

FAUNA MANAGEMENT PLAN

Lot 2 on RP868726
820 Greenbank Road, North Maclean

A Report Prepared for
Norhart Developments

OCTOBER 2025

PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL

Approval no: DEV2025/1661

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1 Introduction

1.1 Background

JWA Pty Ltd (JWA) has been engaged by Norhart Developments to prepare a Fauna Management Plan (FMP) for an industrial subdivision at 820 Greenbank Road, North Maclean.

The development is subject to an existing Economic Development Queensland (EDQ) Priority Development Area (PDA) Development Approval (EDQ/DILGP Ref No: DEV2015/727/5) for the Reconfiguration of a Lot - one (1) into twelve (12) lot industrial subdivision with new road and balance lot. The proponent proposes to lodge a new application with EDQ for a one (1) into twenty-nine (29) lot industrial subdivision plus new road and drainage reserves, generally over the same previously approved development footprint.

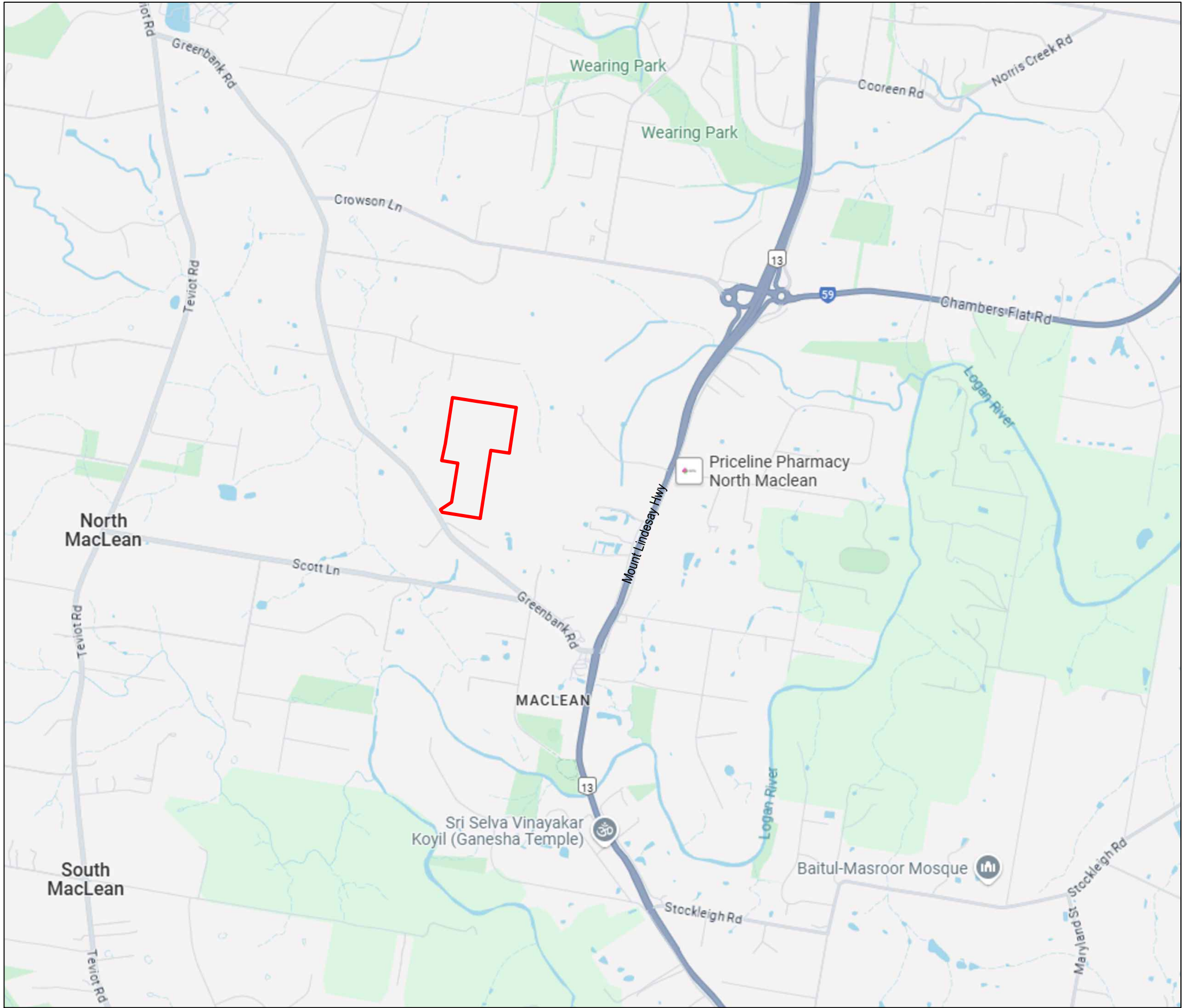
In support of the new application, this FMP has been prepared to comply with Condition 22 of the previous (now lapsed) development approval. Condition 22 states:

22. Fauna Management Plan

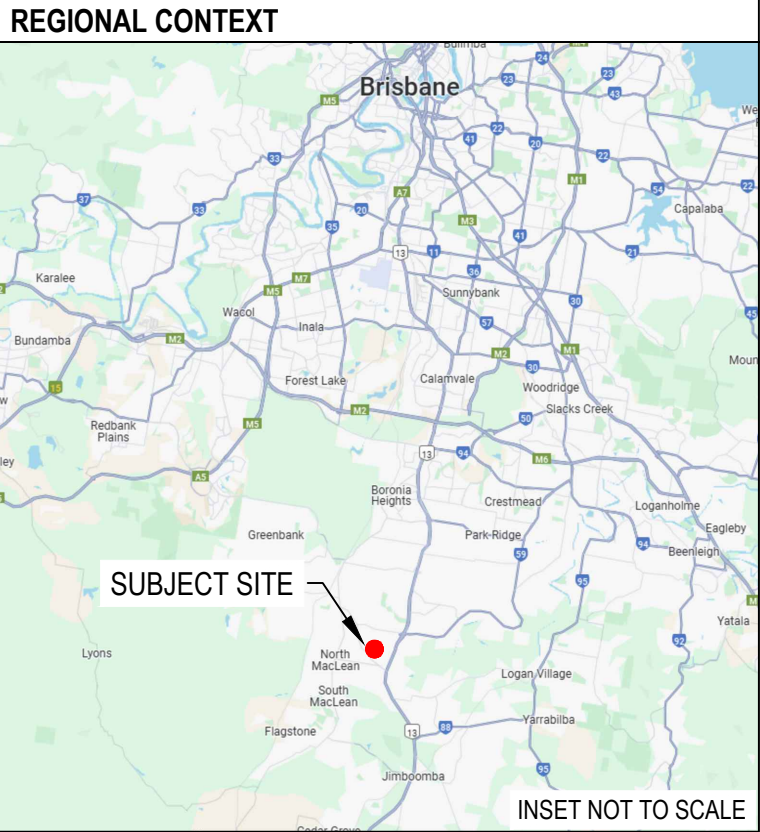
- a) Submit to EDQ Development Assessment, DILGP a Fauna Management Plan, prepared by a suitably qualified professional, which is to include:
 - i. identification of existing habitat trees to be removed, including location, species identification and fauna habitat features;*
 - ii. number of hollows to be removed;*
 - iii. number, location and type of hollows to be relocated;*
 - iv. number of nest boxes to be installed, which should be at a ratio of 1:1 for any hollows removed; and*
 - v. identification of target species for nest box installation.**
- b) Undertake the works generally in accordance with the Fauna Management Plan required under part a) of this condition.*
- c) Submit to EDQ Development Assessment, DILGP a plan prepared by a suitably qualified professional documenting the location and type of nest boxes installed, and hollows relocated generally in accordance with the Fauna Management Plan required under part a) of this condition.*

1.2 The Subject Site

The site is located at 820 Greenbank Road, North Maclean and is formally described as Lot 2 on RP868726 (**FIGURE 1**). The site is located within the Greater Flagstone Priority Development Area (PDA). The site is approximately 20.25 ha in area. An aerial photograph of the site is shown in **FIGURE 2**.



LEGEND
[Red Outline] Subject Site

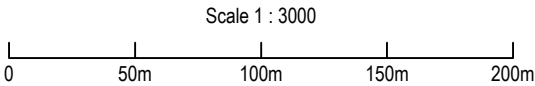


Scale 1 : 25 000
0 200m 400m 600m 800m 1000m

SOURCE: Google Maps	CLIENT Norhart Developments	FIGURE 1	TITLE LOCALITY PLAN
SCALE: 1 : 25 000 @ A3	PROJECT Fauna Management Plan Lot 2 on RP868726 820 Greenbank Road, North Maclean Logan City Council LGA		
JWA PTY LTD Ecological Consultants		PREPARED: BW DATE: 26 June 2025 FILE: Q15004_Base_20250623.dwg	



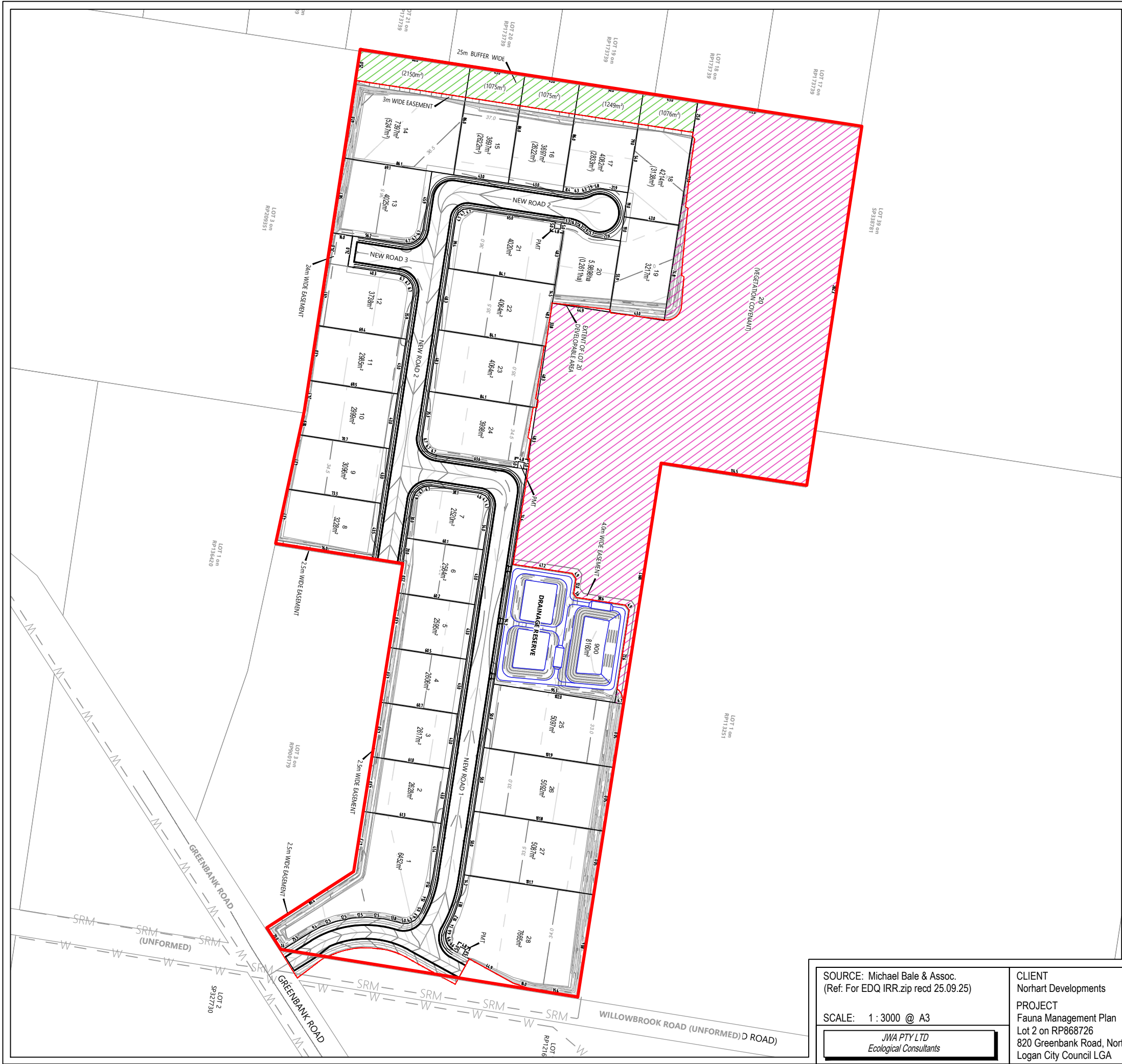
LEGEND
 Subject Site
 Cadastre



SOURCE: Metro Map Aerial dated 13/06/24 SCALE: 1 : 3000 @ A3 JWA PTY LTD Ecological Consultants	CLIENT Norhart Developments PROJECT Fauna Management Plan Lot 2 on RP868726 820 Greenbank Road, North Maclean Logan City Council LGA	FIGURE 2 PREPARED: BW DATE: 26 June 2025 FILE: Q15004_Base_20250623.dwg	TITLE AERIAL PHOTOGRAPH
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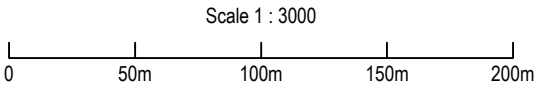
1.3 The Proposed Development

The proposed modified development is for a one (1) into twenty-nine (29) lot industrial subdivision plus new road and drainage reserves (**FIGURE 3**). An industrial access street will traverse the site from the southern boundary, north through the centre of the site. Services will be co-located within this road reserve. An 8,160 m² drainage reserve and stormwater bio basin will be located in the central portion of the site in the vicinity of the existing dam on site. Proposed Lots 14-18 and 20 will include vegetation covenant areas to protect retained vegetation and proposed rehabilitation areas.



