Appendix 39 Black Cockatoo Targeted Assessment 2023 – Willowdale

WILLOWDALE MINESITE

Black Cockatoo Targeted Assessment 2023

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Willowdale Minesite

Black Cockatoo Targeted Assessment 2023

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Executive Summary

Alcoa of Australia Limited (Alcoa) has committed to undertaking pre-clearance ecological surveys as part of its Mining Management Plan (MMP) assessment and other state assessment processes. Alcoa commissioned Western Environmental Pty Ltd (WEPL) to undertake targeted pre-clearance black cockatoo assessments for the Larego region within the Willowdale bauxite mine. The project requires surveys of conceptual clearing alignments, with the survey program divided across five years (2024-2028). This report presents results for surveys undertaken in 2023 corresponding to 2024 conceptual clearing alignments.

The Survey Area is located in the Larego region of the Willowdale bauxite mine, 20 km southeast of the town of Waroona. The Survey Area for the 2023 program comprised two portions with one subject to foraging habitat assessment only:

- Breeding foraging and roosting habitat -2024 Conceptual Clearing Targets (437.35 ha).
- Foraging habitat only - Additional Areas (40.84 ha).

The black cockatoo habitat field survey methodology primarily followed the Commonwealth Referral Guidelines (DCCEEW, 2022) for identifying breeding, foraging and roosting habitat. Consideration was also given to survey requirements under the Alcoa (2023) Fauna Management Plan. Surveys were undertaken across a combined 60 person days between July 2023 and February 2024.

Breeding Habitat

A combined total of 13,267 potential, suitable or known nesting trees were recorded. The vast majority (97 %) of these trees are Bamford Class 4 or 5 trees, defined by DCCEEW, 2022 as potential nesting trees, however these do not currently contain suitable nesting hollows.

Following phase 2 assessment of 86 trees assessed as having a moderate potential to contain suitable nesting hollows (Bamford Class 3), none were identified as containing suitable nesting hollows.

Three Bamford Class 2 trees which show signs of chew marks indicating they are a known breeding tree are present within the Survey Area. Two of these trees were previously recorded by Alcoa/T. Kirkby, with one additional known nesting tree added by 2023 surveys.

Foraging Habitat

The Alcoa (2023) Fauna Management Plan identifies that The Huntly and Willowdale mine areas contain predominantly high-quality foraging habitat due to the prevalence of Jarrah Forest. Foraging habitat quality was rated using the Commonwealth Habitat Quality Scoring Tool (DCCEEW, n.d.). Foraging habitat quality extents within the Survey Area out of ten are:

- Baudin's black cockatoo: 169.51 ha (10/10), 148.56 ha (9/10), 123.85 ha (8/10), 27.24 ha (7/10), 0.23 ha (1/10) and 8.80 ha (None 0).

- Carnaby's black cockatoo: 169.51 ha (10/10), 148.56 ha (9/10), 123.85 ha (8/10), 27.24 ha (7/10), 0.23 ha (1/10) and 8.80 ha (None 0).

- Forest red-tailed black cockatoo: 181.51 ha (10/10), 136.62 ha (9/10), 123.85 ha (8/10), 27.24 ha (7/10), 0.23 ha (1/10) and 8.80 ha (None 0).

Analysis of regional habitat extent indicates there is 63,554.92 ha of remnant native vegetation mapped within a 12 km buffer of the Survey Area. It is expected that the majority of this vegetation would contain suitable foraging species at the same or greater rate than that present within the Survey Area. The 469.4 ha of foraging habitat (excludes cleared areas) represents 0.74 % of the estimated regional habitat extent. The habitat quality within the Survey Area is considered likely to be analogous to that of the regional foraging habitat.

Roosting Habitat

Six locations were recorded that displayed evidence of having been used as a roost site. Of these one (Roost 01) was confirmed as a roosting site through secondary evidence and by dawn visits recording forest red-tailed black cockatoos roosting. Three sites (Roost 02, 04 and 06) are considered likely to be roost sites based on abundant scat patches, feathers and leaf clipping evidence. Roost 02 and 04 are separated by only 500m and may actually comprise one larger roosting area. Two roost sites (Roost 03 and 05) were small areas with small amount of roosting evidence. These sites have been used for roosting but do not appear to be frequently used or used by a large number of birds.

It is highly likely that more roost locations are present within the broader Larego region considering the frequency of observations of black cockatoos. Additional specific surveys involving repeated visits to suspected roost sites and dawn and dusk observations would be required to advance understanding of roosting behaviour in the Larego region.

Acronyms and Abbreviations

Abbreviation	Full Title
BC Act	*Biodiversity Conservation Act 2016*
CR	Critically Endangered
DBCA	Department of Biodiversity, Conservation and Attractions
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DEWHA	Department of the Environment Water Heritage and the Arts
DPIRD	Department of Primary Industries and Regional Development
DWER	Department of Water and Environmental Regulation
EIA	Environmental Impact Assessment
EN	Endangered
EP Act	*Environmental Protection Act 1986*
EPA	Environmental Protection Authority
EPBC Act	*Environment Protection Biodiversity and Conservation Act 1999*
GIS	Geographic Information System
GPS	Global Positioning System
ha	Hectare
IBRA	Interim Biogeographic Regionalisation for Australia
km	Kilometres
m	Metres
MA	Marine
MI	Migratory
MNES	Matters of National Environmental Significance
OS	Other Specially Protected
P	Priority
PMST	Protected Matters Search Tool
T	Threatened
VU	Vulnerable
WA	Western Australia
WAH	Western Australian Herbarium
WC Act	*Wildlife Conservation Act 1950*
WEPL	Western Environmental Pty Ltd

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1. Introduction

1.1 Project Background

Alcoa of Australia Limited (Alcoa) operates the Huntly and Willowdale bauxite mines, which are located in Alcoa's Mining Lease 1SA (ML1SA) within the Northern Jarrah Forest region. Alcoa has committed to undertaking pre-clearance ecological surveys as part of its Mining Management Plan (MMP) assessment and other state assessment processes. Targeted fauna surveys are undertaken based on conceptual clearing alignments which are used to:

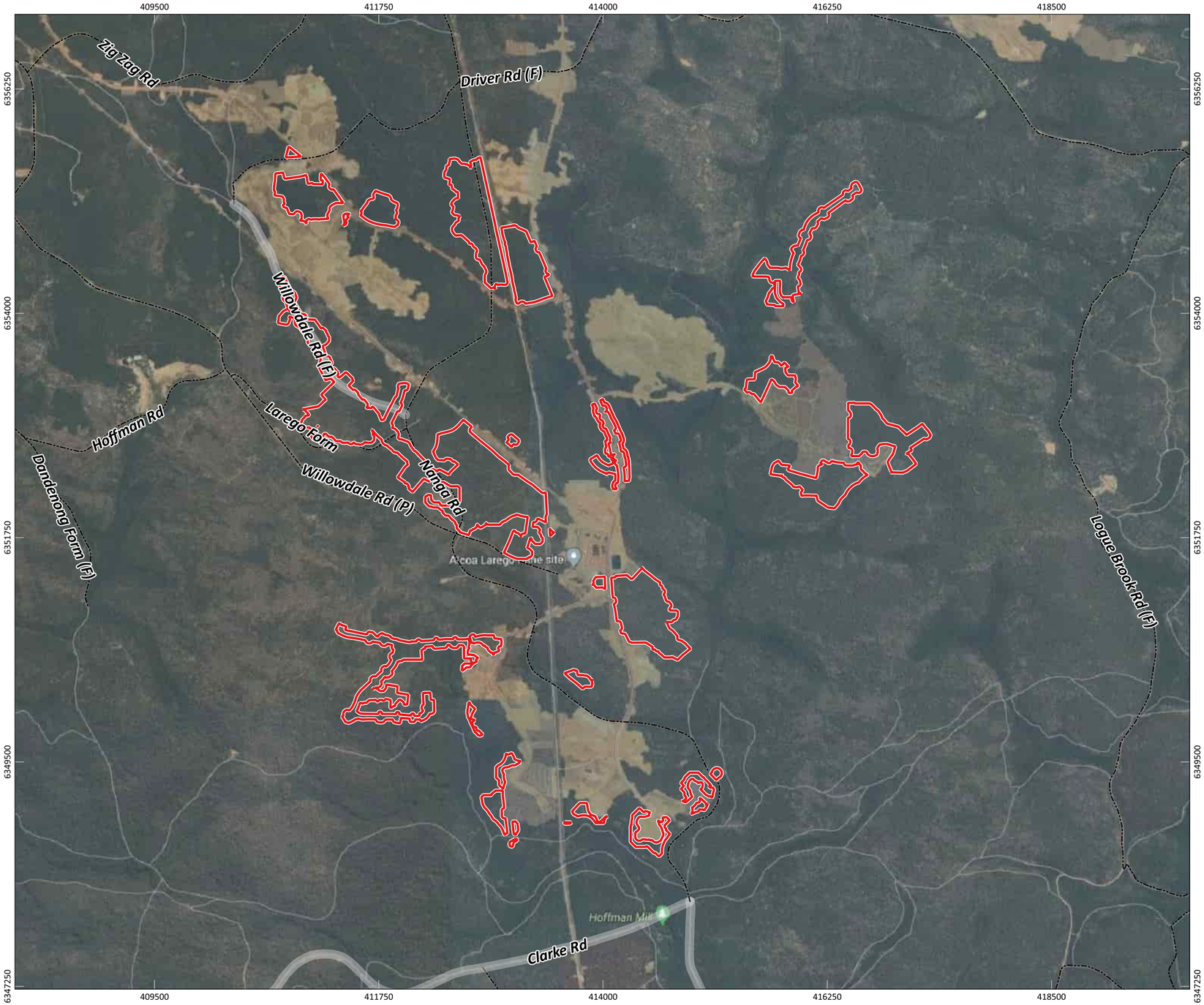
- amend the conceptual alignment to avoid significant fauna.
- inform translocation and environmental management plans as required.
- develop mining avoidance zones for significant fauna; and
- assist Alcoa in preparing MMP submission to the Mining and Management Program Liaison Group.

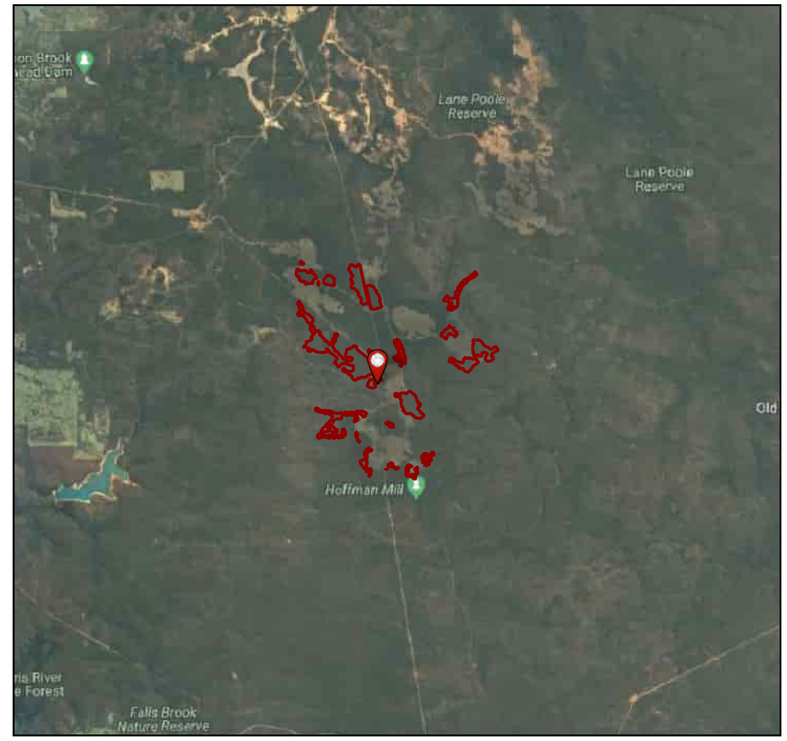
Alcoa commissioned Western Environmental Pty Ltd (WEPL) to undertake targeted pre-clearance black cockatoo assessments for the Larego region within the Willowdale bauxite mine. The project requires surveys of conceptual clearing alignments, with survey program divided across five years (2024-2028). This report presents results for surveys undertaken in 2023 corresponding to 2024 conceptual clearing alignments.

1.2 Location

The Survey Area is located in the Larego region of the Willowdale bauxite mine, 20 km southeast of the town of Waroona, see Figure 1. The Survey Area is within the Northern Jarrah Forest (JAF01) IBRA subregion (Commonwealth of Australia, 2012). The Survey Area for the 2023 program comprised two portions with one subject to foraging habitat assessment only:

- Breeding foraging and roosting habitat -2024 Conceptual Clearing Targets (437.35 ha).
- Foraging habitat only - Additional Areas (40.84 ha).





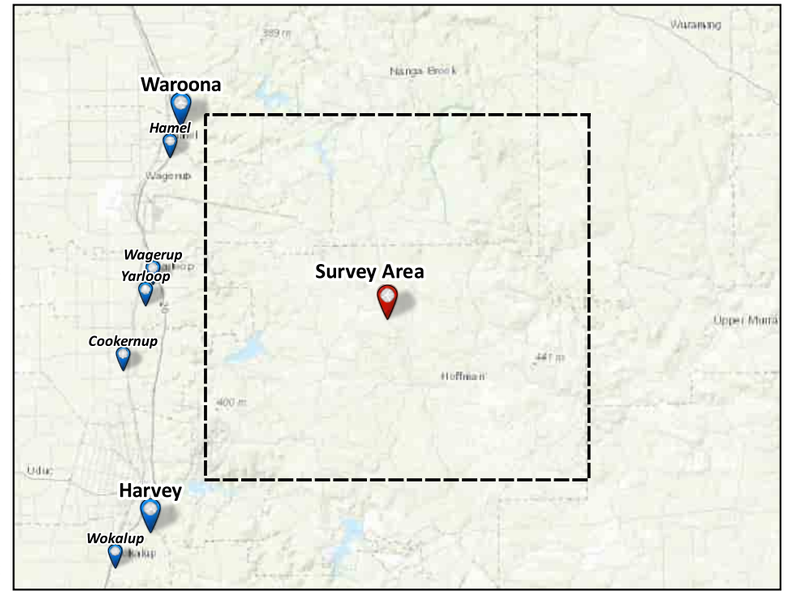


Figure 1: Survey Area

N

0 1 2 km

PROJECT/REPORT NAME: Black Cockatoo Targeted Assessment 2023 Willowdale Minesite		
SCALE: 1:45,000	SHEET SIZE: A3 COLOUR	CLIENT: Alcoa of Australia Limited
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	PROJECT NUMBER: A23.033	VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY Summer 2023	DRAWN BY / REVIEWED BY: HS/AF	DATE: 13/3/2024

Legend

- SurveyArea
- Local Road
- Miscellaneous Road

No	Description	Drawn	Approved	Date
A	Original issue	HS	AF	13/3/2024

NOTES:

Cadastral boundary (LGATE-002). Base map ESRI Topo. Townsites (LGATE-248).

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1.3 Objectives and Scope of Work

The objective of the survey was to identify key black cockatoo habitat values within the Survey Area.

The scope of works included a black cockatoo habitat assessment as per DCCEEW (2022) *Referral guideline for 3 WA threatened black cockatoo species* (the Referral Guidelines) and marking of Significant Trees as per the Alcoa (2023) *Fauna Management Plan Huntley and Willowdale Mines* (the Fauna Management Plan).

The scope of 2023 black cockatoo surveys included two phases:

Phase 1: WEPL ecologists undertake a ground-based assessment recording potential nesting trees, suitable nesting trees or know nesting trees (as defined by DCCEEW (2022)), scoring foraging habitat quality and recording observation/ evidence of roosting and presence of species.

Phase 2: Follow up assessment of trees identified in phase 1 as potential suitable nesting trees or known nesting trees by Tony Kirkby via drone, pole camera or telephoto lens. The results of the phase 2 assessment have been incorporated into this report.

1.4 Relevant Legislation and Guidance

This environmental assessment was conducted in accordance with Commonwealth and State legislation and guidelines:

- Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- Western Australian *Environmental Protection Act 1986* (EP Act).
- Western Australian *Biodiversity Conservation Act 2016* (BC Act).
- Western Australian Biodiversity Conservation Regulations 2018.
- Department of the Environment (DotE). (2013). *Matters of National Environmental Significance. Significant Impact Guidelines 1.1 - Environment Protection and Biodiversity Conservation Act 1999.*
- Department of the Environment Water Heritage and the Arts (DEWHA). (2010). *Survey Guidelines for Australia's Threatened Birds*.
- Department of Climate Change, Energy, Environment and Water (DCCEEW). (2022). *Referral Guidelines for 3 WA threatened black cockatoo species: Carnaby's Cockatoo, Baudin's Cockatoo and the Forest Red-tailed Black-cockatoo.*

As well as those listed above, the assessment complied with Environmental Protection Authority (EPA) requirements for environmental survey and reporting in Western Australia, as outlined in:

- EPA. (2020). *Technical Guidance – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment*. Known herein as the 'Fauna Technical Guidance'.

A short description of key legislation is provided in Appendix A. Other definitions, including species and ecological community conservation categories, are provided in Appendix B.

1.5 Survey Limitations and Constraints

Limitations and constraints of the fauna survey as outlined in the Fauna Technical Guidance are detailed below in Table 1.

Table 1: Limitations and Constraints Fauna Survey

Possible Limitation	Degree of Limitation (Significant, Moderate or Negligible)	Potential Constraints on Survey Outcomes
Survey Level/ Scope	Negligible	A targeted assessment for black cockatoos was considered suitable.
Availability of contextual information	Negligible	All data required to complete the scope of works including regional and local contextual information was available.
Site Access	Negligible	The entire Survey Area was traversed on foot.
Survey Intensity and Extent	Negligible	Survey effort for black cockatoos was suitable to adequately sample habitats present. A total of 54 person days of effort was allocated to phase 1. Assessment of potential black cockatoo nesting hollows was ground-based in phase 1 (undertaken by WEPL). A second survey phase was undertaken by others utilising a drone, pole camera or telephoto lens. Six person days of effort were allocated to phase 2.
Experience	Negligible	Phase 1 lead ecologist Andrew Fry has been conducting biological surveys in Western Australia for over 10 years, with over 5 years' experience undertaking targeted habitat assessments for black cockatoos. Phase 2 lead zoologist Tony Kirkby has extensive experience in black cockatoo nesting habitat with over 25 years' experience as a researcher and consultant, including long-term black cockatoo studies with the West Australian Museum.
Timing, weather, season	Negligible	Phase 1 Surveys undertaken from July -December. Phase 2 Surveys undertaken December-February. The surveys were undertaken within the recommended timing for both foraging and breeding habitat for forest red-tailed black cockatoo (year-round); partially for Carnaby's black cockatoo (July to December); and partially for Baudin's cockatoo (foraging Feb/March to September, breeding August-January)

Possible Limitation	Degree of Limitation (Significant, Moderate or Negligible)	Potential Constraints on Survey Outcomes
		(DCCEEW, 2022). The majority of survey work occurred within breeding periods. Assessment of hollow suitability based on dimensions are not seasonally restricted. Targeted searches were undertaken for secondary evidence of the species presence (e.g. foraging evidence from marri and jarrah nuts which can be done at any time of year).
Proportion of the fauna recorded, and any identification issues	Negligible	Targeted survey focused on three readily identifiable species only. No identification constraints were encountered.
Disturbances (fire, flood etc.)	Negligible	No recent fires or clearing disturbances posed a constraint to surveys. Long term changes due to modification of fire regime, historical and ongoing logging and bauxite mining are considered representative of contemporary habitat and are not considered constraints in the context of the scope of the surveys.

2. Methodology

The black cockatoo habitat field survey methodology primarily followed the Commonwealth Referral Guidelines (DCCEEW, 2022) for identifying breeding, foraging and roosting habitat.

Consideration was also given to survey requirements under the Alcoa (2023) Fauna Management Plan.

2.1 Desktop Assessment and Literature Review

Pre survey a desktop assessment was undertaken considering publicly available datasets and Alcoa fauna records/ existing tree survey data, see Table 2.

Table 2: Datasets for Desktop Assessment

Dataset Name and Date	Information Provided
Alcoa Potential Nest Trees-Larego Region (2012-2023)	Records of potential or actual nesting trees recorded by Alcoa as per Fauna Management Plan in the Willowdale mine region.
Department of Biodiversity, Conservation and Attractions (DBCA). (2018) Carnaby's Cockatoo Confirmed Roost Sites (DBCA-050)	Describes the currently known and confirmed night roost areas for Carnaby's Black Cockatoo in the South - West of Western Australia (DataWA description).
Department of Biodiversity, Conservation and Attractions (DBCA). (2019) Black Cockatoo Roosting Sites - Buffered (DBCA-064).	Data from The Great Cocky Count which takes place annually in early to mid-April. This event records birds as they fly in to night roosts on a single day and has taken place since 2010. Three species are recorded: Carnaby's and Baudin's (white-tailed) and Forest Red-tailed Black-Cockatoos (DataWA description).
Department of Biodiversity, Conservation and Attractions (DBCA). (2019) Black Cockatoo Breeding Sites - Buffered (DBCA-063).	Sites where Black-Cockatoos (generally Carnaby's) are confirmed to be breeding. Breeding is inferred based on surveys which have recorded either birds entering/leaving the nest or the inside of the nest has been viewed with eggs or chicks. (DataWA description).

2.2 Field Survey Timing and Team

Table 3: Survey Effort Summary

Survey Phase	Team Position and Experience	Survey Effort and Timing
Phase 1 (2023)	Senior Ecologist-12 years Graduate Ecologist- 2 years	54 person days- July- December 2023
Phase 2 (2023)	Black cockatoo specialist- 25 years	Six person days- December 2023-February 2024

2.3 Breeding Habitat Assessment

The Commonwealth defines breeding habitat as trees species, 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 (DBH) (1.3 m from the ground) to develop a hollow (DCCEEW, 2022). Terminology used in this report for trees comprising breeding habitat follows that defined in glossary of DCCEEW (2022) as shown in Table 4.

Table 4: Breeding Habitat Terminology

Breeding Habitat Term	Definition (DCCEEW, 2022)
Known nesting trees	Trees (live or dead but still standing) which contains a hollow where black cockatoo breeding has been recorded or which demonstrates evidence of breeding (i.e. showing evidence of use through scratches, chew marks or feathers).
Suitable nesting trees	Trees with suitable nesting hollows present, although no evidence of use.
Suitable nesting hollows	Any hollow with dimensions suitable for use for nesting by black cockatoos. See Table 8 for further discussion on nesting hollow characteristics.
Potential nesting trees	Trees that have a suitable DBH to develop a nest hollow, but do not currently have hollows.

In 2023 breeding habitat assessment included two phases. The survey methodology of these phases are discussed in detail below. Portions of the breeding habitat Survey Area have been subject to prior survey efforts by Tony Kirkby and Alcoa to identify breeding habitat.

Phase 1

WEPL ecologists recorded every potential nesting tree and assessed from the ground potential for presence of suitable nesting trees or know nesting trees.

All trees with suitable DBH (>50cm jarrah, marri, blackbutt, bullich, flooded gum; >30cm wandoo) were recorded using a mobile GIS field data collector platform. The following was recorded for each such tree:

- species
- DBH (approximately 1.3 m from the ground)
- coordinates

For trees possessing hollows of >10cm diameter entry the following characteristics were recorded from ground-based observations:

- size of entry.
- hollow type (knot, fissure, spout, vertical/chimney.

- comments on likelihood of suitable nesting hollow formation based on factors including tree/branch architecture, branch diameter, tree species, appearance and thickness of entry rim, cracking in wood, presence of leaves/ sticks, blackening from burning, and any other pertinent observations.
- evidence of use including chew marks or wear.
- presence of other birds or bees.
- images of each hollow and overall tree.

In addition to Commonwealth guidelines for assessing potential breeding trees, a scoring system based on that developed by Dr Mike Bamford (referred to as Bamford Class) was applied to class potential breeding habitat. This system and the Bamford Class alignment with DCCEEW (2022) breeding habitat definitions are shown in Table 5.

Table 5: Black cockatoo Potential Breeding Tree Bamford Class System

Bamford Class	Description of Tree and Hollows/Activity	Alignment with DCCEEW (2022) Breeding Habitat Definitions
1	Active nest observed; adult (or immature) bird seen entering or emerging from hollow, eggs present.	Known Nesting Tree
2	Hollow of suitable size and angle visible with chew marks around entrance.	Known Nesting Tree
3	Potentially suitable hollow visible but no chew marks present; or potentially suitable hollow present (as suggested by structure of tree, such as large, vertical trunk broken off at a height of >10m).	Suitable Nesting Tree (if confirmed hollow with suitable dimensions present in phase 2); Potential Nesting Tree (if confirmed hollow with suitable dimensions not present or highly unlikely to be present in phase 2)
4	Tree with hollows or broken branches that might contain hollows, but hollows or potential hollows are not of a suitable size, or are aligned or obstructed so as to prevent access	Potential Nesting Tree
5	Tree lacking large hollows or broken branches that might have large hollows; a tree with more or less intact branches and a spreading crown.	Potential Nesting Tree

Phase 2

Tony Kirkby verified the presence of any suitable nesting trees or known nesting trees by revisiting trees scored by WEPL ecologist during phase 1 as Bamford Class 1-3 trees. During the course of phase 1 survey, it was determined that WEPL ecologists were likely applying too high a precautionary threshold to scoring of Bamford Class 3 trees. Following consideration of scoring approach, Bamford Class 3 trees were subdivided into trees with moderate potential to contain suitable nesting hollows and trees deemed highly unlikely to

contain suitable nesting hollows. Of the overall 396 trees scored as Bamford Class 3, 86 were assessed as having a moderate potential to contain suitable nesting hollows and were included in phase 2 assessment. Of these no additional trees were identified as containing suitable nesting hollows. On this basis it was considered suitable to classify the remaining 310 Bamford Class 3 trees as highly unlikely to contain suitable nesting hollows and exclude them from phase 2 assessment.

Phase 2 assessment utilised a drone, pole camera or telephoto lens. Assessment confirmed if hollows are / have been used previously, are not suitable, currently suitable or potentially suitable in the future. Tony Kirkby has been conducting black cockatoo surveys throughout the south-west of Western Australia for the past 25 years and locating black cockatoo breeding trees for Alcoa Australia for the past ten years. Tony has extensive experience in hollow assessment having been involved in many long-term black cockatoo studies with the Western Australian Museum including a 17-year study undertaken into the breeding biology of forest red-tailed black cockatoos (Johnstone, Kirkby and Sarti 2013).

2.4 Foraging Habitat Assessment

The Commonwealth defines foraging habitat as areas including plants of species known to support foraging within the range of each black cockatoo species. Marri (*Corymbia calophylla*) and jarrah (*Eucalyptus marginata*) woodlands are particularly important to Baudin's and the forest red-tailed black cockatoo, while proteaceous heaths (shrublands dominated by Banksia, Hakea and Grevillea species) are also utilised by Carnaby's black cockatoo (DCCEEW, 2022).

The potential of the habitat within the Survey Area to support foraging was described, and any evidence was recorded (e.g. chewed marri and jarrah nuts), along with opportunistic sightings of any black cockatoo individuals. The mapped boundaries of foraging habitat were broadly aligned with the nine broad fauna habitat types described for the Huntly and Willowdale Mine areas as per the Alcoa (2023) Fauna Management Plan. The Fauna Management Plan identifies that "Preliminary fauna habitat mapping has been undertaken in areas of the Huntly and Willowdale mines where baseline fauna surveys have not been undertaken, and extrapolation of habitats was made using available historical site vegetation type mapping, undertaken by Mattiske Consulting. These areas have not been subject to ground truthing in accordance with EPA guidance for terrestrial fauna surveys".

