Preliminary Documentation Report

(Part B – Referral Material)

Springfield Residential Development
Mur Boulevard, Springfield, QLD

(EPBC 2019/8575)

Prepared for Cherish Enterprises Pty Ltd

December 2025

EPBC Act referral

Australian Government

Department of the Environment and Energy

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Title of proposal	2019/8575 - Residential Development, Springfield

Section 1

Summary of your proposed action

1.1 Project industry type Residential Development

1.2 Provide a detailed description of the proposed action, including all proposed activities

Cherish Enterprises Pty Ltd propose to develop a residential subdivision located within Springfield, Queensland. The proposed action is within 'Springfield community residential designation' and 'open space designation' zoning and will be undertaken in accordance with the Ipswich Planning Scheme (2006). The following land uses are proposed across the site:

- Residential
- Local sports park
- Local recreational park
- Local centre (local shops)
- Childcare centre
- Access roads and other associated infrastructure

The proposed action is surrounded by extensive residential development, education (The Springfield Anglican College), recreation and open space (including Brookwater Golf Course, reserves and parklands) land uses. The proposed action is anticipated to be developed over multiple stages. Proposed access to the site will be via Mur Boulevard and Panorama Drive.

The site aerial and locality are presented in ATTACHMENT 1.

1.3 What is the extent and location of your proposed action?

See Appendix B

1.5 Provide a brief physical description of the property on which the proposed action will take place and the location of the proposed action (e.g. proximity to major towns, or for off-shore actions, shortest distance to mainland)

The site is formally known as 7001 Mur Boulevard, Springfield QLD 4300. The real property description of the land parcel is Lot 9999 on SP292760 (158.2 ha). The proposed action will take place on the entirety of the land parcel, where additional area abutting the lot has been included to account for earthworks. The total referral area is therefore 162 ha (see ATTACHMENT 1).

The site is currently vacant and is comprised mostly of intact vegetation where some areas show evidence of historical logging. The site is bound by a highly modified environment, consisting of an education facility to the east, residential development, a golf course and patches of intact vegetation retained largely in lineal strips associated with local waterways. Existing development works are occurring in the south-east adjacent to the referral area under EPBC 2014/7306 approval.

1.6 What is the size of the proposed action area development footprint (or work area) including disturbance footprint and avoidance footprint (if relevant)?

Referral area: 162 ha
Impact area: 136 ha

1.7 Proposed action location

Lot - Lot 9999 on SP292760 (title reference: 51115958)

1.8 Primary jurisdiction Queensland

1.9 Has the person proposing to take the action received any Australian Government grant funding to undertake this project?

☐ Yes ☑ No

1.10 Is the proposed action subject to local government planning approval?

☑ Yes ☐ No

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1.10.1 Is there a local government area and council contact for the proposal?

☐ Yes ☑ No

1.11 Provide an estimated start and estimated end date for the proposed action	Start Date	01/07/2020
	End Date	01/07/2025

1.12 Provide details of the context, planning framework and state and/or local Government requirements

The following paragraphs outline the State and Local planning framework as it applies to the proposed action.

State code 16: Native vegetation clearing

Mapping published by the Queensland Government shows the referral area supports approximately 154.65 ha of regulated vegetation (Category B). This vegetation is protected under the Vegetation Management Act 1999 (Qld), however an exemption to clear this vegetation applies to development for an urban purpose in an urban area if the vegetation management class is 'least concern' or 'of concern' under the Planning Regulation 2017 (Qld).

State code 18: Constructing or raising waterway barrier works in fish habitats

The unnamed tributary situated mostly to the east of the proposed action, where it traverses part of the referral area, is categorised as a low risk waterway for waterway barrier works. This waterway is mapped as entering the referral area intermittently, however it is predominantly off-site. The unnamed waterway corridor will be retained as it currently exists as part of the proposed action.

Should any waterway barrier works be undertaken within the unnamed waterway that does not meet the accepted development requirements under the Fisheries Act 1994 (Qld), a referral to the State Assessment and Referral Agency and response to the applicable performance outcomes of 'State code 18: Constructing or raising waterway barrier works in fish habitats' will be required.

Nature Conservation Act 1992 (Qld) (NCA): Protected Plants Flora Survey Trigger Map

The NCA protected plants framework has established approval triggers and an assessment process for clearing protected plants. The majority of the referral area is mapped within the 'high risk trigger area'. Prior to clearing, State government requires a suitably qualified person to undertake a detailed botanical survey in accordance with the methodology stipulated in the 'Flora Survey Guidelines – Protected Plants' (2019), and an NCA clearing permit or exempt clearing notification will be subsequently required (dependent on the survey results). After the survey, a Flora Survey Report will be prepared and accompany the clearing permit or exempt clearing notification. This report must be submitted within one year of the survey and no more than two years before clearing occurs. Further surveys in accordance with the guidelines and closer to the construction period are required to support the proposed clearing activities within the 'high risk trigger area'.

Ipswich Planning Scheme (2006)

Under the Ipswich Planning Scheme (2006) the proposed action is on land zoned mostly 'Springfield community residential' with areas of 'open space' extending into the boundary. There are no biodiversity overlays mapped within the referral area under the Ipswich Planning Scheme. Due to the existence and extent of native vegetation across the referral area, a response to the Vegetation Management Code is required. This will be addressed through local development applications.

1.13 Describe any public consultation that has been, is being or will be undertaken, including with Indigenous stakeholders

In accordance with the requirements of the Planning Act 2016 (Qld), public notification is not required under section 4 of the Development Assessment Rules.

1.14 Describe any environmental impact assessments that have been or will be carried out under Commonwealth, State or Territory legislation including relevant impacts of the project

The proposed action does not trigger an environmental impact assessment under Queensland legislation.

1.15 Is this action part of a staged development (or a component of a larger project)?

☐ Yes ☑ No

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1.16 Is the proposed action related to other actions or proposals in the region?

☐ Yes ☑ No

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Section 2

Matters of national environmental significance

2.1 Is the proposed action likely to have any direct or indirect impact on the values of any World Heritage properties?

☐ Yes ☑ No

2.2 Is the proposed action likely to have any direct or indirect impact on the values of any National Heritage places?

☐ Yes ☑ No

2.3 Is the proposed action likely to have any direct or indirect impact on the ecological character of a Ramsar wetland?

☐ Yes ☑ No

2.4 Is the proposed action likely to have any direct or indirect impact on the members of any listed species or any threatened ecological community, or their habitat?

☑ Yes ☐ No

Species or threatened ecological community

Koala (Phascolarctos cinereus)

Impact

Koalas are found in a range of habitats, from coastal islands and tall eucalypt forests to low woodlands inland. The species is known to occur within the local area. Extensive searches for the species, including eight spot assessment technique (SAT) survey and assessment of habitat values across the referral area where only indirect evidence in the form of scats was observed. A large majority of the land surrounding the proposed action area is highly modified due to residential land uses and additional developments being undertaken proximal to the site bounds. Connectivity potential exists in association with lineal strips of vegetation retained with Woogaroo and Opossum Creeks to the west, and an unnamed waterway to the east of the site. Vegetation on-site is largely intact and known Koala food trees are present throughout. The proposed action will result in the direct impact (clearing) of approximately 136 ha of native vegetation that is habitat for the Koala, and an indirect impact of an additional 26 ha of native vegetation. A habitat score calculation was completed in accordance with the EPBC Act referral guidelines for the vulnerable Koala (2014) and these areas were assessed to have a habitat score of 7 (where habitat is considered to be critical to the survival of the Koala under the referral guidelines)(refer ATTACHMENT 2). The proposed action is hence considered likely to have a significant impact on critical Koala habitat.

Species or threatened ecological community

Grey-headed Flying-fox (Pteropus poliocephalus)

Impact

This species generally roosts in camps in trees adjacent to larger permanent watercourses. The GHFF requires foraging resources and roosting sites and 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, however the primary food source is blossom from Eucalyptus and related genera. No camps or direct evidence of foraging was observed on-site, however, food resources occur on-site amongst woodland vegetation. The closes flying-fox camp of national importance containing GHFF is situated approximately 9.5 km to the north (known as Mount Ommaney – Westlake Drive (400)). The proposed action is not anticipated to impact the GHFF population within this fly-fox camp. A GHFF was observed as transient fly-over species during targeted field surveys on-site. Intact suitable foraging habitat for GHFF is present within the wider locality, where large patches of suitable vegetation exist to the north of Brisbane river and further to the east and south of the site (south of the Centenary Rail Line). The proposed action will result in the removal of

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136 ha of GHFF foraging habitat, and consequently, the proposed action is likely to adversely impact habitat critical to the survival of the species (refer ATTACHMENT 2).

2.4.2 Do you consider this impact to be significant?

☑ Yes ☐ No

2.5 Is the proposed action likely to have any direct or indirect impact on the members of any listed migratory species or their habitat?

☐ Yes ☑ No

2.6 Is the proposed action to be undertaken in a marine environment (outside Commonwealth marine areas)?

☐ Yes ☑ No

2.7 Is the proposed action likely to be taken on or near Commonwealth land?

☐ Yes ☑ No

2.8 Is the proposed action taking place in the Great Barrier Reef Marine Park?

☐ Yes ☑ No

2.9 Is the proposed action likely to have any direct or indirect impact on a water resource from coal seam gas or large coal mining development?

☐ Yes ☑ No

2.10 Is the proposed action a nuclear action?

☐ Yes ☑ No

2.11 Is the proposed action to be taken by a Commonwealth agency?

☐ Yes ☑ No

2.12 Is the proposed action to be undertaken in a Commonwealth Heritage place overseas?

☐ Yes ☑ No

2.13 Is the proposed action likely to have any direct or indirect impact on any part of the environment in the Commonwealth marine area?

☐ Yes ☑ No

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Section 3

Description of the project area

3.1 Describe the flora and fauna relevant to the project area

The MNES Assessment Report, prepared by Saunders Havill Group, dated September 2019 provides details of all flora and fauna relevant to the proposed action area (ATTACHMENT 2). Extracts from this report have been included below for ease of reference to key details.

The site is surrounded by a highly modified environment, consisting of an education facility to the east, residential development, a golf course, and patches of intact vegetation. Areas of the site have been exposed to weed invasion and evidence of historical logging was observed across the entire site. Drainage lines are mapped within the proposed action area and were not observed to retain pooled water during field survey. Woogaroo Creek lies adjacent to the north-western boundary and Opossum Creek is situated adjacent to the western and south-western boundary. An unnamed waterway is situated adjacent to the eastern boundary in a north-south direction traversing a small section of the subject area. The creeks were observed to contain some pooled water, where Woogaroo and Opossum Creeks were considered to contain some potential frog habitat values. Rocky habitat was recorded in association with the drainage lines on-site and western ridgelines, providing potential habitat for reptiles and small mammals. Internal access tracks exist across the site and heavy rainfall events have resulted in erosion and scouring.

