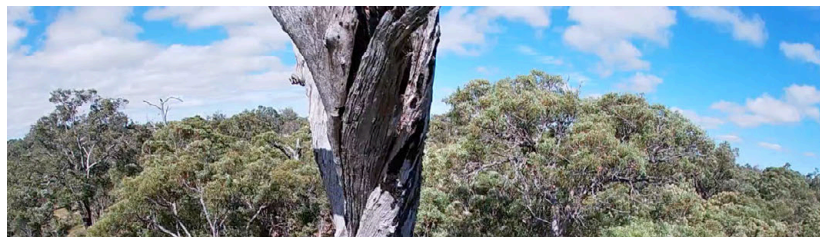


# **Targeted Fauna Survey: Lot 1 Ducane Rd, Lot 156 Marchetti Rd, & Lot 167 Jilley Rd**





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# Targeted Fauna Survey: Lot 1 Ducane Rd, Lot 156 Marchetti Rd & Lot 167 Jilley Rd

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# 1.0 Introduction

## 1.1 Background and Scope

Main Roads Western Australia (Main Roads) are considering the potential purchase of three lots in Gelorup as environmental offsets for the Bunbury Outer Ring Road (BORR) development. These properties are Lot 1 Ducane Road (40.47 ha), Lot 156 Marchetti Road (15.04 ha), and Lot 167 Jilley Road (66.93 ha) and are referred to as the study area (location shown in Figure 1.1). Figure 1.1 also shows the location of the proposed BORR Southern Section development envelope.

Biota Environmental Sciences (Biota) was commissioned to assess the study area as habitat for five significant fauna species with the potential to occur:

- the Western Ringtail Possum (*Pseudocheirus occidentalis*; Schedule 1, Critically Endangered);
- the South-western Brush-tailed Phascogale (*Phascogale tapoatafa wambenger*; Conservation Dependant); and
- three Black Cockatoo species:
  - Carnaby's Cockatoo (*Calyptorhynchus latirostris*; Schedule 2, Endangered),
  - Baudin's Cockatoo (*Calyptorhynchus baudinii*; Schedule 2, Endangered), and
  - Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksia naso*; Schedule 3, Vulnerable).

The scope of the work included:

- identification and mapping of Black Cockatoo habitat trees (those with Diameter at Breast Height (DBH) >50 cm), particularly those that may contain hollows suitable for breeding;
- a targeted survey for Western Ringtail Possum and South-western Brush-tailed Phascogale, using 20 m wide strip-search techniques; and
- reporting of the survey findings, including discussion of habitat significance and linkages.

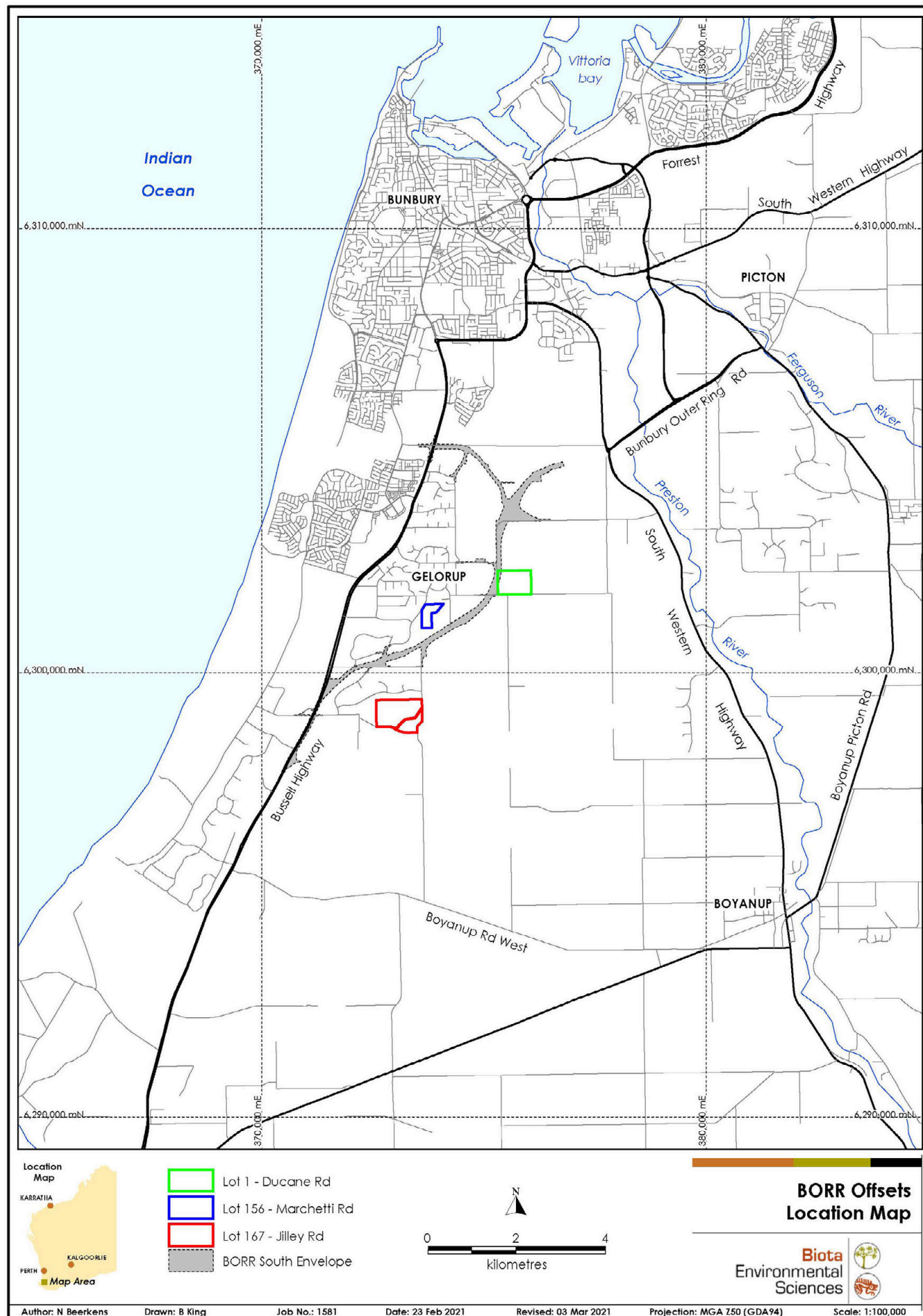


Figure 1.1: Location of the study areas in relation to the BORR South envelope.

## 2.0 Methods

### 2.1 Timing and Team

The field survey was conducted in one phase in February 2021. This survey consisted of strip searches for Western Ringtail Possum at all Lots, and Black Cockatoo habitat assessment at Lot 156 and 167. Lot 1 was assessed for Black Cockatoo habitat by Biota in both October 2018 and January 2019 (Biota 2019), and as such, the site was not reassessed during the February 2021 survey. The Lot 1 Black Cockatoo habitat assessment results from Biota 2019 are re-reported here.

Dates and personnel conducting the work are detailed in Table 2.1, along with weather data obtained from the nearest Bureau of Meteorology<sup>1</sup> weather station (Bunbury, station no. 009965). Conditions during the survey were mild, with no significant rainfall.

**Table 2.1: Summary of survey timing, personnel, and weather conditions.**

	Date	Methods	Personnel	Minimum Temperature (°C)	Maximum Temperature (°C)	Rainfall (mm)
Previous Survey (Biota 2019)	02/10/18	Black Cockatoo habitat assessment (Lot 1)	Victoria Ford, Joshua Keen, Brandon King & Jacinta King	9.6	21.8	0.0
	29/01/19			11.2	28.3	0.0
	Average/Total			10.4	25.1	0.0
Current Survey	17/02/21	Western Ringtail Possum strip searches (Lot 1 & Lot 156)	Nathan Beerkens, Joshua Keen, Peter Kendrick & Roy Teale	15.1	25.7	0.0
	18/02/21	Black Cockatoo habitat assessment (Lot 156)		15.7	24.1	1.0
	25/02/21	Western Ringtail Possum strip searches and Black Cockatoo habitat assessment (Lot 167)	Nathan Beerkens & Joshua Keen	16.9	30.0	0
	26/02/21			18.4	27.8	0
	Average/Total			16.5	26.9	1.0

## 2.2 Black Cockatoos

### 2.2.1 Nomenclature

Black Cockatoo naming conventions in this report follow those of the Main Roads Technical Guidance *Draft Factsheet: Protecting Black Cockatoos - Baudin's Cockatoo, Carnaby's Cockatoo and Forest Red-tailed Black Cockatoo* (Main Roads Western Australia 2021).

### 2.2.2 Breeding Habitat Assessment

The field assessment aimed to determine whether suitable breeding habitat for Black Cockatoos was present within the study area. The Commonwealth Revised *draft referral guideline for three black cockatoo species* (DSEWPaC 2012) defines breeding habitat as those “species of trees known to support breeding within the range of the species, which either have a suitable nest hollow or are of a suitable diameter at breast height to develop a nest hollow” (being greater than 50 cm DBH for most Eucalypts, or 30 cm in the case of Wandoo and Salmon Gum).

