

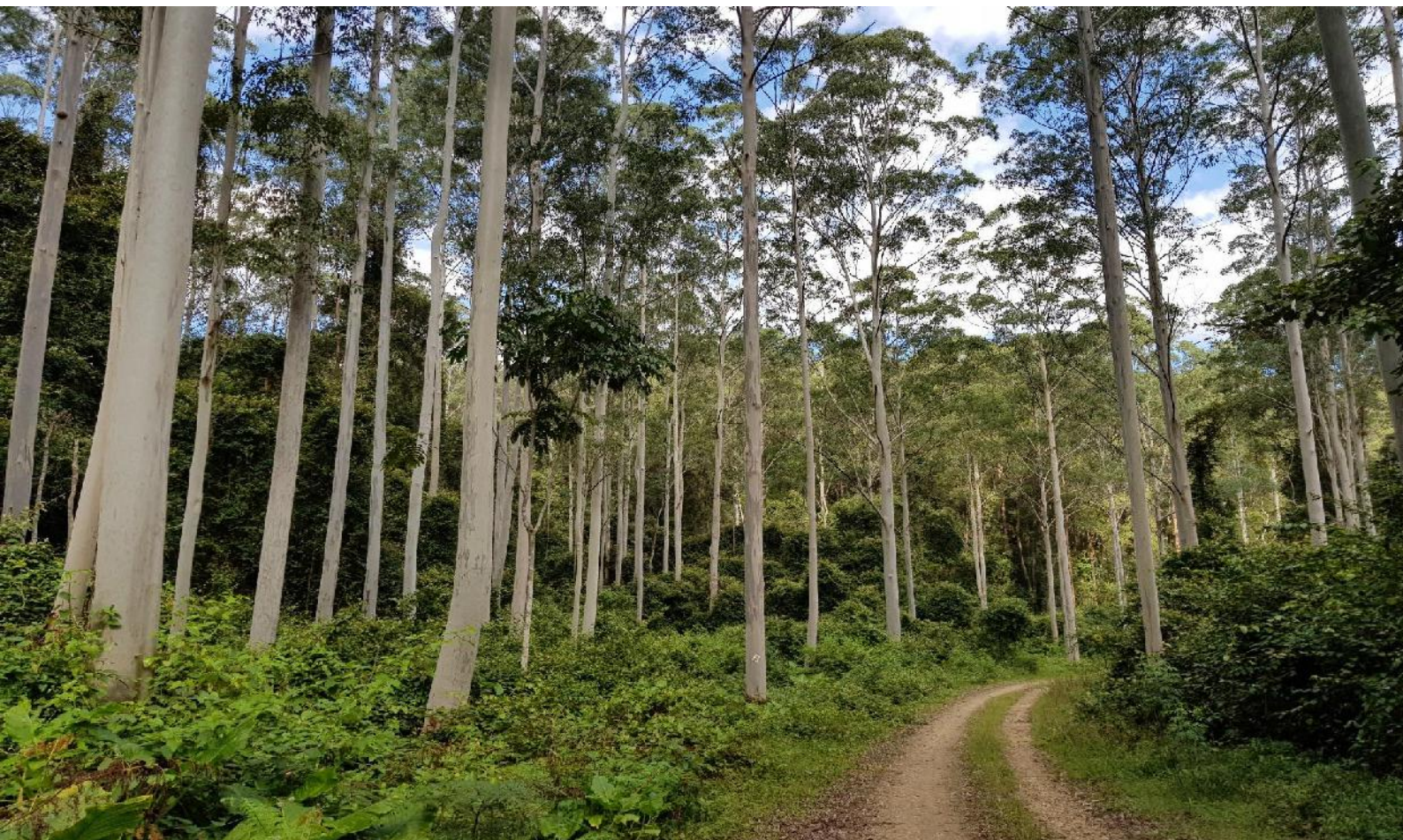


Biodiversity Development Assessment Report

82 Collaroy Parade, Louth Park NSW

HBT0019_BDAR_V7.2

23/09/2024



Biodiversity Development Assessment Report

82 Collaroy Parade, Louth Park NSW

Document No: HBT0019_BDAR_V7.2

23/09/2024

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Prepared for

Newpro25 Pty Ltd c/o Perception Planning Pty Ltd

Prepared by

Habitat Environmental Services Pty Ltd

Certification under clause 6.15 Biodiversity Conservation Act 2016

I certify that this report has been prepared based on the requirements of, and information provided under, the Biodiversity Assessment Method and clause 6.15 of the *Biodiversity Conservation Act 2016* (BC Act).



Signature:

Assessor: Dr. Gilbert Whyte

Date: 23/09/2024

BAM Assessor Accreditation no: BAAS18041

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1 Introduction

1.1 Background

Habitat Environmental Services Pty Ltd (Habitat) was engaged by Newpro25 Pty Ltd c/o Perception Planning Pty Ltd to prepare a Biodiversity Development Assessment Report (BDAR) to support the proposed development (and associated s4.55 modification) of Lot 2 (DP 1286289), located at 82 Collaroy Parade, Louth Park NSW (hereafter referred to as the Study Area), as shown in **Figure 1**.

This assessment has been undertaken in accordance with the NSW Biodiversity Assessment Method 2020 (BAM) (DPIE 2020a) under the *Biodiversity Conservation Act 2016* (NSW) (BC Act) and the *Biodiversity Conservation Regulation 2017* (BC Regulation).

The following terms are used throughout this report:

- Study Area: Lot 2 (DP 1286289) located at 82 Collaroy Parade, Louth Park NSW.
- Subject Land (Development Site): The area within the Study Area to be directly impacted by the proposed development (the entire lot).
- Locality: Land within a 5-kilometre (km) radius of the Study Area.

1.2 Site Description

The Study Area is approximately 7.61 hectares (ha) and is located within Louth Park, approximately 4 kilometers (km) south of the city of Maitland (**Figure 1**). Louth Park occurs within the Maitland City Council Local Government Area (LGA). The Study Area is zoned as *R5 – Large Lot Residential* under the Maitland Local Environmental Plan (LEP 2011).

The Study Area lies to the east of a recently constructed residential area (**Figure 2**). Entry to the site is achieved via Collaroy Parade to the west. Lands to the south of the Study Area are predominantly comprised of cleared agricultural land with scattered trees. Residential development occurs to the west and a small area of bushland occurs to the north.

The topography within the site is relatively flat with a slight northern aspect. Low-lying areas occur in the northern portion. A first order stream flows in a northern direction outside the eastern boundary.

The vegetation within the Study Area is comprised of a mosaic of forest patches and cleared grassland. Forested areas contain large trees, although these areas also show evidence of recent regeneration (mainly comprised of small trees and shrubs). The composition of the vegetation indicates that much of the site was cleared historically. A discussion of the extent and condition of native vegetation within the Development Site is presented in **Section 3**.

1.3 Proposed Development

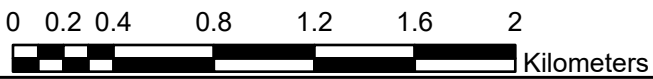
Approval for subdivision (and associated s4.55 modification) of the Study Area will be sought from Maitland City Council via a Development Application (DA). The layout of the proposed development is illustrated on **Figure 3**.

1.4 Scope

This BDAR aims to quantify impacts of the proposed development upon biodiversity values according to the Biodiversity Assessment Method 2020 (DPIE 2020a), including threatened biota listed under the NSW *Biodiversity Conservation Act 2016* (BC Act). The assessment includes:

- **Stage 1 – Biodiversity Assessment** – Mapping of Plant Community Types (PCTs) including Endangered Ecological Communities (EECs), an assessment of the potential occurrence of threatened species and their habitats, and the potential occurrence of candidate threatened species returned by the BAM Calculator (BAM-C).
- **Stage 2 – Impact Assessment** – Identification of potential impacts of the proposed development, avoidance and mitigation measures, and biodiversity offset requirements based upon residual impacts.

The Biodiversity Accredited Assessor System (BAAS) Case number for the Project is 00030538/BAAS18041/22/00030542.



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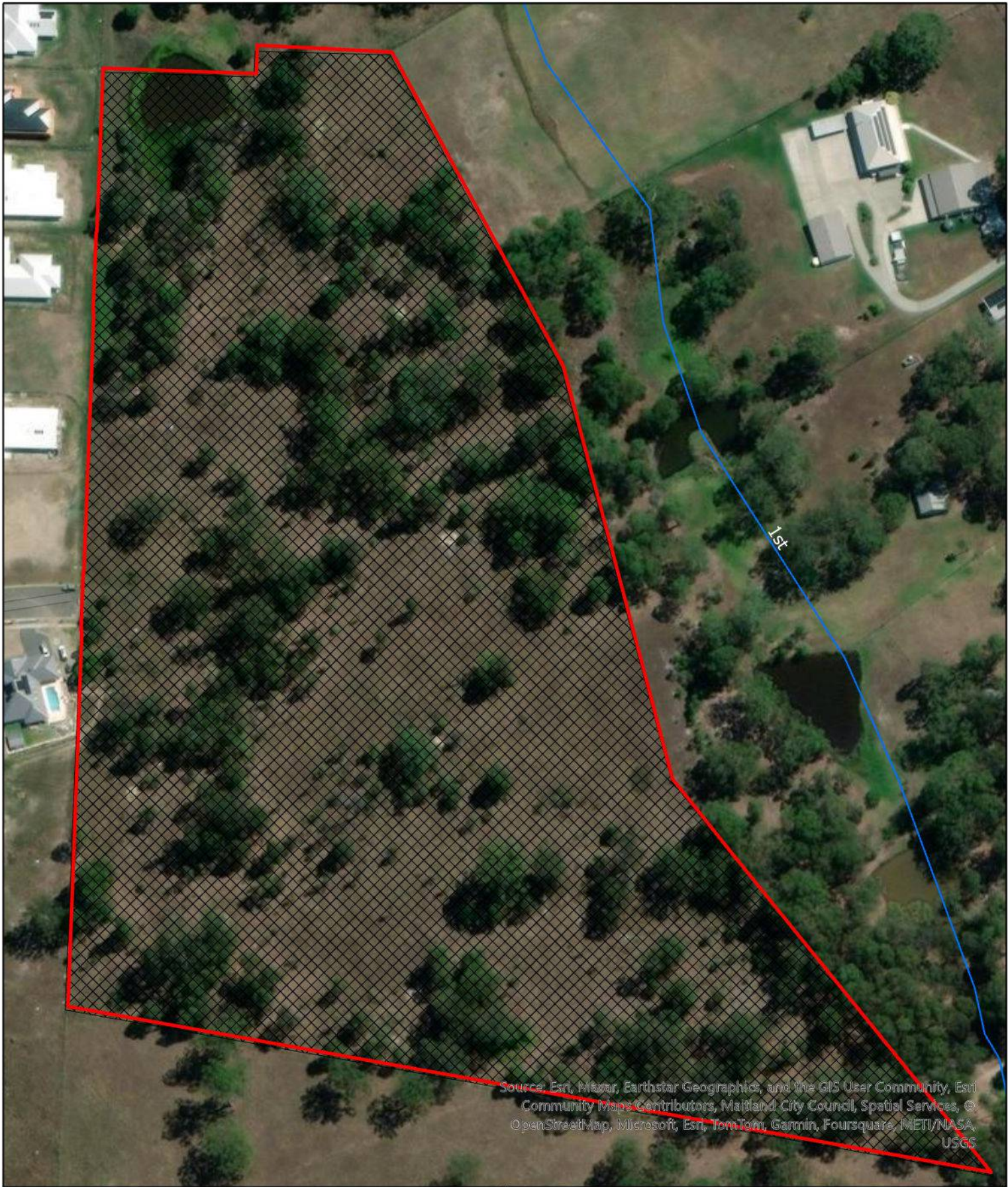
 Study Area

Figure 1 - Locality Map





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- Subject Land
- Development Site
- Mapped Waterways**
- 1st Order Stream

Figure 2 - Subject Land



1.5 Information Sources

The following sources of information were used to inform the assessment:

- The NSW DPE, BioNet Atlas (DPE 2023a) for previous records of threatened species, populations, and ecological communities within a 5-km radius of the Study Area.
- Regional Vegetation Mapping Projects:
 - *Lower Hunter and Central Coast Regional vegetation survey 2018 (VIS_ID 2227)*
- The NSW DPE, BioNet Vegetation Classification Database (DPE 2023b) for identification and allocation of Plant Community Types (PCTs) to vegetation zones on site.
- The NSW DPE, BioNet Threatened Biodiversity Data Collection (DPE 2023c), Threatened Species Profiles (DPE 2023d) and Final Determinations (DPE 2023e) for information on threatened species, populations, and ecological communities.

1.6 Legislative Context

The assessment was undertaken in accordance and consideration of the following Acts and Policies:

- Biodiversity Assessment Method (BAM) (DPIE 2020a).
- *Biodiversity Conservation Act 2016 (NSW) (BC Act).*
- *Biodiversity Conservation Regulation 2017 (NSW) (BC Regulation).*
- *Biosecurity Act 2015 (NSW).*
- *Coastal Management Act 2016.*
- *Environmental Planning and Assessment Act 1979 (NSW) (EP&A Act).*
- *State Environmental Planning Policy (Biodiversity and Conservation) 2021*
- *State Environmental Planning Policy (Resilience and Hazards) 2021*
- *Water Management Act 2000 (NSW) (WM Act).*
- *Local Land Services Act 2013 (LLS Act)*
- *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).*
- Maitland Local Environmental Plan 2011
- Maitland Development Control Plan 2011 (Amended 21 July 2016)

Information pertaining to the above list is presented in the following subsections.

1.6.1 Biodiversity Conservation Act 2016 (NSW)

The NSW BC Act together with the NSW BC Regulation outlines the framework for addressing impacts on biodiversity from development and clearing. The framework details a pathway to avoid, minimise and offset impacts on biodiversity from development through the Biodiversity Offset Scheme (BOS).

Entry into the NSW Biodiversity Offset Scheme (BOS) is triggered by developments, projects and activities that meet criteria or certain thresholds for significant impacts on biodiversity in accordance with Section 6.3 of the BC Act.

Criteria to which the BOS applies include the following:

- Local Development (assessed under Part 4 of the *Environmental Planning and Assessment Act 1979*) that triggers the BOS Threshold or is “likely to significantly affect threatened species” (based on a test of significance pursuant to Section 7.3 of the BC Act). The BOS Threshold has two parts, and is triggered by the following:
 - Clearing of vegetation that exceeds an area threshold (based on the minimum lot size), or
 - Impacts are predicted to occur within an area mapped on the NSW Biodiversity Values Map (BV Map) (DPE 2023f).
- State Significant Development (SSD) and State Significant Infrastructure projects (SSI), unless “the Secretary of the Department of Planning, Industry and Environment and the environment agency head determine that the project is not likely to have a significant impact”.
- Biodiversity certification proposals.
- Clearing of native vegetation in urban areas and areas zoned for environmental conservation that exceeds the BOS threshold and does not require development consent.
- Clearing of native vegetation that requires approval by the Native Vegetation Panel under the *Local Land Services Act 2013*.
- Activities assessed and determined under Part 5 of the EP&A Act (generally, proposals by government entities) if proponents choose to ‘opt in’ to the Scheme.

Conclusion

The minimum lot size of the Study Area (Lot 1 DP 221762) is 0.15 ha. The vegetation clearing threshold that triggers entry to the BOS is 0.25 ha. Approximately 7.54 ha of vegetation clearing will be required for the proposed development; therefore, a BDAR is required to support the DA.

1.6.2 Biosecurity Act 2015

Under the *Biosecurity Act 2015* (NSW) all plants are regulated with a general biosecurity duty “to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable.” Under the Act, a biosecurity impact “is an adverse effect on the economy, environment, or the community that arises, or has the potential to arise, from a biosecurity matter.” This legislation is addressed in **Section 7.2**.

1.6.3 Water Management Act 2000

Controlled activities carried out in, on or under waterfront land are regulated by the *Water Management Act 2000* (“WM Act”). ‘Waterfront land’ is defined as the bed of any river, lake or estuary, and the land within 40 m of the riverbanks, lake shore or estuary mean high water mark.

A mapped watercourse (1st order stream) flows in a northern direction outside the western boundary of the Development Site. No development will occur within the Vegetated Riparian Zone (VRZ) of this watercourse. As such, the proposed development does not constitute a ‘controlled activity’ in accordance with the WM Act. Consideration of indirect impacts to aquatic and riparian habitat is provided in **Section 5**. Mitigation measures are detailed in **Section 5.4**.

1.6.4 State Environmental Planning Policy (Biodiversity and Conservation) 2021

Chapter 4 - Koala Habitat Protection (2021)

Chapter 4 of the SEPP contains provisions aimed to encourage the conservation and management of areas of natural vegetation that provide habitat for Koalas to support a permanent free-living population over their present range and reverse the current trend of Koala population decline.

The chapter applies to each Local Government Area listed under Schedule 2 of the SEPP. Maitland City Council LGA is listed under Schedule 2; therefore, the chapter applies. As such, a suitably qualified and experienced person assessed the site to determine if the land contains ‘Core Koala Habitat’ as defined by the SEPP. See **Section 7.3** for a summary of the Koala habitat assessment.

Part 10.6 Wetlands Protection Area

The objectives of Part 10.6 of the SEPP in relation to wetlands are as follows:

- To preserve, protect and encourage the restoration and rehabilitation of wetlands.
- To maintain and restore the health and viability of wetlands.
- To prevent the fragmentation of wetlands.

- To preserve the scenic qualities of wetlands.

To ensure that wetlands continue to perform their natural ecological functions (such as the provision of wetland habitat, the preservation of water quality, the control of flooding and erosion).

The Development Site does not contain or adjoin Wetland Protection Area; therefore, Part 10.6 of the SEPP does not apply.

1.6.5 State Environmental Planning Policy (Resilience and Hazards) 2021

The State Environmental Planning Policy (Resilience and Hazards) 2021 (Resilience and Hazards SEPP) consolidates, transfers and repeals the provisions of three (3) SEPPs into a single environmental planning instrument, including: the SEPP (Coastal Management) 2018 (Coastal Management SEPP), SEPP 33 – Hazardous and Offensive Development (SEPP 33), and SEPP 55 – Remediation of Land (SEPP 55). The Resilience and Hazards SEPP aims to promote the protection and improvement of key environmental assets for their intrinsic value and the social and economic benefits they provide. Relevant chapters of the Resilience and Hazards SEPP are considered below:

Chapter 2 – Coastal Management

The aim of this Chapter is to promote an integrated and coordinated approach to land use planning in the coastal zone in a manner consistent with the objects of the Coastal Management Act 2016, including the management objectives for each coastal management area, by:

- Managing development in the coastal zone and protecting the environmental assets of the coast.
- Establishing a framework for land use planning to guide decision-making in the coastal zone.
- Mapping the 4 coastal management areas that comprise the NSW coastal zone for the purpose of the definitions in the *Coastal Management Act 2016*.

The Coastal Management Chapter incorporates the provisions of the now repealed Coastal Management SEPP which commenced on 3 April 2018 and consolidated the provisions of: SEPP 14 (Coastal Wetlands), SEPP 26 (Littoral Rainforests) and SEPP 71 (Coastal Protection).

The Coastal Management Chapter defines the four coastal management areas in accordance with the Coastal Management Act and details mapping and specifies assessment criteria that are tailored for each coastal management area. Councils and other consent authorities must apply these criteria when assessing proposals for development that fall within one or more of the mapped areas.

The four coastal management areas are:

- Coastal wetlands and littoral rainforests area – areas which display the characteristics of coastal wetlands or littoral rainforests that were previously protected by SEPP 14 and SEPP 26.
- Coastal vulnerability area – areas subject to coastal hazards such as coastal erosion and tidal inundation.

- Coastal environment area – areas that are characterised by natural coastal features such as beaches, rock platforms, coastal lakes and lagoons and undeveloped headlands. Marine and estuarine waters are also included.
- Coastal use area – land adjacent to coastal waters, estuaries and coastal lakes and lagoons.

The Study Area does not contain areas mapped as any of the four coastal management areas above. As such, the *Coastal Management Act 2016* does not apply to this development.

1.6.6 Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

Under the EPBC Act, approval is required for actions that are likely to have a significant impact on Matters of National Environmental Significance (MNES). An action includes a project, development, undertaking, activity or series of activities. When a person proposes to take an action, which they believe may need approval under the EPBC Act, they must refer the proposal to the Australian Government Minister for the Environment. The Act identifies the following nine MNES:

- World Heritage properties.
- National heritage places.
- Wetlands of international importance (Ramsar Convention).
- Listed threatened species and communities.
- Migratory species listed under international agreements.
- Great Barrier Reef Marine Park.
- Commonwealth marine areas.
- Nuclear actions.
- Water resources in respect to CSG and large coal mines.

While this BDAR is not required to address MNES, the proponent is required to address the EPBC Act as part of a development application to Council. Listed threatened species and communities are relevant to the proposed development. A summary of this assessment is presented in **Section 7.1**.

1.6.7 Maitland Local Environmental Plan 2011

The Study Area is located within the Maitland City Council LGA. The Maitland Environmental Plan 2011 (LEP) controls development within the Study Area through zoning and development controls. These controls are described in greater detail by the supporting Maitland Development Control Plan 2011 (DCP).

1.6.8 Maitland Development Control Plan 2011

The Maitland Development Control Plan 2011 supports the LEP by providing additional detail and guidance on addressing biodiversity issues associated with development. Part B of DCP contains relevant Environmental Guidelines. These guidelines have been considered during the preparation of this assessment.

2 Landscape Features

The landscape features detailed in Section 3 of the BAM (DPIE 2020a), which are applicable to the Study Area are described in **Table 1**.

Table 1 Landscape Features

Landscape Features	Information
IBRA Region	Sydney Basin
IBRA Sub Region	Hunter
Local Government Area (LGA)	Maitland City Council Local Government Area
Mitchell Landscape	<p>Newcastle Coastal Ramp (DECC, 2002; Mitchell 2002) - Undulating lowlands and low to steep hills on complex patterns of faulted and gently folded Carboniferous conglomerate, lithic sandstone, felspathic sandstone, and mudstone, general elevation 50 to 275m, local relief 40 to 150m. Stony red texture-contrast soils on steep slopes, yellow and brown texture-contrast soils on lower slopes and deep dark clay loams along streams.</p> <p>Mitchells Landscape mapping is shown on Figure 4.</p>
Rivers, streams and estuaries	A mapped watercourse (1st order stream) flows in a northern direction outside the western boundary of the Development Site (see Figure 2). No development will occur within the Vegetated Riparian Zone (VRZ) of this watercourse (10m either side of the top of bank).
Wetlands	No Coastal wetlands mapped on the Coastal Wetlands and Littoral Rainforests Area Map (DPE 2022) occur within the Study Area.
Connectivity of different areas of habitat	<p>The vegetation within Study Area has reasonable internal connectivity. External connectivity is limited to small patches of forest to the north and west. Residential or cleared areas exist to the south, west and north-west of the site.</p> <p>Within the locality, the Study Area occurs at the edge of a mosaic of fragmented forest patches and is not part of a regionally important habitat corridor, as shown by the habitat corridor mapping shown on Figure 4.</p>
Areas of geological significance and soil hazard features	The Study Area is not located with an area identified as having any particular geological significance. No mapping was identified that would indicate the site contains any soil hazard features.
Areas of outstanding biodiversity value	There are no areas of “outstanding biodiversity value” (in accordance with Section 3.1.3 of the BAM (DPIE 2020a) mapped within the Development Site or Study Area.
Geology and Soils	<p>The Soil Landscapes of the Newcastle 1:100,000 Sheet (Mathei 1995) indicates that one soil landscape occurs within the Study Area:</p> <p>Beresfield Soil Landscape – This landscape is described as undulating low hills and rises on Permian sediments in the East Maitland Hills region. Slope gradients range 3–15%, local relief to 50 m, elevation is 20–50 m. Partially cleared tall open-forest. Landscape Variant—bea—steeper upper slopes (15–<25%). Soils—moderately deep (<120 cm), moderately well to imperfectly drained Yellow Podzolic Soils (Dy2.21), Brown Podzolic Soils (Db1.21) and brown Soloths (Db2.41) occur on crests with moderately deep (<120 cm), well-drained Red Podzolic Soils (Dr2.21) and red Soloths (Dr2.41) on upper slopes, moderately well to imperfectly drained</p>

Landscape Features	Information
	brown Soloths (Db2.41, Db1.41) and yellow Soloths (Dy3.41) on sideslopes and deep (>200 cm), imperfectly to poorly drained Yellow Podzolic Soils (Dy2.21), yellow Soloths (Dy2.41, Dy3.41) and Gleyed Podzolic Soils (Dg2.41) on lower slopes.
Native Vegetation Cover	<p>Native Vegetation was assessed as per Section 3.2 of the BAM 2020 (DPIE 2020a). Native vegetation constitutes 48.29% (243.67 ha) of the projected 1,500 m site buffer (504.57 ha) associated with the Study Area. Native Vegetation Cover is therefore classed as >30-70%.</p> <p>The native vegetation extent is shown in Figure 4.</p>

IBRA Bioregion - Sydney Basin
 IBRA Sub-region - Hunter

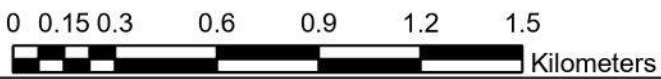
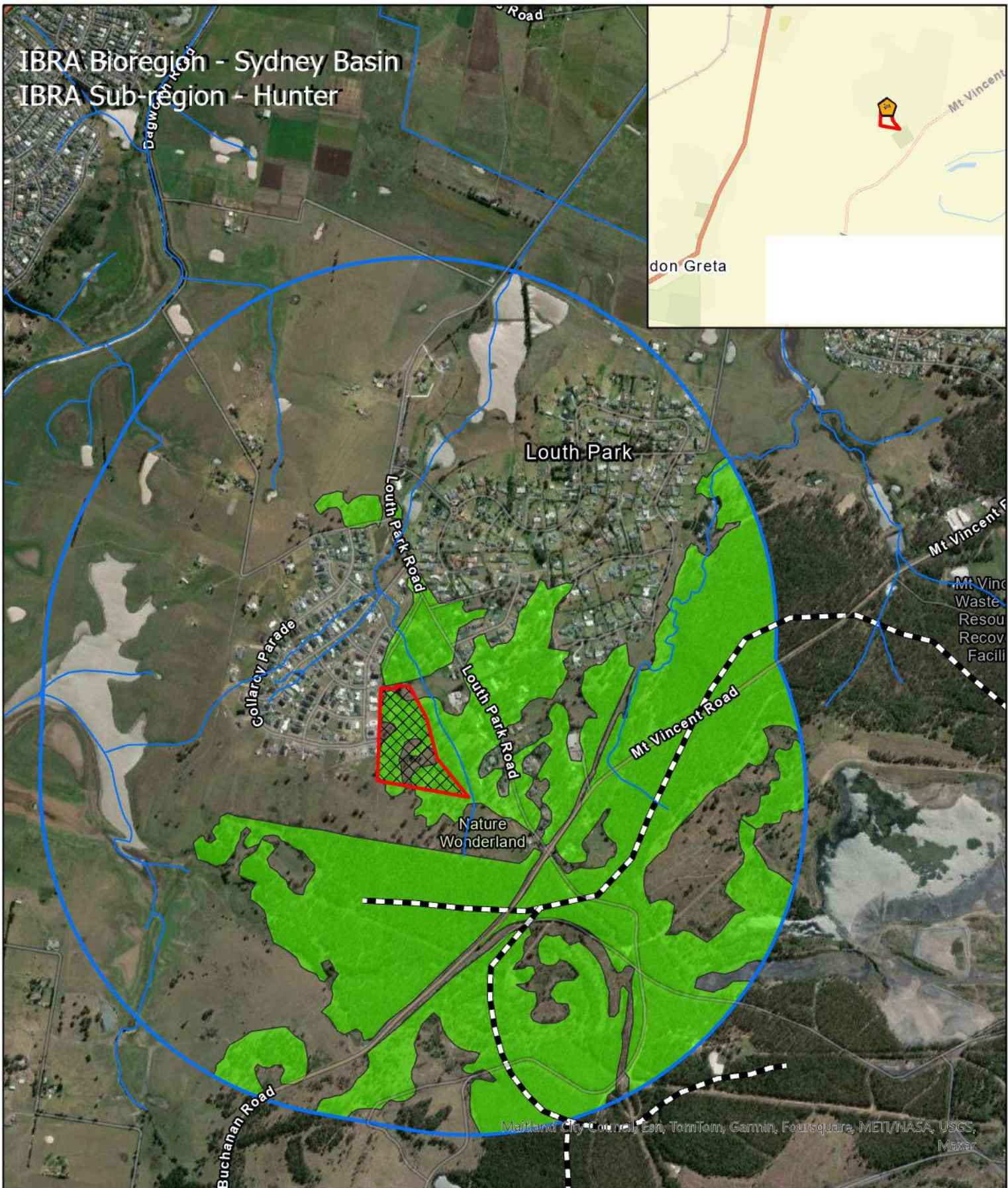


Figure 4 - Landscape Assessment

Legend

- Subject Land
- Native Vegetation Extent (243.67 ha - 48.29%)
- 1500m Buffer (504.57 ha)
- Development Site
- Habitat Links (Corridors)
- Mapped Watercourses (Six Maps 2023)

3 Native Vegetation

3.1 Methodology

3.1.1 Data Review

Regional vegetation mapping projects for the area were reviewed to assist with the determination of Plant Community Types (PCTs) within the Study Area. Review of the *Lower Hunter and Central Coast Regional vegetation survey 2018* (NPWS 2003) indicates that the vegetation within the Study Area is mapped as *Lower Hunter Spotted Gum Ironbark Forest* (Mu17). Vegetation to the north of the Study Area is mapped as *Alluvial Tall Moist Forest* (Mu5).

3.1.2 Vegetation Mapping Surveys

A vegetation survey was conducted across the Study Area on 31/01/2022. The boundaries of PCTs were mapped using a combination of rapid data points (RDP) and walking transects, using the polygons produced through aerial photo interpretation (API) to assist in targeting survey effort. RDPs involved collecting waypoints over the Study Area using a handheld GPS unit and recording dominant species, structure and condition. Walking transects involved verifying polygons where homogenous in floristic composition and condition, as well as walking vegetation ecotones and using the recorded tracks to define vegetation community boundaries. The RDPs and survey tracks were then overlaid on an aerial photograph and used to delineate and/or clarify vegetation boundaries.

3.1.3 Plant Community Type and Determination

Each vegetation community identified within the Study Area was assigned to the closest equivalent PCT from those listed in the BioNet Vegetation Classification database (DPE 2023b). The closest equivalent PCT for each vegetation community was determined through a comparison of the floristic descriptions of PCTs in the database with the plot / transect data collected from the Study Area. In addition to floristic and structural similarity, the landscape position, soil type and other diagnostic features of the vegetation communities on the site were compared to the descriptions in the database to determine the most suitable PCT. Threatened ecological communities (TECs) as defined in NSW and Commonwealth legislation were also identified if present.

3.1.4 Vegetation Zones

Vegetation zones were identified and delineated in the Study Area in accordance with Section 4.3 of the BAM (DPIE 2020a). A vegetation zone is defined in the BAM as a relatively homogenous area that is the same vegetation type and broad condition.

3.1.5 Vegetation Integrity

Following stratification of the Study Area into vegetation zones, plots/transects were undertaken to collect site condition data for the composition, structure and function attributes listed in **Table 2** in accordance with Section 4.3 of the BAM (DPIE 2020a).

