Ecological Assessment – Matters of National Environmental Significance

EPBC Act Referral – MNES Flora and Fauna

633 Ripley Road, Ripley

Prepared for BCove 4 Pty Ltd
24 September 2020

Job 10143 E

saunders havill group

Document Control

Document: 10143 E Ripley Road, Ripley, Ecological Assessment – Matters of National Environmental Significance, prepared by Saunders Havill Group for BCove 4 Pty Ltd, dated 11 September 2020.

Document Issue

Issue	Date	Prepared By	Checked By
Issue A	31.07.2020	AW /JG	AD
Issue B	11.09.2020	AW	AD
Issue C	24.09.2020	HS	AD

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1. Introduction

Saunders Havill Group (SHG) was engaged by BCove 4 Pty Ltd to carry out an ecological assessment of Matters of National Environmental Significance (MNES) to support a referral under the Commonwealth Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The purpose of this report is to identify potential MNES, specifically listed threatened species that may be impacted by the proposed urban development ('the action') of land located at 633 Ripley Road, Ripley, Queensland ('the site').

1.1. Description of the Action

BCove 4 Pty Ltd ('the Proponent') is proposing to develop a residential community on land located at 633 Ripley Road, Ripley, described as Lot 2 on RP806983 (refer **Figure 1** and **Figure 2** for site context and aerial imagery). The site is located within the urban core of the Ripley Valley PDA and the broader surrounding area includes residential developments, future sports precinct and town centre shopping precinct. The referral area is inclusive of the infill residential development that aligns with the adjoining residential approval EPBC 2015/7513), and is separate to the town centre development (EPBC 2015/7417) that is for a different purpose and will be constructed by a different proponent.

The referral area accounts for a total of 11 hectares (ha). The proposed action involves the creation of a residential development within the urban core of the Ripley Valley PDA. The proposed action includes mixed-density residential dwellings, a local park area, sub arterial road, internal road network, and supporting infrastructure. This will involve the construction of 123 dwellings across 115 allotments. Refer to **Figure 3** for the proposed development layout.

1.2. Purpose

This ecological assessment has been prepared to support a referral to the Australian Government's Department of Agriculture, Water and the Environment ('the Department') for assessment against the EPBC Act. The purpose is to:

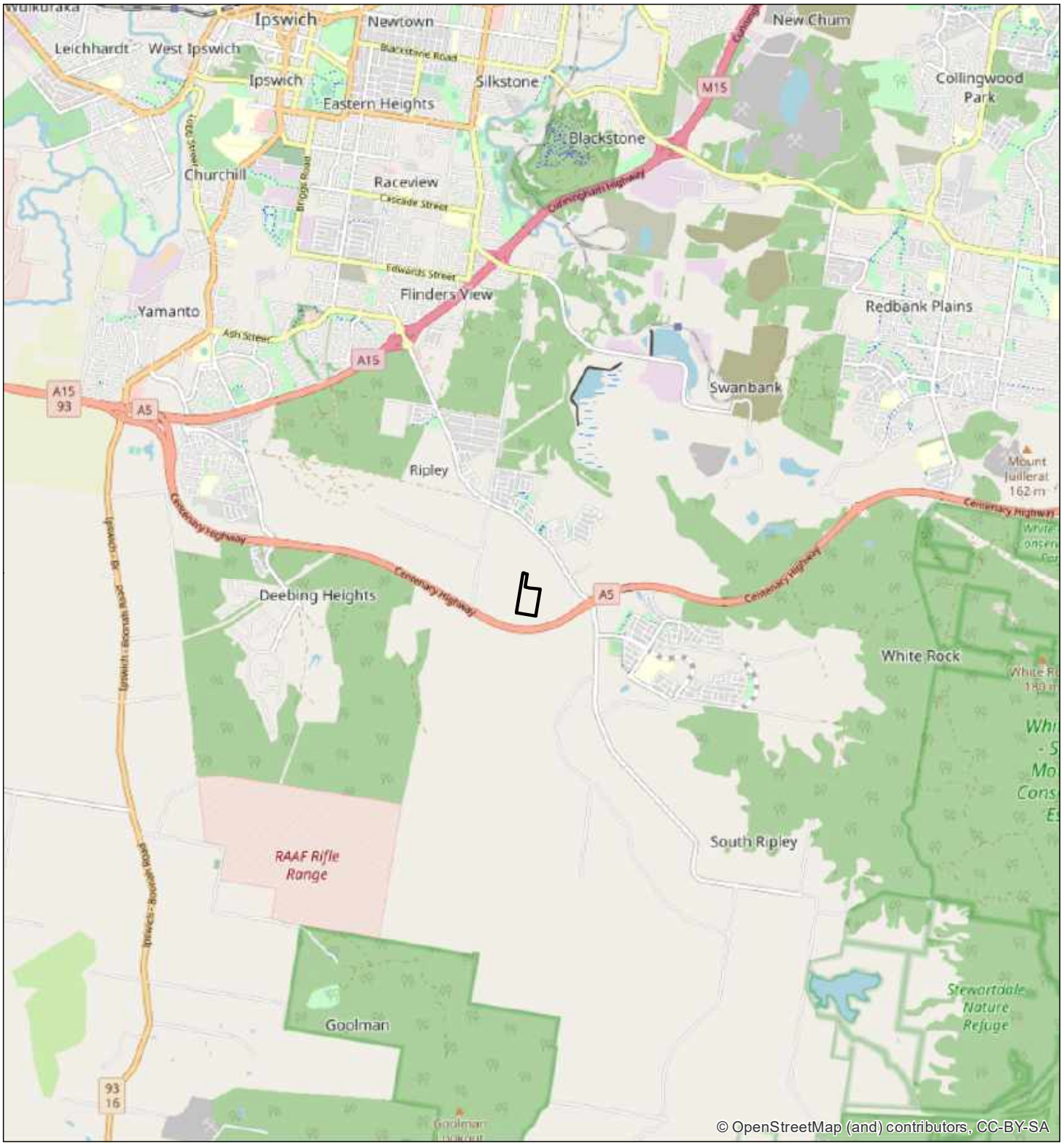
- Identify biodiversity values within or near the project area including MNES
- Identify potential impacts of the proposed action on MNES
- Present a list of measures to avoid, minimise and / or mitigate the identified impacts; and
- Provide an assessment against the *Significant Impact Guideline 1.1* for MNES identified as having the potential to be impacted by the action, at its broadest scope.

The findings of this assessment identify if the action will result in a significant residual impact on MNES and determine if it should be made a controlled action.

1.3. Areas of Investigation

The areas of investigation for this ecological assessment include:

- Referral area – the residential development area within Lot 2 on RP806983 including road reserves along the western and southern boundaries. The referral area totals 11 ha.
- Locality – the extent of the 5 km radius database searches of the referral area.



Legend

Referral area

Figure 1

Site Context

BCove 4 Pty Ltd

File ref. 10143 E Figure 1 Site Context B
Date *17/08/2020*
Project *Ripley Road, Ripley*

0 1 2 3 *km*

N

Scale (A4): 1:75,000 [GDA 1994 MGA Z56]

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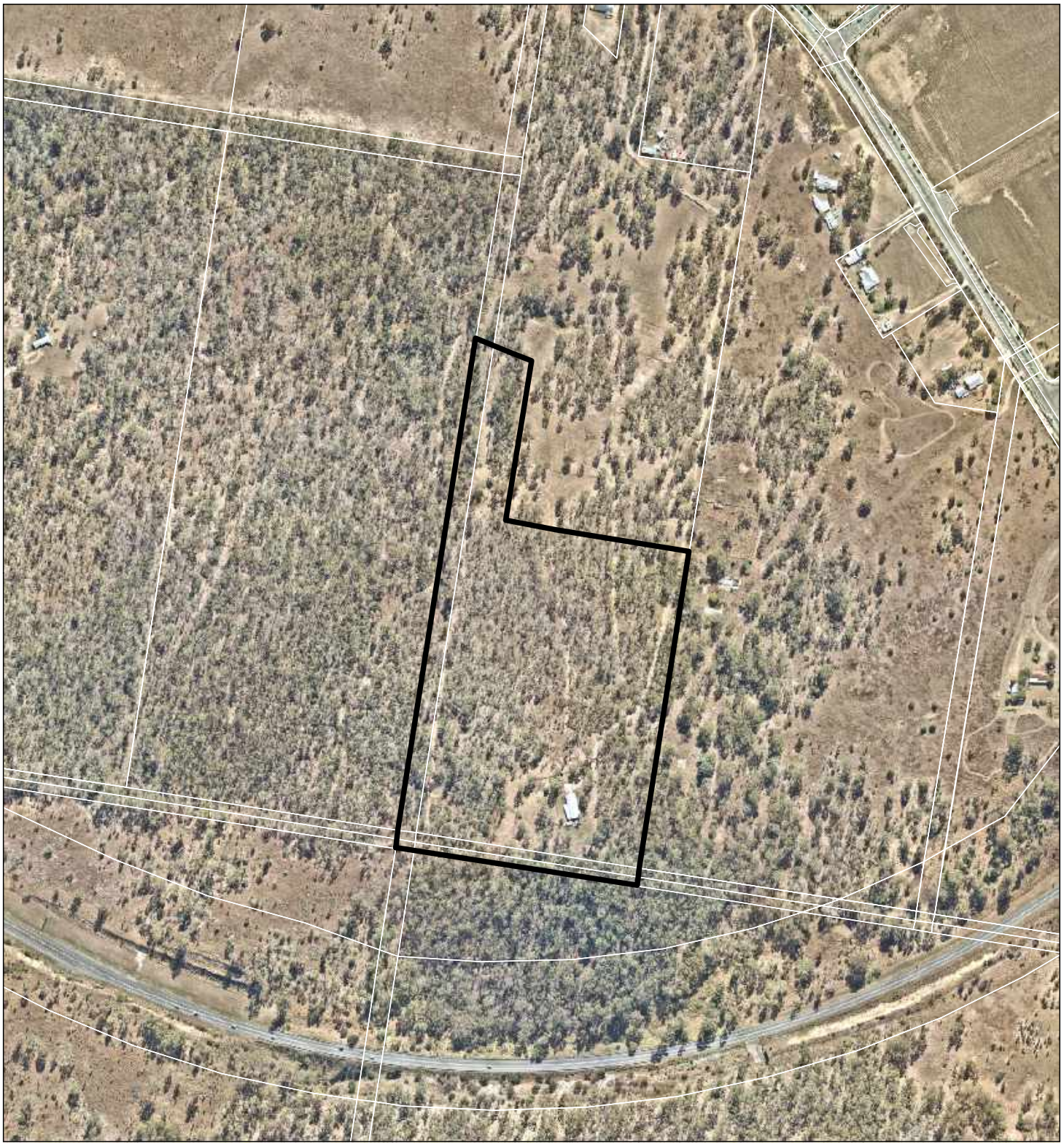
Layer Source: © State of Queensland (Department of Natural Resources, Mines and Energy) 2020



Legend

Qld DCDB

Referral area

Figure 2

Site Aerial

BCove 4 Pty Ltd

File ref. 10143 E Figure 2 Site Aerial B
Date *17/08/2020*
Project *Ripley Road, Ripley*

0 50 100 150 200 *m*

N

Scale (A4): 1:6,000 [GDA 1994 MGA Z56]

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Layer Source: © State of Queensland (Department of Natural Resources, Mines and Energy) 2020, Aerial (Nearmap 2020)

Legend

- Qld DCDB
- Referral area
- layout design
- Openspace
- Drainage/batters
- Disturbance/batters

Figure 3

Proposed Developement

BCove 4 Pty Ltd

File ref. 10143 E Figure 3 Proposed Development A
Date *24/09/2020*
Project *Ripley Road, Ripley*

0 50 100 150 *m*

N

Scale (A4): 1:3,125 [GDA 1994 MGA Z56]

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Layer Source: © State of Queensland (Department of Natural Resources, Mines and Energy) 2020, Aerial (Nearmap 2020)

2. Approval Context & Process

2.1. Planning Framework and State and Local Government Requirements

The Ripley Valley is located in the western growth corridor of South East Queensland, approximately 5 km southeast of Ipswich CBD and 30 km southwest of the Brisbane CBD. In 2009, Ripley Valley was identified under the South East Queensland Regional Plan 2009 -2031 (SEQRP) by the State Government because of its potential to absorb a vast portion of the regional area's population over the two-decade timeframe. The SEQRP suggests a serious population influx to the region with projections of 120,000 residents needing to be accommodated in more than 50,000 dwellings. It is envisaged the Ripley Valley Town Centre will provide 1,500 residences for 3,750 people, 70,000 m^2 of retail floor space and 200,000 m^2 of mixed use commercial space. It will act as an integrated Town Centre, connecting land to the north and south while servicing the growing Ripley Valley community.

The Ripley Valley Priority Development Area (RVPDA) was declared by the then Department of State Development, Infrastructure and Planning on 8 October 2010 and covers a total area of 4,680 hectares in the Ripley Valley of South East Queensland. The referral site is located within the RVPDA urban core that is part of the Ipswich City Council Local Government Area, situated within South East Queensland. The Urban Core Centre is the focal point in the Ripley Valley PDA in terms of density, land use and accessibility. As such it accommodates the highest order mixed use activities such as commercial, business, professional, community, entertainment and retail characterised by a maximum building height of 12 storeys. The urban core will exhibit the following characteristics (refer Image, below):

- Safe, attractive, and permeable movement networks for pedestrians and cyclists.
- Ground floor areas which are used primarily for retail, shop front and other active uses.
- Upper floor areas which are used for a variety of uses including retail, office, entertainment and residential uses.
- Buildings fronting streets that are a minimum of two storeys in height.
- Lower intensity or large building format uses which are 'sleeved' by active street frontage uses.
- Parking in basements or where provided at ground level, screened from streets and other public areas by buildings or landscaping.
- High quality design that recognises the importance of streetscape and public realm and contributes to the overall attractiveness of the Urban Core Centre.
- Built form and associated earthworks that takes precedence over the natural environment in matters concerning pedestrian movements, building disposition, street and open space design.
- Views to Flinders Peak and the Grampian Hills from key streets, public spaces and buildings.
- Buildings, streets and parks that optimise physical and visual connections to the Bundamba Creek greenspace corridor.

A 'Main Street' development typology will form the central linear node for retail land uses within the Urban Core Centre. As such the 'main street' will be a hub for specialty retail, entertainment, recreation, leisure, cultural, food, beverage and dining facilities.

The Urban Core Centre will be comprised of nine development parcels incorporating a transit centre for the proposed Rail Corridor and a Regional, District and Local bus service, retail floor space and of mixed use urban core commercial space and residential uses. This primary destination point will ultimately be actively accessible and linked to the proposed

railway station and transit interchange, as well as having potential for an urban relationship with a town square plaza. The Urban Core Centre will accommodate other key land uses such as educational, health and civic facilities, as well as having an interface with Bundamba Creek's riparian corridor.

The proposed action for planning purposes is guided by the Ripley Valley Priority Development Area Development Scheme as implemented by Economic Development Queensland (EDQ).

Image: Ripley Town Centre Vision

2.2. Site Context

The referral area is compromised by significant fragmentation due to existing and future development (refer **Plan 1** for fragmentation analysis). Properties immediately adjoining to the west, east and south have existing EPBC Act approvals and are under development. The northern boundary of the referral area adjoins the future rail corridor extension and bounds the Ripley Town Centre, also under development. In addition, major arterial roads isolate the referral area to the north, east and south, and fragmented bushland areas west of the referral site are also highly disturbed and bounded by roads and residential development, existing and underway.

This referral relates to an infill residential development of the ECCO Ripley residential area that will ultimately provide approximately 2,500 residences in one of the fastest growing regions of Australia. The referral area is surrounded by a number of existing approvals and assessments, which are at various stages of development, however, importantly, are not considered part of the proposed action (**Plan 1**). Of these, Ripley Town Centre (EPBC 2015/7471) and the ECCO Ripley Residential Development (EPBC 2015/7513) that immediately adjoin the referral area require further consideration.

2.2.1 Adjoining Referrals and Approvals

The referral area adjoins the Ripley Town Centre (EPBC 2015/7471) to the north, which was deemed Not a Controlled Action under the EPBC Act, and is an infill residential component of the surrounding ECCO Ripley Residential Development (EPBC 2015/7513), that was a controlled action and has been approved under the EPBC Act. Both actions fall within the Urban Core of the Ripley Valley PDA, as envisaged by Economic Development Queensland. For this reason, along with other adjoining properties, both have been included in Master Planning initiatives for the Ripley Valley Urban Core and, as such, are included within the same MCU approval at the State level (**Section 2.1**).

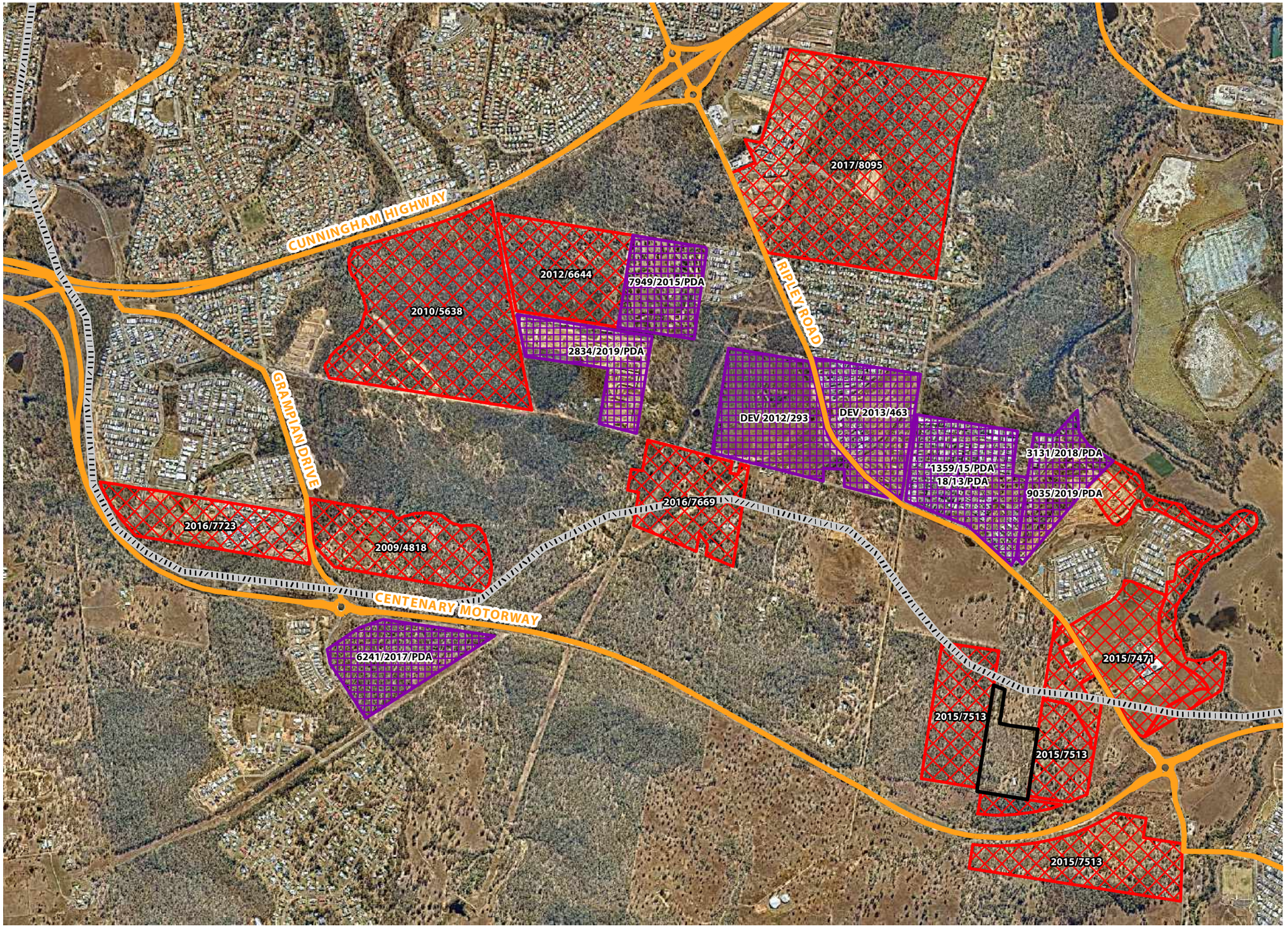
The adjoining actions were agreed by the Department as separate actions and not co-dependant or part of a larger action for the purposes of the EPBC Act for the following reasons:

- The Ripley Town Centre development was a referral for the purpose of providing a town centre for the entire 4,680 ha greater Ripley Valley Priority Development Area (PDA). It covers 35 ha and includes multi-layered activities, such as retail, entertainment, cultural, community, civic, commercial, interpretive, health and wellness, education, and residential uses that provide a vibrant and engaging urban environment shared with the regional, town, and local landscape (refer Image, Section 2.1).
- The Ripley Town Centre can stand alone as a development in its own right, intended to service the entire Ripley Valley Community.
- The ECCO Ripley development is one of several proposed residential developments in the Ripley Valley PDA, and, like the other residential proposals, it is not dependent upon development of the Ripley Town Centre to be viable.
- Each of these proposals is therefore not co-dependent, and they remain individually viable.
- The intended timeframes for each proposal are different, with the Ripley Town centre development anticipated to take 20 years to completion, whereas, the residential development is anticipated to take 10 years to complete in line with market demand.
- Further, the Ripley Town Centre development commenced sooner than the ECCO Ripley development as envisaged at the time of referral.
- Importantly, each proposal is funded by differing subsidiaries of Sekisui House Australia. Notably, this referral, that is an infill to the ECCO Ripley Residential development, is solely funded by Bcove 4 Pty Ltd, whereas, the Town Centre is funded by Ripley Town Holdings Pty Ltd and is for an entirely differing use outcome.

Of note, the Ripley Town Centre includes a portion of Lot 2 on RP806983. This part of the Ripley Town Centre was not referred at the time of EPBC 2015/7471 as the property it sits in was under separate ownership. Likewise, the referral area was not included in the original ECCO Ripley Residential approval (EPBC 2015/7513) due to separate ownership. The property has now been purchased by Sekisui House, but importantly the residential referral area and the Town Centre remain separate actions for the reasons stated above and as agreed under EPBC 2015/7471 and EPBC 2015/7513.

Notably, the Town Centre to the north aligns with the EDQ MCU approval and is separated from the referral area by the future Ipswich to Springfield Rail Corridor. The corridor land has been planned and preserved by the Queensland Department of Transport and Main Roads and is intended to provide a public transport services connection to major population growth areas in the Western Corridor. Land to the north will be part of the Ripley Town Centre and so not part of the action under referral here.

1. Fragmentation Analysis - State & Federal Approvals



NOTES

This plan was prepared as a desktop assessment tool. The information on this plan is not suitable for any other purpose. Property dimensions, areas, numbers of lots and contours and other physical features shown have been compiled from existing information and may not have been verified by field survey. These may need verification if the development application is approved and development proceeds, and may change when a full survey is undertaken or in order to comply with development approval conditions. No reliance should be placed on the information on this plan for detailed design or for any financial dealings involving the land. Saunders Havill Group therefore disclaims any liability for any loss or damage whatsoever or howsoever incurred, arising from any party using or relying upon this plan for any purpose other than as a document prepared for the sole purpose of accompanying a development application and which may be subject to alteration beyond the control of the Saunders Havill Group. Unless a development approval states otherwise, this is not an approved plan.

Layer Sources

Qld State Cadastre and Mapping layers © State of Queensland (Department of Natural Resources and Mines) 2020. Updated data available at http://qldspatial.information.qld.gov.au/catalogue//

Aerial Imagery © Nearmap, 2020

* This note is an integral part of this plan/data. Reproduction of this plan or any part of it without this note being included in full will render the information shown on such reproduction invalid and not suitable for use.

Legend

- Qld DCDB
- Referral area
- Major Roads
- Future rail corridor
- EDQ DA Approved Sites
- EPBC Approvals / 'NCA' determinations

Issue	Date	Description	Drawn	Checked
B	17/08/2020	Preliminary	TC	AD

0 200 400 600 800 m

Transverse Mercator | GDA 1994 | Zone 56 | 1:20,000 @ A3

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BCove 4 Pty Ltd

633 Ripley Road, Ripley

ADDRESS/RPD: 2RP806983

17/08/2020 | 10143 E 01 Approvals B

3. Commonwealth Legislation and Policy

3.1. Environment Protection and Biodiversity Conservation Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) establishes a requirement for Commonwealth environmental assessment and approval for actions that are likely to have a significant impact on any MNES protected under the EPBC Act, including:

- World heritage properties;
- National heritage places;
- Wetlands of international importance (listed under the Ramsar Convention);
- Listed threatened species and ecological communities;
- Migratory species protected under international agreements;
- Commonwealth marine areas;
- The Great Barrier Reef;
- Nuclear actions (including uranium mines); and
- A water resource, in relation to coal seam gas development and large coal mining development.

Other matters protected under the EPBC Act, include:

- The environment, where actions proposed are on, or will affect Commonwealth land and the environment; and
- The environment, where Commonwealth agencies are proposing to take an action.

When a proponent proposes to take an action that they believe may need approval under the EPBC Act, they must refer the proposed action to the Australian Government Minister for the Environment (the Minister). The purpose of the referral is to determine whether or not a proposed action is a 'controlled action' and thereby requires approval under the EPBC Act. If the Minister determines that a proposed action is a 'controlled action', it would then proceed through the Commonwealth assessment and approval process.

3.1.1 Significant Impact Guidelines 1.1.

The purpose of these guidelines is to assist any person who proposes to take an action to decide whether or not they should submit a referral to the Department for a decision by the Australian Government Environment Minister (the Minister) on whether assessment and approval is required under the EPBC Act.

3.1.2 Guidelines of EPBC Act Listed Species

The Australian Government has published a number of guidelines where specific guidance should be made when considering potential impacts on nationally threatened species and communities and should be read in conjunction with the Significant Impact Guidelines.

3.2. EPBC Act Environmental Offsets Policy

The *EPBC Act Environmental Offsets Policy* (2012) (EOP) outlines the Commonwealth Government's approach to the use of environmental offsets under the EPBC Act. The EOP applies to both project-by-project assessments and approvals under Part 8 and Part 9 of the EPBC Act.

The EOP provides a framework on the use of environmental offsets under the EPBC Act including when offsets are required, how offsets can be delivered, and the framework under which they operate. Offsets are not required for all approvals under the EPBC Act and the EOP is only triggered when significant residual impacts to matters protected under the EPBC Act are unavoidable. The EOP relates to all matters protected under the EPBC Act.

The EOP applies to offsetting requirements in both terrestrial and aquatic (including marine) environments. It requires that an environmental offset under the EPBC Act be suitable and '*delivers an overall conservation outcome that improves or maintains the viability of the protected matter(s)*'.

4. Assessment Methodology and Process

4.1. Desktop analysis

Prior to the commencement of field surveys, a desktop analysis was conducted of Commonwealth, State and Local environmental databases and overlay mapping to identify potential MNES and included the following:

- Commonwealth MNES protected under the EPBC Act on and around the site using the protected matters search tool with a 5 km radius (**Appendix A**);
- *Nature Conservation Act 1992* (NCA) listed threatened species on and around the site using the wildlife online database search tool with a 5 km radius (**Appendix B**);
- Public environmental databases including Atlas of Living Australia and BioMaps;
- State regulated vegetation management and vegetation supporting maps under the *Vegetation Management Act 1999* (VMA) including essential habitat mapping; and
- Local government records where MNES threatened species and communities are known to occur in the area.