<sup>1</sup> [www.bom.gov.au](http://www.bom.gov.au)

The study area was divided into transects 20 m wide. At Lots 1 and 156, each of these transects were walked by a zoologist and all trees within each transect were assessed. At Lot 167, to accommodate the large area to be surveyed, adjacent transects were combined into strips 40 m wide. A total of eight strips were assessed, spaced 80 m apart. An estimate of the number of habitat trees (DBH > 50 cm) within Lot 167 was calculated by multiplying the number of recorded habitat trees per hectare within the surveyed transects of each habitat type by the total number of hectares of each habitat type. Survey effort maps are presented in Appendix 1.

All individual trees of species with the potential to form hollows (primarily Flooded Gum, Marri, Jarrah and Tuart) and with sufficient diameter to be considered breeding habitat trees (i.e. DBH > 50 cm) were recorded using a GPS accurate to within 1.5 m. The following parameters were recorded:

1. DBH (diameter at breast height; approximately 1.3 m above the ground);
2. tree height;
3. tree species;
4. height above the ground of each hollow; and
5. the estimated size of entry of the hollow.

Trees were assigned categories according to the draft Main Roads assessment criteria (Main Roads Western Australia 2021; Table 2.2). Trees assessed from ground level as belonging to categories 1 – 4 were considered as warranting further investigation, as described in Section 2.2.2.1.

**Table 2.2: Suitable DBH Tree Categories for Black Cockatoos (Main Roads Western Australia 2021).**

Category Number	Tree Category	Description
1	Suitable DBH Tree with Known Nesting Hollows – hollows where breeding has been recorded (i.e. bird/s observed in hollow) or there is evidence of previous use (i.e. hollow contains feathers or eggs).	Trees with a 500 mm DBH (or 300 mm for Wandoo or Salmon Gum) where breeding has been recorded (i.e. bird/s observed in hollow) or there is evidence of previous use (i.e. hollow contains Black Cockatoo feathers or eggs).
2	Suitable DBH Tree with a potential suitably sized hollow with signs of use (not confirmed)	Trees with a 500 mm DBH (or 300 mm for Wandoo or Salmon Gum) that appears to have a suitably sized entry and there are signs of use, however internal dimensions have not been assessed. Although signs of use may be present, the signs, such as chew marks, could be from prospecting Black Cockatoos or other birds such as Galahs, which leave very distinctive marks on hollow and trees (impacted potentially suitably sized hollows should be confirmed by competent observer).
3	Suitable DBH Tree with a with a suitably sized hollow with no signs of use (confirmed).	Trees with a 500 mm DBH (or 300 mm for Wandoo or Salmon Gum) that appears to have a suitably sized entry, with internal dimensions assessed. Category usually based on follow up hollow assessment with pole camera or drone. Although appears to be suitably sized, there is no evidence of Black Cockatoo use.
4	Suitable DBH Tree with a potential suitably sized hollow with no signs of use (not confirmed).	Trees with a 500 mm DBH (or 300 mm for Wandoo or Salmon Gum) that appears to have a suitably sized entry, however internal dimensions have not been assessed. Category usually based on ground observation only.
5	Suitable DBH Tree with unsuitable hollows	Trees with a 500 mm DBH (or 300 mm for Wandoo or Salmon Gum) that has a hollow entry greater than 50 mm that is not suitable due to the size of its entry, internal dimensions, height off ground.
6	Suitable DBH Tree without hollows	Trees with a 500 mm DBH (or 300 mm for Wandoo or Salmon Gum) that do not have visible hollows (hollows with an entry opening below 50 mm not considered a hollow).



### 2.2.2.1 Breeding Hollow Assessment

For observed hollows considered likely to belong to categories 1 – 4, a follow-up examination was conducted using video camera mounted on an extendable pole. This allowed for more accurate assessment of hollow suitability and evidence of Black Cockatoo use.

Prior to filming, the side of the tree was raked with a branch to encourage Black Cockatoos to emerge, if present. This provides an indication of hollow use and reduces the risk of Black Cockatoo disturbance from the camera. Camera footage was live streamed onto a mobile phone to ensure that usable footage was obtained.

Photographs of each hollow were also taken as a visual reference and to aid future identification of each specific tree. Hollows were assessed in detail to determine whether they represented suitable hollows and/or if they showed any signs of current or previous use by Black Cockatoos (e.g. chew marks around hollow entrance).

Breeding suitability of examined hollows was then reassessed against the criteria detailed in Table 2.2.

### 2.2.2.2 Foraging Habitat Assessment

The study area lies within the known foraging distribution of all three of Western Australia's species of Black Cockatoo (Johnstone and Storr 1998), and the field assessment aimed to determine whether suitable foraging habitat for any of those species was present. Foraging habitat is defined as areas including plants of species known to support foraging within the range of each Black Cockatoo species. Marri and Jarrah woodlands are particularly important to Baudin's Cockatoo and the Forest Red-tailed Black Cockatoo, while proteaceous heaths (i.e. shrublands dominated by *Banksia*, *Hakea* and *Grevillea* species) are also important to Carnaby's Cockatoo (DSEWPac 2012), as are introduced pines, particularly on the Swan Coastal Plain (Johnstone and Kirkby 2011).

In defining the quality of Black Cockatoo foraging habitat, the criteria detailed in both the referral guideline (DSEWPac 2012) and the draft revised referral guideline (DotEE 2017) were incorporated. These include foraging plant composition and density, the provision of continuity to wider areas of foraging habitat, foraging evidence, proximity to known roosting areas and proximity to known breeding areas.

### 2.2.2.3 Roosting Habitat Assessment

Roosting habitat is defined as areas within the range of each Black Cockatoo species which provide Black Cockatoos with shelter during the heat of the day and safe resting places at night (DotEE 2017). Black Cockatoos favour roost sites within close access to both water and foraging habitat (DotEE 2017). They use a variety of vegetation species as roost sites, particularly tall species of *Eucalyptus* and Marri (DotEE 2017). Evidence of Black Cockatoo roosting was searched for opportunistically, and previously-known roost sites were identified from DBCA (<https://naturemap.dpaw.wa.gov.au>) and Bird-data database (<http://www.birddata.birdlife.org.au>) searches.

## 2.3 Western Ringtail Possum

To guide the field assessment, search strips 20 m wide were identified for the study area using aerial photography. These were pre-loaded onto map imagery and displayed on tablets with high-accuracy GPS generally to within 1.5 m. The 20 m width of the strips was chosen based on modelling of distance data (Biota 2020) accumulated from over 3,000 detections of Western Ringtail Possums; this indicates a probability of detection of greater than 90% up to a distance of 10 m from a transect. It is therefore assumed that the number of Western Ringtail Possums counted when using this approach approximates the real abundance within the study area, although it is likely to represent a slight underestimate.

A zoologist walked each 20 m-wide strip spotlighting for Western Ringtail Possums using a high-powered head torch. Survey effort, as indicated by tracklogs of these transects, is shown in

Appendix 1. Surveys commenced half an hour after sunset and were completed by 2 AM. In areas of scattered trees (e.g. paddocks and road reserves), searching of individual trees was undertaken in favour of searching a strip. In addition to the Western Ringtail Possum, observations of South-western Brush-tailed Phascogale and Common Brushtail Possum (*Trichosurus vulpecula*) were also recorded.

The following information was recorded with every Western Ringtail Possum, South-western Brush-tailed Phascogale, and Common Brushtail Possum observation:

- species;
- observer;
- animal location using a high-accuracy GPS, taken while standing directly beneath;
- time;
- number of individuals;
- age class: subadult independent, adult, adult with young at heel, or female with young on back;
- cue: seen (eyeshine), seen (no eyeshine), or heard;
- drey or hollow at observation point; and
- dominant habitat at observation point.

Densities of Western Ringtail Possum and Common Brushtail Possum (individuals / ha) were calculated for each Lot within the study area, using the area of available suitable habitat at that site. Available habitat for both species was judged as being habitat which contains vegetation with a canopy > 2 m height.



## 3.0 Results

### 3.1 Habitats

The following fauna habitat types were identified within the study areas:

1. *Banksia* woodland with Jarrah/Marri (31.2 ha): Dominates the western half of Lot 167, Jilley Rd. Distinguished from 'Marri/Eucalyptus woodland' by the high density presence of *Banksia* (Plate 3.1).
2. Marri/Eucalyptus woodland (63.4 ha): The dominant habitat type in Lot 1 and Lot 156, and well represented in Lot 167. Dominated by Marri and Jarrah, these habitats also contained Peppermint and *Banksia*. Distinguished from '*Banksia* woodland with Jarrah/Marri' by lower densities of *Banksia* (Plate 3.2).
3. *Melaleuca* woodland (14.9 ha): Occurs in each Lot within the study area. Seasonally inundated, these areas are characterised by *Melaleuca* over heath and sedges, with varying densities of Flooded Gum (Plate 3.3).
4. Highly Modified/Cleared (12.9 ha): Occurs in each Lot within the study area. These areas have been significantly degraded by human activities, including settlements and farm paddocks (Plate 3.4).