Table 2 Components of Vegetation Integrity

Growth form groups	Function attributes
<ul style="list-style-type: none"> • Tree (TG) • Shrub (SG) • Grass and grass-like (GG) • Forb (FG) • Fern (EG) • Other (OG) 	<ul style="list-style-type: none"> • Number of large trees • Tree regeneration (presence/absence) • Tree stem size class (presence/absence) • Total length of fallen logs • Litter cover • High threat exotic vegetation cover (HTE) • Hollow-bearing trees (HBT)

The number of plots/transects undertaken across the site meets the minimum number of transects required for each vegetation zone area as detailed in Section 4.3.4, Table 3 of the BAM (DPIE 2020a). Five plots were sampled within the Development Site and one plot was sampled in areas of native vegetation to be retained (see **Figure 5**).

3.1.6 Floristic Identification and Nomenclature

Floristic identification and nomenclature were based on Harden (1992, 1993, 2000 and 2002) with subsequent revisions as published on PlantNet (<http://plantnet.rbgsyd.nsw.gov.au>).

3.2 Results

3.2.1 Floristic Diversity

A total of 114 plant species were detected during the vegetation assessment. These were comprised of 82 native species and 32 exotic species. The diversity of plant species was relatively low compared to the diversity expected to occur in good condition bushland. The diversity of plant species within survey plots ranged from 30 species (Q01) to eight species (Q02). This lack of diversity is attributed to the history of vegetation clearing that has occurred within the site. The composition of the flora is typical of regenerating vegetation.

3.2.2 Plant Community Types

Two PCTs were identified within the Study Area:

- *PCT 1600 - Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter.*
- *PCT 1598 - Forest Red Gum grassy open forest on floodplains of the lower Hunter*

PCT 1600 was found to occur in two condition states (moderate and cleared). PCT 1598 was found to occur in one condition state. Information pertaining to each vegetation zone is presented in **Table 3**.

Table 3 **Vegetation Zones**

Vegetation Zone	Condition	Area within Development Site
Vegetation Zone 01: PCT 1600 - Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter (Moderate Condition).	Moderate: This vegetation has an intact canopy layer. The shrub layer and ground layer is regenerating.	4.03 ha
Vegetation Zone 02: PCT 1600 - Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter (Cleared).	Low: This vegetation has been cleared and generally lacks canopy trees. The shrub layer is largely absent. The groundcover is predominantly exotic.	3.14 ha
Vegetation Zone 03: PCT 1598 - Forest Red Gum grassy open forest on floodplains of the lower Hunter (Moderate Condition)	Moderate: This vegetation has an intact canopy layer. The shrub layer and ground layer is regenerating.	0.37 ha

Floristic descriptions with justification for the allocation of PCT 1600 and PCT 1598 are presented in **Table 4** and **Table 5**. Photographs of each vegetation zone are also provided in **Plates 1-4**.

Table 4 Plant Community Type Information – PCT 1600

Criteria	Information
PCT	PCT 1600 - Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter
Vegetation Formation and Class	Dry Sclerophyll Forest (Shrub/grass sub-formation) Hunter-Macleay Dry Sclerophyll Forest
Survey Effort	Required: 2 BAM plots per vegetation zone. Conducted: 2 BAM plots per vegetation zone (VZ1:Q1 & Q5, VZ2: Q02 & Q04).
Floristic description	<p>The canopy is dominated by <i>Corymbia maculata</i> (Spotted Gum) and <i>Eucalyptus fibrosa</i> (Broad-leaved Ironbark). Canopy species that occur to a lesser extent included <i>Eucalyptus paniculata</i> (Grey Ironbark) and <i>Eucalyptus acmenoides</i> (Red Mahogany). The dominant shrub species include <i>Cassinia aculeata</i> (Dogwood), <i>Acacia parvipinnula</i> (Silver-stemmed Wattle), <i>Daviesia ulicifolia</i> (Gorse Bitter Pea), <i>Breynia oblongifolia</i> (Coffee Bush) and <i>Pittosporum undulatum</i> (Sweet Pittosporum).</p> <p>The groundcover is dominated by grasses and herbs. The dominant grass species were <i>Microlaena stipoides</i> var. <i>stipoides</i> (Weeping Grass), <i>Cymbopogon refractus</i> (Barbed Wire Grass), and <i>Themeda australis</i> (Kangaroo Grass). Occasional herbs included <i>Commelina cyanea</i>, <i>Cyanthillium cinerea</i>, <i>Lobelia purpurascens</i> (Whiteroot), <i>Glycine tabacina</i>, <i>Dianella revoluta</i> (Blueberry Lily), <i>Chrysocephalum apiculatum</i> (Yellow Buttons) and <i>Dichondra repens</i> (Kidney Weed). Several exotic species were also observed. The dominant exotic species were <i>Setaria parviflora</i> (Pigeon Grass), <i>Paspalum dilatatum</i> (Paspalum), <i>Plantago lanceolata</i> (Lamb's Tongues) and <i>Sida rhombifolia</i> (Paddy's Lucerne). These species were more prevalent in cleared areas (Vegetation Zone 02).</p>
Condition within Study Area	Two vegetation zones occur within the Development Site as described previously in Table 3 . A photograph of the moderate condition vegetation zone is shown in Plate 1 . A photograph of the cleared vegetation zone is shown in Plate 2 . Both vegetation zones contain a moderate to high coverage of environmental weeds (exotic species), but few Priority Weeds occur. All vegetation within the site is in a state of regeneration.
HBT presence	Yes
Justification for PCT selection	The vegetation within this zone most closely resembles a Dry Sclerophyll Forest within the Shrub/grass sub-formation due to the dominance of a eucalypt canopy, an abundance of sclerophyllous (hard-leaved) shrubs in the understorey and a groundcover consisting of grasses and herbs. Within this formation, the vegetation is most closely aligned with PCT 1600 due to an open canopy dominated by <i>Corymbia maculata</i> (Spotted Gum) and <i>Eucalyptus fibrosa</i> (Broad-leaved Ironbark). Although the shrub layer is sparse and regenerating, key diagnostic species are also present.
Status	<p>BC Act: The better-quality areas of the site (Vegetation Zone 1) are commensurate with <i>Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions</i>, which is listed as an Endangered Ecological Community (EEC) under the BC Act. Justifications for this determination are as follows:</p> <ul style="list-style-type: none"> The vegetation occurs within the Cessnock - Beresfield area in the Central and Lower Hunter Valley.

Criteria	Information
	<ul style="list-style-type: none"> This canopy of the community is dominated by <i>Corymbia maculata</i> (Spotted Gum) and <i>Eucalyptus fibrosa</i> (Broad-leaved Ironbark), which are key diagnostic species. Key diagnostic shrub species such as <i>Acacia parvipinnula</i> (Silver-stemmed Wattle), <i>Daviesia ulicifolia</i> (Gorse Bitter Pea) and <i>Breynia oblongifolia</i> (Coffee Bush) occur.
	EPBC Act: None
SAII	No
PCT % Cleared	71%
Sensitivity to loss	High Sensitivity to Loss
Sensitivity to gain	High Sensitivity to Gain



Plate 1 PCT 1600 - Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter (Moderate Condition)



Plate 2 PCT 1600 - Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter (Low Condition)

Table 5 Plant Community Type Information – PCT 1598

Criteria	Information
PCT	PCT 1598 - Forest Red Gum grassy open forest on floodplains of the lower Hunter
Vegetation Formation and Class	Forested Wetlands Coastal Floodplain Wetlands
Survey Effort	Required: 1 plot/transect Conducted: 1 plot/transect (Q03)
Floristic description	<p>The canopy is dominated by <i>Eucalyptus tereticornis</i> (Forest Redgum) and <i>Eucalyptus moluccana</i> (Grey Box).</p> <p>The shrub layer is dominated by <i>Acacia falcata</i> (Hickory Wattle), <i>Pittosporum undulatum</i> (Sweet Pittosporum), <i>Ozothamnus diosmifolius</i> (White Dogwood) and <i>Breynia oblongifolia</i> (Coffee Bush).</p> <p>The groundcover is dominated by grasses and herbs. The dominant grass species were <i>Microlaena stipoides</i> var. <i>stipoides</i> (Weeping Grass), <i>Cymbopogon refractus</i> (Barbed Wire Grass), and <i>Entolasia marginata</i> (Bordered Panic). Occasional herbs included <i>Commelina cyanea</i>, <i>Cyanthillium cinerea</i>, <i>Lobelia purpurascens</i> (Whiteroot) and <i>Dichondra repens</i> (Kidney Weed).</p> <p>Several exotic species were also observed. The dominant exotic species were <i>Setaria parviflora</i> (Pigeon Grass), <i>Paspalum dilatatum</i> (Paspalum), <i>Plantago lanceolata</i> (Lamb's Tongues), <i>Sida rhombifolia</i> (Paddy's Lucerne) and <i>Hypochaeris radicata</i> (Cat's Ear).</p>
Condition within Study Area	One vegetation zone was defined within the Study Area as described previously in Table 3 . A photograph of the vegetation is shown in Plate 3 .
HBT presence	Yes
Justification for PCT selection	The vegetation within this zone most closely resembles a Forested Wetland. It occurs in areas of the site that are prone to flooding and is dominated by <i>Eucalyptus tereticornis</i> (Forest Redgum). Within this formation, the vegetation is most representative of PCT 1598 due to the presence of an open canopy dominated by <i>Eucalyptus tereticornis</i> (Forest Redgum). Key diagnostic species in the shrub layer include <i>Breynia oblongifolia</i> (Coffee Bush). Key diagnostic groundcover species include <i>Microlaena stipoides</i> var. <i>stipoides</i> (Weeping Grass) and <i>Cymbopogon refractus</i> (Barbed Wire Grass).
Status	<p>BC Act: The moderate condition areas of the PCT within the Study Area are commensurate with <i>Hunter Lowland Redgum Forest in the Sydney Basin and New South Wales North Coast Bioregions</i> which is listed as an Endangered Ecological Community (EEC) under the BC Act. Justifications for this determination are as follows:</p> <ul style="list-style-type: none"> • The vegetation occurs within the Beresfield area in the Lower Hunter Valley. • This canopy of the community is dominated by <i>Eucalyptus tereticornis</i> and <i>Eucalyptus moluccana</i> (Grey Box), which are key diagnostic species. • Key diagnostic shrub and groundcover species also occur. <p>EPBC Act: None</p>
SAII	No
PCT % Cleared	0.00%

Criteria	Information
Sensitivity to loss	High Sensitivity to Loss
Sensitivity to gain	High Sensitivity to Gain



Plate 3 PCT 1598 - Forest Red Gum grassy open forest on floodplains of the lower Hunter (Moderate Condition)

3.2.3 Aquatic Habitat

A constructed dam occurs in the central portion of the Study Area. Emergent vegetation within the waterbody is limited to the edges where dense rushes and aquatic plants occur. The dominant plant species in the dam is *Eleocharis equisetina*. *Juncus effusus* also occurs at lesser densities. Low occurrences of floating plant species including *Ludwigia peploides* (Water Primrose) and *Ottelia ovalifolia subsp. ovalifolia* (Swamp Lily) were also observed.

A photograph of the dam is shown in **Plate 4**.



Plate 4 Constructed dam in the central portion of the Study Area.

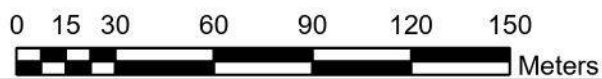
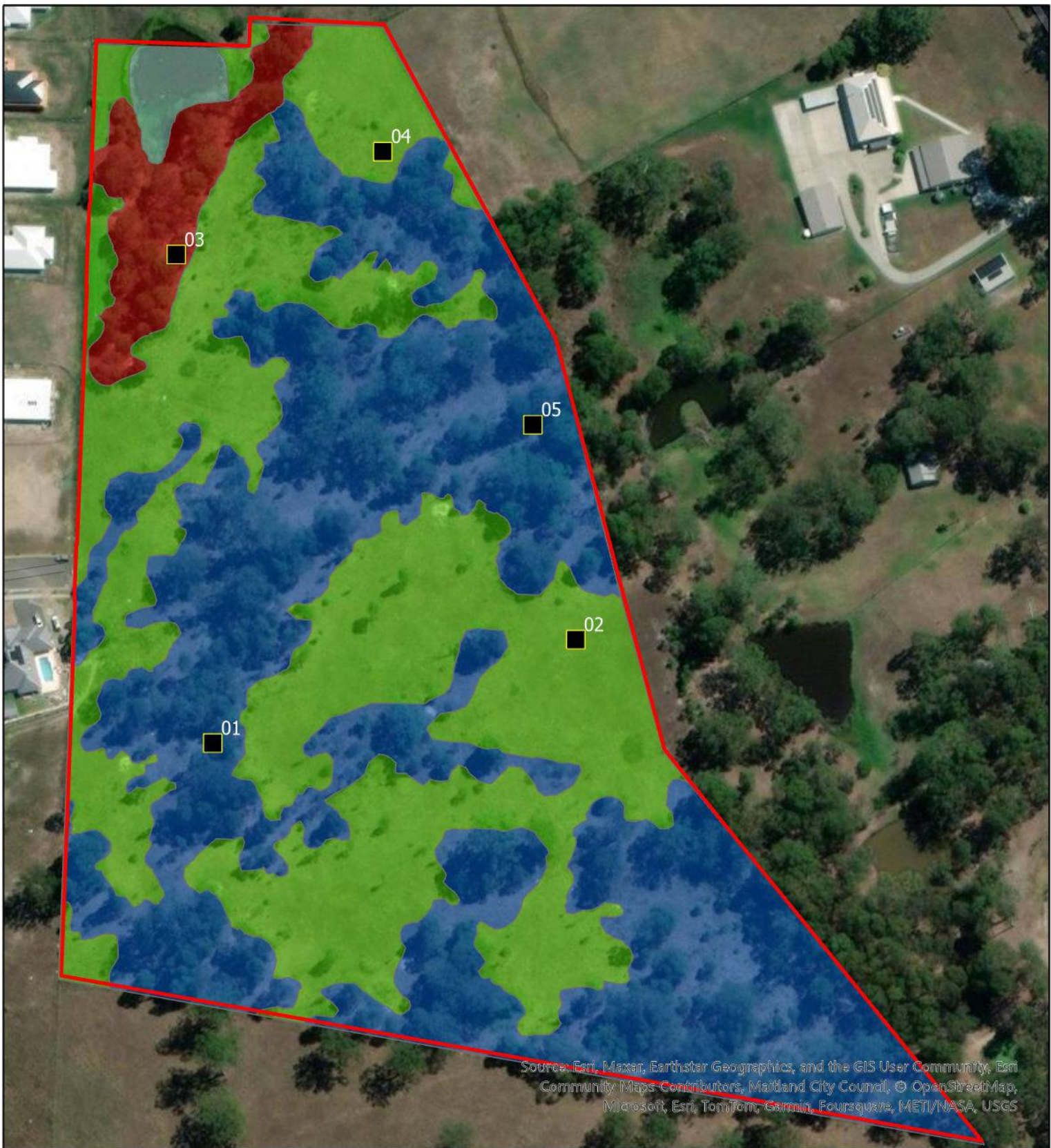


Figure 5 - Plant Community Types



Legend

Subject Land

BAM Plots (01-06)

Vegetation Zone and Plant Community Type

VZ01 - PCT 1600 - Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter (Moderate Condition)

VZ02 - PCT 1600 - Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter (Cleared)

VZ03 - PCT 1598 - Forest Red Gum grassy open forest on floodplains of the lower Hunter (Moderate Condition)

Constructed Dam

3.2.5 Assessment of Patch Size

The patch size for the native forest vegetation within the Study Area was assessed as >100 ha as this vegetation is connected to larger intact areas of native forest vegetation extending to the east (gaps in the connective vegetation across existing roads are less than 100 m).

3.2.6 Vegetation Integrity Score

The current vegetation integrity score of the vegetation zones to be impacted by the proposed development are outlined in **Table 6**.

Table 6 **Vegetation Integrity**

Zone	PCT	Condition class	Area (ha)	Condition scores (Current Score)			Vegetation integrity score
				Composition	Structure	Function	
1	1600	Moderate	4.03	69.5	56.5	72.5	65.8
2	1600	Cleared	3.14	14.6	12.1	9.5	11.9
5	1598	Moderate	0.37	70.9	79.9	42.4	62.1

4 Threatened Species

4.1 Habitat Assessment

To inform the assessment of suitable habitat for threatened species and populations within the Study Area, a database search of the NSW DPE BioNet Atlas (DPE 2023a) was conducted. Results of the database search and ‘likelihood of occurrence’ assessment are provided in **Appendix A**.

4.1.1 Habitat Assessment – Threatened Flora

The majority of threatened plant species returned by the NSW DPE BioNet Atlas (DPE 2023a) were determined to have a low ‘likelihood of occurrence’ (**Appendix A**). The Study Area contains a mosaic of patches of native forest with moderate vegetation integrity and cleared areas (containing scattered trees and shrubs) with low vegetation integrity. The forested areas are considered to represent the better-quality habitat for threatened flora species. In these areas, an intact native canopy of mature *Corymbia maculata* (Spotted Gum) and *Eucalyptus fibrosa* (Broad-leaved Ironbark) is present. The midstorey is regenerating and contains a relatively low diversity of shrub species. The groundcover is predominantly exotic in most areas native species is generally low and typical of regenerating bushland. Due to historical management of the midstorey and groundcover, the vegetation does not represent highly suitable habitat for locally occurring threatened flora.

4.1.2 Habitat Assessment – Threatened Fauna

The majority of threatened fauna species returned by the NSW DPE BioNet Atlas (DPE 2023a) were determined to have a low ‘likelihood of occurrence’ due to a lack of suitable habitat within the Development Site (**Appendix A**). The vegetation has been historically managed, as such there is a low abundance of shrub cover, which would otherwise provide shelter and foraging habitat for terrestrial fauna. Higher quality habitat is limited to scattered occurrences of mature old growth trees containing hollows, suitable for arboreal fauna and birds. Few habitat logs occur, and the low diversity of plant species limits the availability of foraging resources. One dam occurs within the Study Area which may provide habitat for species that require aquatic habitats. A number of dams also occur within adjacent properties.

4.1.3 Hollow-bearing Trees

A total of 15 hollow-bearing trees were detected throughout the Study Area. The hollows in these trees were all observed to be within the small (<5cm) to medium range (5-20cm). The trees represent breeding and roosting habitat for several species of arboreal mammals and birds. Given the small – medium size of the hollows, species such as Large Forest Owls are unlikely to utilise these as breeding habitat.

A summary of information pertaining to the hollow-bearing trees detected within the Study Area is presented in **Table 7**. The location of each habitat tree is shown in **Figure 6**.

Table 7 **Hollow-bearing Tree Information**

Tree No.	Tree Species	DBH (cm)	Height (m)	Hollow Size Class		
				Large (>20cm)	Medium (5-20cm)	Small (<5cm)
1	<i>Corymbia maculata</i>	110	25	-	1	-
2	<i>Dead Tree (Stag)</i>	40	15	-	1	-
3	<i>Dead Tree (Stag)</i>	80	15	-	-	1
4	<i>Eucalyptus fibrosa</i>	90	25	-	-	1
5	<i>Dead Tree (Stag)</i>	70	20	-	-	1
6	<i>Corymbia maculata</i>	120	25	-	1	-
7	<i>Corymbia maculata</i>	140	20	-	1	-
8	<i>Dead Tree (Stag)</i>	70	10	-	1	1
9	<i>Dead Tree (Stag)</i>	120	20	-	-	1
10	<i>Dead Tree (Stag)</i>	60	10	-	-	1
11	<i>Dead Tree (Stag)</i>	40	8	-	-	1
12	<i>Corymbia maculata</i>	60	20	-	-	1
13	<i>Corymbia maculata</i>	80	15	-	2	-
14	<i>Corymbia maculata</i>	90	25	-	1	-
15	<i>Corymbia maculata</i>	100	25	-	2	-



Legend

- Subject Land
- ▲ Habitat Trees

Figure 6 - Habitat Tree Survey



4.1.5 Ecosystem Credit Species

The following assessment of habitat suitability for ecosystem credit species was conducted in accordance with Section 6.2 of the BAM. Ecosystem credits represent threatened species that can reliably be predicted to occur based on the type and condition of vegetation within the Development Site. Targeted surveys are not required for ecosystem credit species.

Step 1: Identify threatened species for assessment.

A list of predicted ecosystem credit species for the Study Area was reviewed in the BAM calculator, according to PCTs present on the subject land. Predicted Species Report is within **Appendix B**.

Step 2: Assessment of the habitat constraints and vagrant species on the subject land

The potential for ecosystem credit species to occur on the Study Area was assessed according to species specific habitat requirements, as detailed in **Table 8**. Where habitat features were not present due to the degraded condition of the site vegetation, ecosystem credit species were determined to not be predicted species and no further assessment was required within these vegetation zones.

Table 8 Ecosystem Credit Species

Scientific name	Common name	Confirmed Predicted Species	Justification
<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow	Yes	Suitable habitat present.
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	Yes	Suitable habitat present.
<i>Calyptorhynchus lathami</i>	Glossy Black-Cockatoo	Yes	Suitable habitat present.
<i>Chthonicola sagittata</i>	Speckled Warbler	Yes	Suitable habitat present.
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)	Yes	Suitable habitat present.
<i>Daphoenositta chrysoptera</i>	Varied Sittella	Yes	Suitable habitat present.
<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	Yes	Suitable habitat present.
<i>Falco subniger</i>	Black Falcon	Yes	Suitable habitat present.
<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	Yes	Suitable habitat present.
<i>Glossopsitta pusilla</i>	Little Lorikeet	Yes	Suitable habitat present.
<i>Grantiella picta</i>	Painted Honeyeater	No	Mistletoes are not present at a density of greater than five per hectare
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	Yes	Suitable habitat present.
<i>Hieraaetus morphnoides</i>	Little Eagle	Yes	Suitable habitat present.

Scientific name	Common name	Confirmed Predicted Species	Justification
<i>Hirundapus caudacutus</i>	White-throated Needletail	Yes	Suitable habitat present.
<i>Lathamus discolor</i>	Swift Parrot (Foraging)	Yes	Suitable habitat present.
<i>Lophoictinia isura</i>	Square-tailed Kite	Yes	Suitable habitat present.
<i>Melanodryas cucullata cucullata</i>	Hooded Robin (south-eastern form)	Yes	Suitable habitat present.
<i>Melithreptus gularis gularis</i>	Black-chinned Honeyeater (eastern subspecies)	Yes	Suitable habitat present.
<i>Micronomus norfolkensis</i>	Eastern Coastal Free-tailed Bat	Yes	Suitable habitat present.
<i>Miniopterus australis</i>	Little Bent-winged Bat	Yes	Suitable habitat present.
<i>Miniopterus orianae oceanensis</i>	Large Bent-winged Bat	Yes	Suitable habitat present.
<i>Neophema pulchella</i>	Turquoise Parrot	Yes	Suitable habitat present.
<i>Ninox connivens</i>	Barking Owl	Yes	Suitable habitat present.
<i>Ninox strenua</i>	Powerful Owl	Yes	Suitable habitat present.
<i>Petaurus australis</i>	Yellow-bellied Glider	Yes	Suitable habitat present.
<i>Petroica boodang</i>	Scarlet Robin	Yes	Suitable habitat present.
<i>Pomatostomus temporalis temporalis</i>	Grey-crowned Babbler (eastern subspecies)	Yes	Suitable habitat present.
<i>Pteropus poliocephalus</i>	Grey-headed Flying Fox	Yes	Suitable habitat present.
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat	Yes	Suitable habitat present.
<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	Yes	Suitable habitat present.
<i>Stagonopleura guttata</i>	Diamond Firetail	Yes	Suitable habitat present.
<i>Tyto novaehollandiae</i>	Masked Owl (foraging)	Yes	Suitable habitat present.

4.1.6 Species Credit Species

Step 1: Identify threatened species for assessment.

A preliminary list of Candidate species credit species for the Development Site was reviewed in the BAM calculator. Species credits pertain to threatened species that cannot reliably be predicted to occur by the vegetation present. A Candidate Species Report is presented within **Appendix B**.

Step 2: Assessment of the habitat constraints and vagrant species on the subject land.

The potential for Candidate species credit species to occur on the Development Site was assessed according to species-specific habitat requirements as detailed in **Table 9**.

Step 3: Identify candidate species credit species for further assessment.

Several species credit species were excluded as candidate species due to their geographic or habitat constraints not being met by the Development Site, and no further assessment of these species was required (Table 9).

Table 9 Species Credit Species

Scientific name	Common name	Confirmed Candidate Species	Justification
<i>Acacia bynoeana</i>	Bynoe's Wattle	Yes	Suitable habitat present.
<i>Anthochaera phrygia</i>	Regent Honeyeater	No	Habitat Constraints – Development Site not mapped as important habitat.
<i>Aprasia parapulchella</i>	Pink-tailed Legless Lizard	No	Habitat Constraints - No rocky areas or habitat within 50m of rocky areas.
<i>Burhinus grallarius</i>	Bush Stone-curlew	Yes	Suitable habitat present.
<i>Callistemon linearifolius</i>	Netted Bottle Brush	Yes	Suitable habitat present.
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	Yes	Suitable habitat present.
<i>Calyptorhynchus lathami</i>	Glossy-black Cockatoo	Yes	Suitable habitat present.
<i>Cercartetus nanus</i>	Eastern Pygmy-possum	Yes	Suitable habitat present.
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	No	Habitat Constraints – No cliffs present. Study Area not within two km of rocky areas containing caves, overhangs, escarpments, outcrops, or crevices, or within two km of old mines or tunnels.
<i>Cryptostylis hunteriana</i>	Leafless Tongue Orchid	No	Species is not recorded previously within the Hunter IBRA Sub-region.
<i>Cynanchum elegans</i>	White-flowered Wax Plant	Yes	Suitable habitat present.
<i>Delma impar</i>	Striped Legless Lizard	Yes	Suitable habitat present
<i>Diuris praecox</i>	Rough Doubletail	Yes	Suitable habitat present.
<i>Diuris tricolor</i>	Pine Donkey Orchid	Yes	Suitable habitat present.
<i>Eucalyptus castrensis</i>	Singleton Mallee	Yes	Suitable habitat present.
<i>Eucalyptus glaucina</i>	Slaty Red Gum	Yes	Suitable habitat present.
<i>Eucalyptus parramattensis subsp. decadens</i>	-	Yes	Suitable habitat present.
<i>Eucalyptus pumila</i>	Pokolbin Mallee	Yes	Suitable habitat present.
<i>Grevillea parviflora subsp. parviflora</i>	Small-flower Grevillea	Yes	Suitable habitat present.

Scientific name	Common name	Confirmed Candidate Species	Justification
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	No	Habitat Constraints – Development Site does not contain living or dead mature trees within suitable vegetation within 1km of a rivers, lakes, large dams or creeks, wetlands and coastlines
<i>Hieraaetus morphnoides</i>	Little Eagle	Yes	Suitable habitat present.
<i>Hoplocephalus bitorquatus</i>	Pale-headed Snake	No	Species is not recorded previously within the Hunter IBRA Sub-region.
<i>Lathamus discolor</i>	Swift Parrot	No	Habitat Constraints – The Development Site is not within an area mapped as “important habitat” for this species.
<i>Litoria aurea</i>	Green and Golden Bell Frog	Yes	Suitable habitat present.
<i>Litoria brevipalmata</i>	Green-thighed Frog	Yes	Suitable habitat present.
<i>Lophoictinia isura</i>	Square-tailed Kite	Yes	Suitable habitat present.
<i>Miniopterus australis</i>	Little Bent-winged Bat	No	Habitat Constraints (breeding) - No Caves, tunnels, mines, culverts or structure known for breeding occur within the Development Site.
<i>Monotaxis macrophylla</i>	Large-leaved Monotaxis	Yes	Suitable habitat present.
<i>Myotis macropus</i>	Southern Myotis	Yes	Suitable habitat present.
<i>Ninox connivens</i>	Barking Owl	No	Habitat Constraints (breeding) - No hollow-bearing trees with hollows greater than 20cm diameter and greater than 4m from the ground.
<i>Ninox strenua</i>	Powerful Owl	No	Habitat Constraints (breeding) - No hollow-bearing trees with hollows greater than 20cm diameter.
<i>Ozothamnus tessellatus</i>	-	Yes	Suitable habitat present.
<i>Persoonia pauciflora</i>	North Rothbury Persoonia	No	Geographic Limitations - Study Area does not occur within 10km of Rothbury
<i>Petauroides volans</i>	Greater Glider	Yes	Suitable habitat present.
<i>Petaurus norfolkensis</i>	Squirrel Glider	Yes	Suitable habitat present.
<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby	No	Habitat Constraints - Study Area is not within 1 km of rocky escarpments, gorges, steep slopes, boulder piles, rock outcrops or cliff lines.
<i>Phascogale tapotafa</i>	Brush-tailed Phascogale	Yes	Suitable habitat present.
<i>Phascolarctos cinereus</i>	Koala (Breeding)	Yes	Suitable habitat present.
<i>Planigale maculata</i>	Common Planigale	No	Species is not recorded previously within the Hunter IBRA Sub-region.
<i>Pomaderris queenslandica</i>	Scant Pomaderris	Yes	Suitable habitat present.

Scientific name	Common name	Confirmed Candidate Species	Justification
<i>Prostanthera cineolifera</i>	Singleton Mintbush	Yes	Suitable habitat present.
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	Yes	Habitat Constraints - No evidence of breeding camps within the Study Area
<i>Pterostylis chaetophora</i>	-	Yes	Suitable habitat present.
<i>Rutidosis heterogama</i>	Heath Wrinklewort	Yes	Suitable habitat present.
<i>Thesium australe</i>	Austral Toadflax	No	Habitat Degraded – Few native species were detected in the groundcover of each vegetation zone. The habitat is considered to be too degraded to support a population of this species. Only 2 records with Hunter Sub Region.
<i>Tyto novaehollandiae</i>	Masked Owl	No	Habitat Constraints (breeding) - No hollow-bearing trees with hollows greater than 20cm diameter.
<i>Vespadelus troughtoni</i>	Eastern Cave Bat	No	Habitat Constraints (breeding) - No Caves, tunnels, mines, culverts or structure known for breeding occur within the Development Site.

4.2 Threatened Species Surveys

Step 4: Determine presence or absence of candidate species credit species.