Over 150 ha of the site is mapped Category B (remnant) vegetation and approximately 3.5 ha is Category X (non-remnant) vegetation. There is a lack of significantly sized trees across the site due to past land uses resulting in modification of natural vegetation features. Dominant canopy species across the site included Eucalyptus crebra (Narrow-leaved Ironbark), Eucalyptus moluccana (Gum topped Box) and Corymbia citriodora (Spotted Gum). Other species included Eucalyptus propinqua (Grey Gum), Lophostemon confertus (Brush Box), Cinnamomum camphora (Camphor Laurel), Acacia disparrima (Hickory Wattle) and Eucalyptus fibrosa (Broad-leaved Red Ironbark). Lantana camara (Lantana) was present in varying densities in association with the drainage lines across the site and within the creeks located off-site. Vegetation within the shrub layer was largely absent from the site, where it was mostly restricted to gullies and to isolated patches across the site.

Endangered RE12.3.16 is mapped in the central-western extent of the site and to the west of the proposed action boundary. This RE contains species reflective of the LRSA TEC and these species were observed within the proposed action bounds. Revegetation works are evident in the Endangered RE12.3.16 to the west of the site associated with past rehabilitation efforts. Both LRSA TEC locations were ground-truthed during ecological survey to have slight discrepancies compared to mapped boundary extents. The rehabilitated TEC located to the west of the site was situated proximal to a waterway, and was bordered by mature Cinnamomum camphora (Camphor Laurel) specimens, potentially restricting the area of the TEC. The LRSA TEC located on-site is situated within the lowest section of a gully line.

Six MNES fauna were identified as may or likely to occur within the proposed action area. Two of these MNES fauna were observed during field survey, being Pteropus poliocephalus (Grey-headed Flying-fox) and Rhipidura rufifrons (Rufous Fantail). The Grey-headed Flying-fox (GHFF) was observed as fly over species only, where no individuals were observed directly utilising the potential foraging habitat recognised in the impact area. Rufous Fantail specimens were observed on multiple occasions across the proposed action area. Phascolarctos cinereus (Koala) are known to occur within the wider local area. However, despite species specific searches being undertaken during field survey effort, only indirect evidence of Koala was observed in the form of scats, where no physical observations were recorded.

Two invasive fauna species were recorded during site field surveys; Vulpes vulpes (Red Fox) and Rhinella marina (Cane Toad). The Red Fox was observed opportunistically during vegetation surveys proximal to the waterway mapped in the western extent of the site. Specific-searches were undertaken surrounding rocky outcrops, however, no fox den was located.

3.2 Describe the hydrology relevant to the project area (including water flows)

The project area is approximately 162 ha with ground elevations ranging from approximately 90mAHD at the central and southern portions of the site to 30mAHD at the western and northern boundaries. No waterways are mapped within the proposed action area, where Woogaroo and Opossum Creeks exist adjacent to the western boundary and an unnamed waterway exists adjacent to the eastern bounds. These waterways are proposed to be retained as a result of the proposed action and a vegetated buffer will exist surrounding the waterways. Existing features and functionality of the waterways is anticipated to be enhanced as a result of the proposed action.

3.3 Describe the soil and vegetation characteristics relevant to the project area

Land zone 9-10 dominates the majority of the site, consisting of fine to coarse grained sedimentary rocks, including sandstone, siltstones, mudstones and shales. Land zone 3 is situated in association with Woogaroo and Opossum Creeks to the west of the proposed action, entering the project area intermittently, and it associated with an unnamed waterway adjacent to the north-eastern boundary. This area is associated with the alluvial floodplains and creek line of Woogaroo and

Opossum Creeks and an unnamed watercourse.

Vegetation characteristics
Dominant canopy species across the site included Eucalyptus crebra (Narrow-leaved Ironbark), Eucalyptus moluccana (Gum topped Box) and Corymbia citriodora (Spotted Gum). Other species included Eucalyptus propinqua (Grey Gum), Lophostemon confertus (Brush Box), Cinnamomum camphora (Camphor Laurel), Acacia disparrima (Hickory Wattle) and Eucalyptus fibrosa (Broad-leaved Red Ironbark). Lantana camara (Lantana) was present in varying densities in association with the drainage lines across the site and within the creeks located off-site. Vegetation within the shrub layer was largely absent from the site, where it was mostly restricted to gullies and to isolated patches across the site.

3.4 Describe any outstanding natural features and/or any other important or unique values relevant to the project area

From an MNES perspective, no outstanding natural features and/or any other important or unique values relevant to the project area were identified on or proximal to the subject site. Within the local area, more optimal, permanent and connected habitat is considered to exist approximately 2.5 km to the south and approximately 3 km to the east of the site. These areas are largely intact, and are included within a regional biodiversity corridor defined under South East Queensland Region Plan 2017. This area is considered to provide continued connectivity potential for fauna movement across the landscape, and provides enhanced biodiversity values to those within the referral area.

3.5 Describe the status of native vegetation relevant to the project area

A summary description of current vegetation mapped over the referral area is as follows:
- RE12.9-10.2 (Least Concern): Corymbia citriodora subsp. variegata +/- Eucalyptus crebra open forest on sedimentary rocks.
- RE12.9-10.7 (Of Concern): Eucalyptus crebra +/- E. tereticornis, Corymbia tessellaris, Angophora spp., E. melanophloia woodland on sedimentary rocks.
- RE12.9-10.19 (Least Concern): Eucalyptus fibrosa subsp. fibrosa woodland on sedimentary rocks.
- RE12.9-10.15 (Endangered): Semi-evergreen vine thicket with Brachychiton rupestris on sedimentary rocks.
- RE12.3.16 (Endangered): Complex notophyll to microphyll vine forest on alluvial plains.
- RE12.3.7 (Of Concern): Eucalyptus tereticornis, Casuarina cunninghamiana subsp. cunninghamiana +/- Melaleuca spp. fringing woodland.
- RE12.3.3 (Endangered): Eucalyptus tereticornis woodland on Quaternary alluvium.
- RE12.9-10.17 (Least Concern): Eucalyptus acmenoides, E. major, E. siderophloia +/- Corymbia citriodora subsp. variegata open forest on sedimentary rocks.
- Non-remnant vegetation: Eucalyptus fibrosa (Red Ironbark), Corymbia citriodora (Spotted Gum), Eucalyptus propinqua (Grey Gum), Eucalyptus moluccana (Gum-topped Box), Acacia disparrima (Hickory Wattle).

The areas mapped as remnant vegetation within the supporting vegetation map are considered to meet remnant status and are mostly reflective of the extents mapped on the regulated vegetation management map. Ground-truthed extents of remnant mapping show some discrepancies, as follows. The mapped composite endangered RE12.3.7/12.3.3 located along the north-eastern referral boundary was ground-truthed and in situ vegetation characteristics indicate the western boundary of the endangered regional ecosystem does not enter the referral area, where only the southern corner enters the proposed action area. A defined remnant vegetation edge of endangered RE12.9-10.15 situated along the western referral area boundary was ground-truthed to identify the actual interface between the endangered and of concern remnant vegetation.

3.6 Describe the gradient (or depth range if action is to be taken in a marine area) relevant to the project area

The ground elevations ranging from approximately 90mAHD at the central and southern portions of the site to 30mAHD at the western and northern boundaries. The average elevation across the site is 10%.

3.7 Describe the current condition of the environment relevant to the project area

The proposed action area is currently vacant and largely vegetated with eucalypt and Corymbia species. Over 150 ha of the site is mapped Category B (remnant) vegetation and approximately 3.5 ha is Category X (non-remnant) vegetation. There is a lack of significantly sized trees across the site due to past land uses resulting in modification of natural vegetation features. Dominant canopy species across the site included Eucalyptus crebra (Narrow-leaved Ironbark), Eucalyptus moluccana (Gum topped Box) and Corymbia citriodora (Spotted Gum). Other species included Eucalyptus propinqua (Grey Gum), Lophostemon confertus (Brush Box), Cinnamomum camphora (Camphor Laurel), Acacia disparrima (Hickory Wattle) and Eucalyptus fibrosa (Broad-leaved Red Ironbark). Lantana camara (Lantana) was present in varying densities in association with the drainage lines across the site and within the creeks located off-site. Vegetation within the shrub layer was largely absent from the site, where it was mostly restricted to gullies and to isolated patches across the site. Where the shrub layer was present, it was dominated by weed invasion including Lantana camara (Lantana).

Overall, the majority of the project area was found to comprise intact vegetation, although the shrub and ground layers

were largely absent. Revegetation efforts was evident in the riparian zone of Opossum Creek, adjacent to the western proposed action boundary.

3.8 Describe any Commonwealth Heritage places or other places recognised as having heritage values relevant to the project

The EPBC Act Protected Matters Report (ATTACHMENT 2) indicated that no World Heritage Properties, National Heritage Places or any other Commonwealth Heritage Places exist within a 5 km radius of the site of the proposed action.

3.9 Describe any Indigenous heritage values relevant to the project area

Areas where significant ground disturbances have previously occurred (observed across this referral area) are generally unlikely to contain aspects of intact Indigenous cultural heritage. Notwithstanding, no areas or artefacts of Indigenous heritage significance have been identified within the referral area.

3.10 Describe the tenure of the action area (e.g. freehold, leasehold) relevant to the project area

All lots within the site of the proposed action are held under freehold tenure.

3.11 Describe any existing or any proposed uses relevant to the project area

The proposed action area is current vacant, where access to the public for walking dogs and similar activities occurs. Proposed activities include:

- Residential
- Local sports park
- Local recreational park
- Local centre (local shops)
- Childcare centre
- Access roads and other associated infrastructure

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Section 4

Measures to avoid or reduce impacts

4.1 Describe the measures you will undertake to avoid or reduce impact from your proposed action

Design of the proposed action has considered the requirements of legislative compliance as well as potential impacts to the environment. The proponent is committed to undertaking ecological rehabilitation works within the western extent of the subject area, in association with remnant values on-site and within the waterway corridors. The development will incorporate a number of avoidance, minimisation and mitigation measures relating to ecological values as follows:

- Avoidance and rehabilitation of the ground-truthed Lowland Subtropical Rainforest of Australia within the central-western extent of the site.
- Avoid impacts on existing healthy trees in future local recreation parks in the proposed action area where not in conflict with necessary earthworks or Ipswich City Council's requirements for safe trees in parkland areas.
- Ecological rehabilitation works in association with vegetation situated in the western extent of the site to enhance functionality of the riparian corridor associated with Woogaroo and Opossum Creeks to the west of the site.
- Implementation of a vegetation management plan that delineates the approved clearing extent.
- Preparation of a fauna management plan to govern clearing and construction works within the referral area and to specify works that must be conducted under the supervision of a suitably qualified and experienced fauna spotter catcher.
- Implementation of an environmental pre-start checklist system that must be acknowledged and signed by the proponent (or their appointed representative), civil contractor, clearing contractor, fauna spotter catcher and environmental consultant (as a minimum) as a mechanism to control and monitor clearing works.
- pre-clearing and post-works reporting completed by the fauna spotter catcher and provided to Ipswich City Council as proof of that clearing works were in accordance with the Nature Conservation Act 1992 and the permit held by the fauna spotter catcher.
- Employ contemporary preclearing survey methodologies as appropriate to avoid injury or mortality to fauna during clearing operations.
- undertake clearing activities in accordance with Schedule 11, Part 3 of the Planning Regulation 2017 (Qld) — requirements for native vegetation clearing which include sequential clearing, clearing duration and clearing extent restrictions.