LEGEND

- Subject Site
- Cadastre
- Development Layout**
 - Lot Boundary
 - Extent of Works Boundary
 - Finished Surface Level Contours - Major
 - Finished Surface Level Contours - Minor
 - Vegetation Covenant over Proposed Lots 14-18
 - Vegetation Covenant over Proposed Lot 20



SOURCE: Michael Bale & Assoc. (Ref: For EDQ IRR.zip recd 25.09.25)	CLIENT Norhart Developments PROJECT Fauna Management Plan Lot 2 on RP868726 820 Greenbank Road, North Maclean Logan City Council LGA	FIGURE 3	TITLE DEVELOPMENT LAYOUT
SCALE: 1 : 3000 @ A3		PREPARED: BW DATE: 30 September 2025 FILE: Q15004_Base_20250929.dwg	
JWA PTY LTD Ecological Consultants			

2 Fauna Assessment

2.1 Introduction

The following section provides an assessment of the existing fauna habitat values of the subject site. The fauna assessment involved a review of databases and previous site surveys undertaken by JWA in 2015 (JWA 2016), as well as site investigations completed by one (1) JWA Senior Ecologist on the 22nd April 2025.

2.2 Database Searches

Database searches were completed to generate a list of threatened and/or migratory fauna species that may occur within 5 km of the subject site. The desktop assessment included a review of the following databases:

- The Protected Matters Search Tool (PMST) was used to generate a list of threatened and migratory fauna species protected under the Commonwealth *Environment Protection Biodiversity and Conservation Act 1999* (EPBC Act).
- The QLD Department of Environment and Science (DES) wildlife online (WildNet) database was used to generate a list of threatened fauna species listed under the *QLD Nature Conservation (Animals) Regulation 2020* (NCAR).

Threatened fauna species detected in the database searches are listed in **TABLE 1**. Migratory species identified in database searches are listed in **TABLE 2**. The conservation status of each species is listed in accordance with the EPBC Act and NCAR. The following species that will clearly not occur on the subject site have been omitted:

- Fish, whales, dolphins, sharks, marine turtles, and marine reptiles;
- Oceanic / pelagic birds; and
- Marine / shorebirds.

TABLE 1
DATABASE RECORDS OF LISTED THREATENED FAUNA SPECIES

Scientific Name	Common Name	NCAR*	EPBC Act [#]
Amphibians			
<i>Adelotus brevis</i>	Tusked frog	V	-
<i>Mixophyes fleayi</i>	Fleay's frog	E	E
Birds			
<i>Anthochaera phrygia</i>	Regent honeyeater	-	CE
<i>Botaurus poiciloptilus</i>	Australasian bittern	E	E
<i>Calidris acuminata</i>	Sharp-tailed sandpiper	V	V
<i>Calyptorhynchus lathami</i>	Glossy Black-cockatoo	V	V
<i>Charadrius leschenaultii</i>	Greater Sand plover	V	V
<i>Climacteris picumnus victoriae</i>	Brown treecreeper (south-eastern)	V	V
<i>Cyclopsitta diophthalma coxeni</i>	Coxen's fig-parrot	CE	CE
<i>Erythrorhynchus radiatus</i>	Red goshawk	E	E
<i>Falco hypoleucos</i>	Grey falcon	V	V
<i>Gallinago hardwickii</i>	Latham's Snipe	V	V

Scientific Name	Common Name	NCAR*	EPBC Act [#]
<i>Geophaps scripta scripta</i>	Squatter pigeon (southern)	V	V
<i>Grantiella picta</i>	Painted honeyeater	V	V
<i>Hirundapus caudacutus</i>	White-throated needletail	V	V
<i>Lathamus discolor</i>	Swift parrot	E	CE
<i>Ninox strenua</i>	Powerful owl	V	-
<i>Rostratula australis</i>	Australian painted snipe	E	E
<i>Stagonopleura guttata</i>	Diamond firetail	V	V
<i>Tringa nebularia</i>	Common greenshank	E	E
<i>Turnix melanogaster</i>	Black-breasted button-quail	V	V
Invertebrates			
<i>Argynnis hyperbius inconstans</i>	Australian fritillary	E	CE
Mammals			
<i>Chalinolobus dwyeri</i>	Large-eared pied bat	E	E
<i>Dasyurus maculatus</i>	Spotted-tailed quoll (southern subspecies)	E	E
<i>Macroderma gigas</i>	Ghost Bat	E	V
<i>Petauroides volans</i>	Southern greater glider	E	E
<i>Petaurus australis</i>	Yellow-bellied glider (south-eastern)	V	V
<i>Phascolarctos cinereus</i>	Koala	E	E
<i>Potorous tridactylus tridactylus</i>	Long-nosed potoroo (northern)	V	V
<i>Pseudomys novaehollandiae</i>	New Holland Mouse	V	V
<i>Pteropus poliocephalus</i>	Grey-headed flying-fox	-	V
Reptiles			
<i>Hemiaspis damelii</i>	Grey Snake	E	E
<i>Coeranoscincus reticulatus</i>	Three-toed snake-tooth skink	-	V
<i>Delma torquata</i>	Adorned Delma	V	V
<i>Furina dunmalli</i>	Dunmall's Snake	V	V
* QLD Nature Conservation (Animals) Regulation 2020 (NCAR)			
[#] Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)			
CE - Critically Endangered, E - Endangered, V - Vulnerable			

TABLE 2
DATABASE RECORDS OF COMMONWEALTH LISTED MIGRATORY SPECIES

Scientific name	Common name	Status [#]
<i>Actitis hypoleucos</i>	Common sandpiper	M
<i>Apus pacificus</i>	Fork-tailed swift	M
<i>Calidris acuminata</i>	Sharp-tailed sandpiper	V, M
<i>Calidris ferruginea</i>	Curlew sandpiper	CE, M
<i>Calidris melanotos</i>	Pectoral sandpiper	M
<i>Charadrius leschenaultii</i>	Greater sand plover	V, M
<i>Cuculus optatus</i>	Oriental cuckoo	M
<i>Gallinago hardwickii</i>	Latham's snipe	V, M
<i>Hirundapus caudacutus</i>	White-throated needletail	V, M
<i>Motacilla flava</i>	Yellow wagtail	M
<i>Tringa nebularia</i>	Common greenshank	E, M
[#] Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)		
CE - Critically Endangered, E - Endangered, V - Vulnerable, M - Migratory		

2.3 Regional Ecosystems and Essential Habitat

The current Regulated Vegetation Management Map of the site includes Category B (Remnant) and Category C (Regrowth) Endangered Regional Ecosystems (REs) throughout the majority of the site, with the remainder of the site mapped as Category X (not regulated) vegetation.

The site is mapped as containing the following regional ecosystems (REs):

- RE 12.3.19 (Endangered) - *Eucalyptus moluccana* and/or *Eucalyptus tereticornis* and *Eucalyptus crebra* open forest to woodland, with a sparse to mid-dense understorey of *Melaleuca irbyana* on alluvial plains;
- RE 12.9-10.12 (Endangered) - Mixed woodland usually containing *Corymbia intermedia*, *Angophora leiocarpa* and at least the presence of *Eucalyptus seeana* on sedimentary rocks;
- RE 12.9-10.2 (Least Concern) - *Corymbia citriodora* subsp. *variegata* +/- *Eucalyptus crebra* open forest on sedimentary rocks;
- RE 12.9-10.27 (Endangered) - *Corymbia* and/or *Eucalyptus* dominated open forest with a very sparse to mid-dense understorey of *Melaleuca irbyana* on sedimentary rocks;
- RE 12.9-10.7 (Of Concern) - *Eucalyptus crebra* +/- *Eucalyptus tereticornis*, *Corymbia tessellaris*, *Angophora* spp. and *Eucalyptus melanophloia* woodland on sedimentary rocks.

Remnant vegetation on the site is mapped as containing essential habitat for the following species:

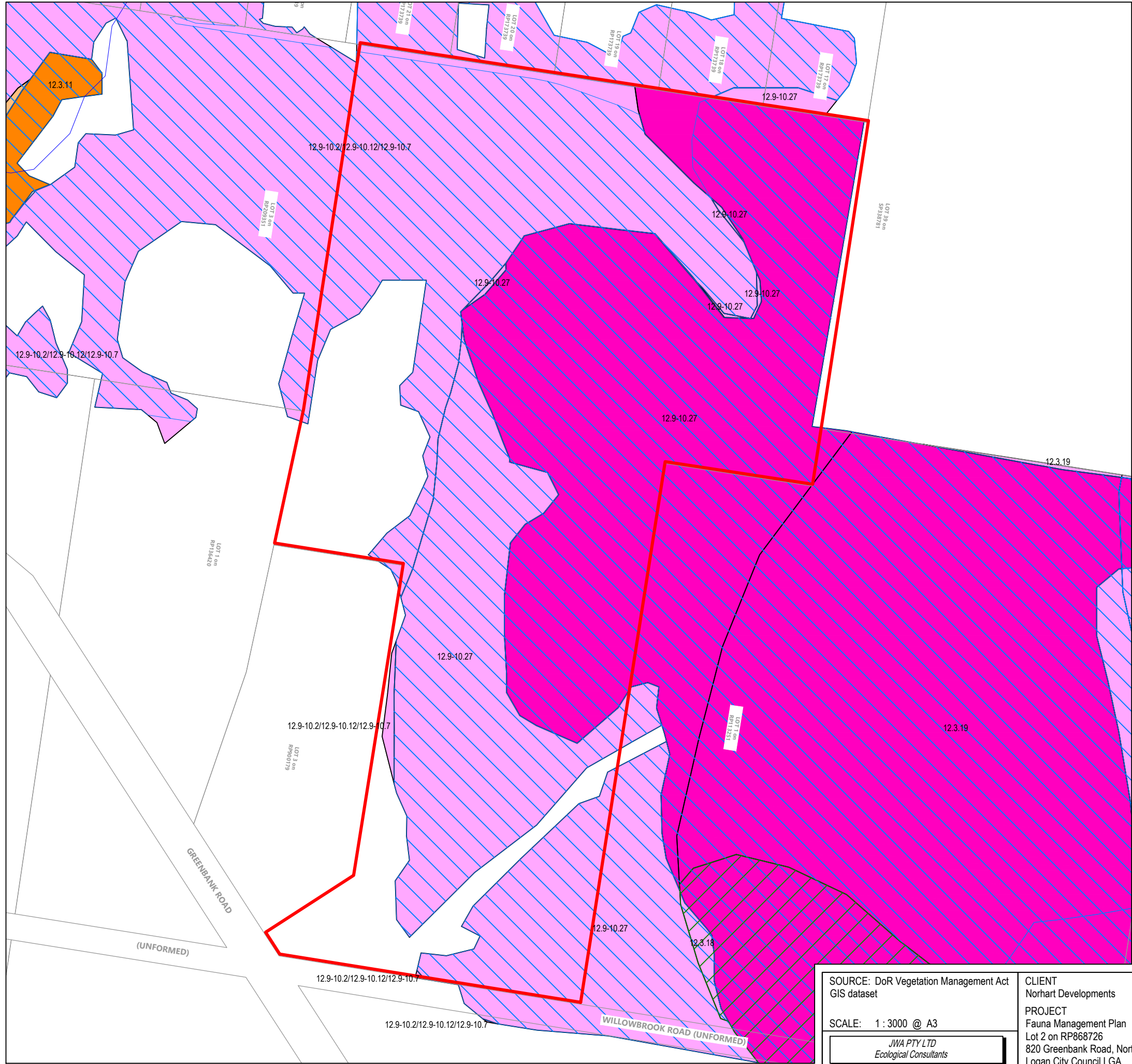
- Koala (*Phascolarctos cinereus*);
- *Melaleuca irbyana*; and
- Spotted-tailed quoll (southern subspecies) (*Dasyurus maculatus maculatus*).

FIGURE 4 shows the current regional ecosystems and essential habitat mapping for the site.