Habitat mapping of the Survey Area was used in conjunction with the site assessment to determine the foraging quality using the Foraging Habitat Scoring Tool (DCCEEW, 2022). The Foraging Habitat Scoring Tool (DCCEEW, 2022) is applied once only for an entire site.

A secondary finer grain assessment was undertaken using the '*Habitat Scoring System for WA black cockatoo foraging habitat*' (the Habitat Quality Scoring Tool) provided by DCCEEW in 2023 as an unpublished source. The Habitat Quality Scoring Tool produces a score of 0-7 for site condition and may be applied to each polygon of identified fauna habitat type. The site condition is scored based on percentage cover of foraging species and influence of tree deaths or degrading factors. An overall site context score of 0-3 is then added. See Appendix C for detailed scoring tool methodologies.

Information collected for the Survey Area was also contextualised with consideration to the wider availability of foraging habitat for black cockatoos in the surrounding area (12 km radius). This buffer is selected as recommended in the Commonwealth referral guidelines due to black cockatoos mainly foraging within 12 km of their nest site during the breeding season and their reliance on this proximity of foraging resources to successfully raise chicks (DCCEEW, 2022). Analysis utilises Remnant Native Vegetation Extent mapping (DPIRD-005) and Vegetation Complexes- Swan Coastal Plain and Southwest forest region (DBCA-046 and DBCA-047) mapping to define extent and type of remnant vegetation.

2.5 Roosting Habitat Assessment

Roosting habitat was assessed based on observation of roosting or roosting evidence recorded during survey and based on habitat suitability (generally tall trees in the landscape in proximity to a water source). During the field survey, searches were conducted for evidence of roosting (e.g. piles of scats, feeding debris or chewed trees). Observations were also collected opportunistically in the early morning or late afternoon or black cockatoos congregating or perching in areas. These areas were further investigated as potential roosts.

2.6 Significant Trees

Under the Alcoa Fauna Management Plan Significant Trees are defined as the following:

- A jarrah tree with a diameter of not less than 2 000 mm at a height of 1300 mm above ground level.
- A marri tree with a diameter of not less than 1 500 mm at a height of 1300 mm above ground level.

AND

- Is healthy (i.e. retaining majority of limbs, with high percentage leaf cover on remaining limbs) and may provide roosting habitat for black cockatoos, as determined by a suitably qualified and experienced person.

Potential significant trees were identified from phase 1 WEPL survey data. They were then subject to follow up assessment by Tony Kirkby during phase 2 assessment.

3. Results

3.1 Desktop Assessment

As per the three species modelled distribution in DCCEEW (2022) the Survey Area falls within:

- A known foraging area and main wintering area for Baudin's black cockatoo but outside the predicted breeding range.
- The breeding range for Carnaby's black cockatoo.
- The likely to occur modelled distribution for forest red-tailed black cockatoo.

The desktop assessment considered proximity of the Survey Area to known nesting and roosting sites. Desktop assessments typically focus on a 12 km radius from Survey Area due to black cockatoos mainly foraging within 6-12 km of their nest site during the breeding season and their reliance on this proximity of foraging resources to successfully raise chicks (DCCEEW, 2022).

The nearest confirmed black cockatoo breeding site mapped by DBCA is located 30km west in the Lake Preston area (DBCA-063). To note this dataset is generally used to record Carnaby's breeding locations and is likely data deficient in the Willowdale area. Surveys of Alcoa mining operations areas undertaken by Alcoa and Tony Kirkby from 2012-2023 have identified 146 'nest trees' (defined as per Fauna Management Plan as "tree containing one or more hollows suitable as Black Cockatoo breeding habitat. A suitable hollow is based on hollow size, shape, and entry angle, irrespective of signs of use for breeding"). A breakdown by cockatoo species is not provided with this dataset however the Fauna Management Plan identifies that at least three Baudin's black cockatoo breeding events were recorded within the Giles Protection Zone, located in close proximity to the 2023 Survey Area. It is assumed that of the 146 'nest' trees identified, the majority are forest red-tailed black cockatoo breeding sites, as this species is most commonly recorded breeding in the Northern Jarrah Forest (Alcoa, 2023). Hence both Baudin's black cockatoo and forest red-tailed black cockatoo breeding sites are present <6km from the Survey Area.

There are two known night roosting locations for black cockatoos approximately 10 km to the west of the Survey Area, both are attribued as Carnaby's black cbckcatoo roositng sites (DBCA-064). The Fauna Management Plan identified that "No confirmed roosting sites are located within the Huntly and Willowdale mine areas based on surveys data. However, it is highly likely that roosting occurs within these areas given the presence of high-quality foraging habitat, water sources, and large number of bird records".

See Figure 2 for known roosting and breeding locations within 12 km buffer from the Survey Area.

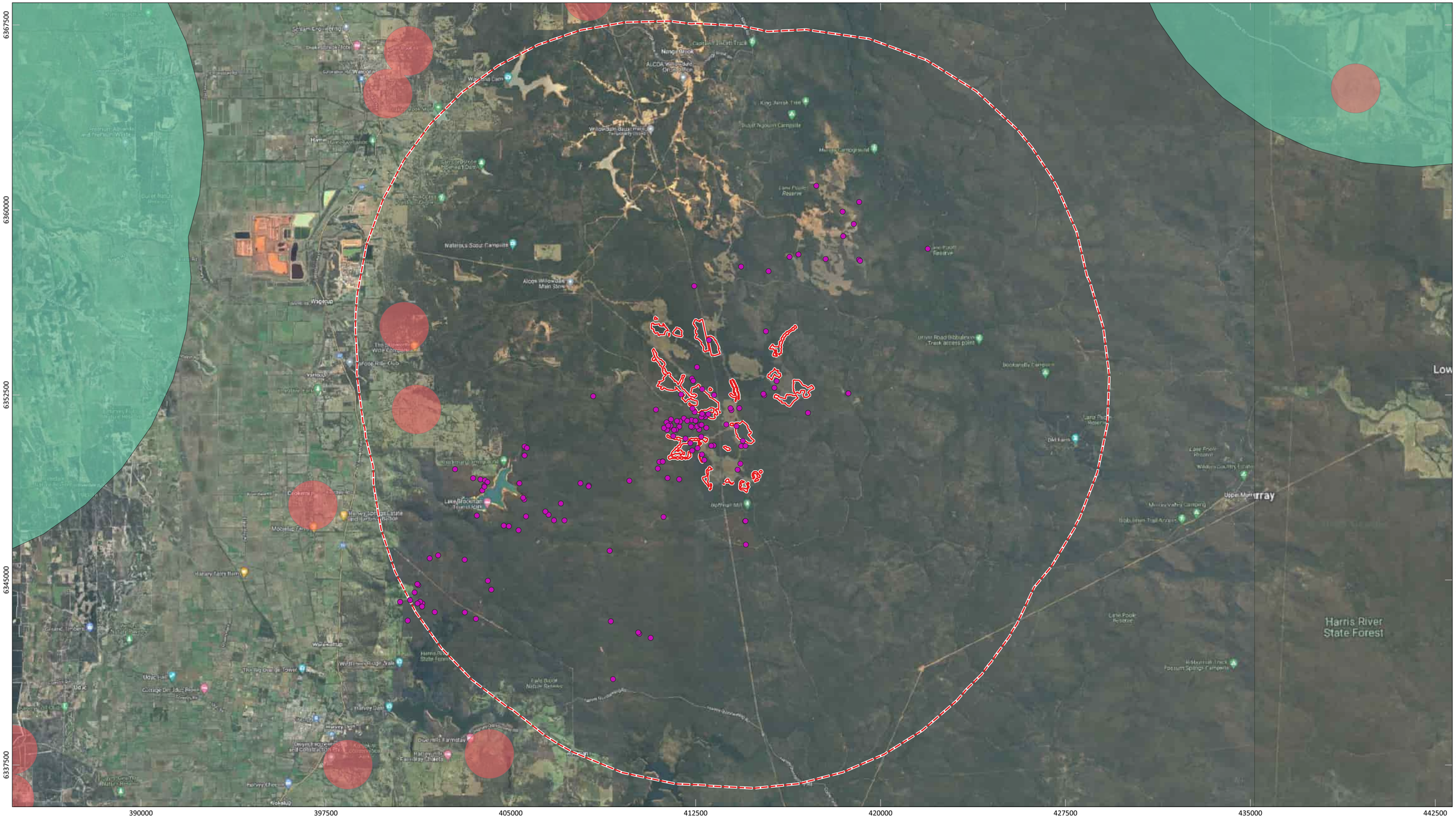

Figure 2: Known Black Cockatoo Roosting and Breeding Sites within 12 km Buffer

N

0 3 6 9 km

PROJECT/REPORT NAME	Black Cockatoo Targeted Assessment 2023 Willowdale Minesite
SCALE	1:150,000
SHEET SIZE	A3 COLOUR
CLIENT	Alcoa of Australia Limited
COORDINATE REFERENCE SYSTEM	GDA2020 / MGA zone 50
PROJECT NUMBER	A23.033
VERSION	0
DATA SOURCE	LANDGATE AERIAL IMAGERY Summer 2023
DRAWN BY / REVIEWED BY	HS/AF
DATE	13/3/2024

Legend

- Survey Area
- 12 km Radius of Survey Area
- Black Cockatoo Roosting Sites - Buffered (DBCA-064)
- Carnabys Cockatoo Confirmed Breeding Areas within the Swan Coastal Plain and Jarrah Forest IBRA Regions (DBCA-054)
- Larego Confirmed Nest Trees

No	Description	Drawn	Approved	Date
A	Original issue	HS	AF	13/3/2024

NOTES:

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3.2 Literature Review

A literature review was undertaken of previous terrestrial fauna studies considered relevant to the current Survey Area, to inform the targeted black cockatoo assessment. A summary of the key findings relevant to the survey is provided below in Table 6.

Table 6: Review of Previous Studies

Source- Title	Key Findings
Alcoa Fauna Management Plan (2023)	**Breeding Habitat** Willowdale contains a 206 ha Protection Zone in the Giles area. This Protection Zone contains a high density of nest tree, particularly in comparison to the surrounding area. In 2021 there were three Baudin's black cockatoo breeding events recorded. The Protection Zone includes a large number of trees of habitat and significant trees (864 Marri trees with a DBH>500mm, excluding nest trees). High quality foraging habitat and permanent water sources are also contained within the Protection Zone. The Huntly and Willowdale mine areas are highly likely to support breeding by forest red tailed black cockatoo and Baudin's cockatoo (T. Kirkby, pers. Comm; GHD, 2021). **Foraging Habitat** The Huntly and Willowdale mine areas contain predominantly high-quality foraging habitat due to the prevalence of Jarrah Forest, which contains key foraging species including Marri, Jarrah and proteaceous species. The mine areas comprise approximately 77% high quality foraging habitat for forest red-tailed black cockatoo and approximately 78% high quality foraging habitat for Baudin's and Carnaby's cockatoos. Other fauna habitats provide low to medium quality foraging habitat. **Roosting Habitat:** No confirmed roosting sites are located within the Huntly and Willowdale mine areas based on surveys data. However, it is highly likely that roosting occurs within these areas given the presence of high-quality foraging habitat, water sources, and large number of bird records.
Doherty et al. (2016). Successional changes in feeding activity by threatened cockatoos in revegetated mine sites	Research project to determine whether there were successional patterns in cockatoo feeding activity in revegetation aged between 4 to 23 years. The study concludes that black cockatoos feed in vegetation at all three mine sites, despite variations in vegetation age, structure and floristics. Black cockatoos begun feeding on proteaceous and myrtaceous food plants within 4 and 7 years following revegetation, indicating that some food sources are restored quickly after mining disturbance of the Jarrah forest. FRTBC breeding was found to appear to be linked to the spatiotemporal availability of its primary food sources, the fruit from the tree species, Marri *Corymbia calophylla* and Jarrah *Eucalyptus marginata*. However, due to climate change experienced and predicted to be experienced in the future in Western Australia it is expected that the food resources during the breeding season for cockatoos will become increasingly limited in time and space, thus threatening their persistence.

Source- Title	Key Findings
	The preference for specific types of hollows indicated that suitable hollows are likely to be scarce in the landscape and that management prescriptions need to be developed to maintain the supply of suitable hollows.
Alcoa; Tony Kirkby (2011-2022) **Preclearance black cockatoo hollow surveys** **Willowdale and Huntly mines**	Black cockatoo surveys undertaken by Black Cockatoo Specialist as engaged by Alcoa. Surveys undertaken within all areas planned for clearing of potential black cockatoo breeding trees. 146 nest trees identified within 15km of Survey Area
Tony Kirkby pers. comm. (2020)	Survey undertaken in 2020 of Jarrahdale and Huntly Mine rehabilitation at 20 and 30 years indicated predominantly low foraging by Black Cockatoos compared to higher foraging in adjacent un-mined forest (T. Kirkby, pers. comm., 2020). Doherty et al (2016) speculated that the lower foraging in rehabilitation may be due to the younger tree age; a higher stem density affecting growth, flowering and fruiting; or a higher stem density impeding access for canopy feeding.
GHD (2021) **Myara North– Terrestrial Fauna Survey and Black Cockatoo Assessment**	The Huntly and Willowdale mine areas are highly likely to support breeding by forest red-tailed black cockatoo and Baudin's black cockatoo. All three EPBC Act listed Black Cockatoo species were recorded primarily throughout the Marri-Jarrah Forest habitat type. All habitat types will be utilised for foraging by either one or all of the species.
Johnstone *et al* 2017 **The distribution, status movements and diet of the forest red-tailed black cockatoo in the south-west with emphasis on the Greater Perth region, Western Australia**	The loss of nest trees through logging, fire (including prescribed burns) and post-fire clean up, and weather is of concern, especially fire. Fire is acknowledged as a significant factor in the fall of hollow trees. Many veteran and stag Marri (the favoured nest tree) are particularly susceptible to fire. Most of these trees have only an outer living shell around rotten heartwood. A fire at the base of these trees quickly burns through the outer shell creating a chimney stack that destroys the tree. The January 2016 Waroona wildfire that swept through the Larego forest block destroyed a total of 19 of 41 known cockatoo hollows.

3.3 Observations

Individuals were recorded through a mix of physical observations, sound of nearby calls, patches of feathers/ scats and foraging evidence (primarily from marri, jarrah and sheoak nuts). A total of 220 records for any observation type were recorded. These are summarised in Table 7 and shown in Figure 3.

Table 7: Summary of Observation

Observation Type	Baudin's Black Cockatoo	Carnaby's Black Cockatoo	Forest Red-tailed Black Cockatoo
Observed or call recorded	-	1 record (2 individuals observed)	34 records (213 total individuals observed)
Foraging Evidence	-	2 records	180 records
Remains or Feathers		-	3 records
Totals	-	3 records	217 records

The most commonly recorded specie was forest red-tailed black cockatoo. Groups of 6-12 individuals were recorded flying over the survey area and smaller groups of 2-6 individuals were recorded foraging in marri and jarrah trees.

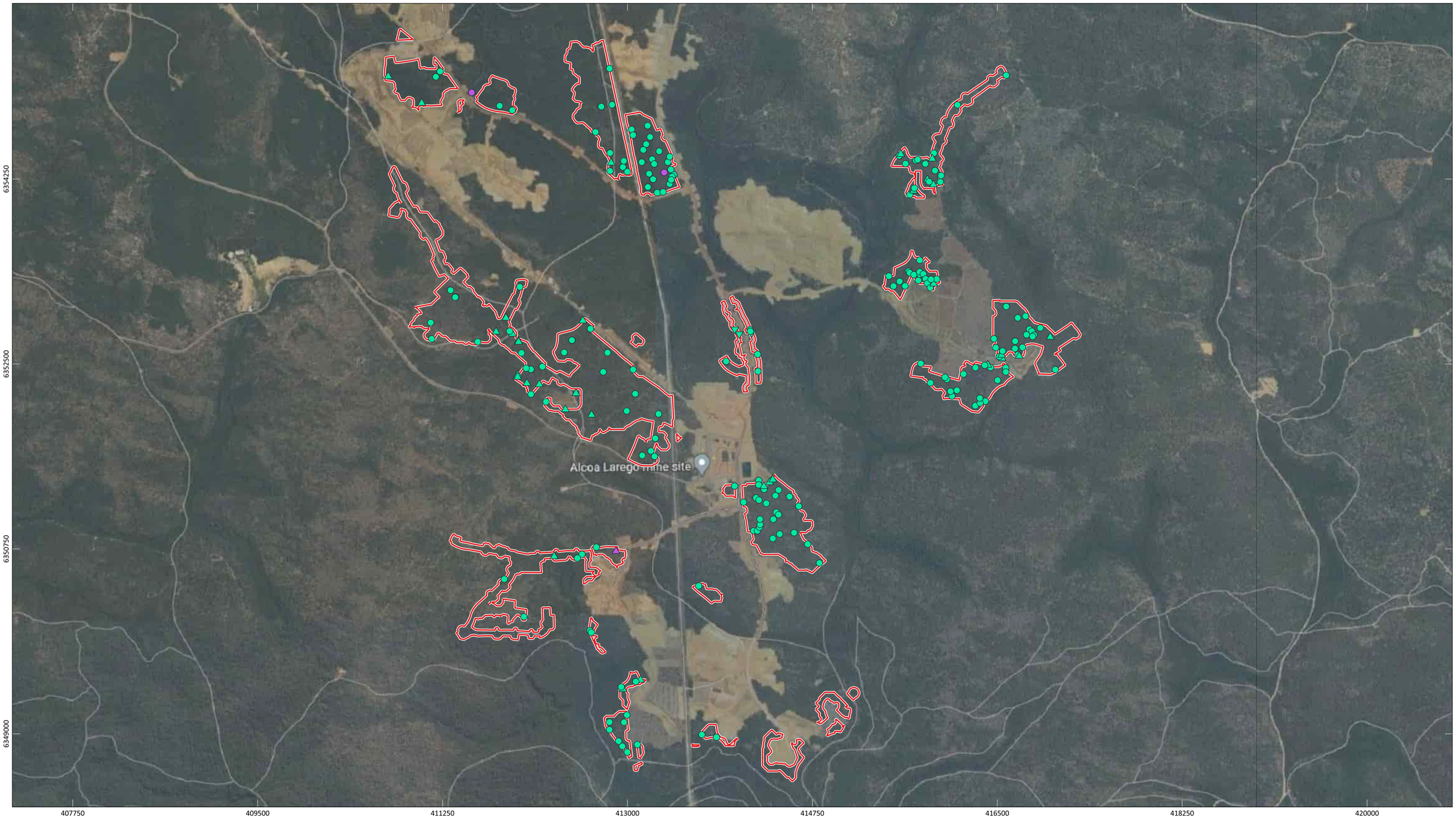

Figure 3: Black Cockatoo Observations

0 1 2 km

N

SCALE: 1:35,000	SHEET SIZE: A3 COLOUR
PROJECT/REPORT NAME: Black Cockatoo Targeted Assessment 2023 Willowdale Minesite	CLIENT: Alcoa of Australia Limited
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	PROJECT NUMBER: A23.033 / VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY Summer 2023	DRAWN BY / REVIEWED BY: HS/AF / DATE: 13/3/2024

Legend

- Survey Area

Carnaby's Black Cockatoo Observations

- Foraging or digging evidence
- Observed

Forest Red-tailed Black Cockatoo Observations

- Foraging or digging evidence
- Observed
- Remains

No	Description	Drawn	Approved	Date
A	Original issue	HS	AF	13/3/2024

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3.4 Breeding Habitat Assessment

Breeding habitat comprises trees species known to support breeding within the range of the species, which either have a suitable nest hollow, or are of a suitable DBH to develop a hollow (DCCEEW, 2022). Breeding typically occurs in native eucalypt species however many species of eucalypt including non-endemic species may develop suitable hollows for breeding (DCCEEW, 2022). In the Willowdale mine region tree species which may provide hollows for black cockatoos as per Tony Kirkby (2023 pers. comm.) are:

- Jarrah- *Eucalyptus marginata*
- Marri- *Corymbia calophylla*
- Bullich- *Eucalyptus megacarpa*
- Blackbutt-*Eucalyptus patens*
- Flooded Gum-*Eucalyptus rudis*
- Wandoo-*Eucalyptus wandoo*
- Powderbark Wandoo-*Eucalyptus accedens*

The most frequently utilised tree species for breeding in the Northern Jarrah Forest region is marri (T. Kirkby, pers. comm. 2023). A long-term study of suitable nesting trees being utilised by forest red-tailed black cockatoo identified that marri accounted for 91% of known nest trees when comparing marri against jarrah (Johnstone *et al*, 2013). Other tree species such as blackbutt, bullich and flooded gum (particularly bullich) while good hollow providers are restricted within their range to stream zones and are far less abundant than jarrah and marri. Wandoo and powderbark wandoo are also good hollow providers however are very uncommon in the Willowdale region (T. Kirkby, pers. comm. 2023).

Black cockatoo hollows are located throughout the landscape but tend to be clustered in stands of old growth marri (T. Kirkby, pers. comm. 2023).

A summary of understood suitable nesting hollow characteristics for the three species is provided below in Table 8.

Table 8 Black Cockatoo Nesting Hollow Characteristics

Species	Baudin's black cockatoo	Carnaby's black cockatoo	Forest red-tailed black cockatoo
Tree species and hollow characteristic	Nesting mainly in karri, marri, jarrah, wandoo, bullich, and tuart Preferred hollow dimensions have not been	Nesting mainly in salmon gum, wandoo, tuart, jarrah, flooded gum, karri and marri.	Nesting mainly in jarrah, marri, karri, wandoo, bullich, blackbutt and tuart

Species	Baudin's black cockatoo	Carnaby's black cockatoo	Forest red-tailed black cockatoo
	specifically studied but are considered likely to be similar to that of the Carnaby's black cockatoo	Utilise hollows with entry diameter of 10-65 cm, internal chamber floor diameter of 15-70 cm and depths of 30-300cm. (mean 26 cm entry, 33 cm floor and 130 cm depth).	Utilise hollows with entry diameters from 12-150 cm, internal floor diameter of 17-54 cm and depths of 30-820 cm. (mean 30 cm entry, 33 cm floor and 140 cm depth).
Sources	DCCEEW, 2022	DCCEEW, 2022, Saunders *et al* 2014a, Saunders *et al* 2014b	DCCEEW, 2022, Johnstone and Storr 1998, Johnstone *et al* 2013

A combined total of 13,267 potential, suitable or known nesting trees (DBH >50cm) were recorded. The vast majority (97 %) of these trees are Bamford Class 4 or 5 trees, which although defined by DCCEEW, 2022 as potential nesting trees, do not currently contain suitable nesting hollows. A breakdown of nesting trees by Bamford Class is shown below in Table 9.

Table 9: Summary of Potential Nesting Trees

Bamford Class	Class 1	Class 2	Class 3	Class 4	Class 5	Totals (tree species)
DCCEEW, 2022 Terminology	Known Nesting Tree		Suitable Nesting Tree (pending phase 2 inspection)	Potential Nesting Trees		
Tree species						
Blackbutt	-	-	-	-	5	**5**
Bullich	-	-	-	1	9	**10**
Dead	-	-	147	799	373	**1319**
Jarrah	-	-	188	1150	8547	**9885**
Marri	-	3	61	312	1672	**2048**
Total (Bamford Class)	-	**3**	**396**	**2,262**	**10,606**	**13,267**

Potential Nesting Trees

The large majority (10,606 trees) do not currently show signs of potential nesting hollow development (Bamford Class 5 trees). There were 2262 trees assessed as possessing small hollows which are of an insufficient size to support nesting, however these trees are of sufficient age and growth form to be developing hollows (Class 4 trees).

There are 396 Bamford Class 3 trees. These were recorded by WEPL ecologist in phase 1 and either appeared to have a potentially suitable nesting hollow visible (opening entry >10cm); or potentially suitable hollow present as suggested by structure of tree, such as large, vertical trunk broken off at a height of >10m which could not be confirmed from ground assessment. Bamford Class 3 trees were further subdivided into trees with moderate potential to contain suitable nesting hollows and trees deemed highly unlikely to contain suitable nesting hollows. Of the overall 396 trees scored as Bamford Class 3, 86 were assessed as having a moderate potential to contain suitable nesting hollows and were included in phase 2 assessment. Of these no additional trees were identified as containing suitable nesting hollows. On this basis it was considered suitable to classify the remaining 310 Bamford Class 3 trees as highly unlikely to contain suitable nesting hollows and exclude them from phase 2 assessment.

Known Nesting Trees

Three Bamford Class 2 trees which show signs of chew marks indicating they are a known breeding tree are present within the Survey Area. See Image 01 below for example of chew marks and hollow. Two of the trees were already known from previous surveys. Class 2 tree attributes are summarised in Table 10.

Table 10:Summary of Known Breeding Trees

Merge Tree Number	Species	DBH (cm)	Hollow Comments
364	Marri	100	Previously assessed by Alcoa/T. Kirkby. Tree ID 1400 on metal tag. Tony K reported slight chewing on upwards facing suitable hollow. WEPL also notes 20cm spout hollow present mid trunk.
529	Marri	70	Chimney hollow at 12m up in snapped trunk. Entry 30-35 cm across with suspected 30cm+ internal dimensions. Significant amount of chew marks from black cockatoo on rim indicating suitable hollow present.
3989	Marri (now dead)	95	Previously assessed by Alcoa/T. Kirkby. Tree 1836 on metal tag. Upwards opening 30cm chimney hollow in 40cm diameter branch at 18m. T. Kirkby reported chewing at entrance in 2022 assessment.

Image 01- Tree number 529 showing chew marks on rim

See locations of potential nesting trees and known breeding trees in Figure 4. Tree attributes, hollow comments and images of Bamford Class 2-3 are provided in Appendix D.

Fire Impacts on Breeding Habitat

During field surveys it was observed that significant areas of the Survey Area have been subject to impacts from intense fire which have modified breeding habitat quality. Assessment of fire footprint mapping (data supplied by Alcoa in 2023) indicates that the entire Survey Area was impacted by the Yarloop-Waroona bushfire in January 2016. The Yarloop-Waroona bushfire was a large scale, very intense fire that impacted approximately 70,000 ha of vegetation. The scale of impact is variable across the Survey Area, with ridges and plateaus most impacted and impacts increasing in the western and northern portions of the Survey Area. In highly impacted areas, a very high rate of mature trees (>80%) have suffered main trunk death, with trees resprouting from base as multi-stemmed, coppiced forms. See Image 2 below for example of fire impacted habitat.

Image 02- Fire Impacted Habitat

Within highly fire impacted habitat it was observed that a high proportion of large, senescent trees which are most suitable for black cockatoo hollow formation were destroyed by the fire. Evidence of large burnt-out stumps and remains of collapsed trees indicate that they were likely present pre 2016 fire. In particular it was noted that large marri trees which provide the most utilised breeding habitat were largely absent.

These observations are consistent with existing research, with Johnstone *et al* (2017) reporting that post 2016 fire, 19 of the 41 know black cockatoo hollows within the Larego forest block (covering the Survey Area) were destroyed. Whitford & Williams (2001) summarised that when exposed to fire, the base of the marri burns quickly, resulting in the loss of the trees' outer shell and destruction of the chimney stack. Due to the marri's lower wood density, it has increased susceptibility to fire, in comparison to jarrah's resistance to fire, correlating with its higher density. Johnstone *et al* (2013) also acknowledges that fire is a significant factor in loss of breeding habitat with veteran and stag marri trees particularly susceptible to collapse in fire.

As a result of these fire impacts portions of the Survey Area contain very low rates of suitable nesting trees and are dominated by multi-stemming regrowth, primarily jarrah.

Significant Trees

As per the Alcoa Fauna Management Plan Significant Trees (jarrah DBH>200cm; marri DBH>150cm) were identified from phase 1 WEPL survey data, then subject to follow up assessment by Tony Kirkby during phase 2 assessment. Significant trees recorded from the Survey Area are identified in Table 11.