Additionally, a review of aerial photography history was undertaken via QImagery to assist with the broad delineation of vegetation communities and to determine historical patterns to local vegetation communities.

Initial desktop assessment identified five (5) threatened ecological communities (TECs), twelve (12) threatened flora species, twenty-three (23) threatened fauna species and sixteen (16) migratory species as having the potential to occur within 5 km of the referral area (refer **Appendix A**). An initial assessment for the likelihood of occurrence was undertaken based on desktop survey to inform field survey methodology for target flora and fauna species and communities.

4.2. Field survey methodology

A field survey utilising the methods outlined in the following subsections was conducted to describe ecological value of the referral area. Field surveys were undertaken during seasonal conditions generally favourable to the detection and identification of flora and fauna species. Field survey methods were determined based on target species and communities and EPBC Act listed species guidelines.

Targeted MNES flora and fauna surveys were undertaken on 24 June 2020, 3 July 2020 and 16 July 2020, during relatively warm conditions with minimal recent rainfall within the Ripley locality (<1 mm rainfall recorded, BOM 2020) (refer **Table 1**). Field surveys utilising the methods outlined in the following subsections were conducted to describe ecological value of the subject site.

Table 1: Field Survey Methods Summary

Date	Weather Conditions	Methods
24 June 2020	2°C min - 20°C max, <1 mm rainfall recorded;	Motion senor camera, bird survey, SAT, spotlighting,
3 July 2020	8.2°C min – 25.2°C max, <1 mm rainfall recorded,	Motion senor camera, bird survey, waterway assessment, observational survey and searches, diurnal searches,
16 July 2020	Sunny (24°C), <1 mm rainfall recorded	Bird survey, waterway assessment, observational survey and searches, call detection

4.2.1 Motion sensor camera trap

Camera trapping involves setting up a fixed digital camera to capture images or video of animals that pass in front of a camera with an infrared trigger. It is a non-invasive technique designed to detect medium to large sized animals as they pass, although it is possible to detect smaller animals depending on the set-up. This method identifies fauna activity beyond the scope of direct observational studies and with the absence of potential observer impacts.

Infrared sensing cameras with an infrared flash that use motion to trigger were deployed. Two (2) cameras were installed across the subject site (refer **Photo 1**). Cameras were attached 30-100 cm from the ground on a tree or post, and directed towards landscape features. The cameras were left to record for as long as possible within the survey period, being installed on 24 June 2020 and removed on 3 July 2020, exceeding the recommended four nights. The cameras were baited to target evidence of wild dogs and other potential threats to known MNES in the broader Ripley Valley PDA area.

For inventory surveys, cameras were placed in the vicinity of an assumed animal trail. Heavy vegetation was avoided as this can cause false triggering, and the camera was aimed to avoid sun shining directly onto the lens. The camera position was directed towards an area away from other frequent survey activity.

Photo 1: Motion sensor camera trap set-up.

4.2.2 Bird surveys

This technique is a non-intrusive active area search that provides a direct census of bird species occurrence and abundance. Inclement weather was avoided as this greatly reduces the detection of bird species. Particular attention was

paid to the detection of EPBC listed Critically Endangered species, *Lathamus discolor* (Swift Parrot) and *Anthochaera phrygia* (Regent Honeyeater) as they were identified by the Likelihood of Occurrence Assessment as having a moderate potential to occur.

Diurnal bird surveys were conducted as per relevant guidelines early morning and late afternoon at specified locations across the site on 24th June and 3rd July 2020. All bird species observed during the assessment period were recorded. Birds were also opportunistically surveyed across the referral area for the duration of the entire survey period. Birds were identified from either direct observation or by their calls.

4.2.3 Koala habitat and SAT surveys

Surveys to understand Koala presence were undertaken across the referral area in accordance with the methodology developed by the Australian Koala Foundation[1] and specified in the *EPBC Act Referral Guidelines for the Vulnerable Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory)* (hereby referred to as 'the Koala referral guideline'). The scat meander technique was utilised to identify the presence of Koala within the surrounding environment. Where scat or signs of Koala usage are identified during the scat meander, the Spot Assessment Technique (SAT) method was implemented. This methodology is an assessment of Koala activity involving a search for any Koalas and signs of Koala usage. The SAT method involves identifying a non-juvenile tree of any species within the referral area that is either observed to have a Koala or scats, or is known to be a Koala food tree or otherwise important for Koalas, and recording any evidence of Koala usage of that tree including physical presence, identifiable scratches or scats. The nearest non-juvenile tree is then identified and the same data recorded. The next closest non-juvenile tree to the first tree is then assessed and so on until 30 trees have been surveyed.

The number of trees showing evidence of Koala activity is expressed as a percentage of the total number of trees sampled to indicate the frequency of Koala usage. Assessment of each tree involves a systematic search for Koala scats beneath the tree within a 1 m radius of the trunk. After approximately two minutes of searching for scats, the base of the trunk is observed for scratches and the crown for Koala[1]. At total of four (4) surveys were conducted. SAT surveys were completed on 24 June 2020.

Koala stocking rate

Koala stocking rate scores are calculated using the SAT activity categories taken from the Australian Koala Foundation Koala activity level classification table by Phillips & Callaghan 2011 (refer **Table 2**). A density category of East Coast (medium – high) has been assigned for the site as for habitat dominated by residual, transferral or alluvial type landscapes considered med-high nutrient soils with good water holding capacity (Steve Phillips, personal communication).

[1] Phillips, S & Callaghan, J 2011, "The *Spot Assessment Technique*: a tools for determining localised levels of habitat use by Koala *Phascolarctos cinereus*", *Australian Zoologist*, 35:3.

Table 2: Koala Activity Level Classification (Phillips and Callaghan 2011)

Usage	East Coastal (low)	East Coastal (med-high)	Western (med-high)
Low	<9.5%	<22.5%	<35.8
Moderate	9.5-12.6%	22.5-32.8%	35.8-46.7
High	>12.6%	>32.8	>46.7

4.2.4 Waterway Assessment

Waterway features within the site were described in terms of the following information:

- General description
- Channel Shape and Modifications
- In Stream Habitat
- Vegetation Quality and Cover (Embankments, channel and overall corridor)
- Bed, Bank and Bar Conditions (Erosion, Scouring, Sediment)
- Weed Cover

4.2.5 Observational survey for significant flora and fauna, habitat trees and biodiversity values

The referral area was walked several times to ensure all species (flora and fauna) were recorded and identified. Particular attention was paid to any threatened species that were listed as possibly occurring on or within the vicinity of the application area and specific micro-assemblages which may support these threatened species. This included observations for vertebrate fauna present on or that may utilise the referral area, including faunal lists and significance status of species under the Commonwealth's EPBC Act including the JAMBA, CAMBA, ROKAMBA and the Bonn Convention, and Queensland's NCA.

The observational survey included identification of ecological features and values such as broad vegetation communities, fauna habitats, and ecological corridors. Identification and description of the fauna habitats present within the area included any habitat trees. Specific attention was paid to threatened flora and fauna species.

For the purposes of this report, a significant flora and fauna species has been defined as a species that is scheduled as 'critically endangered', 'endangered', 'vulnerable' or conservation dependent under the Commonwealth EPBC Act.

4.2.6 Scats, tracks and other traces search

Surveys for scats, tracks and other fauna traces were conducted throughout the survey period during June and July 2020. Both predator and non-predator scats were sought during all searches. Only those samples definitively identified were included in the survey results. Specific search efforts were made to locate the presence of Koalas or evidence of their occurrence on the subject lands and the local area. In addition, particular notice of potential dens, scats and tracks for invasive species, such as European Red Fox and domestic cats, was taken to identify predator-prey interactions and understand existing impacts within the referral area.

4.2.7 Diurnal active searches – *Delma torquata* (Collared Delma)

Targeted searches for *Delma torquata* (Collared Delma) were conducted using the method of hand-searching under rocks. This species prefers rocky areas as the species burrows underneath rocks for shelter, particularly during warm temperatures. One area of potentially suitable microhabitat was identified within the site. Rocks were individually turned over for a duration of two (2) hours. The survey was started at 09:43 with an ambient temperature was 12°C. This method was completed on 3 July 2020.

4.2.8 Nocturnal active searches and spotlighting

This non-intrusive survey technique is the most effective method to obtain estimates of nocturnal arboreal mammal incidence and abundance in wooded habitats. Spotlighting also targets medium to large terrestrial nocturnal mammals, and can detect other nocturnal taxon groups (e.g., frogs, geckoes, nocturnal snakes, nocturnal birds, spiders).

A combination of high-powered spotlights and head torches were used to sample for nocturnal mammals, birds, reptiles and frogs across the proposed action area. This technique involved detecting eye shine, and a record of vegetation density was taken. Additional information recorded included the prevailing conditions and search effort. This method was completed on 24 June 2020.

4.2.9 Echolocation Call Detection

Echolocation call detection is an unobtrusive and non-invasive technique used to target particular areas of interest such as creeks, rocky outcrops and potential flyways for microbats, and is particularly useful for detecting species in the Rhinolophidae and Hipposideridae families. An Echo Meter Touch (Wildlife Acoustics) was used to actively detect bat calls in three (3) locations during the survey. The survey was approximately 1 hour in duration, beginning at dusk. This methodology was completed on 16 July 2020.

4.2.10 Fauna movement barrier assessment

A combination of contemporary aerial imagery, locality knowledge and field inspection can assist in understanding if there are barriers to fauna movement in the landscape. Once the aerial imagery is interrogated, location(s) for inspection are selected (typically roads) and barriers identified.

4.3. Likelihood of Occurrence Assessment

The likelihood of occurrence assessment was based upon publicly available species records and/or other information sources, such as field guides and web-based species profiles, including but not limited to:

- Australian Government's *Species Profile and Threats Database* (SPRAT) for the threatened species and ecological communities listed under the EPBC Act; and
- Queensland Government's *Department of Environment and Science* (DES) threatened species website.

The likelihood of occurrence assessment was informed by desktop assessment and field survey results, including an appreciation and understanding of the species habitats within the referral area. The assessment adopts a two-tiered approach; the first based on desktop analysis and the potential of occurrence and the second based on a combination of desktop and field survey to determine the likelihood of occurrence.

The likelihood of threatened species and ecological communities occurring in the referral area has been assessed against the criteria outlined in **Table 3**.

Table 3: Likelihood of occurrence assessment criteria

Likelihood of occurrence	Assessment criteria
Unlikely	No previous records of the species within the locality and one or more of the following criteria is met: • Not previously recorded on the referral area and surrounds and the referral area is beyond the current known geographic range; or • Dependent on specific habitat types or resources that are not present on the referral area; or • Considered extinct in the wild.
Low	No previous records of the species within the locality and one or more of the following criteria is met: • Site and local connectivity contains marginal habitat excluding suitable/critical habitat attributes; • Lack of recent records exist in a regional context (use 1980 as a delineation); or • Potential for vagrant or individual of the species to survive short-term;
Moderate	Species previously recorded within the locality and one or more of the following criteria is met: • Previously recorded in proximity to the referral area (*i.e.,* vagrant individuals); or • Potential habitat typologies or resources are present on the referral area.
High	Species previously recorded within the locality and one or more of the following criteria is met: • Previously recorded on the referral area; • Dependent on habitats or habitat resources that are available on the referral area; or • Suitable habitats are available on the referral area that are capable of supporting a resident population or individuals of the species.
Known	Flora species or ecological community positively identified during field surveys within the referral area. Fauna species positively recorded during field surveys within the referral area or adjacent habitats.

4.4. Study Limitations

The ecological assessment involves a combination of desktop assessments and field investigations and has relied on publicly available information and data. The likelihood of occurrence assessment has relied upon database searches and publicly available information that relates to the referral area and broader locality. Field surveys focussed on verifying the vegetation and essential habitat mapped by the State Government and flora and fauna surveys targeting threatened species identified by database searches.

The field surveys targeted those threatened species or communities which have either been previously recorded or predicted to occur in the locality, and as such were assessed as having a moderate or high likelihood of occurring on the referral area.

Fauna surveys utilised a combination of passive and active methods for detection, including call recognition, spotlighting, visual identification, motion detection cameras, active searches and inferential evidence of habitat usage (e.g. scratches, scats, burrows, active nests etc). No physical trapping was conducted as part of the fauna surveys, as the target species and degraded habitat values in the referral area did not justify the need for such surveys.

5. Ecological Assessment Results

5.1. Desktop Assessment

5.1.1 Landscape Context and Historical Aerial Imagery

The referral area is located in a landscape that has been subject to extensive modification through logging and agricultural practices (refer to **Plan 2** for historical aerial imagery analysis). The site has become increasingly vegetated over time since historical clearing due to the increase in regrowth vegetation.

Connectivity towards the north and north-east is limited by Ripley Road and residential developments associated with the Ripley PDA. Connectivity to the south is restricted by Centenary Highway. The site retains sporadic and fragmented connectivity to the west through the adjoining bushland in an area already compromised by existing approvals under the EPBC Act.

5.1.2 Matters of National Environmental Significance

Based upon the database searches and the findings of the desktop assessment, MNES identified as being of potential relevance to the Project include threatened flora and fauna species and migratory fauna species.

5.1.3 EPBC Act Threatened Ecological Communities

The Protected Matters Search Tool (PMST) (refer **Appendix A)** returned the following five (5) threatened ecological communities (TEC), listed under the EPBC Act as having potential to occur within 5 km of the referral area:

- Coastal Swamp Oak (*Casuarina glauca)* Forest of New South Wales and South East Queensland ecological community
- Lowland Rainforest of Subtropical Australia
- Poplar Box Grassy Woodland on Alluvial Plains
- Swamp Tea-tree (*Melaleuca irbyana*) Forest of South-east Queensland
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland

The likelihood of occurrence for each TEC within the referral area, as presented in **Table 4**, referred to State Government Regional Ecosystem mapping within the locality and known distributions of the TECs, to identify those TECs with potential to occur in the referral area or recorded during field surveys. All TECs were identified as having low potential to occur based on site characteristics.

2. Historical Aerial Imagery

NOTES

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Layer Sources

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Legend

Referral area

Issue	Date	Description	Drawn	Checked
B	17/08/2020	Preliminary	TC	AD

0 200 400 600 800 m

Transverse Mercator | GDA 1994 | Zone 56 | 1:20,000 @ A3

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633 Ripley Road, Ripley

ADDRESS/RPD: 2RP806983

17/08/2020 | 10143 E 02 Historical Aerial Imagery B

Table 4: Likelihood of occurrence of TECs within referral area

TEC	EPBC Act status	Desktop Potential of Occurrence
Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland ecological community	Endangered	**Low** The site is not mapped as containing any regional ecosystems associated with this threatened ecological community.
Lowland Rainforest of Subtropical Australia	Critically Endangered	**Low** The site is not mapped as containing any regional ecosystems associated with this threatened ecological community.
Poplar Box Grassy Woodland on Alluvial Plains	Critically Endangered	**Low** The site is not mapped as containing any regional ecosystems associated with this threatened ecological community.
Swamp Tea-tree (*Melaleuca irbyana*) Forest of South-east Queensland	Critically Endangered	**Low** The site is not mapped as containing any regional ecosystems associated with this threatened ecological community.
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	**Low** The site is not mapped as containing any regional ecosystems associated with this threatened ecological community.

5.1.4 Threatened Flora Species

Database searches returned fifteen (15) flora species, listed as threatened under the EPBC Act and/or NCA, as having being previously recorded or predicted to occur within 5 km of the referral area, as presented in **Appendix A and Appendix B.**

Based on the presence of species records within the locality and the habitats within the referral area, an assessment was conducted to determine those threatened flora species with potential to occur within the referral area. The desktop assessment identified that three (3) threatened flora species had a moderate potential to occur on the referral area (refer **Table 5**). All other threatened flora species were assessed as having a low potential to occur.

Table 5: Likelihood of occurrence of flora species within referral area

Scientific Name	EPBC	NCA	Desktop Potential of Occurrence
Callitris baileyi **(Bailey's Cypress)**	-	NT	**Moderate** BioNet records indicate a recent sighting (2019) of the species approximately 1.9 km south-west of the site and there is suitable habitat for this species to occur on site. As a result, there is potential for the species to occur on-site.
Marsdenia coronata **(Slender Milkvine)**	-	V	**Moderate** Mapped Regional Ecosystems contain suitable habitat for *Marsdenia coronata* to occur.
Coleus habrophyllus **(Shaggy-leaved Plectranthus)**	E	E	**Moderate** *Coleus habrophyllus* has been found within the locality therefore has potential to occur on-site.

The detailed likelihood of occurrence assessment is presented in **Appendix C**.

5.1.5 Threatened Fauna Species

Database searches returned twenty-three (23) fauna species listened as threatened under the EPBC Act and/or NCA as having been previously recorded or predicted to occur within 5 km of the referral area.

Based on the presence of species records within the locality and the habitats identified within the referral area, a potential of occurrence assessment was conducted to determine those threatened species with potential to occur within the referral area. The assessment determined six (6) threatened fauna species listed under the EPBC Act and/or NCA as having moderate or higher potential to occur on or near the referral area. These species are outlined in **Table** 6 below. All other threatened and/or migratory fauna species were assessed as having a low potential to occur.

Table 6: Likelihood of occurrence of fauna species within referral area

Scientific Name	EPBC	NCA	Desktop Potential of Occurrence
***Anthochaera Phrygia* (Regent Honeyeater)**	Critically Endangered	Endangered	**Moderate** *Corymbia citriodora subsp. variegata* (Spotted Gum) dominated RE12.9-10.2 is mapped as the dominant RE on-site. *Corymbia citriodora subsp. variegata* is a preferred foraging species for this Regent Honeyeaters. This species was been sighted in 2019 in the Springfield Lakes area, approximately 11 km east of the site. There is some potential that this species could opportunistically forage on-site.
***Delma torquata* (Collared Delma)**	Vulnerable	Vulnerable	**Moderate** This species has been observed previously within the Ripley locality therefore there is potential that suitable microhabitat for the Collared Delma is present on-site and therefore may support the species.
***Lathamus discolor* (Swift Parrot)**	Critically Endangered	Endangered	**Moderate** Eucalypt dominated REs, although predominantly regrowth, with preferred foraging species *Corymbia citriodora subsp. variegata* (Spotted Gum) and *Eucalyptus tereticornis* (Forest Red Gum) are mapped as occurring on-site. There are no records of this species in the immediate area, however, this species was sighted in 2019 in the Springfield Lakes area, approximately 11 km east of the site. There is some potential that this species could opportunistically forage on-site.
***Phascolarctos cinereus* (Koala)**	Vulnerable	Vulnerable	**High** Eucalypt dominated REs, although predominantly regrowth, containing foraging habitat area present on-site and Koalas have been known to occur within close proximity to the site.
***Pteropus poliocephalus* (Grey-headed Flying Fox)**	Vulnerable	-	**High** There are no observed roosts on-site or adjacent to the site, with the nearest known roost site located in Yamanto, 6.5 km north-west of the site. Given the site's proximity to a significant roosting site and the presence of suitable foraging habitat on-site, although predominantly regrowth, the species may opportunistically forage on-site.

The likelihood of occurrence assessment is presented in **Appendix C**.

5.1.6 Migratory Species

Database searches returned sixteen (16) migratory fauna species listened as threatened under the EPBC Act and/or NCA as having been previously recorded or predicted to occur within 5 km of the Referral area.

Based on the presence of species records within the locality and the habitats identified within the referral area, an assessment was conducted to determine those threatened species with potential to occur within the referral area. The assessment determined that no threatened migratory fauna species listed under the EPBC Act and/or NCA were identified as having moderate or greater potential to occur in the referral area. All migratory fauna species were assessed as having a low potential to occur.

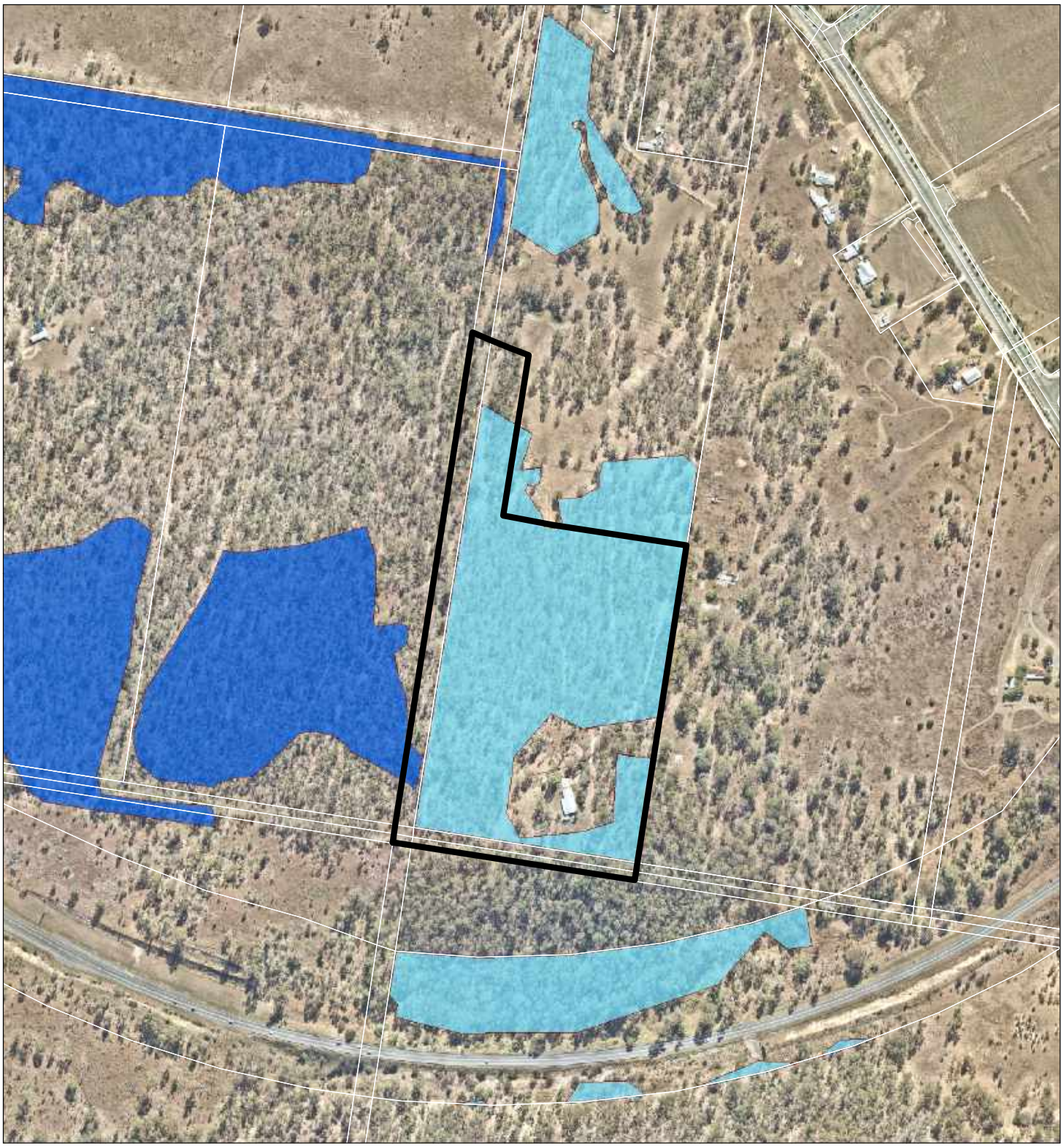
The likelihood of occurrence assessment is presented in **Appendix C**.

5.1.7 State Mapped Regulated Vegetation and Essential Habitat

A desktop review of the Queensland 'Regulated Vegetation Management Mapping' under the *Vegetation Management Act 1999* (VMA) was conducted, focusing on the referral area. This analysis indicated that the referral area contains one (1) large polygon of State mapped regulated regrowth vegetation (regional ecosystem) described as composite RE 12.9-10.2/12.9-10.7/12.9-10.16 (70/25/5), and a small area of remnant RE 12.9-10.2, outlined in **Table 7** and presented in **Figure 4** and **Figure 5**.

Table 7: State mapped regulated vegetation (regional ecosystem) within the referral area

Regional Ecosystem	Short Description	VMA Status
12.9-10.16	*Araucarian microphyll to notophyll vine forest on Cainozoic and Mesozoic sediments*	Of concern
12.9-10.2	*Corymbia citriodora subsp. variegata +/- Eucalyptus crebra open forest on sedimentary rocks*	Least concern
12.9-10.7	*Eucalyptus crebra +/- E. tereticornis, Corymbia tessellaris, Angophora spp., E. melanophloia woodland on sedimentary rocks*	Of concern
Non-remnant	Cleared land	None



Legend

- Qld DCDB
- Referral area

Regulated Vegetation

- Category A area - *Vegetation Offset/Compliance notices/VDecs*
- Category B area - *Remnant vegetation*
- Category C area - *High value regrowth vegetation*
- Category R area - *Reef regrowth watercourse vegetation*
- Category X area - *Vegetation not regulated under the VMA*
- Water
- Area not categorised

Figure 4

Regulated Vegetation Management Map

BCove 4 Pty Ltd

File ref. 10143 E Figure 4 RVMM C
Date *24/09/2020*
Project *Ripley Road, Ripley*

0 60 120 180 240 *m*

N

Scale (A4): 1:6,000 [GDA 1994 MGA Z56]

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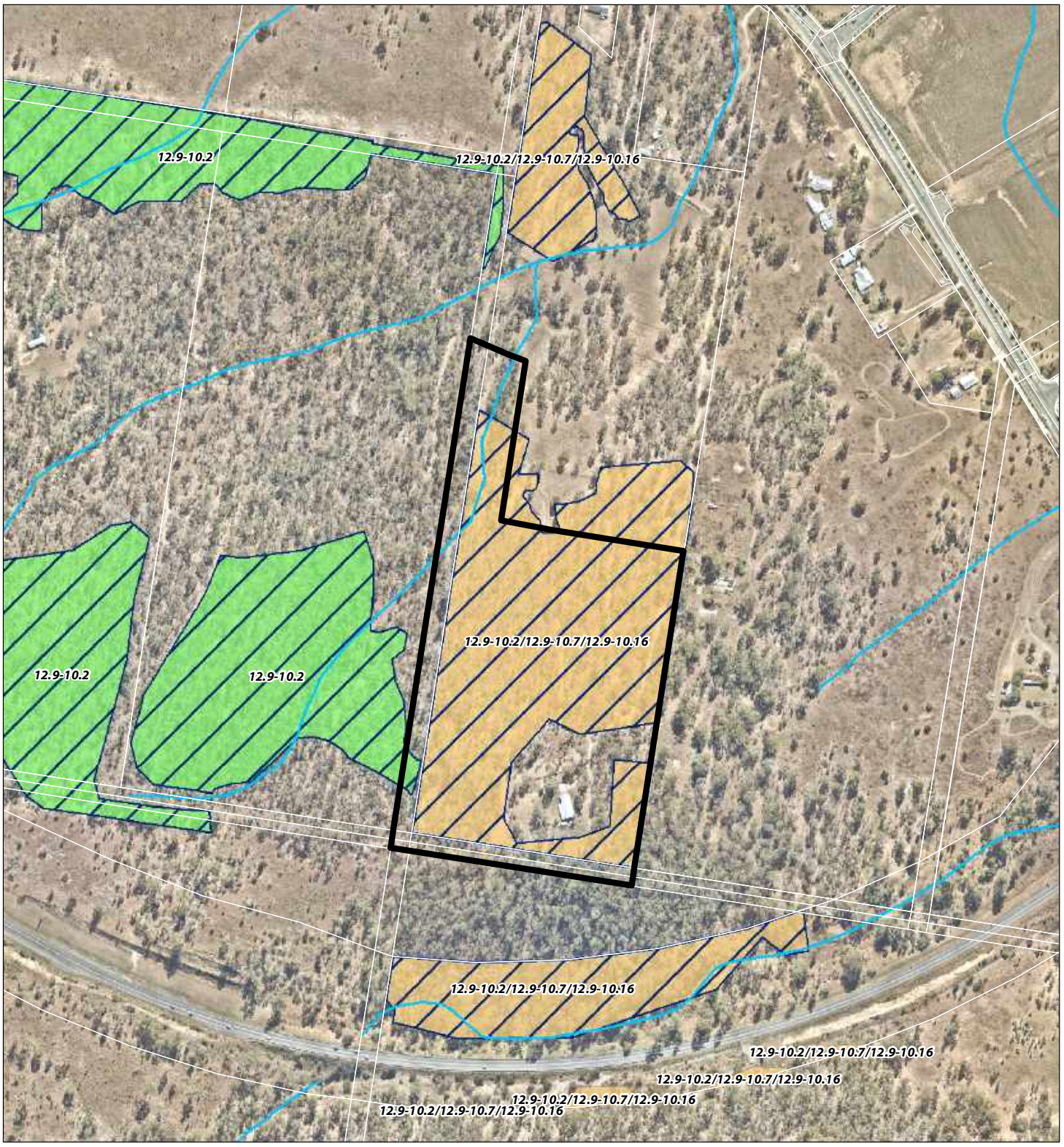
Layer Source: © State of Queensland (Department of Natural Resources, Mines and Energy 2020), Aerial (Nearmap 2020)



Legend

- Qld DCDB
- Referral area
- VM Watercourses
- VM Essential Habitat
- VM Wetland

Regional Ecosystems mapping

- Category A or B area containing endangered regional ecosystems
- Category A or B area containing of concern regional ecosystems
- Category A or B area that is a least concern regional ecosystem
- Category C area containing endangered regional ecosystems
- Category C area containing of concern regional ecosystems
- Category C area that is a least concern regional ecosystem

Figure 5

Regulated Vegetation Supporting Map

BCove 4 Pty Ltd

File ref. 10143 E Figure 5 RVSM C
Date *24/09/2020*
Project *Ripley Road, Ripley*

0 100 200 *m*

N

Scale (A4): 1:6,000 [GDA 1994 MGA Z56]

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Layer Source: © State of Queensland (Department of Natural Resources, Mines and Energy 2020), Aerial (Nearmap 2020)

5.2. Field Surveys

The results of the flora and fauna surveys, and the potential of occurrence, enables an understanding of the ecological constraints and potential impacts to MNES associated with the Project.