4.2 For matters protected by the EPBC Act that may be affected by the proposed action, describe the proposed environmental outcomes to be achieved

The proposed action will directly impact 136 ha of habitat critical to the survival of the Koala. The 136 ha of vegetation is also potential GHFF foraging habitat. The western extent of the proposed action area adjacent to Woogaroo and Opossum Creeks will be retained and rehabilitated as a result of the proposed action. Rehabilitation works will also occur in association with the unnamed creek to the east of the proposed action area. Vegetation within this area includes Lowland Rainforest of Subtropical Australia and Of Concern and Endangered remnant vegetation. The protection and improvement of vegetation associated with these creeks is considered to ensure the continuation of existing dispersal opportunity for the Koala, and ensure potential foraging habitat is maintained in situ for GHFF. Once ecological improvement works are complete, the land will become a reserve managed by Ipswich City Council, providing Koala habitat and GHFF forging habitat into perpetuity.

Potential adverse impacts to Koala and GHFF associated with construction activities (i.e. injury during land clearing, entrapment within excavated trenches) will be avoided via the implementation of environmental management controls and work practices as described in section 4.1. These mitigation measures are commonplace throughout the Ipswich City local government area and South East Queensland. Further, the retention and rehabilitation of vegetation associated with Woogaroo and Opossum Creeks, and the unnamed waterway to the east, will continue to provide suitable foraging habitat to the Koala and GHFF.

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Section 5

Conclusion on the likelihood of significant impacts

5.1 You indicated the below ticked items to be of significant impact and therefore you consider the action to be a controlled action

- ☐ World Heritage properties
- ☐ National Heritage places
- ☐ Wetlands of international importance (declared Ramsar wetlands)
- ☑ Listed threatened species or any threatened ecological community
- ☐ Listed migratory species
- ☐ Marine environment outside Commonwealth marine areas
- ☐ Protection of the environment from actions involving Commonwealth land
- ☐ Great Barrier Reef Marine Park
- ☐ A water resource, in relation to coal seam gas development and large coal mining development
- ☐ Protection of the environment from nuclear actions
- ☐ Protection of the environment from Commonwealth actions
- ☐ Commonwealth Heritage places overseas
- ☐ Commonwealth marine areas

5.2 If no significant matters are identified, provide the key reasons why you think the proposed action is not likely to have a significant impact on a matter protected under the EPBC Act and therefore not a controlled action

N/A

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Section 6

Environmental record of the person proposing to take the action

6.1 Does the person taking the action have a satisfactory record of responsible environmental management? Explain in further detail

Yes—Cherish Enterprises Pty Ltd understands and recognises it has a duty of care to the environment. The company's environmental management record does not include any instances of contraventions or non-compliances with development approval conditions.

6.2 Provide details of any past or present proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against either (a) the person proposing to take the action or, (b) if a permit has been applied for in relation to the action – the person making the application

N/A – Cherish Enterprises Pty Ltd does not have any past or present proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources.

6.3 If it is a corporation undertaking the action will the action be taken in accordance with the corporation's environmental policy and framework?

☑ Yes ☐ No

6.3.1 If the person taking the action is a corporation, provide details of the corporation's environmental policy and planning framework

The Cherish Enterprises Pty Ltd.'s environmental policy and framework is provided in ATTACHMENT 3.

6.4 Has the person taking the action previously referred an action under the EPBC Act, or been responsible for undertaking an action referred under the EPBC Act?

☑ Yes ☐ No

6.4.1 EPBC Act No and/or Name of Proposal

EPBC ref 2014/7306 Cherish Enterprises Pty Ltd/Residential Development/Ipswich City/Queensland/Springview Village One, Springfield, Ipswich City, QLD

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Section 7

Information sources

Reference source

9612 E MNES Assessment Report, prepared by Saunders Havill Group for Cherish Enterprises Pty Ltd, dated 23 September 2019.

Reliability

Information is reliable and current.

Uncertainties

Nil

Reference source

Atlas of Living Australia, 2019, Spatial Data Portal [https://spatial.ala.org.au/], accessed July 2019.

Reliability

Information is reliable and current.

Uncertainties

Nil

Reference source

Barry, S.J. & G.T. Thomas, 1994, Threatened Vascular Rainforest Plants of South-east Queensland: A Conservation Review, Queensland Department of Environment and Heritage.

Reliability

Information is reliable and current.

Uncertainties

Nil

Reference source

Commonwealth of Australia, 2011, The Senate: Environment and Communications References Committee. The Koala – saving our national icon, Commonwealth of Australia.

Reliability

Information is reliable and current.

Uncertainties

Nil

Reference source

Department of Environment & Climate Change NSW, 2008, Recovery plan for the Koala (Phascolarctos cinereus), Department of Environment & Climate Change NSW.

Reliability

Information is reliable and current.

Uncertainties

Nil

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Reference source

Department of Environment and Science (2017), Grey-headed flying-fox, Queensland Government.

Reliability

Information is reliable and current.

Uncertainties

Nil

Reference source

Department of Sustainability, Environment, Water, Population and Communities, 2011, Approved Conservation Advice for the Lowland Rainforest of Subtropical Australia, Canberra, ACT: Department of Sustainability, Environment, Water, Population and Communities.

Reliability

Information is reliable and current.

Uncertainties

Nil

Reference source

Department of the Environment and Energy, 2019, Monitoring Flying-fox Populations – Interactive Flying-fox Web Viewer, Department of the Environment and Energy, Australian Government.

Reliability

Information is reliable and current.

Uncertainties

Nil

Reference source

Department of the Environment, 2013, Matters of Nation Environmental Significance – Significant Impact Guidelines 1.1 Environment Protection and Biodiversity Conservation Act 1999, Australian Government.

Reliability

Information is reliable and current.

Uncertainties

Nil

Reference source

Department of the Environment, 2019, Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) in Species Profile and Threats Database, Department of the Environment, Canberra.

Reliability

Information is reliable and current.

Uncertainties

Nil

Reference source

Department of the Environment, 2019, Plectranthus habrophyllus in Species Profile and Threats Database, Department of the Environment, Canberra.

Reliability

Information is reliable and current.

Uncertainties

Nil

Reference source

Department of the Environment, 2019, Pteropus poliocephalus in Species Profile and Threats Database, Department of the Environment, Canberra.

Reliability

Information is reliable and current.

Uncertainties

Nil

Reference source

Department of the Environment, 2019, Streblus pendulinus in Species Profile and Threats Database, Department of the Environment, Canberra.

Reliability

Information is reliable and current

Uncertainties

Nil

Reference source

Duncan, A., G.B. Baker & N. Montgomery, 1999, The Action Plan for Australian Bats, Canberra: Environment Australia.

Reliability

Information is reliable and current.

Uncertainties

Nil

Reference source

EPBC Act Referral Guidelines for the vulnerable koala (combined populations of Queensland, New South Wales and the Australian Capital Territory), Commonwealth of Australia, 2014.

Reliability

Information is reliable and current.

Uncertainties

Nil

Reference source

Eyre TJ, Ferguson DJ, Hourigan CL, Smith GC, Mathieson MT, Kelly, AL, Venz MF, Hogan, LD & Rowland, J., 2018, Terrestrial Vertebrate Fauna Survey Assessment Guidelines for Queensland, Department of Environment and Science, Queensland Government, Brisbane.

Reliability

Information is reliable and current.

Uncertainties

Nil

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Reference source

Forster, P.I., 1994, Ten new species of Plectranthus L'Her. (Lamiaceae) from Queensland. Austrobaileya. 4(2).

Reliability

Information is reliable and current.

Uncertainties

Nil

Reference source

Gonzalez-Astudillo, V, Allavena, R, Mckinnon, A, Larkin, R & Henning, J, 2017, 'Decline causes of Koalas in South East Queensland, Australia: a 17-year retrospective study of mortality and morbidity', Scientific Reports, 7:42587.

Reliability

Information is reliable and current.

Uncertainties

Nil

Reference source

Ipswich City Council, 2006, Ipswich Planning Scheme, Ipswich.

Reliability

Information is reliable and current.

Uncertainties

Nil

Reference source

Phillips, S & Callaghan, J 2011, The Spot Assessment Technique: a tool for determining localised levels of habitat use by Koalas Phascolarctos cinereus, Australian Zoologist, 35(3): 774-780.

Reliability

Information is reliable and current.

Uncertainties

Nil

Reference source

Queensland CRA/RFA Steering Committee, 1997, Forest taxa at risk, threats, conservation needs and recovery planning in south-east Queensland, Queensland Government & Commonwealth of Australia.

Reliability

Information is reliable and current.

Uncertainties

Nil

Reference source

Queensland Herbarium, 2008, Specimen label information. Viewed 26 June 2008

Reliability

Information is reliable and current.

Uncertainties

Nil

Reference source

Rhodes, J. R., Beyer, H. L., Preece, H.J. and McAlpine, C.A. 2015. South East Queensland Koala Population Modelling Study. UniQuest, Brisbane, Australia.

Reliability

Information is reliable and current.

Uncertainties

Nil

Reference source

Tidemann, C.R., 1998, Grey-headed Flying-fox, Pteropus poliocephalus, Temminck, 1824, In: Strahan, R., ed. The Mammals of Australia. Frenchs Forest: New Holland Publishers Pty Ltd.

Reliability

Information is reliable and current.

Uncertainties

Nil

Reference source

Wilson, PR & Taylor, PM 2012, Land Zones of Queensland, Queensland Herbarium, Queensland Department of Science, Information Technology, Innovation and the Arts, Queensland Government, Brisbane.

Reliability

Information is reliable and current.