2.4 Vegetation Communities

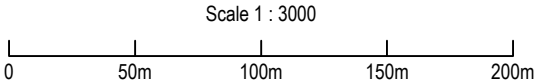
Four (4) broad vegetation communities were identified on the subject site (FIGURE 5):

- Community 1 - *Corymbia intermedia*, *Angophora leiocarpa*, *Eucalyptus tereticornis*, *Eucalyptus seeana* open forest with *Lophostemon suaveolens* sub canopy;
- Community 2 - *Eucalyptus seeana*, *Angophora leiocarpa*, *Eucalyptus tereticornis*, *Eucalyptus siderophloia* open forest with *Lophostemon suaveolens* sub canopy;

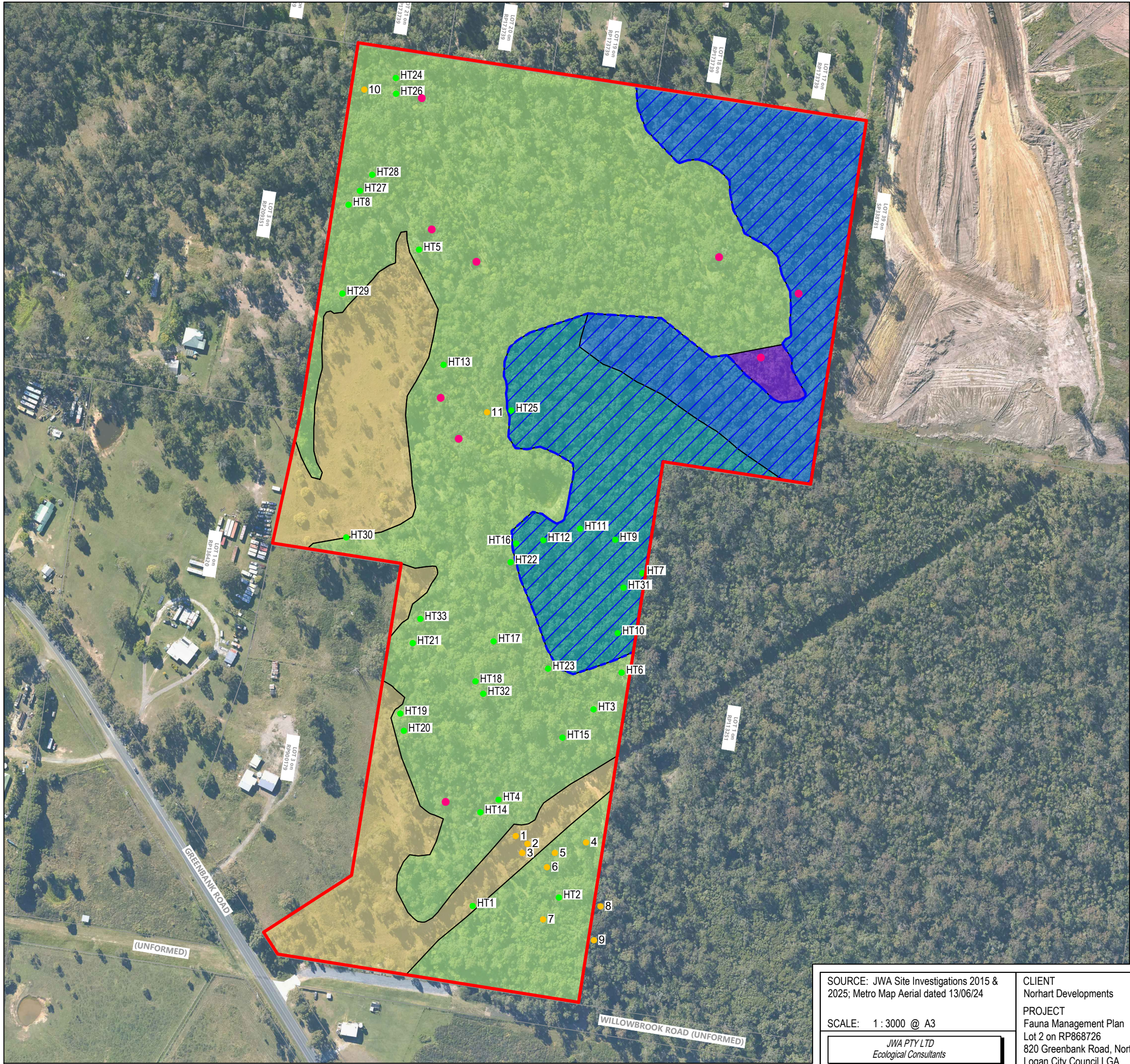


LEGEND

- Subject Site
- Cadastre
- Regional Ecosystems**
 - Category B area containing endangered regional ecosystems
 - Category B area containing of concern regional ecosystems
 - Category C area containing of concern regional ecosystems
 - Category X area
 - Wetland
 - Essential habitat
 - Watercourse and drainage feature



SOURCE: DoR Vegetation Management Act GIS dataset	CLIENT Norhart Developments	FIGURE 4		TITLE REGIONAL ECOSYSTEM
		PREPARED: BW DATE: 26 June 2025 FILE: Q15004_Base_20250623.dwg		
SCALE: 1 : 3000 @ A3	PROJECT Fauna Management Plan Lot 2 on RP868726 820 Greenbank Road, North Maclean Logan City Council LGA			
JWA PTY LTD Ecological Consultants				



LEGEND

- Subject Site
- Cadastre
- Habitat Tree

Threatened Species Records

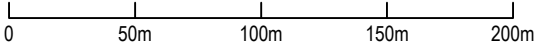
- *Melaleuca irbyana* Record
- Koala (*Phascolarctos cinereus*) Scat

Vegetation Communities

- Ground-truthed Endangered Regional Ecosystem Boundary
- Community 1 - *Corymbia intermedia*, *Angophora leiocarpa*, *Eucalyptus tereticornis*, *Eucalyptus seeana* open forest with *Lophostemon suaveolens* sub canopy
- Community 2 - *Eucalyptus seeana*, *Angophora leiocarpa*, *Eucalyptus tereticornis*, *Eucalyptus siderophloia* open forest with *Lophostemon suaveolens* sub canopy
- Community 3 - *Eucalyptus tereticornis*, *Eucalyptus siderophloia*, *Corymbia intermedia*, *Angophora leiocarpa*, *Eucalyptus seeana*, *Lophostemon suaveolens* open regrowth forest
- Community 4 - *Casuarina glauca* low forest with emergent *Eucalyptus tereticornis*
- Cleared paddock with isolated trees



Scale 1 : 3000



SOURCE: JWA Site Investigations 2015 & 2025; Metro Map Aerial dated 13/06/24

SCALE: 1 : 3000 @ A3

JWA PTY LTD
Ecological Consultants

CLIENT
Norhart Developments
PROJECT
Fauna Management Plan
Lot 2 on RP868726
820 Greenbank Road, North Maclean
Logan City Council LGA

FIGURE 5

PREPARED: BW
DATE: 10 July 2025
FILE: Q15004_Base_20250709.dwg

TITLE
VEGETATION
COMMUNITIES, HABITAT
TREES & THREATENED
SPECIES RECORDS

- Community 3 - *Eucalyptus tereticornis*, *Eucalyptus siderophloia*, *Corymbia intermedia*, *Angophora leiocarpa*, *Eucalyptus seeana*, *Lophostemon suaveolens* open regrowth forest; and
- Community 4 - *Allocasuarina littoralis* low forest with emergent *Eucalyptus tereticornis*.

The remaining portions of the site consist of cleared paddock with isolated trees.

2.5 Habitat Assessment

2.5.1 Introduction

Site habitats were assessed to determine their value for native fauna species. The assessment focused on identifying habitat features associated with threatened species as well as other native fauna groups. Particular attention was paid to habitat features such as:

- The presence of mature trees with hollows, fissures and/or other suitable roosting/nesting places.
- The presence of Koala food trees.
- The presence of preferred Glossy black cockatoo feed trees (Forest oak and/or Black she-oak).
- The presence of Yellow-bellied glider feeding scars.
- Condition, flow and water quality of drainage lines and bodies of water.
- Areas of dense vegetation.
- Presence of hollow logs/debris and areas of dense leaf litter.
- Presence of fruiting flora species.
- Presence of blossoming flora species, particularly winter-flowering species.
- Vegetation connectivity and proximity to neighbouring areas of intact vegetation.
- Presence of caves and man-made structures suitable as microchiropteran bat roost sites.

The following sections discuss the specific habitat requirements of each broad fauna groups and the availability of suitable habitat on the subject site.

2.5.2 Amphibians

Amphibians occurring in the region are poikilothermic, predominantly insectivorous and generally require free water for reproduction, with the exception of two (2) highland genera (*Assa darlingtoni* and *Philoria* spp.) The habitat requirements of most species are unlikely to be determined by forest cover or floristics, but are more strongly influenced by factors such as climate, distance to water bodies, riparian vegetation, hydrological

and morphological characteristics of water bodies and the availability of suitable micro-habitat for aestivation and shelter.

The majority of species that occur within the region lay eggs in or near temporary or permanent water bodies and rely on free water for larval development and metamorphosis. Of these species, only a few are dependent on forested habitats beyond the riparian zone or beyond areas of temporary inundation. These species include the Red-eyed tree frog (*Litoria chloris*), Leseuer's frog (*Litoria leseueri*), Fletchers frog (*Lechriodus fletcheri*) and the Barred frogs of the *Mixophyes* genus.

Four (4) native amphibian species were observed on site during the site surveys:

- Eastern dwarf treefrog (*Litoria fallax*);
- Common eastern froglet (*Crinia signifera*);
- Common green treefrog (*Litoria caerulea*); and
- Striped marsh frog (*Limnodynastes peronii*).

In addition, one (1) introduced amphibian species - the Cane toad (*Rhinella marinus*), was observed on site.

No threatened amphibian species were recorded.

Habitats on site have been degraded due to damage by grazing cattle, invasive weeds and erosion. Dams and drainage lines on the site contain suitable habitat for commonly occurring amphibian species such as the Green tree frog (*Litoria caerulea*), Eastern dwarf tree frog (*Litoria fallax*) and Common eastern froglet (*Crinia signifera*). Grasslands provide suitable habitat for a range of Amphibian species, particularly along drainage depressions and soaks. Native species commonly encountered in grassland communities include the Common eastern froglet, Eastern sign bearing froglet (*Crinia parinsignifera*), Striped marsh frog (*Limnodynastes peronii*), Spotted grass frog (*Limnodynastes tasmaniensis*), Eastern dwarf tree frog, Rocket frog (*Litoria nasuta*) and Whistling tree frog (*Litoria verreauxii*).

Species which typically occur in low elevation rainforest and permanent streams such as the Giant barred frog (*Mixophyes iteratus*) are not provided with any suitable habitat at the subject site.

2.5.3 Reptiles

As reptiles are poikilothermic, and predominantly insectivorous or carnivorous, their habitat requirements are less directly determined by vegetation species composition than other taxa which feed directly on plants. Reptile distributions are strongly influenced by structural characteristics of the vegetation, climate and other factors affecting thermoregulation such as shade and availability of shelter and basking sites (Smith *et al* 1994). In a survey of the moist forest herpetofauna of North-eastern NSW, Smith *et al* (1989) found that few species discriminated between rainforest and wet sclerophyll

forest, however, most species exhibited a response to differences in elevation and the availability of microhabitat components and other substrates.

The availability of microhabitats, of varying thermal properties is particularly important for most reptile species, as behavioural thermoregulation (regulation of body heat) is important in controlling critical body functions such as digestion, foraging activity and reproduction.

Reptile diversity and abundance is often (but not always) significantly higher in drier habitat types, particularly those with a wide variety of ground substrate microhabitats. This contrasts markedly with the distribution patterns of birds, and most mammals.

The single limiting factor in terms of species diversity in coastal vegetation is the lack of shelter sites (e.g. logs, tree hollows and decorticating bark). Such habitat components characterise eucalypt forests and woodlands, where species diversity may be much higher, depending on disturbance factors.

Six (6) native reptile species were observed on site during the site surveys:

- Bearded dragon (*Pogona barbata*);
- Lace monitor (*Varanus varius*);
- Elegant snake-eyed skink (*Cryptoblepharus pulcher pulcher*);
- Red-bellied black snake (*Pseudechis porphyriacus*);
- Friendly suns kink (*Lampropholis amicula*); and
- Garden skink (*Lampropholis delicata*).

No threatened reptile species were observed during the site surveys.

Suitable habitat for a range of native reptile species occurs throughout the site. Vegetation within drainage lines and surrounding dams is likely to act as refuge for aquatic and semi-aquatic reptiles during dry periods. Fallen logs and areas of deep leaf litter, particularly in the areas of remnant vegetation on the site, provide good quality habitat for reptiles. Commonly occurring reptile species such as Common garden skink (*Lampropholis delicata*), Friendly sun skink (*Lampropholis amicula*) and Carpet python (*Morelia spilota*) are likely to occur.

2.5.4 Birds

The significance of near coastal environments of the NSW Far North Coast and South-East Queensland as over-wintering habitat for migratory birds has been established by many observers and bird banders including Keast (1968), Robertson (1973), Gravatt (1974), Porter (1982) and Robertson and Woodall (1983). These patterns may be attributable to the relatively high winter temperatures and long growing season of this region compared with the rest of south-eastern Australia (Fitzpatrick and Nix 1973; Edwards 1979; Nix 1982; Specht *et al* 1981).

Many insectivorous birds from higher latitudes and elevation over-winter in the locality. These include species such as the Fantail cuckoo, Sacred kingfisher, Rainbow bee-eater, Noisy pitta, Tree martin, Black-faced cuckoo-shrike, Cicada bird, Golden whistler, Rufous whistler, Rose robin, Grey fantail, White-throated gerygone, Silvereye, Olive-backed oriole and Spangled drongo.

Birds such as honeyeaters and lorikeets are Blossom nomads (*ibid.*). These birds move locally in response to variation in the availability of nectar and or pollen, important components in their diet. Porter (1982) highlights the importance of Forest red gum, Broad-leaved paperbark and Coast banksia for Scaly-breasted and Rainbow lorikeets as these species flower during the lorikeet's winter breeding period. A sequence of important nectar bearing plants in the genera Eucalyptus, Banksia, Melaleuca and Callistemon provide a continuity of food for nectivorous birds.