The results of the targeted vegetation, flora and fauna surveys is presented within the following sections. Refer to **Plan 3** for the field survey effort undertaken across the referral area and surrounding locality.

5.2.1 Ecological context of referral area

The referral area is located in a landscape that has been subject to rapid landscape changes and urbanisation within the past 5 years (**Plan 2**) since the inception of the Ripley Valley PDA in 2010. The site is dominated by regrowth and mature eucalypts, and has been subject to historic vegetation clearing. Due largely to the surrounding urban development, the site retains limited biodiversity values and contains a relatively degraded ground cover which is dominated by weeds and pastural and exotic grass species.

The referral area is bound by Centenary Highway to the south, fragmented bushland to the west and rural residential properties to the north and east. Large-scale residential development exists to the north of the site on the northern side of Ripley Road. The site retains some connectivity to the west, however, it is relatively limited to the north, south and east by arterial roads and development.

5.2.2 EPBC Act Threatened Ecological Communities

As outlined in **Section 4.1.3**, The Protected Matters Search Tool (PMST) (refer **Appendix A**) returned the following five (5) threatened ecological communities (TECs), listed under the EPBC Act, as having potential to occur within 5 km of the Referral area:

- Coastal Swamp Oak (*Casuarina glauca)* Forest of New South Wales and South East Queensland ecological community
- Lowland Rainforest of Subtropical Australia
- Poplar Box Grassy Woodland on Alluvial Plains
- Swamp Tea-tree (*Melaleuca irbyana*) Forest of South-east Queensland
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland

The potential of occurrence for each TEC within the referral area, as presented in **Appendix C**, referred to State Government Regional Ecosystem mapping within the locality and known distributions of the TECs to identify those TECs with potential to occur in the referral area or recorded during field surveys. The results of the likelihood of occurrence assessment determined that no TECs listed above have the potential to occur within the referral area.

Field verification surveys confirmed that no TECs are present in or adjoining the referral area.

5.2.3 Habitat Assessment and Vegetation Communities

The following section discusses the results of the field verification surveys of vegetation communities and Regional Ecosystems within the referral area.

Field survey confirmed the vegetation on-site consists of four (4) vegetation communities (refer **Plan 4**).

1. Regrowth RE12.9-10.2 representative vegetation (*Corymbia citriodora subsp. variegata* and *Eucalyptus crebra* dominated);

2. Regrowth RE12.9-10.7a representative vegetation (*Eucalyptus siderophloia* and *E. tereticornis* dominated);
3. Non-remnant area including dwelling and planted landscape trees; and
4. Cleared areas

The site is mapped as containing composite regrowth RE12.9-10.2/12.9-10.7a/12.9-10.16 (70/25/5 %) and remnant RE 12.9-10.2, although he later was confirmed as regrowth in the field. The Regional Ecosystems are described below:

- RE12.9-10.2: *"Corymbia citriodora subsp. variegata open forest or woodland usually with Eucalyptus crebra. Other species such as Eucalyptus tereticornis, E. moluccana, E. acmenoides and E. siderophloia may be present in scattered patches or in low densities. Understorey can be grassy or shrubby. Shrubby understorey of Lophostemon confertus (whipstick form) often present in northern parts of bioregion. Occurs on Cainozoic and Mesozoic sediments. (BVG1M: 10b)".*
- RE12.9-10.7a: *"Eucalyptus siderophloia, Corymbia intermedia +/- E. tereticornis and Lophostemon confertus open forest. Occurs on Cainozoic and Mesozoic sediments in near coastal areas. (BVG1M: 12a)".*
- RE12.9-10.16: *"Microphyll to notophyll vine forest +/- Araucaria cunninghamii"* were observed.

The vegetation on-site is considered to be most accurately mapped as 'high value regrowth' status vegetation. RE12.9-10.2 and RE12.9-10.7a were confirmed on-site. No species representative of RE12.9-10.16 were found on-site. The majority of the site is dominated by regrowth vegetation with only sparse, large diameter *Eucalyptus tereticornis* (Forest Red Gum). Ground-truthed environmental values were somewhat inconsistent with the mapping. Species composition and form consistent with the mapped RE was found to extend further north than the mapping.

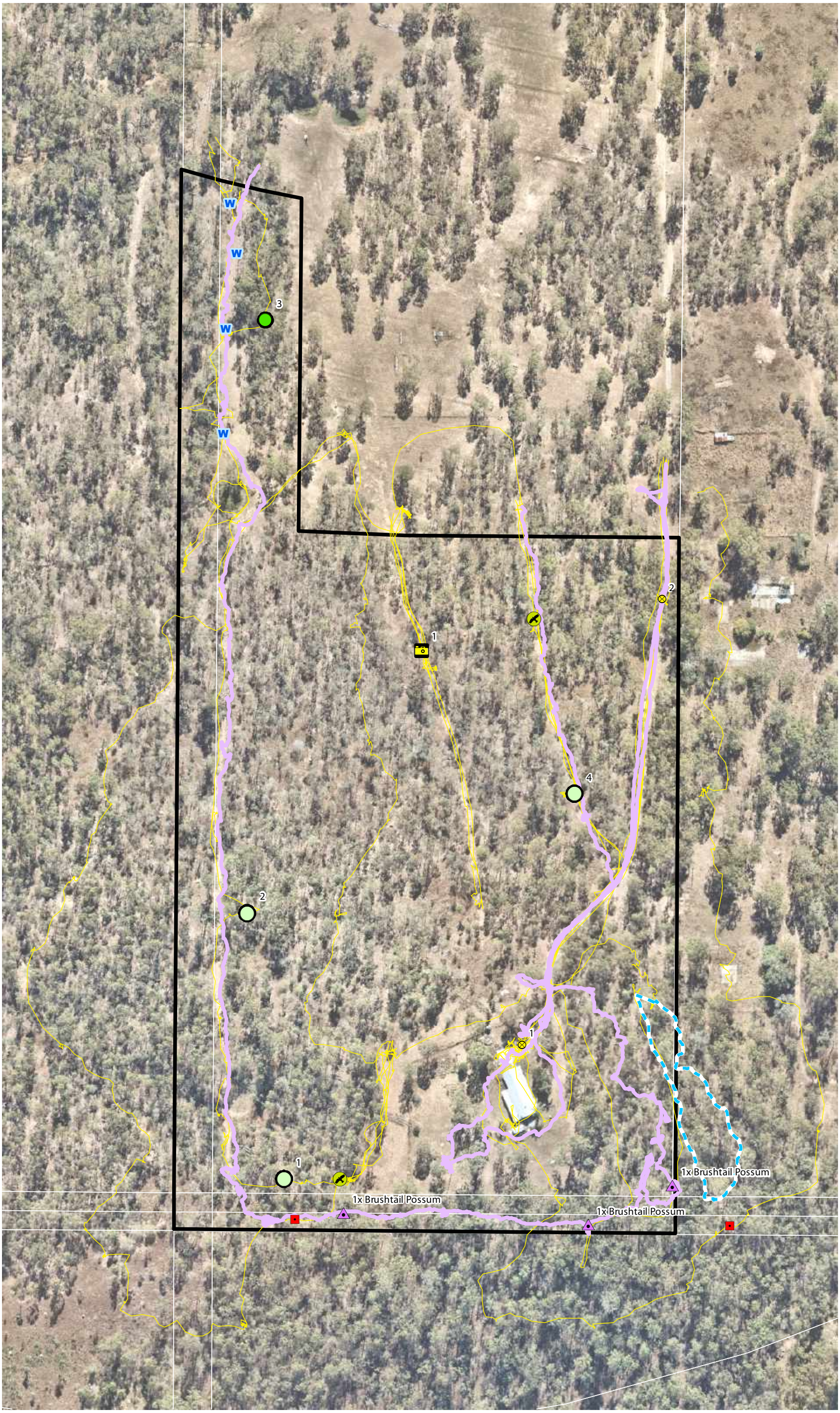
Characteristics of RE12.9-10.2 were more dominant on the upper slopes of the site, concentrated in the south-western portion of the site and nearer to the dwelling area in the south-east. *Eucalyptus crebra* (Narrow-leaved Ironbark) and *Corymbia citriodora subsp. variegata* (Spotted Gum) were the dominant canopy species in this area (refer **Photo set 2**). The balance of the site is dominated by regrowth RE12.9-10.7a, particularly on the lower slopes in the central and northern portion of the site. Species representative of RE12.9-10.7a including *Eucalyptus tereticornis* (Forest Red Gum) and *Eucalyptus siderophloia* (Grey Ironbark) were more dominant on the lower slopes which was found to dominate the majority of the regrowth areas on site (refer **Photo set 3**).

The mapped VMA mapped watercourse and Department of Agriculture and Fisheries mapped 'low' risky waterway for waterway barrier works intersecting the western portion of the site was assessed. The mapped waterway was found to be an eroded drainage line transitioning into overland flow path. No water or riparian vegetation was present. The channel was comprised of bare ground and grass (refer **Photo set 4**).

A dwelling, currently unoccupied, is located in the south-eastern portion of the site. The area surrounding the dwelling is cleared and modified with predominantly planted landscape trees present. The area contains minimal ecological value (refer **Photo set 5**).

Rocky outcrop areas south-east of the site were assessed for the potential presence of *Coleus habrophyllus* (and *Delma torquata*). The rocky area was assessed as highly disturbed so unsuitable habitat for the species, and no specimens were observed at the time of survey.

3. Field Survey Effort



NOTES

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Legend

- Qld DCDB
- Referral area

Field survey data

- Bat Survey
- Diurnal bird survey
- Dog print
- Motion sensor camera
- SAT - high use
- SAT - low use
- Spot-lighting fauna record
- Waterway assessment site
- Collared Delma search extent
- Spot-lighting
- GPS Tracklog

Issue	Date	Description	Drawn	Checked
B	17/08/2020	Preliminary	TC	AD

0 20 40 60 80 m

Transverse Mercator | GDA 1994 | Zone 56 | 1:2,000 @ A3

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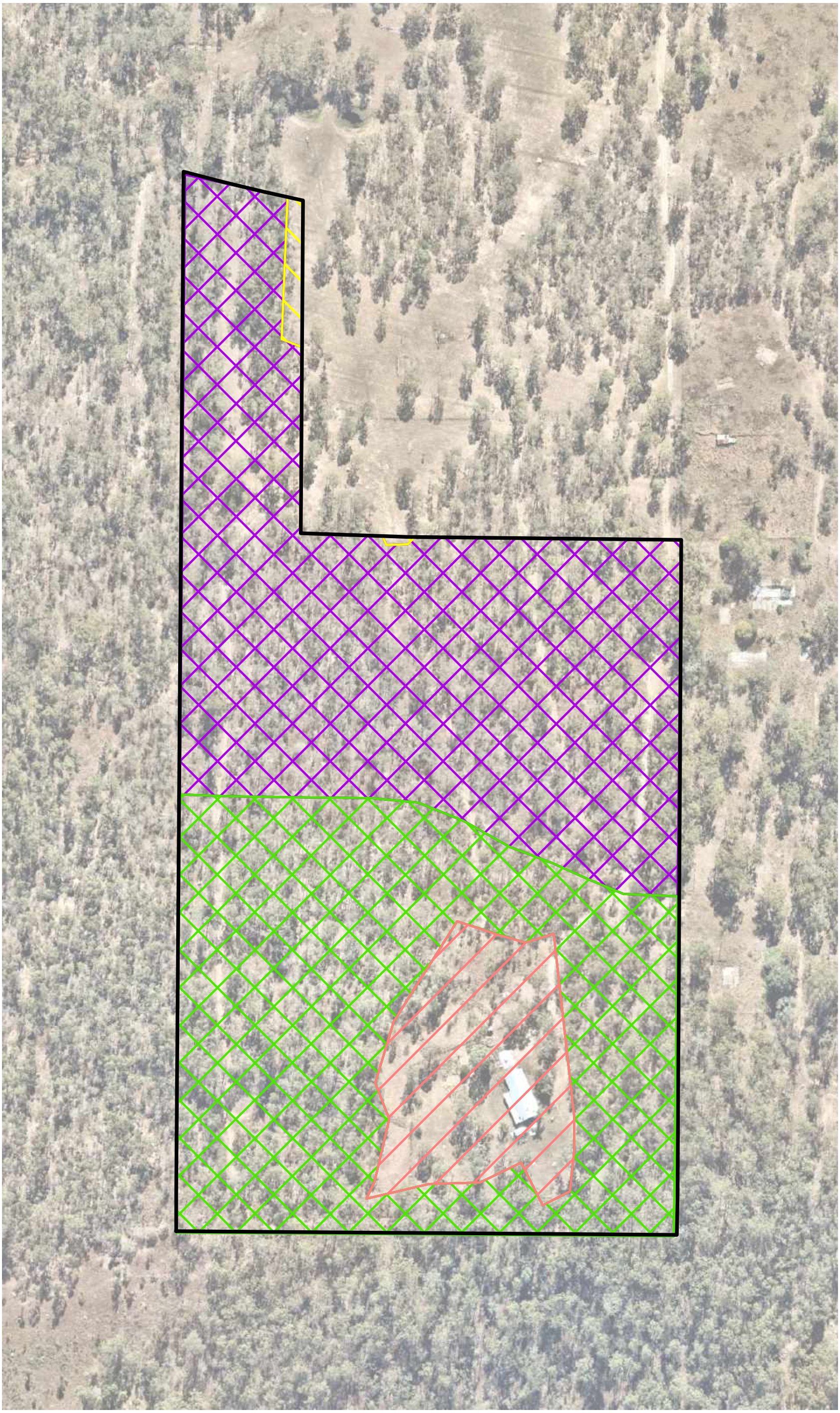
17/08/2020 | 10143E 03 Field Survey Effort B

4. Field Survey Zones



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Aerial Imagery © Nearmap, 2020

Legend

Referral area

Vegetation communities

- RE 12.9-10.2 representative vegetation (eucalyptus crebra & corymbia citriodora dominated (4.47 ha)
- RE 12.9-10.7a representative vegetation (eucalyptus tereticornis & eucalyptus siderophloia dominated) (5.18 ha)
- Cleared flood plain with scattered Eucalyptus (0.07 ha)
- Dwelling with landscape trees (1.20 ha)

Issue	Date	Description	Drawn	Checked
B	17/08/2020	Preliminary	TC	AD

0 20 40 60 80 m

Transverse Mercator | GDA 1994 | Zone 56 | 1:2,000 @ A3

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633 Ripley Road, Ripley

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17/08/2020 | 10143E 04 Field Survey Zones B

Photo set 2: Vegetation representative of RE12.9-10.2.

Photo set 3: Vegetation representative of RE12.9-10.7a.

Photo set 4: Eroded drainage line and overland flow path with no riparian vegetation.

Photo set 5: Dwelling and surrounding vegetation.

5.2.4 Connectivity

Connectivity towards the north and west is compromised by existing residential development and the proximity of Ripley Road that runs through the Ripley Town Centre (refer Section 2.2.1). The referral site retains some fragmented connectivity to the immediate west in the form of eucalypt bushland interspersed with cleared pastoral areas, with connectivity to the east further limited by ongoing development, sparse trees and cleared land. Further west and north of the referral site, Grampian Drive and residential development and the Cunningham Highway provide significant barriers to Koala movement. Connectivity to the south is likewise constrained by the Centenary Highway.

Refer to **Plan 1** for the fragmentation analysis.

5.2.5 Flora Results

A total of eighty-six (86) flora species were recorded within the vegetation communities on site during field surveys, as listed in **Appendix E.** Of the eighty-six (86) flora species recorded throughout the entire site, thirty-seven (37) species are considered to be non-native / introduced species. A total of forty-nine (49) flora species are native.

Refer to **Appendix E** for the complete flora list and native / non-native designation.

No flora species listed under the EPBC Act nor NCA were recorded in or adjoining the referral area.

5.2.6 Fauna Results

Database searches returned twenty-three (23) fauna species listened as threatened under the EPBC Act and/or NC Act, as having been previously recorded or predicted to occur within 5 km of the referral area. Of the twenty-three (23) identified fauna species, six (6) were assigned a moderate or greater likelihood of occurring on site. These species include, Koala, Grey-headed Flying-fox, Swift Parrot, Regent Honeyeater, Collared Delma and Greater Glider.

A total of thirty-eight (38) fauna species were recorded during the field survey, including twenty-eight (28) birds, six (6) mammals, three (3) reptiles and one (1) amphibian. Evidence of Koala was observed on-site in the form of scats (refer below for further details). No other conservation significant fauna species or evidence of their activity were recorded during the field survey.

A complete fauna species list is provided in **Appendix E.**

<u>Microbat Echolocation</u>

Bat calls were actively detected for a duration of one (1) hour in three (3) separate locations within the survey area. One (1) species *Minopterus australis* (Little Bent-wing Bat) was detected during the survey at Survey Location 2 at 8:30 pm. This species is listed as Least Concern under the NC Act and is not listed under the EPBC Act.

Minopterus australis calls are characterised by a down-sweeping tail with a characteristic frequency of 54.5 to 64.5 kHz (refer **Photo 6**).

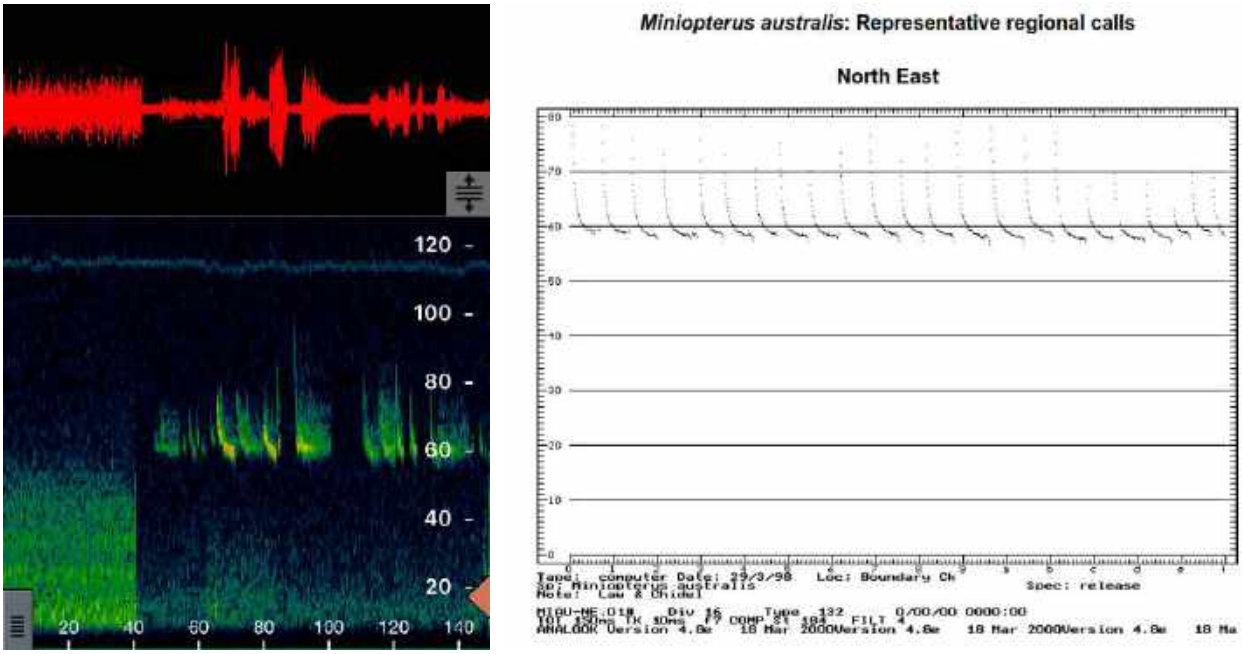


Photo 6: Recorded bat call characterised by a down-sweeping tail at a frequency of 58 kHz, and characteristic frequency of *Minopterus australis*. Source: Pennay, M., Law, B., Reinhold, L. (2004).

Motion sensor cameras

A number of fauna species were captured using the motion sensor cameras including dogs (suspected wild dog and two large uncollared but likely to be domestic – refer **Photo 7**), Eastern Grey Kangaroo, European Hare, Australian Wooduck, Masked Lapwing and Brushtail Possum (refer **Photo set 8** to **Photo set 10**). Only common and pest fauna species were recorded.

Photo 7: Two large dogs (*Canis lupus familiaris*).

Photo set 8: **Eastern Grey Kangaroo (*Macropus giganteus*) (top); Domestic / wild dog (*Canis lupus familiaris*) (bottom).**

Photo set 9: European Hare (Lepus europaeus) (top); Common Brushtail Possum (Trichosurus vulpecula) (bottom).

Photo set 10: Masked Lapwings (Vanellus miles) and Australian Wooducks (Chenonetta jubata) (top); Australian Magpies (*Gymnorhina tibicen*) (bottom).

Koala (*Phascolarctos cinereus*)

In accordance with the *EPBC Act Referral Guidelines for the Vulnerable Koala*, the Spot Assessment Technique (SAT) was applied to search the referral area for the potential presence of the Koala and an estimate of their activity. The Spot Assessment Technique (SAT) method is an assessment of Koala activity involving a search for any Koalas and signs of Koala usage. The SAT involves identifying a focal tree where a Koala or scats are found. The next closest habitat tree to the first tree is then assessed and so on until the 30 closest trees to the original focal tree have been recorded. The number of trees showing evidence of Koalas is expressed as a percentage of the total number of trees sampled to indicate the frequency of Koala usage. Assessment of each tree involves a systematic search for Koala scats beneath the tree within a 1 m radius of the trunk. After approximately 2 minutes of searching for scats, the base of the trunk is observed for scratches and the crown for potential Koala presence.

Surveys of Koala utilisation of the site were conducted across the referral area to determine the likelihood of occurrence throughout the entire extent, and identify whether there was any concentrated occurrence. Four (4) Koala SAT surveys were conducted (refer **Plan 3**). **Table 8** presents the Koala usage scores for the four (4) SAT surveys completed. Evidence of Koala was found during the SAT surveys (refer **Photo set 11**). Opportunistic searches for Koalas were also undertaken as part of the field survey effort.

Refer to **Appendix D** for the raw SAT survey data.

Table 8: Summary of SAT Results

SAT Site Number	Evidence of Koala Use (%)	East Coast (Med-High) Koala Use (High/Medium/Low)
1	20.00 %	Low use
2	20.00 %	Low use
3	50.00 %	High use
4	16.67 %	Low use

Photo set 11: Koala scats found on-site.

The Australian Koala Foundation Koala activity level classification table (following Philips and Callaghan 2011) provides an estimate of Koala utilisation based on defined Activity Categories. The East Coast (med-high) Activity Category is appropriate for the referral area. The evidence suggests that while the referral area is utilised by Koalas, it is considered relatively poor habitat for the species. The absence of direct Koala evidence at the site may be a result of major changes

in the immediate landscape including historical land clearing and rapid urbanisation following approvals for urban development in the Ripley PDA.

Collared Delma (*Delma torquata*)

Delma torquata (Collared Delma) is a species of legless lizard and is brown to reddish-brown in colour and reaches a maximum length of 19 cm. Its preferred habitat is eucalypt dominated woodland and open forest. The species requires specific microhabitat in the form of areas of rocky outcrop. Preferred groundcover vegetation is *Themeda triandra* (Kangaroo Grass), *Cymbopogon refractus* (Barbed Wire Grass), *Aristida sp.* (Wiregrass) and *Lomandra sp.* (Lomandra).

Primary threats to this species include habitat loss and modification and removal of niche habitat. The species prefers to remain in a small area and is largely sedentary, contributing to species declines associated with disturbance.

Due to historical disturbance that has occurred on-site and in the broader landscape, it is unlikely that this species would be present on-site or has established permanently in the area.

Targeted searches of identified potential microhabitat were not successful in identifying the Collared Delma.

Grey-headed Flying-fox (*Pteropus poliocephalus*)

Pteropus poliocephalus (Grey-headed Flying-fox) requires foraging resources and roosting sites to persist. The species is known to use a wide variety of habitats including subtropical and temperate rainforests, tall sclerophyll forest and woodlands, heaths, swamps and also urban and agricultural areas where food trees have been cultivated.

The species is highly adaptive with its diverse native diet, which it can supplement with introduced species. It is known to forage within a variety of habitat areas as each resource does not produce food throughout the entire year. The closest active GHFF roost is located in Yamanto, approximately 6.5 km north-west of the site, while the nearest roost with greater than 2,500 GHFFs is located approximately 24 km north-east on Avondale Crescent, Parkinson. Opportunistic and targeted surveys did not locate roosting sites on the referral area or within the immediate vicinity of the site.

No Grey-headed Flying-fox individuals were recorded during field surveys.

It is noted that foraging habitat for the Grey-headed Flying-fox is generally considered analogous with habitat for the Koala. No eucalypt species were observed to be flowering at the time of survey.