Table 11: Significant Trees

WEPL Tree Number	Species	DBH (cm)	Assessment	Coordinate (AGD/84 Zone 50)	
				Easting	Northing
2664	Jarrah	230	Previously recorded significant tree. ID - 2675	412340.616	6352280.226
8116	Jarrah	210	Should be classed significant tree. Numbered ID-2102	416112.9196	6352335.585

Figure 4: Black Cockatoo Potential Breeding Habitat

N; 0 – 1 – 2 km		PROJECT/REPORT NAME: Black Cockatoo Targeted Assessment 2023 Willowdale Minesite	
SCALE: 1:35,000	SHEET SIZE: A3 COLOUR	CLIENT: Alcoa of Australia Limited	
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50		PROJECT NUMBER: A23.033	VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY Summer 2023		DRAWN BY / REVIEWED BY: HS/AF	DATE: 13/3/2024

Legend

- Survey Area
- Cleared Areas

Potential Nesting Trees (Class 2)

- Dead
- Marri
- T. Kirkby Inspected

Bamford Tree Class

- 2

No	Description	Drawn	Approved	Date
A	Original issue	HS	AF	13/3/2024

NOTES:

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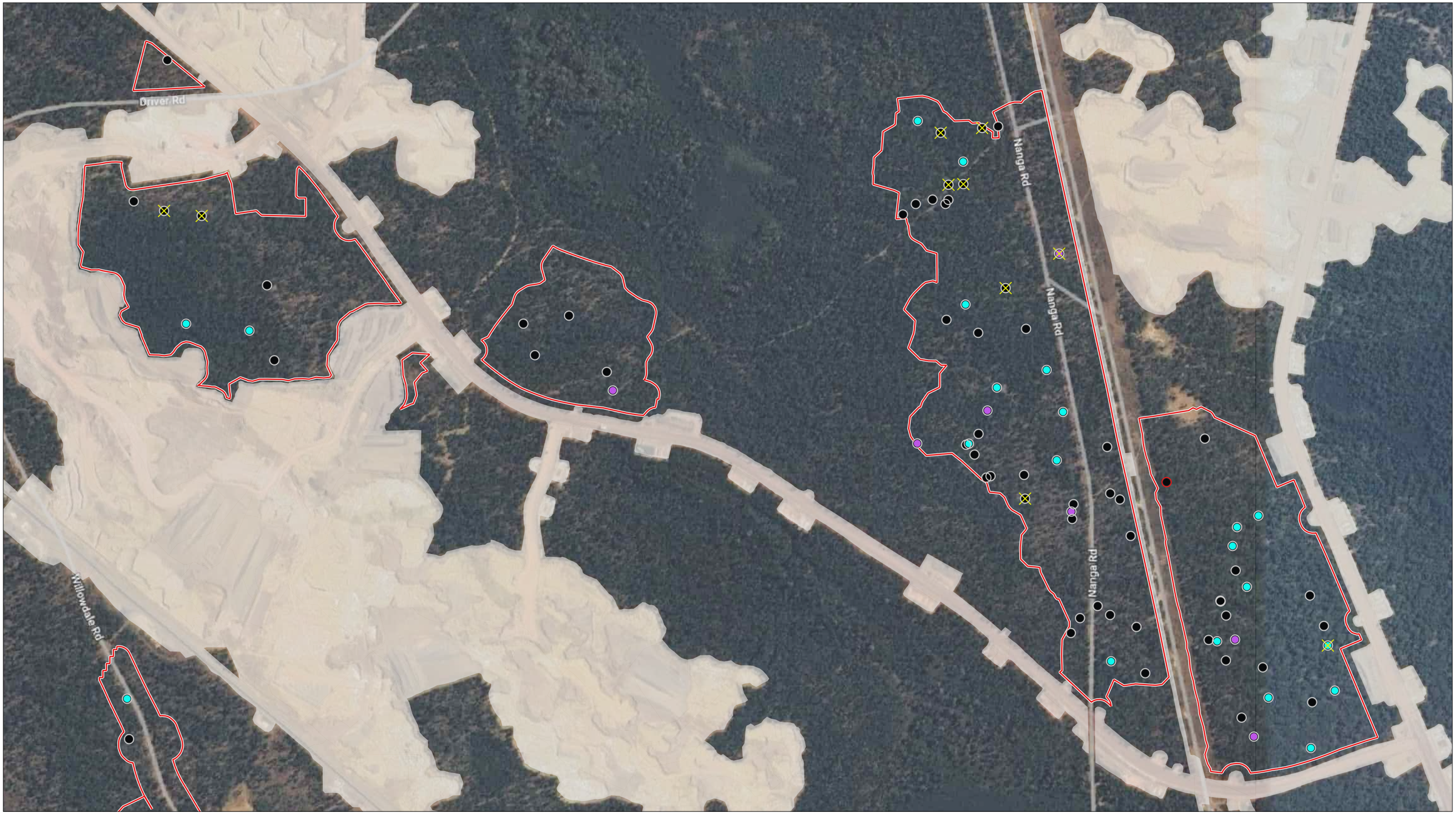

Figure 4a: Black Cockatoo Potential Breeding Habitat

N

0 250 500 m

SCALE: 1:8,000	SHEET SIZE: A3 COLOUR	
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	PROJECT NUMBER: A23.033	VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY Summer 2023	DRAWN BY / REVIEWED BY: HS/AF	DATE: 13/3/2024

PROJECT/REPORT NAME: Black Cockatoo Targeted Assessment 2023
Willowdale Minesite

CLIENT: Alcoa of Australia Limited

Legend

- Survey Area
- Cleared Areas

Potential Nesting Trees (Class 2 and 3)

- Dead
- Jarrah
- Marri
- T. Kirkby Inspected

Bamford Tree Class

- 2
- 3

OVERVIEW MAP

No	Description	Drawn	Approved	Date
A	Original issue	HS	AF	13/3/2024

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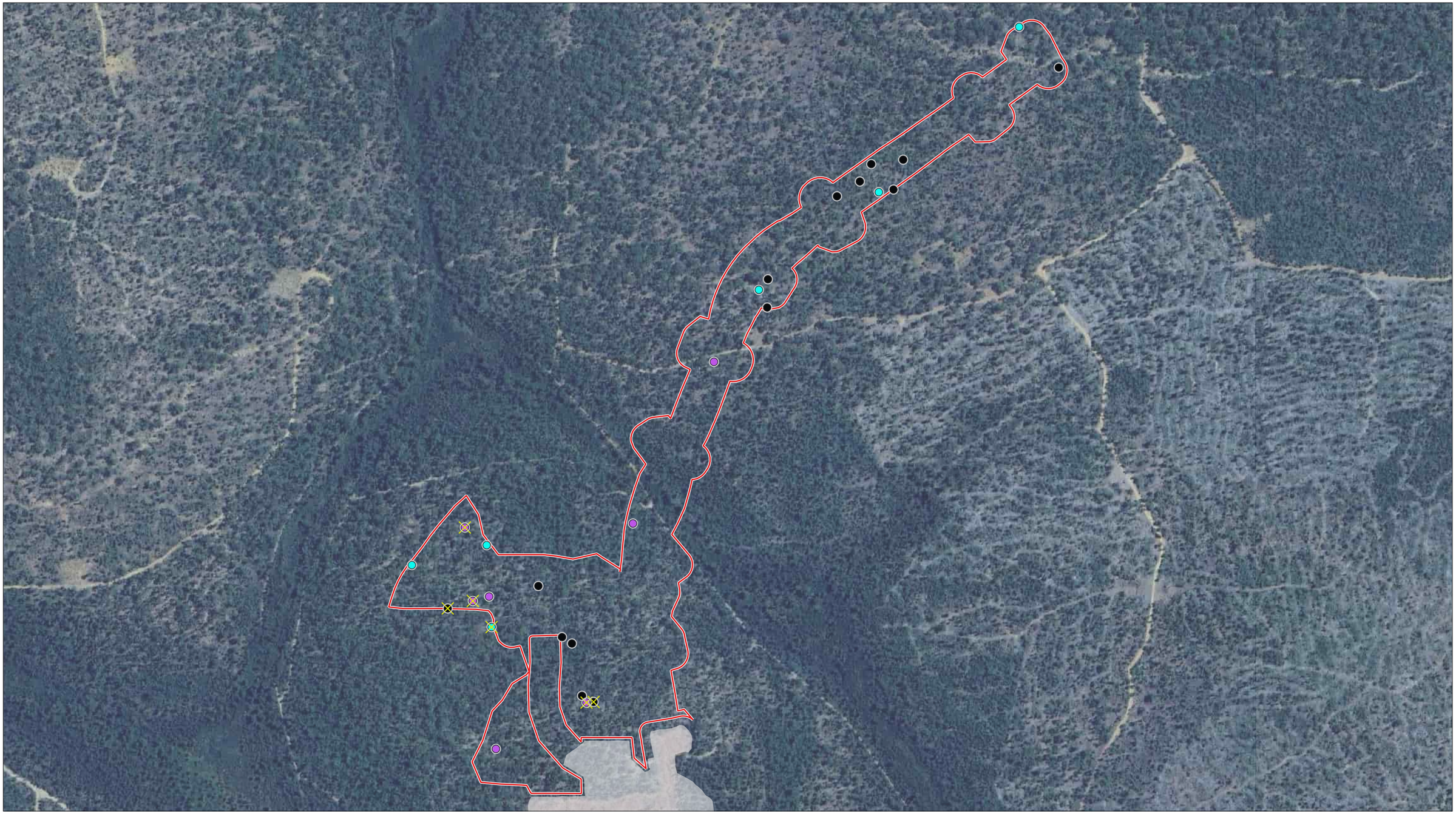

Figure 4b: Black Cockatoo Potential Breeding Habitat

0 150 300 m

N

SCALE	1:6,000
SHEET SIZE	A3 COLOUR
PROJECT/REPORT NAME	Black Cockatoo Targeted Assessment 2023 Willowdale Minesite
CLIENT	Alcoa of Australia Limited
COORDINATE REFERENCE SYSTEM	GDA2020 / MGA zone 50
PROJECT NUMBER	A23.033
VERSION	0
DATA SOURCE	LANDGATE AERIAL IMAGERY Summer 2023
DRAWN BY / REVIEWED BY	HS/AF
DATE	13/3/2024

Legend

- Survey Area
- Cleared Areas

Potential Nesting Trees (Class 2 and 3)

- Dead
- Jarrah
- Marri

Bamford Tree Class

- T. Kirkby Inspected

Bamford Tree Class

- 3

OVERVIEW MAP

No	Description	Drawn	Approved	Date
A	Original issue	HS	AF	13/3/2024

NOTES:

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Figure 4c: Black Cockatoo Potential Breeding Habitat

N

0 400 800 m

SCALE: 1:14,000	SHEET SIZE: A3 COLOUR
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	
DATA SOURCE: LANDGATE AERIAL IMAGERY Summer 2023	

PROJECT/REPORT NAME: Black Cockatoo Targeted Assessment 2023 Willowdale Minesite		
CLIENT: Alcoa of Australia Limited		
	PROJECT NUMBER: A23.033	VERSION: 0
	DRAWN BY / REVIEWED BY: HS/AF	DATE: 13/3/2024

Legend

- Survey Area
- Cleared Areas

Potential Nesting Trees (Class 2 and 3)

- Dead
- Jarrah
- Marri

Bamford Tree Class

- T. Kirkby Inspected

Bamford Tree Class

- 3

OVERVIEW MAP

No	Description	Drawn	Approved	Date
A	Original issue	HS	AF	13/3/2024

NOTES:

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Figure 4d: Black Cockatoo Potential Breeding Habitat

N

0 200 400 m

SCALE: 1:7,500	SHEET SIZE: A3 COLOUR	
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	PROJECT NUMBER: A23.033	VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY Summer 2023	DRAWN BY / REVIEWED BY: HS/AF	DATE: 13/3/2024

PROJECT/REPORT NAME: Black Cockatoo Targeted Assessment 2023 Willowdale Minesite

CLIENT: Alcoa of Australia Limited

Legend

- Survey Area
- Cleared Areas

Potential Nesting Trees (Class 2 and 3)

- Dead
- Jarrah
- Marri

Bamford Tree Class

- T. Kirkby Inspected

Bamford Tree Class

- 3

OVERVIEW MAP

No	Description	Drawn	Approved	Date
A	Original issue	HS	AF	13/3/2024

NOTES:

Cadastral boundary from LANDGATE 2022. Label corresponds to the vegetation association number.

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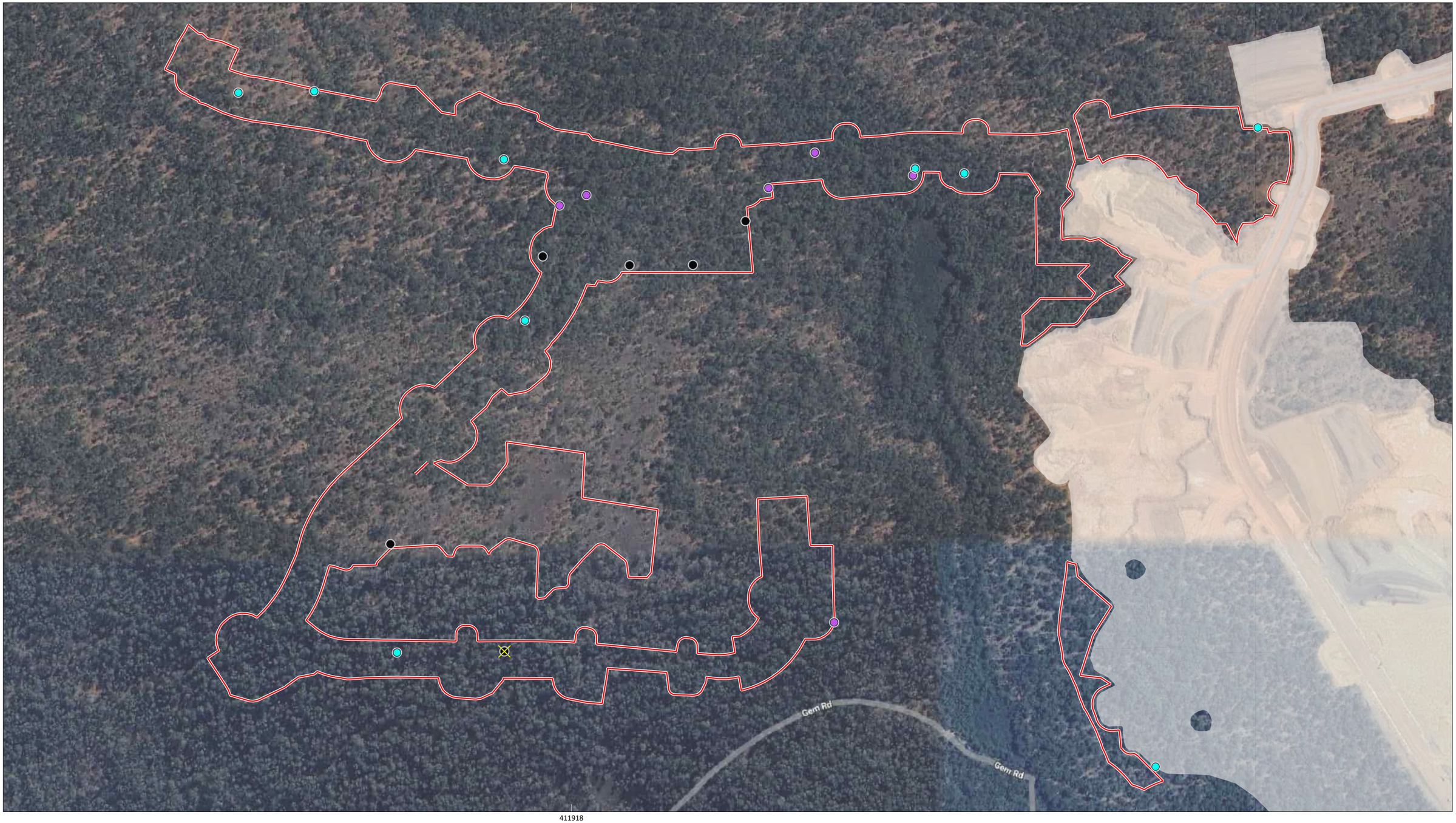

411918

Figure 4e: Black Cockatoo Potential Breeding Habitat

N

0 150 300 m

SCALE: 1:5,500	SHEET SIZE: A3 COLOUR
PROJECT/REPORT NAME: Black Cockatoo Targeted Assessment 2023 Willowdale Minesite	CLIENT: Alcoa of Australia Limited
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	PROJECT NUMBER: A23.033 / VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY Summer 2023	DRAWN BY / REVIEWED BY: HS/AF / DATE: 13/3/2024

Legend

- Survey Area
- Cleared Areas

Potential Nesting Trees (Class 2 and 3)

- Dead
- Jarrah
- Marri

Bamford Tree Class

- T. Kirkby Inspected

Bamford Tree Class

- 3

OVERVIEW MAP

No	Description	Drawn	Approved	Date
A	Original issue	HS	AF	13/3/2024

NOTES:

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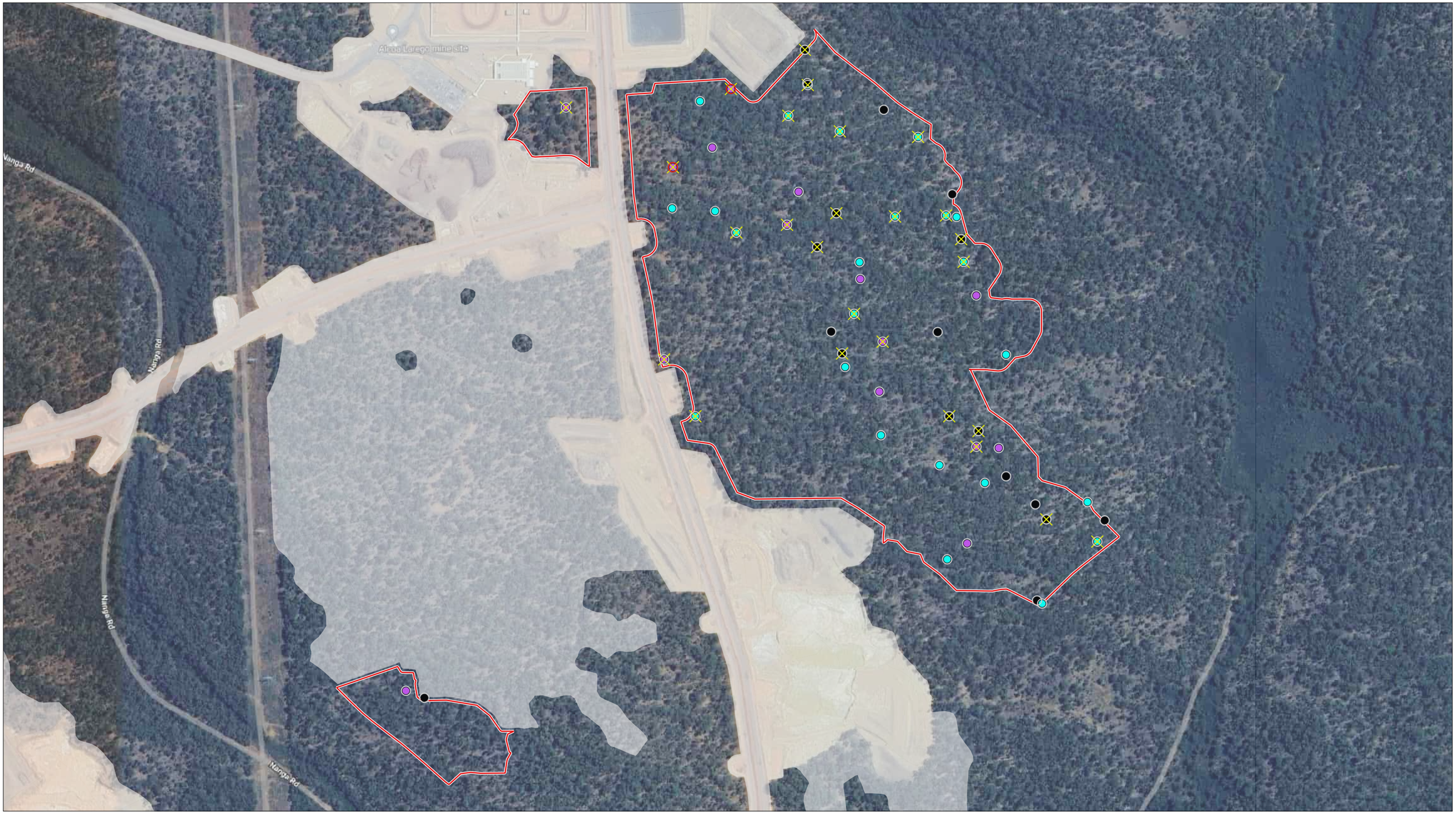

Figure 4f: Black Cockatoo Potential Breeding Habitat

N

0 150 300 m

SCALE: 1:6,000	SHEET SIZE: A3 COLOUR
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	
DATA SOURCE: LANDGATE AERIAL IMAGERY Summer 2023	

PROJECT/REPORT NAME: Black Cockatoo Targeted Assessment 2023 Willowdale Minesite	
CLIENT: Alcoa of Australia Limited	
PROJECT NUMBER: A23.033	VERSION: 0
DRAWN BY / REVIEWED BY: HS/AF	DATE: 13/3/2024

Legend

- Survey Area
- Cleared Areas

Potential Nesting Trees (Class 2 and 3)

- Dead
- Jarrah
- Marri

Bamford Tree Class

- T. Kirkby Inspected

Bamford Tree Class

- 2
- 3

OVERVIEW MAP

No	Description	Drawn	Approved	Date
A	Original issue	HS	AF	13/3/2024

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Figure 4g: Black Cockatoo Potential Breeding Habitat

0 200 400 m

N

SCALE: 1:7,000	SHEET SIZE: A3 COLOUR
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	PROJECT NUMBER: A23.033 / VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY Summer 2023	DRAWN BY / REVIEWED BY: HS/AF / DATE: 13/3/2024

PROJECT/REPORT NAME: Black Cockatoo Targeted Assessment 2023 Willowdale Minesite

CLIENT: Alcoa of Australia Limited

Legend

- Survey Area
- Cleared Areas

Potential Nesting Trees (Class 2 and 3)

- Dead
- Jarrah

Bamford Tree Class

- T. Kirkby Inspected

Bamford Tree Class

- 3

OVERVIEW MAP

No	Description	Drawn	Approved	Date
A	Original issue	HS	AF	13/3/2024

NOTES:

Cadastral boundary from LANDGATE 2022. Label corresponds to the vegetation association number.

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3.5 Foraging Habitat Assessment

The foraging habitat assessment was undertaken at three separate scales, applying guidance, and scoring tools/methodology appropriate to each scale. Assessments were:

- Whole of Survey Area as per Commonwealth referral guidelines foraging quality scoring tool (DCCEEW, 2022).
- Polygon specific foraging habitat quality as per the Habitat Quality Scoring Tool Commonwealth unpublished guidance (DCCEEW, n.d)
- Regional assessment of foraging habitat extent.

The results of these three assessments are discussed in the following sections.

The Alcoa (2023) Fauna Management Plan identifies that The Huntly and Willowdale mine areas contain predominantly high-quality foraging habitat due to the prevalence of Jarrah Forest, which contains key foraging species including marri, jarrah and proteaceous species. The mapped boundaries of foraging habitat were broadly aligned with the nine broad fauna habitat types described for the Huntly and Willowdale Mine areas as per the Alcoa (2023) Fauna Management Plan. Habitat types present within the Survey Area and extents are presented below in

Foraging Habitat Type	Black Cockatoo Habitat Quality (Alcoa, 2023)	Area (ha)
Blackbutt Forest/Bullich Forest- Blackbutt open forest with occasional bullich, and marri over sparse *Banksia littoralis*; or bullich forest valleys and drainage areas dominated by bullich and with some blackbutt, occasional marri, over sheoak and *Banksia littoralis.*	High to Medium	2.59
Jarrah /Marri Forest- Jarrah and marri open forest over grass trees (*Xanthorrhoea preissii*), *Lasiopetalum floribundum, Macrozamia* mid shrubland. Patches have dominance of understory sheoak and *Banksia grandis*. foraging habitat quality.	High	466.58
Melaleuca Dampland-Paperbark (*Melaleuca preissiana*) over sparse isolated *Banksia littoralis* over open Hakea, occasional Woody Pear (*Xylomelum*), Grass trees and over mixed shrub layer of Cyperaceae, Restionaceae, Babingtonia, Jacksonia and Acacia, over low shrubs, sedges and herbs. There are areas of sparse to occasional stunted jarrah and marri however these are limited to lowland transitional zones.	Low	0.23
Cleared-Roads**,** mining footprints, power corridor, other cleared areas.	None	8.80
Total		**478.19**

Commonwealth Referral Guidelines Foraging Quality Scoring Tool

The Commonwealth referral guidelines provides a foraging quality scoring tool to guide referral information (DCCEEW, 2022). The tool advises that if the Survey Area contains native vegetation used for foraging at any time by a black cockatoo species and is >1 ha in size, that it is considered at face value to be of very high quality and assigned a starting score of 10. The tool then allows for subtractions if attributes are present which reduce the functionality of the foraging habitat. The Commonwealth referral guidelines specify that the tool is to be applied once to the entire impact area even if there is more than one type of foraging habitat present. The calculated foraging habitat quality score is shown below in Table 12. Scores of 5-10 are identified as representing high value foraging habitat.

Table 12 Foraging Quality Scoring Tool (DCCEEW 2022)

Attribute	Baudin's black cockatoo	Carnaby's black cockatoo	Forest red-tailed black cockatoo
Starting score	10- contains native eucalypt woodlands and forest, and proteaceous woodland and heath, particularly marri	10- contains eucalypt woodland and forest that contains foraging species	10- contains jarrah or marri woodland and/or forest
Foraging potential (-2 if no foraging evidence)	-2, no foraging evidence present	No change, foraging evidence present	No change, foraging evidence present
Connectivity (-2 if no other foraging habitat in 12km)	No change, other foraging habitat <1 km away	No change, other foraging habitat <1 km away	No change, other foraging habitat <1 km away
Proximity to breeding habitat (-2 if no breeding habitat in 12km)	No change, breeding habitat within 12 km	No change, breeding habitat within 12 km	No change, breeding habitat within 12 km
Proximity to roosting (-1 if >20km from known night roost)	No change, known roosting site <20 km distant	No change, known roosting site <20 km distant	No change, known roosting site <20 km distant
Impact from significant plant disease (-1 if >50% impact)	No change, impact from plant disease affecting <50% of foraging plants	No change, impact from plant disease affecting <50% of foraging plants	No change, impact from plant disease affecting <50% of foraging plants
Total score	**8**	**10**	**10**

Commonwealth Habitat Quality Scoring Tool

The Commonwealth referral guidance allows for the inclusion of additional information for foraging habitat which may be considered during an assessment, such as the extent and density of recognised foraging plants within a Survey Area. As an additional source of information, WEPL provides an assessment of foraging

habitat quality using a more detailed scoring tool developed by DCCEEW (n.d.) referred to as the Habitat Quality Scoring Tool to produce a numerical foraging habitat score. The Habitat Quality Scoring Tool allows for a score of 0 (none) to 7 (very high) for Site Condition. This is assessed based on density of known foraging species and health of vegetation. The 0-7 Site Condition score is applied to each mapped polygon of fauna habitat. The Habitat Quality Scoring Tool then applies a Site Context score out of three, this is applied only once to the whole Survey Area.