Studies of bird usage in rainforest remnants by Holmes (1987), Connelly and Specht (1988) and Lott & Duigan (1993) indicate that the diversity and abundance of birds is related to the size of the Rainforest patches and their degree of isolation from major areas of native forest. Lott & Duigan (1993) and Howe *et al* (1981) also note that sites with a higher diversity of vegetation and those which are closer to water generally support a greater diversity of birds. Locally nomadic and migratory rainforest species such as the Wompoo, Rose-crowned and Superb fruit-doves, Common koel and Black-faced cuckoo-shrike are known to use scattered areas of habitat as "stepping-stones" between more intact areas of forest (Date *et al* 1992; Lott & Duigan 1993).

Forty-five (45) native bird species have been observed on site and are listed in **TABLE 3**. No threatened bird species were observed during the site surveys.

TABLE 3
BIRD SPECIES OBSERVED ON THE SUBJECT SITE

Common name	Scientific name
Australian king parrot	<i>Alisterus scapularis</i>
Australian wood duck	<i>Chenonetta jubata</i>
Barn owl	<i>Tyto alba</i>
Bar-shouldered dove	<i>Geopelia humeralis</i>
Black-faced cuckoo-shrike	<i>Coracina novaehollandiae</i>
Blue-faced honeyeater	<i>Entomyzon cyanotis</i>
Brown honeyeater	<i>Lichmera indistincta</i>
Common bronzewing	<i>Phaps chalcoptera</i>
Crested pigeon	<i>Ocyphaps lophotes</i>
Eastern yellow robin	<i>Eopsaltria australis</i>
Figbird	<i>Sphecotheres vieilloti</i>
Forest kingfisher	<i>Todiramphus macleayii</i>
Galah	<i>Eolophus roseicapilla</i>
Grey fantail	<i>Rhipidura albiscapa</i>
Laughing kookaburra	<i>Dacelo novaeguineae</i>
Lewin's honeyeater	<i>Meliphaga lewinii</i>
Magpie	<i>Gymnorhina tibicen</i>

Common name	Scientific name
Magpie lark	<i>Grallina cyanoleuca</i>
Masked lapwing	<i>Vanellus miles</i>
Mistletoebird	<i>Dicaeum hirundinaceum</i>
Noisy friarbird	<i>Philemon corniculatus</i>
Noisy miner	<i>Manorina melanocephala</i>
Olive-backed oriole	<i>Oriolus sagittatus</i>
Pale-headed rosella	<i>Platycercus adscitus</i>
Peaceful dove	<i>Geopelia placida</i>
Pheasant coucal	<i>Centropus phasianinus</i>
Pied butcherbird	<i>Cracticus nigrogularis</i>
Pied currawong	<i>Strepera graculina</i>
Rainbow lorikeet	<i>Trichoglossus moluccanus</i>
Red-backed fairy-wren	<i>Malurus melanocephalus</i>
Red-browed finch	<i>Neochmia temporalis</i>
Rufous whistler	<i>Pachycephala rufiventris</i>
Scaly-breasted lorikeet	<i>Trichoglossus chlorolepidotus</i>
Scarlet honeyeater	<i>Myzomela sanguinolenta</i>
Silvereye	<i>Zosterops lateralis</i>
Spangled drongo	<i>Dicrurus bracteatus</i>
Striated pardalote	<i>Pardalotus striatus</i>
Sulphur-crested cockatoo	<i>Cacatua galerita</i>
Tawny frogmouth	<i>Podargus strigoides</i>
Torresian crow	<i>Corvus orru</i>
Variegated fairy-wren	<i>Malurus lamberti</i>
White-browed scrubwren	<i>Sericornis frontalis</i>
White-throated gerygone	<i>Gerygone olivacea</i>
White-throated honeyeater	<i>Melithreptus albogularis</i>
Willie wagtail	<i>Rhipidura leucophrys</i>

The subject site provides suitable habitat for a range of native forest and woodland bird species. The habitats present on and adjacent to the subject site is likely to result in a moderate diversity of resident and nomadic birds occurring on the site over the year. The subject site provides suitable habitat for a range of disturbance adapted open country birds such as the Magpie (*Gymnorhina tibicen*), Lewin's honeyeater (*Meliphaga lewinii*), Torresian crow (*Corvus orru*), Magpie-lark (*Grallina cyanoleuca*) and Noisy miner (*Manorina melanocephala*).

Vegetation within drainage lines and surrounding the dams may provide habitat for semi-aquatic bird species such as ducks, rails and crakes, and generate food source for insectivorous birds such as the Willie wagtail (*Rhipidura leucophrys*), Grey fantail (*Rhipidura fuliginosa*), Spangled drongo (*Dicrurus bracteatus*), Welcome swallow (*Hirundo neoxena*) etc.

A number of mature hollow-bearing trees were observed and may provide nesting opportunities for hollow-dependent birds.

2.5.5 Mammals

Small terrestrial mammals generally occur in highest densities in association with a complex vegetation structure. A dense understorey layer, which provides shelter from predators and provides nesting opportunities, is particularly important.

In general, medium-large terrestrial mammals such as macropods select habitats which provide a dense cover for shelter and refuge and open areas for feeding. The larger species tend to occupy drier more open habitats: the smaller species, moister and more densely vegetated habitats.

All arboreal mammals that occur in the region (with the exception of the Koala) utilise tree hollows for nesting and shelter (although the Common ringtail possum is not dependent on hollows). Smith and Lindenmeyer (1988) consider that shortage of nest hollows is likely to limit arboreal mammal populations where density of hollow bearing trees is less than 2 to 8 trees per hectare.

Arboreal folivores (e.g. Common ringtail possum) are widespread and abundant but exhibit local variation in response to such factors as tree species composition, foliage protein and fibre levels, leaf toughness, toxins, forest structure and the availability of shelter sites. Arboreal folivores are expected to be most abundant in areas of high productivity, high soil fertility and moderate climate, in conjunction with adequate shelter and suitable foraging substrate.

Arboreal nectarivore/insectivores feed on a wide variety of plant and insect exudates including the nectar of flowering eucalypts, and shrubs such as Banksia and Acacia sp. These species also feed extensively on insects, particularly under the shedding bark of eucalypts. The distribution of nectarivore/insectivores is considered to be related to the abundance of nectar and pollen producing plants, the abundance of bark shedding eucalypts which harbour insect prey, and the occurrence of sap and gum exudate producing trees (Sap feed trees) and shrubs (e.g. Acacia sp.). Arboreal nectarivores and insectivores are generally hollow dependent species.

Insectivorous bats, like insectivorous birds, overlap considerably in diet and broad vegetation preferences (Hall 1981), but specialise in foraging in specific layers or substrates within the forest (Crome and Richards 1988).

A total of seven (7) species of mammal were recorded during site surveys, including evidence of one (1) threatened species - the Koala (*Phascolarctos cinereus*).

Evidence of Koala activity (i.e. scats) was also observed during the site assessment and preferred Koala food tree species were relatively common within site vegetation communities (i.e. *Eucalyptus tereticornis*, *E. seeana*). The Koala is listed as Endangered under the Commonwealth EPBC Act and the QLD NCAR.

Other native mammal species observed onsite included:

- Common brushtail possum (*Trichosurus vulpecula*);

- Common ringtail possum (*Pseudocheirus peregrinus*); and
- Eastern grey kangaroo (*Macropus giganteus*).

Three (3) introduced species were also observed onsite:

- Brown hare (*Lepus europaeus*);
- House mouse (*Mus musculus*); and
- Red fox (*Vulpes vulpes*).

Habitat on the subject site (and surrounds) is considered suitable to providing foraging and breeding opportunities for a range of common native terrestrial and arboreal mammal species.

The subject site may provide suitable habitat for the larger macropod species. Due to the restricted structural complexity and habitat diversity of the subject site is likely to support a low-moderate diversity and abundance of ground dwelling mammals.

A number of mature hollow-bearing trees were observed and may provide habitat for hollow-dependent species.

Flowering Eucalypt species may provide forage habitat for local flying fox species - Black flying-fox (*Pteropus alecto*) and the EPBC Act listed Grey-headed flying fox (*Pteropus poliocephalus*) (see **APPENDIX 1** for habitat suitability assessments). Vegetation on and adjacent to the subject site is likely to provide forage habitat for a low-moderate diversity and abundance of insectivorous bats, due to the combination of open and forested areas of vegetation.

2.6 Threatened Species Considered Possible Occurrences on the Subject Site

Based on the assessment of available habitat, threatened fauna species identified in the database searches (**TABLES 1 and 2**) were assessed for the likelihood of their occurrence on the subject site (**APPENDIX 1**). In addition to the Koala (*Phascolarctos cinereus*) which was recorded on the site, an additional four (4) threatened fauna species are also considered possible occurrences on the subject site over time:

- Glossy black-cockatoo (*Calyptorhynchus lathami*);
- Grey-headed flying-fox (*Pteropus poliocephalus*);
- Powerful owl (*Ninox strenua*); and
- Spotted-tail quoll (*Dasyurus maculatus maculatus*).

3 Vegetation Retention and Removal

The proposed development will result in the removal of approximately 10.59 ha of native vegetation, and 3.24 ha of paddocks with scattered trees. Direct impacts to vegetation communities as a result of the proposed development are summarised in **TABLE 4**. **FIGURE 6** shows the extent of vegetation to be retained and removed on the site.

TABLE 4
DIRECT IMPACTS ON VEGETATION COMMUNITIES

Vegetation Community	Existing Area	Area to be Retained	Areas to be Removed
Community 1 - <i>Corymbia intermedia</i> , <i>Angophora leiocarpa</i> , <i>Eucalyptus tereticornis</i> <i>Eucalyptus seeana</i> open forest with <i>Lophostemon suaveolens</i> sub canopy	2.48 ha	1.84 ha (74%)	0.64 ha (26%)
Community 2 - <i>Eucalyptus seeana</i> , <i>Angophora leiocarpa</i> , <i>Eucalyptus tereticornis</i> , <i>Eucalyptus siderophloia</i> open forest with <i>Lophostemon suaveolens</i> sub canopy	2.71 ha	2.63 ha (97%)	0.08 ha (3%)
Community 3 - <i>Eucalyptus tereticornis</i> , <i>Eucalyptus siderophloia</i> , <i>Corymbia intermedia</i> , <i>Angophora leiocarpa</i> , <i>Eucalyptus seeana</i> , <i>Lophostemon suaveolens</i> open regrowth forest	11.57 ha	1.70 ha (15%)	9.87 ha (85%)
Community 4 - <i>Allocasuarina littoralis</i> low forest with emergent <i>Eucalyptus tereticornis</i>	0.15 ha	0.15 ha (100%)	0 ha (98%)
Cleared with paddock trees	3.31 ha	0.07 ha (2%)	3.24 ha (98%)
TOTAL	20.22 ha	6.39 ha (32%)	13.83 ha (68%)

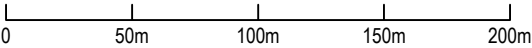


LEGEND

- Subject Site
- Cadastre
- Threatened Species Records**
 - *Melaleuca irbyana* to be Retained
 - *Melaleuca irbyana* to be Removed
- Habitat Trees**
 - Habitat Tree to be Retained
 - Habitat Tree to be Removed
- Vegetation Communities**
 - Ground-truthed Endangered Regional Ecosystem Boundary
 - Community 1 - *Corymbia intermedia*, *Angophora leiocarpa*, *Eucalyptus tereticornis*, *Eucalyptus seeana* open forest with *Lophostemon suaveolens* sub canopy
 - Community 2 - *Eucalyptus seeana*, *Angophora leiocarpa*, *Eucalyptus tereticornis*, *Eucalyptus siderophloia* open forest with *Lophostemon suaveolens* sub canopy
 - Community 3 - *Eucalyptus tereticornis*, *Eucalyptus siderophloia*, *Corymbia intermedia*, *Angophora leiocarpa*, *Eucalyptus seeana*, *Lophostemon suaveolens* open regrowth forest
 - Community 4 - *Casuarina glauca* low forest with emergent *Eucalyptus tereticornis*
 - Cleared paddock with isolated trees
- Development Layout**
 - Extent of Works
 - Lot Boundary
 - Extent of Works Boundary



Scale 1 : 3000



SOURCE: JWA Site Investigations 2015 & 2025; Michael Bale & Assoc (Ref: For EDQ IRR.zip recd 25.09.25) SCALE: 1 : 3000 @ A3 JWA PTY LTD Ecological Consultants	CLIENT Norhart Developments PROJECT Fauna Management Plan Lot 2 on RP868726 820 Greenbank Road, North Maclean Logan City Council LGA	FIGURE 6	TITLE IMPACT ON VEGETATION COMMUNITIES, HABITAT TREES & THREATENED SPECIES RECORDS
		PREPARED: BW DATE: 30 September 2025 FILE: Q15004_Base_20250929.dwg	

4 Fauna Management Strategies

4.1 Introduction

This section contains specific management strategies for mitigating and/or minimising the potential impacts on fauna during clearing works on the subject site. These strategies incorporate general best practice measures to minimise potential adverse impacts on fauna, including significant species.