The extent of each habitat type at each Lot within the study area is presented in Table 3.1, and mapped in Figure 3.1 - Figure 3.3.

'*Banksia* woodland with Jarrah/Marri', 'Marri/Eucalyptus woodland', and '*Melaleuca* woodland' are considered to be suitable habitats for Western Ringtail Possum. '*Banksia* woodland with Jarrah/Marri', and 'Marri/Eucalyptus woodland' are considered to be optimal habitat for South-western Brush-tailed Phascogale, however they may also utilise '*Melaleuca* woodland', particularly in areas with relatively high densities of *Eucalyptus* (Rhind 1996).

**Table 3.1: Extent of each fauna habitat within each study area.**

Study area	Area (ha) and Proportion of Study Area				Total Area (ha)
	<i>Banksia</i> woodland with Jarrah / Marri	Marri / Eucalyptus woodland	<i>Melaleuca</i> woodland	Heavily Modified / Cleared	
Lot 1, Ducane Rd	0	37.7 (93.4 %)	1.9 (4.6 %)	0.8 (2.0 %)	40.5
Lot 156, Marchetti Rd	0	9.7 (64.5 %)	4.5 (29.9 %)	0.8 (5.6 %)	15.0
Lot 167, Jilley Rd	31.2 (46.6 %)	16.0 (23.9 %)	8.5 (12.6 %)	11.3 (16.8 %)	66.9



**Plate 3.1: *Banksia* woodland with Jarrah/Marri**



**Plate 3.2: Marri/Eucalyptus woodland**



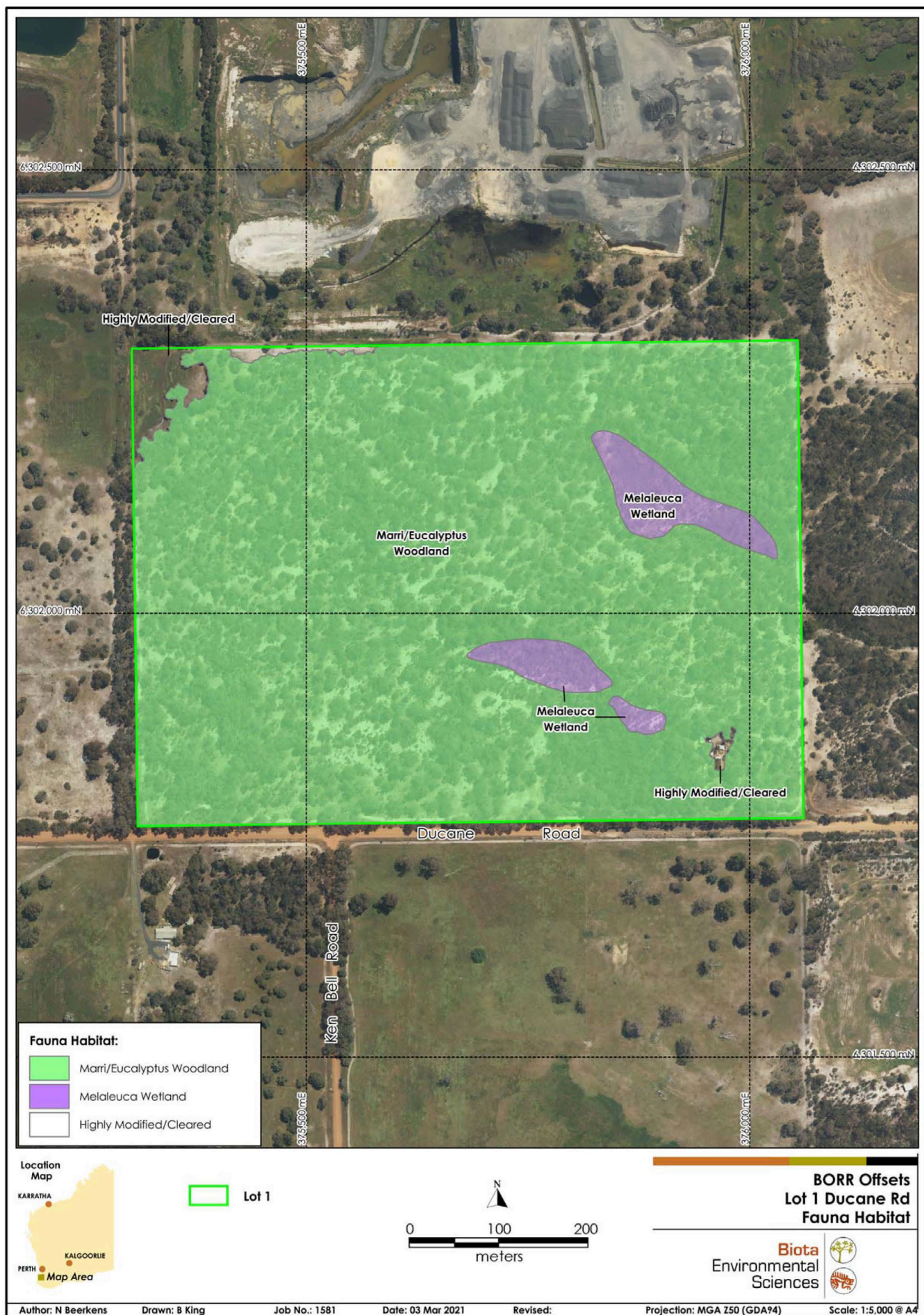
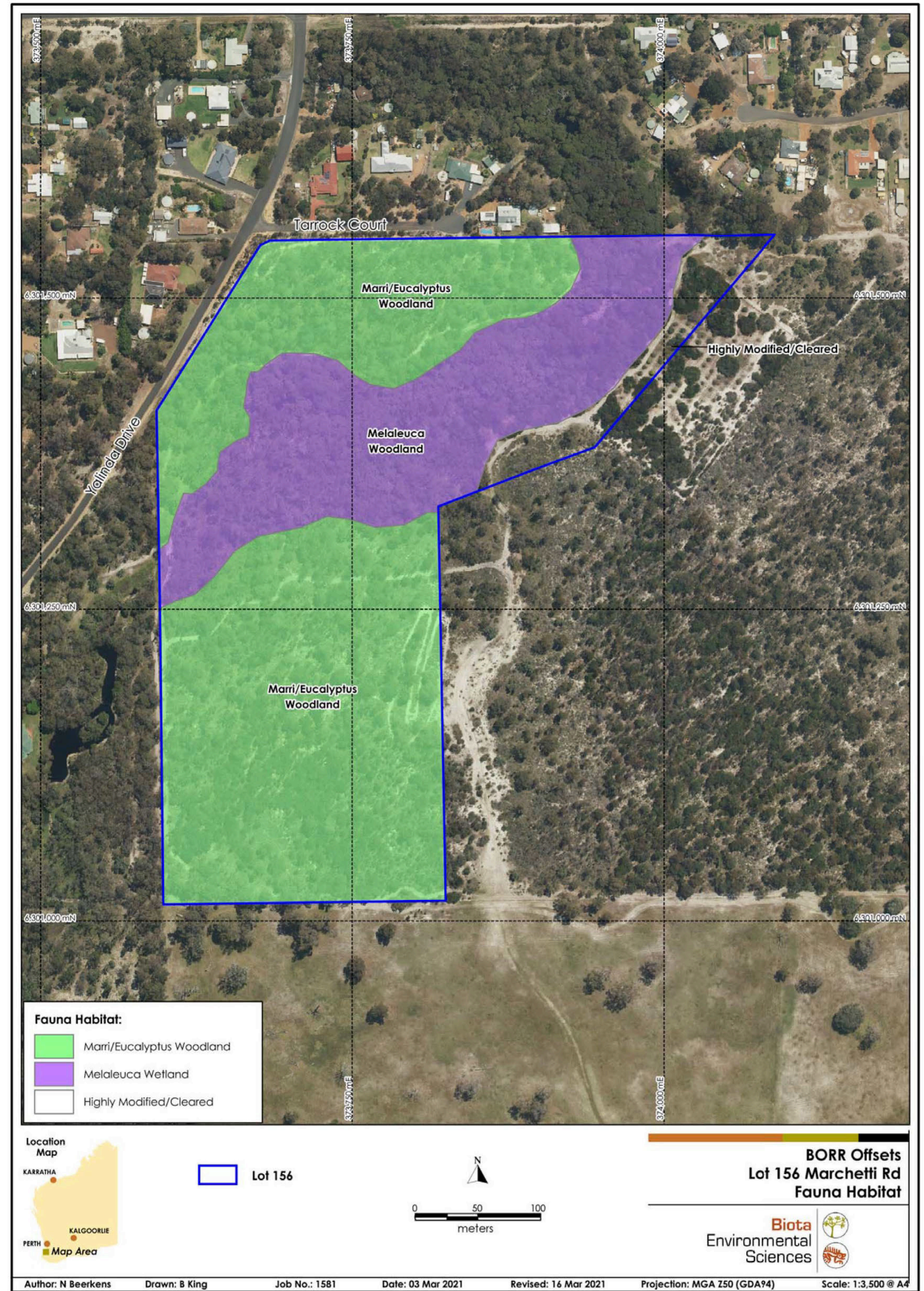


Figure 3.1: Fauna habitats of the Lot 1 Ducane Rd study area.







