Part Lot M1326 Muchea East Rd, Muchea

Targeted Black-Cockatoo Survey

Scattered paddock trees in the study area.

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1. Introduction

Midland Brick propose to clear 11.26 hectares of sparsely vegetated pasture on Lot M1326 Muchea East Rd, Muchea, for the purpose of clay extraction. Information on the significance of the study area to threatened black-cockatoos was required to support a clearing permit application. On behalf of the Midland Brick, Land Insights commissioned Western Wildlife to conduct a targeted black-cockatoo survey of the study area. The aim of the survey was to search the study area for habitat that may be used by black-cockatoos for roosting, foraging or breeding.

2. Methods

The survey was undertaken to be consistent with the *Referral Guidelines for Three Threatened Black-Cockatoo* Species (DSEWPaC 2012). The revised guidelines for these species (DEE 2017) are still in draft form and were yet to be in effect at the time of survey.

The 11.26 ha on Lot M1326 Muchea East Rd, Muchea (the 'study area') was visited on the 11th March 2019 by Ms Jenny Wilcox of Western Wildlife. The vegetated parts of the study area were walked, and assessed for the potential to support one or both of the following species:

- Forest Red-tailed Black-Cockatoo (*Calyptorhynchus banksii naso*)
- Carnaby's Black-Cockatoo (*Calyptorhynchus latirostris*)

Baudin's Black-Cockatoo (*Calyptorhynchus baudinii*) is unlikely to occur in the study area, as it is outside of the known distribution of this species according to DSEWPaC (2012). The study area was examined for the presence of vegetation types or plant species known to constitute black-cockatoo foraging habitat and any evidence of foraging such as chewed fruits or flowers.

The diameter at breast height (DBH) was recorded for all Wandoo (*Eucalyptus wandoo*), Jarrah (*Eucayptus marginata*) and/or Marri (*Corymbia calophylla*) trees that had a DBH ≥ 50cm (Marri and Jarrah) or a DBH ≥ 30cm (Wandoo). These trees are considered to have a high potential to have or develop hollows and support the breeding of black-cockatoos in the long term (DSEWPaC 2012). Trees were also examined from the ground for the presence of existing hollows. Hollows were classified as 'large' if they had some potential to support black-cockatoo breeding and 'small' if considered too small for black-cockatoos, but of potential use by other bird species such as parrots and pardalotes. All trees identified were recorded with a GPS location. Any evidence of hollow use (e.g. chewing around the entrance of the hollow) was also recorded, as were the presence of Feral Bees (*Apis mellifera*).

2.1 Limitations

The brief site visit allowed for a survey of the potential habitat values of the study area. The purpose of the survey was not to observe cockatoos. Even in areas where cockatoos are present, they are not necessarily present all day or in every season. Although tree hollows were recorded, these were observed from the ground and the depth of the hollow was unknown. The survey was undertaken by personnel experienced in cockatoo habitat surveys and sufficient time was allowed to visit all trees and vegetated areas in the study area.

3. Background on black-cockatoo species

3.1 Forest Red-tailed Black-Cockatoo

The Forest Red-tailed Black-Cockatoo (*Calyptorhynchus banksii naso*) is listed as Vulnerable under the *Western Australian Biodiversity Conservation Act 2016* and as Vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999*.

The Forest Red-tailed Black-Cockatoo is endemic to the southwest of Western Australia. It occurs in Jarrah, Marri and Karri forests between about Gingin to the north, Albany to the south, and east to Mt Helena, North Bannister and Rocky Gully (Johnstone and Storr 1998). This species also ranges irregularly onto the Swan Coastal Plain to feed on the seeds of the introduced Cape Lilac (*Melia azerdarach*). It is patchily distributed through its range (Johnstone and Storr 1998). The population size is estimated to be 15,000 birds (Johnstone and Kirkby 1999, DoE 2015).

The Forest Red-tailed Black-Cockatoo inhabits the Jarrah, Marri and Karri forests of the southwest, where the annual rainfall is on average 600mm or more. It may also occur in other woodlands, including Tuart, Wandoo and Flooded Gum (*Eucalyptus rudis*). Groups of up to 50 birds roost in trees overnight, dispersing into smaller flocks when ranging out to forage during the day. Roosts may be on roadsides, paddocks or forested areas (Johnstone and Kirkby 1999).

Forest Red-tailed Black Cockatoos feed primarily on the seeds of Marri and Jarrah, but also feed on the seeds of Blackbutt (*Eucalyptus patens*), Forest Sheoak (*Allocasuarina fraseriana*), Snottygobble (*Persoonia longifolia*) and Cape Lilac (Johnstone and Storr 1998).