4.2 Site Induction

All construction personnel are to complete a site induction prior to starting works on the site. The site induction will aim to ensure personnel are aware of the environmental issues on the site and their responsibilities and procedures under this FMP.

4.3 Identification of Retained/Removed Vegetation

Areas of vegetation to be retained and removed are shown on **FIGURE 6**. These areas will be identified and demarcated prior to the commencement of site preparation works. Vegetation clearing operations shall be completed in a manner that minimises and/or mitigates the potential impacts on vegetation as a result of development activities on the subject site.

4.4 Provision of Spotter Catcher

A suitably qualified fauna spotter catcher will be appointed to conduct a pre-clearing site inspection and is to be present during clearing. The spotter catcher is to direct the civil works contractor in relation to any fauna issues. The contractor will provide access to equipment that may be required by the spotter catcher (e.g. cherry picker, chainsaw) as well as qualified operators.

4.5 Pre-clearing Site Inspection

The following fauna protection strategies will be implemented prior to commencement of any vegetation clearing works.

1. Prior to clearing operations, a suitably qualified ecologist will inspect the site for habitat trees or other habitat features. Habitat trees are defined as those trees that provide suitable refuge and nesting resources for arboreal and avian fauna. These include hollow-bearing trees and trees with fissures, termitaria, etc. Larger, old growth trees are also considered to be habitat trees as they are likely to provide greater amounts of foraging resources, cover, and a high number of potential hollows. Dead (stag) trees are also regarded as important habitat trees as they provide roosting and nesting resources.
2. Any habitat trees or habitat features identified on site will be identified using flagging tape or similar method and shown on appropriately scaled plans. A pre-clearing report shall be prepared prior to clearing which will detail any relevant observations made on site including the presence of habitat trees.

4.6 Clearing Procedures

4.6.1 General Procedures

In order to ensure the most suitable ecological outcome and to ensure that possible impacts on significant species are minimised, the following clearing procedures shall be followed:

1. The operational direction of ground clearing works shall be completed in a manner that ensures maximum fauna movement away from operational works towards areas of retained habitat (**FIGURE 7**). Electric and barbed fencing is not to be utilised within or adjacent to the construction area.
2. The clearing of vegetation and other works will be completed in a direction towards areas of retained vegetation (**FIGURE 7**). This disturbance stimuli will provide fauna with time to leave the site, thus maximising the chances of fauna survival while reducing the need for human intervention for translocation or rescue purposes.
3. The use of temporary fauna proof barrier fencing may be necessary to direct fauna to the fauna relocation area and away from works areas and main roads.
4. No tree is to be cleared if wildlife is present, or if the crown of the tree overlaps one in which fauna is present.

4.6.2 Staged Clearing

4.6.2.1 Background

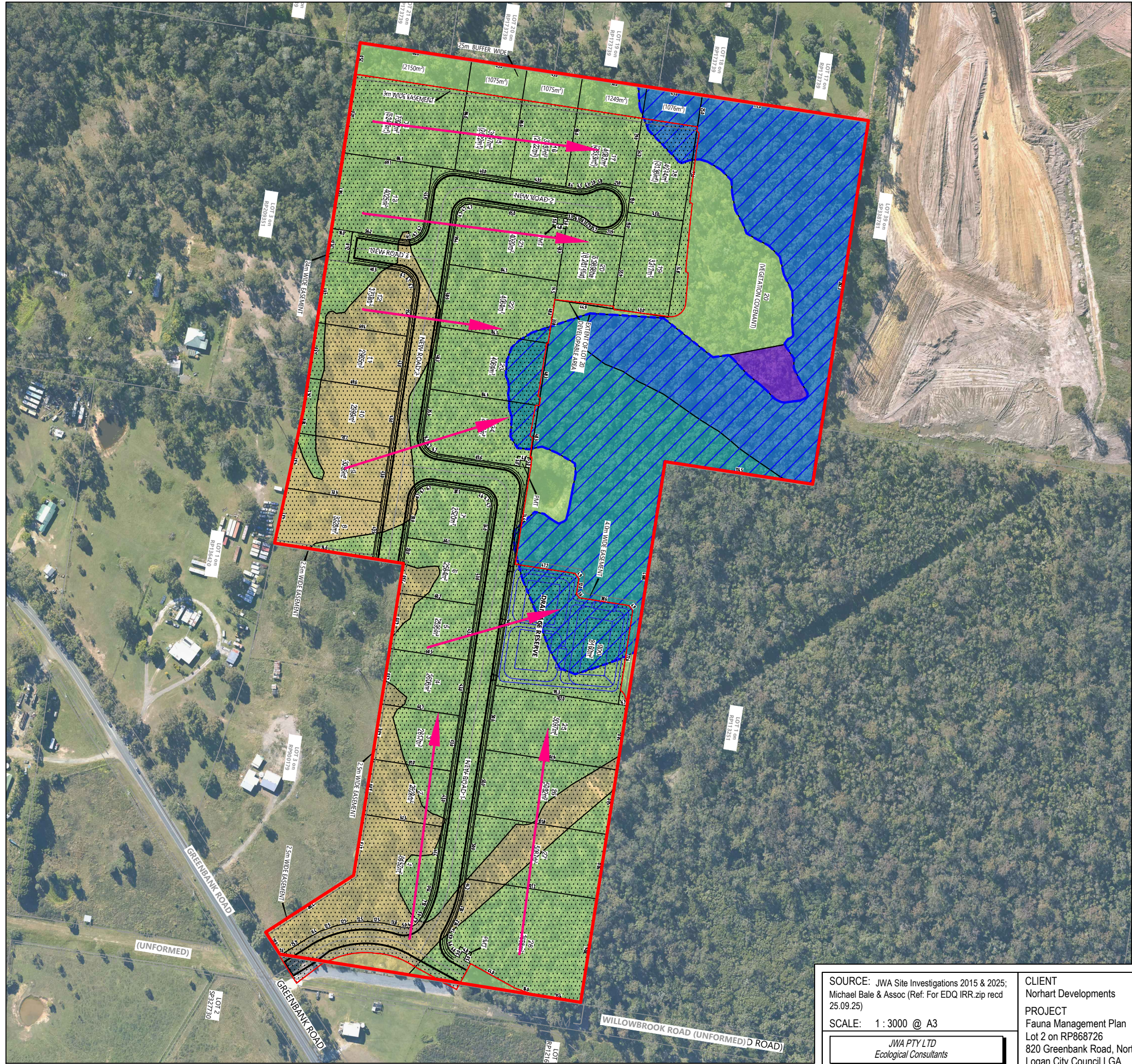
Clearing shall be completed using a staged approach where the smaller non-habitat trees are removed in the first stage with the larger remaining habitat trees removed after the initial clearing. This staged method provides a disturbance stimulus and provides fauna with time to leave the site, thus maximising the chances of fauna survival while reducing the need for human intervention for translocation or rescue purposes.

4.6.2.2 Under Scrubbing

Immediately after the site has been trapped, and the extent of the trapped area clearly identified, the groundcover and midstorey will be cleared utilising a slasher with a mulching head attachment or similar. Any hollow-bearing trees and/or other significant habitat features identified during the initial site inspection will be retained. All under scrubbing works will be completed with a suitably qualified fauna spotter catcher in attendance.

4.6.2.3 Clearing Non-habitat Trees

Immediately after under scrubbing of each area is complete, non-habitat trees (i.e. trees other than those identified as habitat trees) will be cleared and stockpiled for mulching. Clearing of non-habitat trees will only occur where their removal will not impact on identified habitat trees (e.g. canopies do not interconnect with habitat trees). All clearing works will be completed with a suitably qualified fauna spotter catcher in attendance.



LEGEND

- Subject Site
- Cadastre
- Direction of Clearing

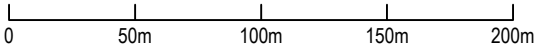
Vegetation Communities

- Ground-truthed Endangered Regional Ecosystem Boundary
- Community 1 - *Corymbia intermedia*, *Angophora leiocarpa*, *Eucalyptus tereticornis*, *Eucalyptus seeana* open forest with *Lophostemon suaveolens* sub canopy
- Community 2 - *Eucalyptus seeana*, *Angophora leiocarpa*, *Eucalyptus tereticornis*, *Eucalyptus siderophloia* open forest with *Lophostemon suaveolens* sub canopy
- Community 3 - *Eucalyptus tereticornis*, *Eucalyptus siderophloia*, *Corymbia intermedia*, *Angophora leiocarpa*, *Eucalyptus seeana*, *Lophostemon suaveolens* open regrowth forest
- Community 4 - *Casuarina glauca* low forest with emergent *Eucalyptus tereticornis*
- Cleared paddock with isolated trees

Development Layout

- Extent of Works
- Lot Boundary
- Extent of Works Boundary

Scale 1 : 3000



SOURCE: JWA Site Investigations 2015 & 2025;
Michael Bale & Assoc (Ref: For EDQ IRR.zip recd
25.09.25)

SCALE: 1 : 3000 @ A3

JWA PTY LTD
Ecological Consultants

CLIENT
Norhart Developments
PROJECT
Fauna Management Plan
Lot 2 on RP868726
820 Greenbank Road, North Maclean
Logan City Council LGA

FIGURE 7

PREPARED: BW
DATE: 30 September 2025
FILE: Q15004_Base_20250929.dwg

TITLE
DIRECTION OF
CLEARING

4.6.2.4 Hollow Inspection and Removal

After under scrubbing and clearing of non-habitat trees, the following hollow inspection and removal protocols will be implemented.

1. An elevated work platform or cherry-picker will be used in conjunction with a chainsaw operator and suitably qualified fauna spotter catcher to inspect and remove hollows as necessary prior to habitat tree felling. This method involves the fauna spotter catcher inspecting each of the potential habitat features (usually hollows, dreys and arboreal termite nests) to determine the presence of arboreal fauna. This process is detailed following the step-by-step basis below:
 - a. The fauna spotter catcher (with arborist unless the fauna spotter catcher is a qualified chainsaw operator) will inspect each visible hollow or potential habitat resource (i.e. ringtail possum drey) identified in each tree using the cherry-picker. This is usually carried out by simply looking into hollows with the assistance of a small torch, however, burrow and bore-scopes can also be useful for deep hollows.
 - b. If fauna is located within a hollow, a piece of towel or rag will be firmly placed in the entrance to prevent the wildlife from escaping as in most cases arboreal fauna becomes aware of the presence of the fauna spotter catcher and may attempt to flee the nesting/denning hollow due to a perceived threat. If an occupied ringtail possum drey is encountered, the fauna spotter catcher should quietly approach (i.e. avoid contacting other branches) the drey in the cherry-picker bucket and physically capture the possum by placing the entire drey in a catch bag or only the possum if it emerges from the drey. If arboreal fauna are captured, or able to be easily removed from hollows, they will be relocated to a suitable habitat area/s on or adjacent to the site the same day of capture.
 - c. Once the hollow entrance has been secured the arborist or fauna spotter catcher will cut the entire hollow limb off below the cavity where the branch remains solid. In circumstances where a hollow continues into the main stem of the tree, a small window will be carefully cut into the hollow, allowing the fauna spotter catcher to plug the hollow above and below the window, then the hollow limb removed and lowered to the ground in sections.
 - d. When the fauna has been safely secured within its hollow, the entire limb can then be placed in the cherry-picker bucket or lowered to the ground using ropes depending on the size of the limb.
 - e. This limb will then be placed in a cool, quiet location until translocation to a suitable donor site the same day of capture, when at dusk the hollow entrance is re-opened to allow the fauna to emerge of its own accord.
2. Once all hollows within the habitat trees have been inspected and cleared, the tree may be removed. All clearing works will be completed with a suitably qualified fauna spotter catcher in attendance.

3. Where possible, the actual felling of the habitat trees shall be conducted in a manner that will maximize the chances of survival for any fauna remaining within the tree. This shall involve pushing rather than cutting, and cushioning the tree fall with other felled timber and foliage. Following felling, a second inspection of the relevant trees shall be carried out to relocate fauna disturbed by the clearing process or remaining within the felled timber to a suitable location.
4. Any fauna captured on site during clearing works will be relocated/translocated by the spotter catcher to a suitable habitat area/s on or adjacent to the site the same day of capture.
5. Any injured animals requiring treatment or euthanasia shall be immediately removed and taken to an appropriately qualified veterinary surgeon. Any animals requiring support or rehabilitation other than vet assistance will be taken to a qualified wildlife carer or centre.
6. A post clearing Fauna Spotter Report will be prepared within two (2) weeks of completion of clearing activities.

4.7 Protocols for Captured Fauna

Any fauna captured on site during clearing works will be relocated/translocated by the spotter catcher to a suitable habitat area/s on or adjacent to the site the same day of capture. The relocation area selected should be well vegetated and provide appropriate habitat for the species being released. Nocturnal animals (i.e. bats, gliders, etc.) should be released at dusk.

4.8 Protocols for Injured Fauna

Any injured animals requiring treatment or euthanasia shall be immediately removed and taken to an appropriately qualified veterinary surgeon.

Contact details for the nearest veterinary clinics are provided below.