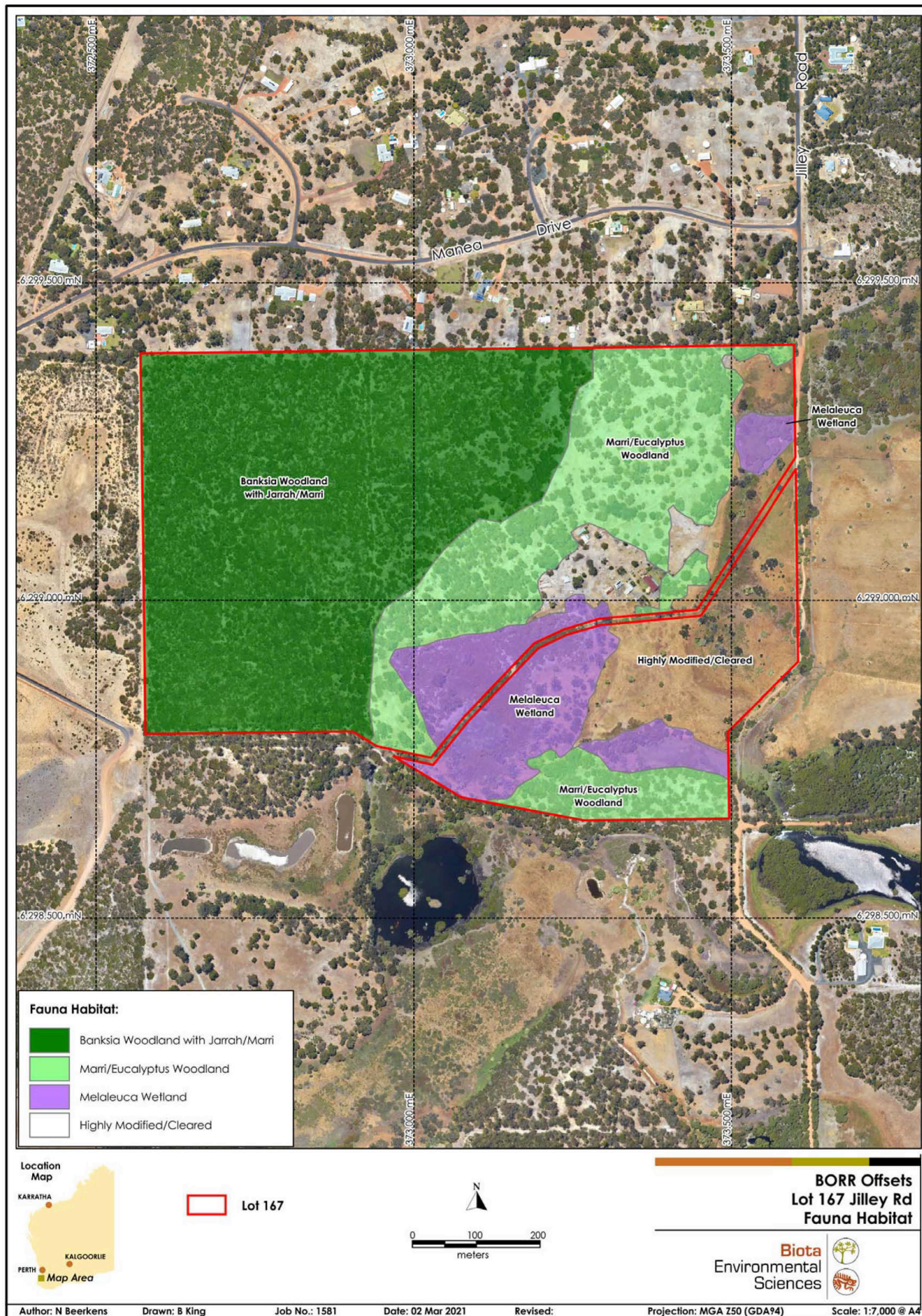


Figure 3.3: Fauna habitats of the Lot 167 Jilley Rd study area.



Plate 3.3: *Melaleuca* woodland

Plate 3.4: Highly Modified/Cleared

## 3.2 Black Cockatoos

### 3.2.1 Historical Records

Based on searches of Faunabase and Bird Life databases (see Section 2.2), all three Black Cockatoo species have previously been recorded within 5 km of the study areas (Figure 3.4). A Black Cockatoo roost site has been recorded 4 km north of Lot 1 (Figure 3.4), but the Black Cockatoo species was not identified. A confirmed Carnaby's Cockatoo breeding hollow has been recorded immediately south-west of Lot 1 (Figure 3.4).

### 3.2.2 Breeding Habitat Assessment

A total of 1,712 trees of suitable hollowing-forming species (DSEWPac 2012) with DBH of 50 cm or greater have been estimated to occur within the study area. This estimate includes known numbers of trees for Lot 1 Ducane Road and Lot 156 Marchetti Road (see Table 3.2), and an estimated number based on sub-sampling at Lot 167 Jilley Road (Table 3.2, see also Figure 3.8). The majority of the habitat trees measured (as opposed to estimated) were Jarrah ( $n=464$ ) and Marri ( $n=430$ ), along with Flooded Gum ( $n=94$ ), Tuart ( $n=5$ ) and dead stags ( $n=51$ ). A breakdown of habitat trees present or estimated (for Lot 167 Jilley Road) in each Lot within the study area is presented in Table 3.2, and their distribution is mapped in Figure 3.6 - Figure 3.8.

Two trees in Lot 1 contained hollows with potential evidence of Black Cockatoo use (chewing), but use could not be confirmed with a pole-mounted camera and the trees were therefore assigned to Category 2. Following pole-mounted camera assessment, a total of 21 trees were identified as containing potentially suitable hollows with no signs of use and were assigned to Category 3. A further 22 trees, assessed from ground level only, were considered to contain hollows potentially suitable for Black Cockatoo breeding (Category 4). While it is recognised that ground surveys often overestimate the suitability of hollows (Johnstone et al. 2013), some of these trees would be expected to support quality hollows. A breakdown of the results of the hollow assessments at each site are presented in Table 3.3.

**Table 3.2: Number of habitat trees (DBH > 50cm) within each Lot within the study area.**

Study area	Tree Species					Total
	Jarrah	Marri	Flooded Gum	Tuart	Indeterminate Dead Stag	
Lot 1, Ducane Rd	311	204	11	2	25	<b>553</b>
Lot 156, Marchetti Rd	45	94	64	2	0	<b>205</b>
Lot 167, Jilley Rd*	327	408	134	44	41	<b>954</b>

- \* Estimated number based on sampling (see Section 2.2).

**Table 3.3:** Number of trees with hollows assessed within each Lot within the study area. Each tree is allocated to the category of its most suitable hollow.

Study area	Tree Assessment Category					Total
	2	3	4	5	6	
Lot 1, Ducane Rd	2	16	7	31	497	<b>553</b>
Lot 156, Marchetti Rd	0	2	8	10	185	<b>205</b>
Lot 167, Jilley Rd	0	3	5	14	264	<b>286</b>

### 3.2.3 Foraging Habitat

At each Lot within the study area, Jarrah-Marri-Banksia woodland was the dominant fauna habitat. This habitat is highly suitable for Black Cockatoo foraging, and direct foraging evidence in the form of chewed Jarrah and Marri nuts was prevalent throughout the study area (Plate 3.5 to Plate 3.7). Bite marks indicative of Forest Red-tailed Black Cockatoo were recorded on Marri nuts and Forest Red-tailed Black Cockatoo were observed foraging in both Jarrah and Marri at Lots 156 and 167 (Figure 3.5).



**Plate 3.5:** Chewed jarrah nuts.



**Plate 3.6:** Marri nuts chewed by Forest Red-tailed Black Cockatoo.



**Plate 3.7:** Many chewed marri nuts.

### 3.2.4 Roosting Habitat

Five individual Forest Red-tailed Black Cockatoos were recorded roosting in a single Marri tree in the north-west corner of Lot 156 (Figure 3.5). These roosting birds were recorded opportunistically during the nocturnal WRP survey.

The roost site tree characteristics were as follows:

- Tree Species = Marri
- DBH = 57 cm,
- Tree height = 10–15 m,
- No hollows.

This roost site is located on the edge of the Lot's Jarrah/Marri habitat, ~100 m north of the ephemeral Five Mile Brook, which was dry during the survey. These roost site attributes are fairly typical for those used by Forest Red-tailed Black Cockatoo, although they generally favour larger trees (DSEWPac 2012). In the long-term, Black Cockatoos are known to show some fidelity to roost sites, and may re-utilise the same roost sites across multiple years (DSEWPac 2012). In the short-term, their night roost sites vary from daily to weekly (DSEWPac 2012). Given the low number of individuals observed roosting, and the relatively small size of the tree, this Marri tree it is unlikely to represent a high-value roost site for the species but may be reused in the future. No further evidence of Black Cockatoo roosting was observed during this survey.