Unlike Carnaby's Black-Cockatoo, the Forest Red-tailed Black-Cockatoo does not undertake regular seasonal movements. Instead, this species exhibits irregular population fluctuations, perhaps as a response to food availability.

The Forest Red-tailed Black Cockatoo nests in hollows in Karri (*Eucalyptus diversicolor*), Marri, Jarrah, Bullich (*Eucalyptus megacarpa*) and Wandoo (*Eucalyptus wandoo*) (Johnstone and Storr 1998, DSEWPaC 2012). However, they have generally been found to prefer nesting in large (mean DBH of 90cm) Marri trees (Johnstone *et al*. 2013). Eggs are laid in October and November (Johnstone and Storr 1998).

The main threats to the Forest Red-tailed Black-Cockatoo include habitat loss, nest hollow shortage, Feral Honeybees, illegal shooting and fire (DoE 2015).

3.2 Carnaby's Black-Cockatoo

Carnaby's Black-Cockatoo (*Calyptorhynchus latirostris*) is listed as Endangered under the *Western Australian Biodiversity Conservation Act 2016* and as Endangered under the *Environment Protection and Biodiversity Conservation Act 1999*.

Carnaby's Black-Cockatoo is endemic to the southwest of Western Australia, occurring mostly in the wheatbelt but also on the Swan Coastal Plain and wetter southwest (Johnstone and Storr 1998). The population size is estimated to be 40,000 birds, though it may be >10,000 - 60,000 birds (Garnett *et al*. 2011).

Typically, Carnaby's Black-Cockatoo breeds in the wheatbelt region of Western Australia, nesting in large hollows in smooth-barked eucalypts such as the Salmon Gum (*Eucalyptus salmonophloia)* and Wandoo (*Eucalyptus wandoo*). However, it has started breeding in areas further west and south than its traditional breeding range, including areas in the Darling Range and on the Swan Coastal Plain (Johnstone *et. al*. 2005, Johnstone *et al*. 2011). Breeding has been recorded from areas such as Baldivis, Lake Clifton, Yanchep and near Bunbury, with these nests always in Tuart (*Eucalyptus gomphocephala*)(Johnstone *et al*. 2011). Eggs are laid from early July to mid-October (Johnstone and Storr 1998).

Some of the Carnaby's Black-Cockatoo population is resident (particularly in wetter areas) and some of the population moves west and south towards the coast after breeding (Johnstone and Storr 1998). Between February and September, large flocks of birds aggregate in feeding flocks on the northern Swan Coastal Plain (Johnstone *et al*. 2011). These birds are foraging mainly in heaths, *Banksia* woodlands and pine plantations, and can be in large numbers of up to 7,000 birds (Johnstone e*t al*. 2011). On the southern Swan Coastal Plain flocks are smaller (200 – 1,200 birds) and these birds forage on vegetation over a wide area (Johnstone *et al*. 2011).

Vegetation on the Swan Coastal Plain and adjacent escarpment is an important resource, with 8,000 – 10,000 birds estimated to use the area during the non-breeding season (Burnham *et al*. 2010). Carnaby's Black-Cockatoo forage on the seeds of a range of plant species, but are particularly attracted to proteaceous heaths, *Banksia* and *Eucalyptus* woodlands and pine plantations (Johnstone and Storr 1998). On the Swan Coastal Plain, important food plants include *Banksia attenuata*, *B. menziesii*, *B. grandis*, *B. ilicifolia*, *B. sessilis*, *B. prionotes*, Marri (*Corymbia calophylla*) and Jarrah (*Eucalyptus marginata*) (Shah 2006). In breeding areas it is important to have sufficient foraging resources in close proximity to nest hollows.

Carnaby's Black-Cockatoo generally roosts in tall native or introduced eucalypts or pines in riparian habitats or near permanent water (DSEWPaC 2012, DEE 2019). Shah (2006) found that of 16 Carnaby's Black-Cockatoo roost sites she identified on the Swan Coastal Plain, all but one were in *Pinus* or *Eucalyptus* species. In 2010, it was similarly found that at 29 roosts for which the tree species were recorded were in *Pinus* or *Eucalyptus* species (Burnham *et al*. 2010).