4.2.1 Flora Surveys

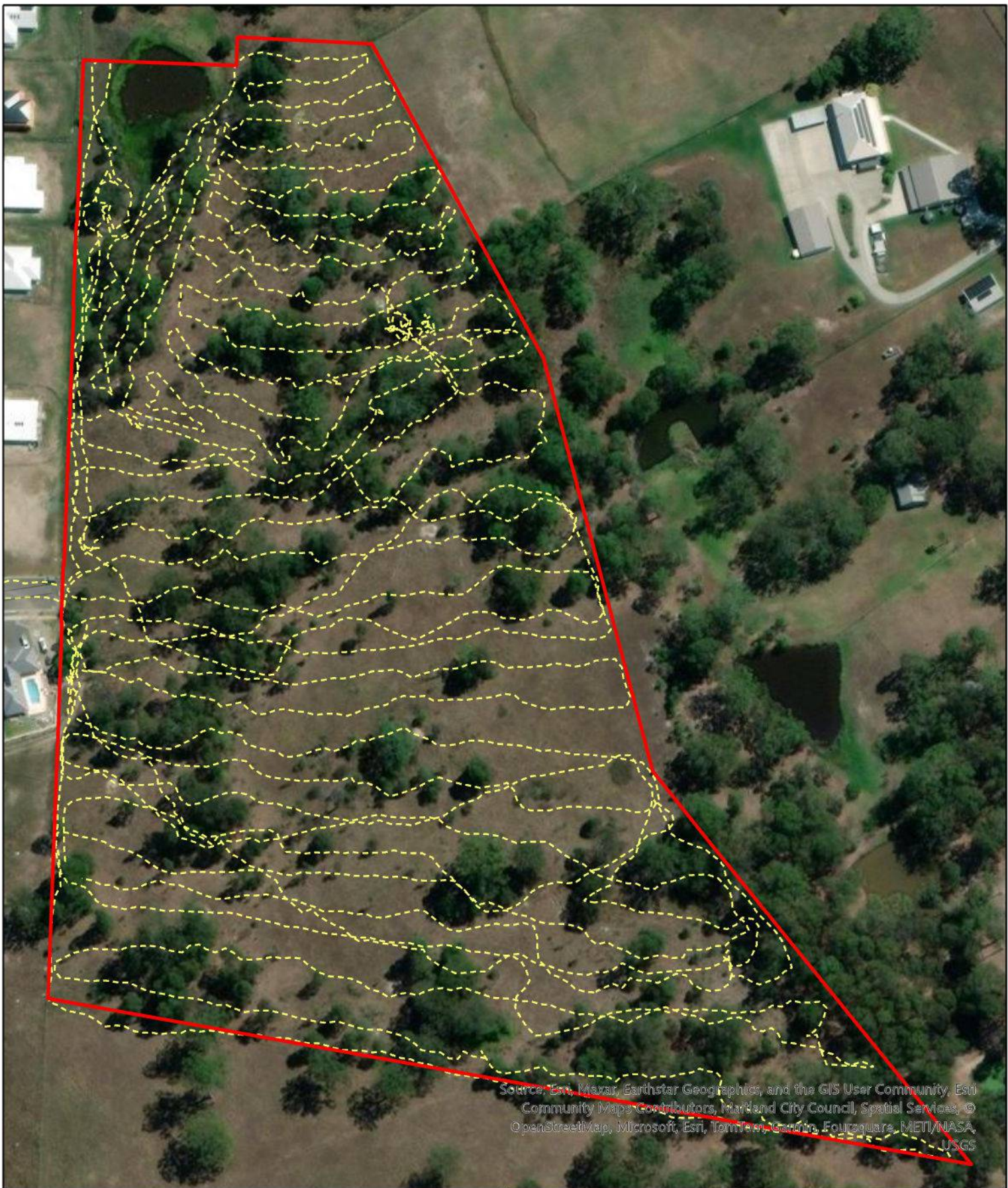
The candidate threatened flora species were surveyed in accordance with the *NSW Guide to Surveying Threatened Plants* (DPIE 2020b), which states:


“Several threatened plant species may be searched for during the same traverse. To ensure detectability is not compromised it is recommended that multi-species searches be restricted to a maximum of five species in the same stratum (i.e. search for five ground species, five mid-layer species or five canopy species) per traverse. Multi-species surveys could also be grouped further, by genus, similar growth form, or species with other similar characteristics where they are likely to occupy the same stratum.”

Targeted surveys for candidate threatened plant species were undertaken in accordance with the recommended survey period for each species (31/01/22, 30/08/22, 13/10/22 and 23/03/23) as shown in **Table 10**. A combination of parallel transects surveys and random meanders were conducted across the site in each of these survey events as shown in **Figures 7-10**.

Table 10 Targeted Surveys for Species Credit Species (Flora)

Scientific name	Common name	Survey Window (BAM-C)
Ground Strata Surveys - 31/01/22		
<i>Acacia bynoeana</i>	Bynoe's Wattle	All Year
<i>Rutidosia heterogama</i>	Heath Wrinklewort	All Year
<i>Monotaxis macrophylla</i>	Large-leaved Monotaxis	Aug-Feb
Midstory Strata- 31/01/22		
<i>Callistemon linearifolius</i>	Netted Bottle Brush	Oct-Jan
Ground Strata Surveys - 30/08/22		
<i>Diuris praecox</i>	Rough Doubletail	Aug
Midstory Strata Surveys - 13/10/22		
<i>Cynanchum elegans</i>	White-flowered Wax Plant	All Year
<i>Grevillea parviflora</i> subsp. <i>parviflora</i>	Small-flower Grevillea	Aug-Nov
<i>Ozothamnus tessellatus</i>	<i>Ozothamnus tessellatus</i>	Sep-Oct
<i>Pomaderris queenslandica</i>	Scant Pomaderris	All Year
<i>Prostanthera cineolifera</i>	Singleton Mintbush	Sep-Oct
Ground Strata Surveys - 13/10/22		
<i>Diuris tricolor</i>	Pine Donkey Orchid	Sep-Oct
<i>Pterostylis chaetophora</i>	Rusty Greenhood	Sep-Nov
Canopy Strata Surveys – 23/01/23		
<i>Eucalyptus castrensis</i>	Singleton Mallee	All Year
<i>Eucalyptus glaucina</i>	Slaty Red Gum	All Year
<i>Eucalyptus parramattensis</i> subsp. <i>decadens</i>	-	All Year
<i>Eucalyptus pumila</i>	Pokolbin Mallee	All Year



0 15 30 60 90 120 150
 Meters

Legend

-  Subject Land
-  Threatened Flora Track (31/08/22)

**Figure 8 - Threatened Flora Survey
(31/08/22)**



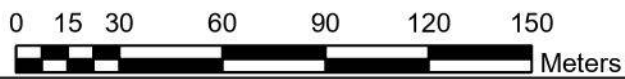


Legend

- Subject Land
- Threatened Flora Search (13/10/22)

Figure 9 - Threatened Flora Survey (13/10/22)





Legend

- Subject Land
- Threatened Flora Search (23/02/23)

Figure 10 - Threatened Flora Survey (23/02/23)



4.2.6 Fauna Survey Methods

Remote Cameras

A total of five infrared remote trigger cameras were installed arboreally within the Development Site from 28/03/22 to 11/04/22 (14 consecutive nights – Round 1). An additional 12 cameras were then deployed from 08/12/22 to 02/02/23 (56 consecutive nights – Round 2). To ensure that fresh baits were present during the survey period, cameras were re-baited on the following dates:

- The round 1 cameras were rebaited on 04/04/22 (week after being deployed).
- The round 2 cameras were rebaited on 22/12/22 (2 weeks after being deployed).

Cameras were baited PVC canisters containing “bait balls” that were freshly made from a mixture of oats, peanut butter, honey, and truffle oil. The tree trunk was sprayed then sprayed with a liquid mixture of water and honey as an additional attractant for fauna species.

Images were downloaded from the cameras and visually analyzed to identify the species recorded. All species were identified by Dr. Daniel O’Brien, an experienced Fauna Ecologist with knowledge of locally occurring threatened species. No expert third party advice was sought for the project.

Spotlighting

Spotlighting surveys were conducted on the 31/01/22 and from 28/03/22 to 31/03/22 using a high-powered headtorch to search for all types of nocturnal fauna. Spotlighting was undertaken via random meanders for 60-minutes each night. Call playback for the Squirrel Glider, Koala, and Large Forest Owl species was also conducted to incite a response following spot lighting.

Koala Surveys

Two Spot Assessment Technique (SAT) surveys (Phillips and Callaghan, 2011) were conducted within vegetation dominated by Koala Feed Trees (mainly Broad-leaved Ironbark) on 31/01/22. This technique involves the selection of a center tree (survey point) that is selected according to the following criteria:

- A tree of any species beneath which one or more Koala fecal pellets have been observed.
- A tree in which a Koala is observed.
- Any other tree known or considered to be potentially important for Koalas.

For each SAT survey, a minimum of 30 trees (including the center tree) with a DBH of 100 mm, or greater, are then surveyed for Koala scats. Surveys involve the inspection of the ground surface within 100 cm from the base of the tree. If fecal scats are identified, the survey concludes, and the surveyor moves to the next closest tree until the 30 trees are surveyed.

Microchiropteran Bats

Two Anabat™ bat-call detectors were used to detect Microchiropteran bats within the Development Site. Surveys for Microchiropteran bats were targeting the Southern Myotis, with Anabats placed at near the constructed dam and in areas containing hollow-bearing trees from 28/03/22 to 11/04/22 (14 consecutive nights).

Hollow-dependent Birds

Within the Study Area, stag-watching and owl call-playback was conducted on the 31/01/22 and from 28/03/22 to 31/03/22. During these surveys, larger hollows (Habitat trees 1, 2, 6, 7 & 8) identified as being potentially suitable for nocturnal birds were stag-watched from dusk (30-minutes prior to last light). After stag-watching was completed, owl call-playback was conducted. Calls of large forest owls (Powerful Owl, Masked Owl, Barking Owl and Sooty Owl) and the Bush Stone-curlew were broadcast through a megaphone to attract individuals or to incite a response. After an initial listening period of 15-minutes, recorded calls of threatened species were broadcast for 5-minutes each, followed by 1-2 minutes of stationary spotlighting. Directly after the final broadcast, a quiet listening period of 5 minutes was conducted followed by a 30-minute spotlighting survey.

Raptor Nest Surveys

Surveys for raptor nests were undertaken opportunistically during all field surveys. Trees were visually inspected from the ground for the presence of stick nests. The ground around the base of trees was also inspected for the presence of droppings or the remains of prey (bones, feathers etc.). A targeted survey for nests of the White-bellied Sea-Eagle and Little Eagle was also undertaken on 13/10/22.

Amphibians

Amphibian surveys (transect searches) were undertaken around the constructed dam on the 31/01/22 and from 28/03/22 to 31/03/22. Nocturnal surveys involved quiet listening periods where species were identified through aural detection of species-specific calls along with spotlighting searches within emergent vegetation. A dip net was also used to collect and identify tadpole species on each night of the survey.

A summary of survey type and survey timing for each candidate threatened fauna species is presented in **Table 11**. The locations of where each of the surveys were undertaken is presented in **Figure 11**.

Diurnal Reptile Surveys

Reptile species were identified opportunistically during all field surveys. Rocks and logs were flipped and inspected. A diurnal reptile survey targeting *Delma impar* (Striped Legless Lizard) was undertaken on 13/10/22. During this survey, habitat logs and debris (rubbish) throughout the Development Site were flipped and inspected.

Table 11 Targeted Surveys for Species Credit Species (Fauna)

Scientific name	Common name	Survey Window (BAM-C)	Surveys Undertaken
<i>Burhinus grallarius</i>	Bush Stone-curlew	All Year	Spotlighting 31/01/22 28/03/22-31/03/22
<i>Callocephalon fimbriatum</i>	Gang Gang Cockatoo	Oct-Jan	Stag-watching 31/01/22 28/03/22-31/03/22
<i>Calyptorhynchus lathami</i>	Glossy-black Cockatoo	Jan-Sep	Stag-watching 31/01/22 28/03/22-31/03/22
<i>Cercartetus nanus</i>	Eastern Pygmy-possum	Oct-Mar	Remote Cameras 28/03/22-11/04/22 08/12/22-02/02/23 Spotlighting 31/01/22 28/03/22
<i>Delma impar</i>	Striped Legless Lizard	Sep-Dec	Opportunistic Surveys 31/01/22 28/03/22-31/03/22 Diurnal Reptile Search 13/10/22
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	Jul-Dec	Raptor Nest Surveys 31/01/22 28/03/22-31/03/22 13/10/22
<i>Hieraaetus morphnoides</i>	Little Eagle	Aug-Oct	Raptor Nest Surveys 31/01/22 28/03/22-31/03/22 13/10/22
<i>Litoria aurea</i>	Green and Golden Bell Frog	Nov-Mar	Spotlighting & Dip Netting 31/01/22 28/03/22-31/03/22
<i>Litoria brevipalmata</i>	Green-thighed Frog	Sep-Apr	Spotlighting & Dip Netting

Scientific name	Common name	Survey Window (BAM-C)	Surveys Undertaken
			31/01/22 28/03/22-31/03/22
<i>Myotis macropus</i>	Southern Myotis	Oct-Mar	Anabat 28/03/22 to 11/04/22 (14 consecutive nights).
<i>Petauroides volans</i>	Greater Glider	All Year	Remote Cameras 28/03/22-11/04/22 08/12/22-02/02/23 Spotlighting & Stag-watching 31/01/22 28/03/22-31/03/22
<i>Petaurus norfolkensis</i>	Squirrel Glider	All Year	Remote Cameras 28/03/22-11/04/22 08/12/22-02/02/23 Spotlighting & Stag-watching 31/01/22 28/03/22-31/03/22
<i>Phascogale tapotafa</i>	Brush-tailed Phascogale	Dec-Jun	Remote Cameras 28/03/22-11/04/22 08/12/22-02/02/23 Spotlighting & Stag-watching 31/01/22 28/03/22-31/03/22
<i>Phascolarctos cinereus</i>	Koala (Breeding)	All Year	Koala Surveys 2 SATs 31/01/22 Remote Cameras 28/03/22-11/04/22 08/12/22-02/02/23 Spotlighting 31/01/22 28/03/22-31/03/22
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	All Year	Spotlighting 31/01/22 28/03/22-31/03/22

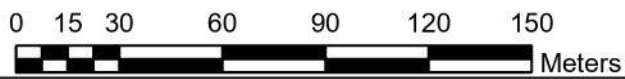
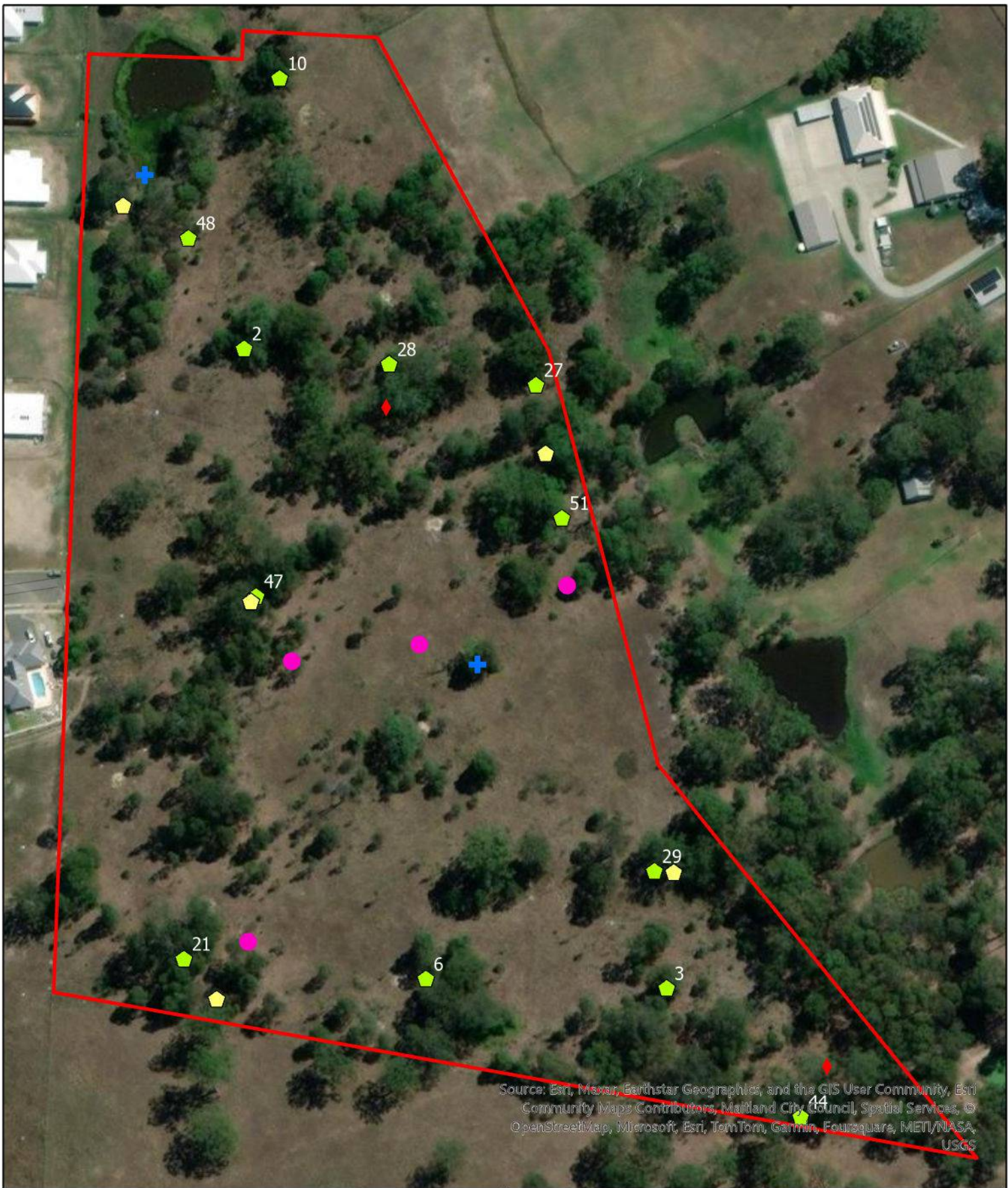


Figure 11 - Threatened Fauna Surveys



- Subject Land
- + Anabat
- Remote Infrared Cameras (Round 1)
- Remote Infrared Cameras (Round 2)
- ♦ Koala SAT
- Stag-Watching Locations

4.2.7 Fauna Survey Results

A total of 32 fauna species were detected during the fauna surveys. These were comprised of 11 birds, 17 mammals, one reptile and three amphibians (**Table 12**, also presented in **Appendix E**). The majority of the species detected are common within the locality. Six threatened species were detected:

- Grey-crowned Babbler (*Pomatostomus temporalis temporalis*) – Individuals of this species were observed foraging in forested areas in the eastern portion of the Development Site on 31/01/22. Five individuals were observed. A search for nests was conducted and none were found. It was determined that this species is not currently breeding within the site.
- Six Microchiropteran Bat species were detected via Anabat™:
 - Eastern Bent-wing Bat (*Miniopterus orianae oceanensis*)
 - Eastern Coastal Free-tail Bat (*Micronomus norfolkensis*)
 - Little Bent-wing Bat (*Miniopterus australis*)
 - Southern Myotis (*Myotis macropus*)

The above listed species are all insectivorous species that are likely to be utilizing the habitat within the Development Site as foraging habitat. All of the species may roost in tree hollows; however, the Eastern Bent-wing Bat and Little Bent-wing Bat predominately breed/roost in caves. No caves or suitable breeding habitat for these species occurs within or near the Development Site.

- Squirrel Glider (*Petaurus norfolcensis*) – The species were detected on six (6) remote cameras across the Development Site (see **Figure 15**). Foraging habitat occurs throughout the forested areas of the site. The hollow-bearing trees also represent potential breeding habitat for the species.

The Southern Myotis and Squirrel Glider are identified by the BAM as Species Credit Species (further discussed in **Section 6.3**). The other threatened species are identified as Predicted Species for which no further assessment is required.

Table 12 Fauna Survey Results

Common Name	Species Name	Conservation Status
Birds		
Australian Magpie	<i>Gymnorhina tibicen</i>	-
Australian Raven	<i>Corvus coronoides</i>	-
Eastern Rosella	<i>Platycercus eximius</i>	-
Eastern Yellow Robin	<i>Eopsaltria australis</i>	-
Grey-crowned Babbler	<i>Pomatostomus temporalis temporalis</i>	Vulnerable (BC Act)
King Parrot	<i>Alisterus scapularis</i>	-
Laughing Kookaburra	<i>Dacelo novaeguineae</i>	-
Noisy Friarbird	<i>Philemon corniculatus</i>	-
Noisy Miner	<i>Manorina melanocephala</i>	-
White-faced Heron	<i>Egretta novaehollandiae</i>	-
Willy Wagtail	<i>Rhipidura leucophrys</i>	-
Mammals		
Black Rat	<i>Rattus rattus</i>	-
Brown Antechinus	<i>Antechinus stuartii</i>	-
Brush-tailed Possum	<i>Trichosurus vulpecula</i>	-
Chocolate Wattled Bat	<i>Chalinolobus morio</i>	-
Eastern Bent-wing Bat	<i>Miniopterus orianae oceanensis</i>	Vulnerable (BC Act)
Eastern Coastal Free-tail Bat	<i>Micronomus norfolkensis</i>	Vulnerable (BC Act)
Eastern Grey Kangaroo	<i>Macropus giganteus</i>	-
Eastern Horseshoe-bat	<i>Rhinolophus megaphylus</i>	-
Feather-tail Glider	<i>Acrobates pygmaeus</i>	-
Gould's Wattled Bat	<i>Chalinolobus gouldii</i>	-
Little Bent-wing Bat	<i>Miniopterus australis</i>	Vulnerable (BC Act)
Ride's freetail bat	<i>Ozimops ridei</i>	-
Southern Myotis	<i>Myotis macropus</i>	Vulnerable (BC Act)
Squirrel Glider	<i>Petaurus norfolcensis</i>	Vulnerable (BC Act)
Sugar Glider	<i>Petaurus breviceps</i>	-
Unidentified Long-eared Bat	<i>Nyctophilus spp.</i>	-
White-striped Freetail Bat	<i>Austronomus australis</i>	-
Reptiles		
Lace Monitor	<i>Varanus varius</i>	-
Amphibians		
Broad-palmed Frog	<i>Litoria latopalmata</i>	-
Eastern Dwarf Tree Frog	<i>Litoria fallax</i>	-
Striped Marsh Frog	<i>Limnodynastes peronii</i>	-

5 Avoiding and Minimising Impacts

Avoidance and minimisation measures considered for the proposed development are outlined in the following sections.

5.1 Impacts on Native Vegetation and Threatened Species Habitat

Consultation

Habitat Ecologists (Dr. Gilbert Whyte and Dr. Daniel O'Brien) met with Council's Coordinator Natural Environment & Resilience (Will Brown) and Newpro25 representative (Tom Goold) at the Study Area on 23/05/23. A tree retention plan and habitat connectivity strategy was subsequently developed and provided to Council on 06/06/23. To comply with the *Planning for Bush Fire Protection* (NSW Rural Fire Service 2019), a small number of trees that were previously identified for retention will require removal to meet the following minimum APZ requirements:

- Tree canopy cover should be less than 15% at maturity.
- Trees at maturity should not touch or overhang the building.
- Lower limbs should be removed up to a height of 2m above the ground.
- Tree canopies should be separated by 2 to 5m.
- Preference should be given to smooth barked and evergreen trees.

The tree retention plan originally submitted to Council on 06/06/03 (107 trees) has since been modified due to building envelope restrictions, APZ standards and the need to eliminate the need for public water easement in lots (the revised plan was supported by MCC, Will Brown on 06/03/24). The revised tree retention plan also includes proposed tree plantings within the north-eastern corner of the Study Area adjacent to where the installation of Glider Poles is proposed. These plantings will also increase the functionality of the Glider crossing (further discussed below). In response to MCC's (Will Brown) comments, additional trees along the southern boundary, including several hollow-bearing trees, will be retained.

Tree Retention Plan

The retention of 101 healthy trees in key locations are proposed as an avoidance measure to reduce the potential for impacts to biodiversity values (**Figure 12**). Most of the trees earmarked for retention are large, mature trees with large canopies. Trees have been selected in areas adjacent to the southern boundary and at the edges of proposed lots where building envelopes are less likely to encroach into the critical root zones of the trees.

The retention of tall, large trees and hollow-bearing trees was prioritised given their high ecological value, particularly to hollow-dependent fauna such as arboreal mammals, cockatoos and owls. Poor condition trees and areas of shrubby regrowth have not been proposed for retention due to its lower ecological value and to comply with bushfire protection measures. Given that the retention of hollow-bearing trees in isolated locations provides little benefit to arboreal mammals that do not

travel along the ground, numerous connective trees in strategic locations (without hollows) are proposed for retention to provide canopy linkage for gliding arboreal fauna. These trees were selected in consideration of the maximum gliding distances of Squirrel Gliders (according to launch height), which is further discussed below.

Information pertaining to each tree is presented in **Appendix F**, including tree heights, canopy spread and presence of hollows. The Tree ID numbers (as shown in **Appendix F**) corresponds to the trees labelled within **Figure 12** and **Figure 13**. Note that all trees proposed for retention have been tagged in the field with their corresponding tree number. While a GPS was used to record the location of retained trees, the accuracy of the GPS is $\pm 5\text{m}$. As such, some additional trees may be able to be retained, particularly those along the southern boundary, either side of the proposed extension of Collaroy Parade.

Habitat Connectivity Strategy

The Squirrel Glider was detected at six locations within the Study Area (further discussed in **Section 6.3**). Research suggests that the home range of a family group of Squirrel Gliders may range from 5 to 15 hectares (van der Ree & Bennett 2003; Sharpe & Goldingay 2007; Goldingay et al. 2010). Squirrel gliders can travel up to 1 km in a night, with the longest reported distance being about 1.9 km (Sharpe & Goldingay 2007). Sharpe & Goldingay (2007) also reported that the average maximum distances moved by female and male Squirrel Gliders within a night were found to be 1,174 m and 1,043 m respectively. Based on this research, Squirrel Gliders are likely to be utilising the Study Area as part of a broader network of habitats within the locality. This is supported given that the vegetation within the Study Area is mainly comprised of regrowth vegetation, which contains a relatively low diversity of shrub species, and is on the periphery of a larger area of higher-quality bushland.

While the proposed development does not impact any significant regional corridors, there is some potential for impacts to smaller local habitat links. Connectivity between Lot 2 (Subject Land) and Lot 1 (smaller patch of retained vegetation to the north) relies on a row of 4 trees adjacent to the dam in the north of Lot 1. Arboreal fauna would need to travel along a row of trees, in sequence, to move between Lot 2 and Lot 1. Remote cameras were deployed within one of these four trees (RC10) and within two nearby trees (RC08 & RC48), however, no Squirrel Gliders were detected. If Squirrel Gliders were to utilise this corridor, it is suspected that they would have been detected on one of these three cameras. Following discussions with the landowner of Lot 1 and inspection of this habitat, almost all vegetation present is the result of tree planting and natural regrowth. Lot 1 contains very few remnant trees and generally lacks hollow-bearing trees. As such, the vegetation in Lot 1 is likely to provide approximately 3 hectares of foraging habitat for the Squirrel Glider and is unlikely to be critical to the survival of the local population.

Due to the sparsity of native vegetation within the Study Area and adjacent landholdings (where recent vegetation has occurred), habitat connectivity to the north (Lot 1) is currently limited.

Distances between canopy trees in the northern eastern portion of the Study Area are greater than the maximum gliding distance of Squirrel Gliders; therefore, supplementary glider poles have been incorporated into the design. The size and positioning of Glider Poles proposed is based on research (Goldingay & Taylor 2009) that shows that the minimum gliding distance of Squirrel Gliders can be calculated based on the following formula:

(The height of the launch site less 2 meters) multiplied by 1.8.

Based on this formula, 15m high glider poles would allow for a maximum glide distance of 23.4m. Accordingly, three Glider Poles (15m in height) are proposed along the north-eastern boundary, separated by distances of 20 meters (**Figure 13**).

Revegetation

Revegetation with non-flammable tree and shrub species is proposed along either side on the glider crossing. As the vegetation becomes established this will provide shelter and refuge for Squirrel Gliders that utilise the crossing. Suggested species and densities for planting are detailed in **Table 13**.