Uncertainties

Nil

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Section 8

Proposed alternatives

Do you have any feasible alternatives to taking the proposed action?

Yes ☑ No

Australian Government

Department of the Environment and Energy

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Section 9

Person proposing the action

9.1.1 Is the person proposing the action a member of an organisation?

☑ Yes ☐ No

Organisation

Organisation name	Cherish Enterprises Pty Ltd
Business name	
ABN	
ACN	052055811
Business address	46 Sentinel Ct, Cleveland, 4163, QLD, Australia
Postal address	
Main Phone number	(07) 3821 2015
Fax	
Primary email address	cherish9899@gmail.com
Secondary email address	

9.1.2 I qualify for exemption from fees under section 520(4C)(e)(v) of the EPBC Act because I am:

☐ Small business

☑ Not applicable

9.1.2.2 I would like to apply for a waiver of full or partial fees under Schedule 1, 5.21A of the EPBC Regulations *

☐ Yes ☑ No

9.1.3 Contact

First name	Samuel
Last name	Lin
Job title	Managing Director
Phone	(07) 3821 2015
Mobile	
Fax	
Email	cherish9899@gmail.com
Primary address	46 Sentinel Ct, Cleveland, 4163, QLD, Australia
Address	

Declaration: Person proposing the action

I, Samuel Lin, **declare that to the best of my knowledge the information I have given on, or attached to the EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence. I declare that I am not taking the action on behalf or for the benefit of any other person or entity.**

Signature: Samuel Lin **Date:** 11/11/2019

I, Samuel Lin, **the person proposing the action, consent to the designation of** Cherish Enterprises Pty Ltd **as the proponent for the purposes of the action described in this EPBC Act Referral.**

Signature: Samuel Lin **Date:** 11/11/2019

Australian Government

Department of the Environment and Energy

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Proposed designated proponent

9.2.1 Is the proposed designated proponent a member of an organisation?

☑ Yes ☐ No

Organisation

Organisation name	Cherish Enterprises Pty Ltd
Business name	
ABN	
ACN	052055811
Business address	46 Sentinel Ct, Cleveland, 4163, QLD, Australia
Postal address	
Main Phone number	(07) 3821 2015
Fax	
Primary email address	cherish9899@gmail.com
Secondary email address	

9.2.2 Contact

First name	Samuel
Last name	Lin
Job title	Managing Director
Phone	(07) 3821 2015
Mobile	
Fax	
Email	cherish9899@gmail.com
Primary address	46 Sentinel Ct, Cleveland, 4163, QLD, Australia
Address	

Declaration: Proposed Designated Proponent

I, Cherish Enterprises Pty Ltd ,**the proposed designated proponent, consent to the designation of myself as the proponent for the purposes of the action described in this EPBC Act Referral.**

Signature: Samuel Lin **Date:** 11/11/2019

Australian Government

Department of the Environment and Energy

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Referring party (person preparing the information)

9.3.1 Is the referring party (person preparing the information) a member of an organisation?

☑ Yes ☐ No

Organisation

Organisation name	Saunders Havill Group Pty Ltd
Business name	SAUNDERS HAVILL GROUP
ABN	24144972949
ACN	
Business address	9 Thompson St, Bowen Hills, 4006, QLD, Australia
Postal address	
Main Phone number	1300 123 744
Fax	
Primary email address	mail@saundershavill.com
Secondary email address	

9.3.2 Contact

First name	James
Last name	Gautrey
Job title	Ecologist
Phone	1300 123 744
Mobile	
Fax	
Email	jamesgautrey@saundershavill.com
Primary address	9 Thompson St, Bowen Hills, 4006, QLD, Australia
Address	

Declaration: Referring party (person preparing the information)

I, JAMES GAUTREY **, declare that to the best of my knowledge the information I have given on, or attached to this EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence.**

Signature: ..... **Date:** 13/11/19

Australian Government

Department of the Environment and Energy

Note: PDF may contain fields not relevant to your application. These fields will appear blank or unticked. Please disregard these fields.

Appendix A

Attachment

Document Type	File Name
action_area_images	ATTACHMENT 1 - 9612 E EPBC Site Locality and Aerial.pdf
supporting_tech_reports	ATT 2_Ecological Technical Report on MNES-part 1 of 4.pdf
supporting_tech_reports	ATT 2_Ecological Technical Report on MNES-part 2 of 4.pdf
supporting_tech_reports	ATT 2_Ecological Technical Report on MNES-part 3 of 4.pdf
supporting_tech_reports	ATT 2_Ecological Technical Report on MNES-part 4 of 4.pdf
corp_env_policy_docs	ATTACHMENT 3 - Cherish Enterprises Environmental Policy.pdf

Appendix B

Coordinates

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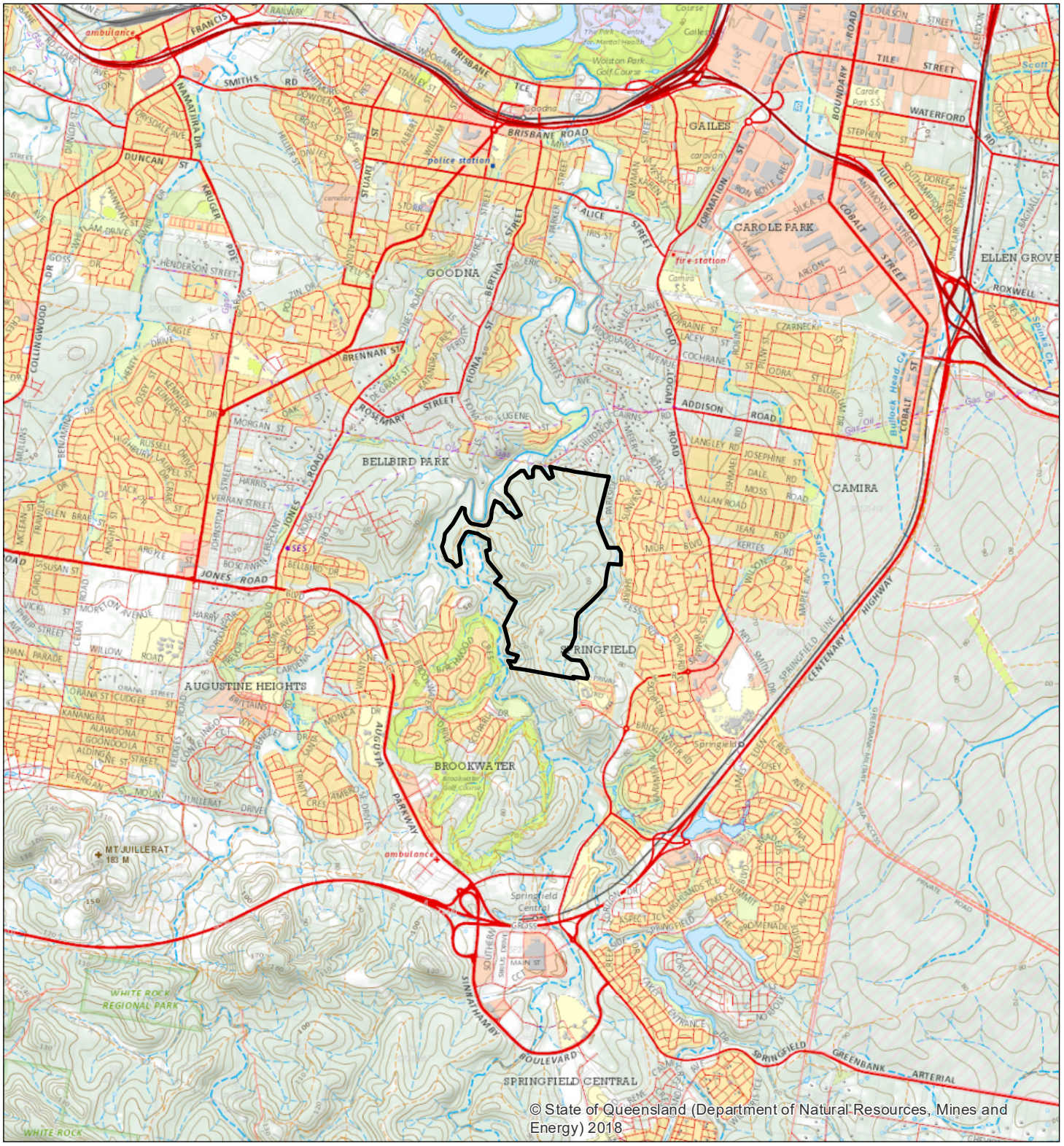
Attachment 1 – EPBC Site Locality and Aerial



Legend

Referral site

Figure 1

Site Locality

Cherish Enterprises Pty Ltd

File ref. 9612 E EPBC Figure 1 Site Locality A
Date *22/10/2019*
Project *Mur Boulevard, Springfield*

0 0.5 1 2 *km*

N

Scale (A4): 1:50,000 [GDA 1994 MGA Z56]