North Maclean Family Vet

Shop 2/4656/4664 Mount Lindesay Highway, North MacLean QLD 4280
(07) 3297 0803

The Bloomin' Vet

Shop 16/15 Pub Lane, Greenbank QLD 4124
(07) 3297 6666

Furkids Veterinary Surgery

2/2/8 Sheppards Drive, Greenbank QLD 4124
(07) 3200 0498

Any animals requiring support or rehabilitation other than vet assistance will be taken to a qualified wildlife carer or centre.

4.9 Tree Hollow Replacement

The loss of potential roosting/breeding sites for fauna is to be ameliorated by the installation of nest boxes within retained vegetation on site. Hollows to be removed for the development will be replaced at a ratio of at least 1:1. Nest boxes are to be installed under the supervision of an Ecologist in suitable locations within the Balance Lot (Lot 901).

The following protocol is to be observed in relation to the installation of nest boxes:

- Nest boxes are to be installed at a minimum ratio of 1:1.
- Each box is to be installed at a height and aspect that is appropriate for the target species.
- The exact locations of the installed nest boxes are to be determined on site at the time of installation.
- Recipient trees are not to be harmed during the installation. Therefore, the boxes are to be installed by the use of a machine such as a cherry picker or manually, using spikeless climbing techniques.
- The boxes are to be installed in retained vegetation as close as possible to the trees to be felled.
- Data are to be collected for each installation including box type, identifying number, location, height, aspect and the species and size of the host tree.
- The boxes must be sourced from reputable suppliers that are experienced in making nest boxes for the target fauna groups/species. The boxes must be sturdy and weather-proof, with thick walls of and secure lids to prevent entry by predators.

It is recommended that the CYPLAS range of nest boxes manufactured by Hollow Log Homes (<https://www.hollowloghomes.com/cyplas-range>) are utilised on site. CYPLAS boxes are made from 100% recycled, high density polyethylene and Queensland Cypress. All boxes come with the Habisure System™ ready to be installed, are termite and rot proof, and have a lifespan of 30+ years. The 30+ year lifespan of the CYPLAS range makes these boxes preferable to the Birch Plywood Boxes that only offer a lifespan of 5-10 years.

An initial audit of the hollow-bearing trees to be removed was completed by one (1) JWA Senior Ecologist on the 22nd April 2025. Thirty-three (33) hollow-bearing trees were identified within the vicinity of the development footprint. Details of the identified hollow-bearing trees are provided in **TABLE 5** and the trees are shown on **FIGURE 5**. The proposed development will result in the removal of twenty-eight (28) of these hollow-bearing trees (**TABLE 5** and **FIGURE 6**). These twenty-eight (28) hollow-bearing trees contain a total of twenty-eight (28) small hollows, eight (8) medium hollows and seven (7) termitaria.

TABLE 5
HOLLOW BEARING TREES IDENTIFIED WITHIN THE DEVELOPMENT FOOTPRINT

ID	Species	Height	DBH	Spread	Habitat Feature	Retained/ Removed
HT1	<i>Lophostemon suaveolens</i>	10m	31cm	3m	Termitarium	Remove
HT2	<i>Eucalyptus tereticornis</i>	18m	39cm	6m	3x small spouts	Remove
HT3	<i>Angophora leiocarpa</i>	18m	47cm	5m	1x small spout	Remove
HT4	<i>Eucalyptus tereticornis</i>	19m	50cm	7m	1x small hollow	Remove
HT5	Standing stag	6m	28cm		1x medium spout	Remove
HT6	Standing stag	17m	72cm		3x small spouts + 2x medium spouts	Remove
HT7	Standing stag	14m	31cm		2x small spouts	Retain
HT8	Standing stag	10m	50cm		2x small spouts + 1x medium spout	Remove
HT9	<i>Lophostemon suaveolens</i>	14m	98cm	6m	3x medium hollows	Retain
HT10	<i>Lophostemon suaveolens</i>	10m	23cm	3m	Termitarium	Remove
HT11	<i>Eucalyptus siderophloia</i>	19m	70cm	7m	Termitarium	Retain
HT12	<i>Eucalyptus siderophloia</i>	17m	31cm	6m	Termitarium	Retain
HT13	<i>Eucalyptus siderophloia</i>	13m	41cm	3m	Termitarium	Remove
HT14	<i>Eucalyptus siderophloia</i>	10m	25cm	3m	Termitarium	Remove
HT15	<i>Eucalyptus siderophloia</i>	10m	24cm	3m	Termitarium	Remove
HT16	<i>Eucalyptus seeana</i>	13m	35cmx2	5m	1x small hollow	Remove
HT17	<i>Eucalyptus tessellaris</i>	20m	30cm	4m	1x small spout	Remove
HT18	<i>Eucalyptus tereticornis</i>	21m	51cm	6m	1x small spout	Remove
HT19	<i>Eucalyptus tereticornis</i>	21m	101cm	9m	2x medium spouts	Remove
HT20	<i>Eucalyptus tereticornis</i>	20m	71cm	7m	1x small spout	Remove
HT21	<i>Eucalyptus tereticornis</i>	19m	83cm	9m	3x small spouts	Remove
HT22	<i>Eucalyptus tereticornis</i>	11m	20cmx2	3m	1x medium hollow	Remove
HT23	<i>Eucalyptus seeana</i>	17m	40cmx3	6m	1x small spout	Remove

ID	Species	Height	DBH	Spread	Habitat Feature	Retained/ Removed
HT24	<i>Eucalyptus seeana</i>	13m	41cm	4m	1x small spout	Remove
HT25	<i>Angophora leiocarpa</i>	8m	25cm	1m	1x small spout	Remove
HT26	<i>Angophora leiocarpa</i>	20m	70cm	7m	2x small spouts	Remove
HT27	<i>Angophora leiocarpa</i>	19m	42cm	6m	1x medium spout	Remove
HT28	<i>Angophora leiocarpa</i>	17m	41cm	5m	2x small spouts	Remove
HT29	<i>Angophora leiocarpa</i>	17m	40cm	5m	3x small spouts	Remove
HT30	<i>Angophora leiocarpa</i>	14m	44cm	5m	1x small spout	Remove
HT31	<i>Angophora leiocarpa</i>	11m	26cm	3m	1x small hollow	Retain
HT32	<i>Acacia disparrima</i>	9m	24cm	3m	Termitarium	Remove
HT33	<i>Acacia disparrima</i>	8m	32cm	4m	Termitarium	Remove

Based on a 1:1 offset ratio, and an assessment of the fauna species recorded from the site or considered a possible occurrence, particularly the Threatened species that rely on hollows, JWA recommend the installation of the following nest boxes:

- 14 x bat boxes (Approx. 300mm l, 160mm w, 340mm h, bottom opening);
- 14 x small parrot boxes (Approx. 180mm l, 200mm w, 490mm h, 75mm opening);
- 4 x possum box (Approx. 260mm l, 340mm w, 460mm h, 110mm opening); and
- 4 x black cockatoo/large owl box (Approx. 360mm l, 490mm w, 640mm h, 150mm opening).

The nest boxes are to be erected at least one (1) month prior to the felling of the hollow-bearing trees. Additional/supplementary boxes may need to be installed after the felled trees are inspected during clearing works and the numbers and characteristics of the hollows properly determined. The fauna spotter catcher is to accurately document the number, sizes and types of hollows removed to ensure that adequate numbers and types of nest boxes have been provided. Additional/supplementary nest boxes (if required) are to be erected as soon as possible after the clearing.

4.10 Light, Dust, Noise and Vibration

4.10.1 Light Emissions

Artificial lighting from infrastructure and machinery may impact fauna within the Project area during construction. Artificial lighting can have a range of impacts which vary between species. Artificial light can disrupt patterns of both nocturnal and diurnal species by eliciting responses. Some species may avoid brightly lit areas, potentially due to the perception of being increased risk of predation. Conversely, some species such as nocturnal reptiles, frogs and bats may congregate at artificial light sources to feed on insects attracted to light.

Other potential adverse impacts include disruption of breeding and migratory patterns, disorientation and potential collision with structures.

To manage/mitigate potential impacts of artificial lighting on fauna during the construction phase, construction activities will be limited to daytime hours where practicable.

4.10.2 Dust

Increased dust from vegetation clearing, earthworks and vehicle movements during construction has the potential to temporarily and locally impact flora and fauna values in the vicinity of the Project footprint. Excess generation of dust and subsequent deposition on leaves can impair plant photosynthesis and productivity, resulting in reduced habitat quality for fauna. Increased dust can also impact on respiratory systems of fauna, alter soil properties impacting on plant species assemblages and reduce water quality in aquatic habitats.

Dust is expected to only be a potential issue during vegetation clearing and construction. Management/ mitigation measures include:

- Areas which have potential to generate airborne dust will be wetted down regularly.
- Low speed limits will be implemented on site to minimise dust generation.
- Areas stripped of topsoil not required for operation will be rehabilitated as soon as practicable.
- Machinery and vehicle tyres will be regularly cleaned to reduce wheel entrained dust emissions or consider use of vibration grids.
- Water spraying of nearby sensitive vegetation should be considered if visible dust sedimentation is observed.

4.10.3 Noise and Vibration

Noise may adversely affect fauna by interfering with communication (e.g. territorial bird song), masking the sound of predators and prey, causing avoidance reactions and displacement from habitat. Construction noise will be generated through the use of machinery, plant and vehicles. Project construction works and therefore potential noise impacts will be temporary.

Vibration from vehicles and equipment may cause temporary disturbance to fauna, and displacement or structural damage to habitat for fauna.

To manage/mitigate potential impacts of noise and vibration on fauna during the construction phase, construction activities will be limited to daytime hours where practicable.

4.11 General Management Protocols for Fauna Groups

4.11.1 Introduction

A brief summary addressing the removal and relocation methods for each broad faunal group is provided in the sections below. Each summary has considered that species observed on site and those species likely to occur in the area to be disturbed.

4.11.2 Amphibians

Potential habitat areas due to be disturbed will be inspected for the presence of amphibians prior to the commencement of clearing. In the event that an amphibian is identified in an area of disturbance, the animal will be captured and relocated. To reduce the risk of disease, hygiene protocols will follow the Hygiene protocols for the control of diseases in Australian frogs (Murray *et al.* 2011). Amphibians will be handled with unused, non-powdered and talc-free gloves. To minimize stress and the risk of death during translocation, translocation will comply with standard operating procedures. Amphibians will be transported in single-use light weight plastic bags and released as soon as possible to reduce stress.

4.11.3 Reptiles

Potential habitat areas due to be disturbed will be inspected for the presence of reptiles prior to the commencement of clearing. This will involve the searching of leaf litter piles and debris prior to clearing or if areas are to be traversed by machinery. In the event that a reptile is identified in a tree to be removed, the animal will be captured and relocated.

4.11.4 Birds

Birds will be “flushed” from areas of disturbance using appropriate techniques. Canopy dwelling birds shall be “flushed” by gently nudging the tree with machinery prior to felling. For ground dwelling birds, the spotter catcher will traverse any potential habitat areas on foot prior to the commencement of clearing in order to locate and “flush out” any birds.

In the event that bird eggs are found within a tree to be felled and are not readily identifiable as belonging to a threatened bird species, the eggs will be removed and taken to a wildlife rehabilitation centre or carer for incubation.

4.11.5 Mammals

All trees to be removed is to be inspected by the spotter catcher for denning or nesting animals prior to the commencement of clearing. All mammals occurring within a tree will be flushed out using the earthworks machinery to nudge the tree. If the animal cannot be “flushed” from the tree, the animal will be removed. The animal is to be removed by placing a pillow slip over the hollow end of the branch and removing the limb by chain sawing the other end.

Any bats captured will be held temporarily in separate cloth bags in a cool, quiet dark location and released at dusk. If bats are held during the day measures will be taken to ensure they are kept adequately hydrated.

Koalas shall not be handled or interfered with in any way but rather allowed to move on overnight. Refer to **SECTION 4.11.3** for management actions specific to koalas.

4.11.6 Issues Relating to all Fauna

No dogs are to be permitted on site during clearing works.

4.12 Threatened Species Management Protocols

4.12.1 Introduction

In the event that any Commonwealth or State listed significant fauna species occur on the subject site during clearing operations, the following fauna management actions shall be implemented.

4.12.2 Frogs

In the event that any threatened frogs are identified within disturbance areas, whether habitat or otherwise, the frogs will be captured and relocated to adjacent habitat. See **Section 4.12.2** for minimising disease risk during translocation.

4.12.3 Koalas

All koala habitat trees with a diameter of 10 cm at 1.3 m above ground height must only be cleared in the presence of a fauna spotter catcher with appropriate koala experience. In the event that a koala is identified in any tree marked for removal, whether habitat or otherwise, that tree is not to be removed until the koala has dispersed from the tree and a 10 m buffer is to be established within which there is to be no works occurring until the koala has moved on of its own accord. The nudging of trees with koalas is not permitted. The tree can only to be removed following inspection by the fauna spotter catcher to ensure that the koala has dispersed and that the removal of the tree poses no direct threat to the health or survival of the koala. Koalas are not to be handled.

4.12.4 Grey-headed Flying Fox

In the event that a Grey-headed flying fox roost tree is identified that tree is not to be removed or modified until the animal has dispersed from the tree. If required, the tree shall be left overnight to enable the flying fox to move away. The tree shall only to be removed following its inspection by an appropriately qualified ecologist to ensure that the animal(s) have dispersed and that the removal of the tree poses no direct threat to the health or survival of the flying fox.

