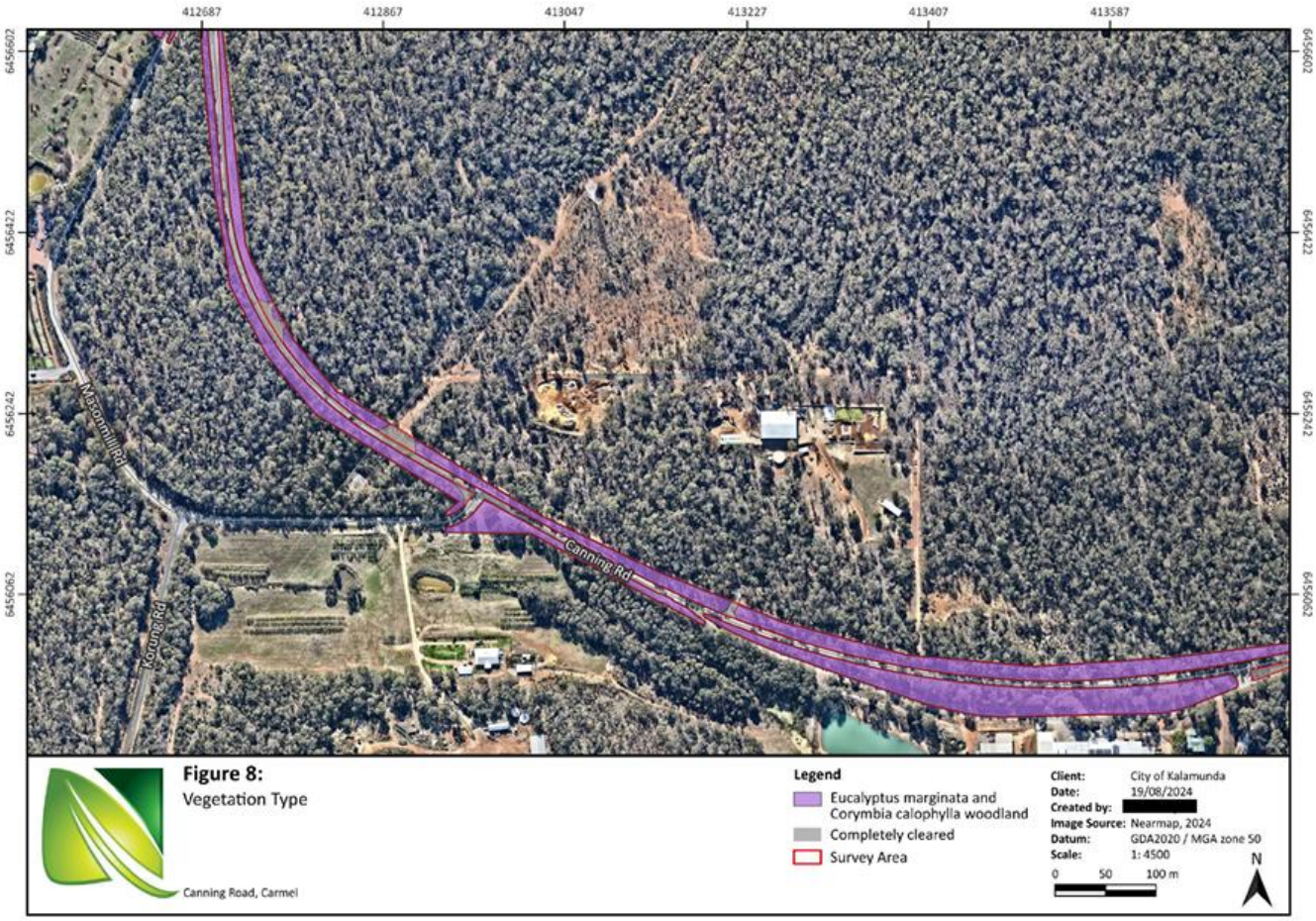


Figure 8:
Vegetation Type
Canning Road, Carmel

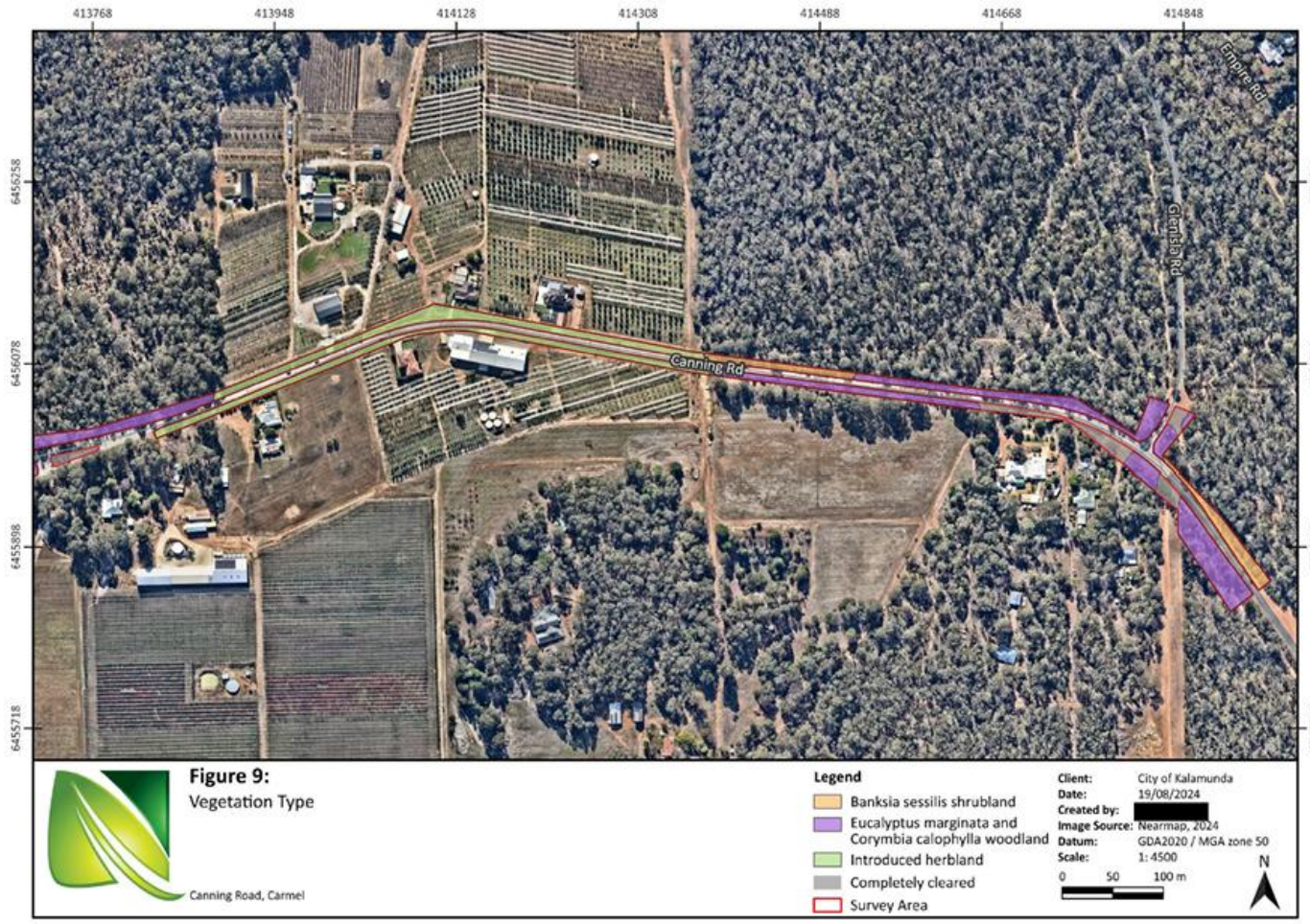


Figure 9:
Vegetation Type

Canning Road, Carmel

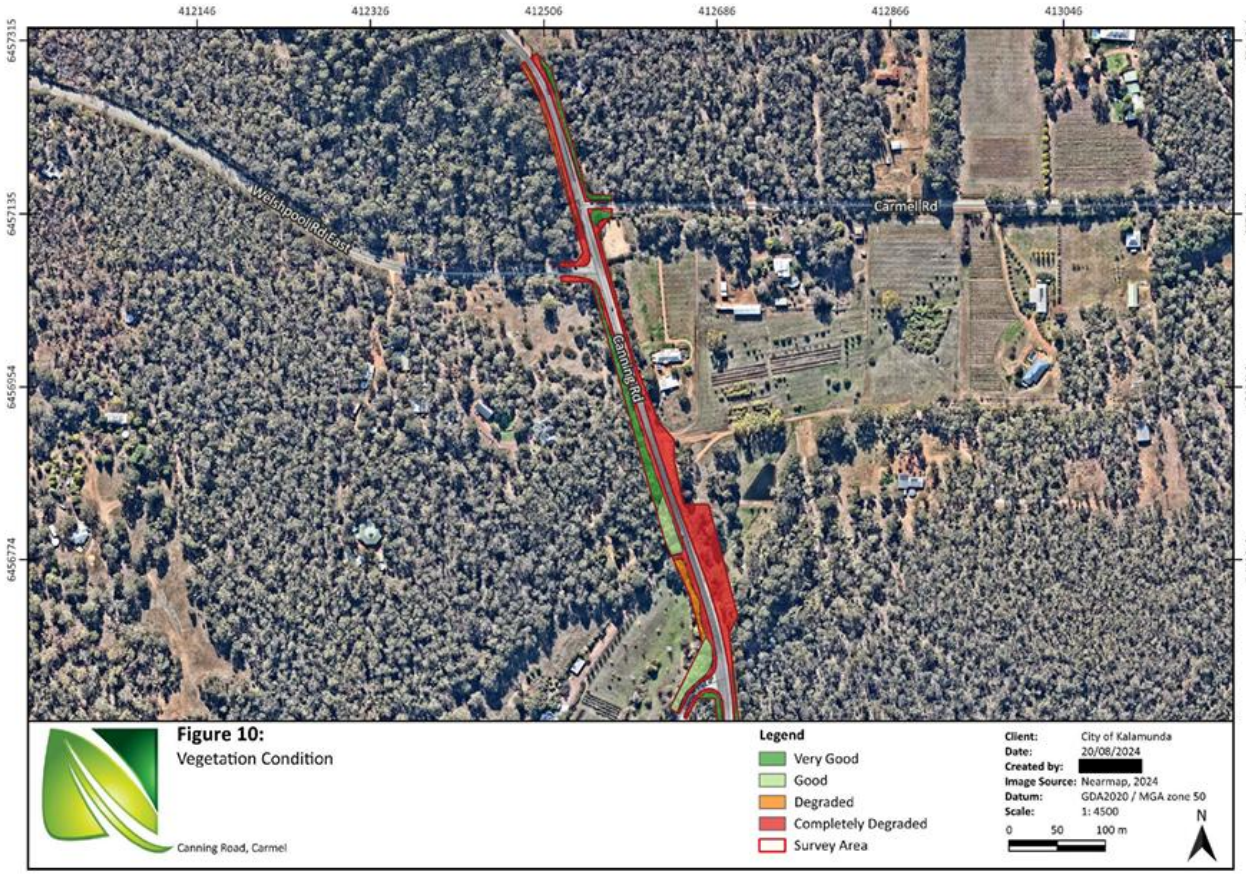


Figure 10:
Vegetation Condition

Canning Road, Carmel

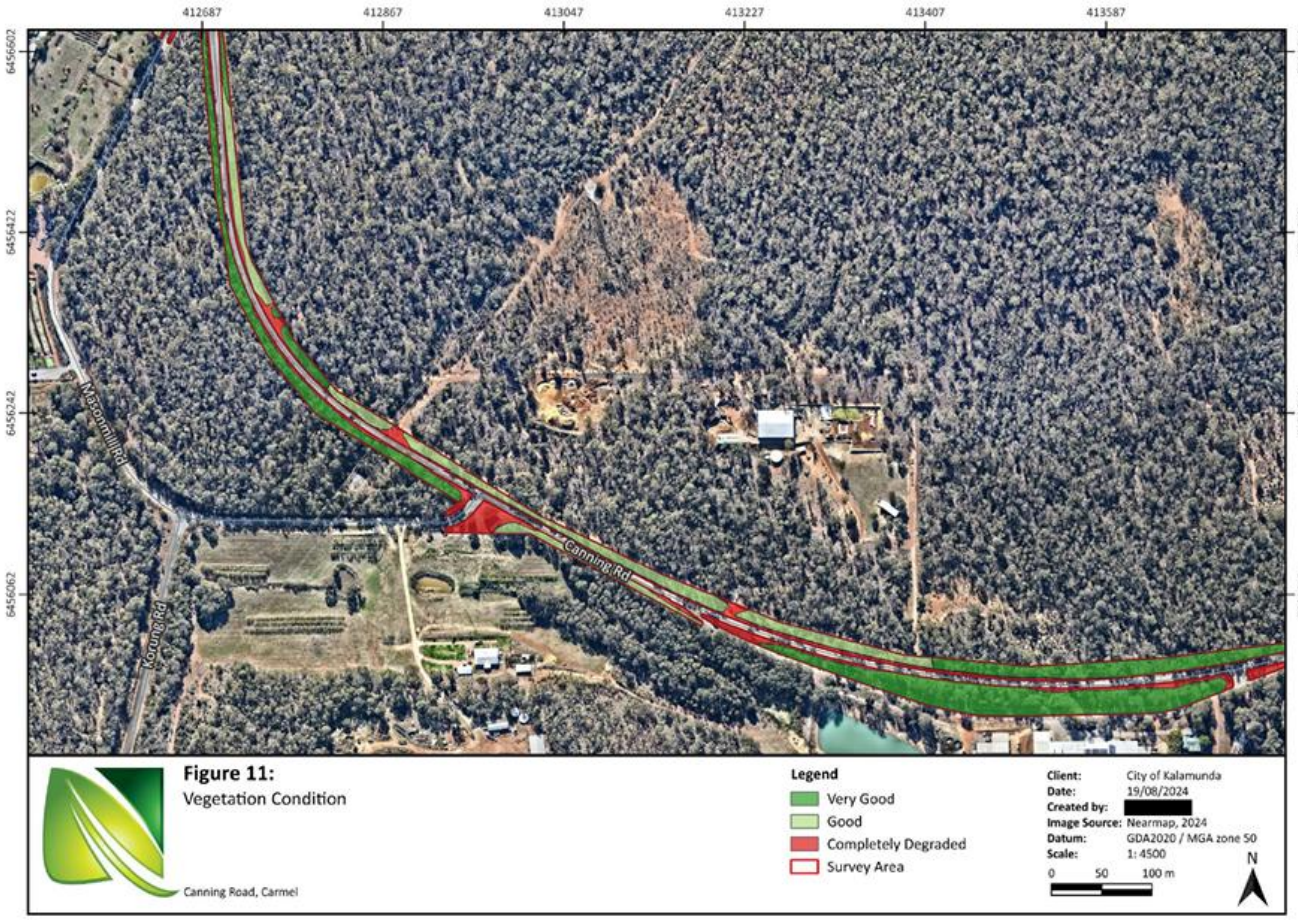


Figure 11:
Vegetation Condition

Canning Road, Carmel

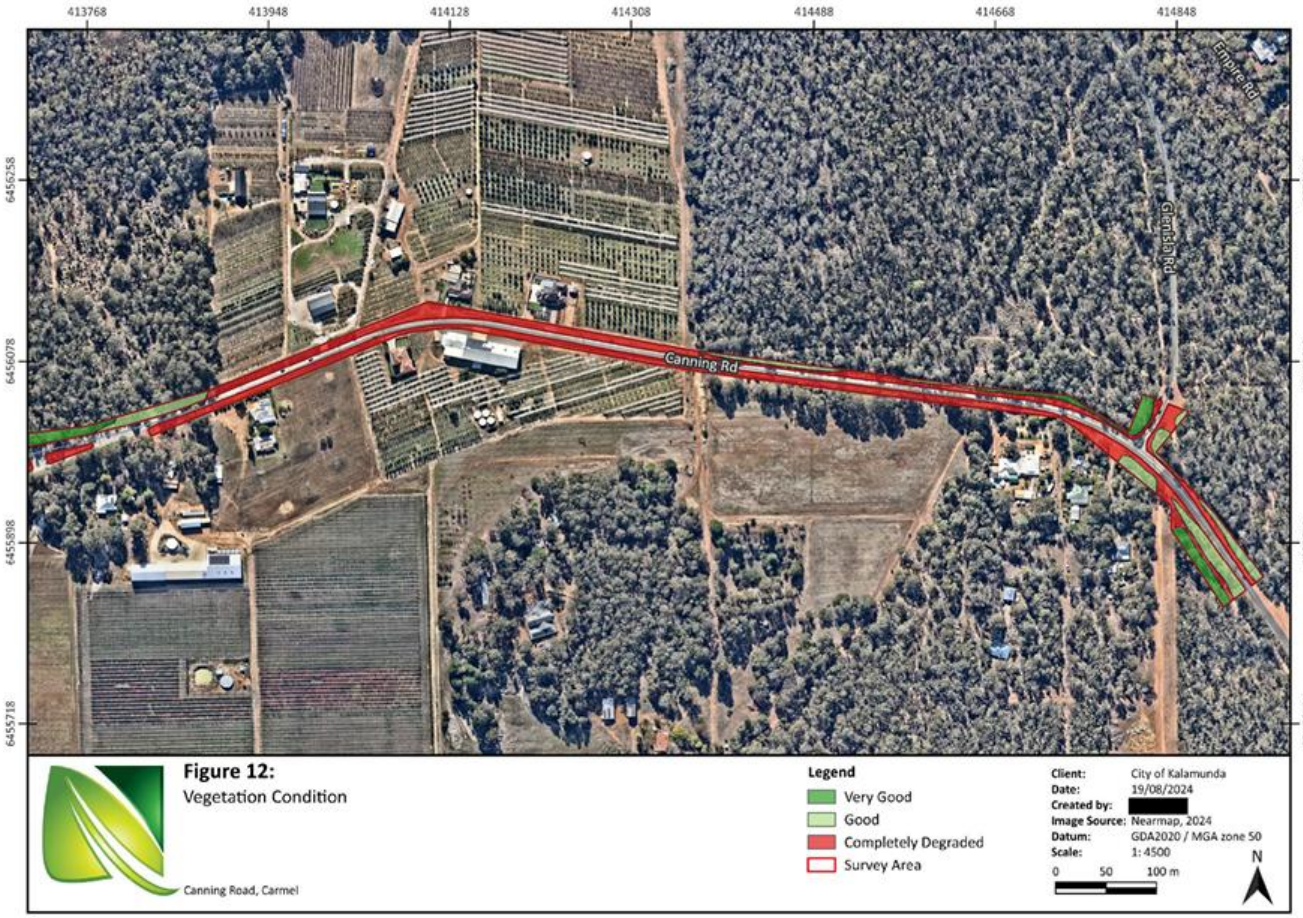


Figure 12:
Vegetation Condition