Other tall Jarrah and Marri trees within each Lot may constitute suitable night roosting habitat. Forest Red-tailed Black Cockatoo are likely to favour trees on the edge of wooded habitat, whilst Baudin's Cockatoo and Carnaby's Cockatoo are more likely to select roost sites near water (DSEWPac 2012).

### **3.2.5 Individuals**

Forest Red-tailed Black Cockatoos were observed at all surveyed Lots in flocks that varied in size from 5 – 12 individuals (Figure 3.5). These flocks were observed flying and foraging in Jarrah and Marri.

Additionally, five Forest Red-tailed Black Cockatoos were observed roosting in Marri overnight during the WRP survey. These records are described in Section 3.2.4.

No Baudin's Cockatoo or Carnaby's Cockatoo were recorded during this survey.



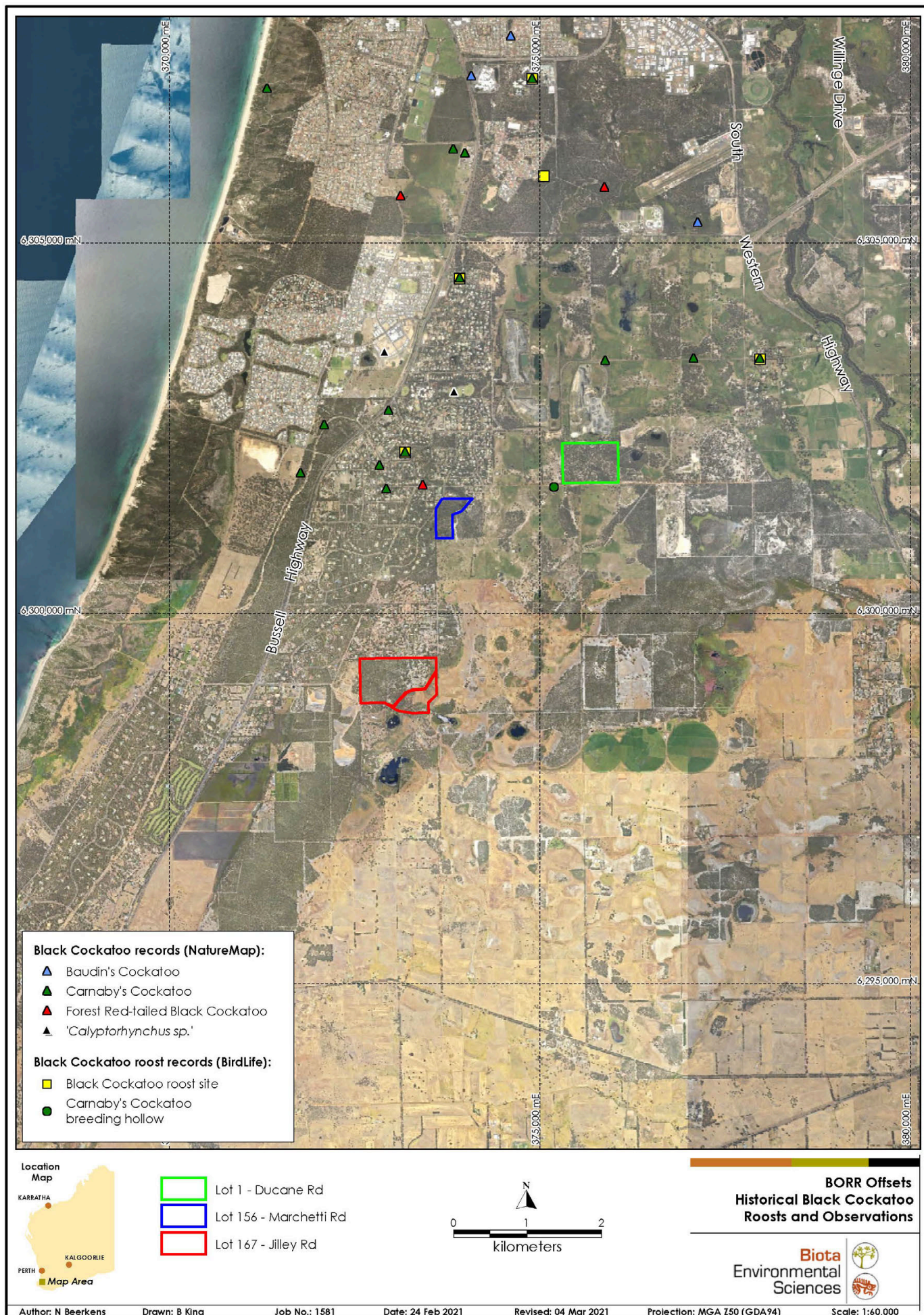
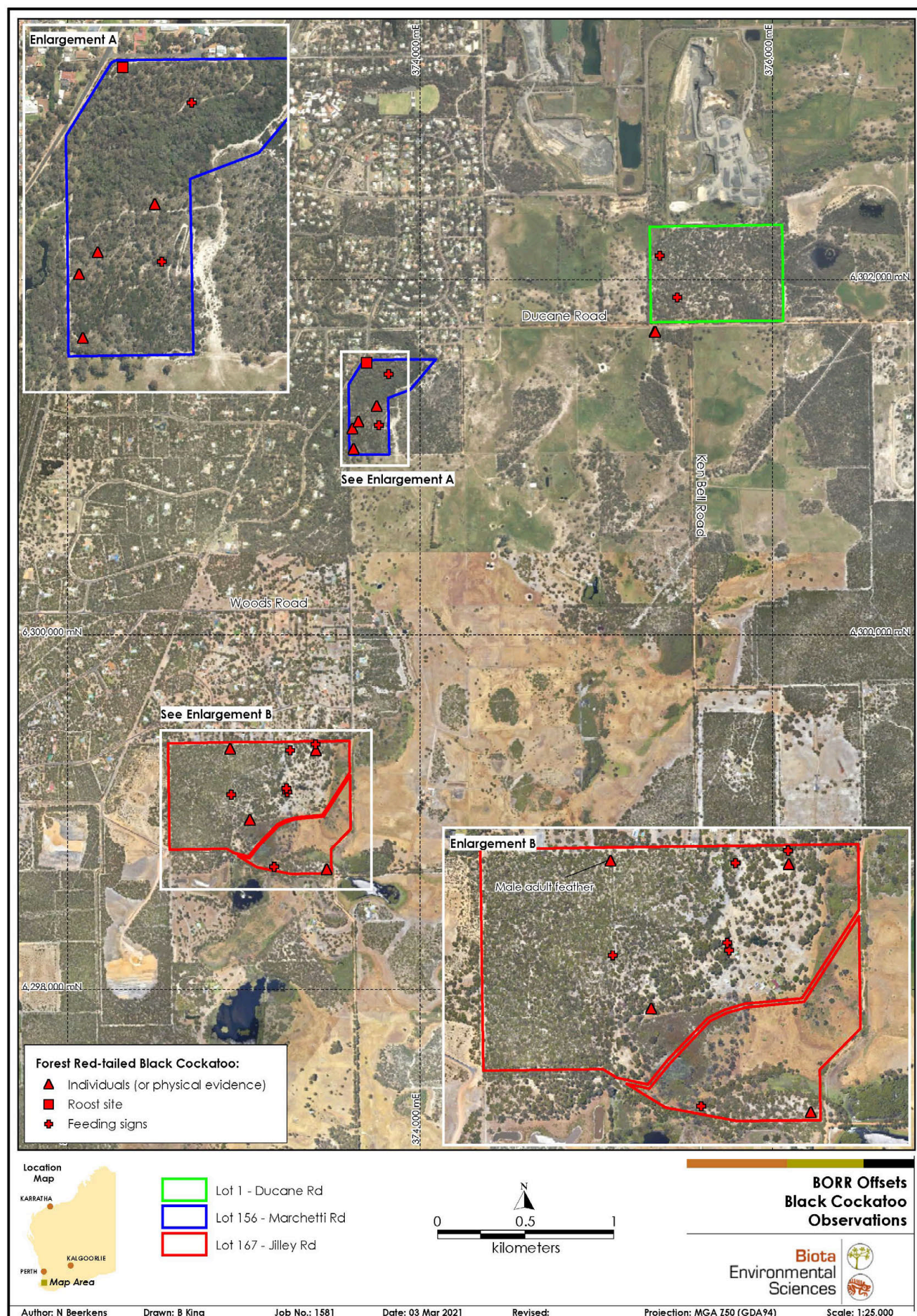


Figure 3.4: Historical Black Cockatoo records and known roost sites within the surrounding area.