Table 13 Suggested Plantings

Stratum	Species	Recommended Separation within Rows(m)	Total No Plants
Canopy	<i>Pittosporum undulatum</i> (Sweet Pittosporum)	1/10m	10
Canopy	<i>Glochidion ferdinandi</i> (Cheese Tree)	1/10m	10
Canopy	<i>Acacia implexa</i> (Hickory Wattle)	1/10m	10
Canopy	<i>Acmena smithii</i> (Lilly Pilly)	1/10m	10
Shrub	<i>Acacia parvipinnula</i> (Silver-stemmed Wattle)	1/5m	20
Shrub	<i>Acacia dealbata</i> (Silver Wattle)	1/5m	20
Shrub	<i>Exocarpos cupressiformis</i> (Native Cherry)	1/5m	20

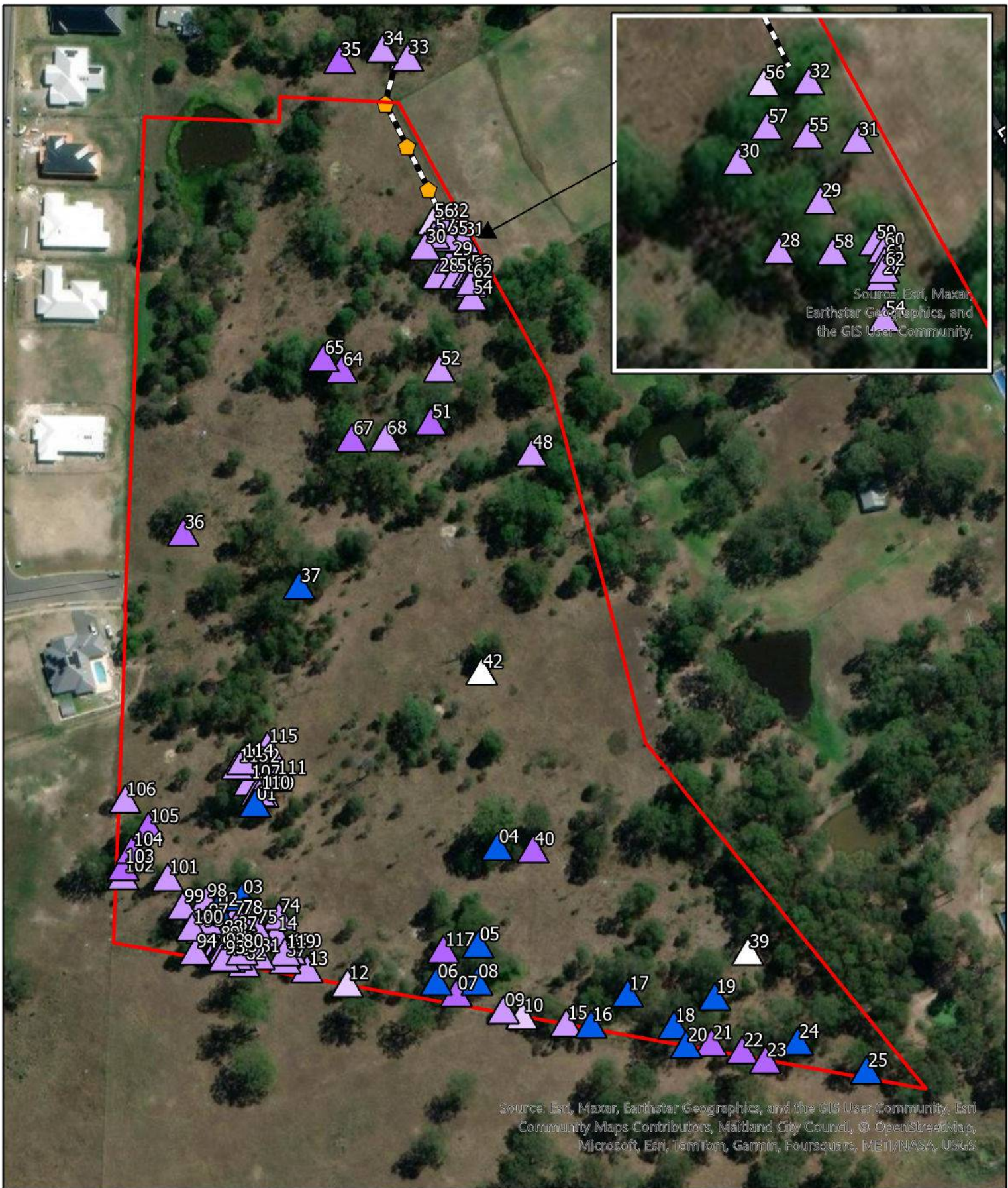


Figure 12 - Tree Retention Plan



- ▬ Subject Land
- ▭ Proposed Glider Pole Locations
- 20m Gliding Distance
- Tree Proposed for Retention (ID labelled on map)
- Height (m)
- ▲ 30
- ▲ 25
- ▲ 20
- ▲ 15
- ▲ 12
- ▲ 10

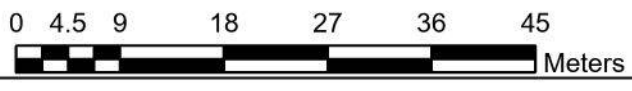
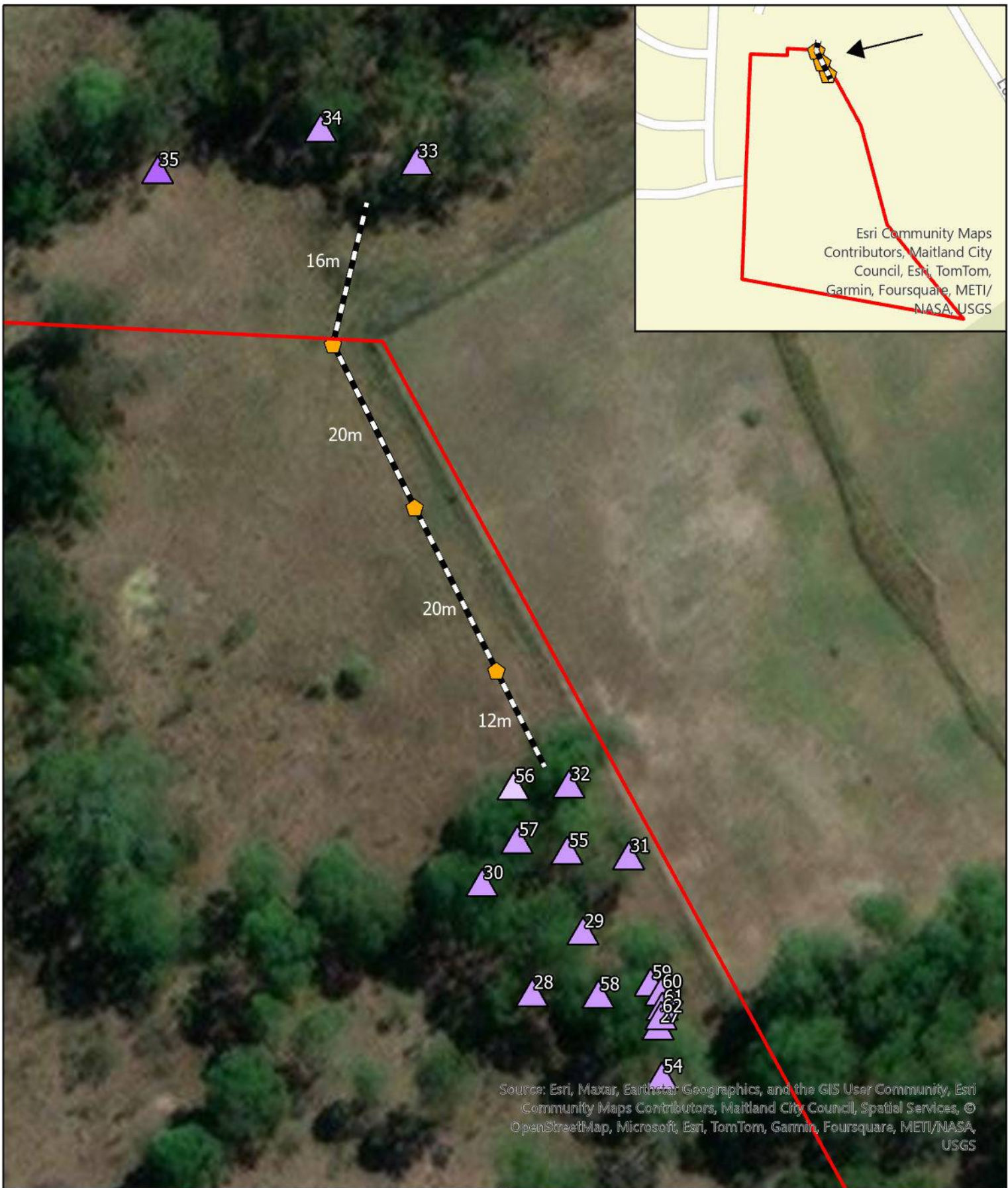


Figure 13 - Habitat Connectivity Strategy



- Subject Land
 - 20m Gliding Distance
 - Proposed Glider Pole Locations
 - Tree Proposed for Retention (ID labelled on map)
 - Height (m)
- | | | | |
|--------------------------------------------|----|--------------------------------------------|----|
| ▲ | 30 | ▲ | 25 |
| ▲ | 20 | ▲ | 20 |
| ▲ | 15 | ▲ | 15 |
| ▲ | 12 | ▲ | 12 |
| ▲ | 10 | ▲ | 10 |

5.2 Assessment of Impacts

The Project will impact approximately 7.54 ha of native vegetation. The vegetation equates to three vegetation zones, and the future value of each attribute (composition, structure, and function) and the vegetation integrity score for all vegetation zones will be zero (**Table 14**).

Table 14 Impacts on Native Vegetation

Zone	PCT	Condition class	Impact Area (ha)	Current VI Score	Future VI Score
1	1600	Moderate	4.03	65.8	0
2	1600	Cleared	3.14	11.9	0
3	1598	Moderate	0.37	62.1	0

5.3 Indirect Impacts

The proposed development has the potential for edge effects on the adjoining vegetation. Potential indirect impacts resulting from the development include:

- Increased weed invasion and potential spread or introduction of pathogens from the site to adjacent vegetation.
- Accidental incursions during clearing.
- Reduced viability of adjoining habitats due to increased noise, dust or light spill.

These potential indirect impacts may have an effect on vegetation adjacent to the Study Area. Provided appropriate mitigation measures and management plans are enforced, the proposed development is unlikely to indirectly impact threatened species, ecological communities, and their habitats during construction and operational phases.

5.4 Prescribed Biodiversity Impacts

The following are prescribed impacts which need to be considered as per Section 8.3 of the BAM (DPIE 2020a).

Impacts of the development on the habitat of threatened species or ecological communities associated with significant geological features, human made structure or non-native vegetation.

The habitat within the Development Site for threatened species and ecological communities is not associated with significant geological features, human made structure or non-native vegetation.

Mitigation measures to minimise any indirect impacts to biodiversity values within the Study Area are detailed in **Section 5.4**.

Impacts of the development on the connectivity of different habitat which facilitates movement of threatened species.

The vegetation within the Study Area occurs in a fragmented state. The predominant surrounding land use is mainly residential development and cleared agricultural land. In a regional context, the Study Area is also located on the periphery of a broader patch of vegetation (located to the south-east) and is unlikely to be used as an important corridor between higher quality areas. A specific row of trees (adjacent to the dam) may provide a narrow link for gliding fauna through the site which may permit Squirrel Glider movements through the property to the north, however, no Gliders were recorded in this area. Despite this, a Connectivity Strategy aims to reinstate a glider corridor along the north-eastern boundary of the property. Glider Poles and revegetation are proposed to link patches of vegetation (rather than scattered trees) ensuring a direct route of passage is achieved. As such, the vegetation proposed to be removed is unlikely to result in the disconnection of any local corridors.

Impact of the development on movement of threatened species that maintains their life cycle.

As discussed above, the proposed development would have limited impacts on the movement of threatened species in the locality. While a small area of native vegetation is proposed to be removed, movement corridors within the local area would largely be maintained through the connectivity strategy and the retention of a large area of intact native forest to the east (along the vegetated riparian zone).

Impacts of the development on water quality, bodies and hydrological processes that sustain threatened species or ecological communities.

A constructed dam in the northern portion of the Study Area will be impacted by the project. The dam represents foraging habitat for the Southern Myotis, however, this is not the preferred habitat type for the species (predominately forages over streams). No mapped watercourses occur within the Development Site. Impacts to water quality will be minimised through the implementation of mitigation measures outlined in **Section 5.4**.

Impact of wind turbine strikes on protected animals.

Not applicable to the current application.

Impacts of vehicle strikes on threatened species or on animals that are part of a TEC.

Given the nature of the proposed development, impacts of vehicle strikes on threatened species or animals are unlikely. To minimise potential impacts from increased movement of vehicles during the construction phase appropriate mitigation measures will be enforced, as outlined below in **Section 5.5**.

5.5 Mitigation Measures

The measures outlined in **Table 15** are proposed to minimise and avoid potential impacts associated with the proposed development.

Table 15 Mitigation Measures

Impact	Action and Outcome	Responsibility	Timing
Direct impacts			
Clearing of native vegetation	<ul style="list-style-type: none"> Avoid and minimise clearing impacts to native vegetation where possible. Clearly delineate the boundaries of the project footprint to prevent any unnecessary clearing beyond its extent. This includes the installation of appropriate fencing along the eastern extent of the Study Area. Fencing should prohibit entry into the retained vegetation area and the minimise indirect impacts during construction such as the movement of dust and rubbish into the forest and wetland. Ensure vehicle and equipment parking areas and stockpile areas are identified and positioned to avoid areas containing ecological value. Stockpiling must not occur within, or in close proximity (5m) to, areas of native vegetation retained under the proposed development. Appropriate signage such as ‘no go zone’ or ‘environmental protection area’ should be installed surrounding the area of retained native vegetation and wetlands. Clearly identify and communicate the location of any ‘no go zones’ in site inductions. Tree protection measures will be implemented to protect retained trees surrounding the Study Area. Tree protection measures should consider allowances for Tree Protection Zones in accordance with AS4970 (Standards Australia, 2009). 	Construction site manager	Prior to and during vegetation clearing
Removal of hollow-bearing trees	<ul style="list-style-type: none"> Limit removal of habitat trees within the Development Site where possible. A pre-clearing protocol will be implemented during clearing works. Pre-clearance surveys will be undertaken to determine if any fauna are utilizing hollow-bearing trees. A suitably qualified and trained fauna handler will be present during hollow-bearing tree clearing to relocate displaced fauna. 	Construction site manager	Prior to and during vegetation clearing
Impacts to surface and groundwater quality and quantity due to sediment run-	<ul style="list-style-type: none"> Source controls such as sediment fences, mulching and jute matting will be utilised where appropriate. Site-based vehicles will carry spill kits. 	Construction site manager	During vegetation clearing, construction and operation

Impact	Action and Outcome	Responsibility	Timing
off and/or contaminant runoff into adjacent watercourses	<ul style="list-style-type: none"> Erosion and sediment control will be required for the development in accordance with Managing Urban Stormwater: Soils and Construction (Landcom, 2004) prior to commencement of construction. Limit the use of pesticides in the project footprint where possible to avoid contamination of nearby watercourses/wetland areas. 		
Vehicle collision with fauna	<ul style="list-style-type: none"> Speed limits within the Study Area should be limited to 20 km/hr. This limit should be clearly signed at all entry points to site. The Study Area should be separated from vegetated areas throughout the construction and operational phases of the development. This separation should be achieved through physical barriers including fencing and appropriate signage. 	Construction site manager	During construction and operation
Indirect Impacts			
Transfer of weeds and pathogens to and from site	<ul style="list-style-type: none"> The fungal pathogens <i>Phytophthora cinnamomi</i> and Myrtle Rust (<i>Puccinia psidii</i>) are known to occur in the LGA, however, it is unknown if they occur within the Development Site. These pathogens can have devastating impacts on native plant communities and inhabiting fauna if not properly managed. Appropriate wash down facilities will be available to clean vehicles and equipment prior to arrival on-site and prior to departure. Ensure soil and seed material is not transferred. Weed infestations within the construction footprint are to be identified and mapped prior to construction. 	Construction site manager	During vegetation clearing, construction, and operation
Noise, vibration, lighting, waste and air pollution impacts to adjacent sensitive habitat areas	<ul style="list-style-type: none"> Increased human activity (from workers and traffic levels) directly adjacent to sensitive habitat areas may cause disturbance to flora and fauna species in adjoining habitat. Impacts from construction and operational activities, such as disturbance to an animal's normal behavior patterns due to noise, vibration, lighting or dust may cause areas of previously suitable habitat to become sub-optimal and may cause fauna species to vacate areas of previously suitable habitat. Measures to mitigate impacts on flora and fauna from noise, vibration, waste, light and air pollution such as: 	Construction site manager	During construction and operation

Impact	Action and Outcome	Responsibility	Timing
	<ul style="list-style-type: none"> • Enforce 'carry-in, carry-out' policy regarding rubbish and waste materials generated on-site during construction to avoid waste materials entering adjacent vegetation. • Restriction of public access and associated impacts from domestic pets, waste dumping and damage to adjoining vegetation must be enforced pre, during and post construction. • Fence sensitive areas to delineate 'no go' zones. • Levels of lighting within the site will be reduced to a minimal level to reduce any adverse effects upon the essential behavioral patterns of light-sensitive fauna. • Lighting should comply with Australian Standard AS4282 (INT) 1997 – Control of Obtrusive Effects of Outdoor Lighting. • Noise minimisation practices in accordance with DPIE recommendations. • Dust control measures such as covering loads where required; amending operations under excessive wind conditions including ceasing operations if required; use of water tankers as required, to control dust; rehabilitation through vegetation of surfaces to be left unsealed; and, truck wheel washes or other dust removal measures. 		

6 Impact Summary

6.1 Serious and Irreversible Impacts

No species at risk of Serious and Irreversible Impacts (SAIs) are to be impacted as a result of the proposed development. As such no SAIs assessments were completed in accordance with Section 9.1 of the BAM (DPIE 2020a).

6.2 Impacts on Native Vegetation

This section provides an assessment of the impacts requiring offsetting in accordance with Section 10.1 of the BAM (DPIE 2020a).

The proposed development will result in the clearing of 7.54 ha of native vegetation (PCT 1600 and PCT 1598). In accordance with the BAM (Section 9.2.1) assessors must determine an offset for all impacts of proposals on PCTs that are associated with a vegetation zone that has a vegetation integrity score of:

- ≥ 15 , where the PCT is representative of an EEC or a CEEC.
- ≥ 17 , where the PCT is associated with threatened species habitat (as represented by ecosystem credits) or represents a vulnerable ecological community.
- ≥ 20 , where the PCT does not represent a TEC and is not associated with threatened species habitat.

A summary of the impacts on native vegetation and the required ecosystem credits is provided in **Table 16**.

Table 16 Ecosystem Credit Requirements

Zone	PCT	Condition class	HBT presence	Impact Area (ha)	Current VI Score	Future VI Score	Credits Required
1	1600	Moderate	Yes	4.03	65.8	0	133
2	1600	Cleared	No	3.14	11.9	0	0
3	1598	Moderate	No	0.37	62.1	0	11

6.3 Impacts on Threatened Species

The proposed development will result in the removal of habitat for two Species Credit Species:

- Southern Myotis (*Myotis macropus*) – detected via Anabat™
- Squirrel Glider (*Petaurus norfolcensis*) – detected via remote camera

The Southern Myotis was identified via Anabat recording in the northern portion of the Development Site. The habitat polygon for the species was defined as all vegetation zones for PCTs which the species is associated with under the *Threatened Biodiversity Data Collection* that occur within 200 m of the foraging habitat (constructed dam within the site and those located within neighbouring properties) as shown in **Figure 14**.

The Squirrel Glider was detected via remote camera in six locations in the Development Site. The species polygon was defined as all vegetation zones containing suitable habitat (forested areas containing Eucalypt and Acacia species and hollow-bearing trees) as shown in **Figure 15**. Vegetation Zone 2 was excluded given that this habitat is considered to be unsuitable for the species.

A summary of species credit requirements for impacts to each of these species is presented respectively in **Table 17** and **Table 18**. The Biodiversity Credit Report (Like-for-like and Variations) detailing credit retirement options is provided in **Appendix C**

Table 17 Southern Myotis Credit Requirements

Zone	PCT	Condition class	Impact Area (ha)	Current Habitat Score	Future Habitat Score	Credits Required
1	1600	Moderate	3.5	65.8	0	115
2	1600	Cleared	2.8	11.9	0	17
3	1598	Moderate	0.37	62.1	0	11
Total						143

Table 18 Squirrel Glider Species Credit Requirements

Zone	PCT	Condition class	Impact Area (ha)	Current VI Score	Future VI Score	Credits Required
1	1600	Moderate	4.03	65.8	0	133
3	1598	Moderate	0.37	62.1	0	11
Total						144



Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community, Esri Community Maps Contributors, Maitland City Council, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, FourSquare, METI/NASA, USGS



Figure 14 - Species Polygon - Southern Myotis V2

- Subject Land
 - ★ Southern Myotis Record (Anabat)
 - Southern Myotis Foraging Habitat (Open water)
 - 200m Foraging Habitat Buffer
- Southern Myotis - Species Polygon V2**
- VZ01 - PCT 1600 - Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter (Moderate Condition)
 - VZ02 - PCT 1600 - Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter (Cleared)
 - VZ03 - PCT 1598 - Forest Red Gum grassy open forest on floodplains of the lower Hunter (Moderate Condition)



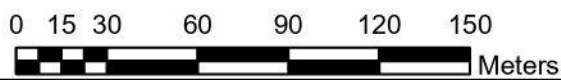
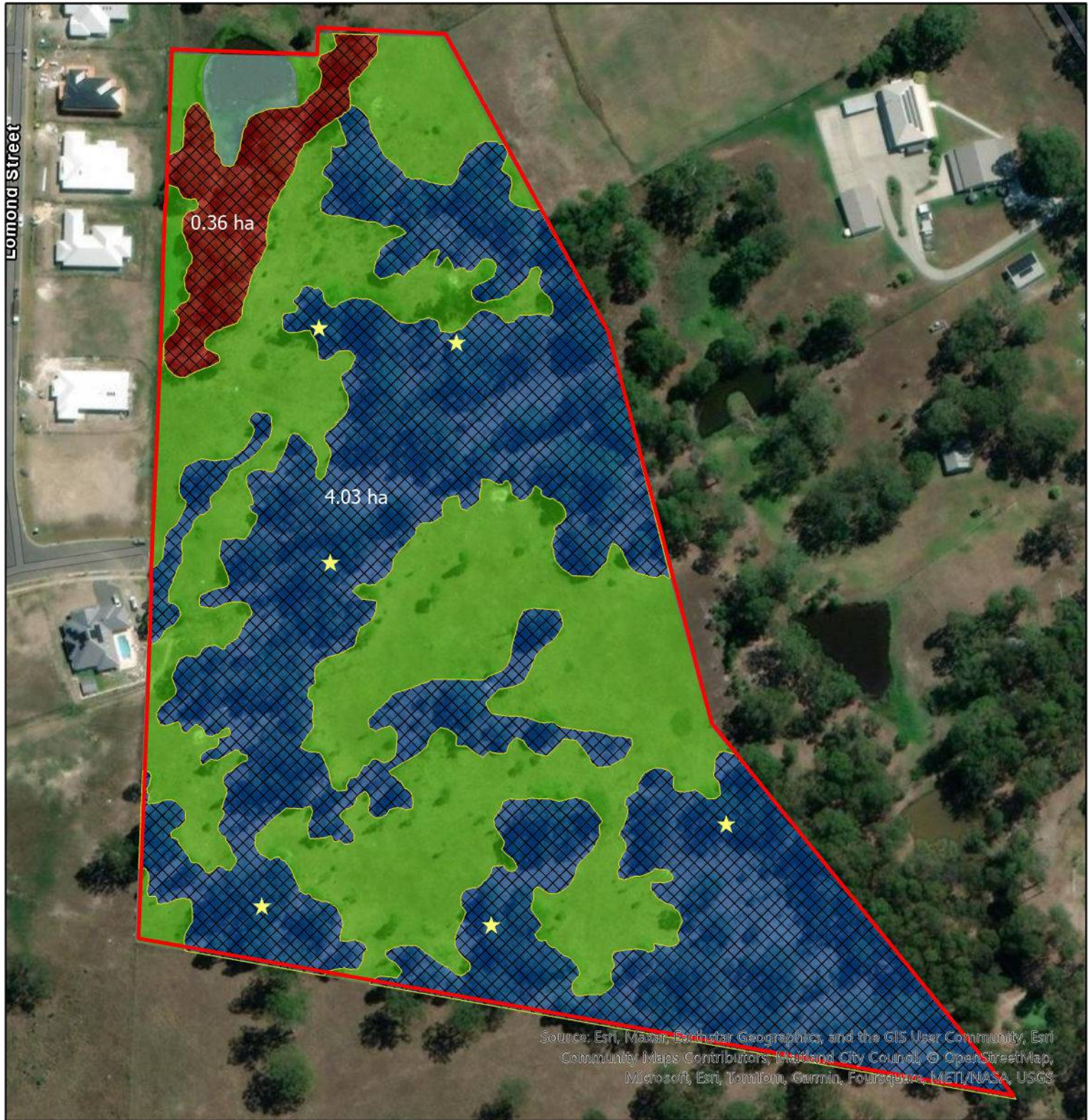


Figure 15 - Habitat Polygon - Squirrel Glider

- Subject Land
 - Squirrel Glider Records (Remote Camera)
 - Squirrel Glider Species Polygon
- Vegetation Zone and Plant Community Type
- VZ01 - PCT 1600 - Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter (Moderate Condition)
 - VZ02 - PCT 1600 - Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter (Cleared)
 - VZ03 - PCT 1598 - Forest Red Gum grassy open forest on floodplains of the lower Hunter (Moderate Condition)
 - Constructed Dam

7 Legislative Review

7.1 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act requires that developments or undertakings that are likely to have a significant impact on MNES be referred for a determination as to whether they are a controlled action that requires approval under the EPBC Act.

Of the nine MNES listed under the Act, the one (1) MNES considered relevant to the Study Area was potential impacts on marginal habitat for listed threatened species and ecological communities. Impacts to EPBC listed species and ecological communities are likely to be negligible; therefore, referral to the Commonwealth Minister for the Environment is not recommended.

7.2 Biosecurity Act

A total of 31 exotic plant species were detected within the Study Area. Five of these species are priority weed species listed under the NSW *Biosecurity Act 2015*:

- *Chrysanthemoides monilifera* (Bitou Bush)
- *Lantana camara* (Lantana)
- *Olea europaea subsp. cuspidata* (African Olive)
- *Opuntia aurantiaca* (Tiger Pear)
- *Opuntia stricta* (Common Prickly Pear)

Mitigation measures are presented previously in **Table 15** to reduce the potential for spread of these species during the construction phase.

7.3 Koala Habitat Protection

The Study Area is located within the Maitland City Council LGA, which is listed within Schedule 1 of Chapter 4 (Koala Habitat Protection 2021) of the Biodiversity and Conservation SEPP (2021). The Koala Habitat Protection SEPP 2021 was therefore deemed applicable for the Study Area. As such, an assessment of Koala habitat suitability was conducted in accordance with the SEPP including the determination of Highly Suitable Koala Habitat and records of Koalas. These are defined as the following:

Highly Suitable Koala Habitat – Where 15% or greater of the total number of trees within any PCT are the regionally relevant species of those listed in Schedule 2 of the Koala SEPP 2021, the site meets the definition of highly suitable Koala habitat

Core Koala Habitat – is defined as:

- An area of land which has been assessed by a suitably qualified and experienced person as being Highly Suitable Koala Habitat and where Koalas are recorded as being present at the time of assessment of the land as highly suitable Koala habitat, or

- An area of land which has been assessed by a suitably qualified and experienced person as being Highly Suitable Koala Habitat and where Koalas have been recorded as within 2.5kms during the previous 18 years. Historical koala occupation of the site area is determined by considering Koala records within the last 18 years

As such, an assessment of ‘Highly Suitable Koala Habitat’ and ‘Core Koala Habitat’ under the Koala SEPP 2021 is detailed below.

Presence of Highly Suitable Koala Habitat

The following Koala use tree species (Central Coast Koala Management Area) were detected within the Development Site:

- *Casuarina glauca* (Swamp Oak)
- *Corymbia gummifera* (Red Bloodwood)
- *Corymbia maculata* (Spotted Gum)
- *Eucalyptus acmenoides* (Red Mahogany)
- *Eucalyptus capitellata* (Brown Stringybark)
- *Eucalyptus crebra* (Narrow-leaved Ironbark)
- *Eucalyptus fibrosa* (Broad-leaved Ironbark)
- *Eucalyptus grandis* (Flooded Gum)
- *Eucalyptus longifolia* (Woollybutt)
- *Eucalyptus moluccana* (Grey Box)
- *Eucalyptus paniculata* (Grey Ironbark)
- *Eucalyptus tereticornis* (Forest Red Gum)
- *Melaleuca quinquenervia* (Broad-leaved Paperbark)

In Vegetation Zones 1 and 3, some of the above listed species constitute over 15% of the total number of trees. As such, these Vegetation Zones constitute “Highly Suitable Koala Habitat” under the Koala SEPP 2021.

Presence of Core Koala Habitat

No Koalas, or evidence of Koalas, were recorded within the Development Site during the site assessment. Two records of Koalas (2017 & 2000) occur within 2.5 km of the Study Area; however, the record from 2017 has an accuracy of 1,320 m (BioNet records with a locational accuracy of more than 1,000 m are not to be considered under the SEPP) and the record from 2000 is greater than 18 years ago. As such, the vegetation does not meet the definition of ‘Core Koala Habitat’ under the Koala SEPP 2021.

Impact Assessment

The vegetation within the Study Area occurs in a highly modified and fragmented state. More intact areas of bushland occur to the east. It is likely that a resident population of Koalas would utilise the habitat within the Study Area intermittently as part of a broader network of habitats within locality. Based on the above, the proposed development is unlikely to cause a significant impact to the Koala.

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Appendix A – Threatened Species Database Search

A list of threatened species, populations and ecological communities that have been reported or modelled to occur from within a five-kilometre radius of the Study Area was obtained from the DPIE BioNet Atlas: (<http://www.bionet.nsw.gov.au/>).

The table below summarises the likelihood of threatened species occurring within the Study Area based on the habitat requirements of each species.

Definition of the likelihood of occurrence criteria are as follows:

- Known – species identified within the site during surveys;
- High – species known from the area (DPIE BioNet Atlas records), suitable habitat (such as roosting and foraging habitat) present within the site;
- Moderate – species may be known from the area, potential habitat is present within the site;
- Low – species not known from the area and/or marginal habitat is present within the site; and
- Nil – habitat requirements not met for this species within the site



Species	Status		Bionet Records	Habitat	LoO	Summary
	BC	EPBC				
<i>Acacia bynoeana</i> Bynoe's Wattle	E1	V	1	The species is endemic to central eastern NSW, currently known from only 30 locations, many of only 1-5 plants. Grows mainly in heath/ dry sclerophyll forest on sandy soils, prefers open, sometimes slightly disturbed sites such as trail margins, road edges, and in recently burnt open patches.	Low	No suitable habitat within the Subject Site. Few records within the locality. Not recorded during site assessment.
<i>Eucalyptus parramattensis subsp. decadens</i>	V	V	17	Generally occupies deep, low-nutrient sands, often those subject to periodic inundation or where water tables are relatively high. It occurs in dry sclerophyll woodland with dry heath understorey. It also occurs as an emergent in dry or wet heathland. Often where this species occurs, it is a community dominant.	Low	No suitable habitat within the Subject Site. Not recorded during site assessment.
<i>Grevillea parviflora subsp. parviflora</i> Small-flower Grevillea	V	V	2	The species distribution is between Moss Vale/Bargo and the lower Hunter Valley, with most occurrences in Appin, Wedderburn, Picton and Bargo. The habitat for the species is broad including heath, shrubby woodland and open forest on light clay or sandy soils, and often in disturbed areas such as on the fringes of tracks.	Low	Habitat is considered to be too degraded. Few records within the locality. Not recorded during site assessment.
<i>Pterostylis chaetophora</i>	E1,P,2	E	1	Recorded in Queensland and NSW. In NSW it is currently known from 18 scattered locations in a relatively small area between Taree and Kurri Kurri, extending to the south-east towards Tea Gardens and west into the Upper Hunter, with additional records near Denman and Wingen. There are also isolated records from the Sydney region. The species occurs in two conservation reserves, Columbey National Park and Wingen Maid Nature Reserve. The preferred habitat is seasonally moist, dry sclerophyll forest with a grass and shrub understorey.	Low	Habitat is considered to be too degraded. Few records within the locality. Not recorded during site assessment.
<i>Rhodomyrtus psidioides</i>	E4A	-	2	Occurs from Broken Bay, approximately 90 km north of Sydney, New South Wales, to Maryborough in Queensland. Populations are typically restricted to coastal and sub-coastal areas of low elevation however the species does occur up to c. 120 km inland in the Hunter and Clarence River catchments and along	Nil	No suitable habitat within the Subject Site. Few records within the locality.

Species	Status		Bionet Records	Habitat	LoO	Summary
	BC	EPBC				
Native Guava				the Border Ranges in NSW. Pioneer species found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines.		Not recorded during site assessment.
<i>Tetratheca juncea</i> Black-eyed Susan	V	V	17	Regarded as extinct within the Sydney area, current range from Wyong north to Bulahdelah and inland 50km to edge of Sugarloaf Range. Occurs predominately in areas of over 1000 mm annual rainfall, within dry sclerophyll forest, and sometimes heath and moist forest, with a preference for Coastal Plains Smooth-barked Apple Woodland and Coastal Plains Scribbly Gum Woodland.	Low	Habitat is considered to be too degraded. Few records within the locality. Not recorded during site assessment.
<i>Anseranas semipalmata</i> Magpie Goose	V,P		1	The Magpie Goose is still relatively common in the Australian northern tropics, but had disappeared from south-east Australia by 1920 due to drainage and overgrazing of reed swamps used for breeding. Since the 1980s there have been an increasing number of records in central and northern NSW. Vagrants can follow food sources to south-eastern NSW. Mainly found in shallow wetlands (less than 1 m deep) with dense growth of rushes or sedges. Equally at home in aquatic or terrestrial habitats; often seen walking and grazing on land; feeds on grasses, bulbs and rhizomes.	Low	Foraging habitat available in constructed dam, but few records in the locality. Not recorded during site assessment.
<i>Artamus cyanopterus cyanopterus</i> Dusky Woodswallow	V,P	-	2	Primarily inhabit dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and ground-cover of grasses or sedges and fallen woody debris. It has also been recorded in shrublands, heathlands and very occasionally in moist forest or rainforest. Also found in farmland, usually at the edges of forest or woodland.	Low	Foraging habitat available, few records in the locality. Not recorded during site assessment.
<i>Calyptorhynchus lathami</i>	V,P,2	-	2	Widespread but uncommon from coast to southern tablelands and central western plains. Feeds almost exclusively on the seeds of Allocasuarina species. Prefers woodland and open forests, rarely away from Allocasuarina. Roost in leafy canopy trees, preferably eucalypts, usually <1 km from feeding	Low	Foraging habitat available, few records in the locality.