Swift Parrot (*Lathamus discolor*)

The Swift Parrot breeds in Tasmania during the austral summer and the entire population migrates north to mainland Australia for the austral winter. Whilst on the mainland the Swift Parrot disperses widely, foraging on flowers and lerps in *Eucalyptus spp.* mainly in Victoria and New South Wales. Only a small number of Swift Parrots are observed in Queensland on a regular basis. Within Queensland, the preferred foraging species include *Eucalyptus macrocarpa, Eucalyptus melliodora, Eucalyptus robusta, Eucalyptus tereticornis* and *Corymbia citriodora*. The species prefers large trees which flower consistently.

The species was not identified on-site during field survey events, however, some potential foraging habitat was noted within the referral area, with species such as *Corymbia citriodora* and *Eucalyptus tereticornis* recorded on-site. Due to historical logging and agriculture activities, eucalypt regrowth was the dominant vegetation with only sparsely located large diameter eucalypts. No eucalypt species were observed to be flowering at the time of survey.

Given the relatively high mobility capacity of the species and abundance of preferential habitat within close proximity of the site (Greenbank Military Base and the Flinders-Karawatha Corridor), the significance of the foraging habitat on-site is considered marginal at best. This is further supported by the National Recovery Plan for the Swift Parrot (*Lathamus discolor*) (Saunders & Tzaros 2011) which states *"Many of the Swift Parrot foraging sites in Queensland occur in council reserves or parkland. The Regional Ecosystems containing preferred Swift Parrot forage tree species have been mapped and overlaid for the recorded areas of Swift Parrots in Queensland"*. Review of the *Vegetation Management Act 1999* Vegetation Management Report indicates that the referral area does not contain essential habitat for the Swift Parrot, whereas, this is not the case for the Greenbank Military Base.

No Swift Parrots were recorded during field surveys.

Regent Honeyeater (*Anthochaera phrygia*)

The Regent Honeyeater has an extremely patchy distribution, with a small number of known breeding sites. Regent Honeyeaters are known to use different areas in different years depending on food resources, with research also indicating that they may travel large distances. Most Regent Honeyeater records have been derived from box-ironbark eucalypt associations, where the species appears to prefer more fertile sites with higher soil water content, including creek flats, broad river valleys and lower slopes. Key tree species for the Regent Honeyeater include *Eucalyptus sideroxylon, Eucalyptus melliodora, Eucalyptus albens, Eucalyptus leucoxylon, Corymbia maculata/citriodora, Eucalyptus robusta, Casuarina cunninghamiana, Amyema cambagei* and *Dendropthoe vitellina*. The species prefers large trees which flower consistently.

The species was not identified on-site during field survey events, however, some potential foraging habitat was noted within the referral area with *Corymbia citriodora* recorded on-site. A number of factors reduce the suitability of this site as potential foraging habitat. Due to historical logging and agriculture activities, eucalypt regrowth was the dominant vegetation on the site and preferred large diameter eucalypts were only sparsely observed. The preference of the species to forage in large, mature trees limits the availability of preferred habitat on-site. Moreover, preferred foraging species, *Corymbia citriodora* was largely limited to the south-west portion of the site and the specimens from this species were observed to be mostly made up of smaller diameter relatively juvenile trees. No eucalypt species were observed to be flowering at the time of survey.

In addition, Regent Honeyeaters are known to be outcompeted by aggressive birds such as the Noisy Miner (*Manorina melanocephala*), a species which was observed utilising the vegetation on-site. As the site is historically disturbed, it is likely that edge habitat dominant species are dominant on this site, further reducing the suitability of the site as a foraging area for Regent Honeyeaters. Further, given the superior mobility capacity of the species and abundance of preferential habitat within close proximity of the site (Greenbank Military Base located and the Flinders-Karawatha Corridor), the significance of the foraging habitat on-site is considered marginal at best.

Overall, there is low potential that Regent Honeyeaters would utilise the vegetation on-site because of the presence of marginal foraging habitat and lack of large diameter eucalypts, and competition from other species.

No Regent Honeyeaters were recorded during field surveys.

5.2.7 Migratory Species

Database searches returned sixteen (16) migratory fauna species listed as threatened under the EPBC Act and/or NC Act, as having been previously recorded or predicted to occur within 5 km of the referral area. Following the likelihood of occurrence assessment, no species were identified as having a moderate or greater likelihood of occurring on-site.

No migratory fauna species of conservation significance were recorded during the field survey.

A complete fauna species list is provided in **Appendix E.**

5.3. Risk of Impact

A potential of occurrence assessment was initially conducted prior to conducting field surveys to identify the MNES (threatened ecological communities and threatened and/or migratory species) of potential relevance to the referral area. The identified MNES were then the focus of the field survey program and effort.

Subsequent to completing the field survey, a likelihood of occurrence (*i.e.*, a revised version of the potential of occurrence assessment) was undertaken based on field survey results and the confirmed vegetation communities and associated habitats contained with the referral area. The outcome of this two-staged likelihood of occurrence is presented in the following sections.

Those matters with a moderate or high likelihood of occurrence proceed to the impact assessment presented in **Section 5.**

Based upon the database searches and the findings of the desktop assessment, the only MNES identified as being of potential relevance to the project include threatened ecological communities, threatened flora and fauna species, and migratory fauna species.

5.3.1 EPBC Act Threatened Ecological Communities

The likelihood of occurrence for each TEC within the referral area, as presented in **Appendix C**, referred to State Government Regional Ecosystem mapping within the locality and known distributions of the TECs, to identify those TEC's with potential to occur in the referral area or recorded during field surveys.

The Protected Matters Search Tool (PMST) (refer **Appendix A**) returned the following five (5) threatened ecological communities (TEC), listed under the EPBC Act, as having potential to occur within 5 km of the referral area:

- Coastal Swamp Oak (*Casuarina glauca)* Forest of New South Wales and South East Queensland ecological community
- Lowland Rainforest of Subtropical Australia
- Poplar Box Grassy Woodland on Alluvial Plains
- Swamp Tea-tree (*Melaleuca irbyana*) Forest of South-east Queensland
- White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland

The results of the likelihood of occurrence assessment determined that none of the above-mentioned TECs were likely to occur due to the absence of indicative Regional Ecosystems and species on site typically associated with these TECs.

Field surveys confirmed no TECs were present within the referral area.

5.3.2 Threatened Flora Species

Database searches returned twenty-three (23) flora species, listed as threatened under the EPBC Act and/or NCA as having been previously recorded or potential to occur within 5 km of the referral area, as presented in **Appendices A & B**.

Based on the presence of species records within the locality and the habitats within the referral area, a likelihood of occurrence assessment was conducted to determine those threatened flora species with potential to occur within the referral area. The assessment identified that twelve (12) of the listed threatened flora species had a low risk of impact on site due to being unlikely to occur in the referral area. *Coleus habrophyllus*, *Callitris baileyi* and *Marsdenia coronata* were identified as having moderate risk of occurrence on the site.

None of the above species were identified on-site during the field surveys (refer **Table 9**). Each species requires relatively undisturbed areas which are not present on this site. As such, **field surveys confirmed that no EPBC or NCA listed flora species were present within the referral area.**

Table 9: Field Assessment Confirmed Likelihood of Occurrence – Threatened Flora

Scientific Name	EPBC/ NC Act status	Desktop Likelihood of Occurrence	Field Assessment Confirmed Likelihood of Occurrence
Coleus habrophyllus	Endangered / Endangered	**Moderate** This species requires niche habitat requirements such a rocky outcrop, limited to no weeds, a relatively undisturbed understorey and shaded location. *Coleus habrophyllus* has previously been found in the locality.	**Low** Field surveys found some suitable microhabitat in the form of rocky outcrops. However, the site is disturbed due to historical logging and agriculture activities, reducing potential for this species to occur on-site.
***Callitris baileyi* (Bailey's Cypress)**	- / Near Threatened	**Moderate** BioNet records indicate a recent sighting (2019) of the species approximately 1.9 km west of the site and there is suitable habitat for this species to occur on site. As a result, there is potential for the species to occur on-site.	**Low** *Callitris baileyi* was not observed on-site during the field surveys. Due to the historical disturbance that has occurred over the site and in the adjoining land, there is low potential that this species would occur.
***Marsdenia coronata* (Slender Milkvine)**	- / Vulnerable	**Moderate** Preferred habitat is present and canopy species this species is associated with such as *Corymbia citriodora* are present throughout the site.	**Low** *Marsdenia coronata* was not observed on-site during the field surveys. Due to the historical disturbance that has occurred over the site and in the adjoining land, there is low potential that this species would occur.

The complete likelihood of occurrence is provided in **Appendix C**.

5.3.3 Threatened Fauna Species

Database searches returned twenty-six (26) fauna species, listed as threatened under the EPBC Act and nine (9) listed under the NCA, as having been previously recorded or predicted to occur within 5 km of the referral area, as presented in **Appendices A & B**.

Based on the presence of species records within the locality and the habitats within the referral area, a likelihood of occurrence assessment was conducted to determine those threatened fauna species with potential to occur within the

referral area (**Appendix C**). The assessment identified that five (5) threatened fauna species had a moderate or high likelihood or occurring on-site (refer **Table 10**).

The Koala was identified as being known to occur on the site due to evidence of activity being recorded during field surveys.

Table 10: Field Assessment Confirmed Likelihood of Occurrence – Threatened Fauna

Scientific name (common name)	EPBC	NCA	Desktop (Preliminary) Likelihood of Occurrence	Field Assessment Confirmed (Revised) Likelihood of Occurrence
Anthochaera phrygia **(Regent Honeyeater)**	Critically Endangered	Endangered	**Moderate** Potential foraging habitat for the Regent Honeyeater occurs on and adjacent to the subject site. The referral area vegetation mapping is dominated by *Corymbia citriodora* (Spotted Gum), *Eucalyptus tereticornis* (Forest Red Gum) and *Eucalyptus crebra* (Narrow-leaved Ironbark). The Regent Honeyeater has been sighted in 2019 in the Springfield Lakes area, approximately 11 km east of the site.	**Low** Field surveys found the extent of preferred foraging habitat to be limited. Preferred foraging species *C. citriodora* is largely restricted to the south-west portion of the site and regrowth in status. The balance of the site is dominated by regrowth vegetation with only sparse large diameter *E. tereticornis*. Regent Honeyeaters experience competition from aggressive species such as Noisy Miner (*Manorina melanocephala)* and Noisy Friarbird (*Philemon corniculatus)*. Noisy Miners were observed to be utilising the vegetation on-site, which may reduce potential for Regent Honeyeaters to opportunistically forage on-site. Overall, there is low potential that the Regent Honeyeater would utilise the vegetation on-site because of the presence of marginal foraging habitat and lack of large diameter eucalypts, and competition from other more aggressive species.
Delma torquata **(Collared Delma)**	Vulnerable	Vulnerable	**Moderate** This species has been observed previously within the Ripley locality therefore there is potential that the species may occur on-site.	**Low** Potential microhabitat for this species was identified on-site, however, targeted field surveys did not identify this species on-site.
Lathamus discolour **(Swift Parrot)**	Critically Endangered	Endangered	**Moderate** Potential foraging habitat for the Swift Parrot is mapped on and adjacent to the subject site in the form of eucalypt trees including *Eucalyptus tereticornis* (Forest Red Gum) and *Corymbia citriodora* (Spotted Gum). This bird species has been sighted in 2019 in the Springfield Lakes area, approximately 11 km east of the site.	**Low** Field surveys found one preferred foraging species *C. citriodora* to be largely restricted to the south-west portion of the site and regrowth in status. The balance of the site is dominated by regrowth vegetation containing *E. tereticornis* and *E. crebra*. Based on the fact that only two preferred foraging species are present (*C. citriodora* and *E. tereticornis*) and the vegetation on-site and adjoining the site is disturbed and predominantly comprised of regrowth, there is a low potential that the Swift Parrot would utilise the vegetation on-site and adjoining.
Phascolarctos cinereus	Vulnerable	Vulnerable	**High**	**Known**

(Koala)		Potential Koala habitat is mapped on-site in the form of eucalypt dominated Regional Ecosystems and Koalas have been known to occur within close proximity to the site.	Evidence of Koala in the form of scats was recorded during field surveys. Koala have been recorded on adjoining properties.
Pteropus poliocephalus **(Grey-headed Flying Fox)**	Vulnerable	**High** There are no observed roosts on-site or adjacent to the site, with the nearest known roost site located in Yamanto, 6.5 km north-west of the site. Given the site's proximity to a significant roosting site and the presence of suitable foraging habitat on-site, there is potential for this species to opportunistically forage on-site.	**Moderate** While suitable foraging vegetation occurs on-site, the species was not seen utilising this vegetation or as a flyover. In addition, there are no observed roosts on site, with the nearest known roost site located in Yamanto, 6.5 km north-west of the site. There is moderate potential for this species may only opportunistically forage on-site.

The complete likelihood of occurrence is provided in **Appendix C.**

6. Impact Assessment

6.1. Potential Project Related Impacts

The proposed residential development will be entirely located within the referral area and will involve the clearing of 9.65 ha of regrowth vegetation for construction and operation.

6.1.1 Impact Avoidance and Minimisation

The site does not contain any features which are of significant habitat value. The site is comprised entirely of regrowth vegetation and cleared, modified land. Impacts are minimised by including areas which are not of 'remnant' status under the VMA that contain older established areas of significant habitat value.

6.1.2 Potential Direct Impacts

Vegetation Clearing

The project is predicted to directly impact the entirety of the referral area. A breakdown of vegetation to be impacted is provided in **Table 11**.

Table 11: Potential direct impacts to field verified vegetation communities

Regional Ecosystem	Short Description	VM Act Status	Extent on the referral area (ha)	Impact (ha)
Regrowth				
12.9-10.2	*Corymbia citriodora subsp. variegata +/- Eucalyptus crebra open forest on sedimentary rocks.*	Least Concern	4.47	4.47
12.9-10.7a	*Eucalyptus siderophloia, Corymbia intermedia +/- E. tereticornis and Lophostemon confertus open forest. Occurs on Cainozoic and Mesozoic sediments in near coastal areas. (BVG1M: 12a)*	Of Concern	5.18	5.18
Total			**9.65 ha**	**9.65 ha**

Habitat Loss

The Project is predicted to impact regrowth habitat, which provides marginal habitat values for a range of native flora and fauna species.

The MNES identified as having a moderate and higher likelihood of occurrence have been further assessed in terms of the risk of potential project related impacts upon each matter, to determine the need or otherwise for EPBC Act significant impact assessments to be completed, as presented in **Table 12**.

The risk of impact assessment (refer to **Table 12**) is qualitative and based upon the potential extent of habitat loss resulting from the construction phase of the project and to a lesser degree the operational phase of the project. It considered, but was not limited to the following:

- The value of the impacted habitat to each respective matter;
- The amount of habitat to be directly impacted (lost) against that to be retained;
- Potential indirect impacts (e.g. dust, noise and soil erosion);
- Potential fragmentation of a population into two or more populations;
- Increased fragmentation of wildlife corridors in the Referral area;
- Risk of operational impacts (e.g. noise); and
- Each species ability (e.g. fauna) or inability (e.g. flora) to move away from areas of direct impact into retained habitat.

Table 12: Fauna with a moderate or greater likelihood of occurring in the referral area post field survey analysis

Scientific Name	Common Name	EPBC Act Status	Likelihood of Occurrence	Risk of Impact
Threatened fauna species				
Phascolarctos cinereus	Koala	Vulnerable	**Known** Suitable Koala habitat is present on-site in the form of eucalypt dominated regrowth Regional Ecosystems and Koalas have been known to occur within close proximity to the site. Evidence of Koala in the form of scats was recorded during field surveys. Koala have been recorded on properties adjoining the subject site.	Yes
Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable	**Moderate** There are no observed roosts on-site, with the nearest known roost site located in Yamanto, 6.5 km north-west of the site. Given the site's proximity to a significant roosting site and the presence of potential foraging habitat on-site, it is likely that the species may opportunistically forage on-site. The species was not observed as a fly over species nor utilising site vegetation as foraging habitat.	Yes

6.1.3 Potential Indirect Impacts

Indirect impacts occur when project related activities affect vegetation or habitats in a manner other than a direct loss or clearing. Examples of indirect impacts include; promotion of soil erosion, sedimentation of waterways, dust inhibiting plant pollination, provision of suitable seed bed for invasive plants, or increased noise activity within of directly adjacent to sensitive habitat areas.

The potential indirect impacts that may result from construction activities and/or the operational phase of the project have been identified below.

Weeds

Increased vehicle movement during the construction phase has the potential to increase the spread of weeds in the area, particularly during the vegetation clearing phase, however, the site is already highly disturbed by weed invasion. With implementation of standard mitigation measures, the project is likely to result in a negligible impact to ecological values due to the potential introduction/spread of weeds.

Vehicle Movement

During construction, a number of vehicles will be required on the referral area. Direct impacts from vehicle movements on threatened species and vegetation communities include:

- damage or destruction of vegetation or fauna habitat by vehicles traversing these areas; and
- fauna strike.

Indirect impacts include:

- interference of fauna through visual and noise impacts. This in turn can affect feeding, roosting, breeding or nesting behaviour;
- introducing and/or spreading weeds or feral animals carried on or in vehicles, resulting in deterioration or loss of vegetation and important fauna habitat; and
- damage or destruction of vegetation and fauna habitat through smothering by dust generated by vehicles traversing the project area.

With implementation of standard mitigation measures, the project is likely to result in a temporary and minor impact to ecological values due to vehicular movements. Further, ecological field survey confirmed mostly common and highly mobile fauna are present on the site.

Earthworks

Construction activities have the potential to generate dust emissions. Dust emissions during construction will be temporary. The main sources of dust will be generated via:

- wheel-generated dust from the haul roads created for the construction phase;
- dust lift-off from exposed surfaces (e.g. construction roads and pads);
- earthworks, including construction of the embankments, and moving, dumping and shaping material; and
- vegetation and soil clearing of the land.

Excessive deposition of dust on leaves of plants can suppress their growth and photosynthesis, resulting in reduced habitat quality for fauna. High levels of airborne dust can irritate the respiratory systems of fauna and potentially result in ingestion of dust-coated seeds and other foods. Excessive deposition of dust on open water bodies may also degrade

water quality and overall habitat quality for fauna. With implementation of standard mitigation measures, the project is likely to result in a temporary and minor impact to ecological values due to the generation of dust.

Light Emissions During Construction

Artificial light can affect both nocturnal and diurnal animals by disrupting behavioural patterns, with quality of light (e.g. wavelength, colour), intensity and duration potentially evoking different faunal responses. Impacts from increased light levels include disorientation from, or attraction toward, artificial sources of light; mortality from collisions with structures, and effects on light-sensitive cycles of species (e.g. breeding and migration for fauna and flowering in plants). An artificial increase in lighting can also affect abundance of predators.

Presence and intensity of artificial light in the project area will temporarily increase during the construction phase; however, night works will not be common. Lighting will be directed to construction areas within the project site. Some light spillage will be inevitable and is likely to be contained. Potential impacts associated with light emissions will be temporary and are unlikely to be significant.

With implementation of standard mitigation measures, the project is likely to result in a negligible impact to ecological values due to the use of light pollution during construction and operation.

Noise and Vibration

Noise levels greater than existing ambient noise levels are expected during the construction within the project area. Sources of noise are likely to consist of short, intense pulses from mobile plant equipment, and more prolonged noise, with consistent vibration, pitch and volume from generators, excavators and pumps, in addition from noise from vehicles.

Both steady continuous and single noise events have the potential to lead to ecological impacts. Construction noise is expected to elicit some avoidance response from fauna using the surrounding vegetation though, with consideration of the extent of habitat available in and adjoining the referral area and species mobility, this is likely to be a temporary and negligible to minor impact.

Waste Disposal

Inappropriate disposal of non-hazardous wastes can attract vermin and other wildlife to site. This may exacerbate potential impacts (e.g. road mortality). Litter may also enter surrounding environments. With implementation of standard mitigation measures, the project is likely to result in a negligible impact to ecological values due to the generation and handling of waste.

Hazardous and Dangerous Goods

Spills and leaks from transfers (e.g. fuel and/or chemicals) and inadequate storage of dangerous goods and hazardous wastes could result in point-source contamination of surrounding land. Direct adverse impacts could include toxic impacts on vegetation (resulting in degradation or loss of vegetation and habitats), direct toxic impacts on fauna (from contact, inhalation or ingestion) or indirect impacts on threatened and migratory species from habitat loss. Direct adverse impacts on surface and groundwater quality are also possible.

With the application of standard mitigation and management measures, impacts from liquid and solid waste disposal will be avoided or localised and small in scale. Further to this, the likelihood of significant spillages is considered extremely low. Therefore, the project is likely to result in a negligible impact to ecological values due to potential spills and leaks.

Increased Human Presence

Increased human activity during construction has the potential to disturb fauna within adjacent habitat areas. Resulting impacts to fauna include heightened vigilance and predator avoidance, which can disrupt foraging and roosting efficiency or deter wildlife from using particular areas. Impacts essentially represent a reduction in habitat availability due to edge effects. The project is likely to result in a temporary and minor impact to ecological values due to increased human presence on site during the construction and operational period.

6.2. Potential Impacts to Matters of National Environmental Significance

As detailed in the previous sections, field surveys confirmed that the following are unlikely to occur or have a low likelihood of occurrence on the referral area.

- EPBC Act listed TECs;
- EPBC Act and NC Act listed flora species; and
- EPBC Act Migratory fauna species.

The desktop assessment found five (5) EPBC Act listed fauna species to have a moderate or higher likelihood of occurring on the site, including Regent Honeyeater, Swift Parrot, Grey-headed Flying Fox, Koala and Collared Delma.

In reference to **Table 12**, the threatened fauna species with a moderate or higher likelihood of occurring within the referral area post field survey are the Grey-headed Flying-fox and Koala, and their supported habitats may be at risk of potential project related impacts and a significant impact assessment is considered necessary.

7. Avoidance, Mitigation and Management Measures

7.1. Construction Phase

General mitigation measures to be implemented during the construction phase of the Project are outlined below.

7.1.1 Vegetation Clearing and Management Plan

A Vegetation Clearing and Management Plan (VC&MP) should form part of the broader management document submitted as part of the operational works application for the development site. The VC&MP should cover clearing of all vegetation listed in this report and include details on:

- Clearly show trees to be removed
- All civil works likely to impact on existing vegetation
- Temporary and permanent exclusion and protection fencing
- Roles and responsibilities for site contractors, the developer and the consultant group
- Stockpiling and site access locations
- A clearing sequence plan showing the commencement of clearing and direction of removal (this should be in conjunction with the Fauna Management Plan to allow for the appropriate flushing of fauna towards safe havens and/or the application of an appropriate relocation program)
- Links to weed management and revegetation proposals
- The stock piling and reuse of cleared vegetation

7.1.2 Fauna Management Plan

A Fauna Management Plan (FMP) should be prepared for potential impacts of the construction phase covering the loss of vegetated areas, isolated trees and likely barriers and impediments to local dispersal.

The FMP should link closely with the VC&MP and include details on:

- Species surveyed as using the site with a focus on those most likely impacted by development works
- A list of relevant State and Commonwealth legislation constraints and controls for the above listed fauna
- A plan showing existing habitat opportunities and locations
- Details of the threats to existing fauna species
- Clearing sequence plan from the VC&MP
- Management and mitigation measures i.e. temporary use of fauna exclusion fencing
- Fauna spotter role, contacts and certification
- Specific fauna management procedures for potential or known habitat trees

7.1.3 Fauna Spotter Catcher

A registered and suitability qualified fauna spotter catcher/ecologist will need to be employed for the construction phase of the Project to implement a protocol of best management practises. Significant habitat features, should any be identified on site, will be flagged prior to clearing events and these areas supervised by an appropriately experienced ecologist. Identified within the clearing supervision protocol should be flagging of hollow bearing trees followed by the removal of vegetation surrounding them. After 24 to 72 hours, these trees should then be removed. Trees must be directionally felled into open or already cleared areas.

The objective of this is to enable hollow dependant fauna an opportunity to move on their own accord as many species utilise multiple den/roost sites within a given home range. Certain areas would be identified and flagged as significant such as old-growth trees with hollow resources and on-site identification to construction personnel will help reduce/avoid clearing. Where required, native fauna situated within areas to be cleared will be relocated to a secure area of similar habitat prior to the commencement of vegetation clearance works by a registered fauna spotter/catcher. Should any removal and relocation of nests be required, it is to be undertaken by a suitably qualified and experienced person and advice sought where necessary.

8. Assessment against Koala Referral Guidelines

On 30 April 2012, the Koala populations of Queensland, New South Wales and the Australian Capital Territory were scheduled as Vulnerable under the EPBC Act. This had the effect of making the Koala population in South East Queensland a MNES. As such, an action considered likely to have a significant impact on the Koala or Koala habitat must be referred for controlled action assessment. In December 2014, the '*EPBC Act Referral Guidelines for the Vulnerable Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory)*' ('Koala Referral Guidelines') were released to guide proponents in determining whether an action will have an impact on the Koala and require referral.

The report considers the environmental impacts against the Koala Referral Guidelines which support the Commonwealth Government scheduling of the Koala as a Vulnerable species under the provisions of the EPBC Act, and the Significant Impact Guidelines (refer **Section 9.2.6**). The assessment methodology included site surveys (including Koala SAT survey techniques) and consideration of Commonwealth, State and Local Government environmental database searches.

To determine whether or not the proposed development will have an impact on the Koala, the flow chart (refer to **Figure 6**) in the Koala referral Guidelines has been responded to in the following sub-sections.

8.1. Stage 1 – Modelled Distribution and Geographical Context

The Modelled Distribution of the Koala contained within the Koala Referral Guidelines encompasses most areas of Queensland, New South Wales and the Australian Capital Territory. A search of the EPBC PMST within a 5 km buffer lists the Koala as species or species habitat known to occur within area (refer **Appendix A**). As per the Koala Referral Guidelines (Map 1), the site is therefore considered to fall within the modelled distribution of the Koala.

The Koala Referral Guidelines separate the geographical context into two zones, inland and coastal, based on the 800 mm per annum rainfall isohyet. The site is mapped within the "coastal" area as per the Koala Referral Guidelines distribution map (Map 2). Therefore, the coastal habitat attributes contained in the Koala Referral Guidelines are relevant when using the Habitat Assessment Tool.

Because the site is located within the coastal context of the modelled distribution area and Koalas have been recorded within 2 km it therefore requires further consideration under the assessment guidelines.

8.2. Stage 2 – Does the Impact Area contain Koala habitat?

The Koala Referral Guidelines assess significant impacts on the Koala through the assessment of habitat critical to the survival of the Koala and actions that interfere substantially with the recovery of the species. A Koala Habitat Assessment Tool (KHAT) is contained within Section 6 of the Koala Referral Guidelines to help determine the sensitivity, value and quality of the impact area. This habitat assessment tool uses five primary Koala habitat attributes:

1) Koala occurrence;
2) Vegetation composition;
3) Habitat connectivity;
4) Key Existing threats; and

5) Recovery value.

Each of these Koala habitat attributes are scored between 0 and 2 and the scores are added together to give a total out of 10. Impact areas that score **5 or more** are considered to contain habitat critical to the survival of the Koala. **Table 13** provides an assessment against the five primary Koala habitat attributes for the site.

The assessment is based on the field surveys carried out by the SHG, discussed in **Section 5** of this report.