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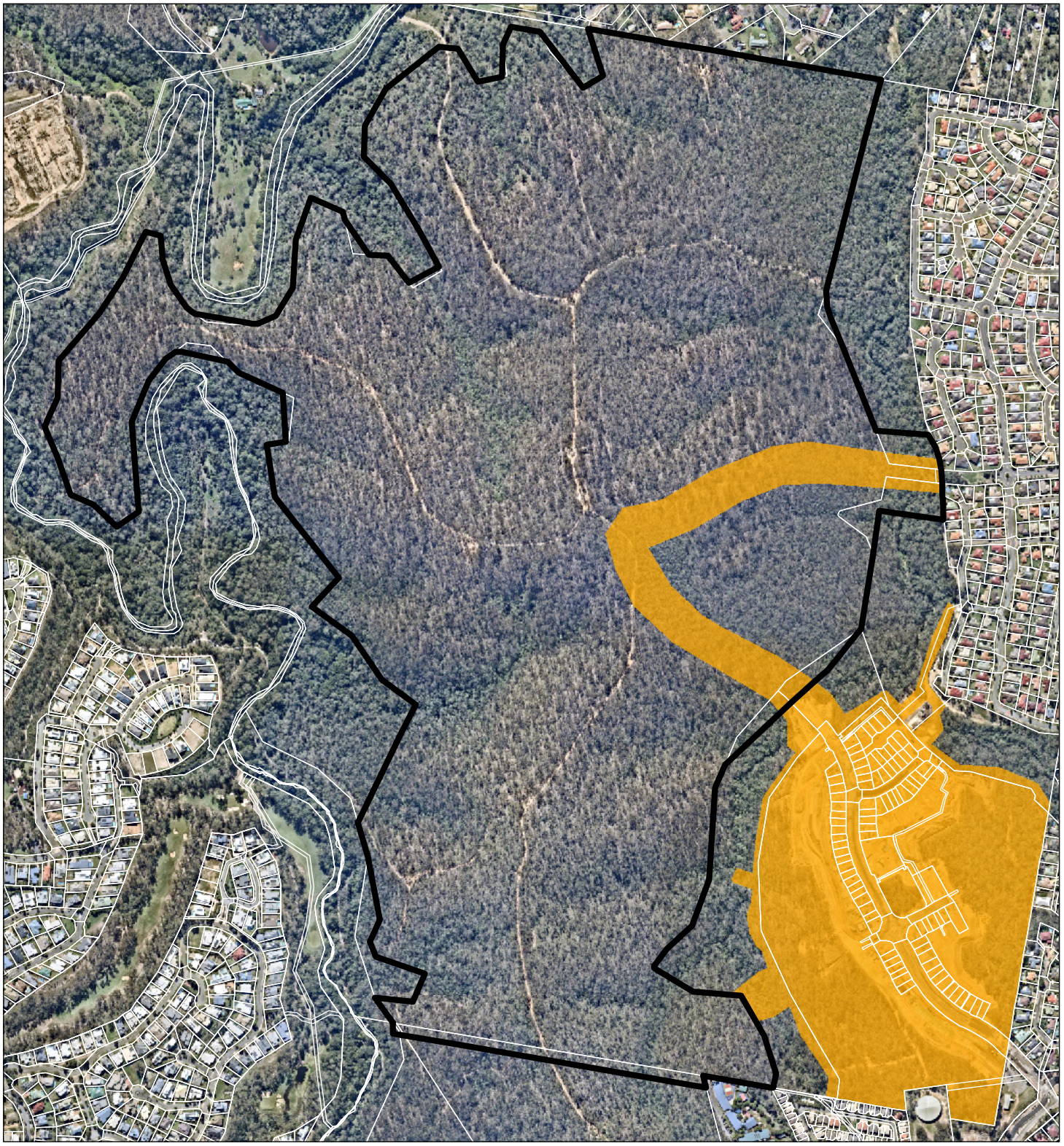
Layer Source: © State of Queensland (Department of Natural Resources, Mines and Energy) 2019.



Legend

- Referral site
- Qld DCDB
- EPBC 2014/7306 approval

Figure 2

Site Aerial

Cherish Enterprises Pty Ltd

File ref. 9612 E EPBC Figure 2 Site Aerial A
Date *22/10/2019*
Project *Mur Boulevard, Springfield*

0 50 100 200 300 400 *m*

N

Scale (A4): 1:10,000 [GDA 1994 MGA Z56]

saunders havill group

Layer Source: © State of Queensland (Department of Natural Resources, Mines and Energy) 2019, Aerial (Nearmap 2019)

Attachment 2 – MNES Ecological Technical Report

MNES Assessment Report

Springview Village – Balance Land
Mur Boulevard, Springfield, Queensland, 4300
Prepared for Cherish Enterprises Pty Ltd
23 September 2019

Job 9612 E

Document Control

Document: MNES Assessment Report for Springview Village balance land at Mur Boulevard, Springfield, prepared by Saunders Havill Group for Cherish Enterprises Pty Ltd.

Document Issue

Issue	Date	Prepared By	Checked By
Issue A	23/10/2019	HS	JG
Issue B	1/11/2019	HS	JG

Prepared by

ABN 24 144 972 949
www.saundershavill.com

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Acronyms and Abbreviations

AKF	Australian Koala Foundation
ASL	Above sea level
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
ETR	Ecological Technical Report
GHFF	Grey-headed Flying-fox
ha	hectares
km	kilometres
LRSA	Lowland Rainforest of Subtropical Australia
m	metres
MNES	Matters of National Environmental Significance
NCA	*Nature Conservation Act 1992* (Qld)
PMR	Protected Matters Report
PMST	Protected Matters Search Tool
RE	Regional Ecosystem
SAT	Spot Assessment Technique
SHG	Saunders Havill Group
SIG 1.1	*Significant Impact Guidelines 1.1 – Matters of National Environmental Significance* (2013)
TEC	threatened ecological community
VMA	*Vegetation Management Act 1999* (Qld)

The Department	Department of the Environment and Energy
Cherish Enterprises	Cherish Enterprises Pty Ltd

1. Introduction

This report is an assessment of Matters of National Environmental Significance (MNES) in relation to Cherish Enterprises Pty Ltd (Cherish Enterprises) proposed action for land located at Mur Boulevard, Springfield, Queensland. The MNES are protected under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and a review of the project with reference to the *Significant Impact Guidelines 1.1 – Matters of National Environmental Significance* (2013) (SIG 1.1) is presented herein.

Contextually, the site covers approximately 162 hectares (ha) and is in the suburb of Springfield, approximately 15 kilometres (km) south-east of Ipswich City CBD (refer **Figure 1**). Neighbouring land uses include general residential development, education (The Springfield Anglican College), recreation and open space (*i.e.*, Brookwater Golf Course, reserves and parklands) (refer **Figure 2**). The site of the proposed action is currently vacant and mostly vegetated.

1.1. Key site details

A summary of the project particulars is provided in **Table 1**.

Table 1: Project summary

Site details	
Address	7001 Mur Boulevard, Springfield, QLD, 4300
Lot/plan	Lot 9999 on SP292760
Area	Total Site Area: 162 ha
Town planning attributes	
Regional plan land use designation	Urban Footprint
Zone	Springfield community residential designation Open space designation
Local plan and precinct	Community residential Open space
Environmental planning attributes	
Vegetation Management Act 1999	Category X (non-remnant) Category B (Least Concern, Of Concern, Endangered) Essential habitat (*Phascolarctos cinereus*, *Ninox strenua*, *Plectranthus habrophyllus*)
Existing land use	Vacant land and natural areas

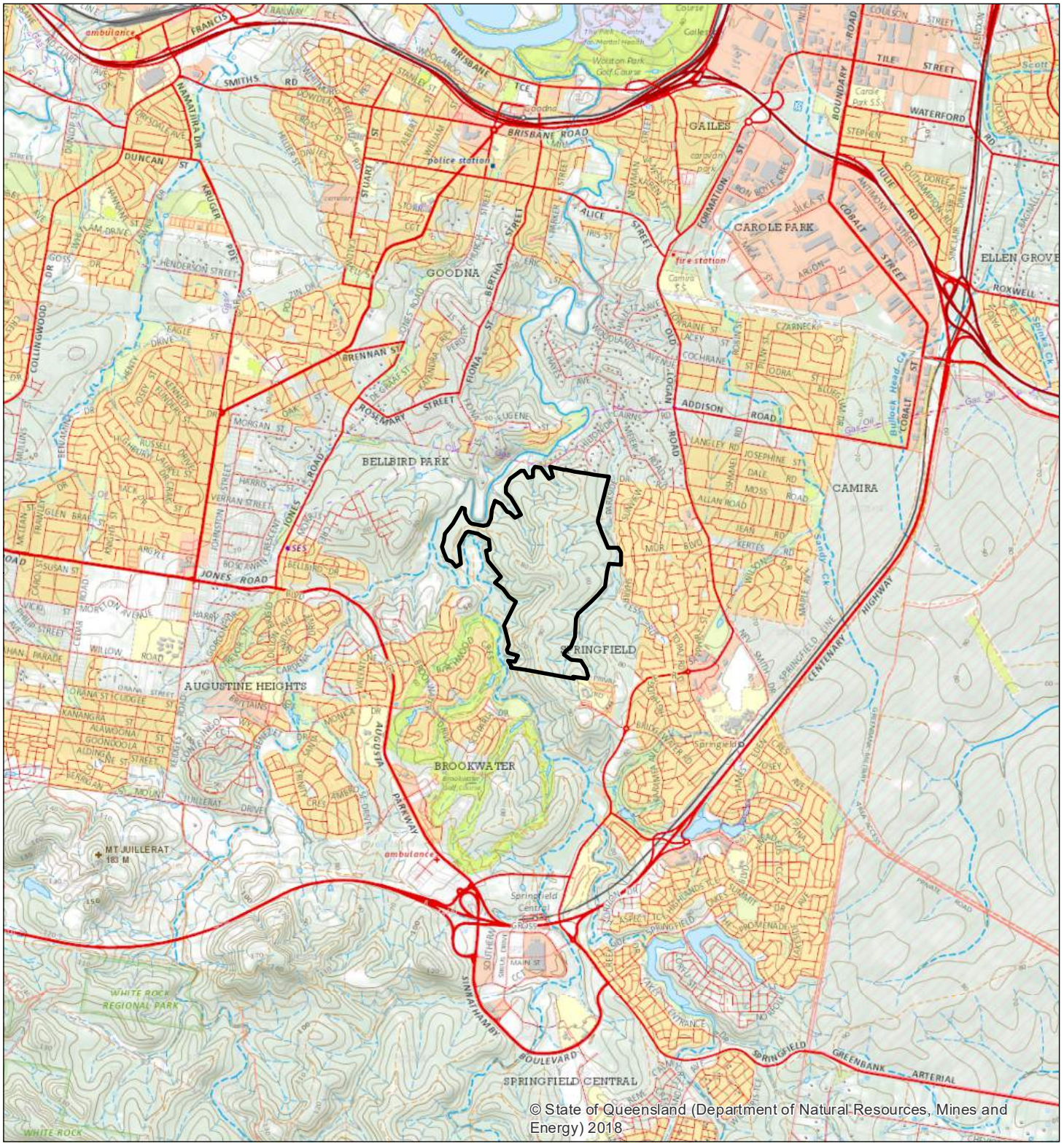
1.2. Purpose

When a person proposes to take an action (*i.e.,* a project), a decision must be made on whether or not to make a referral to the Australian Government Minister of the Environment. The Australian Government Department of the Environment and Energy (the Department) administers the EPBC Act and referral process. To assist the decision-making process, the SIG 1.1 informs proponents on actions that are considered likely to cause a significant impact on MNES and should therefore be referred for assessment under the EPBC Act.

Nine MNES are protected under the EPBC Act, being:

1. World heritage properties;
2. National heritage places;
3. wetlands of international importance (often called 'Ramsar' wetlands after the international treaty under which such wetlands are listed);
4. Nationally threatened species and ecological communities;
5. migratory species;
6. Commonwealth marine areas;
7. the Great Barrier Reef Marine Park;
8. nuclear actions (including uranium mining); and
9. a water resource, in relation to coal seam gas development and large coal mining development.

An assessment has been completed to identify the potential for development to impact MNES, specifically MNES on-site. The Department has published additional referral guidelines for some MNES species and communities and these were considered, where relevant, as part of this review (refer **Section 4**).