Species	Status		Bionet Records	Habitat	LoO	Summary
	BC	EPBC				
Glossy Black-Cockatoo				site. Nests in large (approx. 20 cm) hollows in trees, stumps or limbs, usually in Eucalypts.		Not recorded during site assessment.
<i>Chthonicola sagittata</i> Speckled Warbler	V,P	-	2	Within NSW most frequently reported from the hills and tablelands of the Great Dividing Range, rarely from the coast. The species inhabits a wide range of Eucalypt-dominated communities with a grassy understorey, a sparse shrub layer, often on rocky ridges or in gullies. Sedentary and requires large, relatively undisturbed remnants to persist in an area. Forages on the ground for seeds and insects, and nests in a slight hollow in the ground or at the base of low dense plants.	Low	Foraging habitat available, few records in the locality. Not recorded during site assessment.
<i>Circus assimilis</i> Spotted Harrier	V,P	-	3	The Spotted Harrier occurs throughout the Australian mainland, except in densely forested or wooded habitats of the coast, escarpment and ranges, and rarely in Tasmania. Individuals disperse widely in NSW and comprise a single population. Occurs in grassy open woodland including Acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe. It is found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands.	Low	Foraging habitat available, few records in the locality. Not recorded during site assessment.
<i>Climacteris picumnus victoriae</i> Brown Treecreeper (eastern subspecies)	V,P	-	1	Small grey-brown bird with black streaking on the lower breast/belly and black bars on the undertail. Inhabits Box-Gum woodlands and dry open forest of inland slopes and plains. Preferred woodlands dominant by stringybarks or other rough-barked eucalypts. Forages in trees and on the ground. Endemic to eastern Australia, occurring from the coast to inland plains and western slopes of the great dividing range. Nests in tree or stump hollows greater than 6cm.	Low	Foraging habitat available, few records in the locality. Not recorded during site assessment.

Species	Status		Bionet Records	Habitat	LoO	Summary
	BC	EPBC				
<i>Daphoenositta chrysoptera</i>	V,P	-	4	Sedentary, occurs across NSW from the coast to the far west. Inhabits eucalypt forests and woodlands, especially rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. Sensitive to habitat isolation and loss of structural complexity, and adversely affected by dominance of Noisy Miners. Cleared agricultural land is potentially a barrier to movement. Builds a cup-shaped nest of plant fibres and cobwebs in an upright tree fork high in the living tree canopy, and often re-uses the same fork or tree in successive years.	Low	Foraging habitat available, few records in the locality.
Varied Sittella						Not recorded during site assessment.
<i>Ephippiorhynchus asiaticus</i>	E1,P	-	5	Primarily inhabits permanent freshwater wetlands and surrounding vegetation including swamps, floodplains, watercourses and billabongs, freshwater meadows, wet heathland, farm dams and shallow floodwaters. Will also forage in inter-tidal shorelines, mangrove margins and estuaries. Feeds in shallow, still water. This species breeds during summer, nesting in or near a freshwater swamp.	Low	Foraging habitat available, few records in the locality.
Black-necked Stork						Not recorded during site assessment.
<i>Falco subniger</i>	V	-	2	The Black Falcon is widely, but sparsely, distributed in New South Wales, mostly occurring in inland regions. Some reports of 'Black Falcons' on the tablelands and coast of New South Wales are likely to be referable to the Brown Falcon. In New South Wales there is assumed to be a single population that is continuous with a broader continental population, given that falcons are highly mobile, commonly travelling hundreds of kilometres (Marchant & Higgins 1993). The Black Falcon occurs as solitary individuals, in pairs, or in family groups of parents and offspring.	Low	Foraging habitat available, few records in the locality.
Black Falcon						Not recorded during site assessment.
<i>Glossopsitta pusilla</i>	V,P	-	13	The species occurs from the coast to western slopes of the Great Dividing Range and inhabits dry, open eucalypt forests and woodlands. Occurrence is positively associated with patch size, and with components of habitat complexity including canopy cover, shrub cover, ground cover, logs, fallen branches and litter. Feed primarily on profusely-flowering eucalypts and a variety of other species including melaleucas and mistletoes. On the western slopes and tablelands <i>Eucalyptus albens</i> and <i>E. melliodora</i> are particularly important food sources for pollen and nectar respectively. Mostly nests in small (opening approx. 3cm) hollows in living, smooth-barked eucalypts, especially <i>Eucalyptus viminalis</i> , <i>E. blakelyi</i> and <i>E. dealbata</i> . Most breeding records are from the western slopes.	Moderate	Broadly suitable habitat within the Subject Site. Records within the locality.
Little Lorikeet						Not recorded during site assessment.

Species	Status		Bionet Records	Habitat	LoO	Summary
	BC	EPBC				
<i>Haliaeetus leucogaster</i> White-bellied Sea-Eagle	V,P	-	18	The White-bellied Sea-Eagle is found in coastal habitats (especially those close to the sea-shore) and around terrestrial wetlands in tropical and temperate regions of mainland Australia and its offshore islands. Feed mainly on fish and freshwater turtles, but also waterbirds, reptiles, mammals and carrion. Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby which are used as 'guard roosts'. Nests are large structures built from sticks and lined with leaves or grass.	Low	No suitable habitat Not recorded during site assessment.
<i>Hieraaetus morphnoides</i> Little Eagle	V,P	-	1	Occurs throughout NSW except most densely forested parts of the Dividing Range escarpment. Occupies habitats rich in prey within open eucalypt forest, woodland or open woodland. Sheoak or acacia woodlands and riparian woodlands of interior NSW are also used. For nest sites it requires a tall living tree within a remnant patch, where pairs build a large stick nest in winter and lay in early spring.	Low	Foraging habitat available, few records in the locality. Not recorded during site assessment.
<i>Irediparra gallinacea</i> Comb-crested Jacana	V,P	-	3	Occurs on freshwater wetlands in northern and eastern Australia, mainly in coastal and subcoastal regions, from the north-eastern Kimberley Division of Western Australia to Cape York Peninsula then south along the east coast to the Hunter region of NSW. Inhabit permanent freshwater wetlands, either still or slow-flowing, with a good surface cover of floating vegetation, especially water-lilies, or fringing and aquatic vegetation.	Nil	No suitable habitat within the Subject Site. One record within the locality. Not recorded during site assessment.
<i>Lathamus discolor</i> Swift Parrot	E1,P,3	CE	4	A migratory species that travels to the mainland from March to October, the species breeds in Tasmania from September to January. Principal over-winter habitat is box-ironbark communities on the inland slopes and plains. <i>Eucalyptus robusta</i> , <i>Corymbia maculata</i> and <i>C. gummifera</i> dominated coastal forests are also important habitat.	Low	Foraging habitat available, few records in the locality. Not recorded during site assessment.
<i>Lophoictinia isura</i>	V,P,3	-	4	Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. In arid north-western NSW, has been observed in stony country with a ground cover of	Nil	No suitable habitat within the Subject Site. Few records within the locality.

Species	Status		Bionet Records	Habitat	LoO	Summary
	BC	EPBC				
Square-tailed Kite				chenopods and grasses, open acacia scrub and patches of low open eucalypt woodland. Breeding is from July to February.		Not recorded during site assessment.
<i>Neophema pulchella</i>	V,P,3	-	1	The Turquoise Parrot's range extends from southern Queensland through to northern Victoria, from the coastal plains to the western slopes of the Great Dividing Range. Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland.	Low	Foraging habitat available, few records in the locality.
Turquoise Parrot						Not recorded during site assessment.
<i>Ninox connivens</i>	V,P,3	-	2	Occurs from coast to inland slopes and plains, though is rare in dense, wet forests east of the Great Dividing Range and sparse in higher parts of the tablelands and in the arid zone. Inhabits eucalypt woodlands, open forest, swamp woodlands, and, especially in inland areas, timber along watercourses. Roosts along creek lines in dense, tall understorey foliage (e.g. in Acacia and Casuarina), or dense eucalypt canopy. Nests in hollows of large, old eucalypts including <i>Eucalyptus camaldulensis</i> , <i>Eucalyptus albens</i> , <i>Eucalyptus polyanthemus</i> and <i>Eucalyptus blakelyi</i> . Birds and mammals important prey during breeding. Territories range from 30 to 200 hectares.	Low	Foraging habitat available, few records in the locality.
Barking Owl						Not recorded during site assessment.
<i>Ninox strenua</i>	V,P,3	-	8	The Powerful Owl inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. The Powerful Owl requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. The species breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. It roosts by day in dense vegetation comprising species such as Turpentine <i>Syncarpia glomulifera</i> , Black She-oak <i>Allocasuarina littoralis</i> , Blackwood <i>Acacia melanoxylon</i> , Rough-barked Apple <i>Angophora floribunda</i> , Cherry Ballart <i>Exocarpus cupressiformis</i> and a number of eucalypt species.	Low	Broadly suitable foraging habitat within the Subject Site. No suitable nesting Habitat within the Subject Site. Records within the locality.
Powerful Owl						Not recorded during site assessment.

Species	Status		Bionet Records	Habitat	LoO	Summary
	BC	EPBC				
<i>Oxyura australis</i>	V,P		1	The Blue-billed Duck is endemic to south-eastern and south-western Australia. It is widespread in NSW, but most common in the southern Murray-Darling Basin area. Birds disperse during the breeding season to deep swamps up to 300 km away. It is generally only during summer or in drier years that they are seen in coastal areas. The Blue-billed Duck prefers deep water in large permanent wetlands and swamps with dense aquatic vegetation. The species is completely aquatic, swimming low in the water along the edge of dense cover. It will fly if disturbed, but prefers to dive if approached.	Nil	No suitable habitat within the Subject Site. No records within the locality.
Blue-billed Duck						Not recorded during site assessment.
<i>Petroica boodang</i>	V,P		1	The Scarlet Robin is found from south east Queensland to south east South Australia and also in Tasmania and south west Western Australia. In NSW, it occurs from the coast to the inland slopes. After breeding, some Scarlet Robins disperse to the lower valleys and plains of the tablelands and slopes. Some birds may appear as far west as the eastern edges of the inland plains in autumn and winter. The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. This species lives in both mature and regrowth vegetation. It occasionally occurs in mallee or wet forest communities, or in wetlands and tea-tree swamps. Scarlet Robin habitat usually contains abundant logs and fallen timber: these are important components of its habitat. The Scarlet Robin breeds on ridges, hills and foothills of the western slopes, the Great Dividing Range and eastern coastal regions; this species is occasionally found up to 1000 metres in altitude.	Nil	No suitable habitat within the Subject Site. No records within the locality.
Scarlet Robin						Not recorded during site assessment.
<i>Pandion cristatus</i>	V,P,3	-	2	Favour coastal areas, especially the mouths of large rivers, lagoons and lakes. Feed on fish over clear, open water. Breed from July to September in NSW. Nests are made high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea.	Low	No suitable nesting habitat within the Subject Site. Records within the locality.

Species	Status		Bionet Records	Habitat	LoO	Summary
	BC	EPBC				
Eastern Osprey						Not recorded during site assessment.
<i>Pomatostomus temporalis temporalis</i> Grey-crowned Babbler (eastern subspecies)	V,P	-	31	The Grey-crowned Babbler has two distinctive subspecies that intergrade to the south of the Gulf of Carpentaria. West of here the subspecies rubeculus, formerly considered a separate species (Red-breasted Babbler) is still widespread and common. The eastern subspecies (temporalis occurs from Cape York south through Queensland, NSW and Victoria and formerly to the south east of South Australia. Inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains. Woodlands on fertile soils in coastal regions.	Present	Suitable habitat within the Subject Site. Detected during site assessment.
<i>Rostratula australis</i> Australian Painted Snipe	E1,P	E	1	Normally found in permanent or ephemeral shallow inland wetlands, either freshwater or brackish. The species nests on the ground amongst tall reed-like vegetation near water. Habitat for the species includes the fringes of swamps, dams and nearby marshy areas with cover of grasses, lignum, low scrub or open timber.	Nil	No suitable habitat within the Subject Site. No records within the locality. Not recorded during site assessment.
<i>Sternula albifrons</i> Little Tern	E1,P	C,J,K	1	Migrating from eastern Asia, the Little Tern is found on the north, east and south-east Australian coasts, from Shark Bay in Western Australia to the Gulf of St Vincent in South Australia. In NSW, it arrives from September to November, occurring mainly north of Sydney, with smaller numbers found south to Victoria. It breeds in spring and summer along the entire east coast from Tasmania to northern Queensland, and is seen until May, with only occasional birds seen in winter months. Almost exclusively coastal, preferring sheltered environments; however may occur several kilometres from the sea in harbours, inlets and rivers (with occasional offshore islands or coral cay records).	Nil	No suitable habitat within the Subject Site. No records within the locality. Not recorded during site assessment.
<i>Stictonetta naevosa</i>	V,P		14	The Freckled Duck is found primarily in south-eastern and south-western Australia, occurring as a vagrant elsewhere. It breeds in large temporary swamps created by floods in the Bulloo and Lake Eyre basins and the Murray-Darling system, particularly along the Paroo and Lachlan Rivers, and other rivers within the Riverina. The duck is forced to disperse during extensive	Nil	No suitable habitat within the Subject Site. No records within the locality.

Species	Status		Bionet Records	Habitat	LoO	Summary
	BC	EPBC				
Freckled Duck				inland droughts when wetlands in the Murray River basin provide important habitat. The species may also occur as far as coastal NSW and Victoria during such times. Prefer permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum or Tea-tree. During drier times they move from ephemeral breeding swamps to more permanent waters such as lakes, reservoirs, farm dams and sewage ponds.		Not recorded during site assessment.
<i>Tyto novaehollandiae</i>	V,P,3	-	2	Occurs across NSW except NW corner. Most common on the coast. Inhabits dry eucalypt woodlands from sea level to 1100 m. Roosts and breeds in large (>40cm) hollows and sometime caves in moist eucalypt forested gullies. Hunts along the edges of forests and roadsides. Home range between 500 ha and 1000 ha. Prey mostly terrestrial mammals but arboreal species may also be taken.	Low	Broadly suitable foraging habitat within the Subject Site. Few records within the locality.
Masked Owl						Not recorded during site assessment.
<i>Tyto tenebricosa</i>	V,P,3	-	1	Occurs in the coastal, escarpment and tablelands regions of NSW. More common in the north and absent from the western tablelands and further west. Inhabits tall, moist eucalypt forests and rainforests, and are strongly associated with sheltered gullies, particularly those with tall rainforest understorey. Roosts in tree hollows, amongst dense foliage in gullies or in caves, recesses or ledges of cliffs or banks. Nest in large (>40cm wide, 100cm deep) tree hollows in unlogged/unburnt gullies within 100m of streams or in caves.	Nil	No suitable habitat within Subject Site. Not recorded during site assessment.
Sooty Owl						
<i>Chalinolobus dwyeri</i>	V,P	V	2	The species occurs from the coast to the western slopes of the divide. The largest numbers of records are from sandstone escarpment country in the Sydney Basin and Hunter Valley. The species roosts in caves and mines and	Present	Suitable foraging habitat present. No breeding habitat

Species	Status		Bionet Records	Habitat	LoO	Summary
	BC	EPBC				
Large-eared Pied Bat				most commonly recorded from dry sclerophyll forests and woodlands. In southern Sydney appears to be largely restricted to the interface between sandstone escarpments and fertile valleys.		Recorded during site assessment (Anabat)
<i>Falsistrellus tasmaniensis</i> Eastern False Pipistrelle	V,P	-	17	The species occurs on southeast coast and ranges. Prefers tall (>20m) and wet forest with dense understorey. Absent from small remnants, preferring continuous forest but can move through cleared landscapes and may forage in open areas. Roosts include hollow trunks of Eucalypts, underneath bark or in buildings. Forages in gaps and spaces within forest, with large foraging range (12km foraging movements recorded).	Low	Foraging habitat only. No breeding habitat. Not recorded during site assessment.
<i>Micronomus norfolkensis</i> Eastern Coastal Free-tailed Bat	V,P	-	29	The Eastern Freetail-bat is found along the east coast from south Queensland to southern NSW. Occur in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roost mainly in tree hollows but will also roost under bark or in man-made structures.	Present	Suitable foraging habitat present. No breeding habitat Recorded during site assessment (Anabat)
<i>Miniopterus australis</i> Little Bent-winged Bat	V,P	-	60	East coast and ranges of Australia from Cape York in Queensland to Wollongong in NSW. Moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and banksia scrub. Generally found in well-timbered areas. Little Bentwing-bats roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats.	Present	Suitable foraging habitat present. No breeding habitat Recorded during site assessment (Anabat)
<i>Miniopterus orianae oceanensis</i>	V,P	-	35	Eastern Bentwing-bats occur along the east and north-west coasts of Australia. Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures.	Moderate	Foraging habitat only. No breeding habitat.

Species	Status		Bionet Records	Habitat	LoO	Summary
	BC	EPBC				
Large Bent-winged Bat						Not recorded during site assessment.
<i>Myotis macropus</i>	V,P	-	24	The Southern Myotis is found in the coastal band from the north-west of Australia, across the top-end and south to western Victoria. It is rarely found more than 100 km inland, except along major rivers. Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. Forage over streams and pools catching insects and small fish by raking their feet across the water surface.	Present	Suitable habitat present. Recorded during site assessment (Anabat).
Southern Myotis						
<i>Petaurus norfolcensis</i>	V,P	0	17	The species is widely though sparsely distributed in eastern Australia, from northern Queensland to western Victoria. Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas. Prefers mixed species stands with a shrub or Acacia midstorey.	Present	Suitable habitat present. Recorded during site assessment (Remote Camera).
Squirrel Glider						
<i>Phascolarctos cinereus</i>	E2,V,P	V	2	Fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. In NSW it mainly occurs on the central and north coasts with some populations in the west of the Great Dividing Range. Inhabit eucalypt woodlands and forests feeding on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species.	Low	Broadly suitable habitat within the Subject Site. Few records within the locality. Not recorded during site assessment.
Koala						
<i>Pteropus poliocephalus</i>	V,P	V	70	Generally this species is found within 200 km of the eastern coast of Australia, from Rockhampton in Queensland to Adelaide in South Australia. Inhabit subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.	Moderate	Broadly suitable foraging habitat within the Subject Site. No roosts present. Not recorded during site assessment.
Grey-headed Flying-fox						
<i>Saccolaimus flaviventris</i>	V,P	-	4	Migrates from tropics to SE Aus in summer. Forages across a range of habitats including those with and without trees, from wet and dry sclerophyll forest, open woodland, Acacia shrubland, mallee, grasslands and desert. Seasonal movements are unknown.	Low	Foraging habitat only. No breeding habitat. Not recorded during site assessment.
Yellow-bellied Sheath-tail-bat						

Species	Status		Bionet Records	Habitat	LoO	Summary
	BC	EPBC				
<i>Scoteanax rueppellii</i> Greater Broad-nosed Bat	V,P	-	13	The species is found mainly in the gullies and river systems that drain the Great Dividing Range, from north-eastern Victoria to the Atherton Tableland. It extends to the coast over much of its range. In NSW it is widespread on the New England Tablelands, however does not occur at altitudes above 500 m. Inhabits a variety of habitats from woodland to wet and dry sclerophyll forests and rainforest, also remnant paddock trees and timber-lined creeks.	Low	Foraging habitat only. No breeding habitat. Not recorded during site assessment.
<i>Vespadelus troughtoni</i> Eastern Cave Bat	V,P	-	11	Very little is known about the biology of this uncommon species. A cave-roosting species that is usually found in dry open forest and woodland, near cliffs or rocky overhangs; has been recorded roosting in disused mine workings, occasionally in colonies of up to 500 individuals. Occasionally found along cliff-lines in wet eucalypt forest and rainforest.	Low	Broadly suitable foraging habitat within the Subject Site. One record within the locality. Not recorded during site assessment.
<i>Litoria aurea</i> Green and Golden Bell Frog	E1,P	V	4	Large populations in NSW are located around the metropolitan areas of Sydney, Shoalhaven and mid north coast (one an island population). There is only one known population on the NSW Southern Tablelands. Inhabits marshes, dams and stream-sides, particularly those containing bullrushes (<i>Typha</i> spp.) or spikerushes (<i>Eleocharis</i> spp.). Optimum habitat includes water-bodies that are unshaded, free of predatory fish such as Plague Minnow (<i>Gambusia holbrooki</i>), have a grassy area nearby and diurnal sheltering sites available.	Low	No suitable habitat within the Subject Site. No records within the locality. Not recorded during site assessment.
<i>Caretta caretta</i> Loggerhead Turtle	E1,P	E	1	Large sea turtle to 1.5 m in length with an elongated heart-shaped shell. The species is found in tropical and temperate waters off the Australian coast.	Nil	No suitable habitat within the Subject Site. No records within the locality. Not recorded during site assessment.

Appendix B – Predicted and Candidate Species Reports



Proposal Details

Assessment Id 00030538/BAAS18041/22/00030542	Proposal Name 442 Louth Park Road	BAM data last updated * 14/03/2024
Assessor Name Gilbert Whyte	Report Created 17/06/2024	BAM Data version * 67
Assessor Number BAAS18041	Assessment Type Part 4 Developments (General)	BAM Case Status Finalised
Assessment Revision 2	BOS entry trigger BOS Threshold: Area clearing threshold	Date Finalised 17/06/2024

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name	Vegetation Types(s)
Black Falcon	Falco subniger	1598-Forest Red Gum grassy open forest on floodplains of the lower Hunter
Black-chinned Honeyeater (eastern subspecies)	Melithreptus gularis gularis	1600-Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter
Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	1598-Forest Red Gum grassy open forest on floodplains of the lower Hunter 1600-Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter
Diamond Firetail	Stagonopleura guttata	1600-Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter
Eastern Coastal Free-tailed Bat	Micronomus norfolkensis	1600-Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter
Eastern False Pipistrelle	Falsistrellus tasmaniensis	1600-Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter
Gang-gang Cockatoo	Callocephalon fimbriatum	1600-Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter
Greater Broad-nosed Bat	Scoteanax rueppellii	1600-Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter

BAM Predicted Species Report

Grey-crowned Babbler (eastern subspecies)	<i>Pomatostomus temporalis temporalis</i>	1600-Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	1600-Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter
Large Bent-winged Bat	<i>Miniopterus orianae oceanensis</i>	1600-Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter
Little Bent-winged Bat	<i>Miniopterus australis</i>	1600-Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter
Little Eagle	<i>Hieraetus morphnoides</i>	1600-Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter
Little Lorikeet	<i>Glossopsitta pusilla</i>	1598-Forest Red Gum grassy open forest on floodplains of the lower Hunter
		1600-Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter
Regent Honeyeater	<i>Anthochaera phrygia</i>	1600-Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter
Scarlet Robin	<i>Petroica boodang</i>	1598-Forest Red Gum grassy open forest on floodplains of the lower Hunter
		1600-Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter
South-eastern Glossy Black-Cockatoo	<i>Calyptorhynchus lathami lathami</i>	1600-Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter
South-eastern Hooded Robin	<i>Melanodryas cucullata cucullata</i>	1598-Forest Red Gum grassy open forest on floodplains of the lower Hunter
		1600-Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter
Speckled Warbler	<i>Chthonicola sagittata</i>	1598-Forest Red Gum grassy open forest on floodplains of the lower Hunter
		1600-Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter
Spotted-tailed Quoll	<i>Dasyurus maculatus</i>	1598-Forest Red Gum grassy open forest on floodplains of the lower Hunter
		1600-Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter
Square-tailed Kite	<i>Lophoictinia isura</i>	1600-Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter
Swift Parrot	<i>Lathamus discolor</i>	1598-Forest Red Gum grassy open forest on floodplains of the lower Hunter

BAM Predicted Species Report

Swift Parrot	<i>Lathamus discolor</i>	1600-Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter
Turquoise Parrot	<i>Neophema pulchella</i>	1600-Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter
Varied Sittella	<i>Daphoenositta chrysoptera</i>	1598-Forest Red Gum grassy open forest on floodplains of the lower Hunter
		1600-Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	1598-Forest Red Gum grassy open forest on floodplains of the lower Hunter
		1600-Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter
White-throated Needle-tail	<i>Hirundapus caudacutus</i>	1598-Forest Red Gum grassy open forest on floodplains of the lower Hunter
		1600-Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter
Yellow-bellied Glider	<i>Petaurus australis</i>	1600-Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter
Yellow-bellied Sheath-tail-bat	<i>Saccolaimus flaviventris</i>	1600-Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter

Threatened species Manually Added

None added

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Common Name	Scientific Name	Plant Community Type(s)
Painted Honeyeater	<i>Grantiella picta</i>	1600-Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C
Painted Honeyeater	<i>Grantiella picta</i>	Refer to BAR

Proposal Details

Assessment Id 00030538/BAAS18041/22/00030542	Proposal Name 442 Louth Park Road	BAM data last updated * 14/03/2024
Assessor Name Gilbert Whyte	Report Created 17/06/2024	BAM Data version * 67
Assessor Number BAAS18041	Assessment Type Part 4 Developments (General)	BAM Case Status Finalised
Assessment Revision 2	Date Finalised 17/06/2024	BOS entry trigger BOS Threshold: Area clearing threshold

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List of Species Requiring Survey

Name	Presence	Survey Months
<i>Acacia bynoeana</i> Bynoe's Wattle	No (surveyed)	<input checked="" type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input checked="" type="checkbox"/> Aug <input type="checkbox"/> Sep <input checked="" type="checkbox"/> Oct <input type="checkbox"/> Nov <input type="checkbox"/> Dec <input type="checkbox"/> Survey month outside the specified months?
<i>Burhinus grallarius</i> Bush Stone-curlew	No (surveyed)	<input checked="" type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input checked="" type="checkbox"/> Aug <input type="checkbox"/> Sep <input checked="" type="checkbox"/> Oct <input type="checkbox"/> Nov <input type="checkbox"/> Dec <input type="checkbox"/> Survey month outside the specified months?
<i>Callistemon linearifolius</i> Netted Bottle Brush	No (surveyed)	<input checked="" type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug <input type="checkbox"/> Sep <input checked="" type="checkbox"/> Oct <input type="checkbox"/> Nov <input type="checkbox"/> Dec <input type="checkbox"/> Survey month outside the specified months?

BAM Candidate Species Report

<p><i>Callocephalon fimbriatum</i> Gang-gang Cockatoo</p>	<p>No (surveyed)</p>	<p> <input checked="" type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug <input type="checkbox"/> Sep <input type="checkbox"/> Oct <input type="checkbox"/> Nov <input type="checkbox"/> Dec </p> <p><input type="checkbox"/> Survey month outside the specified months?</p>
<p><i>Calyptorhynchus lathami lathami</i> South-eastern Glossy Black-Cockatoo</p>	<p>No (surveyed)</p>	<p> <input type="checkbox"/> Jan <input type="checkbox"/> Feb <input checked="" type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug <input type="checkbox"/> Sep <input type="checkbox"/> Oct <input type="checkbox"/> Nov <input type="checkbox"/> Dec </p> <p><input type="checkbox"/> Survey month outside the specified months?</p>
<p><i>Cercartetus nanus</i> Eastern Pygmy-possum</p>	<p>No (surveyed)</p>	<p> <input type="checkbox"/> Jan <input type="checkbox"/> Feb <input checked="" type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug <input type="checkbox"/> Sep <input type="checkbox"/> Oct <input type="checkbox"/> Nov <input type="checkbox"/> Dec </p> <p><input type="checkbox"/> Survey month outside the specified months?</p>
<p><i>Cynanchum elegans</i> White-flowered Wax Plant</p>	<p>No (surveyed)</p>	<p> <input checked="" type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input checked="" type="checkbox"/> Aug <input type="checkbox"/> Sep <input checked="" type="checkbox"/> Oct <input type="checkbox"/> Nov <input type="checkbox"/> Dec </p> <p><input type="checkbox"/> Survey month outside the specified months?</p>
<p><i>Delma impar</i> Striped Legless Lizard</p>	<p>No (surveyed)</p>	<p> <input type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug <input type="checkbox"/> Sep <input checked="" type="checkbox"/> Oct <input type="checkbox"/> Nov <input type="checkbox"/> Dec </p> <p><input type="checkbox"/> Survey month outside the specified months?</p>
<p><i>Diuris praecox</i> Rough Doubletail</p>	<p>No (surveyed)</p>	<p> <input type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input checked="" type="checkbox"/> Aug <input type="checkbox"/> Sep <input type="checkbox"/> Oct <input type="checkbox"/> Nov <input type="checkbox"/> Dec </p> <p><input type="checkbox"/> Survey month outside the specified months?</p>