The Site Condition habitat quality score for each species, and the total area of that score present within the Survey Area are listed in Table 13 below and shown in Figure 5. The score was calculated as per the criteria listed in Appendix C. Example images of Site Condition classes are also shown in Appendix C

Table 13: Habitat Quality Scoring Tool- Site Condition Extent

Site Condition	Baudin's Black Cockatoo (ha)	Carnaby's Black Cockatoo (ha)	Forest Red-tailed Black Cockatoo (ha)
7- Very High	169.51	169.51	181.51
6- High	148.56	148.56	136.62
5-Moderate-High	123.85	123.85	123.80
4-Moderate	27.24	27.24	27.24
3-Low-Moderate	-	-	
2-Low	-	-	
1-Negligable to Low	0.23	0.23	0.23
0-None	8.80	8.80	8.80
Total	**478.19**	**478.19**	**478.19**

The Habitat Quality Scoring Tool then requires the application of a Site Context score out of three (see Table 14) which is added to the Site Condition score for a final x/10 score. See Table 15 for final Habitat Quality Scoring Tool score. Note that habitat with a Site Condition starting score of 2 or less are extremely unlikely to be suitable habitat and do not have a Site Context score added.

Table 14: Habitat Quality Scoring Tool-Site Context

Site Context					
Proximity of the site in relation to other habitat	3	Site is within 6 km of known breeding site.	or	Site is within 12 km of other foraging resources with site condition of at least 3.	**3**
	2	Site is within 12 km of known breeding site.		Site is within 15 km of other foraging resources with site condition of at least 4.	
	1	Site is within 15 km of known breeding site.		Site is between 15 km and 20 km of other foraging resources with site condition of at least 5.	
	0	Site is further than 15 km from known breeding site.		Site is further than 20 km from other foraging resources.	
Totals					**3**

Final habitat quality score extents are summarised below in Table 15.

Table 15: Final Habitat Quality Scoring Tool Score

Site Condition	Baudin's Black Cockatoo (ha)	Carnaby's Black Cockatoo (ha)	Forest Red-tailed Black Cockatoo (ha)
10	169.51	169.51	181.51
9	148.56	148.56	136.62
8	123.85	123.85	123.80
7	27.24	27.24	27.24
6	-	-	-
5	-	-	-
4	-	-	-
3	-	-	-
2	-	-	-
1	0.23	0.23	0.23
0	8.80	8.80	8.80
Total	**478.19**	**478.19**	**478.19**

Regional Foraging Habitat Assessment

Analysis of estimated foraging habitat extent within the local area was also undertaken to provide further context. The estimated extent of foraging habitat is calculated for a buffer of 12 km around and including the Survey Area. This buffer is selected as recommended in the Commonwealth referral guidelines due to black cockatoos mainly foraging within 12 km of their nest site during the breeding season and their reliance on this proximity of foraging resources to successfully raise chicks (DCCEEW, 2022).

Analysis considers Remnant Native Vegetation Extent mapping (DPIRD-005) and Vegetation Complexes-Swan Coastal Plain and South West forest region (DBCA-046 and DBCA-047). See summary of regional vegetation complexes and extents in Table 16 and displayed in Figure 6.

Analysis indicates there is 63554.92 ha of remnant native vegetation mapped within a 12 km buffer of the Survey Area. It is expected that the majority of this vegetation would contain suitable foraging species at the same rate than that present within the Survey Area.

Within the Survey Area there is 469.4 ha of foraging habitat (excludes cleared areas). This represents 0.74 % of the estimated regional habitat extent.

Table 16 Regional Foraging Habitat Extent

Vegetation Complex	Remnant Extent (ha)
Cooke	2003.643
Darling Scarp	858.788
Dwellingup	34558.795
Forrestfield Complex	62.583
Guildford Complex	66.918
Helena 1	1489.007
Lowdon	595.673
Murray 1	10232.29
Swamp	378.171
Yarragil 1	11142.761
Yarragil 2	2166.294
Total	**63,554.92**

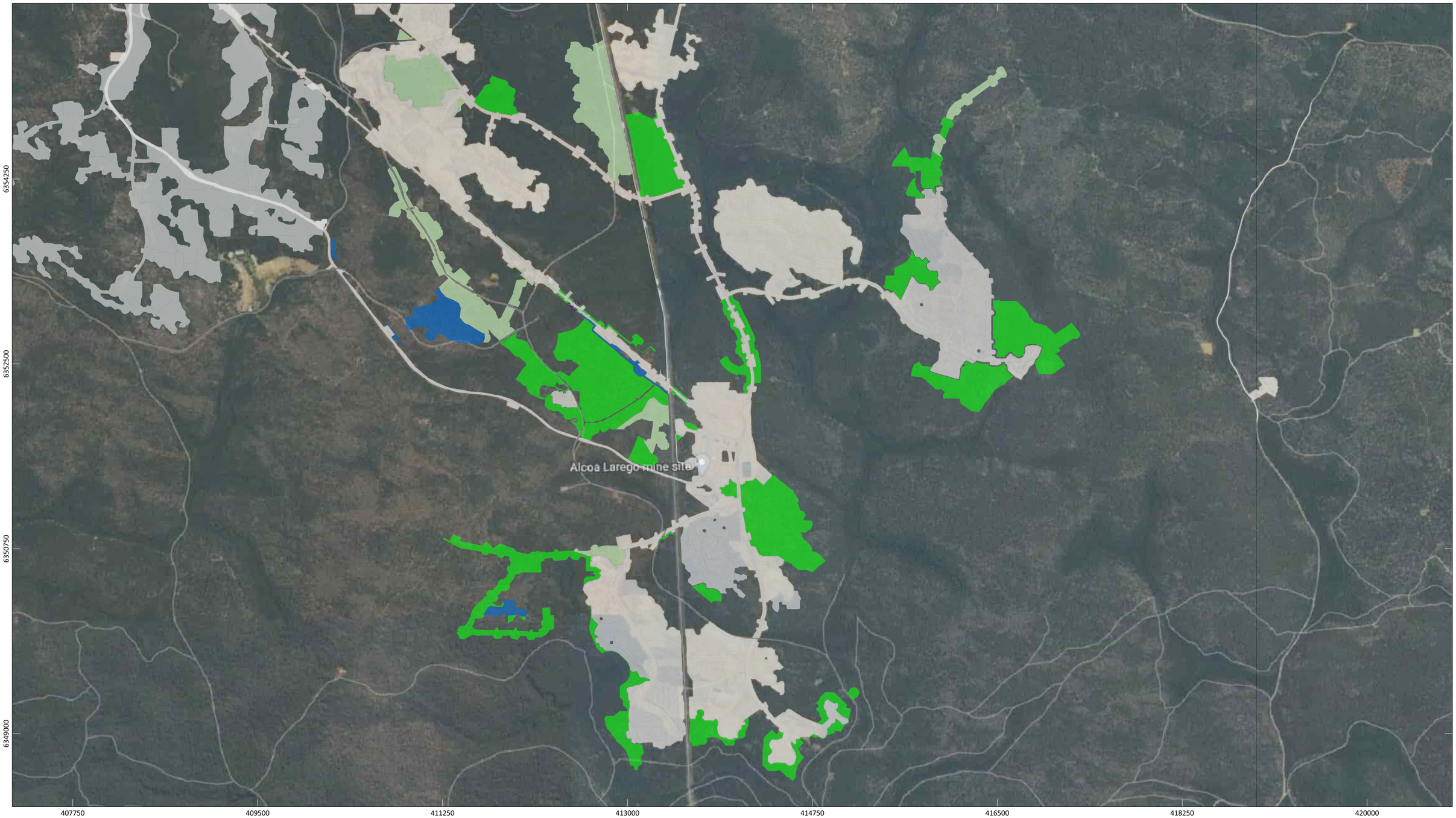

Figure 5: Black Cockatoo Foraging Habitat

N

0 1 2 km

PROJECT/REPORT NAME: Black Cockatoo Targeted Assessment 2023 Willowdale Minesite		
SCALE: 1:35,000	SHEET SIZE: A3 COLOUR	CLIENT: Alcoa of Australia Limited
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	PROJECT NUMBER: A23.033	VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY Summer 2023	DRAWN BY / REVIEWED BY: HS/AF	DATE: 13/3/2024

Legend

Cleared Areas

Foraging Habitat Score (Bamford, 2018 Scale)

- 1 - Negligible
- 4 - Moderate
- 5 - Moderate to High
- 6-7 - High

No	Description	Drawn	Approved	Date
A	Original issue	HS	AF	13/3/2024

NOTES:

Cadastral boundary from LANDGATE 2022. Label corresponds to the vegetation association number.

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411918

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Figure 5a: Black Cockatoo Foraging Habitat

N

0 0.5 1 km

SCALE: 1:18,500	SHEET SIZE: A3 COLOUR		
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50		PROJECT NUMBER: A23.033	VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY Summer 2023		DRAWN BY / REVIEWED BY: HS/AF	DATE: 13/3/2024

PROJECT/REPORT NAME: Black Cockatoo Targeted Assessment 2023 Willowdale Minesite

CLIENT: Alcoa of Australia Limited

Legend

- Cleared Areas

Foraging Habitat Score (Bamford, 2018 Scale)

- 1 - Negligible
- 4 - Moderate
- 5 - Moderate to High
- 6-7 - High

OVERVIEW MAP

No	Description	Drawn	Approved	Date
A	Original issue	HS	AF	13/3/2024

NOTES:

Cadastral boundary from LANDGATE 2022. Label corresponds to the vegetation association number.

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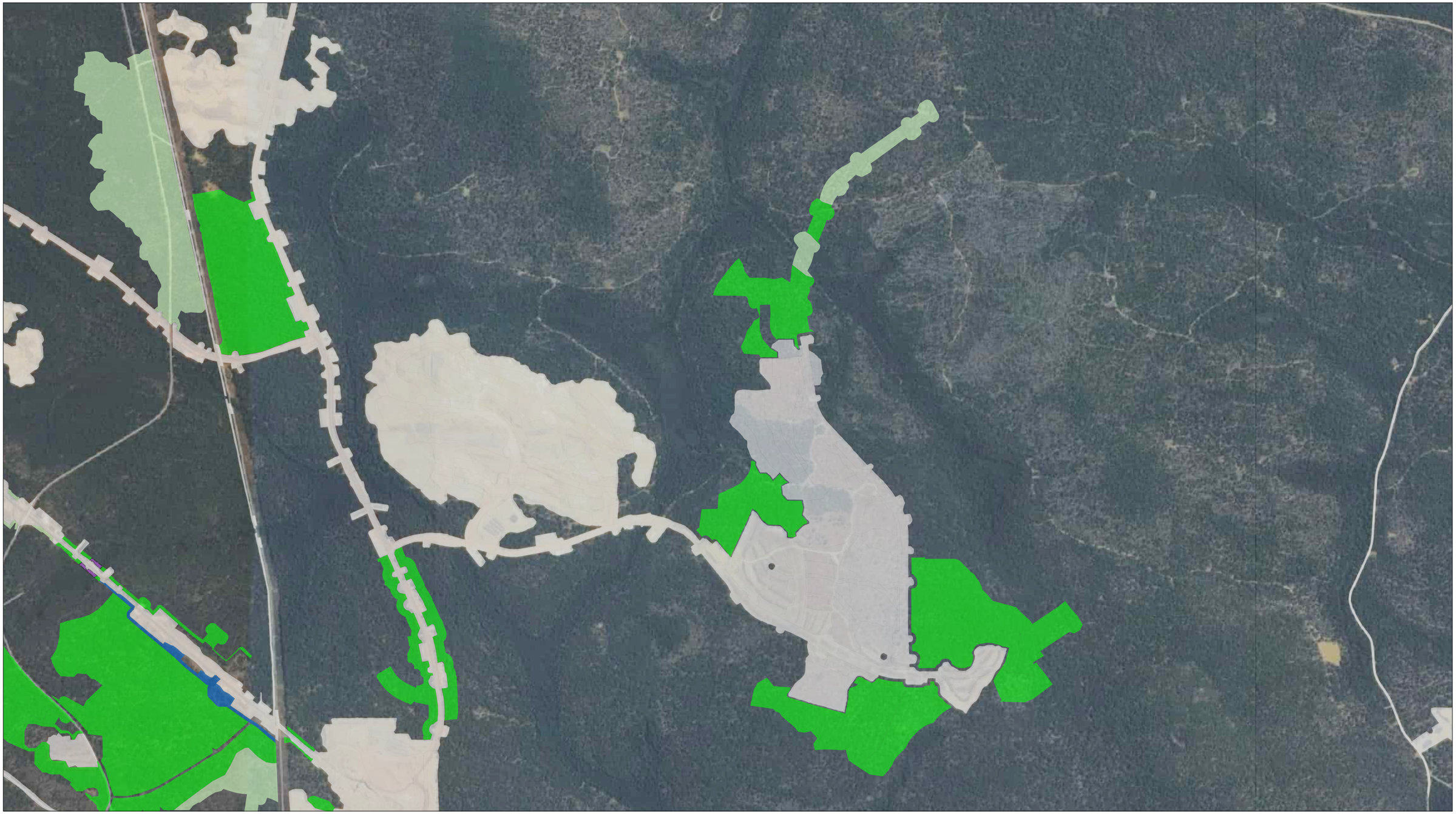

Figure 5b: Black Cockatoo Foraging Habitat

N

0 0.5 1 km

PROJECT/REPORT NAME: Black Cockatoo Targeted Assessment 2023 Willowdale Minesite		
SCALE: 1:18,000	SHEET SIZE: A3 COLOUR	CLIENT: Alcoa of Australia Limited
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	PROJECT NUMBER: A23.033	VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY Summer 2023	DRAWN BY / REVIEWED BY: HS/AF	DATE: 13/3/2024

Legend

- Cleared Areas

Foraging Habitat Score (Bamford, 2018 Scale)

- 1 - Negligible
- 4 - Moderate
- 5 - Moderate to High
- 6-7 - High

OVERVIEW MAP

No	Description	Drawn	Approved	Date
A	Original issue	HS	AF	13/3/2024

NOTES:

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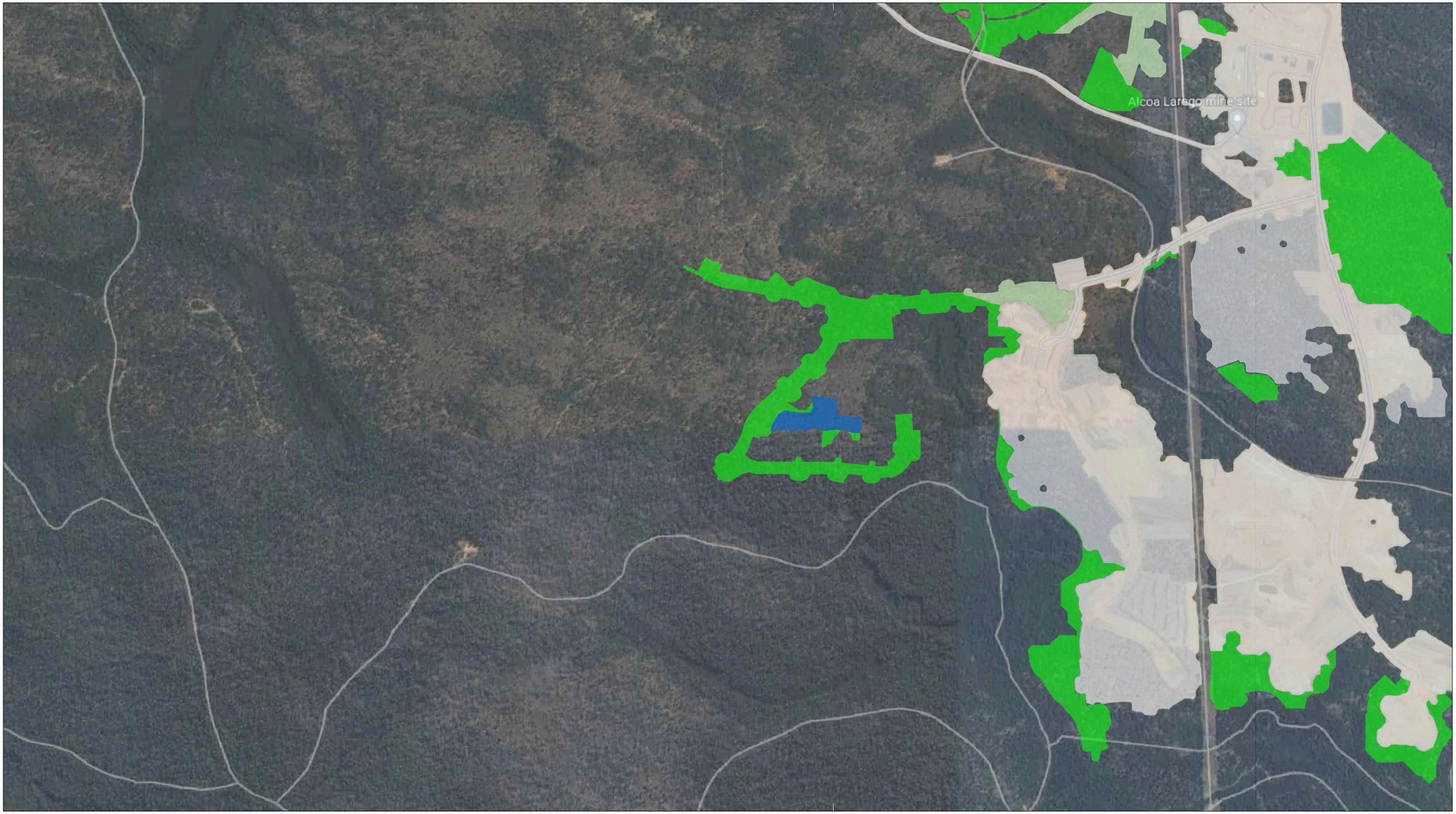


411918

Figure 5c: Black Cockatoo Foraging Habitat

N

0 0.5 1 km

SCALE: 1:16,500	SHEET SIZE: A3 COLOUR	
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	PROJECT NUMBER: A23.033	VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY Summer 2023	DRAWN BY / REVIEWED BY: HS/AF	DATE: 13/3/2024

PROJECT/REPORT NAME: Black Cockatoo Targeted Assessment 2023
Willowdale Minesite

CLIENT: Alcoa of Australia Limited

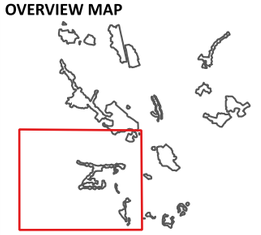
Legend

- Cleared Areas

Foraging Habitat Score (Bamford, 2018 Scale)

- 4 - Moderate
- 5 - Moderate to High
- 6-7 - High

OVERVIEW MAP



No	Description	Drawn	Approved	Date
A	Original issue	HS	AF	13/3/2024

NOTES:

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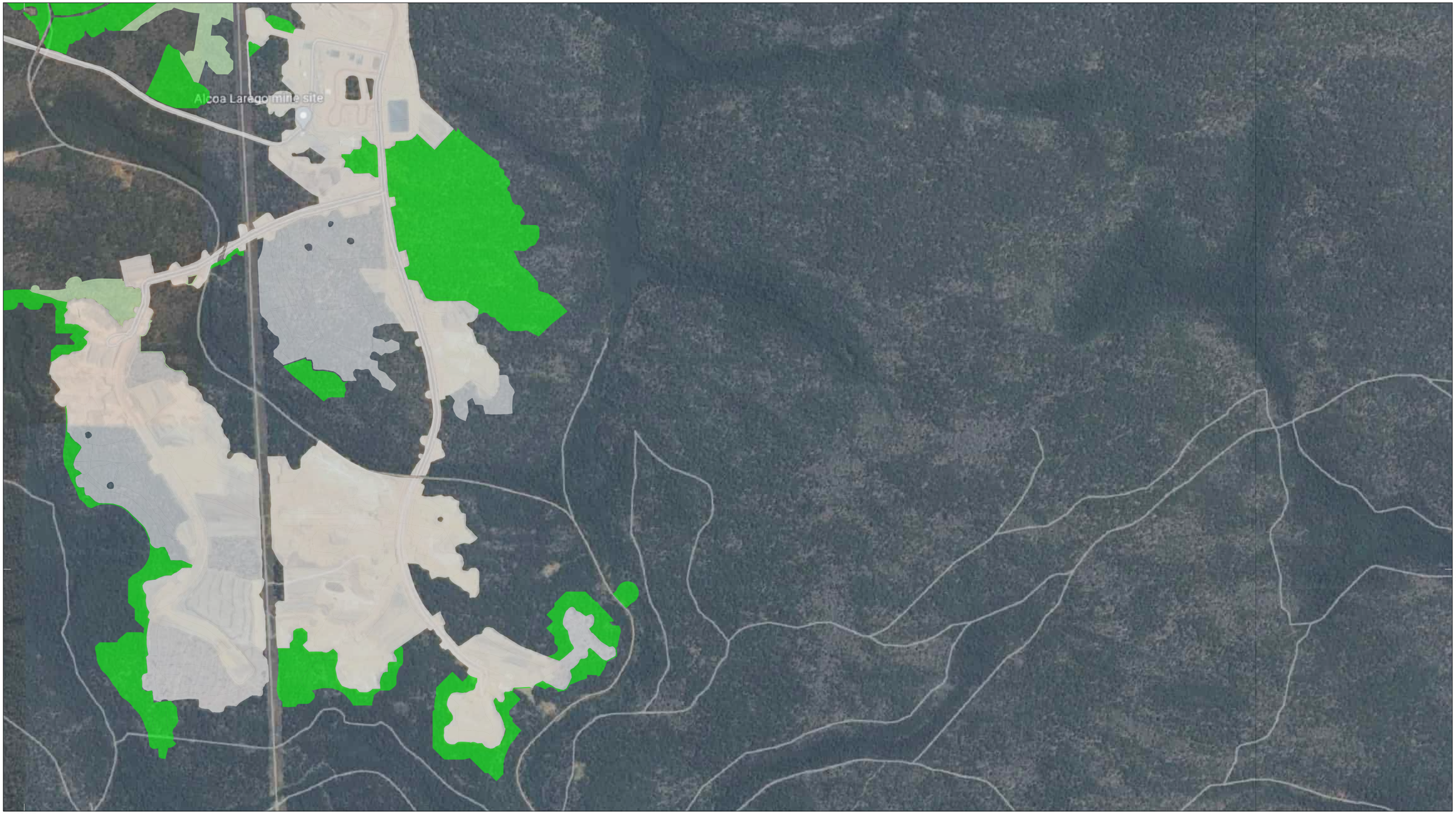

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Figure 5d: Black Cockatoo Foraging Habitat

0 0.5 1 km

N

SCALE: 1:16,500	SHEET SIZE: A3 COLOUR
COORDINATE REFERENCE SYSTEM: GDA2020 / MGA zone 50	PROJECT NUMBER: A23.033 / VERSION: 0
DATA SOURCE: LANDGATE AERIAL IMAGERY Summer 2023	DRAWN BY / REVIEWED BY: HS/AF / DATE: 13/3/2024

PROJECT/REPORT NAME: Black Cockatoo Targeted Assessment 2023
Willowdale Minesite

CLIENT: Alcoa of Australia Limited

Legend

- Cleared Areas

Foraging Habitat Score (Bamford, 2018 Scale)

- 5 - Moderate to High
- 6-7 - High

OVERVIEW MAP

No	Description	Drawn	Approved	Date
A	Original issue	HS	AF	13/3/2024

NOTES:

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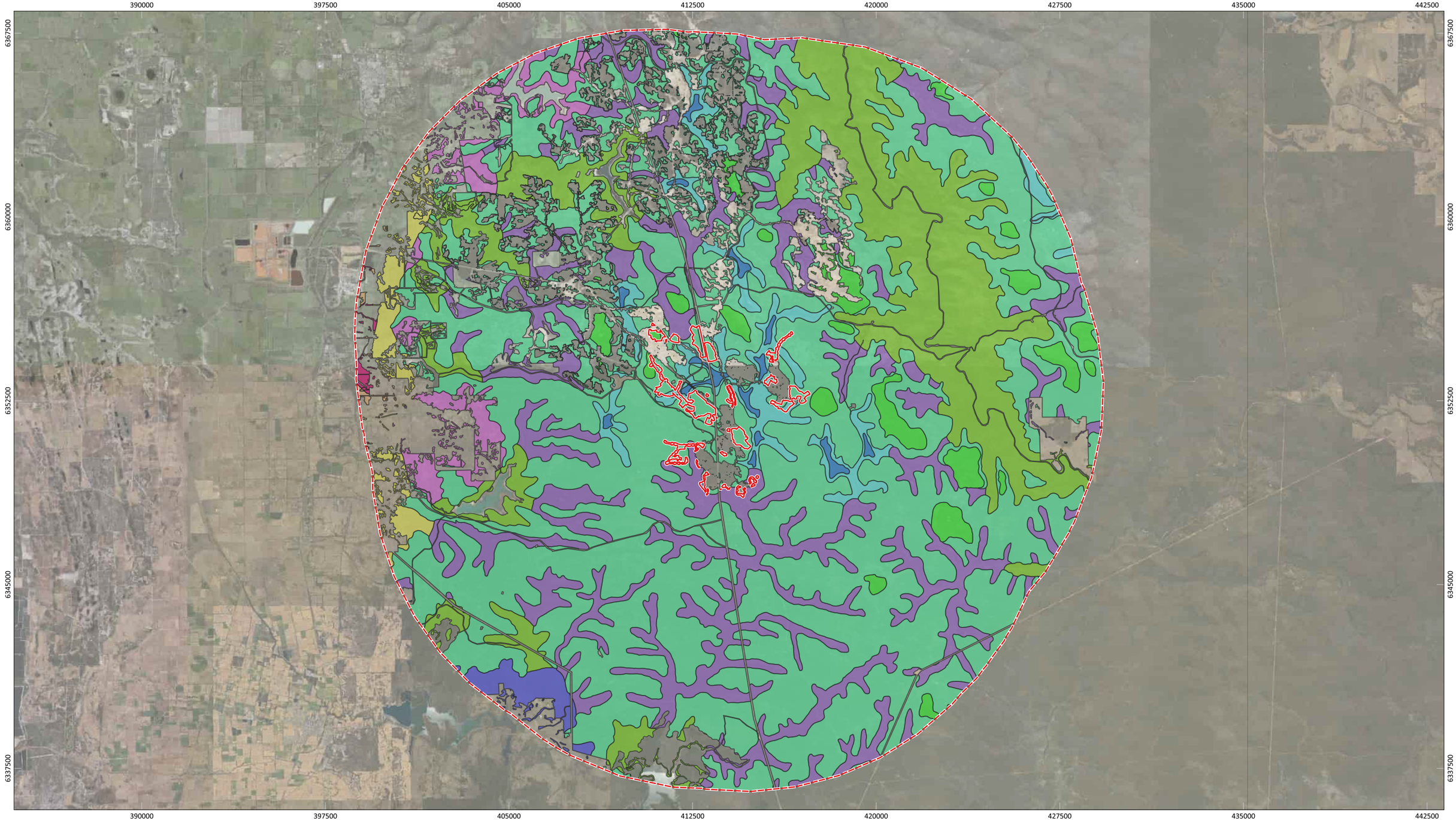

Figure 6: Black Cockatoo Foraging Habitat Extent 12 km Buffer

N

0 3 6 9 km

PROJECT/REPORT NAME	Black Cockatoo Targeted Assessment 2023 Willowdale Minesite
SCALE	1:150,000
SHEET SIZE	A3 COLOUR
CLIENT	Alcoa of Australia Limited
COORDINATE REFERENCE SYSTEM	GDA2020 / MGA zone 50
PROJECT NUMBER	A23.033
VERSION	0
DATA SOURCE	LANDGATE AERIAL IMAGERY Summer 2023
DRAWN BY / REVIEWED BY	HS/AF
DATE	12/3/2024

Legend

- Survey Area
- 12 km Radius of Survey Area

Vegetation Complexes (DBCA-046; DBCA-047) within Extent of Remnant Native Vegetation (DPIRD-005)

- Cooke
- Darling Scarp
- Dwellingup
- Forrestfield Complex
- Guildford Complex
- Helena 1
- Lowdon
- Murray 1
- Swamp
- Yarragil 1
- Yarragil 2

No	Description	Drawn	Approved	Date
A	Original issue	HS	AF	12/3/2024

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3.6 Roosting Habitat Assessment

Night roosting locations are typically in proximity to foraging habitat (black cockatoos forage within 20km of night roosts and most frequently within 6km) and with access to water points <2km from roosting location (DCCEEW, 2022). Any groups of tall trees, particularly large native eucalypts in proximity to water sources may provide night roosting habitat (DCCEEW, 2022).