4.12.5 Gliders

In the event that a glider den tree is identified that tree is not to be removed or modified until the animals have dispersed or been relocated from the tree by a fauna spotter catcher. The tree shall only to be removed following its inspection by an appropriately qualified ecologist to ensure that the animal(s) have dispersed and that the removal of the tree poses no direct threat to the health or survival of the gliders.

5 Monitoring and Reporting

5.1 Introduction

This section provides details of the monitoring and reporting requirements under this FMP.

5.2 Fauna Spotter Catcher Reports

A pre-clearing report shall be prepared prior to clearing which will detail any relevant observations made on site including the presence of habitat trees and requirements for the installation of nest boxes (refer to **SECTION 4.9**).

A post-clearing report shall be prepared within two (2) weeks of completion of clearing activities. The report shall at a minimum contain the following information:

- Conformance with conditions of this FMP;
- The length of time of the clearing;
- Details of any animal/s that were caught and/or sighted and released, and the placement of any released animals;
- Details of any animals that were destroyed due to injury; and
- Any breaches of conditions of this FMP.

5.3 Nest Box Monitoring and Maintenance

5.3.1 *Monitoring and Maintenance Program*

Monitoring of nest boxes is to be completed for three (3) years and will be the responsibility of the proponent. Criteria outlining the performance indicators and corrective actions are provided in **SECTION 5.3.2** below.

The boxes will be physically inspected bi-annually (i.e. twice a year) during the summer and winter seasons to account for seasonal patterns of nest box use. Monitoring will either involve the use of a ladder or an inspection camera mounted on an extendable pole to physically inspect the contents of nest boxes. Visual inspection will enable the observer to perform a close inspection for signs of fauna occupancy including feathers, droppings/scats, hair, nesting material and animals themselves. Monitoring should be undertaken by 1-2 individuals trained to identify and handle fauna (so target species are not unnecessarily removed or harassed and in the event that non-target species are found in the boxes).

Monitoring should determine the occupation of the boxes by the target species and highlight any maintenance actions that are required. During each monitoring event, a visual inspection of each nest box should be completed, and the following information recorded:

- Any native/pest species occupancy;

- Any nest box maintenance requirements; and
- Any changes to the surrounding landscape (i.e. clearing, partial clearing, fauna mitigation devices such as underpasses installed).

During monitoring, any maintenance requirements should be considered including:

- The need to remove non-target species such as European bees and ants;
- Replacement of fallen or damaged nest boxes;
- The GPS location of any damaged boxes;
- Re-positioning, re-installation and/or relocation of any wrongly installed or ineffective nest boxes; and
- Checking that each box is not holding water.

5.3.2 Monitoring Criteria

The performance of the Nest Box monitoring program should be assessed against the following parameters:

- Use of nest boxes by a wide range of native fauna;
- Use of nest boxes designed for target species being used by that species;
- Low rates of usage by exotic fauna;
- Low maintenance requirements.

Corrective actions to be implemented should the nest boxes be deemed ineffective are provided in **TABLE 6**.

TABLE 6
NEST BOX PERFORMANCE MONITORING AND CORRECTIVE ACTION PLAN

Performance Indicator	Corrective Actions
Nest box not being used by target species	Review the location, type and number of nest boxes used.
Poor usage rate by native fauna (i.e. a box found to be not in use by target fauna on three consecutive monitoring events)	
Nest boxes become occupied by exotic or invasive fauna	Review/change nest box design and/or placement on tree to exclude undesirable species, treat if applicable or relocate those nest boxes to another location.
Nest boxes damaged or faulty	Repair or replace nest box within one (1) month of monitoring event where damage or fault was noted.
Nest boxes deteriorating rapidly and require maintenance	Identify causes of nest box failure, modify design and construct accordingly.

5.3.3 Monitoring Reports

A Nest Box Monitoring Report should be prepared every six (6) months after each bi-annual monitoring inspection. The report should detail the results of the nest box monitoring, any corrective actions taken and the success of the program against the performance criteria.

6 Summary

JWA Pty Ltd have been engaged by Norhart Developments to prepare a Fauna Management Plan (FMP) for an industrial subdivision at 820 Greenbank Road, North Maclean.

This FMP provides specific measures for mitigating and/or minimising the potential impacts on fauna as a result of vegetation clearing and development activities on the subject site. Specific actions include:

- The use of a suitably qualified fauna spotter catcher;
- Identification and demarcation of retained and removed vegetation;
- Protocols for the capture and relocation of fauna;
- Protocols for the treatment of injured fauna;
- Tree hollow replacement; and
- Specific threatened species management protocols for:
 - Frogs;
 - Koala;
 - Grey-headed flying fox; and
 - Gliders.

Implementation of the fauna management strategies outlined in this FMP will minimise potential impacts on native fauna due to the proposed clearing and earthworks by ensuring all native fauna are safely relocated to neighbouring vegetation and that fauna injury or death during clearing operations is avoided.

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APPENDIX 1 - Habitat Suitability Assessments

Scientific Name	Common Name	NCAR*	EPBC Act#	Habitat Requirements ¹	Habitat Assessment	Likelihood of Occurrence
Amphibians						
<i>Adelotus brevis</i>	Tusked frog	V	-	This species prefers rainforests, wet sclerophyll forests and grasslands. It is generally found under logs and leaf-litter along streams and dams (NSW OEH 2014).	No watercourses occur on the site, except for one dam which is not connected to other aquatic or vegetated areas.	Unlikely
<i>Mixophyes fleayi</i>	Fleay's frog	E	E	Fleay's frog is associated with montane rainforest (Corben & Ingram 1987) and open forest communities adjoining rainforest (Hines 2001, pers. comm.). The species occurs along stream habitats from first to third order streams (i.e. small streams close to their origin through to permanent streams with grades of 1 in 50) and is not found in ponds or ephemeral pools. Adults may be found in leaf litter and along watercourses in rainforest and adjoining wet sclerophyll forests (Hines & SEQTFRT 2002).	No suitable habitat observed onsite.	Unlikely
Birds						
<i>Actitis hypoleucos</i>	Common sandpiper	-	M	This species utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats. This species has been recorded in estuaries and deltas of streams, as well as on banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties. This species generally forages in shallow	No suitable habitat observed onsite.	Unlikely

Scientific Name	Common Name	NCAR*	EPBC Act [#]	Habitat Requirements ¹	Habitat Assessment	Likelihood of Occurrence
				water and on bare soft mud at the edges of wetlands; often where obstacles project from substrate, e.g. rocks or mangrove roots. Birds sometimes venture into grassy areas adjoining wetlands. Roost sites are typically on rocks or in roots or branches of vegetation, especially mangroves (Dept. Environment 2012).		
<i>Anthochaera phrygia</i>	Regent honeyeater	-	CE	The regent honeyeater is found from Dalby in Queensland, south to Bendigo in Victoria, especially along the ranges and the western slopes. Its distribution is extremely patchy with only a small number of known breeding sites. The estimated total population is between 350 and 400 mature individuals. Potential habitat for this species includes dry eucalypt woodland and open forest, rural and urban areas with mature eucalypts. It favours ironbark-box associations, mugga ironbark (<i>Eucalyptus sideroxylon</i>), white box (<i>E. albens</i>), and yellow box (<i>E. melliodora</i>). Other habitat includes swamp mahogany (<i>E. robusta</i>), spotted gum (<i>Corymbia maculata</i>), or river she-oak (<i>Casuarina cunninghamiana</i>) with associated needle-leaf mistletoe (<i>Amyema cambagei</i>). This species generally prefers wetter, more fertile sites that are reliable nectar producers (both in timing and quantity), such as creek flats, river valleys and lower slopes (OEH 2014).	No suitable habitat observed onsite.	Unlikely
<i>Apus pacificus</i>	Fork-tailed swift	-	M	This is a primarily aerial species, usually occurring above dry or open habitats, but also occasionally above rainforest and wet sclerophyll forests. They have been recorded above settled areas such as farmlands, towns, and cities.	No suitable habitat observed onsite.	Unlikely

Scientific Name	Common Name	NCAR*	EPBC Act [#]	Habitat Requirements ¹	Habitat Assessment	Likelihood of Occurrence
<i>Botaurus poiciloptilus</i>	Australasian bittern	E	E	The Australasian bittern is widespread but uncommon in south-west and south-east Australia, generally preferring freshwater habitats with tall, dense vegetation with bulrushes and spike rushes.	No suitable habitat observed onsite.	Unlikely
<i>Calidris acuminata</i>	Sharp-tailed sandpiper	V	V, M	The Sharp-tailed Sandpiper prefers the grassy edges of shallow inland freshwater wetlands. It is also found around sewage farms, flooded fields, mudflats, mangroves, rocky shores and beaches. Its breeding habitat in Siberia is the peat-hummock and lichen tundra of the high Arctic.	No suitable habitat observed onsite.	Unlikely
<i>Calidris ferruginea</i>	Curlew sandpiper	CE	CE, M	It generally occupies littoral and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats of sheltered coasts. It also occurs in non-tidal swamps, lakes and lagoons on the coast and sometimes inland. It forages in or at the edge of shallow water, occasionally on exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed.	No suitable habitat observed onsite.	Unlikely
<i>Calidris melanotos</i>	Pectoral sandpiper	-	M	Small, migratory wader that prefers shallow fresh to saline wetlands. This species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands.	No suitable habitat observed onsite.	Unlikely
<i>Calyptorhynchus lathamii</i>	Glossy Black-cockatoo	V	V	This species is associated with woodland or open sclerophyll forests with populations of Allocasuarina, which comprise its exclusive diet. They require large old trees with hollows for nesting.	Some suitable habitat observed onsite.	Possible
<i>Charadrius</i>	Greater	V	V, M	In the non-breeding grounds in Australasia, the species is almost entirely coastal, inhabiting littoral and estuarine	No suitable habitat	Unlikely

Scientific Name	Common Name	NCAR*	EPBC Act [#]	Habitat Requirements ¹	Habitat Assessment	Likelihood of Occurrence
<i>leschenaultii</i>	Sand plover			habitats. They mainly occur on sheltered sandy, shelly or muddy beaches with large intertidal mudflats or sandbanks, as well as sandy estuarine lagoons, and inshore reefs, rock platforms, small rocky islands or sand cays on coral reefs. They are occasionally recorded on near-coastal saltworks and saltlakes, including marginal saltmarsh, and on brackish swamps. They seldom occur at shallow freshwater wetlands.	observed onsite.	
<i>Climacteris picumnus victoriae</i>	Brown treecreeper (south-eastern)	V	V	Found in eucalypt woodlands and dry open forest of the inland slopes and plains inland of the Great Dividing Range. This species mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species. It is also found in mallee and River Red Gum (<i>Eucalyptus camaldulensis</i>) Forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses. Fallen timber is an important habitat component for foraging. The Brown treecreeper has been recorded, though less commonly, in similar woodland habitats on the coastal ranges and plains. Hollows in standing dead or live trees and tree stumps are essential for nesting.	No suitable habitat observed onsite.	Unlikely
<i>Cuculus optatus</i>	Oriental cuckoo	-	M	This species is found in monsoon forests, the edges of rainforests, treed paddocks, mangroves, roadsides, and river flats (Pizzey and Knight 1999).	No suitable habitat observed onsite.	Unlikely
<i>Cyclopsitta diophthalma coxeni</i>	Coxen's fig-parrot	CE	CE	Usually recorded from drier rainforests and adjacent wetter eucalypt forest but rarely seen due to its small size and cryptic habits. Also found in the wetter lowland rainforests that are now largely cleared in New South	No suitable habitat observed onsite.	Unlikely

Scientific Name	Common Name	NCAR*	EPBC Act [#]	Habitat Requirements ¹	Habitat Assessment	Likelihood of Occurrence
				Wales.		
<i>Erythrotriorchis radiatus</i>	Red goshawk	E	E	This species occupies open forests and woodlands along rivers and wetlands and rainforest fringes. In New South Wales favoured habitat includes Melaleuca forest along coastal rivers (Debus 1991, 1993).	No suitable habitat observed onsite.	Unlikely
<i>Falco hypoleucos</i>	Grey falcon	V	V	This species is associated with arid or semi-arid environments, where it can be found in shrublands, grasslands, watercourses, and wetlands.	No suitable habitat observed onsite.	Unlikely
<i>Gallinago hardwickii</i>	Latham's Snipe	V	V, M	This species generally occupies flooded meadows, seasonal or semi-permanent swamps, or open waters bogs, waterholes, billabongs, lagoons, lakes, creek or river margins, river pools and floodplains. Dense fringing vegetation is preferred by this species, but it has been recorded in waterlogged paddocks.	No suitable habitat observed onsite.	Unlikely
<i>Geophaps scripta scripta</i>	Squatter pigeon (southern)	V	V	Well-draining, gravelly, sandy or loamy soils support the open-forest to woodland communities with patchy, tussock-grassy understories that support the subspecies' foraging and breeding requirements. Given that the subspecies nests in shallow depressions in the ground, it requires well-draining soils. Natural foraging habitat is remnant or regrowth open-forest to sparse, open-woodland or scrub dominated by Eucalyptus, Corymbia, Acacia or Callitris species, on sandy or gravelly soils, within 3 km of a suitable, permanent or seasonal waterbody (Squatter Pigeon Workshop 2011). Breeding habitat occurs on stony rises occurring on sandy or gravelly soils, within 1 km of a suitable, permanent waterbody (Squatter Pigeon	No suitable habitat observed onsite.	Unlikely