Table 13: Koala Habitat Assessment Tool Assessment

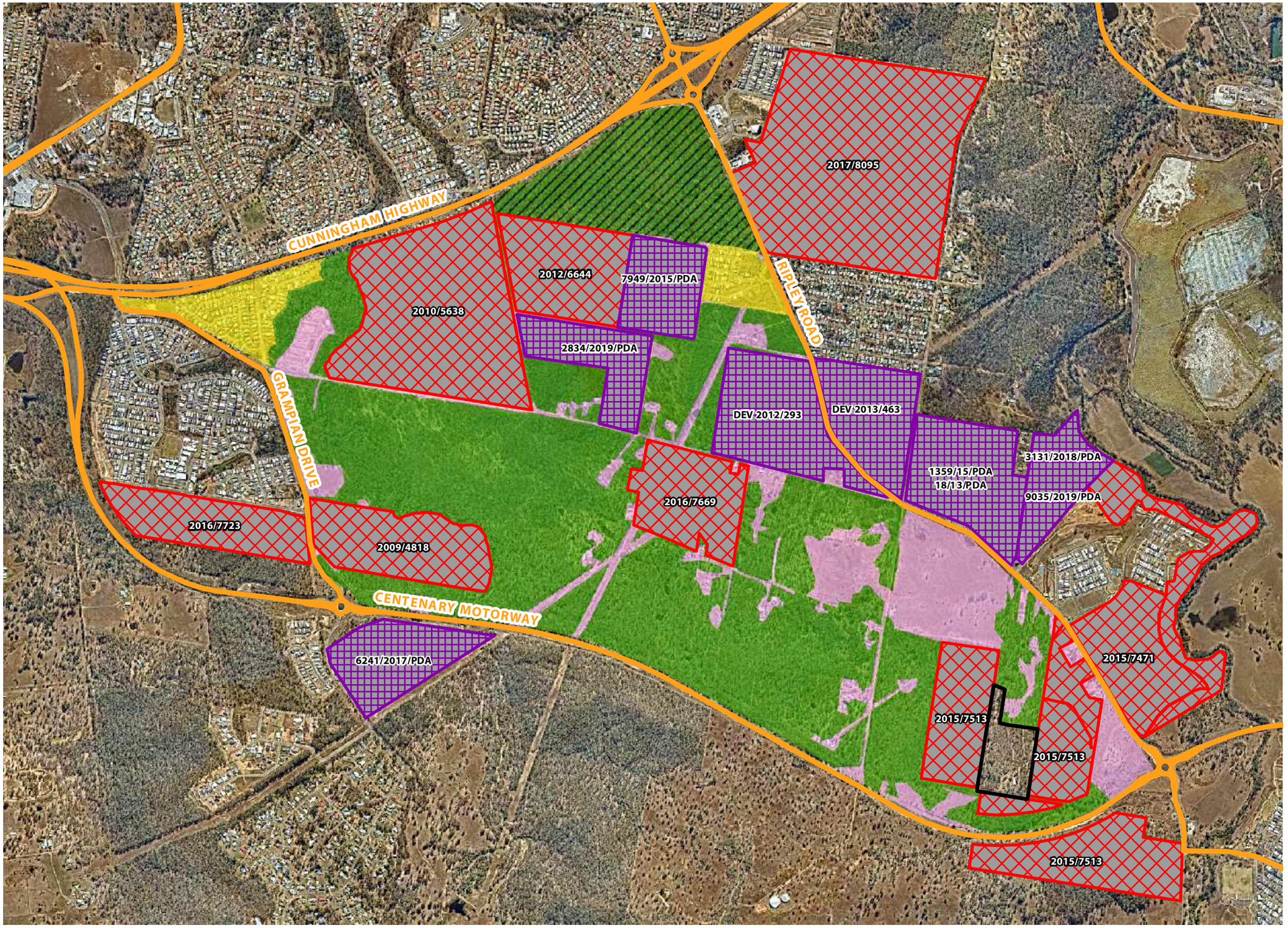
Attribute	Score	Comment
Koala occurrence	**+2 (high)**	**Desktop** The PMR using a 5 km radius identified the Koala as having the potential to occur on-site. The Wildlife Online extract identified 52 records of Koala within a 5 km radius of the site. A search of Atlas of Living Australia identified 9 records within a 5 km radius of the site. **On-ground** Surveys conducted by SHG (June 2020) recorded evidence of Koalas in the form of scats. **There is evidence that one (1) or more Koalas within 2 km of the edge of the impact area within the last five (5) years. This attribute has been given a score of 2.**
Vegetation composition	**+2 (high)**	**Desktop** Regional ecosystem mapping published by the Queensland Government identifies the project area as containing predominantly high value regrowth (Category C) vegetation. **On-ground** The site contains a mix of recognised Koala food and habitat trees in varying densities and maturity. The species recorded include *Eucalyptus moluccana* (Gum-topped Box), *Eucalyptus melanophloia* (Silver-leaved Ironbark), *Eucalyptus tereticornis* (Forest Red Gum), *Eucalyptus crebra* (Narrow-leaved Ironbark), *Corymbia citriodora* (Spotted Gum), *Corymbia tesselaris* (Moreton Bay Ash), *Lophostemon suaveolens* (Swamp Box) and *Angophora leiocarpa* (Smooth-barked Apple). **The site contains a 'woodland' or 'open forest' with two (2) or more known Koala food tree species, the vegetation composition attribute is given a score of 2.**
Habitat connectivity	**+1 (medium)**	Connectivity is limited to the north by Ripley Rd and residential developments and to the south by Centenary Highway. Vegetation to the east is sparse and dominated by large open areas, limiting potential movement east. The site retains fragmented connectivity to the west to adjoining high-value regrowth

		bushland (refer **Plan 5** for Contiguous Landscape Analysis). The vegetation on-site is potentially connected to 375 ha of contiguous bushland habitat. **As the site is connected to < 500 ha of contiguous landscape, this attribute has been given a score of 1.**
Key existing threats	**+1 (medium)**	Two key existing threats pose a risk to survival of local Koala populations; vehicle strike and dog attack. **<u>Vehicle Strike:</u>** A review of the Koala Hospital incident data shows that 38 incidences have occurred within a 5 km buffer of the referral area (refer **Plan 6**). It should be noted that many live sightings of the Koala in the broader region have been along or proximal to major road networks or highly modified environments. The location of these sightings indicates the risk of motor vehicle strike is considerably high. Additionally, it is noted that anticipated growth and planned residential development surrounding the site will result in increased traffic flows. **<u>Dog Attack:</u>** A recent study completed by Gonzalez-Astudillo *et al.* (2017) analysed the Queensland Koala hospital data from 1997-2013 and found that 1,561 Koalas had injuries associated with trauma from animals, namely dogs. Further, Ipswich City Council's *Koalas in Urban Ipswich* guide suggests dog attacks can account for 40% of total Koala mortalities within an area. The likelihood of a Koala attack is increased when more than one dog is in a backyard, and during the periods of dawn and dusk when Koalas are most active. Further, studies completed as part of the Moreton Bay Rail project (DTMR 2016) found that between 2013 and 2016, 113 koalas had been killed by wild dogs with an additional 38 koala deaths suspected as wild dog predation, 82 koala deaths caused by illness and nine (9) vehicle strike deaths. These figures indicate that the threat of wild dog predation is at the forefront, while disease and vehicle strikes are also ongoing contributors to Koala deaths. Notably, wild and domestic dogs were recorded freely roaming the referral area. **As threats from vehicle strikes and dog attacks are present in the area, the key existing threats attribute has been given a score of +1.**
Recovery value	**0 (low)**	The interim recovery objective for coastal areas is based upon protecting and conserving large, connected areas of Koala habitat, particularly where Koalas are genetically diverse or distinct, free of disease or have a low incidence of disease or where there is evidence of breeding and maintained corridors and connective habitat that allows for movement of Koalas within large areas of habitat. The site is located within the Ripley Valley PDA and adjoins fragmented bushland to the west. The removal of vegetation on-site will not significantly

		exacerbate fragmentation or the creation of movement barriers between vegetation due to existing high levels of disturbance and fragmentation. The landscape immediately to the east, north and south of the site is comprised of residential development associated with the Ripley Valley PDA and major roads and is currently unsuitable for fauna movement, therefore the project would not be creating new barriers to movement. The site is also surrounding by approved development. The referral area has been modified previously due to historical logging and agriculture activities. Vegetation on-site is predominantly 'high value regrowth' status under the VMA that contains a range of potential Koala food tree species. However, it is not considered that the site will be important in the recovery of the Koala. The site currently retains fragmented connectivity to 375 ha of bushland habitat, with the removal of the highly disturbed vegetation on-site surrounded by existing approvals not expected to impede the connectivity value of the nearby bushland or significantly impact the dispersal capacity of Koalas utilising it. The site vegetation is also of lower quality than vegetation in the surrounding landscape. Due to the presence of existing residential developments, the Town Centre, approvals for developments and proposed infrastructure including trunk roads and a rail corridor in the surrounding landscape, the vegetation on-site if retained would become completely isolated from other bushland in the landscape and dominated by edge habitat due to the small size of the site, severely reducing suitability for and practical use by the Koala. Due to these factors and the prevalence of threats present on-site and in the landscape, the site is not considered to be of recovery value to the Koala. The local Koala population is not considered genetically distinct from other Koala populations in SEQ. While the health of the local Koalas is unknown and none were recorded, diseases such as Chlamydia and Koala Retrovirus are extremely prevalent amongst SEQ Koalas. In summary, the recovery value of the referral area is compromised by the Ripley Valley PDA and masterplan area designation and existing high level disturbances and fragmentation from the intensification of planned residential development, the Ripley Town Centre and road networks. **The 'recovery value' attribute has been given a score of 0.**
Total	**6**	**As the habitat score is greater than five (5), the site is considered to provide habitat critical to the survival of the Koala.**

Desktop and detailed field analysis confirms that the referral area contains 9.65 ha of habitat critical to the survival of the Koala (refer **Plan 7**).

5. Contiguous Landscape Analysis



NOTES

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Legend

- Qld DCDB
- Referral area
- EDQ DA Approved Sites
- EPBC Approvals
- Major Roads
- Connected bushland (375 ha)
- Disconnected bushland (59 ha)
- Cleared/rural/construction (125 ha)
- Residential development (31 ha)

Issue	Date	Description	Drawn	Checked
B	17/08/2020	Preliminary	TC	AD

0 200 400 600 800 m

Transverse Mercator | GDA 1994 | Zone 56 | 1:20,000 @ A3

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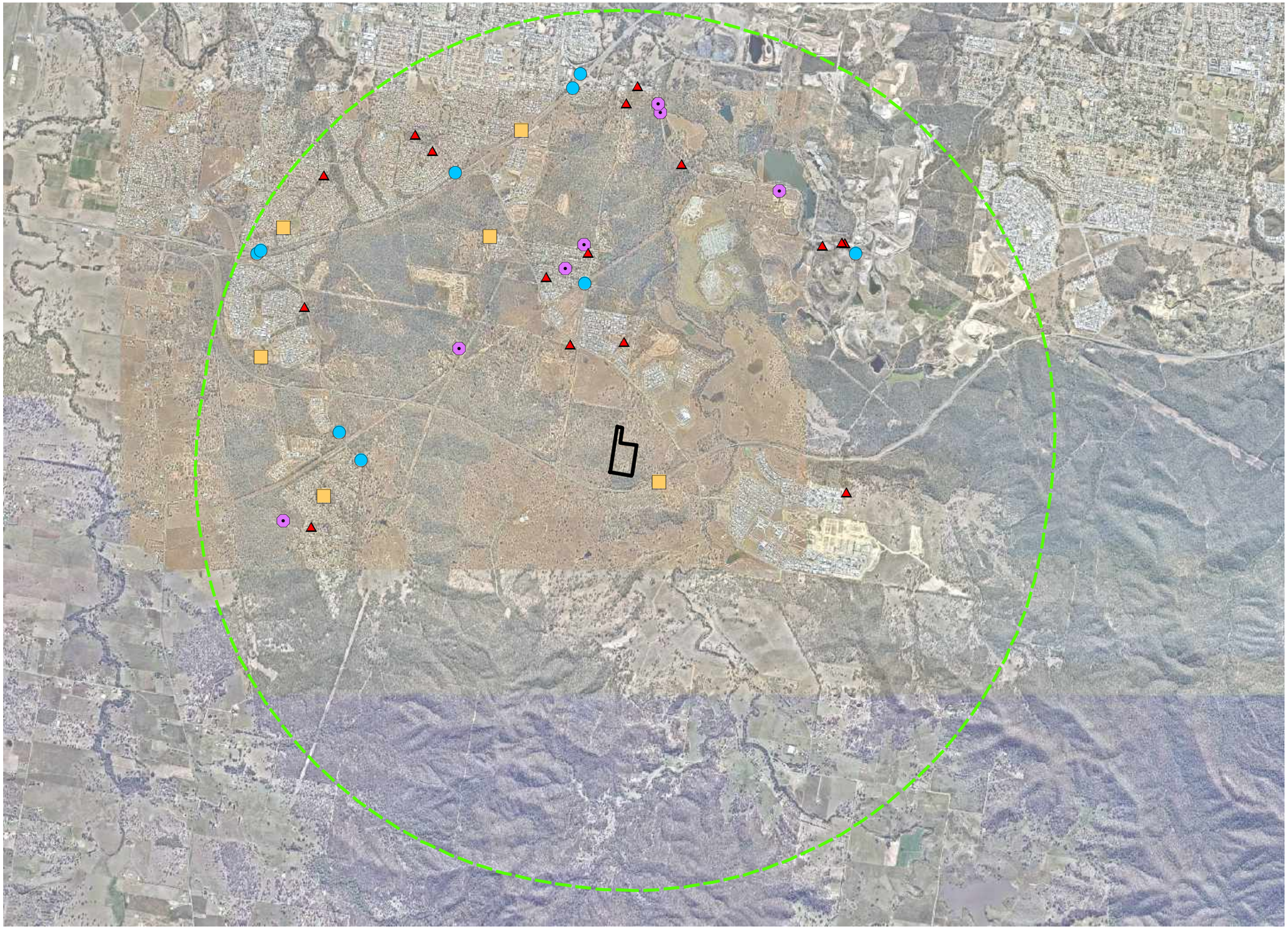
633 Ripley Road, Ripley

ADDRESS/RPD: 2RP806983

17/08/2020 | 10143 E 05 Contiguous Landscape B

6. Qld Koala Hospital Incident Location Records



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Legend

- Qld DCDB
- Referral area
- 5km incident record search
- Death
- Injured
- Sick
- Undetermined incident

Issue	Date	Description	Drawn	Checked
B	17/08/2020	Preliminary	TC	AD

0 500 1,000 1,500 m

Transverse Mercator | GDA 1994 | Zone 56 | 1:46,000 @ A3

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633 Ripley Road, Ripley

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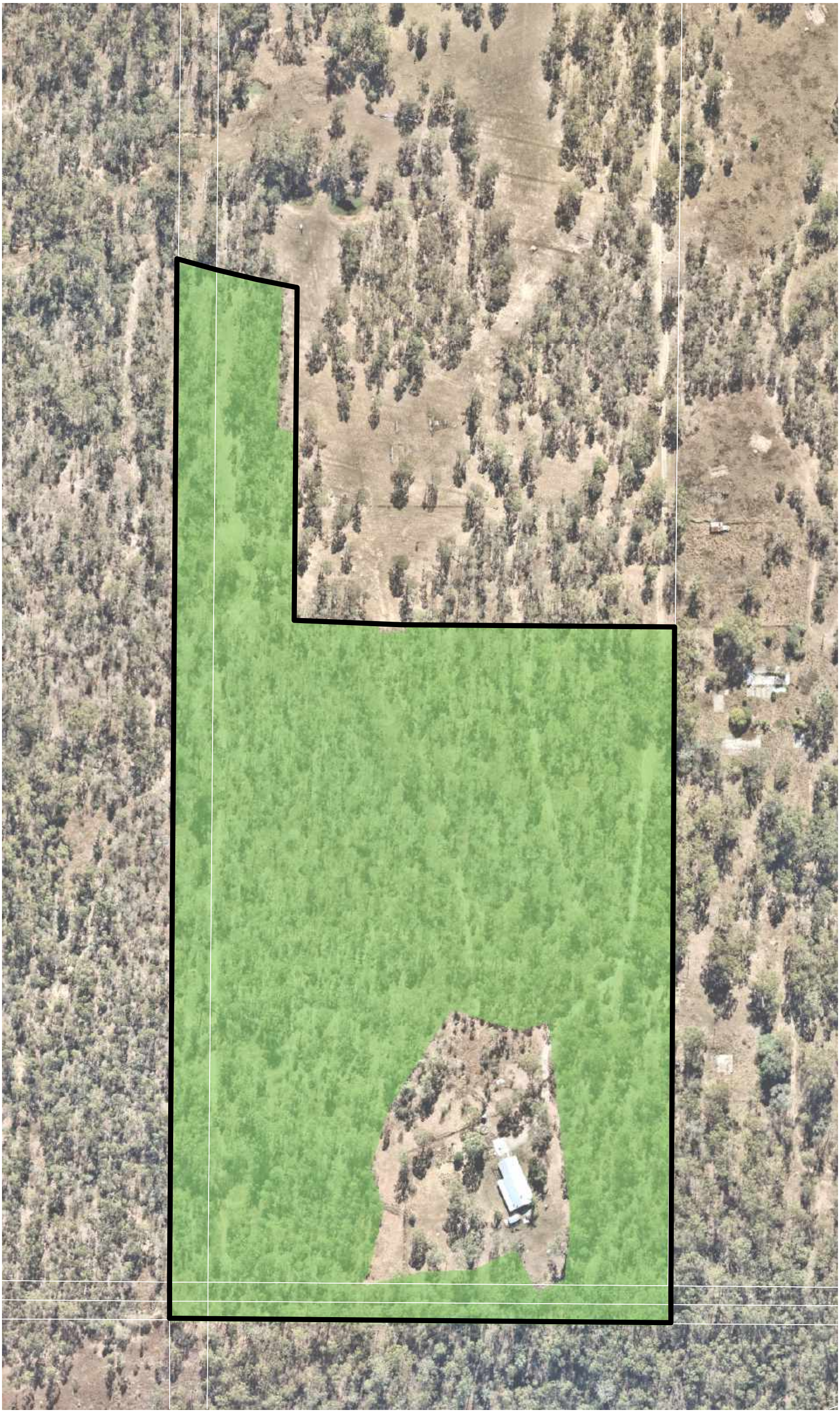
17/08/2020 | 10143 E 06 Koala Hospital Incidents B

7. Habitat Critical To The Survival Of The Koala



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Legend

- Qld DCDB
- Referral area
- Habitat critical to the survival of the Koala (9.65 ha)

Issue	Date	Description	Drawn	Checked
A	17/08/2020	Preliminary	TC	MS

0 20 40 60 80 m

Transverse Mercator | GDA 1994 | Zone 56 | 1:2,000 @ A3

saunders havill group

BCove 4 Pty Ltd

633 Ripley Road, Ripley

ADDRESS/RPD: 2RP806983

17/08/2020 | 10143E 07 Critical Koala Habitat B

8.3. Stage 3 – Adverse Effects on Critical Habitats (Section 7 of Guideline)

8.3.1 Is the action likely to adversely affect Koala habitat?

The next stage of assessment – assessing whether the action is likely to adversely affect habitat critical to the survival of the Koala – is applied in this Section. The methodology is set out in Section 7 of the Guidelines with a flowchart provided to help proponents make an assessment on whether the action should be referred. Assessment of the action at the site against the flowchart is described below.

- **Does your impact area contain habitat critical to the survival of the koala (habitat score ≥ 5)?** – Yes, the vegetation on the property was given a habitat score of 6, which is considered habitat critical to the survival of the Koala under the Koala Referral Guidelines.

- **Do the area(s) proposed to be cleared contain known koala food trees?** – Yes, the on-ground assessment found species considered Koala food trees as defined by the Koala Referral Guideline are present on-site.

- **Are you proposing to clear ≤ 2 ha of habitat containing known koala food trees in an area with a habitat score of 5?** – No, an area of greater than 2 ha with a habitat score of 6 is proposed to be cleared as part of the action.

- **Are you proposing to clear ≥ 20 ha of habitat containing known koala food trees in an area with a habitat score of ≥ 8?** – No, the area proposed to be cleared is 9.65 ha with a habitat score of 6.

Reviewing the site against the characteristics outlined in the flowchart indicates the impacts of the Action are uncertain and therefore the nature of the Action requires further consideration. The following characteristics apply:

- The proposal requires the clearing of 9.65 ha of Koala habitat with a score of 6, which places the referral firmly in the lower end of the potential impact threshold.
- The habitat on-site is entirely non-remnant vegetation with open cleared areas historically disturbed from historical land uses;
- Clearing will not result in further fragmentation of a habitat area from a larger habitat area due to the location of the referral area within a PDA surrounded by approved development;
- The surrounding landscape contains several major movement barriers that currently impede Koala movement to the east, south and north including the Centenary Highway, Ripley Road, residential developments and a future rail corridor. The removal of vegetation on-site will not exacerbate barriers to movement.
- Koalas have been recorded in the area and Koala evidence in the form of scats is present on-site, ranging from usage of mostly low to one site as high under East Coast (mid-high) density category.

While the clearing of approximately 9.65 ha of Koala habitat in an area with a habitat score of 6 may reduce some available habitat for the Koala in the region, the location of the site in between current and approved developments adjoining the Ripley Town Centre suggests that the removal of this vegetation will not impact connectivity or further fragment Koala habitat or populations in the area.

Therefore, the Action is not anticipated to adversely affect habitat critical to the survival of the Koala.

8.4. Stage 4 – Could the action interfere substantially with the recovery of the Koala? (Section 8 of Guideline)

The next step is to ascertain whether the action could interfere substantially with the recovery of the Koala in areas of habitat critical to the survival of the Koala. The methodology is set out in Section 8 of the Koala Referral Guidelines to help proponents make an assessment on whether or not residual impacts are likely to be significant and therefore require referral.

Possible impacts listed in the Koala Referral Guidelines that must be considered include:

- Dog attack;
- Vehicle strike;
- Facilitating the introduction or spread of disease or pathogens;
- Barriers to dispersal and fragmentation; and
- Degradation of critical habitat due to hydrological changes.

These impacts, as well as mitigation measures to address them, if appropriate, are discussed in **Table 14** with further detail on mitigation measures outlined in **Section 7** of this document. The mitigation strategy relies upon the fact that the site is not expected to provide significant connectivity to Koala habitat within the broader landscape, and the site is surrounded by existing approvals, developments associated with the Ripley Valley PDA and arterial roads. Further, according to the Koala hospital incident records, several threats already exist within the area (refer **Plan 6**).

Table 14: Residual Impact Assessment

Impact Type	Residual Impact Assessment	Mitigation Measures
Dog Attack	As discussed in the field survey results (refer **Section 5.2**), multiple domestic/wild dogs were recorded within the referral area. As this threat already exists within the area, it is unlikely that the Action will significantly increase the number of dogs entering the area. Residential land use which is present in the adjoining lots generally represents a higher level of dog ownership per household.	No additional mitigation measures are proposed.
Residual Impact **Due to the confirmed presence of the dogs within the referral area, no residual impacts are identified.**		
Vehicle Strike	It is likely that vehicle activity in the area will increase to some degree as a result of the development on the site. The referral area is surrounded by existing approvals for developments, the Town Centre Precinct associated with the Ripley Valley PDA and is bounded by a future rail corridor to the north. As a result, the surrounding landscape will experience an increase in vehicle traffic. Due to the anticipated impact of the surrounding approvals, the referral area alone is not anticipated to significantly increase vehicular traffic. Further, major threats from	Road design, signage, and the imposition of a low vehicle speed will help mitigate any potential risks to Koalas should they venture on to the site.

	vehicle strike are already present in close proximity to the site with Centenary Highway to the south of the referral area and Ripley Road the north and east (**Plan 6**). Koalas have been recorded in the area, therefore, interaction between vehicles and Koalas is considered to have potential to occur as a result of the development, although impacts from this threat must be considered in terms of the broader landscape changes mentioned above.	
Residual Impact **Due presence of significant vehicle threats with Centenary Highway and Ripley Road in close proximity to the site and the surrounding approved developments, the landscape is anticipated to experience only a minor increase in vehicular traffic. The referral alone is not expected to significantly increase these impacts.** **No residual impacts are identified.**		
Disease and Pathogen	Most of South East Queensland's Koala populations have a high prevalence of *Chlamydia* infection and Koala Retrovirus (KoRV). The symptoms of these diseases are often observed within Koala populations undergoing environmental stresses, such as overcrowding and poor nutrition. Koala disease has been recorded near to the site (evidenced by sick Koala sighting reported in public databases and the media). The project is unlikely to cause pressure on the local Koala population to the point where these diseases manifest and the project is unlikely to introduce or spread disease or pathogens into significant Koala habitat areas.	No mitigation measures are proposed.
Residual Impact **Due to current prevalence of disease among the Koala populations, the Action is not likely to cause an increase in disease among the populations.** **No residual impacts are identified.**		
Barriers to Dispersal	The referral area is surrounded by developed areas and areas that are approved for development within the Ripley Valley PDA (**Plan 1**). Movement to the east and north-east of the site is currently limited by Ripley Road and residential developments. To the south, movement is inhibited by Centenary Highway which is identified as a major barrier to movement. There is no Koala movement infrastructure present in the surrounding area. Further, there are no large patches of Koala habitat on either side of the referral area that would become isolated as a result of the development.	As the development will not exacerbate fragmentation of habitat or the creation of barriers to movement, no mitigation measures are proposed.

	The Action will result in the removal of 9.65 ha of Koala habitat, however, the removal of this habitat will not impede Koala movement due to the absence of any large habitat to the east, south and north of the referral area and the significant barriers to movement currently present in the adjoining landscape to the west.	
Residual Impact **As the development will not exacerbate fragmentation of habitat or the creation of barriers to movement, no residual impacts are identified.**		
Hydrological Change	The increase in hardstand areas across the site has the potential to affect site hydrology. Management plans will be implemented during operational works that will address the requirements of State and Local government guidelines and ensure that impacts are minimised. The mapped waterways on-site were found to be eroded flow paths, lacking riparian vegetation or features. As no development will be occurring within any true waterways, any impacts are likely to be restricted to overland flow, which will be appropriately managed and mitigated through State and Local Governmental requirements. As such, the project is unlikely to result in hydrological changes that will result in the degradation of habitat critical to the survival of the Koala.	No mitigation measures are proposed.
Residual Impact **No residual impacts are identified.**		

8.5. Stage 5 – Is the Action required to be referred to the Minister for signification impacts? (Section 9 of Guideline)

SHG carried out an assessment of clearing at the site against the Koala Referral Guidelines. The assessment followed the process identified in Figure 1 of the Koala Referral Guidelines. The assessment against the Koala Referral Guidelines was based on relevant database searches and site surveys discussed in **Sections 4 and 5**.

According to Section 9 of the Koala Referral Guideline, an action is required to be referred if it is determined to adversely affect habitat critical to the survival of the Koala (Section 7) and/or interferes substantially with the recovery of the Koala through the introduction or exacerbation of key threats in areas of habitat critical to the survival of the Koala (Section 8). As discussed in **Sections 8.1 – 8.5** of this report, neither of these considerations apply. Therefore, under the Guideline, **referral is not recommended** (refer **Figure 6**).

However, to demonstrate due diligence, SHG are proceeding with the referral on behalf of the proponent to confirm these assessments with the Department.