During the field survey six locations were recorded that displayed evidence of having been used as a roost site. Identification of potential roost sites primarily focused on secondary evidence including feather, scats, and branch clippings. During early mornings and late afternoon opportunistic observations of birds congregating at watering points and perching were recorded to assist in identifying potential roost sites. Roost site details are summarised below in Table 17 and locations shown in Figure 7.

Table 17: Summary of Roost Sites

Roost ID	Assessment and Comments	Location
Roost 01	Confirmed as a roost site. Roosting evidence spread over approximately 100m radius in patches under tall trees. Tall mature good condition jarrah and marri forest. Two known nesting trees are located <500 m to the southwest. Abundant scat patches, clipped leaves and twigs, dropped feathers from forest red-tailed black cockatoo. Forest red tail-black cockatoo observed here perching in trees at dawn on two separate mornings in August. Several permanent artificial watering points within 1km from water storage dams and stormwater basins at the Larego offices and crusher hub.	500m west of the Larego offices. At crest of hill running down to valley to north.
Roost 02	Considered likely to be a roost site for forest red tail-black cockatoo. Not visited at night or dawn to confirm. Abundant scat patches, feathers and leaf clipping spread around 100 m radius. Tall mature jarrah forest in good condition. Forest red-tailed black cockatoo frequently observed late afternoon drinking from sump on west side of the haul Rd 200m to the north. Several permanent artificial watering points within 2km from water storage dams and stormwater basins at the Larego offices and crusher hub. Located 500m south of Roost 04. May be part of a single larger roosting area.	1.5km north of Larego office on east side of Ajana Haul Rd. In broad valley with drainage line to east.
Roost 03	Small area with small amount of roosting evidence. Scat splatter patches, leaf and twig clips. No feathers identifying species or birds observed. Site visited at dawn in August on one occasion, no birds present. Small extent covering 20m radius. In medium size jarrah trees on edge of road. The site has been used for roosting but does not appear to be frequently used or used by a large number of birds.	1.5km west of Larego office at intersection of Larego Access Rd and Nanga Rd. On broad plateau.

Roost ID	Assessment and Comments	Location
	Considered likely to be a roost site for forest red tail-black cockatoo. Not visited at night or dawn to confirm. Abundant scat patches, feathers and leaf clipping spread around 100 m radius. Tall mature jarrah forest in good condition.	
Roost 04	Forest red-tailed black cockatoo frequently observed late afternoon drinking from sump on west side of the haul Rd 200m to the south. Several permanent artificial watering points within 2km from water storage dams and stormwater basins at the Larego offices and crusher hub. Located 500m North of Roost 02. May be part of a single larger roosting area.	2 km north of Larego office on east side of Ajana Haul Rd. In broad valley with drainage line to east.
Roost 05	Small area with small amount of roosting evidence. Scat splatter patches, leaf and twig clips. No feathers identifying species or birds observed. Small extent covering 20m radius. The site has been used for roosting but does not appear to be frequently used or used by a large number of birds. Drainage line 1.5 km to west and south may provide watering points.	200m south of intersection of Wills Haul Rd and Gregory 4 Haul Rd. On upper slope of broad hill.
Roost 06	Considered likely to be a roost site for forest red tail-black cockatoo. Not visited at night or dawn to confirm. Abundant scat patches, feathers and leaf clipping spread around 100 m radius. Tall mature jarrah forest in good condition. Known nesting tree located 800m to north. Watering points present <2km away in drainage sumps along haul road and drainage line to east.	At intersection of Ajana Haul Rd and HV Access Rd. On upper slope of broad hill.

It is highly likely that more roost locations are present within the broader Larego region considering the frequency of observations of black cockatoos.

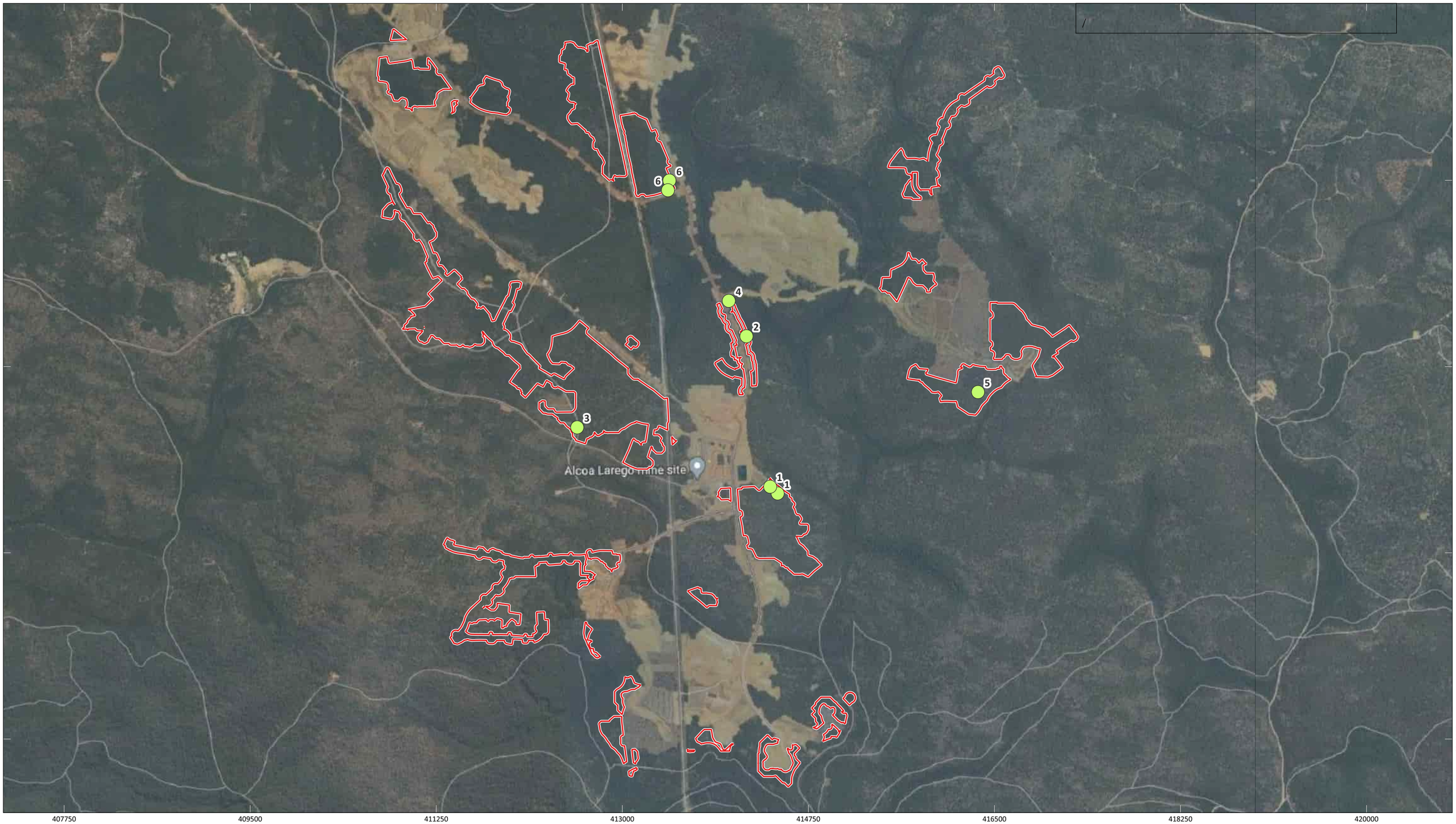

Figure 7: Black Cockatoo Roosting Sites

N

0 1 2 km

PROJECT/REPORT NAME	Black Cockatoo Targeted Assessment 2023 Willowdale Minesite
SCALE	1:35,000
SHEET SIZE	A3 COLOUR
CLIENT	Alcoa of Australia Limited
COORDINATE REFERENCE SYSTEM	GDA2020 / MGA zone 50
PROJECT NUMBER	A23.033
VERSION	0
DATA SOURCE	LANDGATE AERIAL IMAGERY Summer 2023
DRAWN BY / REVIEWED BY	HS/AF
DATE	13/3/2024

Legend

- Survey Area
- Black Cockatoo Roosting Sites (WEPL, 2023)

No	Description	Drawn	Approved	Date
A	Original issue	HS	AF	13/3/2024

NOTES:

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4. Discussion

High quality black cockatoo habitat is present within the jarrah-marri forest of the Survey Area. All three species (forest red-tailed, Baudin's and Carnaby's black cockatoos) were either recorded during the survey or are known to occur from previous survey effort, with forest red-tailed black cockatoo being most frequently recorded. Forest red-tailed black cockatoo and Baudin's black cockatoo breeding is also known to occur within the Larego region.

Significant portions of the Survey Area have been subject to impacts from intense fire which have modified habitat quality. The Yarloop-Waroona bushfire in 2016 has resulted in significant areas where high proportion of large, senescent trees which are most suitable for black cockatoo hollow formation were destroyed by the fire. The quality of foraging habitat has also been decreased in these areas with reduced canopy cover of foraging species and die off of mature trees.

Breeding Habitat

A combined total of 13,267 potential, suitable or known nesting trees were recorded. The vast majority (97 %) of these trees are Bamford Class 4 or 5 trees, defined by DCCEEW, 2022 as potential nesting trees, however these do not currently contain suitable nesting hollows.

Following phase 2 assessment of 86 trees assessed as having a moderate potential to contain suitable nesting hollows (Bamford Class 3) none were identified as containing suitable nesting hollows.

Three Bamford Class 2 trees which show signs of chew marks indicating they are a known breeding tree are present within the Survey Area. Two of these trees were previously recorded by Alcoa/T. Kirkby, with one additional known nesting tree added by 2023 surveys.

Foraging Habitat

The Alcoa (2023) Fauna Management Plan identifies that The Huntly and Willowdale mine areas contain predominantly high-quality foraging habitat due to the prevalence of Jarrah Forest. Foraging habitat quality was rated using the Commonwealth Habitat Quality Scoring Tool (DCCEEW, n.d.). Foraging habitat quality extents within the Survey Area out of ten are:

- Baudin's black cockatoo: 169.51 ha (10/10), 148.56 ha (9/10), 123.85 ha (8/10), 27.24 ha (7/10), 0.23 ha (1/10) and 8.80 ha (None 0).
- Carnaby's black cockatoo: 169.51 ha (10/10), 148.56 ha (9/10), 123.85 ha (8/10), 27.24 ha (7/10), 0.23 ha (1/10) and 8.80 ha (None 0).
- Forest red-tailed black cockatoo: 181.51 ha (10/10), 136.62 ha (9/10), 123.85 ha (8/10), 27.24 ha (7/10), 0.23 ha (1/10) and 8.80 ha (None 0).

Analysis of regional habitat extent indicates there is 63,554.92 ha of remnant native vegetation mapped within a 12 km buffer of the Survey Area. It is expected that the majority of this vegetation would contain

suitable foraging species at the same or greater rate than that present within the Survey Area. The 469.4 ha of foraging habitat (excludes cleared areas) represents 0.74 % of the estimated regional habitat extent. The habitat quality within the Survey Area is considered likely to be analogous to that of the regional foraging habitat.

Roosting Habitat

Six locations were recorded that displayed evidence of having been used as a roost site. Of these one (Roost 01) was confirmed as a roosting site through secondary evidence and by dawn visits recording forest red-tailed black cockatoos roosting. Three sites (Roost 02, 04 and 06) are considered likely to be roost sites based on abundant scat patches, feathers and leaf clipping evidence. Roost 02 and 04 are separated by only 500m and may actually comprise one larger roosting area. Two roost sites (Roost 03 and 05) were small areas with small amount of roosting evidence. These sites have been used for roosting but do not appear to be frequently used or used by a large number of birds.

It is highly likely that more roost locations are present within the broader Larego region considering the frequency of observations of black cockatoos. Additional specific surveys involving repeated visits to suspected roost sites and dawn and dusk observations would be required to advance understanding of roosting behaviour in the Larego region.

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Appendix A
Legislation

Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act aims to protect matters of national environmental significance (MNES). Under the EPBC Act, the Commonwealth Department of Climate Change, Energy and the Environment lists threatened species and communities in categories determined by criteria set out in the EPBC Act.

Projects likely to cause a significant impact on MNES should be referred to the DCCEEW for assessment under the EPBC Act.

Biodiversity Conservation Act 2016

The Biodiversity Conservation Act 2016 aims to conserve and protect biodiversity and biodiversity components within the State and to promote ecologically sustainable use of biodiversity components in the State.

Environmental Protection Act 1986

Declared Rare Flora (DRF) and Threatened Ecological Communities (TECs) are given special consideration in environmental impact assessments and have special status as Environmentally Sensitive Areas (ESAs) under the EP Act and the Environmental Protection (Clearing of Native Vegetation) Regulations 2004. Exemptions for a clearing permit do not apply in an ESA. In addition, habitat necessary for the maintenance of indigenous fauna is considered in the clearing principles and assessed during consideration of applications for a clearing permit.

Biosecurity and Agricultural Management Act 2007

Plants may be 'Declared' by the Minister for Agriculture and Food under the BAM Act. The Western Australian Organism List contains information on the area(s) in which a plant is declared and the control and keeping categories to which it has been assigned in Western Australia. A declaration may apply to the whole State, to districts, individual properties or even to single paddocks. If a plant is 'Declared', landholders are obliged to control that plant on their properties.

Weeds of National Significance

The Australian Government along with the State and Territory governments has endorsed 32 WoNS. Four major criteria were used in determining WoNS:

- The invasiveness of a weed species.
- A weed's impacts.
- The potential for spread of a weed.
- Socio-economic and environmental values.

Each WoNS has a national strategy and a national coordinator, responsible for implementing the strategy. WoNS are regarded as the worst weeds in Australia because of their invasiveness, potential for spread, and economic and environmental impacts.

Department of Biodiversity, Conservation and Attractions Priority Lists

DBCA lists 'Priority' flora and fauna that have not been assigned statutory protection as "Threatened" under the BC Act and are under consideration for declaration as Threatened. Flora and fauna assessed as Priority 1-3 are considered to be in urgent need of further survey. Priority 4 flora requires monitoring every 5 -10 years.

DBCA maintains a list of Priority Ecological Communities (PECs) which identifies plant communities that require further investigation before possible nomination for TEC status. Once listed, a community becomes a PEC and, when endorsed by the WA Minister for Environment, becomes a TEC and protected as an ESA under Environmental Protection (Clearing of Native Vegetation) Regulations 2004.

Informal Recognition of Flora and Fauna

Certain populations or communities of flora and/or fauna may be of local significance or interest because of their patterns of distribution and abundance. For example, specific locations of flora and may be locally significant because they are range extensions to the previously known distribution, or are newly discovered taxa (and have the potential to be of more than local significance). In addition, many species are in decline as a result of threatening processes (land clearing, grazing, and changed fire regimes) and relict populations of such species assume local importance for DBCA. It is not uncommon for DBCA to make comment on these species of interest.

Appendix B
Definitions and Criteria

EPBC Act Categories for Flora, Fauna and Ecological Communities

Category	Threatened Species	Threatened Ecological Communities
Extinct	A native species is eligible to be included in the extinct category at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.	N/A.
Extinct in the wild	A native species is eligible to be included in the extinct in the wild category at a particular time if, at that time: (a) it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or (b) it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.	N/A.
Critically Endangered (CE)	A native species is eligible to be included in the critically endangered category at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.	An ecological community is eligible to be included in the critically endangered category at a particular time if, at that time, it is facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with the prescribed criteria.
Endangered (EN)	A native species is eligible to be included in the endangered category at a particular time if, at that time: (a) it is not critically endangered; and (b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.	An ecological community is eligible to be included in the endangered category at a particular time if, at that time: (a) it is not critically endangered; and (b) it is facing a very high risk of extinction in the wild in the near future, as determined in accordance with the prescribed criteria.
Vulnerable (VU)	A native species is eligible to be included in the vulnerable category at a particular time if, at that time: (a) it is not critically endangered or endangered; and (b) it is facing a high risk of extinction in the wild in the medium term future, as determined in accordance with the prescribed criteria.	An ecological community is eligible to be included in the vulnerable category at a particular time if, at that time: (a) it is not critically endangered or endangered; and (b) it is facing a high risk of extinction in the wild in the medium term future, as determined in accordance with the prescribed criteria.
Conservation Dependent	A native species is eligible to be included in the conservation dependent category at a particular time if, at that time: (a) the species is the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered; or (b) the following subparagraphs are satisfied: (i) the species is a species of fish. (ii) the species is the focus of a plan of management that provides for	N/A.

Category	Threatened Species	Threatened Ecological Communities
	management actions necessary to stop the decline of, and support the recovery of, the species so that its chances of long-term survival in nature are maximised. (iii) the plan of management is in force under a law of the Commonwealth or of a State or Territory. (iv) cessation of the plan of management would adversely affect the conservation status of the species.	

Conservation Codes for Western Australian Flora and Fauna (DBCA)

Conservation Codes for Western Australian Flora and Fauna	
Threatened, Extinct and Specially Protected fauna or flora[1] are species[2] which have been adequately searched for and are deemed to be, in the wild, threatened, extinct or in need of special protection, and have been gazetted as such. **The Wildlife Conservation (Specially Protected Fauna) Notice 2018 and the Wildlife Conservation (Rare Flora) Notice 2018 have been transitioned under regulations 170, 171 and 172 of the Biodiversity Conservation Regulations 2018 to be the lists of Threatened, Extinct and Specially Protected species under Part 2 of the *Biodiversity Conservation Act 2016*.** **Categories of Threatened, Extinct and Specially Protected fauna and flora are:**	
T	**Threatened species** Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as threatened species under section 26(2) of the *Biodiversity Conservation Act 2016* (BC Act). Threatened fauna is that subset of 'Specially Protected Fauna' listed under schedules 1 to 3 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for Threatened Fauna. Threatened flora is that subset of 'Rare Flora' listed under schedules 1 to 3 of the Wildlife Conservation (Rare Flora) Notice 2018 for Threatened Flora. The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using International Union for Conservation of Nature (IUCN) Red List categories and criteria as detailed below.
CR	**Critically endangered species** Threatened species considered to be "facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines". Listed as critically endangered undersection 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for critically endangered fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for critically endangered flora.
EN	**Endangered species** Threatened species considered to be "facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines". Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines. Published under schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for endangered fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for endangered flora.

Conservation Codes for Western Australian Flora and Fauna	
VU	**Vulnerable species** Threatened species considered to be "facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines". Listed as vulnerable undersection 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for vulnerable fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for vulnerable flora.
Extinct species **Listed by order of the Minister as extinct under section 23(1) of the BC Act as extinct or extinct in the wild.**	
EX	**Extinct species** Species where "there is no reasonable doubt that the last member of the species has died", and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act). Published as presumed extinct under schedule 4 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for extinct fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for extinct flora.
EW	**Extinct in the wild species** Species that "is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form", and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act). Currently there are no threatened fauna or threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.
Specially protected species **Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection.** **Species that are listed as threatened species (critically endangered, endangered or vulnerable) or extinct species under the BC Act cannot also be listed as Specially Protected species.**	
MI	**Migratory species** Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act). Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species. Published as migratory birds protected under an international agreement under schedule 5 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.

Conservation Codes for Western Australian Flora and Fauna	
CD	**Species of special conservation interest (conservation dependent fauna)** Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act). Published as conservation dependent fauna under schedule 6 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.
OS	**Other specially protected species** Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act). Published as other specially protected fauna under schedule 7 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018.
P	**Priority species** Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened fauna or flora. Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring. Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.
1	**Priority 1: Poorly-known species** Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.
2	**Priority 2: Poorly-known species** Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.
3	**Priority 3: Poorly-known species** Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.

Conservation Codes for Western Australian Flora and Fauna	
4	**Priority 4: Rare, Near Threatened and other species in need of monitoring** (a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands. (b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent. (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

[1] The definition of flora includes algae, fungi and lichens.

DBCA Definitions and Criteria for TECs and PECs

Criteria	Definition
Threatened Ecological Communities	
Presumed Totally Destroyed (PD)	An ecological community that has been adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure in the foreseeable future. An ecological community will be listed as presumed totally destroyed if there are no recent records of the community being extant and either of the following applies (A or B): A. Records within the last 50 years have not been confirmed despite thorough searches of known or likely habitats or B. All occurrences recorded within the last 50 years have since been destroyed.
Critically Endangered (CR)	An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated. An ecological community will be listed as Critically Endangered when it has been adequately surveyed and is found to be facing an extremely high risk of total destruction in the immediate future. This will be determined on the basis of the best available information, by it meeting any one or more of the following criteria (A, B or C): A. The estimated geographic range, and/or total area occupied, and/or number of discrete occurrences since European settlement have been reduced by at least 90% and either or both of the following apply (i or ii): i. geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is imminent (within approximately 10 years). ii. modification throughout its range is continuing such that in the immediate future (within approximately 10 years) the community is unlikely to be capable of being substantially rehabilitated. B. Current distribution is limited, and one or more of the following apply (i, ii or iii): i. geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the immediate future (within approximately 10 years). ii. there are very few occurrences, each of which is small and/or isolated and extremely vulnerable to known threatening processes.

Criteria	Definition
	iii. there may be many occurrences but total area is very small and each occurrence is small and/or isolated and extremely vulnerable to known threatening processes. C. The ecological community exists only as highly modified occurrences that may be capable of being rehabilitated if such work begins in the immediate future (within approximately 10 years).
Endangered (EN)	An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future. An ecological community will be listed as Endangered when it has been adequately surveyed and is not Critically Endangered but is facing a very high risk of total destruction in the near future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria (A, B, or C): A. The geographic range, and/or total area occupied, and/or number of discrete occurrences have been reduced by at least 70% since European settlement and either or both of the following apply (i or ii): i. the estimated geographic range, and/or total area occupied and/or number of discrete occurrences are continuing to decline such that total destruction of the community is likely in the short term future (within approximately 20 years). ii. modification throughout its range is continuing such that in the short term future (within approximately 20 years) the community is unlikely to be capable of being substantially restored or rehabilitated. B. Current distribution is limited, and one or more of the following apply (i, ii or iii): i. geographic range and/or number of discrete occurrences, and/or area occupied is highly restricted and the community is currently subject to known threatening processes which are likely to result in total destruction throughout its range in the short term future (within approximately 20 years). ii. there are few occurrences, each of which is small and/or isolated and all or most occurrences are very vulnerable to known threatening processes. iii. there may be many occurrences but total area is small and all or most occurrences are small and/or isolated and very vulnerable to known threatening processes. The ecological community exists only as very modified occurrences that may be capable of being substantially restored or rehabilitated if such work begins in the short-term future (within approximately 20 years).
Vulnerable (VU)	An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range. An ecological community will be listed as Vulnerable when it has been adequately surveyed and is not Critically Endangered or Endangered but is facing a high risk of total destruction or significant modification in the medium to long-term future. This will be determined on the basis of the best available information by it meeting any one or more of the following criteria (A, B or C): A. The ecological community exists largely as modified occurrences that are likely to be capable of being substantially restored or rehabilitated.

Criteria	Definition
	B. The ecological community may already be modified and would be vulnerable to threatening processes, is restricted in area and/or range and/or is only found at a few locations. C. The ecological community may be still widespread but is believed likely to move into a category of higher threat in the medium to long term future because of existing or impending threatening processes.
Priority Ecological Communities	
Priority One	**Poorly known ecological communities** Ecological communities with apparently few, small occurrences, all or most not actively managed for conservation (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) and for which current threats exist. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.
Priority Two	**Poorly known ecological communities** Communities that are known from few small occurrences, all or most of which are actively managed for conservation (e.g. within national parks, conservation parks, nature reserves, state forest, unallocated Crown land, water reserves, etc.) and not under imminent threat of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities, but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.
Priority Three	**Poorly known ecological communities** i. Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or. ii. Communities known from a few widespread occurrences, which are either large or within significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat, or. iii. Communities made up of large, and/or widespread occurrences, that may or may not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, and inappropriate fire regimes. Communities may be included if they are comparatively well known from several localities, but do not meet adequacy of survey requirements and / or are not well defined, and known threatening processes exist that could affect them.
Priority Four	**Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list**. These communities require regular monitoring. i. Rare. Ecological communities known from few occurrences that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change These communities are usually represented on conservation lands. ii. Near Threatened. Ecological communities that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for Vulnerable. iii. Ecological communities that have been removed from the list of threatened communities during the past five years.

Criteria	Definition
Priority Five	**Conservation Dependent Ecological Communities** Ecological Communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

Appendix C
Habitat Quality Scoring Tool and Reference Images

Habitat Scoring System for WA black cockatoo foraging habitat

This habitat scoring system describes elements indicative of suitable foraging habitat[1] for the three WA black cockatoo species (Carnaby's Black Cockatoo, Baudin's Black Cockatoo and the Forest Red-tailed Black Cockatoo) in WA. Its use must be supported by survey information and reporting, undertaken by suitably qualified and experienced ecologists.

Appropriate scores will best fit a description. Where all components of the 'detail' column description are not met, this must be specified, and justification provided for that score to be accepted by the Department.

For an offset site to be considered by the Department, the offset site must have a start score of 1 for each indicator (e.g., there must be a species stocking rate score of at least 1).

Indicator	Score	Detail		Impact site	Offset start quality	Without offset	With offset
Site Condition							
		Foraging value	Details				
Vegetation condition and structure. Habitat features	**7**	Very High	Carnaby's Black Cockatoo				
			Native kwongan heath and shrubland (>30% projected foliage cover), banksia and eucalypt woodlands with >50% projected foliage cover. Low percentage (< 5%) of tree deaths[2].				
			Baudin's Black Cockatoo				
			Marri-Jarrah Forest and woodlands with >50% projected foliage cover. Low percentage (< 5%) of tree deaths.				
			Forest Red-tailed Black Cockatoo				
			Marri-Jarrah-Karri Forest, other eucalypt woodlands, or allocasuarina woodlands, with >50% projected foliage cover. Low percentage (< 5%) of tree deaths.				
	6	High	Carnaby's Black Cockatoo				
			Native kwongan heath and shrubland (>25% projected foliage cover), banksia and eucalypt woodlands with >40% projected foliage cover. Low percentage (< 10%) of tree deaths.				
			Baudin's Black Cockatoo				
			Marri-Jarrah Forest and woodlands with >40% projected foliage cover. Low percentage (< 10%) of tree deaths.				
			Forest Red-tailed Black Cockatoo				
			Marri-Jarrah-Karri Forest, other eucalypt woodlands, or allocasuarina woodlands, with >40% projected foliage cover. Low percentage (< 10%) of tree deaths.				

[1] In some cases, an impact or offset site may contain or require both foraging and breeding habitat for one or more black cockatoos. Breeding habitat is 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 (DBH) to develop a nest hollow. For most species of trees, suitable DBH is 500 mm. For salmon gum and wandoo, suitable DBH is 300 mm.

[2]No tree deaths indicate robustness of habitat, unlikely for the habitat to decline in the medium-term. Tree deaths may be owing to disease, water stress, fire, etc.