**Figure 3.5:** Evidence of utilisation by Black Cockatoos recorded within the study area.



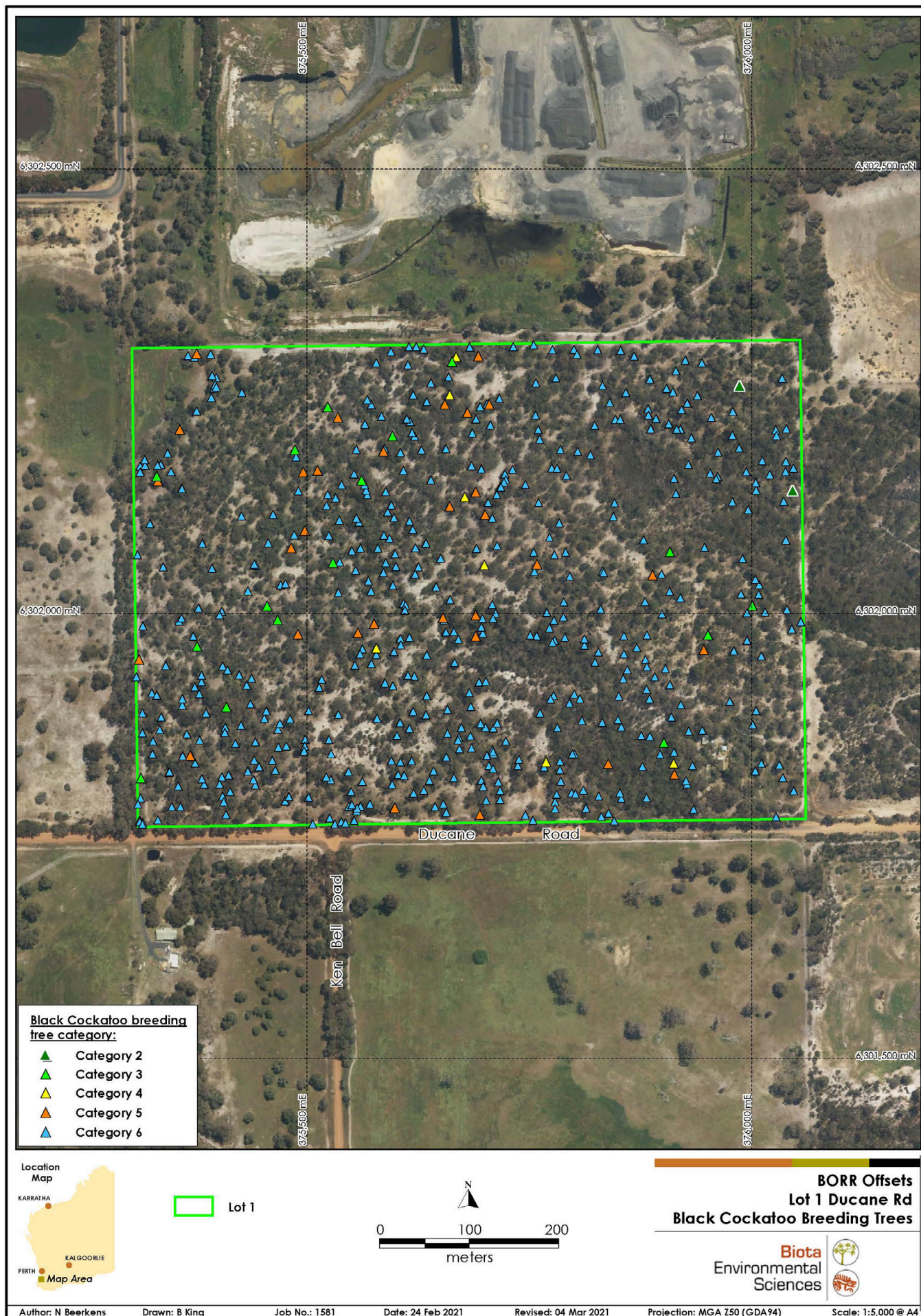


Figure 3.6: Potential breeding trees (>50 cm DBH) recorded within the Lot 1 Ducane Rd study area.



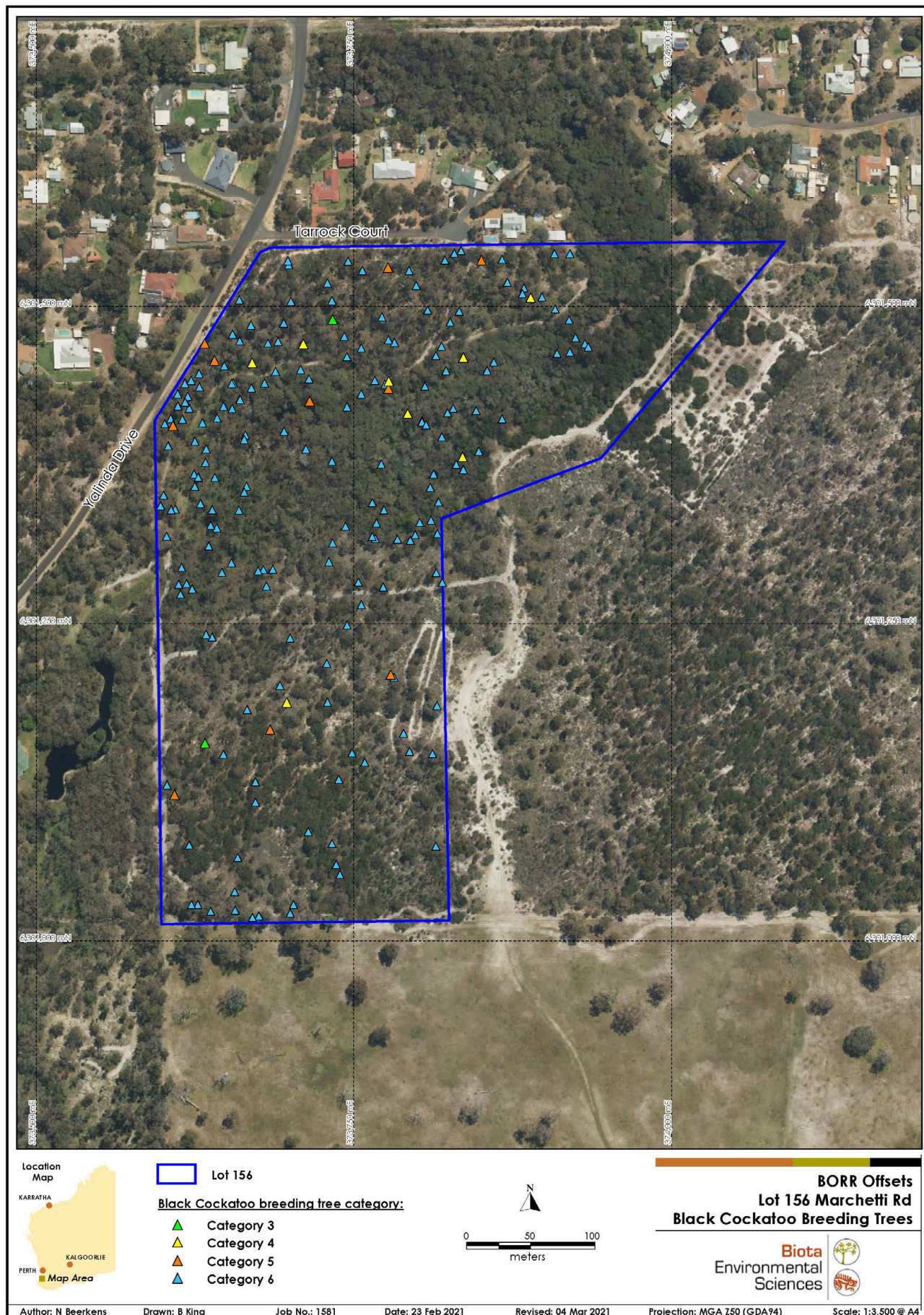


Figure 3.7: Potential breeding trees (>50 cm DBH) recorded within the Lot 156 Marchetti Rd study area.