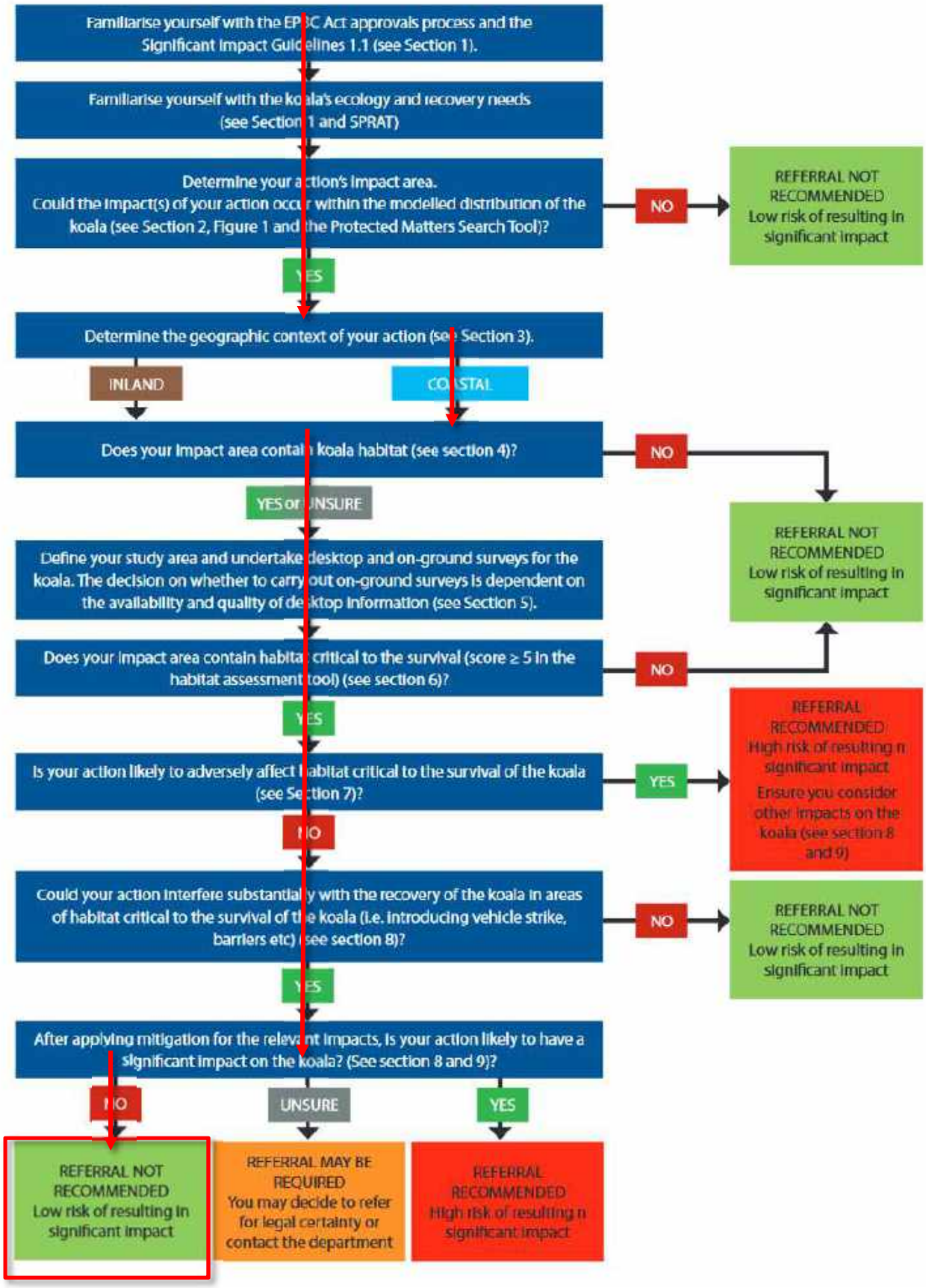

Figure 6: Summary of the EPBC Act referral guideline pathway for the Koala

9. Significant Impact Assessment

9.1. Significant Impact Assessment Definitions

The Significant Impact Guidelines provides specific definitions for '*important population*' and '*habitat critical to the survival of a species or ecological community*'. This definition is a key consideration when conducting significant impact assessments for a threatened species or ecological community listed under the EPBC Act. The definitions are presented below.

9.1.1 Population of a species

A 'population of a species' is defined by the Significant Impact Guidelines as:
"An occurrence of the species in a particular area. In relation to critically endangered, endangered or vulnerable threatened species, occurrences include but are not limited to:

- *A geographically distinct regional population, or collection of local populations*
- *A population, or collection of local populations, that occurs within a particular bioregion.*

9.1.2 Important population

An '*important population*' is defined by the Significant Impact Guidelines as:
"An 'important population' is a population that is necessary for a species' long term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- *Key source populations either for breeding or dispersal*
- *Populations that are necessary for maintaining genetic diversity*
- *Populations that are near the limit of the species range*

9.1.3 Habitat critical to the survival of a species or ecological community

The Significant Impact Guidelines provide the following definition for '*habitat critical to the survival of a species*'
"Habitat critical to the survival of a species or ecological community' refers to areas that are necessary:

- *For activities such as foraging, breeding, roosting or dispersal*
- *For the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators)*
- *To maintain genetic diversity and long-term evolutionary development*
- *For the reintroduction of populations or recovery of the species or ecological community.*

Such habitat may be, but is not limited to:

- *Habitat identified in a recovery plan for the species or ecological community as habitat critical for that species or ecological community*
- *Habitat listed on the Register of Critical Habitat maintained by the minister under the EPBC Act.*

Such habitat can be further explained as an identified area of viable habitat that contains habitat attributes that are essential for the conservation of a threatened species. These areas are typically under a regime of special protection and management to ensure the critical habitat remains a stronghold for the species to ensure its long-term survival and

viability in the wild. Such habitat may also include an area of land not currently occupied by the species, but can act as a sanctuary by possessing the necessary habitat attributes to facilitate the recovery of a declining population of the species.

9.2. Phascolarctos cinereus (Koala)

9.2.1 Conservation Status

The Koala is listed as Vulnerable under the EPBC Act.

9.2.2 Description

Koalas (*Phascolarctos cinereus*) are native Australian tree-dwelling marsupials with predominantly grey coloured fur.

9.2.3 Distribution

The Koala is found from north-east Queensland to the south-east corner of South Australia. As a consequence of translocations, the Koala are found outside their historic range, for example, Kangaroo Island. The distribution of the Koala is influenced by altitude, temperature and leaf moisture. The density of the Koala population in coastal regions is generally greater than inland areas. Koalas are known to naturally inhabit a range of temperate, sub-tropical and tropical forest, woodland and semi-arid communities dominated by *Eucalyptus* sp.

9.2.4 Habitat

Koala habitat can be broadly defined as any forest or woodland containing species that are known Koala food trees, or shrubland and emergent food trees. Preferred food and shelter trees are naturally abundant on fertile clay soils. Along the Great Dividing Range and the coastal belt throughout the species' range, Koalas inhabit moist forests and woodlands mostly dominated by *Eucalyptus* sp.

The Koala species is not territorial and the home ranges of individuals extensively overlap. Home ranges are variable depending on the location, with those in "poorer" habitats being larger than in higher quality habitats. There is little evidence for longer movements in most cases, though dispersing individuals, mostly young males, may occasionally cover distances of several kilometres over land with little vegetation. In SEQ, the average distance between natal and breeding home ranges was similar for males and females, at approximately 3.5 km. Maximum dispersal distances were up to approximately 10 km for males and females. Other studies have reported movement of up to 16 km in rural SEQ.

9.2.5 Threats

Habitat loss and fragmentation, vehicle strike and predation by domestic or feral dogs are the main threats to the Koala. Extreme environmental events, such as drought, can also cause significant mortality.

9.2.6 Significant Impact Assessment

The *EPBC Act referral guidelines for the vulnerable Koala* summarise the significant impact decision for the Koala. The following points help to summarise the guideline:

- Impacts on 'habitat critical to the survival of the species' and impacts that 'substantially interfere with the recovery of the species' are the focus of assessing significance;
- Habitat protection and impact mitigation is focused on areas of habitat that are large and well connected;
- The loss of 20 hectares or more of high-quality habitat critical to the survival (habitat score of 8) is highly likely to have a significant impact for the purposes of the EPBC Act;
- The loss of two hectares or less of marginal quality habitat critical to the survival (habitat score of 5) is highly unlikely to have a significant impact on the koala for the purposes of the EPBC Act;

- The loss of between 2 and 20 ha of habitat critical to the survival may have a significant impact on the koala for the purposes of the EPBC Act. Whether this is more likely or unlikely depends on the characteristics of your action.

To determine whether the proposed action is likely to have a significant impact on the Koala, an assessment against the *EPBC Significant Impact Guidelines 1.1* is provided in **Table 15.** An assessment against the *EPBC Act referral guidelines for the vulnerable Koala* is provided in **Section 8**.

Table 15: Significant Impact Assessment – Vulnerable Koala

Significant Impact Criteria	Description	Impact
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:		
1. Lead to a long-term decrease in the size of an important population of a species	The site is not considered to maintain an important population of Koala. Vegetation on-site is considered to be predominantly 'high value regrowth' composite RE12.9-10.2/12.9-10.7a. A dwelling and cleared land is also present. Field assessments recorded scats throughout the site with SAT survey results ranging from mostly low to only one site with high use according to the East Coast med-high density category. The vegetation on-site identified as Koala habitat is only tenuously connected to 375 ha of fragmented bushland habitat. The vegetation on-site is dominated by regrowth eucalypts with only sparse large diameter eucalypt trees. Importantly, the site is currently located on the edge of developments occurring within the Ripley Valley PDA and does not provide connectivity to the north, east or south due to encroaching developments. It is not anticipated that the removal of vegetation on-site would affect the viability of the Koala population in the area.	No significant impact
2. Reduce the area of occupancy of an important population	Evidence of Koalas was found in the form of scats suggesting the vegetation on-site is utilised by Koalas in some capacity. However, there is no important population of Koalas recorded in the locality. The site has been historically disturbed and borders on residential areas associated with the Ripley Valley PDA to the north and east. The site is located on the most eastern extent of the highly fragmented bushland in the adjoining landscape. As Koala activity was detected on-site the removal of vegetation on-site will reduce the area that can be potentially be utilised by Koalas using the adjoining eucalypt bushland. However, as there is no important Koala population in the locality, the removal of vegetation would not reduce the area of occupancy of an important population.	No significant impact

3. Fragment an existing important population into two or more	Evidence of Koalas activity was found in the form of scats suggesting the vegetation on-site is used by a local population. The site is not considered to support an important Koala population. Due to the positioning of the site on the eastern edge of fragmented bushland area (**Plan 5**), the removal of vegetation on-site will not exacerbate existing fragmentation of adjoining Koala habitat. Notably, the referral area is surrounded by existing EPBC Act approvals and roads. Consequently, the project is not considered likely to fragment an existing important population.	No significant impact
4. Adversely affect habitat critical to the survival of a species	Habitat critical to the survival of the species is located across the site. The proposed action will result in the clearing of 9.65 ha of Koala habitat, however, this habitat is not regarded as critical Koala habitat. The habitat on-site is largely comprised of regrowth eucalypt forest with only sparse large diameter eucalypts. The site is located on the edge of a fragmented area of bushland to the west and is surrounded by approved and existing developments associated with the Ripley Valley PDA. The habitat on-site if retained would become completely isolated in the landscape surrounded by residential developments, future rail corridor and the Ripley Town Centre.	No significant impact
5. Disrupt the breeding cycle of an important population	Site surveys did not identify any breeding Koalas, and the site is not considered to support an important Koala population. Evidence of Koala activity was recorded in the form of scats. The site is not considered critical habitat for a breeding population or an important population due to the highly fragmented potential bushland habitat to the west of the site only and the absence of a known important population in the locality.	No significant impact
6. Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	While the vegetation across the site has been classed as habitat critical to the survival of the species, its removal is unlikely to have a significant impact on the availability of habitat in the landscape, given its relatively small size and value and surrounding fragmentation. The removal of vegetation on-site would not isolate or fragment habitat as it is located within encroaching development and the Town Centre precinct located to the north and east. The surrounding landscape	No significant impact

	contains a mix of existing developments and approvals for development. The removal of this habitat is considered highly unlikely to lead to species decline.	
7. Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	Evidence of wild dogs and other pest species was observed on-site using motion sensor cameras. Threats to Koalas are therefore already present on-site. Due to the placement of the site on the edge of a residential development and Town Centre, there is a high likelihood that domestic or feral dogs will continue to use the site frequently. Domestic dogs have the potential to become feral, are considered a major threat to Koala survival and are present in the surrounding landscape. The proposed action is likely to increase the density of domestic dogs in the area, however, their potential to exacerbate impacts on Koalas will be mitigated by effective governance. It is unlikely that the proposal will augment invasive species impacts already present in the area.	No significant impact
8. Introduce disease that may cause the species to decline	Most of South East Queensland's Koala populations have a high prevalence of Chlamydia infection and Koala Retrovirus (KoRV), and sick Koalas have been recorded in the vicinity of the referral area. As such, the project is considered unlikely to cause pressure on the local Koala population to the point where these diseases manifest and the project is extremely unlikely to introduce or spread disease or pathogens into Koala habitat areas.	No significant impact
9. Interfere substantially with the recovery of the species	The action is unlikely to interfere substantially with the recovery of the Koala (refer previous **Section**). The site is located on the eastern edge of fragmented bushland. Removal of vegetation on-site will marginally reduce available habitat, however, it occurs in an area that is already highly fragmented and disturbed. Furthermore, the vegetation is identified as lower quality habitat due to the dominance of regrowth, close proximity to dwellings and presence of threats to the species (*i.e.,* large domestic/wild dogs). Further, the presence of existing developments, approvals for development and infrastructure including a rail corridor, town centre and roads reduces the overall suitability of the habitat.	No significant impact

9.3. *Pteropus poliocephalus* (Grey-headed Flying-fox)

9.3.1 Conservation Status

The GHFF is listed as Vulnerable under the EPBC Act.

9.3.2 Description

The GHFF is the largest Australian bat with a wingspan of up to one metre. It has dark-grey body fur, a grey head, and a distinctive reddish-brown collar. It is also the only flying-fox with hairy legs right down to its ankles.

9.3.3 Distribution

The GHFF occurs along the south-east coast of Australia, from Rockhampton in central Queensland through to New South Wales to western Victoria. During the last few years, the GHFF has also been recorded from Adelaide.

9.3.4 Habitat

The GHFF is heavily dependent on the availability of foraging resources and roost sites. As canopy feeding frugivores and nectarivores, GHFFs frequent fruiting and flowering trees in rainforests, open eucalypt forests, woodlands, *Melaleuca sp.* swamps and Banksia woodlands (Duncan *et al*. 1999). The GHFF is also known to forage in fruit crops and introduced tree species within urban environments. Roost sites for the GHFF are commonly within dense vegetation close to water, primarily rainforest patches, stands of *Melaleuca sp.*, mangroves or riparian vegetation.

9.3.5 Recovery Actions

There is no adopted or made Recovery Plan for this species at the federal level. The Queensland Government identifies the following recovery actions:

- Identify and map important foraging and roosting habitats
- Prevent the destruction and degradation of important forested habitat, through: identifying guidelines to protect habitat; appropriate zoning; identifying development alternatives and incentives to retain habitat and educating communities.
- Encourage community partnerships and initiatives that protect important habitats, and where possible re-vegetate with foraging trees for GHFF
- Work with orchardists to improve the image of GHFF, and to identify and implement non-destructive methods to protect fruit crops, such as: appropriate netting (not monofilament netting) that is not hung loose over trees (which can entangle bats and birds)
- Reduce negative public attitudes and conflict with humans
- Develop accurate methods for monitoring population size

9.3.6 Significant Impact Assessment

Under the EPBC Act, Grey-headed Flying-fox populations are listed as Vulnerable. The species is not specifically listed under Queensland's *Nature Conservation Act 1992* (Qld) (NCA), however, retains a Least Concern status for the purposes of the Act. The *Referral guideline for management actions in grey-headed and spectacled flying-fox camps* summarise the decision process in considering the likelihood of a significant impact on the Grey-headed Flying-fox or Spectacled Flying-fox schematically. The Guidelines are specifically for the assessment of impacts on Flying-fox camps. Given no roosting sites are located on-site or in the near vicinity, it is highly unlikely that the action will involve impacts on the Grey-headed Flying-fox according to the Guidelines. However, the Guidelines also state that, '*It does not apply to the following actions... Actions which may impact on the foraging habitat of EPBC Act-listed flying-fox species. Proponents of actions of this kind should refer to the Significant Impact Guidelines 1.1.*'

To determine whether or not the proposed action is likely to have a significant impact on the Grey-headed Flying-fox, an assessment against the *EPBC Significant Impact Guidelines 1.1* is provided in **Table 16**.

Table 16: Significant Impact Assessment – Vulnerable Grey-headed Flying-fox

Significant Impact Criteria	Description	Impact
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:		
1. Lead to a long-term decrease in the size of an important population of a species	This species was not observed utilising the site nor observed as a fly over species. Further, no suitable roosting sites occur on or adjacent to the site. SEQ has a permanent and abundant population of GHFF and available habitat is spread throughout the region given the high prevalence of eucalypts. While vegetation on site is considered potential foraging habitat for the species, due to the limited habitat quality, proximity to development and absence of evidence of the species utilising the site even as a transient visitor, the site is not considered to provide critical habitat supporting an important population of the species. The proposed action is unlikely to lead to a long term decrease in the size of any local GHFF populations.	No significant impact
2. Reduce the area of occupancy of an important population	This species was not observed utilising the site nor observed as a fly over species. Further, no suitable roosting sites occur on or adjacent to the site. The proposed action will not reduce the area of occupancy of an important population of GHFF as no part of the action will occur within an area known to be occupied by the species.	No significant impact
3. Fragment an existing important population into two or more	The SPRAT species profile outlines that while there are spatially structured colonies of GHFF, there are no separate or distinct populations due to the constant genetic exchange and movement between camps throughout the species' geographic range. In addition, given the high mobility of the species, the proposed action is unlikely to fragment a population into two or more populations. Of note, the species was not observed utilising the site nor observed as a fly over species.	No significant impact
4. Adversely affect habitat critical to the survival of a species	This species was not observed utilising the site nor observed as a fly over species. Despite this, vegetation across the site is considered to be potential low value foraging habitat for the species. The proposal will result in the removal of 9.65 ha of potential low value GHFF foraging habitat. However, the habitat on-site predominantly consists of regrowth eucalypt bushland with only sparse large diameter eucalypts. Due to the vast quantity and higher quality of eucalypt bushland in the	No significant impact

	surrounding landscape and the GHFF's high mobility, the small amount of habitat on-site is not considered critical to the survival of this species.	
5. Disrupt the breeding cycle of an important population	The site surveys did not identify GHFF nor any evidence of breeding GHFF. Mating normally occurs within autumn, and females generally give birth in October, where they carry their young to feeding sites for four to five weeks after giving birth. As no roosting camps were observed on or near the site, the proposed action is unlikely to disrupt the breeding cycle of an important population.	No significant impact
6. Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	While potential foraging habitat is located across the site, its removal is unlikely to have a significant impact on the availability of habitat in the landscape as the vegetation on-site is primarily comprised of eucalypt regrowth with only sparse large diameter eucalypts and there is a larger quantity of higher quality foraging habitat in the broader area accessible to this highly mobile species (*i.e.,* Flinders-Karawatha Corridor).	No significant impact
7. Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The proposed action is unlikely to result in the introduction of invasive species.	No significant impact
8. Introduce disease that may cause the species to decline	The project is unlikely to introduce disease into the area.	No significant impact
9. Interfere substantially with the recovery of the species	Recovery of the species has specifically targeted the broad scale culling of the species. In addition, conservation efforts have led to the protection of known roosting sites and important habitat. The site has not been identified as an important habitat nor roost site and the action is unlikely to interfere with the recovery of the species.	No significant impact

10. EPBC Act Determination Advice

10.1. EPBC Act Significant Impact Guidelines

Assessing the proposed action against the *EPBC Act referral guidelines for the vulnerable Koala* and the *EPBC Significant Impact Guidelines 1.1* determined that the action would not have a significant impact on habitat critical for the survival of Koala and potential foraging habitat for the GHFF. The project is not considered to have potential for a significant impact on habitat for the Swift Parrot, Regent Honeyeater or Collared Delma and therefore these species were not addressed further than the Risk of Impact section (**Section 5.3**) of this report.

The Koala Habitat Assessment Tool provided in the *EPBC Act referral guidelines for the vulnerable Koala* scored the habitat score on the referral area **6/10.** As the habitat score is greater than five (5), the site is considered to provide habitat critical to the survival of the Koala. The clearing of 9.65 ha of Koala habitat with a score of 6 is considered to be on the lower end of the impact threshold, and is not considered to be a significant impact as per detailed assessment against the relevant Guidelines.

Further, the Action is not considered to interfere substantially with the recovery of the Koala as no residual impacts were identified. As a result, the proposed development is identified as having a **low risk of significant impact on Koala** and is not recommended for referral, however, in order to demonstrate due diligence and confirm these assessments, SHG on behalf of the proponent are proceeding with the referral of this proposed action for certainty.

10.2. Residual Impacts and EPBC Act Offset Policy

No residual impacts were identified.

11. Conclusion

This ecological assessment has identified Matters of National Environmental Significance (MNES) recorded or predicted to potentially occur on or near the referral area. It presents the design and mitigation measures employed to avoid and minimise project related impacts to the matters of conservation significance and quantifies the extent of potential residual impacts.

While the proposed action involves the clearing of 9.65 ha of habitat critical to the survival of the Koala at a Koala Habitat Assessment Tool score of 6, as per assessment against the referral Guidelines, referral of the action is **not** recommended for an EPBC Act 'controlled action' assessment. Although no GHFF or their roosts were identified on or near the site, given the Koala and GHFF habitat are generally considered analogous, likewise, the proposed action is not considered to have a significant impact on foraging habitat for the GHFF.

Despite assessment against the relevant EPBC Act guidelines demonstrating that referral is not recommended, the proposed action has been referred by the proponent to the Department for a controlled action determination for project certainty.

12. Appendices

Appendix A

EPBC Act Protected Matters Search Tool Results

Appendix B

NCA Wildlife Online Search Results

Appendix C

Likelihood of Occurrence Assessment

Appendix D

SAT survey results

Appendix E

Flora and Fauna Species Lists

Appendix A

EPBC Act Protected Matters Search Tool Results

Australian Government
Department of the Environment and Energy

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

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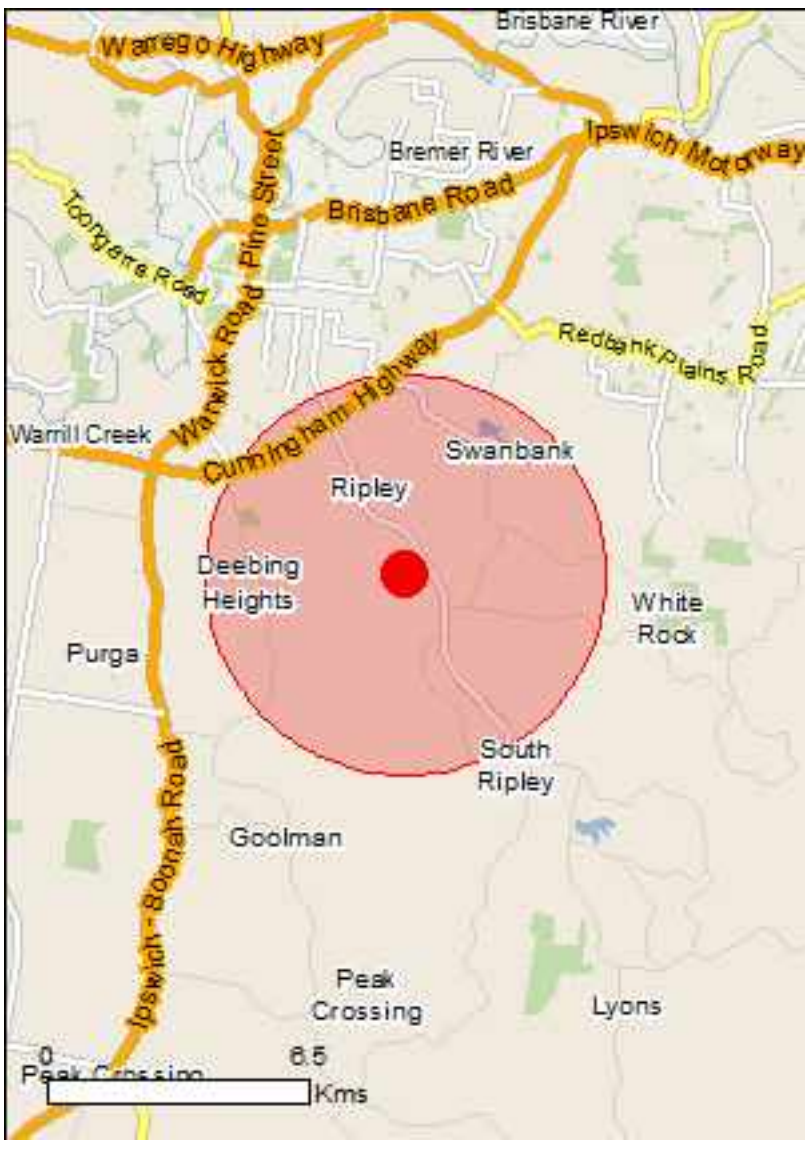
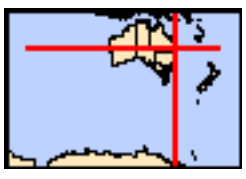


This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

Coordinates

Buffer: 5.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	5
Listed Threatened Species:	35
Listed Migratory Species:	16

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	22
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	None
Regional Forest Agreements:	None
Invasive Species:	34
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar) [Resource Information]

Name	Proximity
Moreton bay	40 - 50km upstream

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community may occur within area
Lowland Rainforest of Subtropical Australia	Critically Endangered	Community may occur within area
Poplar Box Grassy Woodland on Alluvial Plains	Endangered	Community may occur within area
Swamp Tea-tree (Melaleuca irbyana) Forest of South-east Queensland	Critically Endangered	Community likely to occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community may occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour may occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat may occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat may occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area

Name	Status	Type of Presence
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area
Turnix melanogaster Black-breasted Button-quail [923]	Vulnerable	Species or species habitat likely to occur within area
Insects		
Argynnis hyperbius inconstans Australian Fritillary [88056]	Critically Endangered	Species or species habitat may occur within area
Mammals		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus hallucatus Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat may occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat likely to occur within area
Petrogale penicillata Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat likely to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Potorous tridactylus tridactylus Long-nosed Potoroo (SE Mainland) [66645]	Vulnerable	Species or species habitat may occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Plants		
Arthraxon hispidus Hairy-joint Grass [9338]	Vulnerable	Species or species habitat may occur within area
Bosistoa transversa Three-leaved Bosistoa, Yellow Satinheart [16091]	Vulnerable	Species or species habitat likely to occur within area
Cupaniopsis shirleyana Wedge-leaf Tuckeroo [3205]	Vulnerable	Species or species habitat may occur within area
Cupaniopsis tomentella Boonah Tuckeroo [3322]	Vulnerable	Species or species habitat likely to occur within area
Cycas ophiolitica [55797]	Endangered	Species or species

Name	Status	Type of Presence
		habitat may occur within area
Dichanthium setosum bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area
Fontainea venosa [24040]	Vulnerable	Species or species habitat may occur within area
Notelaea ipsviciensis Cooneana Olive [81858]	Critically Endangered	Species or species habitat may occur within area
Notelaea lloydii Lloyd's Olive [15002]	Vulnerable	Species or species habitat likely to occur within area
Plectranthus habrophyllus [64589]	Endangered	Species or species habitat likely to occur within area
Samadera bidwillii Quassia [29708]	Vulnerable	Species or species habitat likely to occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
Delma torquata Adorned Delma, Collared Delma [1656]	Vulnerable	Species or species habitat may occur within area
Furina dunmalli Dunmall's Snake [59254]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Defence - AMBERLEY - AP90 SMALL ARMS RANGE (PURGA)

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Extra Information

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat known to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur

Name	Status	Type of Presence within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Equus caballus Horse [5]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Parkinsonia aculeata Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean [12301]		Species or species habitat likely to occur within area
Parthenium hysterophorus Parthenium Weed, Bitter Weed, Carrot Grass, False		Species or species

Name	Status	Type of Presence
Ragweed [19566]		habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii		
Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta		
Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis		
Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
Solanum elaeagnifolium		
Silver Nightshade, Silver-leaved Nightshade, White Horse Nettle, Silver-leaf Nightshade, Tomato Weed, White Nightshade, Bull-nettle, Prairie-berry, Satansbos, Silver-leaf Bitter-apple, Silverleaf-nettle, Trompillo [12323]		Species or species habitat likely to occur within area
Reptiles		
Hemidactylus frenatus		
Asian House Gecko [1708]		Species or species habitat likely to occur within area
Ramphotyphlops braminus		
Flowerpot Blind Snake, Brahminy Blind Snake, Cacing Besi [1258]		Species or species habitat may occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-27.685 152.7945

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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Appendix B

NCA Wildlife Online Search Results

Queensland Government

Wildlife Online Extract

Search Criteria: Species List for a Specified Point
Species: All
Type: All
Status: Rare and threatened species
Records: Confirmed
Date: Since 1980
Latitude: -27.6850
Longitude: 152.7945
Distance: 5
Email: hannahsilcox@saundershavill.com
Date submitted: Thursday 11 Jun 2020 10:06:59
Date extracted: Thursday 11 Jun 2020 10:10:02

The number of records retrieved = 8

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Apodidae	*Hirundapus caudacutus*	white-throated needletail		V	V	1
animals	birds	Rostratulidae	*Rostratula australis*	Australian painted snipe		E	E	3
animals	mammals	Phascolarctidae	*Phascolarctos cinereus*	koala		V	V	52
animals	mammals	Pseudocheiridae	*Petauroides volans volans*	southern greater glider		V	V	1
plants	land plants	Apocynaceae	*Marsdenia coronata*	slender milkvine		V		1/1
plants	land plants	Cupressaceae	*Callitris baileyi*	Bailey's cypress		NT		1/1
plants	land plants	Lamiaceae	*Coleus habrophyllus*			E	E	1/1
plants	land plants	Myrtaceae	*Melaleuca irbyana*			E		3/3

CODES

I - Y indicates that the taxon is introduced to Queensland and has naturalised.