BAM Candidate Species Report

<p><i>Diuris tricolor</i> Pine Donkey Orchid</p>	<p>No (surveyed) *Survey months are outside of the months specified in Bionet.</p>	<table border="1"> <tr> <td><input type="checkbox"/> Jan</td> <td><input type="checkbox"/> Feb</td> <td><input type="checkbox"/> Mar</td> <td><input type="checkbox"/> Apr</td> </tr> <tr> <td><input type="checkbox"/> May</td> <td><input type="checkbox"/> Jun</td> <td><input type="checkbox"/> Jul</td> <td><input type="checkbox"/> Aug</td> </tr> <tr> <td><input type="checkbox"/> Sep</td> <td><input checked="" type="checkbox"/> Oct</td> <td><input type="checkbox"/> Nov</td> <td><input type="checkbox"/> Dec</td> </tr> </table> <p><input checked="" type="checkbox"/> Survey month outside the specified months?</p>	<input type="checkbox"/> Jan	<input type="checkbox"/> Feb	<input type="checkbox"/> Mar	<input type="checkbox"/> Apr	<input type="checkbox"/> May	<input type="checkbox"/> Jun	<input type="checkbox"/> Jul	<input type="checkbox"/> Aug	<input type="checkbox"/> Sep	<input checked="" type="checkbox"/> Oct	<input type="checkbox"/> Nov	<input type="checkbox"/> Dec
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<p><i>Eucalyptus castrensis</i> Singleton Mallee</p>	<p>No (surveyed)</p>	<table border="1"> <tr> <td><input checked="" type="checkbox"/> Jan</td> <td><input type="checkbox"/> Feb</td> <td><input type="checkbox"/> Mar</td> <td><input type="checkbox"/> Apr</td> </tr> <tr> <td><input type="checkbox"/> May</td> <td><input type="checkbox"/> Jun</td> <td><input type="checkbox"/> Jul</td> <td><input checked="" type="checkbox"/> Aug</td> </tr> <tr> <td><input type="checkbox"/> Sep</td> <td><input checked="" type="checkbox"/> Oct</td> <td><input type="checkbox"/> Nov</td> <td><input type="checkbox"/> Dec</td> </tr> </table> <p><input type="checkbox"/> Survey month outside the specified months?</p>	<input checked="" type="checkbox"/> Jan	<input type="checkbox"/> Feb	<input type="checkbox"/> Mar	<input type="checkbox"/> Apr	<input type="checkbox"/> May	<input type="checkbox"/> Jun	<input type="checkbox"/> Jul	<input checked="" type="checkbox"/> Aug	<input type="checkbox"/> Sep	<input checked="" type="checkbox"/> Oct	<input type="checkbox"/> Nov	<input type="checkbox"/> Dec
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<p><i>Eucalyptus glaucina</i> Slaty Red Gum</p>	<p>No (surveyed)</p>	<table border="1"> <tr> <td><input checked="" type="checkbox"/> Jan</td> <td><input type="checkbox"/> Feb</td> <td><input type="checkbox"/> Mar</td> <td><input type="checkbox"/> Apr</td> </tr> <tr> <td><input type="checkbox"/> May</td> <td><input type="checkbox"/> Jun</td> <td><input type="checkbox"/> Jul</td> <td><input checked="" type="checkbox"/> Aug</td> </tr> <tr> <td><input type="checkbox"/> Sep</td> <td><input checked="" type="checkbox"/> Oct</td> <td><input type="checkbox"/> Nov</td> <td><input type="checkbox"/> Dec</td> </tr> </table> <p><input type="checkbox"/> Survey month outside the specified months?</p>	<input checked="" type="checkbox"/> Jan	<input type="checkbox"/> Feb	<input type="checkbox"/> Mar	<input type="checkbox"/> Apr	<input type="checkbox"/> May	<input type="checkbox"/> Jun	<input type="checkbox"/> Jul	<input checked="" type="checkbox"/> Aug	<input type="checkbox"/> Sep	<input checked="" type="checkbox"/> Oct	<input type="checkbox"/> Nov	<input type="checkbox"/> Dec
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<p><i>Eucalyptus parramattensis subsp. decadens</i> Eucalyptus parramattensis subsp. decadens</p>	<p>No (surveyed)</p>	<table border="1"> <tr> <td><input checked="" type="checkbox"/> Jan</td> <td><input type="checkbox"/> Feb</td> <td><input type="checkbox"/> Mar</td> <td><input type="checkbox"/> Apr</td> </tr> <tr> <td><input type="checkbox"/> May</td> <td><input type="checkbox"/> Jun</td> <td><input type="checkbox"/> Jul</td> <td><input checked="" type="checkbox"/> Aug</td> </tr> <tr> <td><input type="checkbox"/> Sep</td> <td><input checked="" type="checkbox"/> Oct</td> <td><input type="checkbox"/> Nov</td> <td><input type="checkbox"/> Dec</td> </tr> </table> <p><input type="checkbox"/> Survey month outside the specified months?</p>	<input checked="" type="checkbox"/> Jan	<input type="checkbox"/> Feb	<input type="checkbox"/> Mar	<input type="checkbox"/> Apr	<input type="checkbox"/> May	<input type="checkbox"/> Jun	<input type="checkbox"/> Jul	<input checked="" type="checkbox"/> Aug	<input type="checkbox"/> Sep	<input checked="" type="checkbox"/> Oct	<input type="checkbox"/> Nov	<input type="checkbox"/> Dec
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<p><i>Eucalyptus pumila</i> Pokolbin Mallee</p>	<p>No (surveyed)</p>	<table border="1"> <tr> <td><input checked="" type="checkbox"/> Jan</td> <td><input type="checkbox"/> Feb</td> <td><input type="checkbox"/> Mar</td> <td><input type="checkbox"/> Apr</td> </tr> <tr> <td><input type="checkbox"/> May</td> <td><input type="checkbox"/> Jun</td> <td><input type="checkbox"/> Jul</td> <td><input checked="" type="checkbox"/> Aug</td> </tr> <tr> <td><input type="checkbox"/> Sep</td> <td><input checked="" type="checkbox"/> Oct</td> <td><input type="checkbox"/> Nov</td> <td><input type="checkbox"/> Dec</td> </tr> </table> <p><input type="checkbox"/> Survey month outside the specified months?</p>	<input checked="" type="checkbox"/> Jan	<input type="checkbox"/> Feb	<input type="checkbox"/> Mar	<input type="checkbox"/> Apr	<input type="checkbox"/> May	<input type="checkbox"/> Jun	<input type="checkbox"/> Jul	<input checked="" type="checkbox"/> Aug	<input type="checkbox"/> Sep	<input checked="" type="checkbox"/> Oct	<input type="checkbox"/> Nov	<input type="checkbox"/> Dec
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<p><i>Grevillea parviflora subsp. parviflora</i> Small-flower Grevillea</p>	<p>No (surveyed) *Survey months are outside of the months specified in Bionet.</p>	<table border="1"> <tr> <td><input type="checkbox"/> Jan</td> <td><input type="checkbox"/> Feb</td> <td><input type="checkbox"/> Mar</td> <td><input type="checkbox"/> Apr</td> </tr> <tr> <td><input type="checkbox"/> May</td> <td><input type="checkbox"/> Jun</td> <td><input type="checkbox"/> Jul</td> <td><input checked="" type="checkbox"/> Aug</td> </tr> <tr> <td><input type="checkbox"/> Sep</td> <td><input checked="" type="checkbox"/> Oct</td> <td><input type="checkbox"/> Nov</td> <td><input type="checkbox"/> Dec</td> </tr> </table> <p><input checked="" type="checkbox"/> Survey month outside the specified months?</p>	<input type="checkbox"/> Jan	<input type="checkbox"/> Feb	<input type="checkbox"/> Mar	<input type="checkbox"/> Apr	<input type="checkbox"/> May	<input type="checkbox"/> Jun	<input type="checkbox"/> Jul	<input checked="" type="checkbox"/> Aug	<input type="checkbox"/> Sep	<input checked="" type="checkbox"/> Oct	<input type="checkbox"/> Nov	<input type="checkbox"/> Dec
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<p><i>Haliaeetus leucogaster</i> White-bellied Sea-Eagle</p>	<p>No (surveyed)</p>	<table border="1"> <tr> <td><input type="checkbox"/> Jan</td> <td><input type="checkbox"/> Feb</td> <td><input type="checkbox"/> Mar</td> <td><input type="checkbox"/> Apr</td> </tr> <tr> <td><input type="checkbox"/> May</td> <td><input type="checkbox"/> Jun</td> <td><input type="checkbox"/> Jul</td> <td><input type="checkbox"/> Aug</td> </tr> <tr> <td><input type="checkbox"/> Sep</td> <td><input checked="" type="checkbox"/> Oct</td> <td><input type="checkbox"/> Nov</td> <td><input type="checkbox"/> Dec</td> </tr> </table> <p><input type="checkbox"/> Survey month outside the specified months?</p>	<input type="checkbox"/> Jan	<input type="checkbox"/> Feb	<input type="checkbox"/> Mar	<input type="checkbox"/> Apr	<input type="checkbox"/> May	<input type="checkbox"/> Jun	<input type="checkbox"/> Jul	<input type="checkbox"/> Aug	<input type="checkbox"/> Sep	<input checked="" type="checkbox"/> Oct	<input type="checkbox"/> Nov	<input type="checkbox"/> Dec
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<p><i>Hieraetus morphnoides</i> Little Eagle</p>	<p>No (surveyed)</p>	<table border="1"> <tr> <td><input type="checkbox"/> Jan</td> <td><input type="checkbox"/> Feb</td> <td><input type="checkbox"/> Mar</td> <td><input type="checkbox"/> Apr</td> </tr> <tr> <td><input type="checkbox"/> May</td> <td><input type="checkbox"/> Jun</td> <td><input type="checkbox"/> Jul</td> <td><input type="checkbox"/> Aug</td> </tr> <tr> <td><input type="checkbox"/> Sep</td> <td><input checked="" type="checkbox"/> Oct</td> <td><input type="checkbox"/> Nov</td> <td><input type="checkbox"/> Dec</td> </tr> </table> <p><input type="checkbox"/> Survey month outside the specified months?</p>	<input type="checkbox"/> Jan	<input type="checkbox"/> Feb	<input type="checkbox"/> Mar	<input type="checkbox"/> Apr	<input type="checkbox"/> May	<input type="checkbox"/> Jun	<input type="checkbox"/> Jul	<input type="checkbox"/> Aug	<input type="checkbox"/> Sep	<input checked="" type="checkbox"/> Oct	<input type="checkbox"/> Nov	<input type="checkbox"/> Dec
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<p><i>Litoria aurea</i> Green and Golden Bell Frog</p>	<p>No (surveyed)</p>	<table border="1"> <tr> <td><input type="checkbox"/> Jan</td> <td><input type="checkbox"/> Feb</td> <td><input checked="" type="checkbox"/> Mar</td> <td><input type="checkbox"/> Apr</td> </tr> <tr> <td><input type="checkbox"/> May</td> <td><input type="checkbox"/> Jun</td> <td><input type="checkbox"/> Jul</td> <td><input type="checkbox"/> Aug</td> </tr> <tr> <td><input type="checkbox"/> Sep</td> <td><input type="checkbox"/> Oct</td> <td><input type="checkbox"/> Nov</td> <td><input type="checkbox"/> Dec</td> </tr> </table> <p><input type="checkbox"/> Survey month outside the specified months?</p>	<input type="checkbox"/> Jan	<input type="checkbox"/> Feb	<input checked="" type="checkbox"/> Mar	<input type="checkbox"/> Apr	<input type="checkbox"/> May	<input type="checkbox"/> Jun	<input type="checkbox"/> Jul	<input type="checkbox"/> Aug	<input type="checkbox"/> Sep	<input type="checkbox"/> Oct	<input type="checkbox"/> Nov	<input type="checkbox"/> Dec
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<p><i>Litoria brevipalmata</i> Green-thighed Frog</p>	<p>No (surveyed)</p>	<table border="1"> <tr> <td><input type="checkbox"/> Jan</td> <td><input type="checkbox"/> Feb</td> <td><input checked="" type="checkbox"/> Mar</td> <td><input type="checkbox"/> Apr</td> </tr> <tr> <td><input type="checkbox"/> May</td> <td><input type="checkbox"/> Jun</td> <td><input type="checkbox"/> Jul</td> <td><input type="checkbox"/> Aug</td> </tr> <tr> <td><input type="checkbox"/> Sep</td> <td><input type="checkbox"/> Oct</td> <td><input type="checkbox"/> Nov</td> <td><input type="checkbox"/> Dec</td> </tr> </table> <p><input type="checkbox"/> Survey month outside the specified months?</p>	<input type="checkbox"/> Jan	<input type="checkbox"/> Feb	<input checked="" type="checkbox"/> Mar	<input type="checkbox"/> Apr	<input type="checkbox"/> May	<input type="checkbox"/> Jun	<input type="checkbox"/> Jul	<input type="checkbox"/> Aug	<input type="checkbox"/> Sep	<input type="checkbox"/> Oct	<input type="checkbox"/> Nov	<input type="checkbox"/> Dec
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<p><i>Monotaxis macrophylla</i> Large-leafed Monotaxis</p>	<p>No (surveyed)</p>	<table border="1"> <tr> <td><input checked="" type="checkbox"/> Jan</td> <td><input type="checkbox"/> Feb</td> <td><input type="checkbox"/> Mar</td> <td><input type="checkbox"/> Apr</td> </tr> <tr> <td><input type="checkbox"/> May</td> <td><input type="checkbox"/> Jun</td> <td><input type="checkbox"/> Jul</td> <td><input checked="" type="checkbox"/> Aug</td> </tr> <tr> <td><input type="checkbox"/> Sep</td> <td><input checked="" type="checkbox"/> Oct</td> <td><input type="checkbox"/> Nov</td> <td><input type="checkbox"/> Dec</td> </tr> </table> <p><input type="checkbox"/> Survey month outside the specified months?</p>	<input checked="" type="checkbox"/> Jan	<input type="checkbox"/> Feb	<input type="checkbox"/> Mar	<input type="checkbox"/> Apr	<input type="checkbox"/> May	<input type="checkbox"/> Jun	<input type="checkbox"/> Jul	<input checked="" type="checkbox"/> Aug	<input type="checkbox"/> Sep	<input checked="" type="checkbox"/> Oct	<input type="checkbox"/> Nov	<input type="checkbox"/> Dec
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<p><i>Myotis macropus</i> Southern Myotis</p>	<p>Yes (surveyed)</p>	<table border="1"> <tr> <td><input type="checkbox"/> Jan</td> <td><input type="checkbox"/> Feb</td> <td><input checked="" type="checkbox"/> Mar</td> <td><input type="checkbox"/> Apr</td> </tr> <tr> <td><input type="checkbox"/> May</td> <td><input type="checkbox"/> Jun</td> <td><input type="checkbox"/> Jul</td> <td><input type="checkbox"/> Aug</td> </tr> <tr> <td><input type="checkbox"/> Sep</td> <td><input type="checkbox"/> Oct</td> <td><input type="checkbox"/> Nov</td> <td><input type="checkbox"/> Dec</td> </tr> </table> <p><input type="checkbox"/> Survey month outside the specified months?</p>	<input type="checkbox"/> Jan	<input type="checkbox"/> Feb	<input checked="" type="checkbox"/> Mar	<input type="checkbox"/> Apr	<input type="checkbox"/> May	<input type="checkbox"/> Jun	<input type="checkbox"/> Jul	<input type="checkbox"/> Aug	<input type="checkbox"/> Sep	<input type="checkbox"/> Oct	<input type="checkbox"/> Nov	<input type="checkbox"/> Dec
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<p><i>Ozothamnus tessellatus</i> Ozothamnus tessellatus</p>	<p>No (surveyed) *Survey months are outside of the months specified in Bionet.</p>	<table border="1"> <tr> <td><input type="checkbox"/> Jan</td> <td><input type="checkbox"/> Feb</td> <td><input type="checkbox"/> Mar</td> <td><input type="checkbox"/> Apr</td> </tr> <tr> <td><input type="checkbox"/> May</td> <td><input type="checkbox"/> Jun</td> <td><input type="checkbox"/> Jul</td> <td><input type="checkbox"/> Aug</td> </tr> <tr> <td><input type="checkbox"/> Sep</td> <td><input checked="" type="checkbox"/> Oct</td> <td><input type="checkbox"/> Nov</td> <td><input type="checkbox"/> Dec</td> </tr> </table> <p><input checked="" type="checkbox"/> Survey month outside the specified months?</p>	<input type="checkbox"/> Jan	<input type="checkbox"/> Feb	<input type="checkbox"/> Mar	<input type="checkbox"/> Apr	<input type="checkbox"/> May	<input type="checkbox"/> Jun	<input type="checkbox"/> Jul	<input type="checkbox"/> Aug	<input type="checkbox"/> Sep	<input checked="" type="checkbox"/> Oct	<input type="checkbox"/> Nov	<input type="checkbox"/> Dec
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<p><i>Petauroides volans</i> Southern Greater Glider</p>	<p>No (surveyed)</p>	<table border="1"> <tr> <td><input type="checkbox"/> Jan</td> <td><input type="checkbox"/> Feb</td> <td><input checked="" type="checkbox"/> Mar</td> <td><input type="checkbox"/> Apr</td> </tr> <tr> <td><input type="checkbox"/> May</td> <td><input type="checkbox"/> Jun</td> <td><input type="checkbox"/> Jul</td> <td><input type="checkbox"/> Aug</td> </tr> <tr> <td><input type="checkbox"/> Sep</td> <td><input type="checkbox"/> Oct</td> <td><input type="checkbox"/> Nov</td> <td><input type="checkbox"/> Dec</td> </tr> </table> <p><input type="checkbox"/> Survey month outside the specified months?</p>	<input type="checkbox"/> Jan	<input type="checkbox"/> Feb	<input checked="" type="checkbox"/> Mar	<input type="checkbox"/> Apr	<input type="checkbox"/> May	<input type="checkbox"/> Jun	<input type="checkbox"/> Jul	<input type="checkbox"/> Aug	<input type="checkbox"/> Sep	<input type="checkbox"/> Oct	<input type="checkbox"/> Nov	<input type="checkbox"/> Dec
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<p><i>Petaurus norfolcensis</i> Squirrel Glider</p>	<p>Yes (surveyed)</p>	<table border="1"> <tr> <td><input type="checkbox"/> Jan</td> <td><input type="checkbox"/> Feb</td> <td><input checked="" type="checkbox"/> Mar</td> <td><input type="checkbox"/> Apr</td> </tr> <tr> <td><input type="checkbox"/> May</td> <td><input type="checkbox"/> Jun</td> <td><input type="checkbox"/> Jul</td> <td><input type="checkbox"/> Aug</td> </tr> <tr> <td><input type="checkbox"/> Sep</td> <td><input type="checkbox"/> Oct</td> <td><input type="checkbox"/> Nov</td> <td><input type="checkbox"/> Dec</td> </tr> </table> <p><input type="checkbox"/> Survey month outside the specified months?</p>	<input type="checkbox"/> Jan	<input type="checkbox"/> Feb	<input checked="" type="checkbox"/> Mar	<input type="checkbox"/> Apr	<input type="checkbox"/> May	<input type="checkbox"/> Jun	<input type="checkbox"/> Jul	<input type="checkbox"/> Aug	<input type="checkbox"/> Sep	<input type="checkbox"/> Oct	<input type="checkbox"/> Nov	<input type="checkbox"/> Dec
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<p><i>Phascogale tapoatafa</i> Brush-tailed Phascogale</p>	<p>No (surveyed)</p>	<table border="1"> <tr> <td><input type="checkbox"/> Jan</td> <td><input type="checkbox"/> Feb</td> <td><input checked="" type="checkbox"/> Mar</td> <td><input type="checkbox"/> Apr</td> </tr> <tr> <td><input type="checkbox"/> May</td> <td><input type="checkbox"/> Jun</td> <td><input type="checkbox"/> Jul</td> <td><input type="checkbox"/> Aug</td> </tr> <tr> <td><input type="checkbox"/> Sep</td> <td><input type="checkbox"/> Oct</td> <td><input type="checkbox"/> Nov</td> <td><input type="checkbox"/> Dec</td> </tr> </table> <p><input type="checkbox"/> Survey month outside the specified months?</p>	<input type="checkbox"/> Jan	<input type="checkbox"/> Feb	<input checked="" type="checkbox"/> Mar	<input type="checkbox"/> Apr	<input type="checkbox"/> May	<input type="checkbox"/> Jun	<input type="checkbox"/> Jul	<input type="checkbox"/> Aug	<input type="checkbox"/> Sep	<input type="checkbox"/> Oct	<input type="checkbox"/> Nov	<input type="checkbox"/> Dec
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<p><i>Phascolarctos cinereus</i> Koala</p>	<p>No (surveyed)</p>	<table border="1"> <tr> <td><input checked="" type="checkbox"/> Jan</td> <td><input type="checkbox"/> Feb</td> <td><input checked="" type="checkbox"/> Mar</td> <td><input type="checkbox"/> Apr</td> </tr> <tr> <td><input type="checkbox"/> May</td> <td><input type="checkbox"/> Jun</td> <td><input type="checkbox"/> Jul</td> <td><input type="checkbox"/> Aug</td> </tr> <tr> <td><input type="checkbox"/> Sep</td> <td><input type="checkbox"/> Oct</td> <td><input type="checkbox"/> Nov</td> <td><input type="checkbox"/> Dec</td> </tr> </table> <p><input type="checkbox"/> Survey month outside the specified months?</p>	<input checked="" type="checkbox"/> Jan	<input type="checkbox"/> Feb	<input checked="" type="checkbox"/> Mar	<input type="checkbox"/> Apr	<input type="checkbox"/> May	<input type="checkbox"/> Jun	<input type="checkbox"/> Jul	<input type="checkbox"/> Aug	<input type="checkbox"/> Sep	<input type="checkbox"/> Oct	<input type="checkbox"/> Nov	<input type="checkbox"/> Dec
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<p><i>Pomaderris queenslandica</i> Scant Pomaderris</p>	<p>No (surveyed)</p>	<table border="1"> <tr> <td><input checked="" type="checkbox"/> Jan</td> <td><input type="checkbox"/> Feb</td> <td><input type="checkbox"/> Mar</td> <td><input type="checkbox"/> Apr</td> </tr> <tr> <td><input type="checkbox"/> May</td> <td><input type="checkbox"/> Jun</td> <td><input type="checkbox"/> Jul</td> <td><input checked="" type="checkbox"/> Aug</td> </tr> <tr> <td><input type="checkbox"/> Sep</td> <td><input checked="" type="checkbox"/> Oct</td> <td><input type="checkbox"/> Nov</td> <td><input type="checkbox"/> Dec</td> </tr> </table> <p><input type="checkbox"/> Survey month outside the specified months?</p>	<input checked="" type="checkbox"/> Jan	<input type="checkbox"/> Feb	<input type="checkbox"/> Mar	<input type="checkbox"/> Apr	<input type="checkbox"/> May	<input type="checkbox"/> Jun	<input type="checkbox"/> Jul	<input checked="" type="checkbox"/> Aug	<input type="checkbox"/> Sep	<input checked="" type="checkbox"/> Oct	<input type="checkbox"/> Nov	<input type="checkbox"/> Dec
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<input type="checkbox"/> Sep	<input checked="" type="checkbox"/> Oct	<input type="checkbox"/> Nov	<input type="checkbox"/> Dec											

BAM Candidate Species Report

<p><i>Prostanthera cineolifera</i> Singleton Mint Bush</p>	<p>No (surveyed) *Survey months are outside of the months specified in Bionet.</p>	<p> <input type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug <input type="checkbox"/> Sep <input checked="" type="checkbox"/> Oct <input type="checkbox"/> Nov <input type="checkbox"/> Dec <input checked="" type="checkbox"/> Survey month outside the specified months? </p>
<p><i>Pterostylis chaetophora</i> Pterostylis chaetophora</p>	<p>No (surveyed) *Survey months are outside of the months specified in Bionet.</p>	<p> <input type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input type="checkbox"/> Aug <input type="checkbox"/> Sep <input checked="" type="checkbox"/> Oct <input type="checkbox"/> Nov <input type="checkbox"/> Dec <input checked="" type="checkbox"/> Survey month outside the specified months? </p>
<p><i>Rutidosia heterogama</i> Heath Wrinklewort</p>	<p>No (surveyed)</p>	<p> <input checked="" type="checkbox"/> Jan <input type="checkbox"/> Feb <input type="checkbox"/> Mar <input type="checkbox"/> Apr <input type="checkbox"/> May <input type="checkbox"/> Jun <input type="checkbox"/> Jul <input checked="" type="checkbox"/> Aug <input type="checkbox"/> Sep <input checked="" type="checkbox"/> Oct <input type="checkbox"/> Nov <input type="checkbox"/> Dec <input type="checkbox"/> Survey month outside the specified months? </p>

Threatened species Manually Added

Common Name	Scientific Name
Squirrel Glider	Petaurus norfolcensis

Threatened species assessed as not on site

Refer to BAR for detailed justification

Common name	Scientific name	Justification in the BAM-C
Austral Toadflax	Thesium australe	Habitat degraded Species is vagrant
Barking Owl	Ninox connivens	Refer to BAR
Brush-tailed Rock-wallaby	Petrogale penicillata	Refer to BAR
Common Planigale	Planigale maculata	Species is vagrant
Eastern Cave Bat	Vespadelus troughtoni	Habitat constraints
Grey-headed Flying-fox	Pteropus poliocephalus	Habitat constraints
Large Bent-winged Bat	Miniopterus orianae oceanensis	Habitat constraints
Large-eared Pied Bat	Chalinolobus dwyeri	Habitat constraints

BAM Candidate Species Report

Leafless Tongue Orchid	<i>Cryptostylis hunteriana</i>	Species is vagrant
Little Bent-winged Bat	<i>Miniopterus australis</i>	Habitat constraints
Masked Owl	<i>Tyto novaehollandiae</i>	Refer to BAR
North Rothbury Persoonia	<i>Persoonia pauciflora</i>	Refer to BAR
Pale-headed Snake	<i>Hoplocephalus bitorquatus</i>	Species is vagrant
Pink-tailed Legless Lizard	<i>Aprasia parapulchella</i>	Geographic limitations
Powerful Owl	<i>Ninox strenua</i>	Refer to BAR
Regent Honeyeater	<i>Anthochaera phrygia</i>	Refer to BAR
Square-tailed Kite	<i>Lophoictinia isura</i>	Habitat constraints
Swift Parrot	<i>Lathamus discolor</i>	Refer to BAR

Appendix C – Biodiversity Credit Reports



Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00030538/BAAS18041/22/00030542	442 Louth Park Road	14/03/2024
Assessor Name	Report Created	BAM Data version *
Gilbert Whyte	17/06/2024	67
Assessor Number	BAM Case Status	Date Finalised
BAAS18041	Finalised	17/06/2024
Assessment Revision	Assessment Type	BOS entry trigger
2	Part 4 Developments (General)	BOS Threshold: Area clearing threshold

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Zone	Vegetation zone name	TEC name	Current Vegetation integrity score	Change in Vegetation integrity (loss / gain)	Area (ha)	Sensitivity to loss (Justification)	Species sensitivity to gain class	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAI	Ecosystem credits
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Forest Red Gum grassy open forest on floodplains of the lower Hunter

1	1598_Mod	Hunter Lowland Redgum Forest in the Sydney Basin and New South Wales North Coast Bioregions	62.1	62.1	0.37	PCT Cleared - 0%	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00		11
										Subtotal	11	
Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter												
2	1600_Low	Not a TEC	11.9	11.9	3.1	PCT Cleared - 71%	High Sensitivity to Gain			2.00		0
										Subtotal	0	

Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter											
3	1600_Mod	Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions	65.8	65.8	4	PCT Cleared - 71%	High Sensitivity to Gain	Endangered Ecological Community	Not Listed	2.00	133
										Subtotal	133
										Total	144

Species credits for threatened species

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	Sensitivity to loss (Justification)	Sensitivity to gain (Justification)	BC Act Listing status	EPBC Act listing status	Potential SAIL	Species credits	
<i>Myotis macropus / Southern Myotis (Fauna)</i>										
1598_Mod	62.1	62.1	0.37			Vulnerable	Not Listed	False	11	
1600_Low	11.9	11.9	2.8			Vulnerable	Not Listed	False	17	
1600_Mod	65.8	65.8	3.5			Vulnerable	Not Listed	False	115	
									Subtotal	143
<i>Petaurus norfolcensis / Squirrel Glider (Fauna)</i>										
1598_Mod	62.1	62.1	0.37			Vulnerable	Not Listed	False	11	
1600_Mod	65.8	65.8	4			Vulnerable	Not Listed	False	133	
									Subtotal	144



BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00030538/BAAS18041/22/00030542	442 Louth Park Road	14/03/2024
Assessor Name	Assessor Number	BAM Data version *
Gilbert Whyte	BAAS18041	67
Proponent Names	Report Created	BAM Case Status
Tom Goold	17/06/2024	Finalised
Assessment Revision	Assessment Type	Date Finalised
2	Part 4 Developments (General)	17/06/2024
BOS entry trigger	* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.	
BOS Threshold: Area clearing threshold		

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Nil		
Species		
Nil		

Additional Information for Approval



BAM Biodiversity Credit Report (Like for like)

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
Grantiella picta / Painted Honeyeater

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)



BAM Biodiversity Credit Report (Like for like)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
1598-Forest Red Gum grassy open forest on floodplains of the lower Hunter	Hunter Lowland Redgum Forest in the Sydney Basin and New South Wales North Coast Bioregions	0.4	0	11	11
1600-Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter	Not a TEC	3.1	0	0	0
1600-Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter	Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions	4.0	0	133	133

1598-Forest Red Gum grassy open forest on floodplains of the lower Hunter	Like-for-like credit retirement options					
	Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
	Hunter Lowland Redgum Forest in the Sydney Basin and New South Wales North Coast Bioregions This includes PCT's: 1591, 1598, 1603, 1605, 1691, 1692, 1749, 3328, 3446, 3634	-	1598_Mod	No	11	Hunter, Ellerston, Karuah Manning, Kerrabee, Liverpool Range, Peel, Tomalla, Upper Hunter, Wyong and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.



BAM Biodiversity Credit Report (Like for like)

1598-Forest Red Gum grassy open forest on floodplains of the lower Hunter						
1600-Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter	Like-for-like credit retirement options					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Hunter-Macleay Dry Sclerophyll Forests This includes PCT's: 1178, 1589, 1600, 1601, 3431, 3442, 3446	Hunter-Macleay Dry Sclerophyll Forests >=70% and <90%	1600_Low	No	0	Hunter, Ellerston, Karuah Manning, Kerrabee, Liverpool Range, Peel, Tomalla, Upper Hunter, Wyong and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
1600-Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter	Like-for-like credit retirement options					
	Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region



BAM Biodiversity Credit Report (Like for like)

	Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions This includes PCT's: 1590, 1592, 1593, 1600, 1602, 3433, 3442, 3443, 3444, 4158	-	1600_Mod	No	133	Hunter, Ellerston, Karuah Manning, Kerrabee, Liverpool Range, Peel, Tomalla, Upper Hunter, Wyong and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
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Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Myotis macropus / Southern Myotis	1598_Mod, 1600_Low, 1600_Mod	6.7	143.00
Petaurus norfolcensis / Squirrel Glider	1598_Mod, 1600_Mod	4.4	144.00

Credit Retirement Options

Like-for-like credit retirement options

Species	Spp	IBRA subregion
Myotis macropus / Southern Myotis	Myotis macropus / Southern Myotis	Any in NSW



BAM Biodiversity Credit Report (Like for like)

Petaurus norfolcensis / Squirrel Glider	Spp	IBRA subregion
	Petaurus norfolcensis / Squirrel Glider	Any in NSW

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00030538/BAAS18041/22/00030542	442 Louth Park Road	14/03/2024
Assessor Name	Assessor Number	BAM Data version *
Gilbert Whyte	BAAS18041	67
Proponent Name(s)	Report Created	BAM Case Status
Tom Goold	17/06/2024	Finalised
Assessment Revision	Assessment Type	Date Finalised
2	Part 4 Developments (General)	17/06/2024
BOS entry trigger	* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.	
BOS Threshold: Area clearing threshold		

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Nil		
Species		
Nil		

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

BAM Biodiversity Credit Report (Variations)

PCT
No Changes

Predicted Threatened Species Not On Site

Name
Grantiella picta / Painted Honeyeater

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
1598-Forest Red Gum grassy open forest on floodplains of the lower Hunter	Hunter Lowland Redgum Forest in the Sydney Basin and New South Wales North Coast Bioregions	0.4	0	11	11.00
1600-Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter	Not a TEC	3.1	0	0	0.00
1600-Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter	Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions	4.0	0	133	133.00

1598-Forest Red Gum grassy open forest on floodplains of the lower Hunter	Like-for-like credit retirement options					
	Class	Trading group	Zone	HBT	Credits	IBRA region

BAM Biodiversity Credit Report (Variations)

	Hunter Lowland Redgum Forest in the Sydney Basin and New South Wales North Coast Bioregions This includes PCT's: 1591, 1598, 1603, 1605, 1691, 1692, 1749, 3328, 3446, 3634	-		1598_Mod	No	11	Hunter, Ellerston, Karuah Manning, Kerrabee, Liverpool Range, Peel, Tomalla, Upper Hunter, Wyong and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Variation options							
Formation		Trading group		Zone	HBT	Credits	IBRA region
Forested Wetlands		Tier 3 or higher threat status		1598_Mod	No	11	IBRA Region: Sydney Basin, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
1600-Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter	Like-for-like credit retirement options						
Class		Trading group		Zone	HBT	Credits	IBRA region
Hunter-Macleay Dry Sclerophyll Forests This includes PCT's: 1178, 1589, 1600, 1601, 3431, 3442, 3446		Hunter-Macleay Dry Sclerophyll Forests $\geq 70\%$ and $< 90\%$		1600_Low	No	0	Hunter, Ellerston, Karuah Manning, Kerrabee, Liverpool Range, Peel, Tomalla, Upper Hunter, Wyong and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Variation options							
Formation		Trading group		Zone	HBT	Credits	IBRA region

BAM Biodiversity Credit Report (Variations)

	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 2 or higher threat status	1600_Low	No	0	IBRA Region: Sydney Basin, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
1600-Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter	Like-for-like credit retirement options					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin and NSW North Coast Bioregions This includes PCT's: 1590, 1592, 1593, 1600, 1602, 3433, 3442, 3443, 3444, 4158	-	1600_Mod	No	133	Hunter, Ellerston, Karuah Manning, Kerrabee, Liverpool Range, Peel, Tomalla, Upper Hunter, Wyong and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
Formation	Trading group	Zone	HBT	Credits	IBRA region	
Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 3 or higher threat status	1600_Mod	No	133	IBRA Region: Sydney Basin, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.	