Canning Road, Carmel

Figure 17:
Foraging Evidence Present Underneath Habitat Trees

Canning Road, Carmel

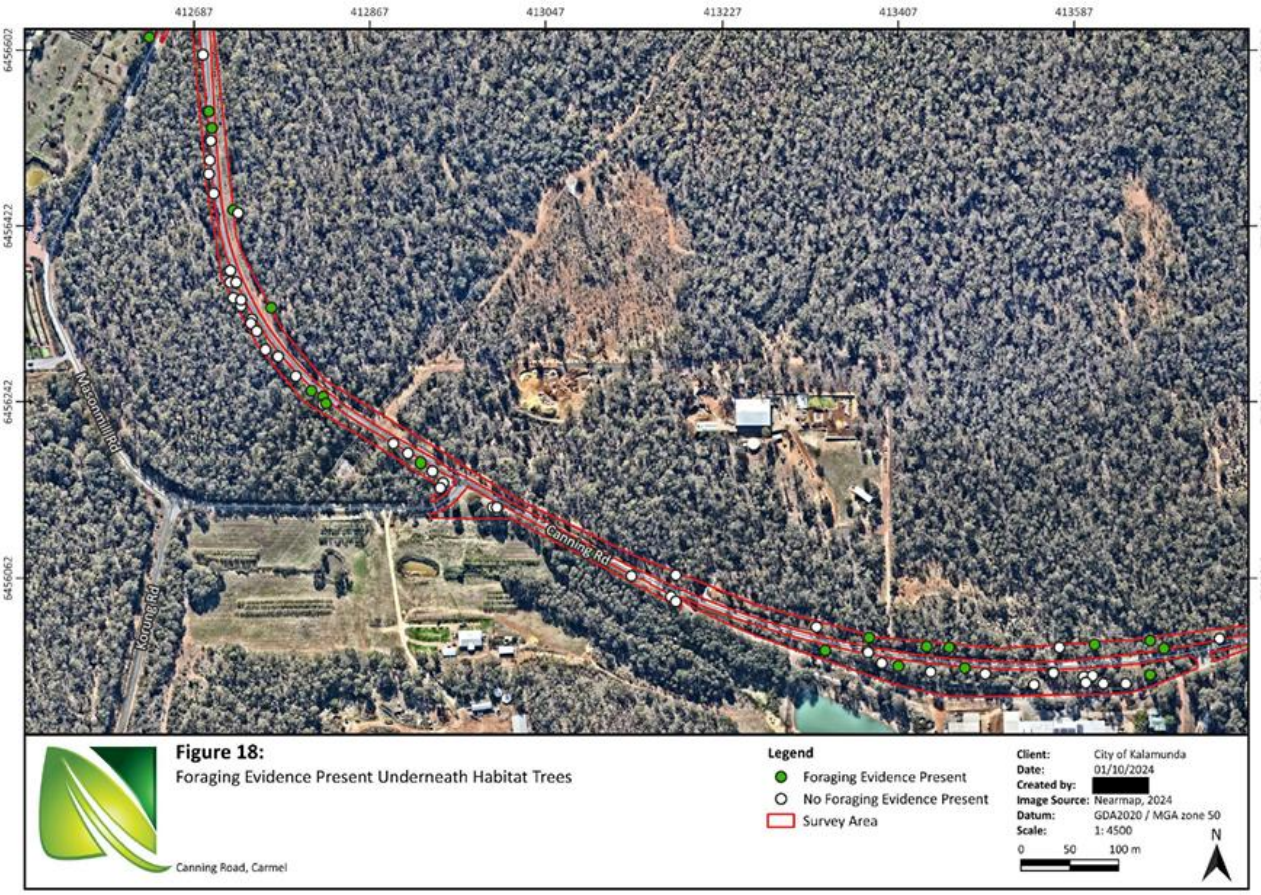


Figure 18:
Foraging Evidence Present Underneath Habitat Trees

Canning Road, Carmel

Figure 19:
Foraging Evidence Present Underneath Habitat Trees

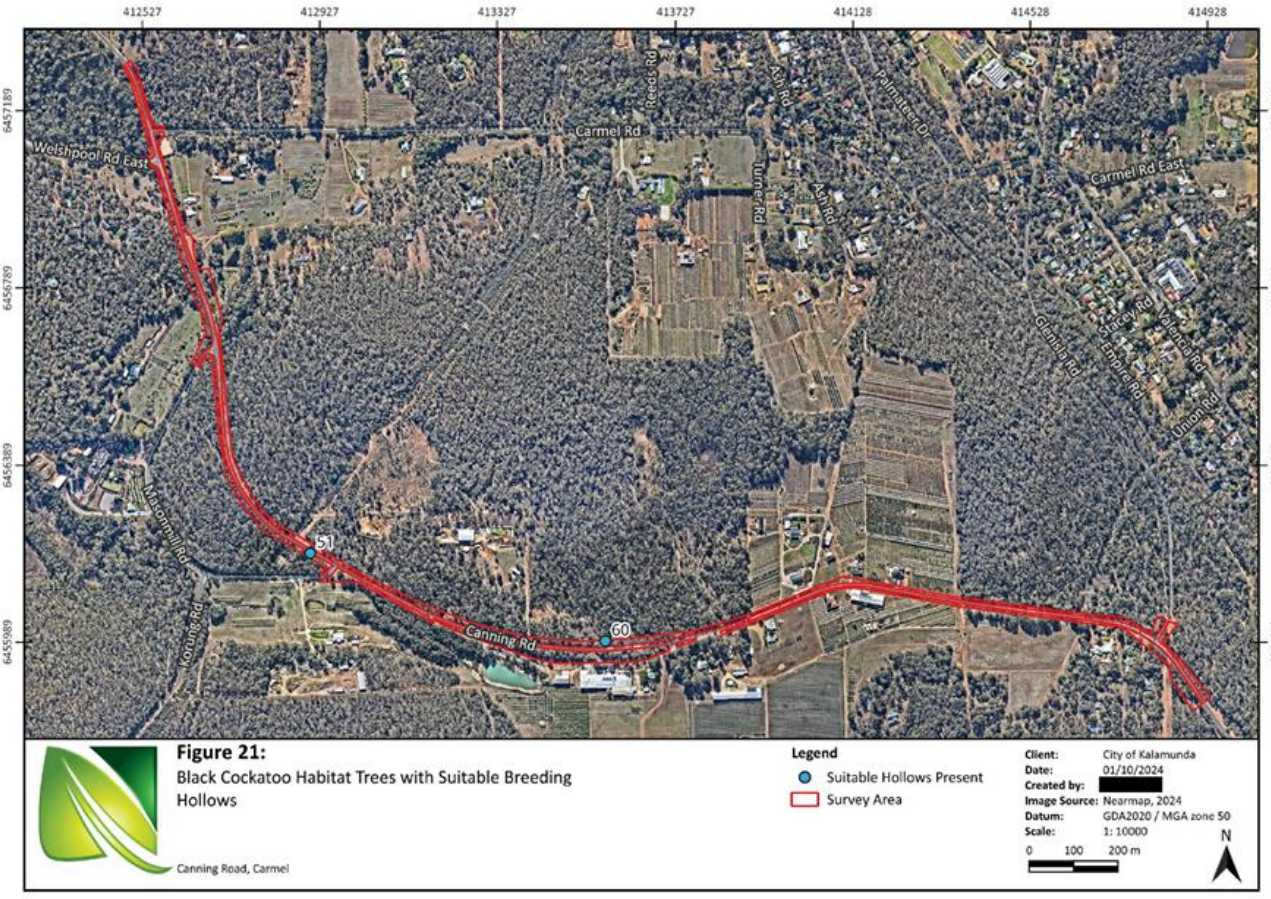


Figure 21:
Black Cockatoo Habitat Trees with Suitable Breeding Hollows

Table 6: Vegetation types within the survey area

Vegetation Type	Description	Photograph
Eucalyptus marginata and *Corymbia calophylla woodland*	A woodland of *Eucalyptus marginata* and *Corymbia calophylla* over *Xanthorrhoea preissii* shrubland over native understorey.	
Banksia sessilis shrubland	A shrubland of *Banksia sessilis* over native and introduced understorey.	
Introduced herbland	A herbland of introduced flora species	

Appendix F. Sources of information

F.1. GIS databases

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

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

Restricted GIS Databases used:

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

F.2. References

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