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992.* The codes are Extinct in the Wild (PE), Endangered (E), Vulnerable (V), Near Threatened (NT), Least Concern (C) or Not Protected ( ).

A - Indicates the Australian conservation status of each taxon under the *Environment Protection and Biodiversity Conservation Act 1999.* The values of EPBC are Conservation Dependent (CD), Critically Endangered (CE), Endangered (E), Extinct (EX), Extinct in the Wild (XW) and Vulnerable (V).

Records – The first number indicates the total number of records of the taxon for the record option selected (i.e. All, Confirmed or Specimens).
This number is output as 99999 if it equals or exceeds this value. The second number located after the / indicates the number of specimen records for the taxon.
This number is output as 999 if it equals or exceeds this value.

Appendix C

Likelihood of Occurrence Assessment

Listed Threatened Ecological Communities (TECs)

Name	Status	Type of presence	Description of the community/preferred habitat	Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland ecological community	Endangered	Community may occur within area	Coastal Swamp Oak Forest typically occurs on unconsolidated sediments, including alluvium deposits. The canopy layer is dominated by Casuarina glauca (swamp oak, swamp she-oak). This often occurs as a relatively uniform upper layer of swamp oak, with height and density dependent on the local environmental conditions. This TEC is associated with RE12.1.1 and RE12.3.20.	Desktop analysis and detailed field surveys confirmed that this TEC does not occur on-site or adjacent to the site. The Regional Ecosystems associated with this TEC were confirmed to be absent on-site.	Low	Unlikely
Lowland rainforest of subtropical Australia	Critically endangered	Community may occur within area	This TEC occurs mainly on basalt and alluvial soils and is characteristic of a low abundance of *Eucalyptus, Melaleuca* and *Casuarina* species. Specimens with buttress roots and a diversity of vines are common throughout this TEC. This TEC is associated with RE12.3.1, RE12.5.13, RE12.8.3, RE12.8.4, RE12.11.1, RE12.11.10, RE12.12.1 and RE12.12.16.	Desktop analysis and detailed field surveys confirmed that this TEC does not occur on-site or adjacent to the site. The Regional Ecosystems associated with this TEC were confirmed to be absent on-site.	Low	Unlikely
Poplar Box Grassy Woodland on Alluvial Plains	Endangered	Community may occur within area	The Poplar Box Grassy Woodland on Alluvial Plains ecological community is typically a grassy woodland with a canopy dominated by *Eucalyptus populnea* and understorey mostly of grasses and other herbs. The ecological community mostly occurs in gently undulating to flat landscapes and occasionally on gentle slopes on a wide range of soil types of alluvial and depositional origin. This TEC is associated with RE11.3.2, RE11.3.17, RE11.4.7, RE11.4.12, and RE12.3.10.	Desktop analysis and detailed field surveys confirmed that this TEC does not occur on-site or adjacent to the site. The Regional Ecosystems associated with this TEC were confirmed to be absent on-site.	Low	Unlikely

Swamp Tea-tree (*Melaleuca irbyana*) Forest of South-east Queensland	Critically endangered	Community likely to occur within area	Low open forest dominated by dense thickets of Swamp Teatree, usually growing to about 8-12 m high. In south-east Queensland, Swamp Tea-tree occurs in monotypic stands uniquely linked to Tea Tree Clay soils which drain slowly after heavy rains, becoming waterlogged and forming temporary ponds. This ecological community comprises Queensland regional ecosystems 12.9-10.11 (Land Zone 9-10) and 12.3.3c (Land Zone 3) which are listed as endangered under the VMA.	Desktop analysis and field surveys confirmed that regional ecosystem 12.9-10.11 and 12.3.3c do not occur on-site.	Low	Unlikely
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically endangered	Community may occur within area	Box – Gum Grassy Woodlands and Derived Grasslands are characterised by a species-rich understorey of native tussock grasses, herbs and scattered shrubs, and the dominance, or prior dominance, of White Box, Yellow Box or Blakely's Red Gum trees. In Queensland the ecological community is a primary component of the following Regional Ecosystems: 11.8.2a, 11.8.8, 11.9.9a, 13.3.1, 13.11.8, 13.12.8 and 13.12.9. It can also be a smaller component of the following regional ecosystems: 11.3.23, 12.8.16 (only at the far western edge of the bioregion), 13.3.4, 13.11.3 and 13.11.4. These regional ecosystems range in conservation status from 'not of concern at present' to 'endangered'.	Desktop analysis and detailed field surveys confirmed that this TEC does not occur on-site or adjacent to the site. The Regional Ecosystems associated with this TEC were confirmed to be absent on-site.	Low	Unlikely

Listed threatened species

Scientific name	**Common name**	**Status**		**EPBC code**	**Description of preferred habitat**	**Analysis**	**Desktop Likelihood of occurrence (on-site)**	**Field Survey Confirmed Likelihood of occurrence (on-site)**
		National	**QLD**					
Birds								
Anthochaera phrygia	Regent Honeyeater	CE	E	82338	Regent Honeyeaters mostly occur in dry Box-Ironbark Eucalypt woodland and dry sclerophyll forest associations in areas of low to moderate relief, wherein they prefer moister, more fertile sites. These areas are generally associated with creek flats and river valleys and foothills. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. They are a generalist forager, which mainly feed on nectar from a wide range of eucalypts and mistletoes, particularly in areas with box-ironbark associations, preferring more fertile sites with higher soil water content, more typical of Land Zone 3. They have also been found to prefer large diameter eucalypt trees for foraging as they typically produce more nectar. The Regent Honeyeater's preferred foraging species is *Corymbia maculata* which is primarily found in southern NSW. Similar species, *Corymbia citriodora* and *C. henryi*	Suitable foraging habitat for the Regent Honeyeater occurs on and adjacent to the subject site. The referral area is dominated by *Corymbia citriodora* (Spotted Gum), *Eucalyptus tereticornis* (Forest Red Gum) and *Eucalyptus crebra* (Narrow-leaved Ironbark). The Regent Honeyeater has been sighted in 2019 in the Springfield Lakes area, approximately 11 km east of the site. Field surveys found the extent of preferred foraging habitat to be limited. Preferred foraging species *C. citriodora* is largely restricted to the south-west portion of the site. The balance of the site is dominated by regrowth vegetation with sparse large diameter *E. tereticornis*. The site is mapped and confirmed Land Zone 9-10. Greater fertility soils, associated with Land Zone 3 are located along Deebing Creek, north of Ripley Road, reducing the potential for	Moderate	Low

Scientific name	Common name	Status		EPBC code	Description of preferred habitat	Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		National	QLD					
					are more common in south-east Queensland.	flowering and productive eucalypts to occur on-site. Regent Honeyeaters experience competition from aggressive species such as Noisy Miner (*Manorina melanocephala)* and Noisy Friarbird (*Philemon corniculatus)*. Noisy Miners were observed to be utilising the vegetation on-site which may reduce potential for Regent Honeyeaters to opportunistically forage on-site. Overall, there is low potential that the Regent Honeyeater would utilise the vegetation on-site because of the presence of marginal foraging habitat contributed by low soil fertility and lack of large diameter eucalypts, and competition from other species.		
Botaurus poiciloptilus	Australasian Bittern	E	-	1001	The Australasian Bittern occurs in terrestrial wetlands and, rarely, estuarine habitats, mainly in the temperate south-east and south-west. It favours wetlands with tall dense vegetation, where it forages in still, shallow water up to 0.3 m	There are no wetlands present on-site.	Low	Unlikely

Scientific name	Common name	Status		EPBC code	Description of preferred habitat	Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		National	QLD					
					deep, often at the edges of pools or waterways, or from platforms or mats of vegetation over deep water. It favours permanent and seasonal freshwater habitats, particularly those dominated by sedges, rushes and / or reeds or cutting grass growing over muddy or peaty substrate. The Australasian Bittern occurs in the far south-east of Queensland; it has been reported North to Baralaba and West to Wyandra, although in most years it is probably confined to a few coastal swamps. It is rarely recorded in Queensland, and possibly survives only in protected areas such as the Cooloola and Fraser regions.			
Calidris ferruginea	Curlew Sandpiper	CE	E	856	Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of	No suitable foraging or breeding habitat in the form of wetlands and mudflats occurs on-site.	Low	Unlikely

Scientific name	Common name	Status		EPBC code	Description of preferred habitat	Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		National	QLD					
					mud or sand. They occur in both fresh and brackish waters. In Queensland, scattered records occur in the Gulf of Carpentaria, with widespread records along the coast south of Cairns.			
Dasyornis brachypterus	Eastern Bristlebird	E	E	533	The Eastern Bristlebird inhabits low dense vegetation in a broad range of habitat types including sedgeland, heathland, swampland, shrubland, sclerophyll forest and woodland, and rainforest. It occurs near the coast, on tablelands and in ranges. The Eastern Bristlebird is found in habitats with a variety of species compositions, but is defined by a similar structure of low, dense, ground or understorey vegetation.	A variety of species compositions is not present on-site therefore it is unlikely the species would occur here. Understorey vegetation is generally absent throughout the site therefore is not considered suitable for this species.	Low	Unlikely
Erythrotriorchis radiatus	Red Goshawk	V	V	942	A wide ranging and highly mobile species generally observed over eucalypt habitats. This species prefers forest and woodland with a mosaic of vegetation types, large prey populations (birds) and permanent water. The vegetation types include eucalypt woodland, open forest, tall open forest, gallery rainforest, swamp sclerophyll forest and rainforest margins.	This site does not contain the mosaic of vegetation types that this species favours.	Low	Low

Scientific name	Common name	Status		EPBC code	Description of preferred habitat	Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		National	QLD					
					Habitat has to be open enough for fast attack and manoeuvring in flight, but provide cover for ambushing of prey.			
Geophaps scripta scripta	Squatter Pigeon (southern)	V	V	64440	This species inhabits open grasslands and woodlands typically with a native understorey although may occur in artificial pasture.	This site does not contain grasslands. In addition, the species is very rarely observed in southern Queensland, and thus this species is not expected to occur on-site.	Low	Unlikely
Grantiella picta	Painted Honeyeater	V	V	470	The species inhabits mistletoes in eucalypt forests/woodlands, riparian woodlands of black box and river red gum, box-ironbark-yellow gum woodlands, acacia-dominated woodlands, paperbarks, casuarinas, callitris, and trees on farmland or gardens. The species prefers woodlands which contain a higher number of mature trees, as these host more mistletoes. It is more common in wider blocks of remnant woodland than in narrower strips.	Preferred eucalypt species and vegetation community is not present on-site.	Low	Low
Hirundapus caudacutus	White-throated Needletail	V	-	682	Although they occur over most types of habitat, they are probably recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below	WildNet records indicate species has previously been recorded within the Springfield locality, however, as this is not in the direct vicinity of the sighting it	Low	Low

Scientific name	**Common name**	**Status**		**EPBC code**	**Description of preferred habitat**	**Analysis**	**Desktop Likelihood of occurrence (on-site)**	**Field Survey Confirmed Likelihood of occurrence (on-site)**
		National	**QLD**					
					the canopy, but they are less commonly recorded flying above woodland. They also commonly occur over heathland, but less often over treeless areas, such as grassland or swamps.	is unlikely this species would opportunistically forage on-site.		
Lathamus discolor	Swift Parrot	CE	E	744	The Swift Parrot breeds in Tasmania during spring to early summer. During autumn and winter the species migrates to the mainland where it follows a nomadic existence linked to the availability and timing of flowering of trees in various locations.	Suitable foraging habitat for the Swift Parrot occurs on and adjacent to the subject site in the form of eucalypt trees such as *Eucalyptus tereticornis* (Forest Red Gum) and *Corymbia citriodora* (Spotted Gum). This species has been sighted in 2019 in the Springfield Lakes area, approximately 11 km east of the site. Field surveys found one preferred foraging species *C. citriodora* to be largely restricted to the south-west portion of the site. The balance of the site is dominated by regrowth vegetation containing *E. tereticornis* and *E. crebra*. Based on the fact that only two preferred foraging species are present (*C. citriodora* and *E. tereticornis*) and the vegetation on-site and adjoining the site is disturbed and predominantly comprised of regrowth, there is a low potential that	Moderate	Low

Scientific name	Common name	Status		EPBC code	Description of preferred habitat	Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		National	QLD					
						the Swift Parrot would utilise the vegetation on-site and in the adjoining vegetation.		
Numenius madagascariensis	Eastern Curlew	CE	E	847	The Eastern Curlew is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass. Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. The birds are often recorded among saltmarsh and on mudflats fringed by mangroves, and sometimes use the mangroves. The birds are also found in saltworks and sewage farms.	No suitable foraging or breeding habitat in the form of wetlands and mudflats occurs on-site.	Low	Unlikely
Rostratula australis	Australian Painted-snipe	E	V	77037	The Australian Painted Snipe is usually found in shallow inland wetlands, either freshwater or brackish, that are either permanently or temporarily filled. The species has a scattered distribution throughout many parts of Australia, with a single record from Tasmania.	No suitable foraging or breeding habitat in the form of wetlands occur on-site.	Low	Unlikely

Scientific name	**Common name**	**Status**		**EPBC code**	**Description of preferred habitat**	**Analysis**	**Desktop Likelihood of occurrence (on-site)**	**Field Survey Confirmed Likelihood of occurrence (on-site)**
		National	**QLD**					
Turnix melanogaster	Black-breasted Button Quail	V	V	923	Typical habitat occurs in dry rainforest and vegetation immediately adjacent to rainforest. However, the species has also been recorded in a variety of low coastal heathlands around Fraser Island and nearby mainland. Deep leaf litter in which the species can forage appears to be particularly favoured.	The site does not contain dry rainforest or vegetation immediately adjacent to rainforest, and no heathlands are present.	Low	Unlikely
Insects								
Argynnis hyperbius inconstans	Australian Fritillary	CE	E	88056	Most specimens have been collected from river estuaries or swampy coastal areas at or near sea level. The Australian fritillary butterfly is restricted to open, swampy, coastal areas where the larval food plant, *Viola betonicifolia*, grows as a small, insignificant ground herb in association with *Lomandra longifolia* (Long Leaved Matrush) and grasses, especially the grass *Imperata cylindrica* (Blady Grass). This habitat is called *Melaleuca* wetlands, although the larval food plant does not occur in all sub-types of this plant community.	Preferred coastal habitat is not present throughout the assessment area.	Low	Unlikely
Mammals								

Scientific name	**Common name**	**Status**		**EPBC code**	**Description of preferred habitat**	**Analysis**	**Desktop Likelihood of occurrence (on-site)**	**Field Survey Confirmed Likelihood of occurrence (on-site)**
		National	**QLD**					
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	183	The Large-eared Pied Bat roosts on sandstone cliffs and fertile woodland valley habitat within close proximity of each other. However, in South East Queensland habitat includes rainforest and moist eucalypt forest habitats at high elevations.	No suitable high elevation habitat to support this species occurs on-site.	Low	Unlikely
Dasyurus hallucatus	Northern Quoll	E	-	331	The Northern Quoll occupies a diversity of habitats across its range which includes rocky areas, eucalypt forests and woodlands, rainforests, sandy lowlands and beaches, shrubland, grassland and desert. Northern Quoll habitat generally encompasses some form of rocky area for denning purposes with surrounding vegetated habitats used for foraging and dispersal. Eucalypt forest or woodland habitats usually have a high structural diversity containing large diameter trees, termite mounds or hollow logs for denning purposes. Dens are made in rock crevices, tree holes or occasionally termite mounds. Surveys in Queensland suggest that Northern Quolls are more likely to be present in high relief areas that have shallower soils, greater cover of boulders,	No suitable denning habitat to support this species occurs on-site, or in the nearby vicinity.	Low	Unlikely

Scientific name	Common name	Status		EPBC code	Description of preferred habitat	Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		National	QLD					
					less fire impact and were closer to permanent water.			
Dasyurus maculatus maculatus	Spot-tailed Quoll	E	V	75184	The Spot-tailed Quoll prefers mature wet forest habitat. Unlogged forest or forest that has been less disturbed by timber harvesting is also preferable. This predominantly nocturnal species rests during the day in dens. Habitat requirements include suitable den sites such as hollow logs, tree hollows, rock outcrops or caves. Individuals require an abundance of food such as birds and small mammals, and large areas of relatively intact vegetation through which to forage.	The site has been subjected to high levels of disturbance and does not contain wet forest habitat. It is unlikely this species would occur.	Low	Unlikely
Petauroides volans	Greater Glider	V	V	254	The Greater Glider is an arboreal nocturnal marsupial that is mostly restricted to eucalypt forests and woodlands, although it occurs in highest abundance in taller, montane, moist eucalypt forests with abundant (large) hollow-bearing trees for shelter and a variety of eucalypt species for feeding. Diet consists of eucalypt leaves, and occasionally flowers. Small home ranges and low dispersibility make	Marginal foraging habitat is present within the surrounding properties, particularly towards the west, however, is still highly disturbed from historical logging and rural activities. Some of the adjacent remnant vegetation contains trees with hollows however the density of these hollows is low and would reduce the likelihood of occurrence.	Low	Low

Scientific name	Common name	Status		EPBC code	Description of preferred habitat	Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		National	QLD					
					this species sensitive to clearing and fragmentation, with low persistence in small forest fragments.			
Petrogale penicillata	Brush-tailed Rock Wallaby	V	V	225	This species prefers rocky habitats, including loose boulder-piles, rocky outcrops, steep rocky slopes, cliffs, gorges and isolated rock stacks. It also utilises tree limbs. While it appears that most Brush-tailed Rock-wallaby colonies are on north-facing slopes and cliff lines, colonies have been found on south-facing cliffs in Kangaroo Valley, in the Macleay River Gorge, in the Warrumbungles and at Mt Kaputar, although usually in lower densities.	No suitable habitat was observed throughout the subject site.	Low	Unlikely
Phascolarctos cinereus	Koala	V	V	85104	The Koala is found in a range of habitats, from coastal islands and tall eucalypt forests to low woodlands inland.	Suitable Koala habitat is present on-site in the form of eucalypt dominated REs and Koalas have been known to occur within close proximity to the site. Evidence of Koala in the form of scats and direct observations was recorded during field surveys. One (1) Koala specimen was recorded on the western	High	Known

Scientific name	Common name	Status		EPBC code	Description of preferred habitat	Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		National	QLD					
						adjacent property near the boundary of the subject site.		
Potorous tridactylus tridactylus	Long-nosed Potoroo	V	V	66645	The Long-nosed Potoroo inhabits coastal heaths and dry and wet sclerophyll forests. Dense understorey with occasional open areas is an essential part of habitat, and may consist of grass-trees, sedges, ferns or heath, or of low shrub of tea-trees or melaleucas. A sandy loam soil is also a common feature.	Suitable habitat is not located on-site.	Low	Unlikely
Pteropus poliocephalus	Grey-headed Flying-fox	V	-	186	Species generally roosts in camps in trees adjacent to larger permanent watercourse. The Grey-headed flying fox requires foraging resources and roosting sites. It is a canopy-feeding frugivore and nectarivore, which utilises vegetation communities including rainforests, open forests, closed and open woodlands, Melaleuca swamps and Banksia woodlands. It also feeds on commercial fruit crops. The primary food source is blossom from Eucalyptus and related genera.	There are no observed roosts on-site, with the nearest known roost site located in Yamanto, 6.5 km north-west of the site. Given the site's proximity to a significant roosting site and the presence of suitable foraging habitat on-site, it is likely that the species may opportunistically forage on-site. The species was not observed as a fly over species or utilising the vegetation.	High	Moderate
Plants								

Scientific name	**Common name**	**Status**		**EPBC code**	**Description of preferred habitat**	**Analysis**	**Desktop Likelihood of occurrence (on-site)**	**Field Survey Confirmed Likelihood of occurrence (on-site)**
		National	**QLD**					
Arthraxon hispidus	Hairy-joint Grass	V	-	9338	Hairy-joint Grass has been recorded from scattered locations throughout Queensland and on the northern tablelands and north coast of New South Wales. In NSW and QLD, Hairy-joint Grass is found in or on the edges of rainforest and in wet eucalypt forest, often near creeks and swamps. In SEQ, Hairy-joint Grass has also been recorded growing around freshwater springs on coastal foreshore dunes, in shaded small gullies, on creek banks, and on sandy alluvium in creek beds in open forests. The distribution of Hairy-joint Grass overlaps with Semi-evergreen vine thickets of the Brigalow Belt and White Box-Yellow Box-Blakely's Red Gum Grassy Woodland.	No suitable habitat to support this species occurs on-site.	Low	Unlikely
Bosistoa transversa	Three-leaved Bosistoa	V	-	16091	The Three-leaved Bosistoa is conserved within Mt Warning National Park, Numbinbah Nature Reserve, Limpinwood Nature Reserve and Whian State Forest. While population information is unavailable, it is thought to be common in its range. It generally grows in wet sclerophyll forest, dry sclerophyll forest and rainforest up to 3oo metres in	Rainforest/wet forest and the species that the Three-leaved Bosistoa is commonly associated with were not located on site.	Low	Unlikely

Scientific name	Common name	Status		EPBC code	Description of preferred habitat	Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		National	QLD					
					altitude. It is commonly associated with *Argyrodendron trifoliolatum, Syzygium hodgkinsoniae, Endiandra pubens, Dendrocnide photinophylla, Acmena ingens, Diploglottis australis and Diospyros mabacea*.			
Callitris baileyi	Bailey's Cypress	-	NT	-	Grows on rocky slopes, hilly or mountainous areas, in shallow and often clay soils. It is found in eucalypt woodland, commonly associated with ironbark, blue gum and spotted gum. The New South Wales population occurs in an open grassy eucalypt forest near a creek.	BioNet records indicate a recent sighting (2019) of the species approximately 1.9 km west of the site and there is suitable habitat for this species to occur on site. As a result, there is potential for the species to occur on-site. *Callitris baileyi* was not identified during the survey. Due to the historical disturbance that has occurred over the site and in the adjoining land, there is low potential that this species would occur.	Moderate	Low
Cupaniopsis shirleyana	Wedge-leaf Tuckeroo	V	V	3205	The Wedge-leaf Tuckeroo occurs in a variety of dry rainforest vegetation types, including vine thicket communities on hillsides, stream beds and along riverbanks at altitudes up to 550 m above sea level. This species is also likely to occur on the margins of native vegetation in scrubby urbanised areas. Predominately	Preferred habitat not present on-site.	Low	Unlikely

Scientific name	Common name	Status		EPBC code	Description of preferred habitat	Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		National	QLD					
					found on dark brown sandy loams and sandy clay loams (pH 5-7.5) and rocky scree slopes. Generally, these soils have formed from volcanic parent materials (mainly granites and granodiorites, basalt and andesitic flows, and pyroclastics).			
Cupaniopsis tomentella	Boonah Tuckeroo	V	V	3322	No description available.	Little is known about species' habitat and distribution. Unlikely to occur on-site in a highly disturbed eucalypt woodland.	Low	Unlikely
Cycas ophiolitica		E	E	55797	*Cycas ophiolitica* grows on hills and slopes in sparse, grassy open forest at altitude ranges from 80–400 m above sea level. Although this species reaches its best development on red clay soils near Marlborough, it is more frequently found on shallow, stony, infertile soils, which are developed on sandstone and serpentinite, and is associated with species such as *Corymbia dallachiana, C. erythrophloia, C. xanthope* and *Eucalyptus fibrosa*. *Cycas ophiolitica* has also been found on mudstone in association with *Corymbia dallachiana, C. erythrophloia* and *Eucalyptus crebra*, and on alluvial loams	The site contains is located on Land Zone 9-10 has potential to support this species, however, preferred eucalypt species that this species occurs with on this Land Zone are absent from the site. Therefore, it is unlikely that the habitat on-site is suitable to support this species.	Low	Unlikely