Vegetation condition and structure. Habitat features	**5**	Moderate to high	Carnaby's Black Cockatoo				
			Native kwongan heath and shrubland (>20% projected foliage cover), banksia and eucalypt woodlands with 30-40% projected foliage cover; OR > 60% projected foliage cover but veg. condition reduced due to tree deaths (up to 20%).				
			Baudin's Black Cockatoo				
			Marri-Jarrah Forest or woodlands with 30-40% projected foliage cover; OR > 60% projected foliage cover but veg. condition reduced due to tree deaths (up to 20%).				
			Forest Red-tailed Black Cockatoo				
			Marri-Jarrah-Karri Forest, other eucalypt woodlands, or allocasuarina woodlands, with 30-40% projected foliage cover; OR > 60% projected foliage cover but veg. condition reduced due to tree deaths (up to 20%).				
	4	Moderate	Carnaby's Black Cockatoo				
			Native kwongan heath and shrubland, banksia or eucalypt woodlands with 20-30% projected foliage cover. Moderate percentage of tree deaths (30-40%).				
			Baudin's Black Cockatoo				
			Marri-Jarrah Forest or woodlands with 20-30% projected foliage cover; OR Marri-Jarrah Forest with 40-60% projected foliage cover but vegetation condition reduced due to tree deaths (up to 30-40%).				
			Forest Red-tailed Black Cockatoo				
			Marri-Jarrah-Karri Forest, other eucalypt woodlands, or allocasuarina woodlands with: 20-30% projected foliage cover; OR 40-60% projected foliage cover but veg. condition reduced due to tree deaths (up to 30-40%).				
	3	Low to moderate	Carnaby's Black Cockatoo				
			Native kwongan heath and shrubland, banksia or eucalypt woodlands with 10-20% projected foliage cover.				
			Baudin's Black Cockatoo				
			Marri-Jarrah Forest or woodlands with 5-20% projected foliage cover.				
			Forest Red-tailed Black Cockatoo				
			Marri-Jarrah-Karri Forest, other eucalypt woodlands, or allocasuarina woodlands with 5-20% projected foliage cover.				
	2	Low	Carnaby's Black Cockatoo				
			Native kwongan heath and shrubland, banksia and eucalypt woodlands with <10% projected foliage cover; OR Paddocks and/or urban areas with scattered foraging trees such as banksias, marri.				
			Baudin's Black Cockatoo				
			Marri-Jarrah Forest or woodlands with 1-5% projected foliage cover; OR Paddocks and/or urban areas with scattered foraging trees such as banksia, hakea, dryandra.				

Vegetation condition and structure. Habitat features			Forest Red-tailed Black Cockatoo				
			Marri-Jarrah-Karri Forest, other eucalypt woodlands, or allocasuarina woodlands with 1-5% projected foliage cover; OR Paddocks and/or urban areas with scattered food plants such as Cape Lilac, *Eucalyptus caesia* and *E. erythrocorys*.				
	1	Negligible to low	All species				
			Scattered specimens of known food plants but projected foliage cover of these is <2%. May include: paddocks or urban areas with scattered foraging trees.				
	0	None	All species				
			No Proteaceae, eucalypts or other potential sources of food. May include bare ground or developed sites devoid of vegetation (e.g. infrastructure, roads, gravel pits).				
			Totals				

Site Context								
Proximity of the site in relation to other habitat.	**3**	Site is within 6km of known breeding site.	or	Site is within 12km of other foraging resources with site condition of at least 3.				
	2	Site is within 12km of known breeding site.	or	Site is within 15km of other foraging resources with site condition of at least 4.				
	1	Site is within 15km of known breeding site.	or	Site is between 15km and 20km of other foraging resources with site condition of at least 5.				
	0	Site is further than 15km from known breeding site.	or	Site is further than 20km from other foraging resources.				
				Totals				

Final Totals				

Indicator		**Species Stocking Rate**[3]	**Impact Site**			**Offset Site**		
			CBC	**BBC**	**FRT**	**CBC**	**BBC**	**FRT**
Confirm presence/ absence of species.	**Yes**	Species is seen or reported regularly and/or there is abundant foraging evidence, e.g. chewed nuts can be identified as this species. Regularly is when the species is seen at intervals of every few days or weeks for at least several months of the year.						
	No	Species is recorded or reported very infrequently and there is little or no foraging evidence.						

[3] Species stocking rate is indicated by yes or no to confirm if any of the species is frequently present or not. If yes, the presence must be for the species being impacted by the proposal, not for a species that will not be impacted.

Legend	
	If the site scores between 0-2 (low to no value) for site condition, 0 for the site context score, or is **No** for species stocking rate, it is extremely unlikely to be considered as suitable habitat. This would not be appropriate to use as an offset site.

The metrics used to determine Site Condition, Site Context, and Species Stocking Rate were developed by the Department of Climate Change, Energy, the Environment, and Water in consultation with species experts in WA.

A standard habitat quality scoring system for a species allocates scores out of 3 for both site condition and site context, and out of 4 for species stocking rate. However, as black cockatoos are very mobile, this HQS uses a score out of 7 for site condition and a score out of 3 for site context. Site condition is considered the key factor in determining the quality of habitat for these black cockatoo species. Species stocking rate is considered only in terms of presence or absence of the species and does not add to the total score. Note that the species, or strong indicators of the species, must be present, consistent with the presence/usage description above, for an offset to be considered suitable.

Site Condition 4-Moderate. Marri-Jarrah Forest or woodlands with 20-30% projected foliage cover; OR Marri-Jarrah Forest with 40-60% projected foliage cover but vegetation condition reduced due to tree deaths

Site Condition 5- Moderate to High. Marri-Jarrah Forest or woodlands with 30-40% projected foliage cover; OR > 60% projected foliage cover but veg. condition reduced due to tree deaths (up to 20%).

Site Condition 6-High. Marri-Jarrah Forest and woodlands with >40% projected foliage cover. Low percentage (< 10%) of tree deaths.

Site Condition 7- Very High. Marri-Jarrah Forest and woodlands with >50% projected foliage cover. Low percentage (< 5%) of tree deaths.

Appendix D
Breeding Tree Data

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
364	Marri	2	100	Prev assessed. Tree 1400 metal tag. Tony K reported slight chewing on upwards facing hollow. Also 20cm spout hollow mid trunk	414156.5816	6351230.976	
529	Marri	2	70	Chimney hollow at 12m up in snapped trunk with 30cm+ internal. Chew marks from BC on rim, potential nest tree.	414250.0891	6351357.219	
3989	Dead	2	95	Previously assessed by Alcoa/T. Kirkby. Tree 1836 on metal tag. Upwards opening 30cm chimney hollow in 40cm diameter branch at 18m. T. Kirkby reported chewing at entrance in 2022 assessment.	413038.0688	6354722.224	
14	Dead	3	95	Potentially upwards opening hollow	414827.8811	6349143.528	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
31	Jarrah	3	135	Tony. 3 side entry 20cm opening hollows. No chew marks	414875.7646	6349373.483	 
55	Dead	3	100	Tony. Potentially several chimney hollows, unable to confirm	414308.4425	6348876.198	
100	Dead	3	95	Tony. Potentially chimney hollow, can't confirm	414369.4009	6351420.387	
102	Jarrah	3	130	Tony. Snapped off at 12m. Potential for large chimmney hollow. Cant confirm.. sig tree	414373.9901	6351363.639	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
131	Dead	3	85	Tony. Potentially two spout hollows, can't confirm	414419.5447	6348984.983	
167	Dead	3	90	Tony. Potentially a chimney hollow at top, can't confirm. no obvious chew marks	414507.8889	6348600.289	
236	Jarrah	3	115	Tony. Potential 25 cm mid branch upwards opening. Potential upwards in main trunk fork.	414956.8385	6349043.995	
243	Jarrah	3	90	Tony. One upwards opening 25 cm hollow. No chew	414990.3698	6349111.593	 

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
245	Jarrah	3	110	Tony. Potential upwards 25 cm opening, cant confirm. Sig tree	415003.336	6349022.829	
260	Jarrah	3	130	Tony. One 30 cm upward opening hollow. No chew. Sig tree	415034.3244	6349058.65	
311	Marri	3	65	Tony. Mid trunk hollow	413984.1582	6351327.32	
350	Marri	3	100	Tony. Side opening 20cm hollow. Angle slightly down. Potential for upwards opening hollow in upper branches.	414142.3835	6350921.081	 

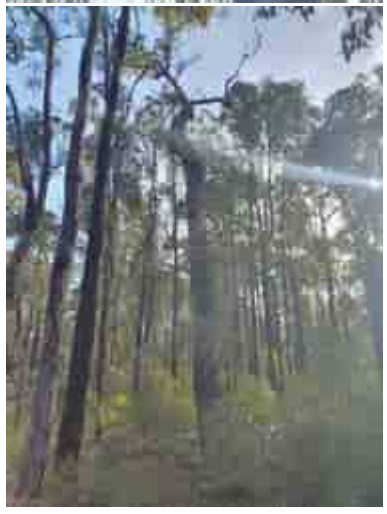
Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
362	Jarrah	3	70	Potential for upwards facing hollows in dead branches.cant confirm. No evidence of chew	414155.3766	6351164.631	
416	Jarrah	3	160	Tony. Potentially chimney hollow in canopy, can't confirm	414192.8599	6350829.329	
425	Jarrah	3	95	Potential hollow 10-15 cm	414200.2651	6351337.443	
472	Marri	3	90	Potentially chimney hollow, however does not appear to be deep enough for bc	414220.0485	6351262.685	
484	Jarrah	3	100	Potential 10-15 cm vertical hollow. Sig tree	414224.5336	6351160.319	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
553	Jarrah	3	125	Tony. Potentially chimney hollow, can't confirm	414258.9279	6351125.562	
672	Marri	3	120	Tony. Potential >30cm chimney opening in snapped off trunk at 10m . Can't confirm. No chew. Access partially blocked by branches	414340.5532	6351138.226	
676	Jarrah	3	130	Tony. Potential mid trunk upwards 30cm hollow. Sig tree.	414342.5892	6351314.071	 

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
708	Marri	3	110	Potential upwards opening hollows in large branches. Can't confirm. Looks less likely hollows are developed. No signs of use.	414359.199	6351191.418	
728	Dead	3	120	Potential chimney hollow, not very deep	414373.3105	6351366.562	
760	Dead	3	90	Tony. Potentially spout hollows, canr confirm. No visible chewing evidence	414389.0946	6351102.282	
809	Dead	3	70	Two potential spout hollows, 10-15 cm	414411.7775	6350965.822	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
827	Dead	3	200	Tony. Potentially chimney hollow, can't confirm	414420.1359	6351156.787	
833	Jarrah	3	95	Tony. Potentially chimney hollow, can't confirm.	414425.8063	6351288.756	
838	Dead	3	100	Tony. Potentially mid trunk and chimney hollow, can't confirm.	414429.3954	6350930.671	
852	Jarrah	3	90	Potential chimney hollow 10-15 cm, becomes narrower from opening down	414434.3095	6350908.827	
880	Jarrah	3	140	Tony. Several potential hollows	414448.7276	6350994.636	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
899	Jarrah	3	80	10-15 cm mid trunk opening, potentially suitable hollow for bc	414457.4371	6351077.84	
902	Marri	3	70	Potential spout hollow 10-15 cm, however becomes narrower from opening down	414458.7418	6351050.747	
958	Marri	3	115	Potential for 2 upwards facing large chimney hollows. Does not look like they are developed to depth but can't confirm.	414489.4641	6350869.082	 

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
962	Jarrah	3	115	Potential chimney hollow of suitable size. Think unlikely to be developed to depth. Smaller hollows developing.	414492.0239	6350798.753	 
966	Marri	3	80	Tony.Mid trunk upwards facing hollow 15 cm by 25 cm. Wear marks, no chew.	414494.7872	6350949.686	 

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
970	Dead	3	130	One 15- 20cm spout type hollow, wear marks no BC chew.potential for a large upwards opening hollows, can't confirm. Several well fromed	414496.6354	6351323.671	 
1008	Jarrah	3	100	Tony. Potential large chimney hollow in snapped off dead trunk section	414514.8255	6351151.517	 
1129	Dead	3	100	Potential spout hollows in snapped off branches, can't confirm. Has <10 cm hollows	413235.3448	6351721.391	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
1133	Dead	3	100	Snapped off tree, potential hollow in broken spot. No evidence of weather.	413239.255	6351675.845	
1144	Dead	3	50	Snapped off tree, potential chimney hollow, no sign of wear.	413252.6794	6351728.856	
1145	Marri	3	120	Potential mid trunk hollow ans spout hollow	413252.792	6351586.668	
1156	Dead	3	80	10-20 cm spout opening and potential chimney hollow from snappedoff tree.	413268.1892	6351606.408	
1171	Jarrah	3	70	10-15 cm mid trunk and downward facing hollows. No sign of wear.	413290.352	6351765.69	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
1194	Marri	3	90	10-15 cm spout opening present, potential hollow	413335.5787	6351730.886	
1262	Jarrah	3	160	Tony. Three large vertical branches suit to form chimney hollows. No use evidence. Sig tree	414551.9796	6351279.822	 
1318	Dead	3	70	Has 10-15 cm openings, potential hollow	414583.4761	6350965.196	
1326	Jarrah	3	80	Broken branches with potential hollow development and potential mid trunk hollow	414586.3238	6350750.503	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
1353	Jarrah	3	180	Tony. Potential chimney hollow at the top, can't conf8rm.	414597.011	6351153.209	
1355	Jarrah	3	130	One 15 cm knot hollow mid trunk. Likely too small for BC. Potential large upwards opening hollow in fork mid canopy. Can't confirm. Several small hollows. Sig tree	414598.9037	6350598.738	 
1363	Dead	3	120	Tony. Potential mid trunk hollow.	414602.1526	6350829.376	
1377	Dead	3	85	Potential spout hollow from broken branches, appears 15-20 cm	414607.0906	6351187.381	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
1396	Jarrah	3	110	Snapped off 12 m high, potential chimney hollow, cant confirm. No chewing evidence.	414613.9826	6351150.807	
1421	Dead	3	85	Tony. Snapped off tree with potential chimney hollow, can't confirm	414621.4483	6351115.001	
1429	Jarrah	3	100	Tony. One 25cm side opening. Other potential upwards	414625.3802	6351078.404	 

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
1438	Marri	3	90	20cm up angles knot type hollow. Unlikely to be deep enough but can't confirm. Other shallow spout type hollows forming at branch ends	414631.0234	6350624.393	
1466	Marri	3	90	Potential >30cm chimney in upper. Can't confirm	414645.7953	6351024.149	
1467	Marri	3	80	Tony. Potential chimney hollow	414645.9638	6350780.348	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
1472	Dead	3	140	Tony. Has a couple of potential spout openings, can't confirm. Sig tree	414649.3329	6350805.629	
1490	Jarrah	3	90	Has spout opening <10 cm however appears too narrow for bc	414659.5877	6350721.906	
1535	Marri	3	75	Two <10 cm vertical openings, potential hollow	414682.0366	6350778.212	
1553	Jarrah	3	120	Potential mid trunk slit hollow at 20cm wide and 40 tall. Think probably shallow but can't confirm.	414693.7269	6350928.637	 

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
1554	Dead	3	60	Has >10 cm chimney opening, potentially hollow, abut 4 m from ground appears shallow	414693.8344	6350732.574	
1595	Dead	3	80	Has vertical opening 10-15 cm, potential hollow immediately under snapped off top	414740.951	6350687.316	
1601	Dead	3	100	Dead snapped at 10m. Potential for large upwards hollow can't confirm	414743.6578	6350532.362	
1606	Jarrah	3	200	Very large tree, several large upwards dead branch with potential for large hollow formation. Smaller 10-12cm hollows present. Sig tree	414751.9025	6350527.336	
1611	Dead	3	80	Tony. Potential hollow in fork of tree	414758.6817	6350663.119	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
1631	Jarrah	3	60	Potential chimney hollow from snapped off tree, however side has cracks potentially thin wall	414825.1473	6350691.02	
1638	Jarrah	3	110	Tony. >30cm spout hollow. Wear marks no chew. Angle and access potentially reduces likelihood. Other small hollows present	414840.8826	6350627.3	
1642	Dead	3	80	Has several 10-15 cm openings, potential hollow	414852.7995	6350661.405	
1655	Jarrah	3	80	Has potential chimney opening, however stocks are poking out, assume not that deep.	412596.1674	6351981.511	
1671	Jarrah	3	160	Has several snapped off big branches, one opening is jot very developed 10-	412614.1162	6351969.547	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
				15 cm. There has a crac aln ad oes not see suitable			
1688	Marri	3	80	Potential chimney hollow from snapped off tree top. Stocks poke out, potentially not very deep.	412642.9687	6351957.498	
1690	Jarrah	3	70	Pote tial chimney hollow about 20 cm. No chew marks visible	412643.9137	6351842.806	
1752	Jarrah	3	75	One 10-15 cm mid trunk hollow. No evidence of chew marks.	412736.2571	6352157.774	
1824	Dead	3	100	Has a mid trunk hollow 10-15 cm. No chew marks.	412852.06	6351895.032	
1898	Jarrah	3	85	Has small <10 cm hollow and potential 10-15 cm hollows in broken branches up in canopy.	412982.4387	6352132.441	
1921	Jarrah	3	120	Tony. Potential chimney hollow from snapped off tree top. No visible chewing evidence pi	413052.1538	6351972.002	
1923	Jarrah	3	100	Potential chimney hollow 20+ cm, however sides has cracks. No chew marks observed.	413066.8467	6352156.684	
1991	Jarrah	3	100	Potential spout hollow 10-15 cm.	413333.974	6352125.264	
2076	Jarrah	3	80	Has one <10 cm hollow with signs of wear. Has one undeveloped spout hollow from broken branch and one unco firmed spout hollow 10-15 cm facing upwards.	412597.81	6352171.522	
2086	Dead	3	130	One >10 cm opening but is visibly shallow. Has pote tial chimney hollow from snapped branch.	412631.2105	6352478.418	
2126	Dead	3	160	Has several potential chimney hollows <20 cm. None has smooth edges, signs of wear or chew marks.	412695.5096	6352381.246	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
2139	Jarrah	3	90	One >20 cm opening at the top. Potential spout hollow. No chew marks and bottom of the opening appears thin. Also three u developed spout hollows.	412712.6396	6352468.677	
2156	Jarrah	3	110	One 10-15 cm opening, potentially hollow. Additionally several <10 cm hollows along branches and spouts.	412756.9521	6352330.669	
2188	Jarrah	3	130	Has 10- 15cm opening, potential hollow. Also two undeveloped spout hollows from broken branches.	412828.8267	6352494.299	
2229	Dead	3	85	Unconfirmed chimney hollow at the top, 15-25 cm chimney width. Has several undeveloped hollows from broken branches. Also a <10 cm vertical hollow.	412912.7198	6352188.294	
2236	Jarrah	3	80	Tony. Potential chimney hollow, can't confirm. No chewing Mrks.	412919.3308	6352392.381	
2237	Jarrah	3	70	Potential know hollow, entrance appreciation >10 cm. No Wear or chew marks visible.	412924.3857	6352326.324	
2366	Jarrah	3	70	Has one potential 10-15 cm mid trunk hollow, however back wood is visible on the back wall so probably not enough depth for bc. Has two undeveloped hollows from broken branches.	412663.7625	6352191.198	
2367	Dead	3	75	Pote tial chimney hollow from broken tree top, can't confirm. Three undeveloped spout hollows from broken branches.	413176.0771	6352314.197	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
2380	Dead	3	70	One >15 cm chimney hollow with somewhat smooth edges. Facing slightly downward. No visiblt chew marks.	412032.5307	6352704.632	
2417	Dead	3	110	Tony. One pote tial chimney hollow, has somewhat smooth edges at entrance does not appear to have chew marks. Also two undeveloped spout hollows.	412056.8092	6352318.643	
2487	Jarrah	3	110	Has several >10 cm upwards facing spout hollows and undeveloped spout hollows. Cannot confirm if any has a hollow. None has sign of wear or chew marks.	412116.1508	6352508.212	
2547	Marri	3	135	Vertical branch 40cm dbh potential forming 20 cm chimney hollow. Can't confirm. Think unlikely developesxto bC size hollow	412159.8495	6352544.784	
2571	Jarrah	3	100	Two potential hollows with entrance >20cm in forks of trunk and largecbranch. Can't confirm. Think unlikely to be developing toBC sizexand depth. One 10 cm side entry hollow mid trunk	412197.1811	6352356.74	 
2664	Jarrah	3	230	Large 50 cm plus potential upwards opening hollow in snapped mid trunk.	412340.616	6352280.226	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
				think likley not developedcto deep chamberBut can't confirm			
2676	Jarrah	3	230	50 cm diameter cup opening in upper canopy. Potnetial for hollow development. Think unlikley. Cant confirm.	412347.9167	6352284.063	
2716	Jarrah	3	140	Potential 20cm opening spout hollow. Branch sufficient size for chamber development. Can't confirm but think unlikely to develop tocdepth. Other snapped branches	412374.991	6352616.032	
2767	Jarrah	3	170	Trunk snapped at 13m. Potential for large chimney hollow. Can't confirm. Think unlikely.	412419.1167	6352805.53	
2796	Jarrah	3	120	Trunk snapped at 12m. Potential chimney hollow of suitable size. Can't confirm.	412449.1717	6352627.436	
2895	Jarrah	3	100	One large broken branch with potential to contain suitable size chimney hollow. Can't confirm	412555.1511	6352608.213	
2923	Jarrah	3	95	Potential for 20-30 chimney hollow in 40cm branchbat fork. Can't confirm. Think unlikely to have BCsize chamber	412581.2938	6352865.753	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
3012	Jarrah	3	180	Tony. One >20 cm potential knot hollow and one >20 cm potential chimney hollow, can't confirm.	412660.0824	6352695.051	
3083	Jarrah	3	80	One potential >20 cm chimney hollow at top, upwards facing and can't confirm. One side has a Crack and no chew marks or other signs of wear visible. Also one undeveloped spout hollow in broken branch.	412744.7192	6352694.693	
3102	Jarrah	3	50	One potential >20 cm hollow in fork, can't confirm from ground. No signs of wear. Also two undeveloped spout hollows in branches.	412786.7344	6352523.543	
3103	Jarrah	3	50	Tony. One potential spout hollow >20 cm, upwards facing cant confirm. Also Potentially two >10 cm spout hollows, upwards facing, can't confirm.	412787.7288	6352540.53	
3122	Jarrah	3	160	Tony. Potential >20 cm mid trunk hollow, can't confirm firm from ground. also two undeveloped spout hollows.	412818.1745	6352527.122	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
3170	Jarrah	3	210	Tony. One potential side entry hollow mid trunk, 25cm entrance. Potential 20 cm spout hollow in snapped branch mid canopy	412909.8286	6352560.464	
3176	Dead	3	80	Tony. Potential >20 cm chimney hollow from. Snapped off t treepwards facing ca t Co firm.	412921.3368	6352513.093	
3237	Jarrah	3	90	Has two >20 cm mid trunk and fork hollow. Also three <10 cm spout hollows and a few undeveloped spout hollows.	411474.4855	6352861.25	
3243	Jarrah	3	70	Has one >20 cm potential mid trunk hollow and one >10 cm potential mid trunk hollow. Also two undeveloped spout hollows.	411478.6108	6353147.559	
3265	Dead	3	60	One 10-15 cm mid trunk hollow, however appears shallow but can't confirm. Also three <10 cm undevelopec spout hollowx.	411504.6648	6352758.205	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
3267	Dead	3	95	One >20 cm knot opening, potential hollow, about 8-10 m from the ground. No chew marks visible. Also one 10-15 cm undeveloped knot hollow and 8 <10-20 cm undeveloped spout hollows.	411505.9964	6352765.39	
3273	Jarrah	3	55	One 15-20 cm pote tial mid trunk hollow and a few <10 cm hollows along the trunk.	411510.3199	6353054.649	
3308	Jarrah	3	160	One >20 cm potential spout hollow, cannot confirm. Also potential large opening in fork, cannot confirm. Burnt out tree. Also >20 cm undeveloped and burnt out spout hollow.	411545.3984	6353107.709	
3317	Jarrah	3	130	One >20 potential hollow in fork, can't confirm. Not signs of wear or chew marks. Also two >10 cm undeveloped chimney and spout hollows.	411551.2094	6352693.859	
3346	Dead	3	170	Potential for chimney hollow at top of snapped burnt trunk. Can't confirm think unlikley	411596.8689	6353002.955	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
3358	Dead	3	100	Mid trunk slit hollow opening 20 cw widby 40 high. Is upwards opening. 14m up.edgesxlook smooth and worn. Tree was a jarrah.	411615.0762	6352908.203	
3382	Dead	3	100	Potential for chimney hollow in near vertical large snapped branch. Can't confirm. Think unlikely.	411672.8492	6352840.364	
3393	Jarrah	3	80	Snapped trunk at 13m. potential for chimney type hollow to be present. Can't see to confirm. Think unlikely as snap looks 10 ish years old	411686.9236	6352838.801	
3399	Dead	3	100	Potential for chimney hollow in snapped trunk at 15m. Tree heavily burnt. Can't confirm. Think unlikely bC chamber formed	411706.5098	6352889.995	
3439	Jarrah	3	105	One 15-20cm side entry hollow mid trunk. Think unlikely to develop BC size internal chamber	411803.4354	6352754.6	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
3463	Marri	3	70	One >20 cm potential spout hollow. No signs of wear.	411827.4433	6352686.008	
3492	Jarrah	3	90	Potential for mid trunk upwards opening in burnt out section at 6m up. Likely not developed to a hollow and too low to ground but can't confirm	411856.5604	6352874.353	
3498	Marri	3	65	One 10-15 cm knot hollow, one <10 cm knot hollow and two 10-15 cm undeveloped spout hollows.	411859.8929	6352688.829	
3514	Jarrah	3	100	Potential upwards angle opening 15-20cm hollow forming in large slit type scar mid trunk 15m up. Wear marks no chew. Think unlikely bc size chamber present.	411881.9852	6352872.532	
3521	Jarrah	3	125	One potential >30cm opening spout type hollow. On horizontal alignment. Think unlikely to have suitable chamber but can't confirm. Otherclarge snapped branches potential to form future hollows	411887.7046	6352788.827	 
3544	Marri	3	85	20cm upwards opening knot type hollow in mid trunk at 7m off ground. Wear marks but no chewing. Trunk	411902.6571	6352838.786	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
				size sufficient for BC sizes chamber developing			
3547	Marri	3	95	One >10 cm opening, knot hollow, cannot confirm. Also several undeveloped spout hollow ranging between <10->20 cm.	411906.4887	6352728.7	
3678	Jarrah	3	110	One 15 cm sideways opening knot type hollow. 15m up in 40 cm diameter branch. Branch large enough to potentially develop chamber. Think unlikely to have suitable chamber	411122.8866	6352727.616	 
3681	Jarrah	3	95	One potential >20 cm chimney hollow ab9ut 30 m from the ground. No signs of wear and has spiky edges. Also has one broken branch with undeveloped hollow.	411125.1649	6352915.274	
3691	Dead	3	155	Potential upwards opening hollow in fork at 13m. Entry 20cm by 25 cm. Going into main trunk. Think unlikely to have BC size chamber, can't confirm	411139.3078	6352757.613	 
3798	Jarrah	3	75	One >20 cm potential knot hollow, however edges are very uneven and now signs of wear.about 25 m above ground.	411308.8651	6353290.285	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
3821	Jarrah	3	85	Snapped off tree at about 15 m, has potential >20 cm chimney hollow. Appears to become narrower close to the opening.	411330.8938	6353010.622	
3844	Dead	3	70	One potential >10 cm mid trunk hollow. Has cracks along the sides and appear shallow. Also four undeveloped spout hollows.	411365.465	6352918.372	
4062	Dead	3	75	Snapped off tree at about 7 m, potential chimney hollow, cant confirm. No chew marks or other signs of wear.	413120.2677	6354815.721	
4200	Dead	3	50	One spout type hollow with entry of 10-15cm. Going into larger braanch with potential to form chamber. Think high unlikley to be developed	413128.5327	6354383.006	
4236	Jarrah	3	110	Three large upwards facing branches with potential to have upwards opening hollows. Rough broken rims suggest not developed tobdepth, can't confirm but thinking unlikley suitable.	413146.7116	6354380.236	
4248	Dead	3	110	Main trunk snapped at 15m. Potential for chimney hollow at top. Can't confirm. Think unlikley	413153.727	6354467.446	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
4250	Dead	3	80	Several large snapped off branches with potential to have upwards facing hollows. Branches of sufficient size to fit BC . hollow. think unlikley hollows present	413154.2616	6354465.733	
4283	Dead	3	110	Has three >10 cm potential spout hollows. One has cracks along the side and appear unstable. Also has a cup formation that appears to have sticks in it and other broken burnt out branches with undeveloped hollows	413165.6099	6354338.984	
4287	Dead	3	90	Main trunk snapped at 17m. Potential for chimney hollow formation.	413166.0407	6354435.378	
4318	Jarrah	3	90	Large snapped branch at 12m with potential for chimney hollow. Branch large enough to have BC size hollow. Think unlikely to be developed	413179.9843	6354584.996	
4331	Marri	3	85	Dead main trunk snapped off at 8m. Potential chimney hollow in trunk. Rim suggests some hollow formation. Think unlikely deep enough.	413185.2853	6354383.898	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
4342	Dead	3	70	Has two >10 cm potential spout hollows. Appear undeveloped as sides are uneven and no signs of wear, however can't confirm firm.	413186.5579	6354532.273	
4350	Jarrah	3	150	Several large snapped upwards facing branches with potential to contain hollows. Branches of sufficient size to develop BC size hollow. Think unlikely developed.	413189.5181	6354625.533	
4380	Dead	3	120	One >10 cm potential spout hollow, my vision obstructed by surrounding branches and leaves so cannot co firm. Also have several broken branches in canopy with undeveloped hollows	413199.3463	6354216.08	
4414	Jarrah	3	60	Has >20 cm potential slit hollow about 40 m above ground with pote tial signs of wear	413210.6312	6354497.151	
4458	Marri	3	110	One large upwards facing branch potentially develop chimney hollow. Some stocks visible at top, think unlikely developed	413225.7639	6354175.24	
4482	Jarrah	3	95	Main trunk snapped at 12m. Cup or hollow at top potential for chimney	413235.557	6354650.19	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
				hollow. Think unlikely to be developed.			
4520	Dead	3	70	Have three ~10-15 cm potential spout/mid trunk hollows, all upwards facing so can't be co firmed. No chew marks or other signs of wear.	413244.891	6354324.027	
4558	Jarrah	3	60	Has two >10 cm potential spout hollows. No signs of wear or chewed marks. 10-15 m above ground. Also broken branches with undeveloped hollows	413257.2091	6354258.99	
807	Dead	3	75	Snapped off at 15-20 m, pote tial >20 cm chimney hollow. Tree is fully burnt out and cracks goes along the potential hollow down the trunk. No signs of wear	413346.2151	6354478.431	
4815	Jarrah	3	80	One >20 cm potential mid branch hollow 30-35 m above ground with no chew marks or sign of wear. One 10-15 cm knot hollow 20ish m above the with potential sign of wear but no chew marks.also undeveloped hollows from broken,en branches and along the trunk.	413348.3293	6354150.712	
4828	Dead	3	190	Snapped off tree at about 30 m with >20 cm potential chimney hollow. No chew marks or sign of wear.	413351.0074	6354249.134	
4884	Dead	3	125	Potential for upwards opening hollow mid main trunk in old fork aat 12m. Trunk suitable size for BC hollow formation	413376.3332	6354413.117	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
4898	Jarrah	3	110	Tony. Chimney type opening of 40cm on snapped main trunk at 15m. Rim suggests that a hollow may be present.	413384.7653	6354371.042	
4937	Jarrah	3	110	Has two >10 cm potential spout hollows up in canopy, cannot confirm. No chew marks or sign of wear.	413399.7796	6354274.135	
5056	Dead	3	80	Snapped off tree at about 15 m. >20 cm potential spout/chimney hollow at top. Appear undeveloped with wood sticking out, but can't confirm,	412471.2041	6355297.357	
5076	Dead	3	80	Burnt out tree with a couple of branches with undeveloped hollows. Top of tree potential spout/chimney hollow >20 cm. Cannot confirm.	412498.853	6355320.01	
5080	Jarrah	3	120	One >20 cm potential knot hollow, cannot confirm, from ground about 30m from ground. Does not appear deep. Potential upwards facing spout hollow 30 m from groud at top from snapped off tree	412503.0925	6355498.567	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
5093	Dead	3	95	One 10-15 cm spout hollow at about 40 m height. Also other broken branches in canopy with undeveloped hollows.	412534.9453	6355329.42	
5103	Dead	3	110	Tony. Snapped off tree at about 25 m and a >20 cm potential chimney hollow, cannot confirm from ground. No chew marks visible or other signs of wear. Also has a pote tial >10 cm spout hollow and other broken branches.	412552.3954	6355473.123	
5108	Dead	3	100	Snapped off tree at about 2 m, has >20 m potential chimney hollow with cracks along side and rough edges. No signs of wear.	412562.777	6355320.136	
5114	Dead	3	120	Potetial spout/chimney hollow at top. Cannot confirm. Two Other broken branches potential undeveloped hollows . Very tall tree >50 m.	412568.9302	6355328.786	
5115	Dead	3	95	Tony. Dead marri central trunk snapped at 12m. Right diameter for BC hollow . Think likely chimney hollow forming at top. Rim of top smooth and thin looking	412569.1792	6355361.344	 