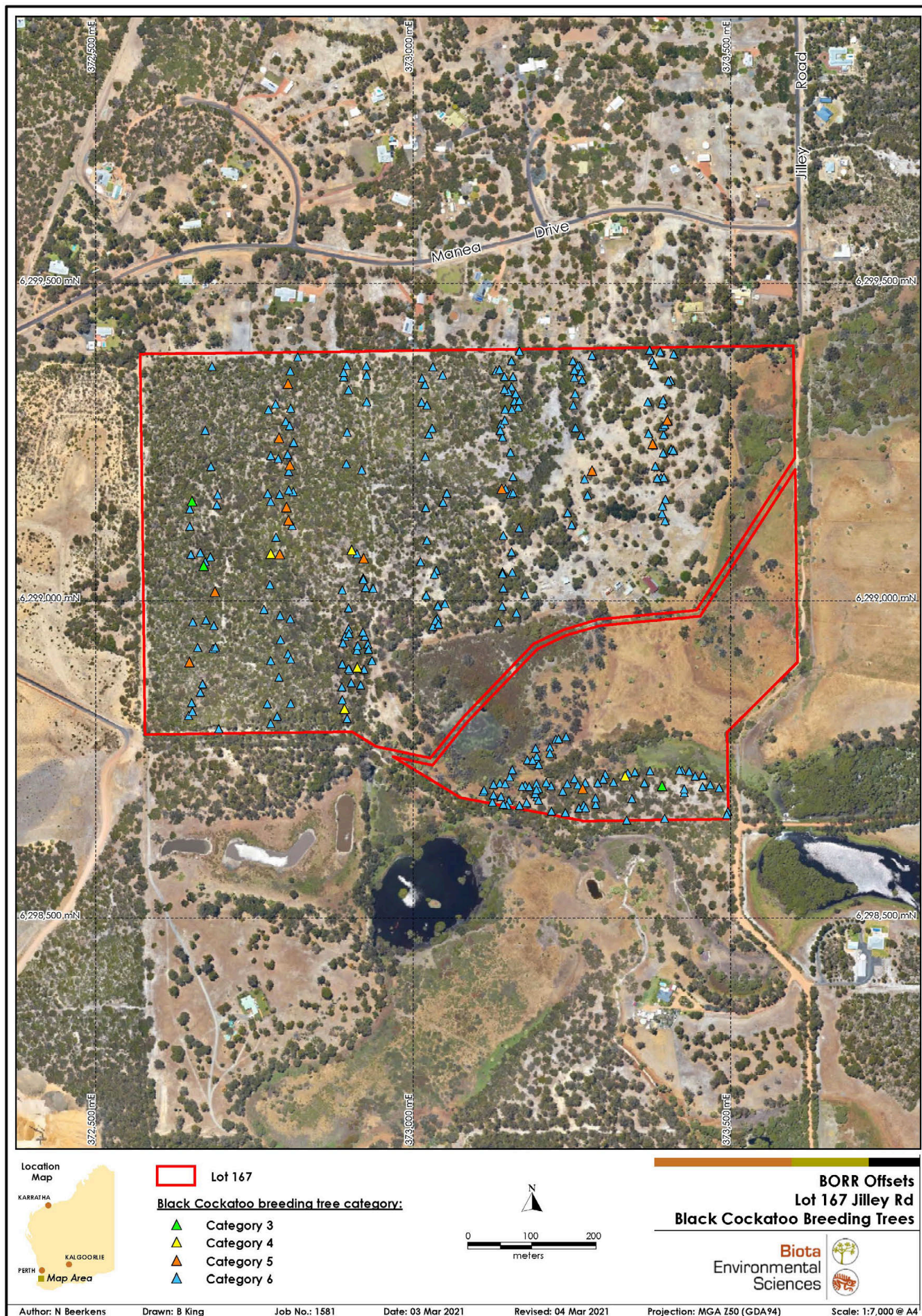


Figure 3.8: Potential breeding trees (>50 cm DBH) recorded within the Lot 167 Jilley Rd study area.



### 3.3 Western Ringtail Possum

A total of 89 individual Western Ringtail Possums were recorded from 75 detections (61 single adults, nine detections of mother with subadult, and five detections of two adults). A breakdown of the Western Ringtail Possums records from each site is shown in Table 3.4, and distribution of detections across each Lot within the study area is shown in Figure 3.9 - Figure 3.11.

**Table 3.4: Western Ringtail Possums detections, and density within each Lot within the study area.**

Study area	Detections Breakdown			Total Detections	Total Individuals	Available Habitat (ha)	Density (Individuals / ha)
	Adult (single)	Adult (double)	Mother with subadult (at heel)				
Lot 1, Ducane Rd	29	4	0	33	37	39.7	0.93
Lot 156, Marchetti Rd	9	0	3	12	15	14.2	1.06
Lot 167, Jilley Rd	23	1	6	30	37	55.6	0.67
<b>Total</b>				<b>75</b>	<b>89</b>		

#### 3.3.1 South-western Brush-tailed Phascogale

Two South-western Brush-tailed Phascogales were observed, both as single adult individuals, in Lot 167 (Figure 3.11).

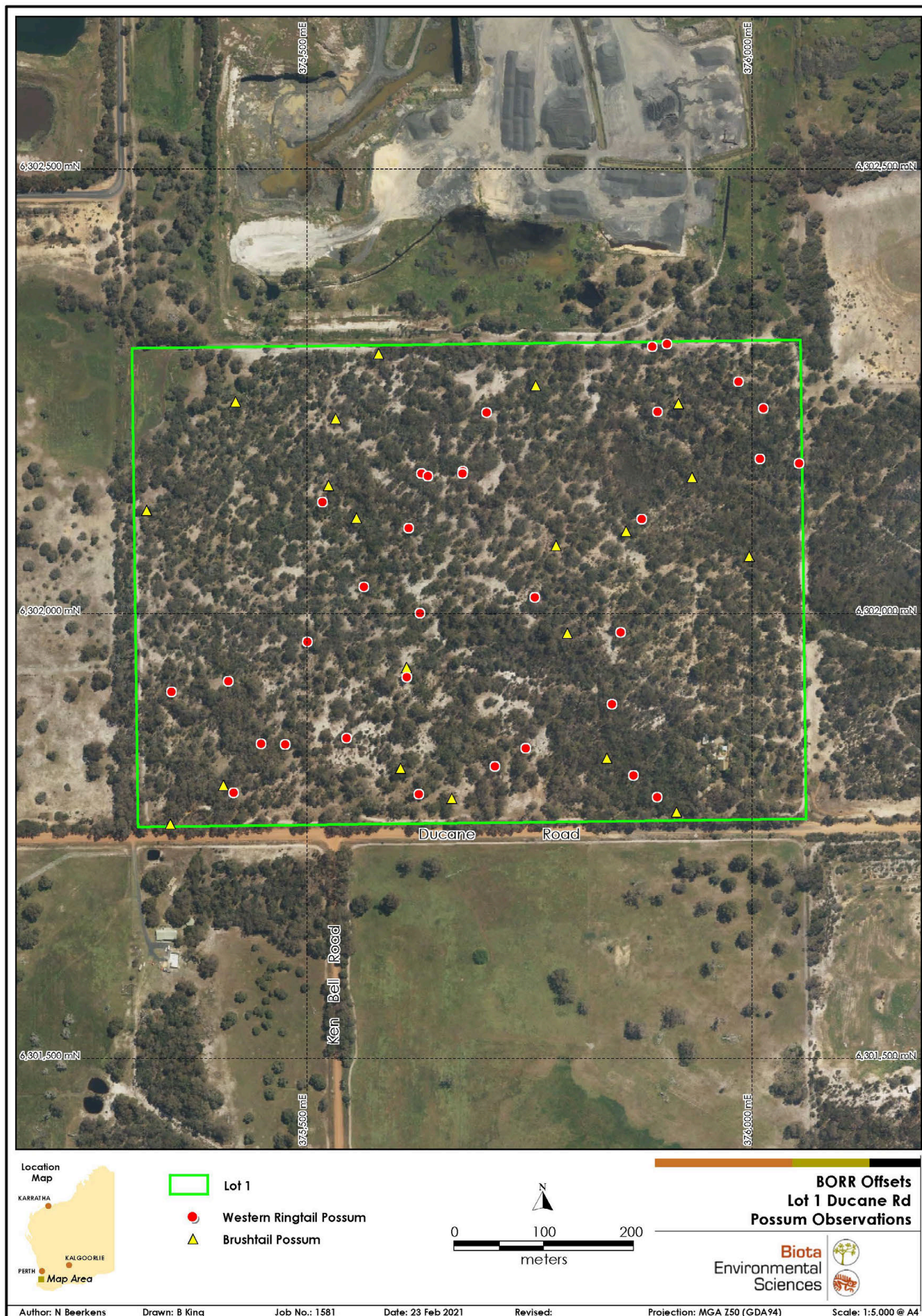
#### 3.3.2 Other Fauna Recorded

A total of 50 individual Common Brushtail Possums were recorded from 46 detections (43 single adults, one detection of mother with subadult, one detection of two adults, and one detection of three adults). A breakdown of the Common Brushtail Possum records from each Lot within the study area is reported in Table 3.5 and the distribution of detections is shown in Figure 3.9 - Figure 3.11.