Legend

Referral site

Figure 1

Site Locality

Cherish Enterprises Pty Ltd

File ref. 9612 E EPBC Figure 1 Site Locality A
Date *22/10/2019*
Project *Mur Boulevard, Springfield*

0 0.5 1 2 *km*

N

Scale (A4): 1:50,000 [GDA 1994 MGA Z56]

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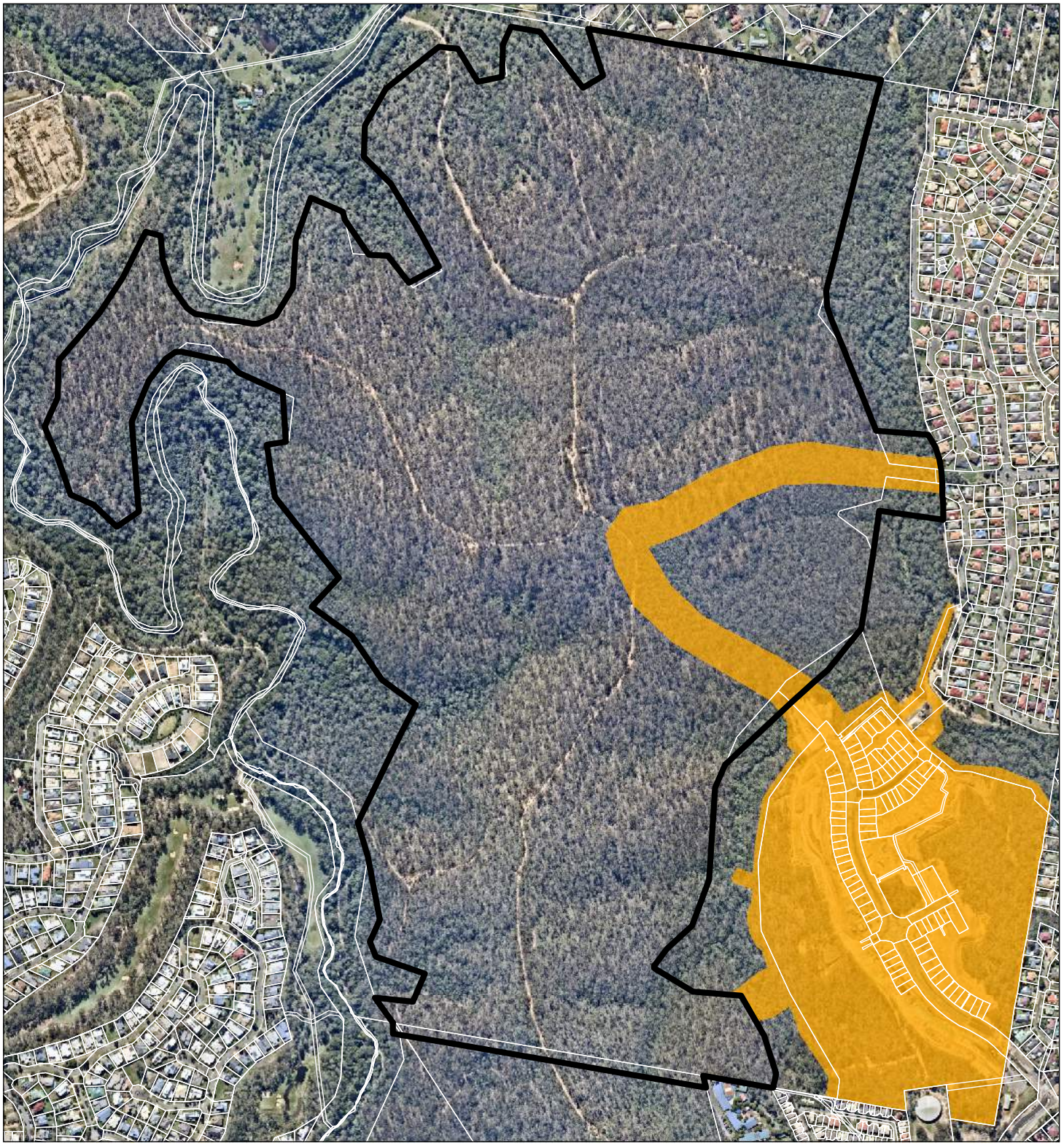
Layer Source: © State of Queensland (Department of Natural Resources, Mines and Energy) 2019.



Legend

- Referral site
- Qld DCDB
- EPBC 2014/7306 approval

Figure 2

Site Aerial

Cherish Enterprises Pty Ltd

File ref. 9612 E EPBC Figure 2 Site Aerial A
Date *22/10/2019*
Project *Mur Boulevard, Springfield*

0 50 100 200 300 400 *m*

N

Scale (A4): 1:10,000 [GDA 1994 MGA Z56]

saunders havill group

Layer Source: © State of Queensland (Department of Natural Resources, Mines and Energy) 2019, Aerial (Nearmap 2019)

2. Methodology and process

The following steps were undertaken in the preparation of this assessment:

1. desktop analysis;
2. field surveys;
3. results and discussion;
4. assessment of impacts relating to MNES; and
5. conclusion and recommendations.

Details of the methodology undertaken for each of the assessment phases is provided in the following subsections.

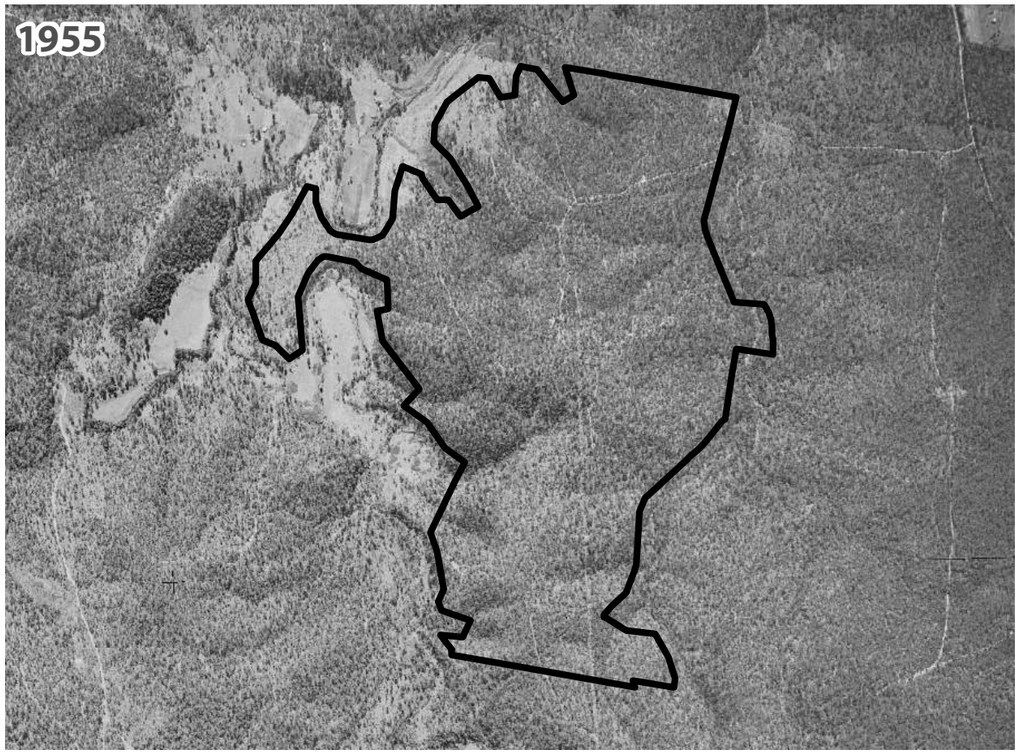
2.1. Desktop analysis methodology

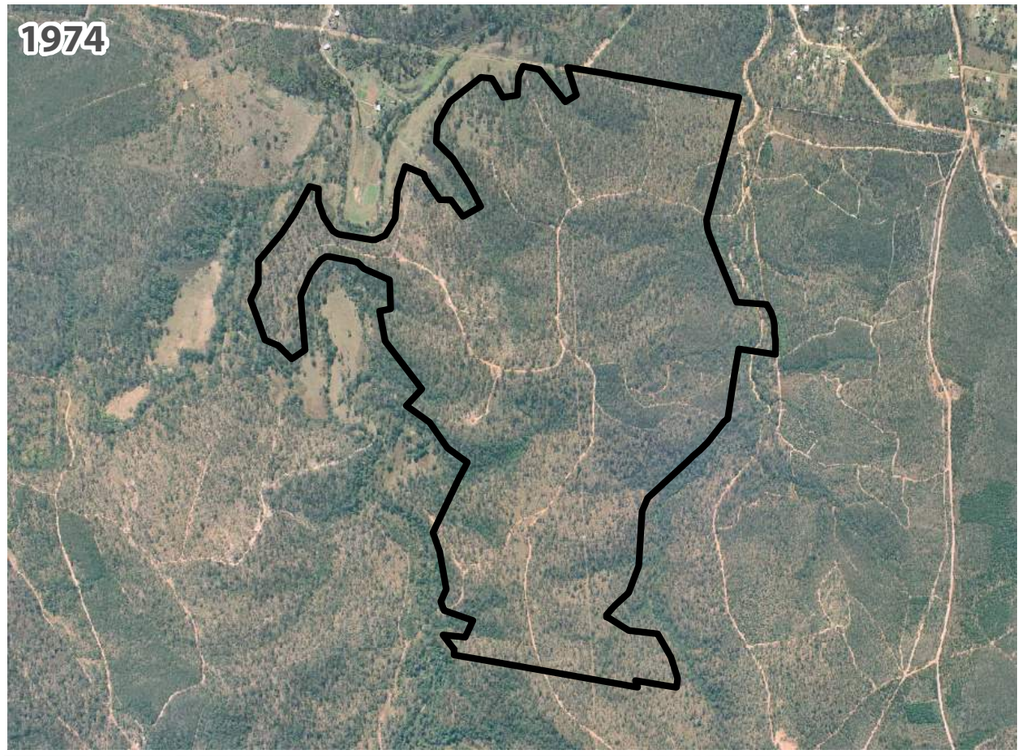
Prior to the commencement of field surveys, a desktop analysis was conducted of Commonwealth, State and Local environmental databases and overlay mapping, and included the following:

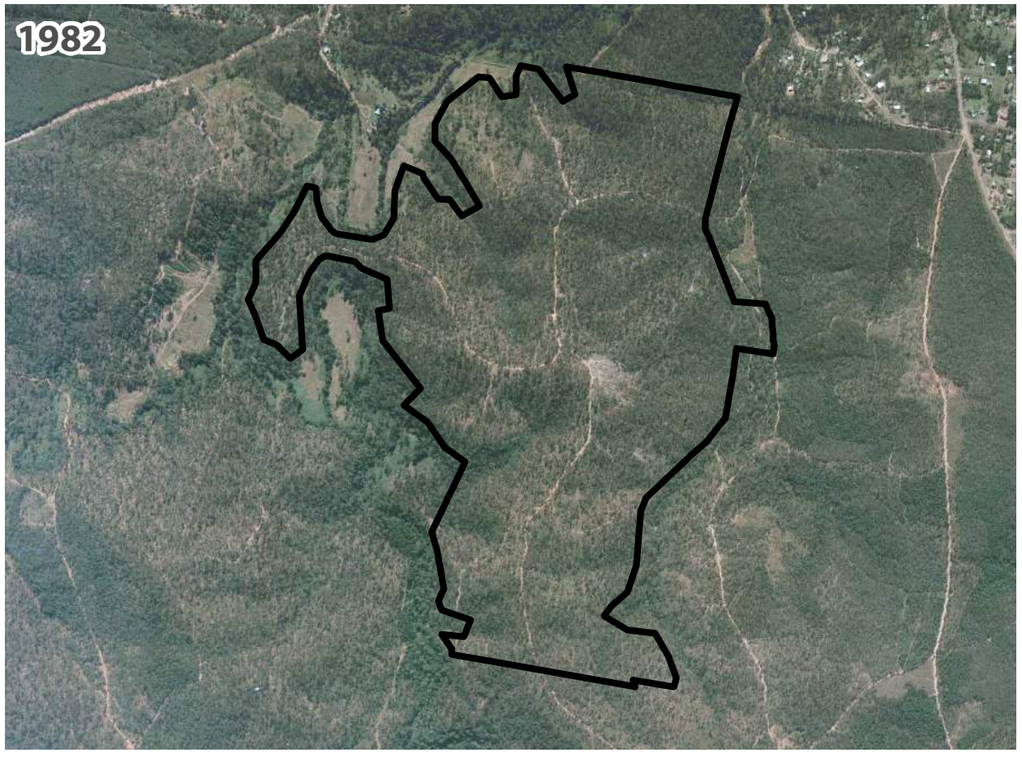
- Commonwealth MNES protected under the EPBC Act on and around the site using the Protected Matters Search Tool (PMST) (**Appendix A**);
- *Nature Conservation Act 1992* (NCA) listed threatened species on and around the site using the wildlife online database search tool (**Appendix B**);
- public environmental databases including Atlas of Living Australia; and
- regulated vegetation management and vegetation supporting maps under the *Vegetation Management Act 1999* (VMA).

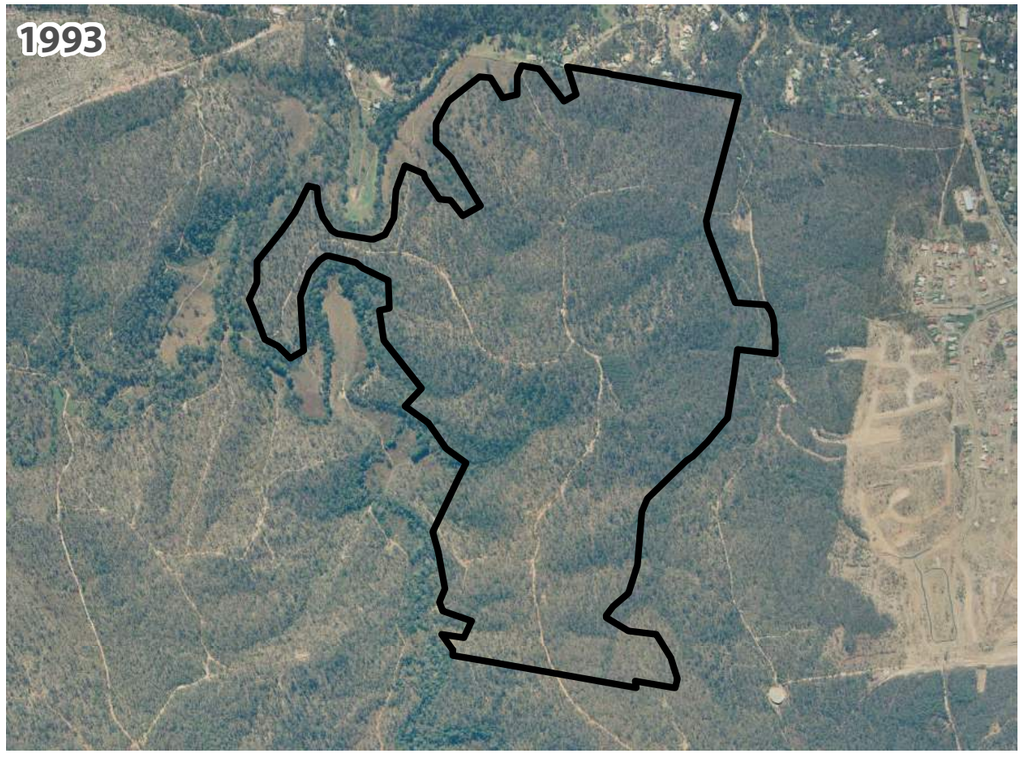
In addition, a review of aerial photography history was undertaken via QImagery to assist with the broad delineation of vegetation communities and to determine historical patterns to local vegetation communities. A review of historical aerial imagery indicates that the property has remained largely intact vegetation, where significant urban development has occurred surrounding the site (refer **Plan 1**).

1. Historical Aerial Imagery









NOTES
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Layer Sources
Qld State Cadastre and Mapping layers © State of Queensland (Department of Natural Resources and Mines) 2019. Updated data available at http://qldspatial.information.qld.gov.au/catalogue//
Aerial Imagery © Nearmap, 2019

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Legend

Referral site

Qld DCDB

Issue	Date	Description	Drawn	Checked
A	22/10/2019	Preliminary	TC	HS

0 200 400 600 m

Transverse Mercator | GDA 1994 | Zone 56 | 1:19,000 @ A3

saunders havill group

Cherish Enterprises Pty Ltd

Mur Boulevard, Springfield

ADDRESS/RPD: Mur Boulevard, Springfield *22/10/2019* *9612 E 01 Aerial History A*

2.2. Field survey methodology

A field survey utilising the following methods was conducted to describe site ecological values and identify the presence or absence of MNES with the potential to occur on-site. The results are presented in **Section 4**.

Three field survey events occurred where ecological assessments were completed across the site; 11 to 15 March, 2019 (autumn), 7 to 16 August, 2019 (winter), and 17 September 2019 (spring). Leading up to the survey events held in March, 2019, weather conditions were monitored to ascertain if the preceding rainfall would result in suitable conditions for the identification of acid frog species.

The field surveys utilised a range of survey methods which are detailed within the following subsections and summarised in **Table 2**. MNES-specific field survey results are detailed in **Section 4** onwards.

Table 2: Field survey method summary

Survey type	11/03/19	12/03/19	13/03/19	14/03/19	15/03/19	07/08/19	15/08/19	16/08/19	17/09/19
Amphibian call playback and recording	✓	-	✓	-	-	-	-	-	-
Baited motion sensor camera traps	✓	✓	✓	✓	✓	-	-	-	-
Bird surveys	✓	✓	✓	✓	✓	-	-	-	-
Diurnal active searches	-	✓	-	-	-	-	-	-	-
Flying-fox roost searches	-	-	✓	-	-	-	-	-	-
Ground-truthing of vegetation communities	✓	✓	-	✓	-	✓	✓	✓	✓
Koala habitat and SAT surveys	-	-	-	✓	✓	-	-	-	-
Observational surveys - opportunistic	✓	✓	✓	✓	✓	✓	✓	✓	✓
Scat, tracks and other traces search	✓	✓	✓	✓	✓	-	-	-	-
Spotlighting – nocturnal surveys	✓	-	✓	-	-	-	-	-	-
Ultrasonic bat call detectors	✓	-	✓	-	-	-	-	-	-

2.2.1 Amphibian call playback and recording

This method detects species that make loud and distinctive vocalisations by call identification. Call detection surveys are carried out by passively listening for calls in suitable habitat, or alternatively eliciting calls by conducting call playback surveys. Call detection and playback are conducted in conjunction with spotlight surveys. Call playback is effective for a range of species that are rarely detected by visual encounter methods (mostly because the species remain hidden) or have restricted calling periods but are aggressive when a conspecific call is played. Volume of call playback should be audible over a distance of approximately 10 metres (m). Use of overly loud broadcast may deter calls in some species.

Call playback surveys were conducted for amphibian species deemed likely to occur in the area (refer **Table 13**). The survey was completed through broadcasting a recording of the target species' call through a speaker at regular intervals from either a fixed point or points along a transect. Targeted call playback for 'acid frogs' was undertaken in suitable habitats on 11 and 13 March 2019.

2.2.2 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.

Birds were surveyed at each trapping site for at least one hour in the morning and afternoon where possible, with incidental observations recorded during other survey activities including spotlighting and opportunistic survey. Birds were identified from either direct observation or by their calls throughout 11 to 15 March 2019.

2.2.3 Baited motion sensor camera trap

Camera trapping involves setting up a fixed digital camera to capture images or video of animals which pass in front of camera or are lured by bait. It is a non-invasive technique ideally designed to detect medium to large sized animals as they pass, although it is possible to detect smaller animals with the right set-up. This set-up identifies fauna activity beyond the scope of direct observational studies and in the absence of potential observer impacts.

Infrared sensing cameras with an infrared flash were deployed, which use motion to trigger. A total of three cameras were installed across the site. Ideally, cameras were attached 30-50 cm from the ground on a tree or post, and directed towards the bait/bait cage which is placed about 1.5 m to 2 m from the camera. The recommended bait is dependent on target species. The cameras were left to record for as long as possible within the survey period, being installed on 11 March and removed on 15 March 2019, meeting the recommended four nights. The programming was consistent across all cameras, and cameras were set up in a consistent manner to maintain similar detection probabilities.

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

2.2.4 Diurnal active searches

Diurnal searches involve intensive investigation of streams, ground layer (under logs, rocks and leaf litter), low vegetation (under bark and tree stumps) and caves (if present) for targeted invertebrates and all amphibians, reptiles, bats and animal signs (*e.g.,* scats, owl pellets, remains and tracks). The individual search spanned a minimum of 30 minutes for each vegetation community and was conducted 1-2 hours at the beginning and end of the day on 12 March 2019. The diurnal search was conducted in conjunction with the morning bird census and during the warmer part of the day when reptile activity was likely to peak.