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Myotis macropus / Southern Myotis	1598_Mod, 1600_Low, 1600_Mod	6.7	143.00

Petaurus norfolcensis / Squirrel Glider	1598_Mod, 1600_Mod	4.4	144.00
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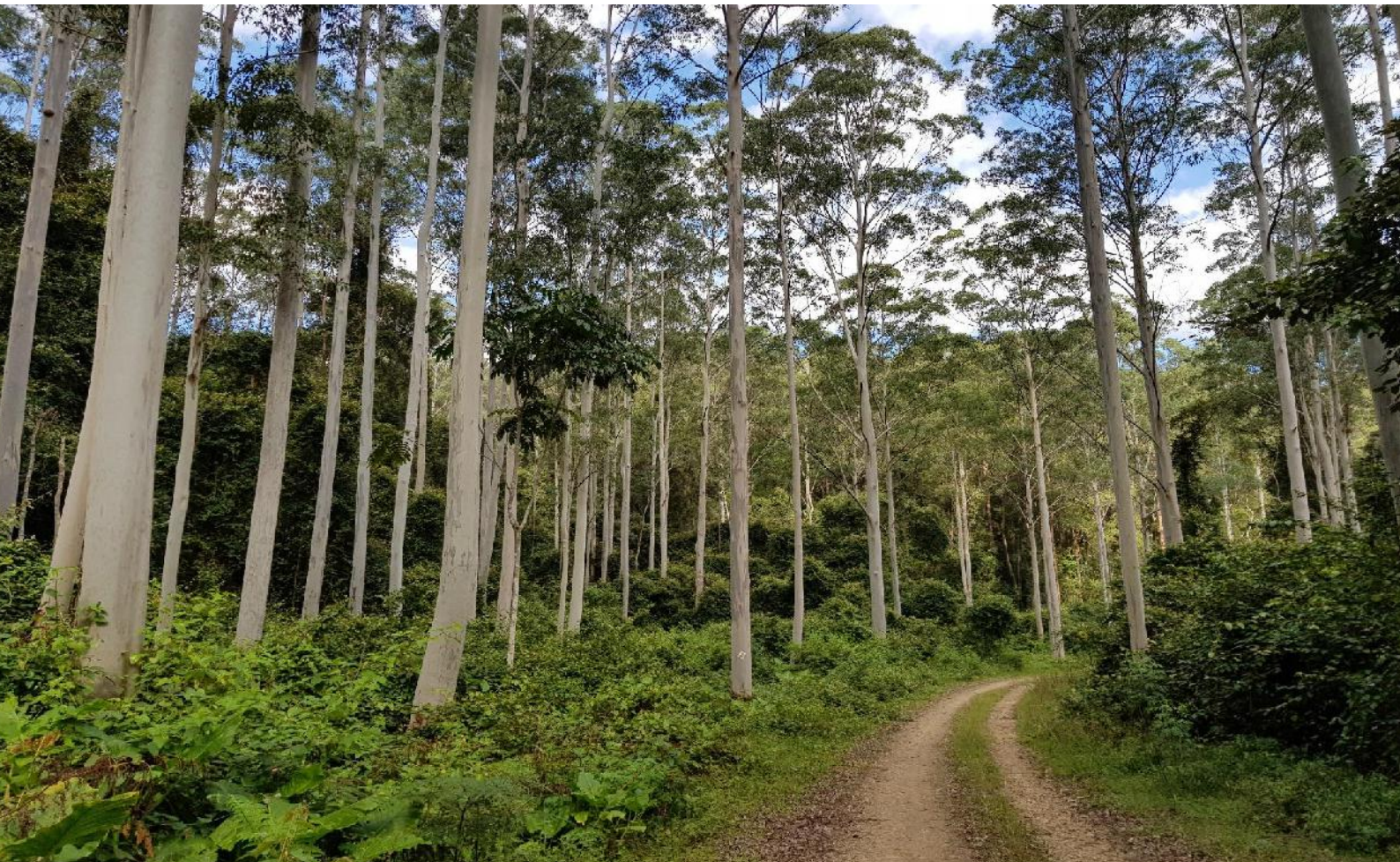
Credit Retirement Options Like-for-like options

Myotis macropus/ Southern Myotis	Spp		IBRA region
	Myotis macropus /Southern Myotis		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
Fauna	Vulnerable	Hunter, Ellerston, Karuah Manning, Kerrabee, Liverpool Range, Peel, Tomalla, Upper Hunter, Wyong and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.	
Petaurus norfolcensis/ Squirrel Glider	Spp		IBRA region
	Petaurus norfolcensis /Squirrel Glider		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

BAM Biodiversity Credit Report (Variations)

	Fauna	Vulnerable	<p>Hunter, Ellerston, Karuah Manning, Kerrabee, Liverpool Range, Peel, Tomalla, Upper Hunter, Wyong and Yengo.</p> <p>or</p> <p>Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.</p>
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Appendix D – BAM Plot Datasheets



BAM Site – Field Survey Form Site Sheet no:

Date		31 01 22	Survey Name	LOUTH PARK	Zone ID	1	Recorders		GILBERT WHITE	
Zone	56	Datum	GDA 94	Plot ID	Q01	Plot dimensions	400m ²	Photo #	✓	
Easting	364146	Northing	6372039	IBRA region	SYD BASIN	Midline bearing from 0 m	012°			
Vegetation Class			HUMER MACLEAY DSF			Confidence:		H M L		
Plant Community Type			1600-mod			EEC: Y		Confidence: H M L		

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m ² plot)	Sum values
Trees	3
Shrubs	4
Count of Native Richness	
Grasses etc.	11
Forbs	9
Ferns	1
Other	2
Sum of Cover of native vascular plants by growth form group	
Trees	3.2
Shrubs	6.7
Grasses etc.	50.4
Forbs	2.8
Ferns	0.2
Other	1.1
High Threat Weed cover	0.7

BAM Attribute (1000 m ² plot)		
DBH	# Tree Stems Count	# Stems with Hollows
80 + cm		
50 – 79 cm	11	
30 – 49 cm	✓	
20 – 29 cm	✓	
10 – 19 cm	✓	
5 – 9 cm	✓	
< 5 cm	✓	n/a
Length of logs (m) (≥10 cm diameter, >50 cm in length)	11M 111 - 8m.	

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree only the largest living stem is included in the count/estimate. Tree stems must be living.

For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)	Bare ground cover (%)	Cryptogam cover (%)	Rock cover (%)
Subplot score (% in each)	30 40 60 60 60	✓	✓	✓
Average of the 5 subplots	50	✓	✓	✓

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type	Landform Element	Landform Pattern	Microrelief
Lithology	Soil Surface Texture	Soil Colour	Soil Depth
Slope	Aspect	Site Drainage	Distance to nearest water and type

Plot Disturbance	Severity code	Age code	Observational evidence:
Clearing (inc. logging)			MODERATE CONDITION - MATURE CANOPY - SPARSE SHRUB LAYER (REGEN) - LOW WOOLLY DEBRIS.
Cultivation (inc. pasture)			
Soil erosion			
Firewood / CWD removal			
Grazing (identify native/stock)			
Fire damage			
Storm damage			
Weediness			
Other			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

400 m ² plot: Sheet _ of _		Survey Name	Plot Identifier	Recorders		
Date	31 of 21	LOUNJ PARK	Q01	GILBERT WHITE		
GF Code	Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable	N, E or HTE	Cover	Abund	stratum	voucher
T	CORYMBIA MACULATA	N	25	10		
T	EUCALYPTUS PANICULATA	N	5	5		
S	CASSIYA ACULEATA	N	5	10		
S	ACACIA PARVIPPINULA	N	0.2	1		
S	DAURYSIA ULCIFOLIA	N	0.5	5		
G	PANICUM SIMILE	N	0.1	5		
G	ARISTIDA RAMOSA	N	2	100		
G	LOMANDRA FILIFORMIS	N	0.1	5		
G	ERAGRODUS BROWNII	N	0.1	10		
G	CYMBOPOGON REFRACTUS	N	10	5000		
G	MICROLAENA STIPOIDES	N	10	5000		
G	LOMANDRA MULTIFLORA	N	1	20		
G	DICHELIAENAE MICRAMTHA	N	20	1000		
G	ECHINOPOGON CAESPITOSUS	N	2	100		
F	COMMELINA CYNEA	N	0.2	20		
F	CYANTHILLIUM CINEREA	N	0.2	10		
F	LOBELIA PURPURASCENS	N	0.5	20		
O	GLYCINE TABACINA	N	1	50		
F	DIANELLA REVOLUTA	N	0.2	5		
O	GLYCINE CLANDESTINA	N	0.1	5		
F	CHRYSOCEPHALUM APICULATUM	N	0.5	100		
E	CHEILANTHES SIEDERII	N	0.2	10		
G	THEMEDA AUSTRALIS	N	5	1000		
F	EINDRA HASTATA	N	0.1	10		
F	DICHONDRA REPENS	N	0.5	100		
-	SETARIA PARVIFLORA	E	2	1000		
-	PLANTAGO LANCEOLATA	E	2	500		
-	SIDA RHOMBIFOLIA	E	5	500		
-	HIPOCHARRIS RADICATA	E	2	100		
-	VERBENA BONARIENSIS	E	0.5	50		
-	SENECIO MADAGASCARIENSIS	(HTW)	0.1	5		
-	LANTANA CAMARA	(HTW)	0.5	1		
-	BIDENS PILOSA	(HTW)	0.1	2		
F	OXALIS PERRENANS	N	0.1	2		
G	FIMBRISTYLIS DICHOTOMA	N	0.1	2		
F	TRICORYNE SIMPLEX	N	0.1	5		
-	CYPRIUS BREVIFOLIUS	N	0.1	1		
S	PIMOSPORUM UNDULATUM	N	1	1		
T	EUCALYPTUS CREBRA	N	2	1		
		N				

GF Code: see Growth Form definitions in Appendix 1 N: native, E: exotic, HTE: high threat exotic GF - circle code if 'top 3'.
 Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
 Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

BAM Site – Field Survey Form Site Sheet no: _____

Date		31 01 22	Survey Name	LOUTH PARK 2	Zone ID			Recorders			
Zone		Datum	Plot ID	Q02	Plot dimensions	400m ²	Photo #	✓			
Easting		Northing		IBRA region	Midline bearing from 0 m						
364280		6372079		SYD BASIN	183°						
Vegetation Class				HUNTER MCCLAEY (DRAINED GRASSLAND)				Confidence: H M L			
Plant Community Type				1600-LOW				EEC: N Confidence: H M L			

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m ² plot)		Sum values
Count of Native Richness	Trees	0
	Shrubs	0
	Grasses etc.	5
	Forbs	2
	Ferns	1
	Other	0
Sum of Cover of native vascular plants by growth form group	Trees	0
	Shrubs	0
	Grasses etc.	11.7
	Forbs	10.1
	Ferns	0.2
Other	0	
High Threat Weed cover		51

BAM Attribute (1000 m ² plot)		
DBH	# Tree Stems Count	# Stems with Hollows
80 + cm	0	0
50 – 79 cm	0	0
30 – 49 cm	0	
20 – 29 cm	0	
10 – 19 cm	0	
5 – 9 cm	0	
< 5 cm	0	n/a
Length of logs (m) (≥10 cm diameter, >50 cm in length)		0

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree only the largest living stem is included in the count/estimate. Tree stems must be living.

For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)	Bare ground cover (%)	Cryptogam cover (%)	Rock cover (%)
Subplot score (% in each)	2 2 2 2 2	/	/	/
Average of the 5 subplots	2	/	/	/

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type	Landform Element	Landform Pattern	Microrelief
Lithology	Soil Surface Texture	Soil Colour	Soil Depth
Slope	Aspect	Site Drainage	Distance to nearest water and type

Plot Disturbance	Severity code	Age code	Observational evidence:
Clearing (inc. logging)			CLEARED (MANAGED)
Cultivation (inc. pasture)			
Soil erosion			
Firewood / CWD removal			
Grazing (identify native/stock)			
Fire damage			
Storm damage			
Weediness			
Other			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

400 m ² plot: Sheet _ of _		Survey Name	Plot Identifier	Recorders			
Date	31 01 22	LOUN PARK	Q02	GILBERT WILHE			
GF Code	Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable	N, E or HTE	Cover	Abund	stratum	voucher	
4	CYMBOPOGON REFRACENS	N	10	1000			
4	BONRIOCHLOA MAERA	N	1	100			
#	HYPERICUM GRAMINEUM	N	0.1	5			
4	LOMANDRA MULTIFLORA	N	0.1	1			
4	CYNODON DACTYLON	N	0.5	200			
4	FIMBRISTYLIS DICHOTOMA	N	0.5	200			
E	CHERKANTHES SIEBERI	N	0.2	50			
#	CENITELLA ASIATICA	N	10	10,000			
-	SIDA RHOMBIFOLIA	E	2	1000			
-	SETARIA PARVIFLORA	E	5	10,000			
-	SENECIO MADAGASCARIENSIS	HTE	1	200			
-	ERAGROSTIS CILIANENSIS	E	20	10,000			
-	VERBENA BONARIENSIS	E	0.5	100			
-	AXONOPUS FISSIFOLIUS	HTE	50	100,000			
-	CONYZA BONARIENSIS	E	0.2	10			
-	HYPOCHAERIS RADICATA	E	1	200			
-	PLANTAGO LANCEOLATA	E	1	200			
-	CYPERUS BREVI-FOLIUS	E	0.1	2			

GF Code: see Growth Form definitions in Appendix 1 N: native, E: exotic, HTE: high threat exotic GF - circle code if 'top 3'.
 Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); **Note:** 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
 Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

BAM Site – Field Survey Form Site Sheet no: _____

Date		Survey Name	Zone ID	Recorders	
31 01 22		LOUTH PARK 3	3	GILBERT WHYTE	
Zone	Datum	Plot ID	Plot dimensions	Photo#	<input checked="" type="checkbox"/>
56	QDA 94	Q03	400m ²		
Easting	Northing	IBRA region	Midline bearing from 0 m	MagNorth	
364130	6372219	SYD BARN	015°		
Vegetation Class			FORESTED WETLAND.		Confidence: <input checked="" type="radio"/> M L
Plant Community Type			1598 (HUNTER LOWLAND 12)		Confidence: <input checked="" type="radio"/> H M L
			EEC: Y		

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m ² plot)	Sum values
Count of Native Richness	
Trees	2
Shrubs	4
Grasses etc.	6
Forbs	5
Ferns	1
Other	1
Sum of Cover of native vascular plants by growth form group	
Trees	62
Shrubs	3.2
Grasses etc.	63.2
Forbs	2
Ferns	0.2
Other	0.2
High Threat Weed cover	0.4

BAM Attribute (1000 m ² plot)		
DBH	# Tree Stems Count	# Stems with Hollows
80 + cm		
50 – 79 cm		
30 – 49 cm	✓	
20 – 29 cm	✓	
10 – 19 cm	✓	
5 – 9 cm	✓	
< 5 cm	✓	n/a
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0m	

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.

For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)					Cryptogam cover (%)					Rock cover (%)				
Subplot score (% in each)	60	40	10	10	10	/					/					/				
Average of the 5 subplots	26					/					/					/				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type	Landform Element	Landform Pattern	Microrelief
Lithology	Soil Surface Texture	Soil Colour	Soil Depth
Slope	Aspect	Site Drainage	Distance to nearest water and type

Plot Disturbance	Severity code	Age code	Observational evidence:
Cleaning (inc. logging)			SMALL DRAINAGE CHANNEL FLOWING NORTH INTO CONSTRUCTED DAM. LOW WOODY DEBRIS.
Cultivation (inc. pasture)			
Soil erosion			
Firewood / CWD removal			
Grazing (identify native/stock)			
Fire damage			
Storm damage			
Weediness			
Other			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

400 m ² plot: Sheet _ of _		Survey Name	Plot Identifier	Recorders			
Date	31 01 22	LOWRIE PARK	G03	GILBERT WYATT			
GF Code	Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable	N, E or HTE	Cover	Abund	stratum	voucher	
X	EUCALYPTUS TERETICORNIS	N	50	20			
X	EUCALYPTUS MOLLUCANA	N	2	1			
S	ACACIA FALCATA	N	0.5	5			
S	PITOSPORUM UNDOULATUM	N	2	2			
S	OZOTHAMNUS DIOSMIFOLIUS	N	0.5	20			
S	BREYNIA OBLONGIFOLIA	N	0.2	1			
G	ENTOLASIA MARGINATA	N	0.2	50			
F	EINADIA HASTATA	N	0.1	1			
F	CYANTHILLIUM CINEREA	N	0.2	5			
F	LOBELIA PURPURASCENS	N	1	100			
F	WAHLENBERGIA GRACILIS	N	0.5	10			
G	DICHELACHNE MICRANTHA	N	10	1000			
G	CYMBOPOGON REFRACTUS	N	10	1000			
G	MICROLAENA STIPOIDES	N	40	10,000			
A	CYNODON DACTYLON	N	1	500			
G	ERAGROSTIS BROWNII	N	2	1000			
O	GLYCINE CLANDESTINA	N	0.2	10			
E	CHEUKANNES SIEBESCI	N	0.2	10			
F	DICTONORA REPENS	N	0.2	50			
<u>EXOTIC SPECIES</u>							
-	SUNCUS EFFUSUS	E	0.1	1			
-	ERAGROSTIS CILIARIENSIS	E	0.5	50			
-	PLANTAGO LANCEOLATA	E	0.1	10			
-	HYPSCYPERIS RADICATA	E	0.2	20			
-	SENECIO MADAGASCARIENSIS	(HTE)	0.2	5			
-	BIDENT PILOSA	(HTE)	0.2	5			
-	COMYZA BONARIENSIS	E	1	20			

GF Code: see Growth Form definitions in Appendix 1 N: native, E: exotic, HTE: high threat exotic GF - circle code if 'top 3'.
 Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); **Note:** 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
 Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

BAM Site – Field Survey Form Site Sheet no: _____

Date		Survey Name	Zone ID	Recorders		
31 01 22		LOUTH PRL	1600 2	GILBERT WHITE		
Zone	Datum	Plot ID	Plot dimensions	Photo #		
56	GDA 94	Q04	400m ²			
Easting	Northing	IBRA region	Midline bearing from 0 m			
364206	6372258	S40 BASIN	348°			
Vegetation Class				Confidence:		
HUNTER MACLEAY DRF				H M L		
Plant Community Type				Confidence:		
1600 (LOW)				H M L		
				EEC: N		

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m ² plot)	Sum values
Trees	1
Shrubs	1
Grasses etc.	5
Forbs	2
Ferns	0
Other	0
Count of Native Richness	
Trees	2
Shrubs	5
Grasses etc.	28.1
Forbs	1.5
Ferns	0
Other	0
Sum of Cover of native vascular plants by growth form group	
Trees	2
Shrubs	5
Grasses etc.	28.1
Forbs	1.5
Ferns	0
Other	0
High Threat Weed cover	2.5

BAM Attribute (1000 m ² plot)		
DBH	# Tree Stems Count	# Stems with Hollows
80 + cm	0	0
50 – 79 cm	0	0
30 – 49 cm		
20 – 29 cm		
10 – 19 cm		
5 – 9 cm	✓	
< 5 cm	✓	n/a
Length of logs (m) (≥10 cm diameter, >50 cm in length)		7m

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30, ..., 100, 200, 300, ...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.

For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)	Bare ground cover (%)	Cryptogam cover (%)	Rock cover (%)
Subplot score (% in each)	2 2 2 2 2	/	/	/
Average of the 5 subplots	2	/	/	/

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type	Landform Element	Landform Pattern	Microrelief
Lithology	Soil Surface Texture	Soil Colour	Soil Depth
Slope	Aspect	Site Drainage	Distance to nearest water and type

Plot Disturbance	Severity code	Age code	Observational evidence:
Clearing (inc. logging)			CLEARED AREA. - MIX NATIVE/EXOTIC GROUND COVER.
Cultivation (inc. pasture)			
Soil erosion			
Firewood / CWD removal			
Grazing (identify native/stock)			
Fire damage			
Storm damage			
Weediness			
Other			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=no. recent (3-10yrs), O=old (>10yrs)

400 m ² plot: Sheet _ of _		Survey Name	Plot Identifier	Recorders			
Date	31 01 22	LOUTH PARK	CR04	GILBERT WATNE			
GF Code	Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable	N, E or HTE	Cover	Abund	stratum	voucher	
1	FUC FIBROSA	N	2	2			
5	ACACIA DEALBATA	N	5	5			
4	CYMBOPOGON REFRACTUS	N	20	10,000			
4	SPOROBOLUS CARRISER	N	2	500			
4	THEMIDA AUSTRALIS	N	5	1000			
F	ITRICOZYNE SIMPLEX	N	1	50			
F	COMMELINA CYNIFA	N	0.5	20			
-	SIDA RHOMBOIFOLIA	E	0.2	5			
-	GAMUCHAETA AMERICANA	E	0.2	10			
-	ERAGROSTIS CICIANENSIS	E	30	100,000			
-	SETARIA PARVIFLORA	E	5	1000			
-	GOMPHRENA CELSIODES	E	0.2	5			
-	SENECIO MADAGASCARIENSIS	HTE	0.5	20			
-	CONYZA BONARIENSIS	E	0.5	20			
-	PLANTAGO LANCEOLATA	E	1	50			
-	DICHELACHNE CRINATA	E	0.1	5			
-	AXONOPUS FISSIFOLIUS	HTE	2	50			
4	CYNODON DACTYLON	N	1	50			

GF Code: see Growth Form definitions in Appendix 1 N: native, E: exotic, HTE: high threat exotic GF - circle code if 'top 3'.
 Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); **Note:** 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
 Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

BAM Site – Field Survey Form Site Sheet no: _____

Date		31 01 22	Survey Name	LOUTH PARK	Zone ID	Q05			Recorders	GILBERT WHYTE					
Zone	56	Datum	GDA 94	Plot ID	Q05	Plot dimensions	400m ²	Photo #	✓						
Easting	364263	Northing	6372158	IBRA region	SYD BAIN	Midline bearing from 0 m	242°								
Vegetation Class					HUNTER MACLEAY DSF					Confidence: H M L					
Plant Community Type					1600 - (MOP)					EEC: Y			Confidence: H M L		

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m ² plot)	Sum values
Count of Native Richness	
Trees	2
Shrubs	5
Grasses etc.	8
Forbs	7
Ferns	1
Other	3
Sum of Cover of native vascular plants by growth form group	
Trees	30
Shrubs	6.2
Grasses etc.	38.3
Forbs	6.2
Ferns	0.2
Other	1.2
High Threat Weed cover	1

BAM Attribute (1000 m ² plot)		
DBH	# Tree Stems Count	# Stems with Hollows
80 + cm		
50 – 79 cm	1	
30 – 49 cm	✓	
20 – 29 cm	✓	
10 – 19 cm	✓	
5 – 9 cm	✓	
< 5 cm	✓	n/a
Length of logs (m) (≥10 cm diameter, >50 cm in length)		5m. x 10 + 20 = 35m.

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30 ... 100, 200, 300...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.

For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)	Bare ground cover (%)	Cryptogam cover (%)	Rock cover (%)
Subplot score (% in each)	5 5 5 2 = 20	✓	✓	✓
Average of the 5 subplots	11	✓	✓	✓

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type	Landform Element	Landform Pattern	Microrelief
Lithology	Soil Surface Texture	Soil Colour	Soil Depth
Slope	Aspect	Site Drainage	Distance to nearest water and type

Plot Disturbance	Severity code	Age code	Observational evidence:
Clearing (inc. logging)			LOW-LYING - DENSE GRASS COVER
Cultivation (inc. pasture)			
Soil erosion			
Firewood / CWD removal			
Grazing (identify native/stock)			
Fire damage			
Storm damage			
Weediness			
Other			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

400 m ² plot: Sheet _ of _		Survey Name	Plot Identifier	Recorders			
Date	31 01 22	LOUTH PARK	Q05	GILBERT WYTHE			
GF Code	Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable	N, E or HTE	Cover	Abund	stratum	voucher	
1	CORYMBIA MACULATA	N	10	1			
1	EUCALYPTUS ACUMINOIDES	N	20	3			
S	ACACIA DEALBATA	N	2	5			
S	PITOSPORUM UNDULATUM	N	2	2			
S	CASSINIA ACULEATA	N	2	5			
G	LOMANORA MULTIFLORA	N	0.2	2			
S	BREYNA OBLONGIFOLIA	N	0.1	1			
O	GLYCINE TABAENA	N	0.2	10			
G	ECHINOPOGON CAESPITOSUS	N	0.5	20			
F	TRICORYNE SIMPLEX	N	0.2	10			
G	MICROLAENA STILOIDES	N	30	100,000			
G	CYMBROPOGON REFRACTUS	N	5	1000			
F	CHRYSOCEPHALUM APICULATUM	N	0.5	100			
F	LOBELIA PURPURASCENS	N	0.5	50			
F	COMMELINA CYNEA	N	2	1000			
F	DICTYONDA REPIENS	N	2	1000			
F	SOLANUM PRINOPHYLLUM	N	0.5	2			
E	CHELLANthes SIEBERZII	N	0.2	10			
O	GLYCINE CLAUSTRINA	N	0.5	50			
O	PANDOREA PANDORANA	N	0.5	10			
-	BIDENS PILOSA	HTW	0.1	5			
-	SENECIO MADAGASCARIENSIS	HTW	0.2	10			
-	LANTANA CAMARA	HTW	0.2	1			
G	CYNODON DACTYLON	N	0.2	50			
G	CAREX INVERSA	N	0.2	50			
S	LISSANTHE STRIGOSA	N	0.1	1			
G	THEMEDA AUSTRALIS	N	2	10			
-	HYPONICARIS RADICATA	E	0.5	20			
-	WATSONIA MERIANA	E	0.1	1			
-	SETARIA PARVIFLORA	E	0.5	20			
-	COMYZA SUMATRIENSIS	E	0.1	1			
-	PLANTAGO LANCEOLATA	E	0.5	50			
-	ERHARTA ERECTA	HTW	0.5	0.5	200		
-	COMYZA BOMBIENSIS	E	0.2	5			
-	SIDA RHOMBIFOLIA	E	15	1,000			
	WALLENBERGIA GRACILIS	N	0.5	10			
	FIABRI STYLIS NICHOTOMA	N	0.2	50			

GF Code: see Growth Form definitions in Appendix 1 N: native, E: exotic, HTE: high threat exotic GF - circle code if 'top 3'.

Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m. 5% = 4 x 5 m. 25% = 10 x 10 m

Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Project: <u>H350 - LOUHA PARK</u>	
Assessor: <u>Gilbert Whyte (BAAS18041)</u>	
Date: <u>0 23/03/23</u>	Plot ID: <u>Q 06</u>
Bearing: <u>011</u>	Datum: <u>GDA94</u>
East: <u>364248</u>	North: <u>6372474</u>

HABITAT
ENVIRONMENTAL SERVICES



Landscape Position: <u>FLAT</u>	Weeds: <u>BIDENS & OTHERS</u>
Soil/Geology: <u>ALLUVIUM</u>	Condition: <u>MOD - GOOD</u>
Veg Structure: <u>FOREST</u>	

PCT: <u>159</u>	EEC: <u>YES</u>
<u>SPOTTED GUM IRONBARK</u>	
Veg Zone:	

Litter Cover	
P1	<u>20</u>
P2	<u>60</u>
P3	<u>20</u>
P4	<u>40</u>
P5	<u>60</u>
Average:	<u>32</u>

Tree Stems (DBH)	P	Stem Count	Hollows
>80cm			
50-79cm	✓	<u>1</u>	<u>1</u>
30-49cm	✓		
20-29cm	✓		
10-19cm	✓		
5-9cm	✓		
<5cm	✓		

Length Logs (m): 0

Predicted VI: 65

Actual VI:

GF Code	Species	Cover	Abundance
T	1. EUCALYPTUS PANICULATA	<u>10</u>	<u>5</u>
T	2. EUCALYPTUS PUNCTATA	<u>5</u>	<u>2</u>
T	3. CORYMBIA MACULATA	<u>10</u>	<u>5</u>
S	4. PITTIOSPORUM UNDULATUM	<u>15</u>	<u>5</u>
S	5. ACACIA IMPLIXA	<u>5</u>	<u>2</u>
F	6. CENTELLA ASIATICA	<u>1</u>	<u>5000</u>
G	7. CYNBOPHON REFRONS	<u>20</u>	<u>10,000</u>
G	8. TITHEBA ANSERIS	<u>20</u>	<u>10,000</u>
G	9. SPOROBOLUS CRISTATUS	<u>5</u>	<u>10000</u>
G	10. DICTYELLA MICRANTHA	<u>10</u>	<u>5,000</u>
G	11. MICROAENA STIPITIS	<u>5</u>	<u>10000</u>
G	12. CYNODON DACTYLON	<u>1</u>	<u>5000</u>
HTU	13. BIDENS PILOSA	<u>0.1</u>	<u>50</u>
F	14. DICHOMRA REPENS	<u>0.5</u>	<u>500</u>
O	15. PARSONIA STRAMINEA	<u>1</u>	<u>2</u>
EX	16. HYPOCHARTIS RADICATA	<u>0.1</u>	<u>50</u>
G	17. DILITARIA PARVIFLORA	<u>1</u>	<u>500</u>
EX	18. COMIZA BONARIENSIS	<u>1</u>	<u>500</u>
EX	19. VERBENA BONARIENSIS	<u>0.2</u>	<u>50</u>
EX	20. PLANTAGO LANCEOLATA	<u>0.1</u>	<u>100</u>
G	21. CYPRESSUS CRACKLI	<u>0.2</u>	<u>50</u>
F	22. ARTHROPODUM MILEFLORUM	<u>0.1</u>	<u>10</u>
FR	23. CISTIFILANthes SIBIROLI	<u>0.1</u>	<u>50</u>

Project: LOUTH PARK
Date: 23/03/23 Plot ID: Q07



GF Code	Species	Cover	Abundance
G	24. <i>FIMBRISTYLIS DICHOTOMA</i>	0.2	50
HTW	25. <i>SENECIO MADAGASCALIENSIS</i>	0.1	10
HTW	26. <i>BRIZA MAJOR MAXIMA</i>	0.2	50
F	27. <i>TRICORYNE SIMPLEX</i>	0.1	20
G	28. <i>CARYX INVERSA</i>	0.1	50
Fx	29. <i>SIDA RHOMBIFOLIA</i>	0.5	100
S	30. <i>ACACIA IRRORATA</i>	0.1	1
G	31. <i>LOMANDRA FILIFORMIS</i>	0.1	20
F.	32. <i>LO DIANELLA CAEZULEA VAR. PRODUCA</i>	0.2	2
	33.		
	34.		
	35.		
	36.		
	37.		
	38.		
	39.		
	40.		
	41.		
	42.		
	43.		
	44.		
	45.		
	46.		
	47.		
	48.		
	49.		
	50.		
	51.		
	52.		
	53.		
	54.		
	55.		
	56.		
	57.		
	58.		
	59.		