The main threats to Carnaby's Black-Cockatoos are habitat loss, competition for nesting hollows, habitat degradation and illegal trade in eggs and nestlings (DSEWPaC 2012). Habitat loss is the primary cause of the decline of this species, with much of its wheatbelt habitat cleared or fragmented, and the clearing of heathland around breeding sites has reduced the foraging opportunities for birds raising young (Cale 2003). Within remnant wheatbelt woodlands there is little regeneration of eucalypts and the remaining hollows are deteriorating (Cale 2003). Carnaby's Black-Cockatoo may face competition for remaining hollows from other bird species and feral bees (*Apis mellifera*) (DSEWPaC 2012, Cale 2003).

4. Results and discussion

Although neither Carnaby's Black-Cockatoo nor the Forest Red-tailed Black-Cockatoo were recorded during the site visit, the study area is within the range of both species, according to distribution maps published by DSEWPaC (2012).

Carnaby's Black-Cockatoo is highly likely to occur in the area, at least as a foraging seasonal visitor, and potentially for breeding. The Forest Red-tailed Black-Cockatoo is on the edge of its range in the area, so may be a non-breeding visitor.

4.1 Black-cockatoo foraging habitat

The vegetation consists scattered eucalypts, mainly Wandoo, Marri and Jarrah, over pasture (Plates 1 and 2). All of the trees along the fenceline were planted by the current landholder, and these include Marri and exotic eucalypts. The trees in the paddock areas appear to be remnant or regrowth woodland. The native understorey is absent, and the entire area is currently used to pasture horses and/or sheep.

All the native vegetation in the study area is likely to be black-cockatoo foraging habitat, as the canopy of Wandoo, Jarrah and Marri trees provides seeds for foraging black-cockatoos. Evidence of black-cockatoo foraging (chewed Marri nuts) was observed during the site visit (Plate 3), and Carnaby's Black-Cockatoo is likely to forage in the study area. The Forest Red-tailed Black Cockatoo potentially forages in the area throughout the year, whenever Marri and Jarrah fruits are available.

The areas of pasture have negligible value as black-cockatoo foraging habitat, but even scattered trees within the pasture have foraging value.

Plate 1. Wandoo trees in the study area.

Plate 2. Marri trees in the study area.

Plate 3. Foraging signs of black-cockatoos.

4.2 Black-cockatoo roosting habitat

Black-cockatoos are known to roost in pines and tall eucalypts, often near riparian environments (DSEWPaC 2012, Shah 2006, Burnham *et al*. 2010). The study area includes tall eucalypts, but no riparian environments. The study area is not known to be a roost site, though birds are known to roost nearby at Muchea (about 4km west), near Barracca Nature Reserve (about 7km north) and off Morely Rd, Chittering (about 5km south-east).

No evidence of roosting by black-cockatoos (e.g. feathers, scats) was recorded during the site visit, however, some black-cockatoos are seasonal migrants and may not be present in an area year-round. Birds may roost nearby when foraging in the area, then move on. It is unlikely that the study area is of particular significance for roosting black-cockatoos, though birds may roost there on occasion.

4.3 Black-cockatoo breeding habitat

The study area is within the known or predicted breeding range of Carnaby's Black-Cockatoo, as modelled by DSEWPaC (2012). This species is known to breed in the Shire of Chittering, with breeding recorded within 12km of the study area. On a nearby survey along the Great Northern Highway from Muchea to Chittering, nine trees were identified that appeared to have been used by Carnaby's Black-Cockatoo for breeding (Phoenix Environmental Sciences 2015). Several of these were about 3.5km north of the study area, near the corner of Reserve Rd and the Great Northern Highway.