Scientific Name	Common Name	NCAR*	EPBC Act [#]	Habitat Requirements ¹	Habitat Assessment	Likelihood of Occurrence
				Workshop 2011).		
<i>Grantiella picta</i>	Painted honeyeater	V	V	The Painted Honeyeater is found in dry open forests and woodlands and is strongly associated with mistletoe. It may also be found along rivers, on plains with scattered trees and on farmland with remnant vegetation. It has been seen in urban parks and gardens where large eucalypts are available.	No suitable habitat observed onsite.	Unlikely
<i>Hirundapus caudacutus</i>	White-throated needletail	V	V, M	This species is recorded in all coastal regions of Queensland and New South Wales and almost always forages aerially. Most often, the species is recorded above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy, but they are less commonly recorded flying above woodland.	No suitable habitat observed onsite.	Unlikely
<i>Lathamus discolor</i>	Swift parrot	E	CE	The swift parrot migrates from its Tasmanian breeding grounds to overwinter in the box-ironbark forests and woodlands of Victoria, New South Wales, and southern Queensland. In Southeast Queensland, narrow-leaved ironbark and forest red gum forests are commonly utilized (Kennedy and Tzaros 2005, Saunders and Tzaros 2011, Swift Parrot Recovery Team 2001).	No suitable habitat observed onsite.	Unlikely
<i>Motacilla flava</i>	Yellow wagtail	-	M	Inhabits open country near water, such as wet meadows. It nests in tussocks.	No suitable habitat observed onsite.	Unlikely
<i>Ninox strenua</i>	Powerful owl	V	-	The Powerful Owl is found in open forests and woodlands, as well as along sheltered gullies in wet forests with dense understoreys, especially along watercourses. Will sometimes be found in open areas near forests such as farmland, parks and suburban areas,	Some suitable habitat occurs onsite.	Possible

Scientific Name	Common Name	NCAR*	EPBC Act [#]	Habitat Requirements ¹	Habitat Assessment	Likelihood of Occurrence
				as well as in remnant bushland patches. Needs old growth trees to nest.		
<i>Rostratula australis</i>	Australian painted snipe	E	E	This species inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps, and clay pans. They also use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains. Typical sites include those with emergent tussocks of grass, sedges, rushes or reeds, or samphire; often with scattered clumps of lignum <i>Muehlenbeckia</i> or canegrass or sometimes tea-tree (<i>Melaleuca</i>). Breeding habitat requirements appear to be specific and includes shallow wetlands with areas of bare wet mud, with both upper and canopy cover nearby. Nest records are predominately from or near small islands in freshwater wetlands, provided that these islands are a combination of very shallow water, exposed mud, dense low cover and sometimes some tall dense cover.	No suitable habitat observed onsite.	Unlikely
<i>Stagonopleura guttata</i>	Diamond firetail	V	V	The Diamond firetail is typically found in grassy eucalypt woodlands (including Box-Gum woodlands and Snow Gum <i>Eucalyptus pauciflora</i> woodlands) and is often found in riparian areas (rivers and creeks), and sometimes in lightly wooded farmland. It also occurs in open forest, mallee, natural temperate grassland, and in secondary grassland derived from other communities. Nests are built either in the shrubby understorey, or higher up, especially under hawk's or raven's nests. Birds roost in dense shrubs or in smaller nests built especially for roosting.	No suitable habitat observed onsite.	Unlikely

Scientific Name	Common Name	NCAR*	EPBC Act [#]	Habitat Requirements ¹	Habitat Assessment	Likelihood of Occurrence
<i>Tringa nebularia</i>	Common greenshank	E	E, M	The Common greenshank is found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. It occurs in sheltered coastal habitats, typically with large mudflats and Saltmarsh, mangroves or seagrass. Habitats include embayments, harbours, river estuaries, deltas and lagoons and are recorded less often in round tidal pools, rock-flats and rock platforms. The species uses both permanent and ephemeral terrestrial wetlands, including swamps, lakes, dams, rivers, creeks, billabongs, waterholes and inundated floodplains, claypans and saltflats. It will also use artificial wetlands, including sewage farms and saltworks dams, inundated rice crops and bores. The edges of the wetlands used are generally of mud or clay, occasionally of sand, and may be bare or with emergent or fringing vegetation, including short sedges and saltmarsh, mangroves, thickets of rushes, and dead or live trees. It was once recorded with Black-winged Stilts (<i>Himantopus himantopus</i>) in pasture but are generally not found in dry grassland (Higgins & Davies 1996).	No suitable habitat observed onsite.	Unlikely
<i>Turnix melanogaster</i>	Black-breasted button-quail	V	V	This species is restricted to areas mostly with 770-1200 mm rainfall per annum. They prefer drier low closed forests, particularly semi-evergreen vine thicket, low microphyll vine forest, Araucarian microphyll vine forest and Araucarian notophyll vine forest. This species may also be found in low, dense acacia thickets and in littoral areas, in vegetation behind sand dunes. An extensive dense leaf-litter layer is required for foraging and possibly also roosting. Fallen logs and a dense,	No suitable habitat observed onsite.	Unlikely

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				heterogeneously distributed shrub layers are also considered to be important habitat characteristics for shelter and breeding.		
Invertebrates						
<i>Argynnis hyperbius inconstans</i>	Australian fritillary	E	CE	The Australian Fritillary is found in open swampy coastal habitat. Eggs are laid singly on a leaf of the caterpillar's food plant, the Arrowhead Violet (<i>Viola betonicifolia</i>). The food plant occurs in the vegetation ground layer beneath grasses and mat-rushes (<i>Lomandra</i> spp.).	No suitable habitat observed onsite.	Unlikely
Mammals						
<i>Chalinolobus dwyeri</i>	Large-eared pied bat	E	E	This species requires a combination of sandstone cliff/escarpment to provide roosting habitat that is adjacent to higher fertility sites, particularly box gum woodlands or river/rainforest corridors that are used for foraging. Almost all records have been found within several kilometres of cliff lines or rocky terrain. Roosting has also been observed in disused mine shafts, caves, overhangs, and disused fairy martin (<i>Hirundo ariel</i>) nests. The structure of primary nursery roosts appears to be very specific, <i>i.e.</i> arch caves with dome roofs (that need to be deep enough to allow juvenile bats to learn to fly safely inside) and with indentations in the roof (presumably to allow the capture of heat). These physical characteristics are very uncommon in the landscape and therefore a limiting factor to the species distribution.	No suitable habitat observed onsite.	Unlikely
<i>Dasyurus maculatus</i>	Spotted-tailed quoll	E	E	This species is recorded from a wide range of habitats, including montane rainforests, sclerophyll forests (<i>e.g.</i>	Some suitable habitat occurs onsite.	Possible

Scientific Name	Common Name	NCAR*	EPBC Act [#]	Habitat Requirements ¹	Habitat Assessment	Likelihood of Occurrence
	(southern subspecies)			open, closed, wet), coastal heathlands, sub-alpine woodlands, and riparian forests. It prefers mature wet forests that have not been logged and require large areas of relatively intact forest for foraging. Preferred den sites include hollow logs, caves, or rocky outcrops for daytime shelter.		
<i>Macroderma gigas</i>	Ghost Bat	E	V	The ghost bat is a monotypic species endemic to northern Australia, where they rely of roost sites that include caves, rock crevices and disused mine adits.	No suitable habitat observed onsite.	Unlikely
<i>Petauroides volans</i>	Southern greater glider	E	E	This species is found in eucalypt forests and woodlands. It prefers forests with a good diversity of eucalypt species to provide consistent forage opportunities year-round, and is found in the greatest abundance in tall, montane, moist old growth forests.	No suitable habitat observed onsite.	Unlikely
<i>Petaurus australis</i>	Yellow-bellied glider (south-eastern)	V	V	Occur in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils.	No suitable habitat observed onsite.	Unlikely
<i>Phascolarctos cinereus</i>	Koala	E	E	This species inhabits a range of temperate, sub-tropical and tropical forest, woodland and semi-arid communities where suitable food trees are present. The koala is a leaf-eating specialist that feeds primarily during dawn, dusk, or night. Its diet is restricted mainly to foliage of a small selection of preferred <i>Eucalyptus</i> spp; however, it may also consume foliage of related genera, including <i>Corymbia</i> spp., <i>Angophora</i> spp., <i>Melaleuca</i> spp., and <i>Lophostemon</i> spp.	Suitable habitat and evidence of activity recorded on site.	RECORDED ONSITE

Scientific Name	Common Name	NCAR*	EPBC Act [#]	Habitat Requirements ¹	Habitat Assessment	Likelihood of Occurrence
<i>Potorous tridactylus tridactylus</i>	Long-nosed potoroo (northern)	V	V	This species inhabits coastal heath and dry and wet sclerophyll forests. Dense understorey with occasional open areas is an important habitat feature, and may consist of grasstrees, sedges, ferns, or heath, or of low shrubs of tea-trees or melaleucas. A sandy loam soil is also a common feature.	No suitable habitat observed onsite.	Unlikely
<i>Pseudomys novaehollandiae</i>	New Holland Mouse	V	V	Known to inhabit open heathlands, woodlands and forests with a heathland understorey and vegetated sand dunes.	No suitable habitat observed onsite.	Unlikely
<i>Pteropus poliocephalus</i>	Grey-headed flying-fox	-	V	This species occurs in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths, and swamps as well as urban gardens and cultivated fruit crops. This species feeds on the nectar and pollen of native trees, in particular <i>Eucalyptus</i> , <i>Melaleuca</i> and <i>Banksia</i> , and fruits of rainforest trees and vines. It also feeds on commercial fruit crops and on introduced tree species in urban areas. The grey-headed flying-fox roosts in aggregations of various sizes on exposed branches. Roost sites are generally located within 20 km of a regular food source and are typically located near water, such as lakes, rivers, or the coast. Roost vegetation includes rainforest patches, stands of <i>Melaleuca</i> , mangroves and riparian vegetation, but colonies also use highly modified vegetation in urban and suburban areas. The species can maintain fidelity to roost sites for extended periods, although new sites have been colonized.	Some suitable habitat occurs onsite.	Possible
Reptiles						

Scientific Name	Common Name	NCAR*	EPBC Act [#]	Habitat Requirements ¹	Habitat Assessment	Likelihood of Occurrence
<i>Hemiaspis damelii</i>	Grey Snake	E	E	Key attributes of grey snake habitat are the floodplains and ephemeral wetlands which provide breeding habitat for the frog species that are its main prey, the presence of the frog species themselves, and the heavy clay soils which provide cracks and crevices that the species uses in its hunting strategy and for shelter.	No suitable habitat observed onsite.	Unlikely
<i>Coeranoscincus reticulatus</i>	Three-toed snake-tooth skink	-	V	This species inhabits rainforest and occasionally moist eucalypt forest, on loamy or sandy soils. This species feeds on earthworms and beetle grubs and is found in leaf litter, often immediately adjacent to fallen tree trunks.	No suitable habitat observed onsite.	Unlikely
<i>Delma torquata</i>	Adorned Delma	V	V	Due to specific habitat requirements, this species distribution is highly fragmented and restricted to only a few locations. The collared delma is known from the western suburbs of Brisbane, Queensland and the following sites: Bunya Mountains, Blackdown Tableland National Park (NP), Bullyard Conservation Park, D'Aguilar Range NP, Expedition NP, Naumgna and Lockyer Forest Reserves, Western Creek near Millmerran and the Toowoomba Range. This species inhabits eucalypt dominated woodland and open forest where it is associated with suitable micro-habitats (exposed rocky outcrops). The ground cover is predominantly native grasses, such as kangaroo grass (<i>Themeda triandra</i>), barbed-wire grass (<i>Cymbopogon refractus</i>), wiregrass (<i>Aristida</i> sp.) and Lomandra (<i>Lomandra</i> sp.). The presence of rocks, logs, bark and other coarse woody debris, and leaf litter (typically 30-100 mm thick) appears to be an essential characteristic of the collared	No suitable habitat observed onsite.	Unlikely

Scientific Name	Common Name	NCAR*	EPBC Act [#]	Habitat Requirements ¹	Habitat Assessment	Likelihood of Occurrence
				delma microhabitat, and these features are always present where the species occurs.		
<i>Furina dunmalli</i>	Dunmall's Snake	V	V	Preferred habitat is Brigalow forest and woodland with fallen timber and ground litter, growing on cracking clay soils and clay loam soils. Also occurs in eucalypt and Callitris woodland with fallen timber and ground litter.	No suitable habitat observed onsite.	Unlikely
* QLD Nature Conservation (Animal) Regulation 2020 (NCAR) # Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) CE - Critically Endangered, E - Endangered, V - Vulnerable, M - Migratory ¹ Sources (including specific literature references) from: - DAWE (2022) <i>Species Profile and Threats Database</i>. Department of Agriculture, Water and the Environment (DAWE). Australian Government. Available at http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl. - DES (2022) <i>Species Profile Search</i>. Department of Environment and Science (DES), Queensland Government. - DoPIE (2022) <i>Threatened biodiversity profile search</i>. Office of Environment and Heritage, Department of Planning, Industry and Environment (DoPIE), New South Wales Government.						