Total Species		Total Cover	
Trees	3	Trees	25.0
Shrubs	3	Shrubs	20.1
Grasses	4	Grasses	62.6
Forbs	5	Forbs	1.9
Ferns	1	Ferns	0.1
Other	1	Other	1
		HTW	0.2

Data Check	
Site/ Date	✓
Plot ID	✓
Bearing/ Coordinates	✓
Photos	✓
Landscape Info	✓
Litter/ Stems/ Logs	✓
Species/ Cover/ Abund.	✓

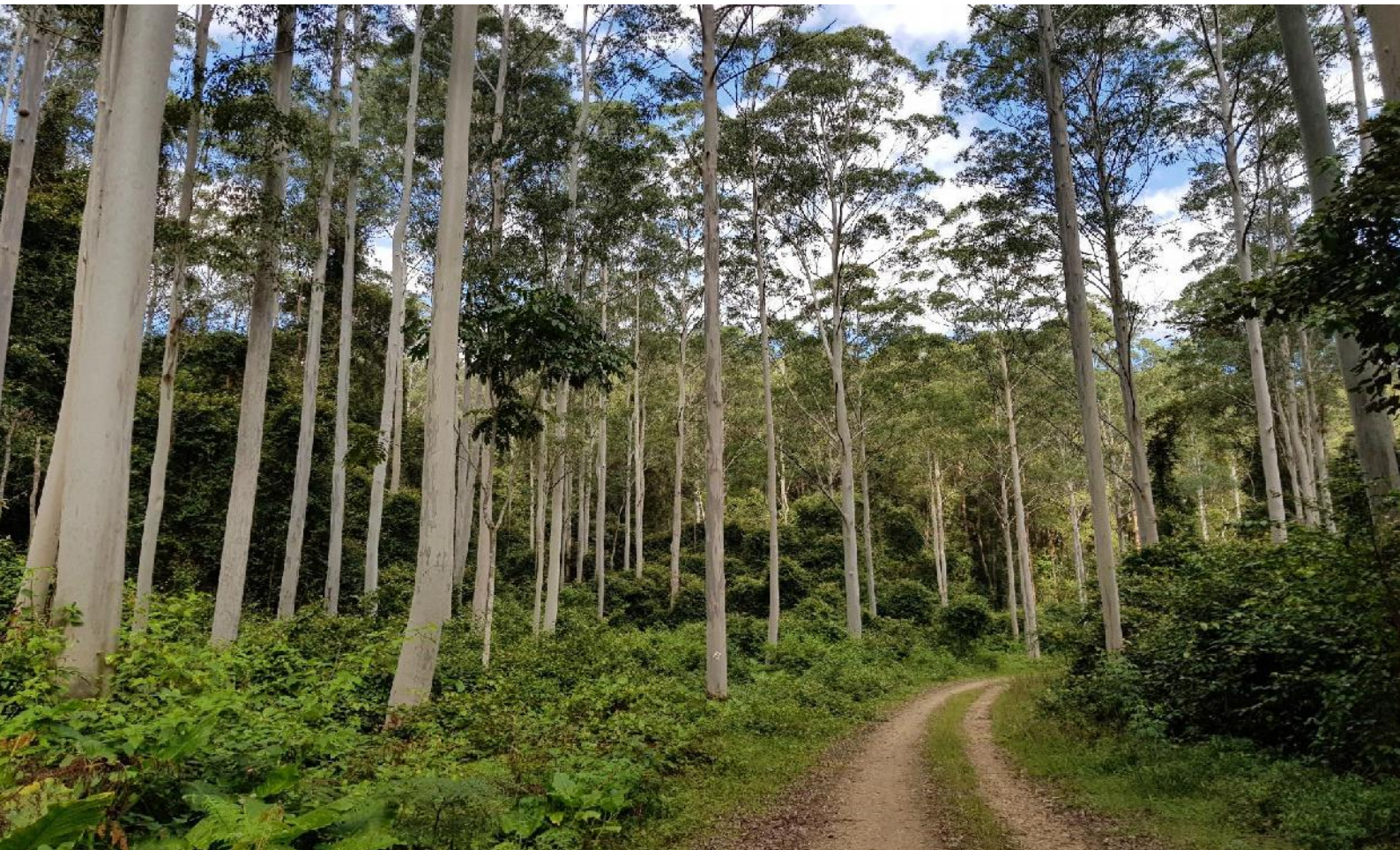
400 m ² plot: Sheet _ of _		Survey Name	Plot Identifier	Recorders		
Date	31 01 22	LOULT PARK	N/A	GILBERT WHITE		
GF Code	Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable	N, E or HTE	Cover	Abund	stratum	voucher
	COLYMBIA MACULATA	SENECIO VULGARIS				
	EUCALYPTUS PANICULATA	TARAXACUM OFFICINALE				
	BURBURA SPINOSA	WATSONIA MERIANA				
	ACACIA PARVIPPINULA	BIDENS SUBALTERNA				
	CASSINIA ACULEATA	IMPERATA CYLINDRICA				
	PHOSPORUM UNDULATUM	NOTELAEA VENOSA				
	DAVIESIA ULICIFOLIA	HARDENBERGIA VIOLACEA				
	BREYNIA ORLONGIFOLIA	PANDORA PANDORANA				
	ACACIA ELONGATA	EUCALYPTUS FIBROSA				
	OZOTHAMNUS DIOSMIFOLIUS	OLEA EUROPEA CUSPITATA				
	DICHOMORA REPENS	OPUNTIA AURANTIACA				
	MICROLAENA SIPOIDES	INDIGOFFERA AUSTRALIS				
	DICHELACHNE MICRAMBA	PARSONIA STRAMINEA				
	CYMBOPOGON REFRACTUS	ERAGROSTIS CILIENSIS				
	FIMBASTYLIS DICHOTOMA	DIANELLA REVOLUTA				
	ARISTIDA VAGANS	SPOROBOLOUS CREBRUS				
	ECHINOPOGON CAESPITOSUM	GOODENIA ROTUNDIFOLIA				
	LOMANORA MULTIFLORA	CYANTILLUM CINEREA				
	PANICUM EFFUSUM	LISSANTHE STRIGOSA				
	ENTOLASIA STRICTA	ACACIA FASCATA				
	LOBELIA PURPURACCENS	CENTELLA ASIATICA				
	SOLANUM PRINOPHYLLUM	GAMOCNATA AMERICANA				
	COMMELINA CYNEA	ACACIA LONGIFOLIA				
	GLYCINE TAJACINA	CHRYSANTHEMUM MONOLIFLORUM				
	GLYCINE CLANDESTINA	EXOCARPUS CUPRESSIFOLIUS				
	ARTHROPODUM MILLIFLORUM	AXONOPUS FISSIFOLIUS				
	CITELANTHES SIEBERI	HYPERICUM GRAMINEUM				
	THEMEOA AUSTRALIS	NEPHROLEPS CORDIFOLIA				
	BIDENS PILOSA	OCNA SERRULATA				
	LANTANA CAMARA	CHRYSOCEPHALUM APICULATUM				
	CONYZA SUMATRIENSIS	OPUNTIA STRICTA				
	VERBENA BONARIENSIS	PRUNUS SP.				
	GOMPHOCARPOS FRUCOSUS	ACACIA DEALBATA				
	SETARIA PARVIFLORA	ANGOPHORA PARKERI				
	SENECIO MADAGASCARIENSIS	EUCALYPTUS TERETICORNIS				
	CHLORIS GAYANA	ACACIA DECORA				
	CYNODON DACTYLON	ELEOCHARIS EQUISINA				
	PASPALUM DILATATUM	SUNCUS EFFUSUS				
	PLANTAGO LANCEOLATA	CASUARINA GLAUCA				
	SIDA RHOMBIFOLIA	EUCALYPTUS MOLLESCENS				

GF Code: see Growth Form definitions in Appendix 1 N: native, E: exotic, HTE: high threat exotic GF - circle code if 'top 3'.
 Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
 Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

400 m ² plot: Sheet <u> </u> of <u> </u>		Survey Name	Plot Identifier	Recorders			
Date	31 01 22	LOUTH PARK ROAD		GILBERT WYTE			
GF Code	Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable	N, E or HTE	Cover	Abund	stratum	voucher	
	MELALEUCA QUINQUENERVIA						
	LEPTOSPERMUM POLYGALIFOLIUM						
	CALLISTEMON LINEARIS						
	ACACIA ULCIFOLIA						
	LUDWIGIA PEPLIOIDES						
	EUCALYPTUS LONGIFOLIA						
	CORYMBIA GUMMIFERA						
	EUCALYPTUS GRANDIS						
	PULTENAEA RETUSA						
	EUCALYPTUS CAPITELLATA						
	PELLAEA FALCATA						
	(SEIACEA) RHYNCHOSPORA SP.						
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GF Code: see Growth Form definitions in Appendix 1 N: native, E: exotic, HTE: high threat exotic GF - circle code if 'top 3'.
 Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); **Note:** 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across. 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
 Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Appendix E – Flora and Fauna Species Lists



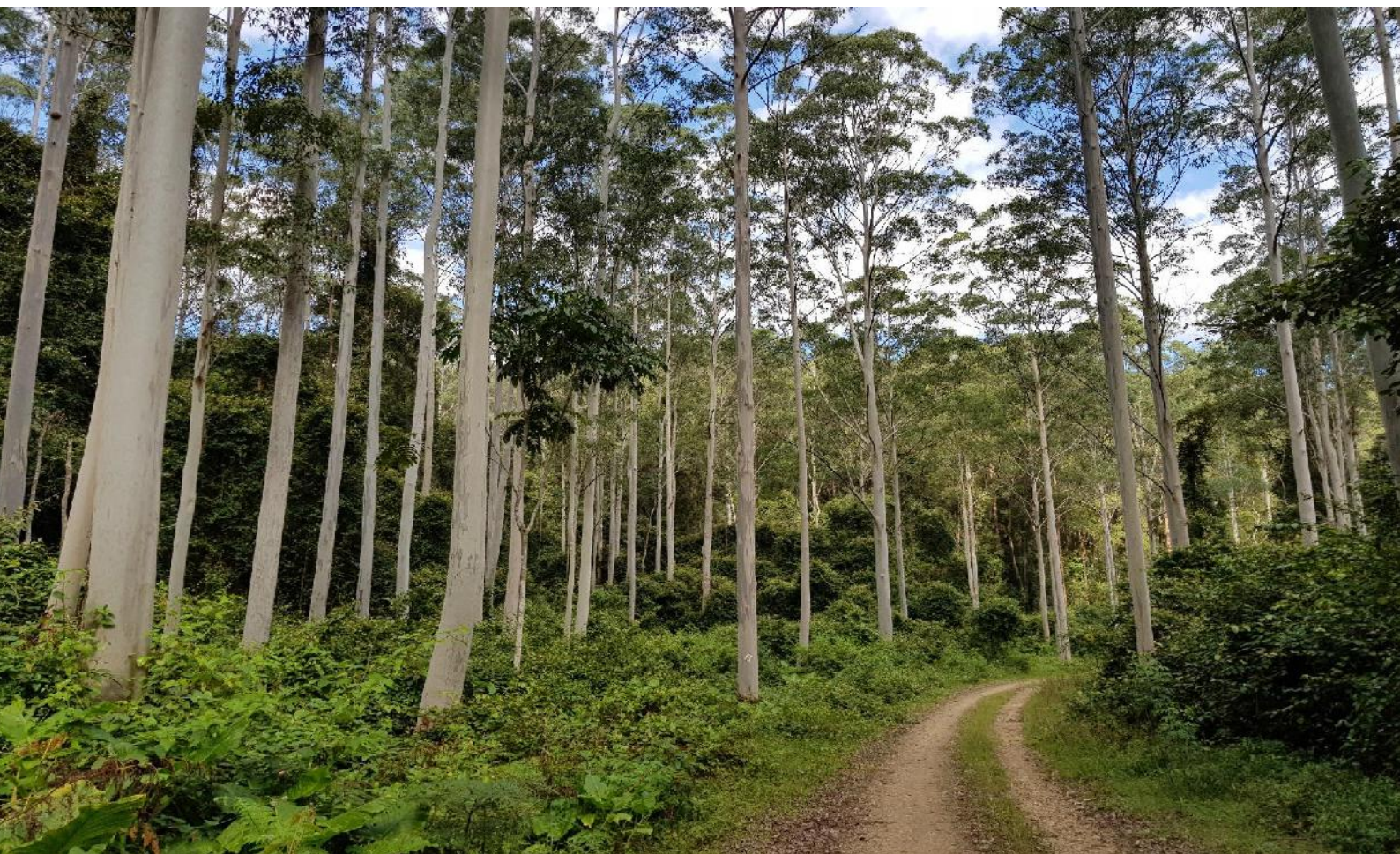
Form	Name	Q01	Q02	Q03	Q04	Q05	Q06	RM
Exotic	<i>Bidens subalternans</i>							x
Exotic	<i>Briza maxima</i>							
Exotic	<i>Conyza bonariensis</i>		0.2	1	0.5	0.2	1	
Exotic	<i>Conyza sumatriensis</i>					0.1		
Exotic	<i>Cyperus brevifolius</i>	0.1	0.1					
Exotic	<i>Eragrostis cilianensis</i>		20	0.5	30			
Exotic	<i>Gamochoaeta americana</i>				0.2			
Exotic	<i>Gomphocarpus fruticosus</i>							x
Exotic	<i>Gomphrena celosoides</i>				0.2			
Exotic	<i>Hypochaeris radicata</i>	2	1	0.2		0.5	0.1	
Exotic	<i>Juncus effusus</i>			0.1				
Exotic	<i>Nephrolepis cordifolia</i>							x
Exotic	<i>Plantago lanceolata</i>	2	1	0.1	1	0.5	0.1	
Exotic	<i>Prunus sp.</i>							x
Exotic	<i>Senecio vulgaris</i>							x
Exotic	<i>Setaria parviflora</i>	2	5		5	0.5		
Exotic	<i>Sida rhombifolia</i>	5	2		0.2	15	0.5	
Exotic	<i>Taraxacum officinale</i>							x
Exotic	<i>Verbena bonariensis</i>	0.5	0.5				0.2	
Exotic	<i>Watsonia meriana</i>					0.1		
Fern	<i>Cheilanthes sieberi</i>	0.2	0.2	0.2		0.2	0.1	
Fern	<i>Pellaea falcata</i>							x
Forb	<i>Arthropodium milleflorum</i>						0.1	x
Forb	<i>Centella asiatica</i>		10				1	
Forb	<i>Chrysocephalum apiculatum</i>	0.5				0.5		
Forb	<i>Commelina cyanea</i>	0.2			0.5	2		
Forb	<i>Cyanthillium cinerea</i>	0.2		0.2				
Forb	<i>Dianella caerulea var. producta</i>						0.2	
Forb	<i>Dianella revoluta</i>	0.2						
Forb	<i>Dichondra repens</i>	0.5		0.2		2	0.5	
Forb	<i>Einadia hastata</i>	0.5		0.1				
Forb	<i>Goodenia rotundifolia</i>							x
Forb	<i>Hypericum gramineum</i>		0.1					
Forb	<i>Lobelia purpurascens</i>	0.5		1		0.5		
Forb	<i>Oxalis perennans</i>	0.1						
Forb	<i>Solanum prinophyllum</i>					0.5		
Forb	<i>Tricoryne simplex</i>	0.1			1	0.2	0.1	
Forb	<i>Wahlenbergia gracilis</i>			0.5		0.5		
Grass/Grass Like	<i>Aristida ramosa</i>	2						
Grass/Grass Like	<i>Bothriochloa macra</i>		1					
Grass/Grass Like	<i>Carex inversa</i>					0.2	0.1	
Grass/Grass Like	<i>Cymbopogon refractus</i>	10	10	10	20	5	20	
Grass/Grass Like	<i>Cynodon dactylon</i>		0.1	1	1	0.2	1	
Grass/Grass Like	<i>Cyperus gracilis</i>						0.2	
Grass/Grass Like	<i>Dichelachne crinata</i>				0.1			
Grass/Grass Like	<i>Dichelachne micrantha</i>	20		10			10	
Grass/Grass Like	<i>Digitaria parviflora</i>						1	

Form	Name	Q01	Q02	Q03	Q04	Q05	Q06	RM
Grass/Grass Like	<i>Echinopogon caespitosus</i>	2				0.5		
Grass/Grass Like	<i>Eleocharis equisetina</i>							x
Grass/Grass Like	<i>Entolasia marginata</i>			0.2				
Grass/Grass Like	<i>Eragrostis brownii</i>	0.1		2				
Grass/Grass Like	<i>Fimbristylis dichotoma</i>	0.1	0.5			0.2	0.2	
Grass/Grass Like	<i>Imperata cylindrica</i>							x
Grass/Grass Like	<i>Lomandra filiformis</i>	0.1					0.1	
Grass/Grass Like	<i>Lomandra multiflora</i>	1	0.1			0.2		
Grass/Grass Like	<i>Microlaena stipoides var. stipoides</i>	10		40		30	5	
Grass/Grass Like	<i>Panicum simile</i>	0.1						
Grass/Grass Like	<i>Rytidosperma fulva</i>							x
Grass/Grass Like	<i>Sporobolus creber</i>					2	5	
Grass/Grass Like	<i>Themeda australis</i>	5				5	2	20
HTW	<i>Axonopus fissifolius</i>		50		2			
HTW	<i>Bidens pilosa</i>	0.1		0.2		0.1	0.1	
HTW	<i>Chloris gayana</i>							x
HTW	<i>Chrysanthemoides monolifera</i>							x
HTW	<i>Erharta erecta</i>					0.5		
HTW	<i>Lantana camara</i>	0.5				0.2		
HTW	<i>Ochna serrulata</i>							x
HTW	<i>Olea europaea subsp. cuspidata</i>							x
HTW	<i>Opuntia aurantiaca</i>							x
HTW	<i>Opuntia stricta</i>							x
HTW	<i>Paspalum dilatatum</i>							x
HTW	<i>Senecio madagascariensis</i>	0.1	1	0.2	0.5	0.2	0.1	
Other	<i>Glycine clandestina</i>	0.1		0.2		0.5		
Other	<i>Glycine tabacina</i>	1				0.2		
Other	<i>Hardenbergia violacea</i>							x
Other	<i>Ludwigia peploides</i>							x
Other	<i>Ottelia ovalifolia subsp. ovalifolia</i>							x
Other	<i>Pandorea pandorana</i>					0.5		
Other	<i>Parsonsia straminea</i>						1	x
Shrub	<i>Acacia dealbata</i>				5	2		
Shrub	<i>Acacia elongata</i>							x
Shrub	<i>Acacia falcata</i>			0.5				
Shrub	<i>Acacia implexa</i>						5	
Shrub	<i>Acacia irrorata</i>						0.1	
Shrub	<i>Acacia longifolia</i>							x
Shrub	<i>Acacia parvipinnula</i>	0.2						
Shrub	<i>Acacia ulicifolia</i>							x
Shrub	<i>Breynia oblongifolia</i>			0.2		0.1		
Shrub	<i>Callistemon linearis</i>							x
Shrub	<i>Cassinia aculeata</i>	5				2		
Shrub	<i>Daviesia ulicifolia</i>	0.5						
Shrub	<i>Exocarpos cupressiformis</i>							x
Shrub	<i>Indigofera australis</i>							x
Shrub	<i>Leptospermum polygalifolium</i>							x
Shrub	<i>Lissanthe strigosa</i>					0.1		

Form	Name	Q01	Q02	Q03	Q04	Q05	Q06	RM
Shrub	<i>Notelaea venosa</i>							x
Shrub	<i>Ozothamnus diosmifolium</i>			0.5				
Shrub	<i>Pittosporum undulatum</i>	1		2		2	15	
Shrub	<i>Pultenaea retusa</i>							x
Tree	<i>Angophora bakeri</i>							x
Tree	<i>Casuarina glauca</i>							x
Tree	<i>Corymbia gummifera</i>							x
Tree	<i>Corymbia maculata</i>	25				10	10	
Tree	<i>Eucalyptus acmenoides</i>					20		
Tree	<i>Eucalyptus capitellata</i>							x
Tree	<i>Eucalyptus crebra</i>	2						
Tree	<i>Eucalyptus fibrosa</i>				2			
Tree	<i>Eucalyptus grandis</i>							x
Tree	<i>Eucalyptus longifolia</i>							x
Tree	<i>Eucalyptus moluccana</i>			2				
Tree	<i>Eucalyptus paniculata</i>	5					10	
Tree	<i>Eucalyptus punctata</i>						5	
Tree	<i>Eucalyptus tereticornis</i>			50				
Tree	<i>Melaleuca quinquenervia</i>							x

Common Name	Species Name	Conservation Status
Birds		
Australian Magpie	<i>Gymnorhina tibicen</i>	
Australian Raven	<i>Corvus coronoides</i>	
Eastern Rosella	<i>Platycercus eximius</i>	
Eastern Yellow Robin	<i>Eopsaltria australis</i>	
Grey-crowned Babbler	<i>Pomatostomus temporalis temporalis</i>	Vulnerable (BC Act)
King Parrot	<i>Alisterus scapularis</i>	
Laughing Kookooburra	<i>Dacelo novaeguineae</i>	
Noisy Friarbird	<i>Philemon corniculatus</i>	
Noisy Miner	<i>Manorina melanocephala</i>	
White-faced Heron	<i>Egretta novaehollandiae</i>	
Willy Wagtail	<i>Rhipidura leucophrys</i>	
Mammals		
Black Rat	<i>Rattus rattus</i>	
Brown Antechinus	<i>Antechinus stuartii</i>	
Brush-tailed Possum	<i>Trichosurus vulpecula</i>	
Chocolate wattled bat	<i>Chalinolobus morio</i>	
Eastern bent-wing bat	<i>Miniopterus orianae oceanensis</i>	Vulnerable (BC Act)
Eastern coastal free-tail bat	<i>Micronomus norfolkensis</i>	Vulnerable (BC Act)
Eastern Grey Kangaroo	<i>Macropus giganteus</i>	
Eastern horseshoe-bat	<i>Rhinolophus megaphylus</i>	
Feather-tail Glider	<i>Acrobates pygmaeus</i>	
Gould's wattled bat	<i>Chalinolobus gouldii</i>	
Little bent-wing bat	<i>Miniopterus australis</i>	Vulnerable (BC Act)
Ride's freetail bat	<i>Ozimops ridei</i>	
Southern Myotis	<i>Southern Myotis</i>	Vulnerable (BC Act)
Squirrel Glider	<i>Petaurus norfolcensis</i>	Vulnerable (BC Act)
Sugar Glider	<i>Petaurus breviceps</i>	
Unidentified long-eared bat	<i>Nyctophilus spp.</i>	
White-striped freetail bat	<i>Austronomus australis</i>	
Reptiles		
Lace Monitor	<i>Varanus varius</i>	
Amphibians		
Broad-palmed Frog	<i>Litoria latopalmata</i>	
Eastern Dwarf Tree Frog	<i>Litoria fallax</i>	
Striped Marsh Frog	<i>Limnodynastes peronii</i>	

Appendix F – Tree Retention Information



Tree ID	Tree Species	Tree Height (m)	Canopy Spread (m)	DBH (cm)	Age Class	Health	Habitat Tree	Hollows Diameter (cm)
1	<i>Corymbia maculata</i> (Spotted Gum)	25	15	110	Mature	Good	HBT	10,20
2	<i>Corymbia maculata</i> (Spotted Gum)	30	20	110	Mature	Good	HBT	15
3	<i>Corymbia maculata</i> (Spotted Gum)	25	20	100	Mature	Good	HBT	20 20
4	<i>Corymbia maculata</i> (Spotted Gum)	25	20	130	Mature	Good	HBT	15
5	<i>Eucalyptus fibrosa</i> (Broad-leaved Ironbark)	25	15	90	Mature	Good	Non-HBT	0
6	<i>Corymbia maculata</i> (Spotted Gum)	25	20	100	Mature	Good	Non-HBT	0
7	<i>Corymbia maculata</i> (Spotted Gum)	20	20	100	Mature	Good	Non-HBT	0
8	<i>Corymbia maculata</i> (Spotted Gum)	25	15	90	Mature	Good	HBT	10
9	<i>Corymbia maculata</i> (Spotted Gum)	15	8	40	Mature	Good	Non-HBT	0
10	<i>Eucalyptus paniculata</i> (Grey Ironbark)	12	8	40	Mature	Good	Non-HBT	0
12	<i>Corymbia maculata</i> (Spotted Gum)	12	6	40	Mature	Good	Non-HBT	0
13	<i>Corymbia maculata</i> (Spotted Gum)	15	10	40	Mature	Good	Non-HBT	0
14	<i>Corymbia maculata</i> (Spotted Gum)	15	8	40	Mature	Good	Non-HBT	0
15	<i>Corymbia maculata</i> (Spotted Gum)	15	20	80	Mature	Good	HBT	10 15
16	<i>Eucalyptus fibrosa</i> (Broad-leaved Ironbark)	25	15	80	Mature	Good	Non-HBT	0
17	<i>Corymbia maculata</i> (Spotted Gum)	25	25	100	Mature	Good	Non-HBT	0
18	<i>Corymbia maculata</i> (Spotted Gum)	25	15	90	Mature	Good	Non-HBT	0
20	<i>Corymbia maculata</i> (Spotted Gum)	25	15	100	Mature	Good	Non-HBT	0
21	<i>Eucalyptus fibrosa</i> (Broad-leaved Ironbark)	20	10	90	Mature	Good	Non-HBT	0
22	<i>Corymbia maculata</i> (Spotted Gum)	20	15	40	Mature	Good	Non-HBT	0
23	<i>Corymbia maculata</i> (Spotted Gum)	20	15	70	Mature	Good	Non-HBT	0
24	<i>Eucalyptus fibrosa</i> (Broad-leaved Ironbark)	25	15	90	Mature	Good	Non-HBT	0
25	<i>Eucalyptus fibrosa</i> (Broad-leaved Ironbark)	25	25	90	Mature	Good	Non-HBT	0
26	<i>Eucalyptus fibrosa</i> (Broad-leaved Ironbark)	20	20	60	Mature	Good	Non-HBT	0
27	<i>Eucalyptus fibrosa</i> (Broad-leaved Ironbark)	15	6	25	Mature	Good	Non-HBT	0
28	<i>Eucalyptus fibrosa</i> (Broad-leaved Ironbark)	15	6	25	Mature	Good	Non-HBT	0
29	<i>Eucalyptus fibrosa</i> (Broad-leaved Ironbark)	15	6	25	Mature	Good	Non-HBT	0

Tree ID	Tree Species	Tree Height (m)	Canopy Spread (m)	DBH (cm)	Age Class	Health	Habitat Tree	Hollows Diameter (cm)
31	<i>Eucalyptus fibrosa</i> (Broad-leaved Ironbark)	15	6	30	Mature	Good	Non-HBT	0
32	<i>Eucalyptus fibrosa</i> (Broad-leaved Ironbark)	15	6	30	Mature	Good	Non-HBT	0
33	<i>Eucalyptus punctata</i> (Grey Gum)	15	8	50	Mature	Good	Non-HBT	0
34	<i>Eucalyptus eugenioides</i> (Thin-leaved Stringybark)	15	8	40	Mature	Good	Non-HBT	0
35	<i>Corymbia maculata</i> (Spotted Gum)	20	8	40	Mature	Good	Non-HBT	0
36	<i>Corymbia maculata</i> (Spotted Gum)	20	15	70	Mature	Good	Non-HBT	0
37	<i>Angophora costata</i> (Smooth-barked Apple)	15	15	25	Mature	Good	Non-HBT	0
37	<i>Corymbia maculata</i> (Spotted Gum)	25	15	100	Mature	Good	HBT	5
38	<i>Eucalyptus fibrosa</i> (Broad-leaved Ironbark)	20	15	80	Mature	Good	Non-HBT	0
39	<i>Eucalyptus fibrosa</i> (Broad-leaved Ironbark)	10	10	40	Mature	Good	Non-HBT	0
40	<i>Corymbia maculata</i> (Spotted Gum)	20	20	90	Mature	Good	Non-HBT	0
41	<i>Eucalyptus fibrosa</i> (Broad-leaved Ironbark)	15	10	80	Mature	Good	Non-HBT	0
42	<i>Eucalyptus fibrosa</i> (Broad-leaved Ironbark)	10	10	50	Mature	Good	HBT	5
48	<i>Corymbia maculata</i> (Spotted Gum)	15	10	60	Mature	Good	Non-HBT	0
49	<i>Eucalyptus fibrosa</i> (Broad-leaved Ironbark)	20	15	30	Mature	Good	Non-HBT	0
51	<i>Eucalyptus fibrosa</i> (Broad-leaved Ironbark)	20	15	80	Mature	Good	Non-HBT	0
52	<i>Eucalyptus fibrosa</i> (Broad-leaved Ironbark)	15	15	100	Mature	Good	Non-HBT	0
54	<i>Eucalyptus fibrosa</i> (Broad-leaved Ironbark)	15	6	25	Mature	Good	Non-HBT	0
55	<i>Eucalyptus fibrosa</i> (Broad-leaved Ironbark)	15	6	25	Mature	Good	Non-HBT	0
56	<i>Eucalyptus fibrosa</i> (Broad-leaved Ironbark)	12	6	20	Mature	Good	Non-HBT	0
57	<i>Eucalyptus fibrosa</i> (Broad-leaved Ironbark)	15	6	30	Mature	Good	Non-HBT	0
58	<i>Eucalyptus fibrosa</i> (Broad-leaved Ironbark)	15	6	30	Mature	Good	Non-HBT	0
59	<i>Eucalyptus fibrosa</i> (Broad-leaved Ironbark)	15	6	30	Mature	Good	Non-HBT	0
60	<i>Eucalyptus fibrosa</i> (Broad-leaved Ironbark)	15	6	30	Mature	Good	Non-HBT	0
61	<i>Eucalyptus fibrosa</i> (Broad-leaved Ironbark)	15	6	30	Mature	Good	Non-HBT	0
62	<i>Eucalyptus fibrosa</i> (Broad-leaved Ironbark)	15	6	30	Mature	Good	Non-HBT	0
64	<i>Eucalyptus fibrosa</i> (Broad-leaved Ironbark)	20	15	100	Mature	Good	Non-HBT	0

Tree ID	Tree Species	Tree Height (m)	Canopy Spread (m)	DBH (cm)	Age Class	Health	Habitat Tree	Hollows Diameter (cm)
65	<i>Eucalyptus fibrosa</i> (Broad-leaved Ironbark)	20	15	60	Mature	Good	Non-HBT	0
68	<i>Eucalyptus fibrosa</i> (Broad-leaved Ironbark)	15	15	50	Mature	Good	Non-HBT	0
74	<i>Corymbia maculata</i> (Spotted Gum)	15	8	40	Mature	Good	Non-HBT	0
75	<i>Corymbia maculata</i> (Spotted Gum)	15	8	20	Mature	Good	Non-HBT	0
76	<i>Corymbia maculata</i> (Spotted Gum)	12	8	15	Mature	Good	Non-HBT	0
77	<i>Corymbia maculata</i> (Spotted Gum)	15	8	40	Mature	Good	Non-HBT	0
78	<i>Corymbia maculata</i> (Spotted Gum)	15	8	40	Mature	Good	Non-HBT	0
98	<i>Corymbia maculata</i> (Spotted Gum)	15	8	20	Mature	Good	Non-HBT	0
101	<i>Corymbia maculata</i> (Spotted Gum)	15	8	20	Mature	Good	Non-HBT	0
102	<i>Corymbia maculata</i> (Spotted Gum)	15	8	20	Mature	Good	Non-HBT	0
103	<i>Corymbia maculata</i> (Spotted Gum)	20	8	50	Mature	Good	Non-HBT	0
104	<i>Corymbia maculata</i> (Spotted Gum)	20	8	60	Mature	Good	Non-HBT	0
105	<i>Corymbia maculata</i> (Spotted Gum)	20	8	40	Mature	Good	Non-HBT	0
106	<i>Corymbia maculata</i> (Spotted Gum)	15	8	20	Mature	Good	Non-HBT	0
107	<i>Corymbia maculata</i> (Spotted Gum)	15	8	30	Mature	Good	Non-HBT	0
108	<i>Corymbia maculata</i> (Spotted Gum)	15	8	30	Mature	Good	Non-HBT	0
109	<i>Corymbia maculata</i> (Spotted Gum)	15	8	30	Mature	Good	Non-HBT	0
110	<i>Corymbia maculata</i> (Spotted Gum)	15	8	30	Mature	Good	Non-HBT	0
111	<i>Corymbia maculata</i> (Spotted Gum)	15	8	30	Mature	Good	Non-HBT	0
117	<i>Corymbia maculata</i> (Spotted Gum)	20	15	100	Mature	Good	Non-HBT	0
118	<i>Eucalyptus fibrosa</i> (Broad-leaved Ironbark)	20	20	90	Mature	Good	Non-HBT	0
119	<i>Angophora costata</i> (Smooth-barked Apple)	15	15	25	Mature	Good	Non-HBT	0
120	<i>Angophora costata</i> (Smooth-barked Apple)	15	15	30	Mature	Good	Non-HBT	0