Scientific name	Common name	Status		EPBC code	Description of preferred habitat	Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		National	QLD					
					with *Corymbia intermedia*, *Eucalyptus drepanophylla* and *E. tereticornis*.			
Dichanthium setosum	Bluegrass	V	-	14159	In Queensland, bluegrass has been reported from the Leichhardt, Morton, North Kennedy and Port Curtis regions. *Dichanthium setosum* is associated with heavy basaltic black soils and stony red-brown hardsetting loam with clay. It can be found in moderately disturbed areas such as cleared woodland, grassy roadside remnants, grazed land and highly disturbed pasture. The extent to which this species tolerates disturbance is unknown.	There are no local records of this species within the Queensland Wildlife Online sightings data, with the closest sighting in the Toowoomba and surrounds. This species is unlikely to occur on-site due to lack of suitable conditions.	Low	Unlikely
Fontainea venosa		V	V	24040	Occurs in notophyll vine forest and vine thicket with a mean annual rainfall of 1000-1100 mm on soils derived from and containing abundant andesitic rocks, often on rocky outcrops or along creeks.	Suitable habitat not present on-site.	Low	Unlikely
Marsdenia coronata	Slender Milkvine	-	V	-	Most commonly found in open eucalypt forest and woodland communities on hillslopes and ridge tops at altitudes of 40–780m above sea level. The soils are generally well drained, shallow, vary in texture from sandy, gravelly sand, loam to	Preferred habitat is present and canopy species this species is associated with such as *Corymbia citriodora* are present throughout the site. Field surveys did not identify this species on-site. Due to the historical disturbance that has occurred	Moderate	Low

Scientific name	Common name	Status		EPBC code	Description of preferred habitat	Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		National	QLD					
					clay loam and are derived from sandstone or acid volcanic rocks. It has also been found on rocky outcrops along cliff lines. Most commonly recorded with *Eucalyptus fibrosa* (Red ironbark), *E. carnea* (White Mahogany), *Corymbia citriodora* (Lemon-Scented Gum), *C. henryi* (Large-leaved Spotted Gum), *E. acmenoides* (Yellow Stringybark) and *E. propinqua* (Grey Gum).	over the site and in the adjoining land, there is low potential that this species would occur.		
Melaleuca irbyana	Swamp Tea-tree	-	E	-	Forms dense forest communities. The Swamp Tea-tree (Forest) grows on poorly draining clay soils on the plains and low hills of the Moreton basin. The clay soils drain slowly and often become waterlogged after heavy rains, resulting in the appearance of numerous temporary ponds.	The regional ecosystems that this species occurs within is not present on-site.	Low	Low
Notelaea ipsviciensis	Cooneana Olive	CE	E	81858	The Cooneana Olive survives as an understorey plant in degraded, eucalypt dominated dry sclerophyll vegetation communities. Soils in the area are of low fertility, depauperate and sandstone-based. This species prefers open woodland communities with open canopies. The known population is	While suitable habitat is present on-site, it is unlikely to occur as there is only one known population of which the site is not located near.	Low	Unlikely

Scientific name	**Common name**	**Status**		**EPBC code**	**Description of preferred habitat**	**Analysis**	**Desktop Likelihood of occurrence (on-site)**	**Field Survey Confirmed Likelihood of occurrence (on-site)**
		National	**QLD**					
					adjacent to subdivided, modified and developed land.			
Notelaea lloydii	Lloyd's Olive	V	V	15002	The species occurs on undulating to hilly terrain either in moist gullies or on gentle to steep dry slopes, but is rarely found on rocky outcrops. Soil types are mostly shallow, well drained and stony to very rocky in texture. Found in the ecotone between eucalypt open forests and vine thickets at 80-480 m above sea level (asl).	No suitable habitat to support this species occurs on-site.	Low	Unlikely
Coleus habrophyllus *(Plectranthus habrophyllus)*	Shaggy-leaved Plectranthus	E	E	64589	Plants have been recorded growing on chert or sandstone outcrops, in open woodlands often in shaded situations near vine forest. Seven populations are known including: Oxley Creek, Greenbank; Opposum Creek, Springfield; Woogaroo Creek, Goodna; three populations within White Rock Conservation Park, incorporating Six Mile Creek Conservation Park near Ormeau (south of Beenleigh).	This species requires niche habitat requirements such a rocky outcrop, limited to no weeds with a relatively undisturbed understorey and shaded location. *Coleus habrophyllus* has previously been found in the locality. Field surveys found some potential microhabitat in the form of rocky outcrops. However, the site is disturbed due to historical logging and agriculture activities, reducing potential for this species to occur on-site, and the species was not recorded.	Moderate	Unlikely

Scientific name	Common name	Status		EPBC code	Description of preferred habitat	Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		National	QLD					
Samadera bidwillii	Quassia	V	V	29708	Quassia commonly occurs in lowland rainforest or on rainforest margins, but it can also be found in other forest types, such as open forest and woodland. Quassia is commonly found in areas adjacent to both temporary and permanent watercourses in locations up to 510 m altitude. The species occurs on lithosols, skeletal soils, loam soils, sands, silts and sands with clay subsoils.	This species favours lowland rainforest or rainforest margins which are absent from the site, and no local records exist.	Low	Unlikely
Thesium australe	Austral Toadflax	V	V	15202	Austral Toadflax is semi-parasitic on the roots of a range of grass species, notably *Themeda triandra* (Kangaroo Grass). It occurs in shrubland, grassland or woodland, often on damp sites.	No suitable habitat to support this species occurs on-site.	Low	Low
Reptiles								
Delma torquata	Collared Delma	V	V	1656	In general, the species occurs on rocky hillsides on basalt and lateritic soils supporting open eucalypt and Acacia woodland with a sparse understorey of shrubs and tussocks or semi-evergreen vine thicket.	This species has been observed previously within the Ripley locality therefore it is possible that the species may occur on-site. Microhabitat for this species was identified on-site, however, targeted field surveys did not identify this species on-site.	Moderate	Low

Scientific name	**Common name**	**Status**		**EPBC code**	**Description of preferred habitat**	**Analysis**	**Desktop Likelihood of occurrence (on-site)**	**Field Survey Confirmed Likelihood of occurrence (on-site)**
		National	**QLD**					
Furina dunmalli	Dunmall's Snake	V	V	59254	Dunmall's Snake has been found in a broad range of habitats, including forests and woodlands on black alluvial cracking clay and clay loams dominated by Brigalow other Wattles, native Cypress or Bull-oak, and various Blue Spotted Gum, Ironbark, White Cypress Pine and Bull oak open forest and woodland associations on sandstone derived soils. Dunmall's Snake occurs primarily in the Brigalow Belt region in the south-eastern interior of Queensland. Records indicate sites at elevations between 200–500 m above sea level. The snake is very rare or secretive with limited records existing. It has been recorded at Archokoora, Oakey, Miles, Glenmorgan, Wallaville, Gladstone, Lake Broadwater, Mount Archer, Exhibition Range National Park, roadside reserves between Inglewood and Texas, Rosedale, Yeppoon and Lake Broadwater Conservation Park.	No suitable habitat to support this species occurs on-site and site is outside species' recorded populations.	Low	Low

Listed migratory species (not listed above)

Scientific name	**Common name**	**EPBC code**	**Description of preferred habitat**	**Analysis**	**Desktop Likelihood of occurrence (on-site)**	**Field Survey Confirmed Likelihood of Occurrence**
Migratory marine birds						
Apus pacificus	Fork-tailed Swift	678	This species is almost exclusively aerial and mostly occur over inland plains but sometimes above foothills or in coastal areas.	No suitable habitat to support this species occurs on-site.	Low	Unlikely
Migratory terrestrial species						
Cuculus optatus	Oriental Cuckoo	86651	Non-breeding habitat only: monsoonal rainforest, vine thickets, wet sclerophyll forest or open Casuarina, Acacia or Eucalyptus woodlands. Frequently at edges or ecotones between habitat types.	No suitable habitat to support this species occurs on-site.	Low	Unlikely
Monarcha melanopsis	Black-faced Monarch	609	The Black-faced Monarch mainly occurs in rainforest ecosystems, including semi-deciduous vine thickets, complex notophyll vine forests, tropical (mesophyll) rainforest, subtropical (notophyll) rainforest, mesophyll (broadleaf) thicket/shrubland, warm temperate rainforest, dry (monsoon) rainforest and occasionally cool temperate rainforest.	No suitable habitat to support this species occurs on-site.	Low	Unlikely
Monarcha trivirgatus	Spectacled Monarch	610	The Spectacled Monarchs natural habitats are subtropical or tropical moist lowland forests, subtropical or tropical mangrove forests, and subtropical or tropical moist montane forests. Its preference is for thick understorey areas.	No suitable habitat to support this species occurs on-site.	Low	Unlikely
Motacilla flava	Yellow Wagtail	644	This species occupies a range of damp or wet habitats with low vegetation, from damp meadows, marshes,	No suitable habitat to support this species occurs on-site.	Low	Unlikely

Scientific name	Common name	EPBC code	Description of preferred habitat	Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of Occurrence
			waterside pastures, sewage farms and bogs to damp steppe and grassy tundra.			
Myiagra cyanoleuca	Satin Flycatcher	612	Satin Flycatchers inhabit heavily vegetated gullies in eucalypt dominated forests and taller woodlands, and on migration occur in coastal forests, woodlands, mangroves and drier woodlands and open forests.	No suitable habitat to support this species occurs on-site.	Low	Unlikely
Rhipidura rufifrons	Rufous Fantail	592	The Rufous fantail mainly inhabits wet sclerophyll forests, often in gullies dominated by eucalypts such as *Eucalyptus microcorys*, *Eucalyptus pilularis*, *Eucalyptus resiniferia* and a number of other Eucalyptus species.	WildNet records indicate species has been previously observed in Springfield Lakes area, however, preferred habitat is absent from the site therefore it is unlikely that the species would utilise the vegetation on-site.	Low	Low
Migratory wetland species						
Actitis hypoleucos	Common Sandpiper	59309	The Common Sandpiper utilises a wide range of coastal wetlands and some inland wetlands, including estuaries and deltas of streams, banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and clay pans, and occasionally piers and jetties. They are mostly found in shallow water, around muddy margins or rocky shores and sometimes in muddy areas littered with rocks or snags. The species commonly utilises mangroves for foraging and roosting but is rarely seen on mudflats.	No suitable foraging or breeding habitat for this species occurs on-site.	Low	Unlikely
Calidris acuminata	Sharp-tailed Sandpiper	874	In Australia, the Sharp-tailed Sandpiper prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh, and beach cast algae / seaweed or other low vegetation. This	No suitable foraging or breeding habitat for this species occurs on-site.	Low	Unlikely

Scientific name	Common name	EPBC code	Description of preferred habitat	Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of Occurrence
			includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline salt lakes inland. They also occur in salt works and sewage farms. They use flooded paddocks, sedgelands and other ephemeral wetlands, but leave when they dry. They use intertidal mudflats in sheltered bays, inlets, estuaries or seashores, and also swamps and creeks lined with mangroves.			
Calidris melanotos	Pectoral Sandpiper	858	The Pectoral Sandpiper prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. Occasionally found further inland.	No suitable foraging or breeding habitat for this species occurs on-site.	Low	Unlikely
Gallinago hardwickii	Latham's Snipe	863	Latham's Snipe occurs in permanent and ephemeral wetlands. They usually inhabit open, freshwater wetlands with low, dense vegetation.	No suitable foraging or breeding habitat for this species occurs on-site.	Low	Unlikely
Pandion haliaetus	Osprey	952	Eastern Ospreys occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. They are mostly found in coastal areas but occasionally travel inland along major rivers.	No suitable foraging or breeding habitat for this species occurs on-site.	Low	Unlikely
Tringa nebularia	Common Greenshank	832	The Common Greenshank is found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. The species is known to forage at the edges of wetlands in soft mud or mudflats.	No suitable foraging or breeding habitat for this species occurs on-site.	Low	Unlikely

Appendix D

SAT survey results

Spot Assessment Technique (SAT) Summary		
SAT Site	Evidence of Use (%)	Koala Use (Low, Medium, High)
1	6	Low use
2	6	Low use
3	15	High use
4	5	Low use

Spot Assessment Technique (SAT) 1				
Date: 24 June 2020		Site: 10143		
Canopy Tree Species Composition				
Tree #	Species		DBH	Scat
1	*Eucalyptus crebra*	Narrow Leaf Ironbark	180	Scats
2	*Corymbia citriodora*	Spotted Gum	270	Scats
3	*Corymbia citriodora*	Spotted Gum	190	Nil
4	*Corymbia citriodora*	Spotted Gum	260	Scats
5	*Corymbia citriodora*	Spotted Gum	350	Nil
6	*Eucalyptus crebra*	Narrow Leaf Ironbark	120	Nil
7	*Corymbia citriodora*	Spotted Gum	170	Nil
8	*Corymbia citriodora*	Spotted Gum	230	Nil
9	*Corymbia citriodora*	Spotted Gum	280	Nil
10	*Eucalyptus crebra*	Narrow Leaf Ironbark	440	Scats
11	*Corymbia citriodora*	Spotted Gum	100	Nil
12	*Corymbia citriodora*	Spotted Gum	100	Nil
13	*Corymbia citriodora*	Spotted Gum	160	Nil
14	*Corymbia citriodora*	Spotted Gum	140	Nil
15	*Corymbia citriodora*	Spotted Gum	100	Nil
16	*Eucalyptus crebra*	Narrow Leaf Ironbark	100	Nil
17	*Corymbia citriodora*	Spotted Gum	130	Nil
18	*Corymbia citriodora*	Spotted Gum	140	Nil
19	*Corymbia citriodora*	Spotted Gum	170	Nil
20	*Corymbia citriodora*	Spotted Gum	100	Nil
21	*Corymbia citriodora*	Spotted Gum	170	Nil
22	*Corymbia citriodora*	Spotted Gum	160	Nil
23	*Eucalyptus crebra*	Narrow Leaf Ironbark	100	Nil
24	*Corymbia citriodora*	Spotted Gum	180	Nil
25	*Corymbia citriodora*	Spotted Gum	110	Nil
26	*Eucalyptus crebra*	Narrow Leaf Ironbark	150	Nil
27	*Corymbia citriodora*	Spotted Gum	260	Scats
28	*Eucalyptus crebra*	Narrow Leaf Ironbark	100	Nil
29	*Corymbia citriodora*	Spotted Gum	140	Scats
30	*Corymbia citriodora*	Spotted Gum	240	Nil
Total				**6/30**
Koala use				**20%**

Spot Assessment Technique (SAT) 2				
Date: 24 June 2020		Site: 10143		
Canopy Tree Species Composition				
Tree #	Species		DBH	Scat
1	*Corymbia citriodora*	Spotted Gum	310	Scats
2	*Corymbia citriodora*	Spotted Gum	150	Nil
3	*Eucalyptus crebra*	Narrow Leaf Ironbark	130	Nil
4	*Eucalyptus crebra*	Narrow Leaf Ironbark	140	Nil
5	*Eucalyptus crebra*	Narrow Leaf Ironbark	100	Nil
6	*Eucalyptus crebra*	Narrow Leaf Ironbark	170	Nil
7	*Corymbia citriodora*	Spotted Gum	290	Scats
8	*Corymbia citriodora*	Spotted Gum	240	Scats
9	*Eucalyptus crebra*	Narrow Leaf Ironbark	190	Nil
10	*Eucalyptus crebra*	Narrow Leaf Ironbark	620	Nil
11	*Corymbia citriodora*	Spotted Gum	150	Nil
12	*Corymbia citriodora*	Spotted Gum	220	Scats
13	*Eucalyptus crebra*	Narrow Leaf Ironbark	110	Nil
14	*Corymbia citriodora*	Spotted Gum	300	Nil
15	*Eucalyptus crebra*	Narrow Leaf Ironbark	110	Nil
16	*Corymbia citriodora*	Spotted Gum	320	Nil
17	*Eucalyptus crebra*	Narrow Leaf Ironbark	120	Nil
18	*Corymbia citriodora*	Spotted Gum	100	Nil
19	*Eucalyptus crebra*	Narrow Leaf Ironbark	120	Nil
20	*Corymbia citriodora*	Spotted Gum	250	Nil
21	*Corymbia citriodora*	Spotted Gum	310	Nil
22	*Eucalyptus crebra*	Narrow Leaf Ironbark	100	Nil
23	*Eucalyptus crebra*	Narrow Leaf Ironbark	110	Nil
24	*Corymbia citriodora*	Spotted Gum	110	Nil
25	*Corymbia citriodora*	Spotted Gum	150	Nil
26	*Corymbia citriodora*	Spotted Gum	130	Nil
27	*Eucalyptus crebra*	Narrow Leaf Ironbark	120	Nil
28	*Corymbia citriodora*	Spotted Gum	260	Scats
29	*Corymbia citriodora*	Spotted Gum	260	Scats
30	*Corymbia citriodora*	Spotted Gum	100	Nil
Total				**6/30**
Koala use				**20%**

Spot Assessment Technique (SAT) 3				
Date: 24 June 2020		Site: 10143		
Canopy Tree Species Composition				
Tree #	Species		DBH	Scat
1	*Corymbia citriodora*	Spotted Gum	220	Scats
2	*Corymbia citriodora*	Spotted Gum	330	Scats
3	*Eucalyptus crebra*	Narrow Leaf Ironbark	160	Nil
4	*Corymbia citriodora*	Spotted Gum	110	Scats
5	*Eucalyptus crebra*	Narrow Leaf Ironbark	270	Nil
6	*Eucalyptus tereticornis*	Forest Red Gum	160	Nil
7	*Corymbia citriodora*	Spotted Gum	110	Nil
8	*Corymbia citriodora*	Spotted Gum	270	Scats
9	*Eucalyptus crebra*	Narrow Leaf Ironbark	210	Nil
10	*Eucalyptus tereticornis*	Forest Red Gum	220	Scats
11	*Eucalyptus crebra*	Narrow Leaf Ironbark	180	Scats
12	*Eucalyptus tereticornis*	Forest Red Gum	280	Scats
13	*Corymbia citriodora*	Spotted Gum	280	Scats
14	*Corymbia citriodora*	Spotted Gum	190	Nil
15	*Eucalyptus crebra*	Narrow Leaf Ironbark	130	Nil
16	*Corymbia citriodora*	Spotted Gum	190	Nil
17	*Corymbia citriodora*	Spotted Gum	230	Scats
18	*Corymbia citriodora*	Spotted Gum	160	Scats
19	*Eucalyptus tereticornis*	Forest Red Gum	150	Nil
20	*Corymbia citriodora*	Spotted Gum	280	Nil
21	*Corymbia citriodora*	Spotted Gum	170	Scats
22	*Corymbia citriodora*	Spotted Gum	100	Nil
23	*Corymbia citriodora*	Spotted Gum	160	Nil
24	*Eucalyptus crebra*	Narrow Leaf Ironbark	160	Nil
25	*Eucalyptus crebra*	Narrow Leaf Ironbark	130	Nil
26	*Corymbia citriodora*	Spotted Gum	150	Scats
27	*Corymbia citriodora*	Spotted Gum	160	Scats
28	*Corymbia citriodora*	Spotted Gum	180	Scats
29	*Corymbia citriodora*	Spotted Gum	310	Scats
30	*Eucalyptus tereticornis*	Forest Red Gum	120	Nil
Total				**15/30**
Koala use				**50%**

Spot Assessment Technique (SAT) 4				
Date: 24 June 2020		Site: 10143		
Canopy Tree Species Composition				
Tree #	Species		DBH	Scat
1	*Eucalyptus crebra*	Narrow Leaf Ironbark	210	Nil
2	*Eucalyptus crebra*	Narrow Leaf Ironbark	180	Scats
3	*Corymbia citriodora*	Spotted Gum	250	Scats
4	*Allocasuarina luehmannii*	Bull Oak	180	Nil
5	*Eucalyptus tereticornis*	Forest Red Gum	310	Nil
6	*Eucalyptus crebra*	Narrow Leaf Ironbark	220	Nil
7	*Eucalyptus crebra*	Narrow Leaf Ironbark	160	Nil
8	*Eucalyptus crebra*	Narrow Leaf Ironbark	130	Nil
9	*Corymbia citriodora*	Spotted Gum	320	Nil
10	*Eucalyptus crebra*	Narrow Leaf Ironbark	130	Nil
11	*Corymbia citriodora*	Spotted Gum	100	Nil
12	*Eucalyptus crebra*	Narrow Leaf Ironbark	230	Scats
13	*Eucalyptus crebra*	Narrow Leaf Ironbark	100	Nil
14	*Eucalyptus crebra*	Narrow Leaf Ironbark	190	Nil
15	*Eucalyptus tereticornis*	Forest Red Gum	210	Scats
16	*Corymbia citriodora*	Spotted Gum	110	Nil
17	*Eucalyptus crebra*	Narrow Leaf Ironbark	140	Nil
18	*Eucalyptus tereticornis*	Forest Red Gum	280	Nil
19	*Eucalyptus crebra*	Narrow Leaf Ironbark	170	Nil
20	*Eucalyptus crebra*	Narrow Leaf Ironbark	100	Nil
21	*Eucalyptus tereticornis*	Forest Red Gum	180	Nil
22	*Eucalyptus crebra*	Narrow Leaf Ironbark	240	Nil
23	*Acacia leiocalyx*	Early Flowering Black Wattle	110	Nil
24	*Acacia leiocalyx*	Early Flowering Black Wattle	100	Nil
25	*Acacia leiocalyx*	Early Flowering Black Wattle	120	Nil
26	*Eucalyptus tereticornis*	Forest Red Gum	220	Nil
27	*Eucalyptus crebra*	Narrow Leaf Ironbark	130	Nil
28	*Eucalyptus crebra*	Narrow Leaf Ironbark	130	Nil
29	*Corymbia citriodora*	Common Name	260	Scats
30	*Eucalyptus crebra*	Narrow Leaf Ironbark	100	Nil
Total				**5/30**
Koala use				**16.67%**

Appendix E

Flora and Fauna Species Lists

FLORA SPECIES LIST

Scientific Name	**Common Name**
NATIVE	
Acacia disparrima	Hickory Wattle
Acacia leiocalyx	Early Flowering Black Wattle
Allocasuarina littoralis	Black She-oak
Allocasuarina luehmannii	Bull Oak
Alphitonia excelsa	Soap Tree
Angophora leiocarpa	Smooth-barked Apple
Aristdia calycina	Dark Wiregrass
Breynia oblongifolia	Coffee Bush
Cassinia laevis	Cough Bush
Cassytha glabella	Devil's Twine
Cheilanthes distans	Bristle Cloak Fern
Chrysocephalum apiculatum	Yellow Buttons
Commelina diffusa	Wandering Jew
Corymbia citriodora	Spotted Gum
Corymbia tessellaris	Moreton Bay Ash
Cupaniopsis anacardoides	Tuckeroo
Cymbopogon refractus	Barbed Wire Grass
Cynodon dactylon	Green Couch
Cyperus difformis	Dirty Dora
Dianella longifolia	Blueberry Lily
Dodonaea viscosa	Hop Bush
Eremophila deblis	Winter Apple
Eucalyptus crebra	Narrow-leaved Ironbark
Eucalyptus melanophloia	Silver-leaved Ironbark
Eucalyptus moluccana	Gum-topped Box
Eucalyptus tereticornis	Forest Red Gum
Fimbristylis ferruginea	A Fringe Rush
Gahnia aspera	Sword Sedge
Goodenia rotundifolia	Star Goodenia
Heteropogon contortus	Black Speargrass
Imperata cylindrica	Blady Grass
Juncus usitatus	Common Rush
Lobelia purpurascens	White Root
Lomandra multiflora	Many Flowered Mat Rush
Lophostemon suaveolens	Swamp Box
Marsilea mutica	Smooth Nardoo
Melaleuca viminalis	Weeping Bottlebrush
Murdannia graminea	Slug Herb
Panicum decompositum	Native Millet
Parsonsia straminea	Monkey Rope Vine

Scientific Name	**Common Name**
Persicaria decipiens	Slender Knotweed
Petalostigma pubescens	Quinine Bush
Philydrum lanuginosum	Woolly Frogmouth
Sporobolus caroli	Fairy Grass
Stephania japonica	Tape Vine
Themeda triandra	Kangaroo Grass
Trema tomentosa	Poison Peach
Typha orientalis	Bulrush
Wahlenbergia gracilis	Small-flowered Bluebell
INTRODUCED	
Ageratum houstonianum	Blue Billygoat Weed
Ambrosia artemisiifolia	Annual Ragweed
Asclepias curassavica	Red-head Cotton Bush
Baccharis halimifolia	Groundsel Bush
Bidens pilosa	Cobbler's Pegs
Centella asiatica	Pennywort
Chloris gayana	Rhodes Grass
Conyza bonariensis	Flaxleaf Fleabane
Crassocephalum crepidioides	Thickhead
Cyperus polstachyos	Bunchy Sedge
Cyperus rotundus	Nutgrass
Eragrostis curvula	African Lovegrass
Gomphocarpus physocarpus	Balloon Cotton Bush
Heliotropium amplexicaule	Blue Heliotrope
Lantana camara	Lantana
Lantana montevidensis	Creeping Lantana
Ludwigia peploides	Water Primrose
Macroptilium lathyroides	Phasey Bean
Medicago polymorpha	Burr Medic
Megathyrsus maximus	Guinea Grass
Melinis repens	Red Natal Grass
Neonotonia wightii	Glycine
Ochna serrulata	Ochna
Oxalis corniculata	Yellow Wood-sorrel
Passiflora suberosa	Corky Passion Vine
Senecio madagascariensis	Fireweed
Senna pendula	Easter Cassia
Setaria sphacelata	South African Pigeon Grass
Sida cordifolia	Flannel Weed
Sida rhombifolia	Common Sida
Solanum mauritianum	Wild Tobacco Tree
Solanum nigrum	Blackberry Nightshade
Solanum seaforthianum	Brazilian Nightshade

Scientific Name	**Common Name**
Solanum torvum	Devil's Fig
Sporobolus pyramidalis	Giant Rat's Tail Grass
Syagrus romanzoffiana	Cocos Palm
Tecoma stans	Yellow Bells

FAUNA SPECIES LIST

Scientific Name	Common Name
BIRDS	
Anas superciliosa	Pacific Black Duck
Cacatua sanguinea	Little Corella
Chenonetta jubata	Australian Wood Duck
Coracina novaehollandiae	Black-faced Cuckoo-shrike
Corvus orru	Torresian Crow
Coturnix ypsilophora	Brown Quail
Cracticus nigrogularis	Pied Butcherbird
Cracticus tibicen	Australian Magpie
Dacelo novaeguineae	Laughing Kookaburra
Dendrocygna eytoni	Plumed Whistling Duck
Egretta novaehollandiae	White-faced Heron
Eolophus roseicapilla	Galah
Gallinula tenebrosa	Dusky Moorhen
Gerygone olivacea	White-throated Gerygone
Glossopsitta pusilla	Little Lorikeet
Haliastur sphenurus	Whistling Kite
Hirundo neoxena	Welcome Swallow
Lichmera indistincta	Brown Honeyeater
Malurus cyaneus	Superb Fairy-wren
Manorina melanocephala	Noisy Miner
Merops ornatus	Rainbow Bee-eater
Pardalotus striatus	Striated Pardalote
Platycercus adscitus	Pale-headed Rosella
Podargus strigoides	Tawny Frogmouth
Rhipidura leucophrys	Willie Wagtail
Taeniopygia bichenovii	Double-barred Finch
Trichoglossus haematodus	Rainbow Lorikeet
Vanellus miles	Masked Lapwing
MAMMALS	
Canis lupus familiaris	Domestic Dog
Lepus europaeus	European Hare
Macropus giganteus	Eastern Grey Kangaroo
Miniopterus australis	Little Bent-wing Bat
*Phascolarctos cinereus**	Koala
Trichosurus vulpecula	Common Brushtail Possum
REPTILES	
Cryptoblepharus virgatus	Wall Skink
Hemidactylus frenatus	Common House Gecko
Lampropholis guichenoti	Common Garden Skink
AMPHIBIANS	

Scientific Name	Common Name
Rhinella marina	Cane Toad

*Scats observed on-site.