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
5141	Jarrah	3	250	Very large tree. Dead central trunk burnt out fully internally. Large upwards branch with potential chimney opening at top. Branch big enough for BC hollow	412600.7405	6355411.11	
5142	Dead	3	100	Tony. Dead marri. Trunk snapped at 18m. Potential side entry hollow 40cm opening at 15m. Also Potential chimney hollow at top. Suitable sizecto support BC hollow	412601.0664	6355362.797	
5176	Dead	3	110	Tony. Snapped off tree at about 35 m. has potential >20 cm chimney hollow with smooth edges. No chew marks present.	412641.5251	6355483.396	
5202	Dead	3	90	Has several burnt out branches with undeveloped hollows. One appear to be >10cm spout hollow about 20 m above ground however it is has an obstructed entry	412675.9756	6355486.783	
5328	Marri	3	120	Tony. Likely chimney hollow in snapped trunk at 14m. Rim smooth and narrow looking. Trunk suitable diameter to have BC hollow	412807.2034	6355213.29	
5351	Marri	3	85	Has one >10 cm potential spout hollow ~30 m above ground. Chamber appear too narrow suitable for bc.Also have broken branches with undeveloped hollows	412502.0092	6354805.381	
5382	Dead	3	140	Has one >10 cm slit hollow at ~~15 m height. No chew marks present. Also have larger broken branches in canopy that appears to be undeveloped.	412607.0036	6354802.497	
5384	Jarrah	3	130	Large dead main trunk and branches upwards facing with burnt out sections. Potential for chimney hollows. Think unlikley can't confirm	412612.9851	6354804.79	
5390	Dead	3	120	One >10 cm mid branch hollow up top in the canopy about 40 m up. Has	412625.1367	6354781.346	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
				smooth edges but no visible shew marks. Also several broken branches with undeveloped hollows and one just developing <10 cm slit hollow.			
5396	Dead	3	140	Large trunk snapped off at 20m. Potential for chimney hollow development at top. Can't confirm.	412633.8286	6354825.867	
5406	Dead	3	210	Has one >20 cm potential spout hollow about 30m up, cannot confirm. Does not appear to have smooth edges. Has one undeveloped spout hollow and three cup formations that are visibly shallow.	412650.5014	6354731.828	
5408	Marri	3	55	Dead central trunk snapped off. Chimney hollow opening at 25-30 cm 10m up . Potential hollow, rim looks thin and smooth. Think trunk not long dead and unlikley developed to BC depth	412652.9283	6354876.166	
5414	Dead	3	65	Has one >20 cm hollow in fork about 20 m up. Has smooth edges but no chew marks.	412659.6047	6354735.09	
5430	Dead	3	90	Tony. Has one >20 cm spout hollow ~30 m up, smooth bottom edge. No chew marks visible. Also one broken branch appears undeveloped. Also one bid open mid trunk, obstructed by shoots.	412692.0104	6355139.285	

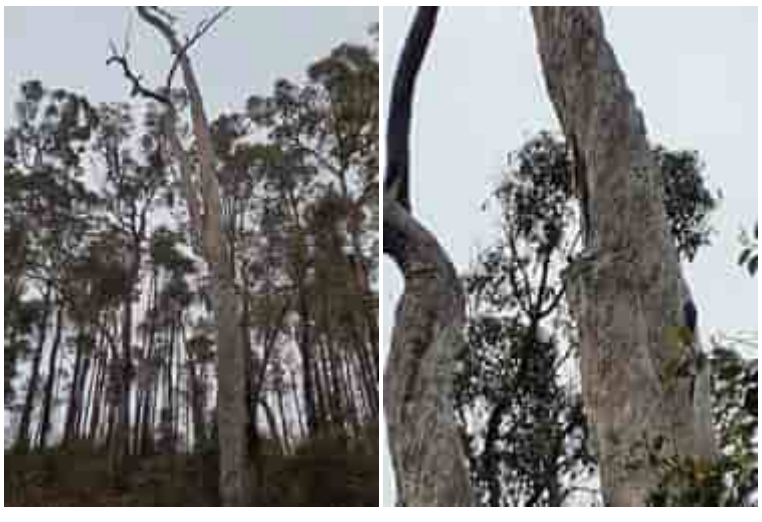
Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
5450	Dead	3	130	One >10 cm knot hollow ~25 m from ground. Also broken branches with undeveloped hollows	412731.6828	6354737.721	
5452	Dead	3	150	Tony. Has one >20 cm pote tial spout hollow ~25 m above the ground. One side appears smooth a d potentially nibbled on, cannot confirm from ground. Mainly rough edges with no signs of wear. big broken branches up at the top that apper undeveloped	412733.8279	6354686.728	 
5505	Jarrah	3	150	One >20 cm potential spout hollow ~40m above ground. Slightly downward facing with smooth edges. No chew marks are visible.	412801.9557	6354769.206	
5523	Jarrah	3	75	Potential chimney hollow opening 20cm in dead main trunk snapped at 12m. Also potential side opening at 20cm in side branch at 12m. Think unlikely developed to depth	412815.3707	6354873.139	
5547	Dead	3	195	Large snapped upwards facing branches potential for chimney hollows. One 15cm side entry opening at 18m. Looks defined edge but no wear. One 20cm by 40cm slit opening at 6m. Think unlike to have hollow	412832.199	6354397.997	 

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
5554	Marri	3	120	Has one >20 cm potential spout hollow ~30 m above ground cannot confirm. No signs of wear or chew marks and has a crack along one side.	412833.287	6354658.916	
5556	Dead	3	70	Burnt out top with >10 cm pote tial chimney hollow ~25 m above ground, cannot confirm. Has cracks along one side and no signs of wear. Also has pote tial <10 cm knot hollow about 10 m from the ground, however upwards facing so cannot confirm	412835.0258	6354643.012	
5564	Dead	3	190	One >15 cm potential knot hollow about 20 m above ground that appears to be shallow and become narrower, however cannot confirm from ground. Also have e other large branches in canopy that appears undeveloped	412838.0279	6354674.81	
5597	Dead	3	100	Has one ~15 cm potential knot hollow that is upwards facing ~35 m above ground. Has smooth edges but can't confirm if chew marks are present. Also have broken branches in canopy with undeveloped hollows	412851.9145	6354429.892	
5655	Dead	3	110	Has one >10 cm potential spout hollow ~20 m above grou d, slightly upwards facing so cannot confirm. it has rough ecges and no visible chew marks or other signs of wear. Also have one <10 cm spout hollow and other broken branches with undeveloped hollows	412889.8701	6354456.032	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
5685	Dead	3	60	Has one >10 cm spout hollow with disturbed bark above galah? At ~15 m height.	412910.2893	6354797.848	
5693	Dead	3	90	Has one <10 cm potential knot hollow at ~30 m height. Has smooth edges but no visible chew marks. Also have broken branches with undeveloped hollows.	412916.5704	6354436.646	
5694	Dead	3	70	Has one >20 cm mid trunk hollow ~20 above ground with smooth edges. No visible chew marks. Also <10 cm slit hollow and other broken branches in canopy.	412916.8831	6354697.923	
5697	Jarrah	3	100	Large mid trunk opening 40-50cm facing upwards at 8m up. Think likely too open and shallow for BC chamber.	412918.6835	6354337.172	
5732	Dead	3	110	One >10 cm potential upwards facing knot/spout hollow ~25 m above ground and one >20 cm potential spout hollow about ~15 m above ground, slightly smooth edges. No signs of wear. One big broken branch at top appears undeveloped	412937.5599	6354684.912	 
5768	Dead	3	100	Has one 10-15 cm spout hollow ~20 m above ground with no signs of chew marks or other wear. Also have <10 cm spout hollow and other broken branches with undeveloped hollows	412960.8292	6354606.6	
5781	Dead	3	90	Has one >10 cm potential knot hollow about 15 m Above ground, it's upwards facing so cant confirm. Has smooth edges but not visible chew marks. Also Has >20 cm broken branches with undeveloped hollows.	412973.2733	6354410.968	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
5795	Dead	3	80	Snapped trunk at 14m potential for chimney hollow entry 30 cm . Think unlikley developed to depth	412992.196	6354311.524	
5844	Dead	3	60	Burnt and snapped off tree, potential >10 chimney hollow at ~15 m up. Also potetial >10 cm knot hollow at ~10 m.	411655.1644	6355062.744	
5857	Dead	3	105	One side entry hollow at 8m off ground. 40cm opening. Bottom edge looks thin with wear. Large burnt out upper branches. Potential spout hollows. Not preferred angle.	411679.9305	6354995.094	 
5911	Dead	3	110	Broken branches in canopy with undeveloped hollows	411753.3045	6355080.002	
5979	Dead	3	90	Dead trunk snapped at 16m. Potential for two chimney hollows at top. Can't confirm. No evidence of clear rim forming.	411834.4453	6354959.088	
5989	Marri	3	100	One upwards opening 15cm entry knot hollow at 15m going into main trunk. Think unlikley to haave BC size chamber. Upper trunk dead with large snapped branches	411847.4197	6354919.265	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
6069	Dead	3	120	Potential >10 cm spout hollow ~15 m up, upwards facing so cannot confirm. edges are somewhat smooth but no chew marks visible. Also broken branches at top with undeveloped hollows	412564.7814	6355071.047	
6084	Jarrah	3	100	Has one potential >10 cm hollow in fork ~30 m up. The opening travel down the trunk about 10 cm, smooth edges but no visiblw chew marks. Opening obstructed by minor branch and leaves. Also broken branches with undeveloped hollows	412605.8003	6355103.978	
6096	Dead	3	70	Has one >10 cm mid branch hollow ~30 m up and one >10 cm knot hollow ~25 m up that is obstructed by loose bark. Also have e broke branches with undeveloped hollows	412633.0679	6355043.042	
6120	Jarrah	3	130	Large dead central trunk snapped at 15m. One upwards opening hollow 25cm entry top main trunk. Also potential for two 20cm opening spout hollows . Think unlikley developed to depth	412673.1962	6354925.447	
6153	Dead	3	70	Has one >10 cm potential spout hollow ~15 m up. It's burnt out can't confirm if present. smooth edges but no visible chew marks	412735.8675	6355051.648	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
6180	Jarrah	3	80	Potential chimney type hollow at 16m in snapped main trunk. Entry 20cm, looks like wall thin down to 50cm depth. With Crack in wall	412780.0898	6354963.369	
6286	Dead	3	115	Has two >10 cm knot hollows which both appear shallow as the wall is well visible. Has one >20 cm potential chimney hollow ~20 m up, has rough edges. Has one <10 cm mid branch hollow and small broken branches with undeveloped hollows	412882.8274	6348978.687	
6327	Jarrah	3	95	Potential for upwards facing hollow in snapped dead main trunk at 18m. Trunk angled at 50 degrees. Think unlikley to be developed.	412958.1608	6349194.163	
6414	Jarrah	3	105	Trunk snapped at 18m. Burnt at end with potential to have chimney hollow. Can't confirm but think unlikley developing suitable hollow. Small <10cm side entry hollows in upper branches	413697.2954	6349010.509	
6429	Marri	3	90	Mostly dead central trunk. Potential upwards opening vertical hollow in branch at 10m. Branch 40cm dbh . May have hollow forming. Rim looks smooth. Can't confirm, think likely branch too small	413726.1016	6350386.654	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
6443	Dead	3	105	Has two >10 cm spout hollows ~15 m up. Both has smooth edges but no chew marks. Spout length is potentially too short for bc use. Also one <10 cm spout hollow and other broken branches with undeveloped hollows	413755.7866	6350375.416	
6501	Dead	3	80	Has one potential >10 cm spout hollow 15-20 m up, upwards facing and can't confirm from ground. It has rough edges and no signs of wear. Also several undeveloped hollows from broken branches.	413955.4982	6348889.289	
6502	Dead	3	175	Has three >20 cm potential spout hollow up top in canopy approx 20 m up. No signs of wear or chew marks, all have rough edges.	413989.0769	6348915.749	
6579	Jarrah	3	160	One 10cm upward facing entry in dead side branch at 18m. Branch diameter is 30 cm. Think highly unlikley forming BC size chamber.	412932.3815	6350739.773	
6588	Jarrah	3	160	Large 40-50cm upwards facing opening in fork of main trunk at 15m. Think likely shallow or full of leaves , can't confirm. Seedling growing near rim suggests full of leaves. Potential for hollow to be present or develop	415434.9267	6353225.213	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
6592	Dead	3	95	Dead main trunk snapped at 17m. Potential for chimney type hollow formation in 50cm diameter upper trunk. Edges look jaggeg. Think unlikley hollow forming.	415447.1509	6353256.442	
6665	Jarrah	3	95	Mid trunk slit opening 60 cm long 20 cm wide , 10m off ground. Potential to develop chamber. Think unlikley. Also Potential chimney type hollow at 15m at top.	415531.1089	6353281.313	 
6710	Dead	3	130	One 25 cm vertical opening in fork at 15m. Potential for hollow, think very unlikley developed to depth. One 10 cm side entry spout type hollow in branch. Branch too small to have BC size chamber	415554.3768	6353148.982	 
6761	Dead	3	80	Dead pole type trunk snapped at 15m. Potential for chimney hollow forming at top. Think unlikley but can't confirm	415586.7068	6353356.925	 
6775	Jarrah	3	100	Main trunk snapped at 10m. Potential for upwards opening chimney hollow. Can't confirm but think unlikely developed.	415594.5458	6353292.446	 

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
7111	Dead	3	90	Upwards opening 30 cm knot hollow mid trunk at 8m. Edges smoothed off. Think unlikley developed to depth.	415900.134	6353355.117	
7198	Jarrah	3	170	Potential upwards facing hollow 30 cm opening, at fork at 15m faving east. . Snapped trunk sections at 15m . One large cup . Full leaves and sticks, not hollow forming. Small and shallow spout hollows at branch ends	412781.3448	6349795.434	
7299	Jarrah	3	120	Potential 20cm opening chimney hollow in 50cm diameter dead branch at 15. Think unlikley developed to depth but can't confirm.	415535.9094	6354439.013	
7329	Dead	3	100	Tony. Main trunk snapped at 15m. 40-50cm chimney type opening at top. Rim around edge looks thin suggesting depth development. Potential chimney hollow present	415593.7663	6354369.103	 
7347	Marri	3	85	Tony. One 25cm opening side entry hollow mid trunk at 15m. Hollow entry looks well developed. Upper 8m of trunk where hollow is is dead. Also potential chimney hollow in 40cm diameter trunk at top.	415621.339	6354499.656	 

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
7356	Marri	3	85	Tony. Main trunk snapped at 18m. 40 cm entry chimney opening at top. Rim looks thin suggests hollow developing. Potential suitable hollow present.	415634.2205	6354381.142	
7375	Marri	3	70	Main trunk snapped at 15m . Top 40cm diameter. Has clean looking rim around dead top section. vPotential for 20 to 30cm chimney hollow to form. Has thin young branches over entry blocking access. Think unlikley that suitable hollow present but potential.	415660.4286	6354388.212	
7388	Marri	3	160	Large dead central trunk snapped at 7m. Trunk diameter 1.5m at snap. Potential for large chimney hollow/cavity. Edges of rim look thin suggesting cavity present. Think high likelihood that too large and open to be suitable for BC.m	415671.487	6354142.589	
7482	Dead	3	85	Has one >10 cm knot hollow ~20 m up with smooth edges. The entrance is clamp shaped	415778.0616	6354322.89	
7503	Dead	3	70	Snapped off tree at 20-25 m. pote tialy >20 cm chimney hollow. Rough edges nut can't co firm from ground.	415794.057	6354312.521	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
7525	Dead	3	70	One >10 cm pote tial hollow ~20 m up. Very unlikely to have developed to depth. rough edges and no other signs of wear.	415810.2691	6354228.199	
7535	Marri	3	120	Tony. Main trunk snapped at 16m. Potential chimney hollow at top. Snapped top 60cm diameter. Rim looks thin suggests hollow. Small branches obstruct access.	415817.5805	6354217.26	
7546	Dead	3	70	Tony. Snapped off tree at ~20 m with potential >20 chimney hollow. Has smoother edge on the northern side and potential signs of chew marks.	415828.9316	6354218.292	
7673	Jarrah	3	150	Large 50cm diameter snapped off branches, burnt out sections and cavities. . Potential for 2 upwards facing openings in large snapped branches at 15. Think unlikley hollows forming , can't confirm	415656.6043	6354471.151	
7675	Jarrah	3	160	Tony. Main trunk snapped at 12m. Upwards facing 30-40cm opening in fork near top. Bottom rim edge looks smooth rounded and thin. Think hollow of some depth likely present.	415664.4959	6354339.046	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
7755	Marri	3	60	Trunk snapped at 12m. Potential chimney hollow in 30cm diameter branch . Rim looks thin and cracks suggest depth development. May be too narrow internally. Should be checked	415892.4536	6354506.08	 
7808	Marri	3	90	Dead central trunk. Snapped at 10m. Potential chimney hollow in 40cm diameter top. Edge of rim looks thin but jagged. Should be checked from top	416023.0452	6354766.769	 
7844	Jarrah	3	100	One potential >10 cm slit hollow along a branch in canopy, can't confkrm if developed depth. Also two >10 cm broken branches with hollows	416095.4501	6354882.908	
7850	Dead	3	120	One >10 cm potential spout hollow ~30 m up, can't confirm. One <10 cm knot hollow ~20 m up. One large undeveloped knot hollow from broken branch at ~25 m	416108.8225	6354854.394	 
7851	Dead	3	100	Has two larger broken branches that are burnt out. One has a crack along the side. The other can pote tially be a spout hollow, can't confirm from ground.	416110.073	6354899.96	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
7887	Dead	3	80	One potential >20 cm hollow in fork ~15 m up. No signs of wear or chew marks.	416221.4287	6355033.784	
7894	Dead	3	65	Two broken off branches, one visibly undeveloped and the other is potential >10 cm spout hollow, can't confirm from ground.	416258.3162	6355057.641	
7897	Dead	3	85	Snapped off tree at ~30 m, potential >20 cm chimney hollow at top, cant confirm. no signs of wear of chew marks.	416276.6795	6355085.685	
7902	Jarrah	3	100	One pote tial >10 cm fork hollow 15-20 m up. Entrance appears slightly obstructed but can't confirm	416288.9063	6355040.414	
7908	Dead	3	80	Three potential >10 cm spout hollows 15-20 m up. Can't confirm as all are upwards facing. Two unlikely to be suitable for bc and one very unlikely as it becomes more narrow after entrance.	416312.5417	6355044.685	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
7914	Dead	3	70	Two >10 cm potential spout hollows from burnt out broken branches, can't confirm depth. 15-20 m up. unlikely to be suitable for bc.	416328.1265	6355092.762	
7964	Marri	3	95	Tony. 40cm side entry hollow opening at 10m in damaged main trunk. Rim of hollow smoothed off and we'll defined. Can see back of hollow angle forward. Potential not developed to depth.	416472.8923	6352433.706	 
7967	Marri	3	90	. Tony. Main trunk old break at 10m. 50cm diameter chimney type opening present. Edges of hollow are thin with vertical cracks and parts where edge of hollow has broken. Potential to be too open to be suitable.	416478.1277	6352439.14	 
7989	Jarrah	3	115	One well defined 20cm side entry hollow in main trunk at 15m. Edges rounded and smooth. Potential for upwards facing hollows in two large snapped off branches	416515.2279	6355306.907	 

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
8025	Dead	3	70	Potential chimney hollow I 40cm diameter branch. Rim is thin. Think unlikley developed hollow but can't confirm	416579.0215	6355241.372	 
8036	Jarrah	3	110	Mallee with 110 cm DBH Has one >10 cm knot hollow 10-15 m up. Smooth edges but can't confirm from ground. Trunk with 95 cm DBH has one <10 cm mid branch hollow and broken branches with undeveloped hollows	416618.7143	6352347.599	
8043	Dead	3	70	Potential suitable >20 cm chimney hollow from snapped off tree at ~20 m. no signs of wear or chew marks.	415739.95	6354405.293	
8056	Marri	3	100	Potential >10 cm fork hollow 25-30 m up, can't confirm.where visible, it appears to have rough edges, pote tial cup formation	416027.3841	6352278.012	 

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
8063	Jarrah	3	110	One >10 cm knot hollow ~8 m up, one <10 cm slit hollow in a knot at least one <10 cm spout hollow with potentially a couple more that can't be confirmed. Also broken branches with undeveloped hollows	416040.743	6352258.392	 
8076	Dead	3	140	Two potential >10 cm spout hollows 20-25 m up, can't confirm from ground	416054.368	6352229.793	
8082	Jarrah	3	110	Tony. One pote tial >20 cm chimney hollow from snapped off tree top. Can't confirm, no signs of wear or chew marks visible.	416058.9014	6352261.558	
8092	Jarrah	3	100	One potential >10 cm knot hollow ~15 m up. Has rough edges and appears to have wood coming out of it. Also have one >10 cm knot hollow ~20 m up and broken branches scattered.	416079.1834	6352311.827	 
8096	Jarrah	3	115	One >10 cm knot hollow ~10 m up and a few broken branches with undeveloped hollows in canopy	416083.3139	6352184.124	 

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
8101	Jarrah	3	90	One potential >10 cm knot hollow 15-20 m up. Upwards facing so cant confirm. Also two potential <10 cm knot hollows, upwards facing so can't confirm.	416091.3254	6352224.838	
8108	Jarrah	3	95	Tony. Has three >20cm (two mid branch and one knot) hollows 20-25 m up. All has semi smooth edges. Also broken branches with undeveloped hollows and two <10 cm hollows.	416103.648	6352224.437	 
8111	Jarrah	3	105	One pote tial >10 cm hollow 20-25 m up. Can't confirm. Also broken branches and undeveloped knot hollows along the trunk. One <10 cm knot hollow ~30 m up.	416104.7795	6352183.771	 
8116	Jarrah	3	210	Tony. One well defined 18 cm side entry hollow opening in 50 cm diameter branch at 15m. Snapped branches with shallow and small spout type hollow forming.	416112.9196	6352335.585	 
8127	Jarrah	3	130	Tony. Well defined 20 cm wide 30 high upwards opening knot type entry 12m up. Think good potential for chamber present. Second 10cm side entry hollow in 30cm diameter dead branch at 15m. Think too small for BC hollow.	416130.9738	6352268.369	 