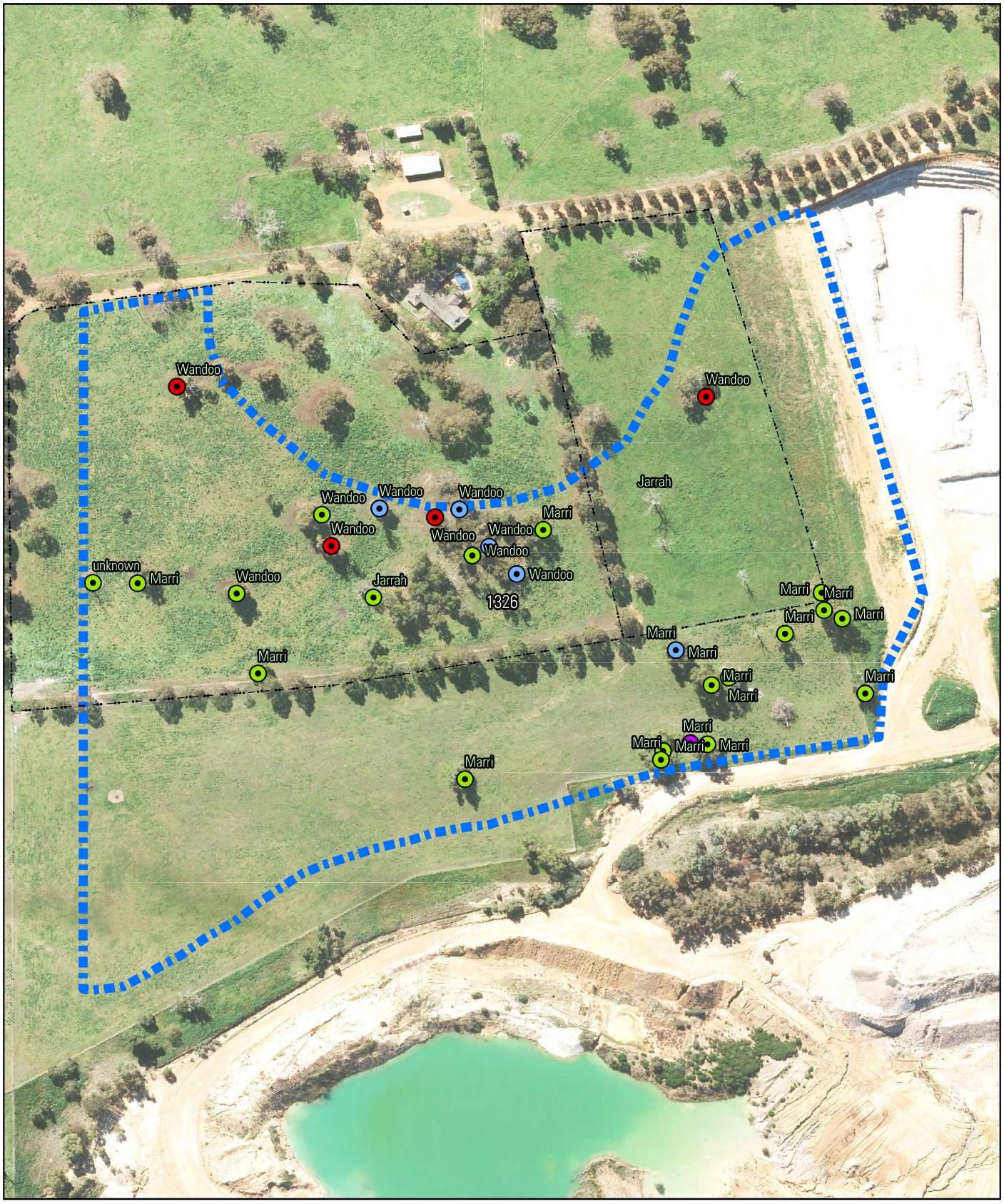
The Forest Red-tailed Black-Cockatoo is on the edge of its range in the area and is unlikely to breed in the area. This species favours large old Marri trees for breeding and the Marri trees present, although they have a DBH >50cm, are relatively small, often branching low, and none were recorded as containing potential hollows.

In the study area, Carnaby's Black-cockatoo may potentially use Wandoo, Jarrah or Marri trees for breeding, and though they favour smooth-barked eucalypts, they may potentially use any suitably-sized hollow (Johnstone and Storr 1998, DSEWPaC 2012). Overall, 30 trees were identified that demonstrated a DBH ≥ 50cm (in Jarrah or Marri) or DBH ≥ 30cm (Wandoo) (Figure 1). The habitat trees recorded were Wandoo (11 trees) Marri (17 trees), Jarrah (2 trees) and a single dead tree of unknown species (Appendix 1).

Four of these trees (three Wandoo and one Jarrah) appeared to have at least one large existing hollow potentially suitable for black-cockatoos (e.g. Plate 4), though one of these contained Feral Bees. There were potential small hollows present in five of the trees and the remaining 19 had a DBH of at least 30cm, but no visible hollows. Some of the trees also branch low on the trunk, so while the DBH may be sufficiently large, the width of the upper branches is much smaller, requiring a long time for large hollows to form.

It should be noted that 'potential' hollows may not be very deep, or actually suitable for use by black-cockatoos, though this is not possible to ascertain from the ground. Conversely, some hollows are not visible from the ground, hence the approach of recording trees with a DBH ≥ 30cm (for Wandoo) or ≥ 50cm (for Jarrah and Marri).