**Table 3.5: Common Brushtail Possum detections, and density within each Lot within the study area.**

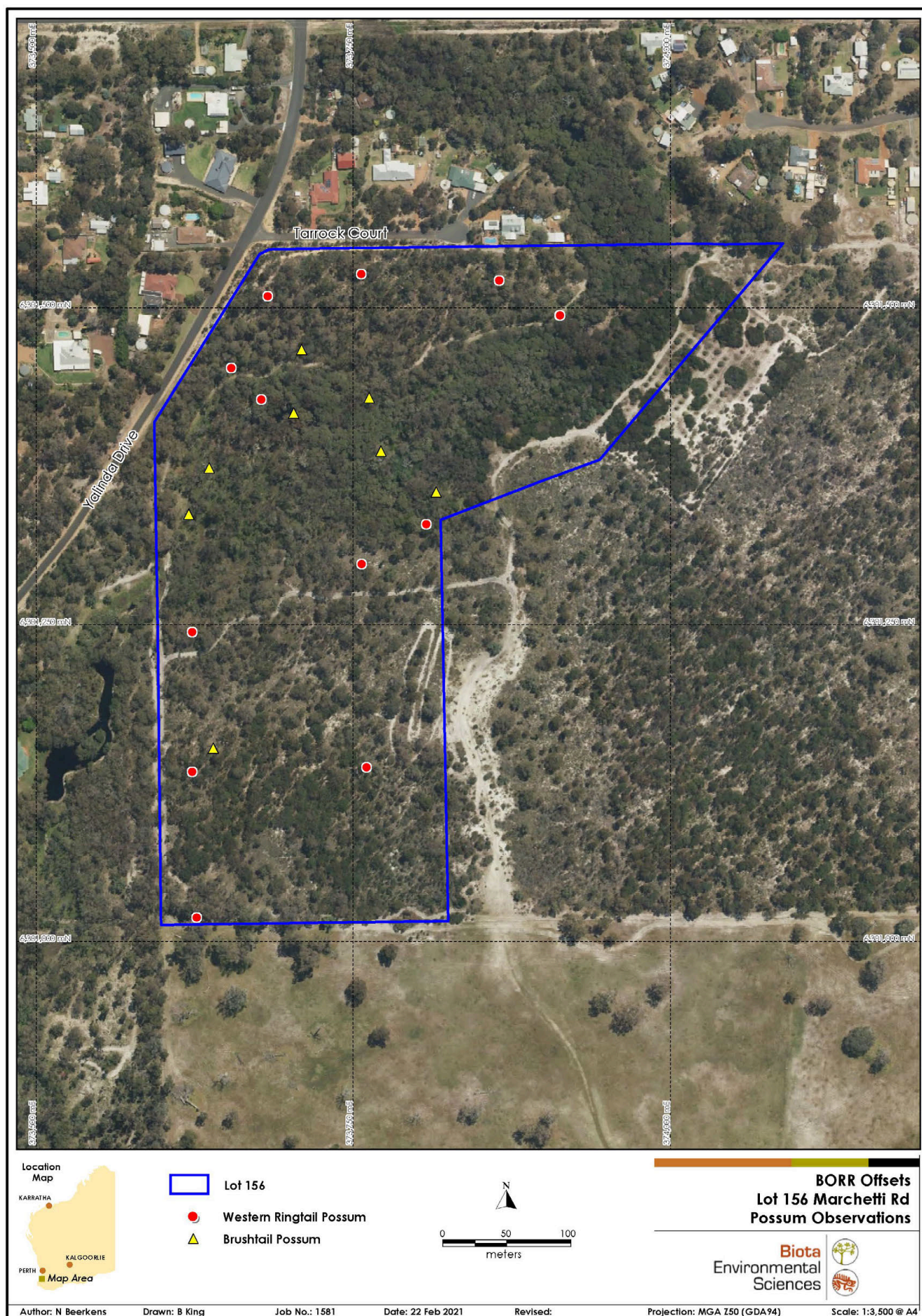
Study area	Detections Breakdown				Total Detections	Total Individuals	Available Habitat (ha)	Density (Individuals / ha)
	Adult (single)	Adult (double)	Adult (triple)	Mother with subadult (at heel)				
Lot 1, Ducane Rd	20	0	0	0	20	20	39.7	0.50
Lot 156, Marchetti Rd	7	0	1	0	8	10	14.2	0.70
Lot 167, Jilley Rd	16	1	0	1	18	20	55.6	0.36
<b>Total</b>					<b>46</b>	<b>50</b>		





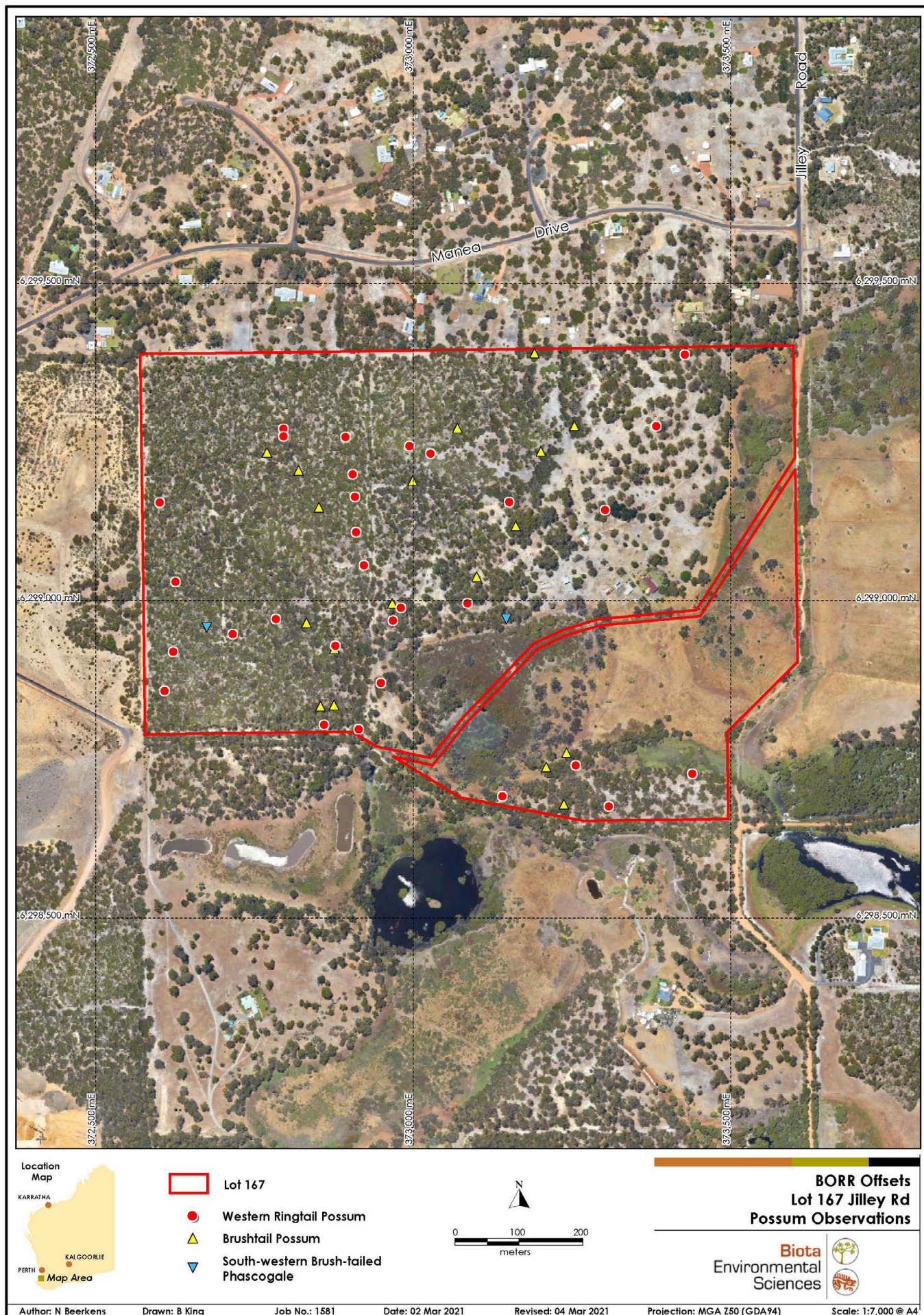
**Figure 3.9: Detections of Western Ringtail Possum and Common Brushtail Possum within the Lot 1 Ducane Rd study area.**





**Figure 3.10: Detections of Western Ringtail Possum and Common Brushtail Possum within the Lot 156 Marchetti Rd study area.**





**Figure 3.11:** Detections of Western Ringtail Possum, Common Brushtail Possum and South-western Brush-tailed Phascogale within the Lot 167 Jilley Rd study area.



## 4.0 Discussion

The Marri/Eucalyptus woodland, and Banksia/Eucalyptus woodland habitats within the study area represented high quality foraging habitat for all three Black Cockatoo species and evidence of foraging was common. Red-tailed Black Cockatoos were observed flying, foraging and roosting during the survey. A total of 45 trees across all sites were assigned to Categories 2 – 4 as defined by Main Roads (Main Roads Western Australia 2021), indicating that they are likely to contain hollows suitable for Black Cockatoo breeding. These comprise two trees in Category 2 (both in Lot 1), 21 trees in Category 3, and 22 trees in Category 4. It is noted that the Category 4 trees were ground-assessed only, which typically overestimates the quality of breeding hollows (Johnstone et al. 2013). However, some of these trees would be expected to support quality hollows.

Western Ringtail Possums were recorded from all Lots within the study area in Marri/Eucalyptus woodland, as well as within Banksia/Eucalyptus woodland at Lot 167. All vegetated habitat types within each of the Lots in the Study Area included tree species (such as Marri, Jarrah, Banksia, and Peppermint) that are all suitable for Western Ringtail Possums foraging as well as offering suitable denning opportunities in the form of hollows and drey-construction materials (Jones et al. 1994, DPaW 2017).

South-western Brush-tailed Phascogales were recorded at Lot 167 in Marri/Eucalyptus woodland and Banksia/Eucalyptus woodland habitats. This species is known to utilise relatively-large Jarrah and Marri trees (mean DBH = 87 cm for Marri and 76 cm for Jarrah), and requires hollow-bearing trees for breeding (Rhind 1996). The extent of suitable Marri and Jarrah habitat within each Lot within the study area, and the significant number of trees >50cm DBH present, indicates that each of these sites are of suitable size to support South-western Brush-tailed Phascogales.

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## 5.0 References

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## Appendix 1

### Survey Effort (2021 Survey)