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
8134	Jarrah	3	180	Two potential upwards openings 30-40 cm diameter in forks at snapped main trunk at 10m. Think very unlikley developed to depth or having chamber. Can't confirm	416140.2207	6352348.746	
8180	Marri	3	80	Tony. One 20-25cm spout type opening in 3m long 40cm diameter dead branch. Angle 60 degrees and 11m up. Think good potential to form hollow	416166.1477	6352360.709	
8183	Jarrah	3	105	Two well defined 15-20cm knot type openings angled upwards at 60 degrees. 12 and 13m up. Potential for hollow present. Think unlikley developed to BC depths.	416170.1102	6352445.737	
8314	Jarrah	3	135	Large 40-50 cm upwards angle knot opening at 10m where large branch snapped. Potential for hollow to be developed. Think unlikley developed to depth but can't confirm	416229.5687	6352445.848	
8372	Dead	3	80	Snapped at 12m . Potential chimney hollow in 50cm diameter top. Rim looks thin around edge suggests some depth development	416252.6317	6352201.998	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
8429	Jarrah	3	100	One 10-15 cm upwards facing opening at 8m. Potential hollow . Forming in growth around snapped main trunk. Well defined opening. Think likely too small and shallow for BC use if hollow forming	416278.0606	6352466.561	 
8480	Jarrah	3	190	Tony. Well defined 20cm side opening knot hollow at 9m. Has perch below improving access. Second similar opening 1m below but think shallow. Other <10cm spout hollows in branch ends	416297.2946	6352517.984	 
8555	Jarrah	3	185	One potential >10 cm knot hollow 30-35 m up, can't confirm from ground. Potentially some chew marks visible. Also other branches which all appear undeveloped hollows	416332.9351	6352335.959	 
8557	Jarrah	3	120	One potential >10 cm spout hollow ~30 m up, upwards facing so cant confirm. Has rough edges. below it's a <10 cm knot hollow. Also other broken branches with undeveloped hollows in canopy	416335.9026	6352471.457	 
8581	Jarrah	3	150	One >10 cm mid trunk hollow~10 m up with smooth edges. One pote tial >10 cm knot hollow ~15 m up, has rough edges. Can't confirm depth from ground. Also have broken branches with undeveloped hollows	416351.0917	6352152.203	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
8601	Dead	3	125	One potential tial >10 cm slit hollow 15-20 m up, can't confirm depth from ground. Also have broken branches with undeveloped hollows	416370.4219	6352123.794	
8603	Jarrah	3	135	Two potential >10 cm spout hollows, one ~30 m up and the other ~20 m up. Both has rough edges and no signs of wear however can't confirm from ground. Also have other broken branches with undeveloped hollows	416371.6782	6352371.65	 
8672	Marri	3	85	Dead central trunk snapped at 8m. Has chimney opening 30cm diameter at top. Can see rim is thin and wall thin in upper sections indicates hollow. Joins to sideways trunk section 40 cm below. Think likely shallow and ends at join	415689.22	6352445.667	 
8734	Jarrah	3	80	One 10x15 cm side entry opening in 25cm diameter branch at 20m upper canopy. Entry rim looks well defined smooth and worn at base. Think branch is likely too small to support BC chamber development	415817.5527	6352447.155	 
8737	Jarrah	3	100	One side entry 20x30cm opening mid main trunk at 14m. Well defined smooth rim. Second 20x40cm opening 1m below. Can see back looks shallow. Think unlikley openings developed into chamber with depth	415825.6337	6352349.901	 

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
8760	Jarrah	3	160	Two potential chimney openings in dead snapped 40cm diameter branches at 20m. One upwards angle spout with 15cm opening off dead main trunk at 17m. Think all are unlikley to have chamber developed. Can't confirm	415862.3556	6352346.773	 
8776	Jarrah	3	80	Tony. 30x40cm side entry hollow upper main trunk at 14m. Rim of hollow smooth well defined. Minor chew marks on upper edge of rim galaha or BC investigate chew rather than nesting. Second 40 cm side entry opening on west side. Can see back is shallow	415896.1794	6352417.702	 
8802	Jarrah	3	80	Tony. Has one >20 cm mid branch hollow 30-35 m up. Has smooth edges and pote tially some chew marks.	415933.4797	6352404.891	 
8803	Jarrah	3	80	One >10 cm mid branch hollow at 20 m up. Has smooth edges and appear to have some type of wear around the edges.One <10 cm mid trunk hollow <10 m up and broken branches with beginning to develop-undevelop3d hollows.	415933.73	6352325.041	 
8806	Jarrah	3	100	One ~10 cm mid branch hollow 20-25 m up. Smooth edges but too small? For bc. Also broken branches with undeveloped hollows in canopy	415937.8048	6352387.599	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
8818	Jarrah	3	95	One potential >10 cm chimney hollow from snapped off tree top ~25 m up. Edges are rough so unlikely to be a well developed hollow	415957.9569	6352332.266	
8820	Jarrah	3	85	One potential ~10cm mid branch hollow 25 m up, can't confirm. No signs of wear and the edges are somewhat smooth. Also broken branches with undeveloped hollows in canopy	415960.9266	6352337.114	
8823	Jarrah	3	135	One large cup formation ~6 m up filled with debris. one potential >20 cm hollow 25-30 m up, it's hidden by branches so cant confirm. Edg3s appears rough and a large crack running along the top wall appears to be present. Also broken branches with undeve	415969.122	6352368.555	
8826	Jarrah	3	130	One >10 cm spout hollow 15-20 m up, has smooth edges. One >20 cm mid trunk hollow 10-15 m up. Smooth and thin edges, potentially too close to ground. broken branches with undeveloped. Burnt out branch, pot. hollow	415974.3859	6352340.489	
8837	Dead	3	85	One >10 cm mid branch hollow ~20 m up. It has smooth edges but no signs of wear. Also broken branch with undeveloped hollows.	415991.7023	6352175.228	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
8838	Dead	3	95	Three >10 cm knot hollows 15, 20 and 25 m up. All with smooth edges. Two larger broken and burnt out branches that both appear undeveloped. Also small broken branches with undeveloped hollows in canopy	415991.7468	6352171.873	
8841	Jarrah	3	90	One potential >20 cm spout hollow 30 m up, can't confirm as it's downwards facing. Walls appears thin but edg3s are somewhat rough. One >10 cm burnt out branch appears undeveloped	415996.153	6352344.836	
8850	Jarrah	3	105	One potential hollow in fork >30 cm 20 m up. Potential cup formation, cant confirm. One pote tial >20 cm spout hollow 25 m up, burnt out brokwn branch. Appears a bit obstructed from bark at the top.	416004.0685	6352262.359	
8853	Jarrah	3	85	One ~10 cm knot hollow 20-25 m up, smooth edges but appears too small for bc. Appears to have >10 cm slit hollow 30 m up, can't confirm depth. One <10 cm mid trunk hollow 20-25 m up. Broken branches with undeveloped hollows.	416006.1419	6352284.443	
8855	Jarrah	3	100	One potential >20 cm fork hollow or cup formation 15-20 m up, can't confirm and no debris is visible. Tree is burnt out first 10 m from the ground. One potential >20 cm spout hollow 30 m up. Appears unlikely as edges are rough but can't confirm.	416007.6793	6352351.682	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
8873	Marri	3	110	Two large broken branches 25 & 30 m up with pote tial >10 cm spout hollows. Both have rough edges and no signs of wear. Also other broken branches with undeveloped hollows	416772.957	6352921.721	
8882	Dead	3	150	A few >10 cm broken branches up in the canopy >30 m, with potentialt hollows, can't confirm from ground. All branches have rough edges and are unlikely to have w well developed hollow that is used. x2 <10 cm mid branch hollows. Broken branch Undeveloped	416778.174	6352703.912	
8890	Dead	3	115	One pote tial >20 cm knot hollow at 20 m up. Its burnt out and somewhat smooth edges. No signs of wear. Two >10 cm at 25-30 m up Broken branches that appears undeveloped hollows with rough edges , however can't confirm.	416784.6885	6352846.066	
8965	Jarrah	3	125	Several larger broken branches, all appear undeveloped. The broken branches in the canopy appears also to be undeveloped but cannot confirm from ground.	416841.7575	6352783.484	 

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
9142	Jarrah	3	85	One potential >10 cm mid branch hollow 20 m up, cant0confirm. One <10 cm hollow and broken branches in canopy.	416014.1766	6352195.18	 
9186	Jarrah	3	110	One >10 cm broken branch with potential spout hollow 15 m up, cant confirm. Appears unlikely to be well developed, edges are very rough. Also a few <10 cm knot and spout hollows in canopy and broken branches.	416484.4253	6352902.287	
9194	Jarrah	3	100	One potential >10 cm spout hollow 20 m up. Appears to have thin walls but rough edges. Upwards facing so can't confirm,	416491.2149	6352914.671	
9196	Jarrah	3	120	Two 17cm side entry knot opening. Lower at 8m looks shallow, upper at 15m well defined with smooth rim and wear at base. Think unlikley developed to BC hollow depth.	416492.6607	6352986.302	 
9211	Dead	3	105	Tony. Snapped off tree at 20 m up, >20 cm potential chimney hollow at top. Edges are rough with no signs of wear. Can't confirm hollow from ground. Has a larger hole on the eastern side so potentially not a suitable hollow.	416500.9962	6352607.999	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
9302	Jarrah	3	100	One >10 cm spout/knot hollow 20-25 m up. Has smooth edges but unlikely to have developed enough depth. also one <10 cm knot hollow 30 m up a d other broken branches with undeveloped hollows	416544.4796	6352653.087	
9312	Jarrah	3	130	One 40x80 cm side entry opening. Base of rim looks blackened and not worn recently. Think likely not developed to depth internally. Two upwards angle snapped branches potential for hollow formation. Snap looks fresh, edges jagged. Think unlikley hollow.	416549.8076	6352785.362	
9314	Jarrah	3	60	One >10 cm mid trunk hollow 20-25 m up. Entrance mainly smooth but uneven in shape. No signs of chew marks. Unlikely to be suitable for bc.	416550.3586	6352606.174	
9323	Jarrah	3	90	Has one >10 cm mid branch hollow 15-20 m up. Has smooth edges but no signs of chew marks. unlikey to have developed into suiablt size for bc. Several broken branches with undeveloped hollows	416553.7119	6352893.201	
9382	Dead	3	220	Snapped at 10m. Top with opening 70cm diameter. Can see rim edges thin suggests hollow. Think unlikely suitable, too broad and open	416583.0283	6352817.897	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
9431	Jarrah	3	110	Large broke. Branches that all appear to have undeveloped hollows, however can't confirm from ground. All have rough edges and broken on an angle.	416604.6475	6352660.356	
9460	Jarrah	3	130	Tony. Two 15 cm side entry hollows in dead main trunk section at 20m. Think internally connecting. Rims well defined and smoothed off with ware marks. Accessible to birds from above.	416622.3951	6352753.018	
9465	Dead	3	180	Three 30-40cm potential upwards facing knot type openings in main trunk from 12-15m. Think likely open shallow cups. One well defined 15cm horizontal spout opening in large branch at 10m. Think shallow	416624.0775	6352716.269	
9569	Jarrah	3	120	One 12cm horizontal opening spout type hollow at12m in dead main trunk. Rim is thin and well defined with wear marks at base Minor chew marks on rim. Think very unlikley to support a BC size chamber internally.	416674.8121	6352671.905	
9643	Marri	3	105	Tony. Think likely a chimney hollow present with approx 20cm opening at 10m in 50cm diameter trunksection. Rim is in alive section grown rounded shape with well defined rim. Faces up need pole or drone to confirm	416714.1608	6352670.007	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
9662	Jarrah	3	60	One >10 cm1knot hollow 5 m up, appears shallow. One undeveloped knot hollow and one <10 cm mid branch hollow 15-20 m up.	416723.7752	6352660.18	
9684	Marri	3	110	Snapped at 15m . Top has 40-50cm upwards chimney opening. Edges are tin and rotted indicating some depth development. Some regrowth branches growing over top. Think lower likely that a suitable hollow present, think too wide and open	416735.0857	6352668.77	
9690	Jarrah	3	130	One spout type 20cm 45 degree angle opening main trunk at 10m. Bottom rim smooth, think unlikley developed to depth. dead snapped branches, burnt out sections, cavities and shallow cups in branch ends.	416741.0965	6352733.145	
9706	Jarrah	3	145	Potential for upwards angle 30cm slit type opening occurring in fork of dead main trunk at 18m. Can't get view to check depth. Rim looks well defined and smooth. Think unlikley BC size chamber present	416748.3435	6352760.56	
9725	Jarrah	3	120	One 25x40cm opening in horizontal large branch. Rim well defined and smoothed. Angle of branch and potential hollow not preferred by BC. Think unlikley chamber developed and non preferred angle	416754.9064	6352818.61	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
9734	Jarrah	3	110	One potential >20 cm spout hollow 15-20 m up, can't confirm from ground. Walls appear thin but edges are rough. A cup formation at 8 m. One potential <10 cm spout hollow in canopy and other broken branches with undeveloped hollows	416763.152	6352879.668	 
9844	Dead	3	110	One potential chimney hollow 25-30 m up from broken off branch. Walls appears thing but edges are mainly rough with no signs of wear. Unlikely to have developed depth.	410889.8082	6355629.298	 
9980	Marri	3	75	One potential >10 cm hollow in fork 10-15 m up. Could potentially also be a cup formation, can't confirm.ppears not worn on the bootom edge of entry so unlikely developed a depth.	416713.4601	6353032.449	 

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
9988	Jarrah	3	85	One 18cm upwards facing opening in fork of main trunk at 18m. Opening well defined, smooth rounded edges. Wear marks are from rubbing by adjacent branches. Think unlikley developed to BC chamber depth.	416732.4641	6353016.968	
10020	Dead	3	240	Appears to have a cup formation 25 m up from snapped off tree top. Also potential >30 cm knot hollow 20 m up from broken off branch. No evidence of wear and bottom on entrance is rough.	416918.8818	6352418.613	
10036	Dead	3	90	One potential >20 cm chimney hollow 30 m up. Edges are rough and the walls appears thin. No signs of wear. Can't confirm from ground.	416934.8983	6352589.607	
10104	Marri	3	60	Snapped off tree at 15 m potential >10 cm chimney hollow. Walls appear thin however the edges are rough and have no signs of wear. ~50 cm down is a broken branch with an undeveloped hollow	416997.682	6352529.838	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
10114	Dead	3	70	Has one pote tial >20 cm spout hollow 20 m up. Cracks are running along the walls around the whole spout. 30 cm down is a burnt out dent in the branch and it appear unlikely for a well developed hollow. Edges are also rough no signs of wear	417004.7169	6352533.592	
10124	Dead	3	85	One potential >10 cm knot hollow 10 m up. Could also be cup formation, can't confirm. Edges are somewhat smooth but no signs of wear. Also a couple of broken branches with undeveloped hollows	417008.6586	6352423.414	
10140	Dead	3	140	Tony. One >10 cm spout hollow 30 m up. Not a huge entrance but it could pote tiall open up to larger chamber. Pote tial chew marks visible from something. Also has other broken branches with undeveloped hollows	417018.3449	6352590.699	 
10161	Jarrah	3	110	30cm opening potential chimney hollow top of main snapped trunk at 18m. Edges burnt and rough. One 15cm upwards opening knot type at 10m mid trunk, rim is rough with flake bark. Think both unlikley to have chamber development.	417034.0642	6352636.456	 

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
10201	Dead	3	115	Tony. One potenial >30 cm hollow from snapped off tree 25 m up. could potentially be cup formation, can't confirm. Edges are rough and no signs of wear. Unlikely to have developed depth.	417054.8201	6352486.143	
10252	Jarrah	3	70	Tony. Potential >20 cm chimney hollow 20 m up from snapped off tree top. edges are somewhat smooth and appear relatively thin. Can't confirm from ground.	417078.7152	6352490.493	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
10280	Jarrah	3	90	One potential >10 cm spout hollow 30 m up. Appears unlikely as the edges are very rough and no signs of wear. however can't confirm	417103.8279	6352537.518	
10288	Jarrah	3	125	One potential >20 cm spout hollo2 25 m up. appears to be undeveloped as the edges are very rough and wood is still poking out around dthe rim of the entrance.	417108.5841	6352505.106	 
10301	Jarrah	3	180	One 17cm spout opening into short 30cm diameter branch stump off main trunk. Edges look rough suggests no hollow formation. Sideways angle not preferred by BC. Think unlikley suitable.	417118.6083	6352827.104	 
10335	Jarrah	3	165	Tony. One 25cm side entry opening at 15m into 50cm diameter branch. Branch angle 45 degrees. Opening well defined smooth at base has minor chew marks at base. Think hollow forming. Second 15cm hollows at 18m. Rim well defined. Jagged wood vis at back	417158.9952	6352811.576	 

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
10363	Marri	3	70	Tony. One upwards opening 18cm hollow top of dead central trunk at 8m. Rim well defined thin and worn smooth at base from use. Going into 35cm diameter trunk. Potential too narrow for BC size chamber development. Think good hollow present.	417207.2685	6352778.732	
10428	Jarrah	3	80	Large upwards facing 40cm diameter dead snapped branches. Potential for chimney hollow formation. Rim looks thin and smooth. Think unlikely developed to depth	411425.4899	6350791.126	
10430	Jarrah	3	85	15-20cm side entry opening at 15m main trunk. Rim smooth. Potential upwards opening at 15-20cm in fork at 12m .	411537.6481	6350793.44	
10458	Jarrah	3	95	One potential >20 cm chimney hollow 30 m up. Edges are rough but walls appear thin. Can't confirm depth. However it is a jarrah so probably unlikely.	411817.9678	6350692.717	 

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
10464	Dead	3	120	One potential >20 cm spout hollow 15 m up, cant confirm. Unlikely suitable, because more narrow as it goes down and no signs of wear. Also broken branch with undeveloped hollows in canopy	411875.4916	6350549.216	
10476	Marri	3	85	Trunk snapped at 12m. Top section dead with potential chimney hollow developing. Edges of rim look thin. Cant see leaves accumulated.	411900.3454	6350624.421	
10498	Marri	3	80	Dead central trunk. 40cm diameter upward facing snapped branches ends jagged and rough but rims look thin with potential for hollow present. Think unlikley developed BC hollow. 30 cm side opening looks shallow.	411940.006	6350639.936	
10525	Dead	3	125	One pote tial >20 cm chimney hollow 15-20 m up, cant confirm from ground. No chew marks or other signs of wear. Roken branches with undeveloped hollows are also present in the canopy.	412003.8178	6350536.104	
10566	Dead	3	130	One potential >15 cm middle of branch hollow 15-20 m up, can't confirm from ground. Also a broken branch with a potential >10 cm spout hollow, can't confirm from ground. A few	412097.4462	6350536.628	 

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
10582	Dead	3	75	One potential >10 cm spout hollow 20 m up, can't confirm. Appears to have thin walls, however u likely to be suitable due to the upwards angle. AlsoHas a a branch with an undeveloped hollow	412175.2409	6350601.369	
10586	Marri	3	160	Snapped trunk with >30cm chimney hollow. Chew from BC at entrance. BC observed chewing hollow edge. Departed in group. Think prospecting rather than nesting	412351.0873	6352053.565	
10588	Marri	3	100	Dead central trunk. Chimney type opening 10-20cm diameter in 30cm diameter branch. Thin around rim, no chew. Think unlikley developed to BC depth or chamber diameter.	411188.066	6353686.692	 
10589	Marri	3	85	Dead central trunk. One 20cm upwards facing opening in 40degree angle branch 45cm diam. At m 13high. Think unlikley developed to BC chamber depth and size	411251.1085	6353726.46	 
10590	Marri	3	130	Tony. Potential chimney hollow 20cm opening in 40cm diameter branch at 20m. Looks thin around rim suggests some hollow formation	411229.594	6353737.822	 

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
10591	Jarrah	3	90	30cm spout opening at 15m in 45 cm diameter branch. At 30 degrees Blackened and burnt. Think unlikley hollow deep and angle not preferred	411169.7156	6353721.328	
10592	Marri	3	90	Tony. Dead central trunk. 25-30cm upwards facing opening in 40cm diameter branch. At 60 degrees angle. 12m up. Rim thin hollow appears present	410992.1175	6353964.406	
10593	Jarrah	3	100	Tony. Side entry 30cm opening at 17m. Potential spout opening 40cm diameter at 10 m	410992.0419	6353993.115	
10594	Marri	3	70	Chimney hollow 40cm diameter at 10m in dead central trunk. Partially burnt out and collapsed. Think unlikley developed deep hollow in remaining trunk sections	411027.1315	6353870.343	
10595	Marri	3	80	Chimney hollow entry 15cm in 25cm diameter branch at 12m. Advanced decomp and white ant mud visible. Think unlikley developed suitable chamber	412306.1259	6350008.554	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
10596	Jarrah	3	130	Potential chimney hollow opening 30cm in 45cm branch. Burnt and black inside. Think unlikely developed to depth	412425.9656	6350678.874	 
10597	Jarrah	3	120	Two potential hollows in upwards angle 40cm diameter branch. At 12m and 18m. Rims look thin. Upper hollow has some wear. Think hollow forming but unlikley developed to depth	412498.55	6350671.942	 
10598	Marri	3	150	Potential upwards opening hollow at knot 25cm opening mid way along cm 40cm diameter branch angle 60 degrees. At 12m.	412422.6582	6350668.816	
10599	Marri	3	90	Potential 45 degree 30cm diameter hollow in knot at 13m in mid of main trunk. Think unlikley developed to depth. Can't confirm	412209.1464	6350650.243	
10600	Jarrah	3	135	Side entry opening at 25cm diameter in 50cm diameter branch angled 50 degrees. m 20up.	411849.1528	6350454.471	
10601	Jarrah	3	110	Potential 40cm opening chimney hollow in 50cm diameter branch. Rim looks thin and smooth. at 16m. Think unlikley developed to depth	411066.1205	6355047.825	
10602	Jarrah	3	90	25cm upwards opening in knot . Branch angle 70degrees at 14m high. Looks blackened inside. Unlikely to develop to depth	410930.0282	6355062.611	 

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
10603	Jarrah	3	110	Tony. 30cm spout into 50cm diameter trunk. Angle 70 degrees height 15m.	414021.4837	6352487.535	
10604	Dead	3	80	Chimney opening 20cm in 30cm diameter trunk. Has wear marks around rim. Also wear marks in tree forks. Potential roosting tree ?	414057.608	6352490.975	
10605	Jarrah	3	120	Tony. 25cm upwards facing hollow in knot mid main trunk at 12m. Rim well defined with wear marks	414232.6364	6352414.488	
10613	Marri	3	105	Tree snapped at 10 m. Potential for chimney hollow 30cm. Does not appear to be developed	413115.7231	6352031.508	
10616	Jarrah	3	90	One mid trunk 15-20cm upwards knot hollow. Can't tell depth	412955.9962	6352009.238	
10617	Jarrah	3	150	Several potential 30 cm upwards opening entrances. Can't estimate depth. Sig tree.	412582.3365	6352049.282	
10619	Jarrah	3	170	One 20 cm upwards opening knot hollow mid trunk. Several large snapped branches developing hollows in upper	412650.1425	6352091.001	
10620	Marri	3	105	2 large dead snapped branches potentially forming chimney hollow of >25cm. Can't confirm	412287.8837	6352108.185	
10621	Jarrah	3	220	Potential for chimney hollows in large upwards branches and on snappedcmain trunk. Can't confirm. Sig tree	412814.1307	6352250.942	
10622	Jarrah	3	140	Two 20cm spout type hollow entery.Thinj unlikely to be developed to depth. Several small hollows and dead branches	412791.7461	6352275.269	
10624	Jarrah	3	130	Tony. One 20 c20well developed side entery hollow. Potential for three upwards chimney hollows in trunk and large branches,	412770.2507	6352273.896	
10625	Jarrah	3	100	One 20cm upwards angle knot type hollow. Large dead branches in upper	412519.8055	6352450.817	
10627	Jarrah	3	135	Tony. One up angle knot type mid trunk. 20cm opening hollow.. has minor chew and wear marks. not clear if fron BC	412837.6074	6352489.14	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
10629	Jarrah	3	90	Cup formation at 8 m. Medium sized branches broken off with potential spout hollows 20 m up. Can't confirm depth from ground. No chew marks or other signs of wear. Edges rough.	411170.377	6353537.131	
10630	Dead	3	70	One potential >10 cm spout hollow 20 m up. Upwards facing so can't confirm from ground. Edges are rough and no sign of chew marks or other wear. One 10 cm spout hollow 15 m up. No signs of wear.	410931.4688	6353935.02	
10631	Dead	3	195	Four Broken >10 cm branches 25 m up in canopy with potential hollows cant confirm from ground. No sign of wear.	410861.6094	6354007.718	
10632	Dead	3	155	One >10 cm potential knot hollow 20 m up. Potentially not developed depth, wood is poking out. Can't confirm from ground. No sign of wear is visible. Also broken branches with potential 10 cm spout hollow up in canopy, can't confirm from ground.	410807.3913	6354169.938	
10633	Jarrah	3	100	Three potential >10 cm hollows (knot, fork and spout). Can't confirm from ground. Fork and spout hollow appears undeveloped hollow.	410803.1408	6354256.693	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
10634	Marri	3	95	Has one >10cm potential chimney hollow 25 m up. No signs of wear or chew marks. Can't confirm from ground. Narrows in after opening.	412277.6628	6350702.537	
10635	Dead	3	125	Tony. Has one >20 cm potential spout hollow 25 m up. Edges and wall appears thin and run down for about 0.5 m. No chew marks or wear.	411818.7743	6349965.648	
10636	Jarrah	3	75	Two dead and burnt out branches 15 m up. Potentially >10 cm chimney/spout hollows. Edges appear somewhat thin however rough and no signs of wear.	411660.0039	6349963.907	
10637	Dead	3	70	One potential chimney >10 cm hollow 15 m up. Can't confirm from ground. Edges are somewhat smooth however no signs of wear or chew marks.	411650.2667	6350124.2	
0638	Dead	3	70	One potential >10 cm chimney hollow 20 m up. No chew marks or other signs of wear, however can't confirm depth from ground. Walls appear thick, no gaps.	411119.7294	6354984.089	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
10639	Dead	3	95	Potential >10 cm fork hollow can't confirm from ground, however unlikely. Also one <10 cm spout hollow. Other broken branches no hollow development.	411103.987	6355145.328	 
10640	Dead	3	100	Tony. One potential >10 cm chimney hollow 20 m up in canopy. Can't confirm from ground. Edges somewhat flat and walls appear somewhat thin. No chew marks.	410963.5361	6355294.448	
10641	Dead	3	95	Tony. Has one potential >20 cm chimney hollow 20 m up. Edges appear smooth, no signs of chew marks or other wear.	410882.6405	6355305.181	 
10642	Jarrah	3	160	Tony. One potential >10 cm spout hollow 10 m up. Has thin edges and crack along the side. Also potentially >10 cm upwards facing spout hollow 5 m above the other spout hollow. Appears to have thin edges with a cracked running down the side.	414123.8143	6352283.514	 
10643	Dead	3	85	Potentially a >10 cm chimney hollow at the top of canopy, 25 m. Can't confirm from ground. Edges are somewhat smooth. No cracks to indicate thin walls. No signs of wear.	410817.6109	6355325.716	

Merge Tree Number	Species	Class Bamford	DBH (cm)	Hollow Comments	Easting (AGD84/AMG zone 50)	Northing (AGD84/AMG zone 50)	Images
10644	Marri	3	105	Tony. One >20 cm mid trunk hollow, smooth edges. Can't confirm depth from ground. Main trunk snapped off at 20 m. Potential chimney hollow, cracks along side potentially too big for suitable nesting.	414088.8405	6352924.945	
10645	Dead	3	115	One >10 cm mid trunk hollow. Potentially shallow as some type of texture is a bit noticeable, can't confirm depth from ground. Also some broken branches, none appear hollow formation.	414051.2916	6353063.72	
10646	Dead	3	70	Tony. Snapped off tree 15 m up. Potentially >10 cm chimney hollow. Edges rough, walls appear thin with cracks.	414095.117	6352932.346	
10647	Jarrah	3	90	Tony. One >20 cm might branch hollow 10 m up, has somewhat smooth edges. One potential >10 cm chimney hollow 20 m up. Has somewhat rough edges and small cracks along the side.	414116.6321	6352934.722	
10648	Dead	3	55	Potential >10 cm spout hollow 10 m up, can't confirm from ground but unlikely. Edges are rough, walls have cracks and appear thin.	414147.1015	6352853.127