The presence of trees with a DBH of 30cm (for Wandoo) or 50cm (for Jarrah and Marri) or more indicates that the study area is potential breeding habitat for both the Forest Red-tailed Black-Cockatoo and Carnaby's Black-Cockatoo. Although no evidence of breeding was found (e.g. chewed hollow entrances), Carnaby's Black-Cockatoo potentially nests in the area currently, or may nest in the area in the future. The Forest Red-tailed Black-Cockatoo is unlikely to nest in the area as it favours Marri-dominated forests and woodlands and the study area is outside the core range of this species.



Base data provided by SLIP.

Cadastre
Site Boundary
Fenceline
Approved Clay Extraction Area

Hollows
Evidence of Cockatoo foraging
Large hollows
Small hollows
No visible hollows

landinsights

N

0 25 50 75 100 m

Scale: 1:3,000

PROPOSED CLEARING PERMIT - TREE HOLLOWS
Lot 1326 WANDENA ROAD, MUCHEA
(MUCHEA 3)
MIDLAND BRICK

Plate 4. Large Wandoo trees with potential hollows.

5. Summary and Conclusions

The Forest Red-tailed Black-Cockatoo and Carnaby's Black-Cockatoo potentially occur in the study area, though the Forest Red-tailed Black-Cockatoo is on the edge of its range in the area.

All the native trees in the study area, particularly the canopy of Wandoo, Jarrah and Marri, is foraging habitat for these species and foraging signs were recorded. The proposed clearing will result in the loss of about 1.2 ha of foraging habitat.

The study area is potential breeding habitat for Carnaby's Black-Cockatoo, as it contains tree species known to be used by this bird for breeding, and it is within the known breeding range of this species. No evidence of nesting was noted during the site visit, though potential nesting hollows appeared to be present and nesting hollows are not always visible from a ground level inspection. The Forest Red-tailed Black-Cockatoo is unlikely to breed in the area, as the study area is on the edge of its range, this species favours Marri-dominated forests or woodlands, and the Marri tree present in the study area are generally small.

6. References

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Appendix 1. Records of habitat trees in the study area.

Name	Tree species	DBH (cm)	Hollows	Comments	Tree Status	Latitude	Logitude
Foraging signs	Marri	N/A	N/A	Signs on Marri nuts		-31.585	116.017
Me01	Wandoo	120	Large hollows	Tree Martin nesting	Live	-31.583	116.014
Me02	unknown	80	No visible hollows		Dead	-31.584	116.014
Me04	Wandoo	105	No visible hollows	Tree splits low, upper branches small	Live	-31.584	116.015
Me05	Marri	85	No visible hollows	Tree splits low, upper branches small	Live	-31.585	116.015
Me06	Jarrah	70	No visible hollows		Live	-31.584	116.015
Me07	Wandoo	110	Large hollows		Live	-31.584	116.015
Me08	Wandoo	60	No visible hollows		Live	-31.584	116.015
Me09	Wandoo	80	Small hollows		Live	-31.584	116.015
Me10	Wandoo	80	Large hollow		Live	-31.584	116.016
Me11	Wandoo	70	Small hollows		Live	-31.584	116.016
Me12	Wandoo	65	Small hollows		Live	-31.584	116.016
Me13	Wandoo	35	No visible hollows		Live	-31.584	116.016
Me14	Wandoo	50	Small hollows		Live	-31.584	116.016
Me15	Marri	90	No visible hollows		Live	-31.584	116.016
Me16	Jarrah	80	Large hollow	Low/short tree	Live	-31.584	116.017
Me17	Marri	80	No visible hollows		Live	-31.585	116.017
Me18	Marri	90	Small hollows		Live	-31.585	116.017
Me19	Marri	55	No visible hollows		Live	-31.585	116.017
Me20	Marri	90	No visible hollows		Live	-31.585	116.017
Me21	Marri	75	No visible hollows		Live	-31.585	116.017
Me22	Marri	75	No visible hollows		Live	-31.584	116.018
Me23	Marri	125	No visible hollows		Live	-31.585	116.017
Me24	Marri	80	No visible hollows	Tree splits low, upper branches small	Live	-31.585	116.017
Me25	Marri	70	No visible hollows		Live	-31.585	116.017
Me26	Marri	55	No visible hollows		Live	-31.585	116.016
Me27	Marri	60	No visible hollows		Live	-31.584	116.018
Me28	Wandoo	120	Large hollows	Feral Bees present	Live	-31.583	116.017
Me03	Marri	60	No visible hollows	Tree splits low, upper branches small	Live	-31.584	116.014
Me29	Marri	80	No visible hollows		Live	-31.584	116.018
Me30	Marri	80	No visible hollows		Live	-31.585	116.018

APPENDIX G

BLACK COCKATOO HOLLOW INSPECTION