2.2.5 Flying-fox roost searches

This search was conducted during the day within the survey area, watching for flying-foxes and listening for their distinctive calls. This search is not only for flying-fox camps, but the presence of food plants to assess the potential importance of the survey area to the species. The search for flying-fox roosts was justified due to the proximity of the site to an active Flying-fox camp located at Camira, Barbara Street, approximately 1.3 km north-east of the site.

2.2.6 Ground-truthing of vegetation communities

Vegetation was ground-truthed and assessed against current VMA Regional Ecosystem (RE) mapping. This included reviewing the accuracy and extent of mapped RE types in addition to the broad vegetation condition. Particular attention was made in identifying whether threatened ecological communities (TECs) identified as having the potential to occur on or proximal to the site were present during field survey.

2.2.7 Koala habitat and SAT surveys

These surveys were undertaken on-site in accordance with the methodology developed by the Australian Koala Foundation[1] (AKF) 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 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 non-juvenile tree of any species within the site that is either observed to have a Koala or scats, or is known to be a 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].

[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.

2.2.8 Observational survey for species and communities

The site area was walked to ensure all species (flora and fauna) were recorded and identified. Particular attention was paid to any MNES that were listed as possibly occurring on or within the vicinity of the site and specific micro-assemblages which may support these threatened species. This included observations of vertebrate fauna present on or proximal to the site and species listed as migratory under the EPBC Act.

The observational survey included identification of ecological features and values such as broad vegetation communities, fauna habitats and ecological corridors. Recording fauna habitat features within the project area included the identification of habitat trees. In addition, specific attention was paid to flora and fauna species previously identified on-site.

2.2.9 Scats, tracks and other traces search

Surveys for scats, tracks and other traces were conducted throughout the survey period between 11 and 15 March 2019. 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 for invasive species, such as European Red Fox, was conducted to identify predator-prey interactions and understand existing impacts within the site.

2.2.10 Spotlighting – nocturnal survey

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 nocturnal mammals, birds, reptiles and frogs across the project 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 methodology was completed on 11 and 13 March 2019.

2.2.11 Ultrasonic bat call detectors

Echolocation call detection is an unobtrusive and non-invasive technique used to target areas of interest such as creeks, rocky outcrops and potential flyaways for microbats, and is particularly useful for detecting species in the Rhinolophidae and Hipposideridae families.

An ANABAT II ultrasonic bat call detection unit and associated ZCAIM interface module were also used to capture the calls of insectivorous bat species within representative habitat types on 11 and 13 March 2019.

3. Desktop results

3.1. *Environment Protection and Biodiversity Conservation Act 1999*

Under the EPBC Act, MNES with the potential to occur are listed in the Protected Matters Report (PMR) obtained from the Department using an online search function for the area of interest. For this project, the following inputs were used:

- Coordinates: -27.6449, 152.9039.
- Buffer: 5 km (this equates to approximately a 78.5 km search area).

The results are presented in **Appendix A** and are summarised in **Table 3**. Each record in the PMR has a type of presence nominated, and where the species, species habitat, foraging, feeding or related behaviour is known to occur within the search area (78.5 km buffer area), an asterisk (*) is shown.

Table 3: EPBC Act Protected Matters Report summary

World Heritage Properties	Nil	
National Heritage Places	Nil	
Wetlands of International Importance	1	
Great Barrier Reef Marine Park	Nil	
Commonwealth Marine Area	Nil	
Listed Threatened Ecological Communities	4	
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)		
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland – Critically Endangered (community likely to occur within area)		
Listed Threatened Species	61	
Scientific name	**Common name**	**Status**
Birds		
**Anthochaera Phrygia*	Regent Honeyeater	Critically Endangered
Botaurus poiciloptilus	Australasian Bittern	Endangered
Calidris ferruginea	Curlew Sandpiper	Critically Endangered
Cyclopsitta diophthalma coxeni	Coxen's Fig-Parrot	Endangered
Dasyornis brachypterus	Eastern Bristlebird	Endangered
Diomedea antipodensis	Antipodean Albatross	Vulnerable

Scientific name	Common name	Status
Diomedea antipodensis gibsoni	Gibson's Albatross	Vulnerable
Diomedea exulans	Wandering Albatross	Vulnerable
**Erythrotriorchis radiatus*	Red Goshawk	Vulnerable
Geophaps scripta scripta	Squatter Pigeon (southern)	Vulnerable
Grantiella picta	Painted Honeyeater	Vulnerable
**Hirundapus caudacutus*	White-throated Needletail	Vulnerable
**Lathamus discolor*	Swift Parrot	Critically Endangered
Macronectes giganteus	Southern Giant-petrel	Endangered
Macronectes halli	Northern Giant Petrel	Vulnerable
Numenius madagascariensis	Eastern Curlew	Critically Endangered
Pachyptila turtur subantarctica	Fairy Prion	Vulnerable
Rostratula australis	Australian Painted Snipe	Endangered
Strernula nereis nereis	Australian Fairy Tern	Vulnerable
Thalassarche cauta cauta	Shy Albatross	Vulnerable
Thalassarche cauta steadi	White-capped Albatross	Vulnerable
Thalassarche eremita	Chatham Albatross	Endangered
Thalassarche impavida	Campbell Albatross	Vulnerable
Thalassarche melanophris	Black-browed Albatross	Vulnerable
Thalassarche salvini	Salvin's Albatross	Vulnerable
Turnix melanogaster	Black-breasted Button-quail	Vulnerable
Fish		
Epinephelus daemelii	Black Rockcod	Vulnerable
Frogs		
Mixophyes fleayi	Fleay's Frog	Endangered
Insects		
Argynnis hyperbius inconstans	Australian Fritillary	Critically Endangered
Phyllodes imperialis smithersi	Pink Underwing Moth	Endangered
Mammals		
Chalinolobus dwyeri	Large-eared Pied Bat, Large Pied Bat	Vulnerable
Dasyurus hallucatus	Northern Quoll	Endangered
**Dasyurus maculatus maculatus*	Spot-tailed Quoll	Endangered

Scientific name	Common name	Status
**Petauroides volans*	Greater Glider	Vulnerable
Petrgale penicillata	Brush-tailed Rock-wallaby	Vulnerable
**Phascolarctos cinereus*	Koala	Vulnerable
Potorous tridactylus tridactylus	Long-nosed Potoroo	Vulnerable
**Pteropus poliocephalus*	Grey-headed Flying-Fox	Vulnerable
Plants		
Bosistoa transversa	Three-leaved Bosistoa	Vulnerable
Corchorus cunninghamii	Native Jute	Endangered
Cupaniopsis shirleyana	Wedge-leaf Tuckeroo	Vulnerable
Cupaniopsis tomentella	Boonah Tuckeroo	Vulnerable
Cycas ophiolitica	-	Endangered
Dichanthium setosum	Bluegrass	Vulnerable
**Macadamia integrifolia*	Macadamia Nut	Vulnerable
Macadamia tetraphylla	Rough-shelled Bush Nut	Vulnerable
Notelaea ipsviciensis	Cooneana Olive	Critically Endangered
Notelaea lloydii	Lloyd's Olive	Vulnerable
Phaius australis	Lesser Swamp-orchid	Endangered
**Plectranthus habrophyllus*	-	Endangered
Samadera bidwillii	Quassia	Vulnerable
Thesium australe	Austral Toadflax	Vulnerable
Reptiles		
Delma torquata	Adorned Delma	Vulnerable
Furina dunmalli	Dunmall's Snake	Vulnerable
Saiphos reticulatus	Three-toed Snake-tooth Skink	Vulnerable
Listed migratory species	36	
Scientific name	**Common name**	**Status**
Migratory Marine Birds		
Apus pacificus	Fork-tailed Swift	-
Ardenna grisea	Sooty Shearwater	-
Migratory Terrestrial Species		
Cuculus optatus	Oriental Cuckoo	-

Scientific name	Common name	Status
**Monarcha melanopsis*	Black-faced Monarch	-
**Monarcha trivirgatus*	Spectacled Monarch	-
Motacilla flava	Yellow Wagtail	-
**Myiagra cyanoleuca*	Satin Flycatcher	-
**Rhipidura rufifrons*	Rufous Fantail	-
Migratory Wetlands Species		
**Actitis hypoleucos*	Common Sandpiper	-
**Calidris acuminata*	Sharp-tailed Sandpiper	-
**Calidris melanotos*	Pectoral Sandpiper	-
Gallinago hardwickii	Latham's Snipe	-
**Pandion haliaetus*	Osprey	-
Tringa nebularia	Common Greenshank	-

Note: Species of Shark, Turtle, and Whale, and those listed as Migratory Marine Species, are not included as suitable habitat was known not to occur on-site.

3.2. Other databases/sources

3.2.1 *Nature Conservation Act 1992* – Wildlife Online

A Wildlife Online extract was obtained from the Queensland Government Department of Environment and Science to ascertain the State's confirmed records of MNES in the project area and vicinity since the year 1980. The search parameters were as follows:

- coordinates: -27.6449, 152.9039;
- buffer: 5 km (this equates to approximately a 78.5 km search area);
- all flora and fauna;
- native only;
- threatened and near-threatened status only;
- confirmed records only; and
- more recent records (only records since 1980).

Three MNES species were listed as confirmed records in the search areas via the Wildlife Online search tool:

1. *Hirundapus caudacutus* (White-throated Needletail).
2. *Phascolarctos cinereus* (Koala).
3. *Plectranthus habrophyllus* (Plectranthus).

A copy of these searches results is provided in **Appendix B**. These species are captured in **Table 3**, and the PMR indicates that the Koala and White-throated Needletail is known to occur within the search area. Further, *Plectranthus habrophyllus* (Plectranthus) is known to occur within the search area and Springfield locality. The Wildlife Online extract did not identify additional MNES for consideration.

3.2.2 Regional ecosystem mapping

Regional Ecosystem (RE) mapping published under the VMA was obtained and reviewed to ascertain the potential for TECs to occur on-site. RE's are indicators of whether a TEC is present. The mapping indicated eight REs with the potential to occur on-site (refer **Table 4**).

Table 4: Regional ecosystem description

Regional ecosystem	Description
12.3.3	*Eucalyptus tereticornis* woodland on Quaternary alluvium
12.3.7	*Eucalyptus tereticornis*, *Casuarina cunninghamiana subsp. cunninghamiana* +/- *Melaleuca spp*. fringing woodland
12.3.16	Complex notophyll to microphyll vine forest on alluvial plains
12.9-10.2	*Corymbia citriodora subsp. variegata* +/- *Eucalyptus crebra* open forest on sedimentary rocks
12.9-10.7	*Eucalyptus crebra* +/- *E. tereticornis*, *Corymbia tessellaris*, *Angophora spp*., *E. melanophloia* woodland on sedimentary rocks
12.9-10.15	Semi-evergreen vine thicket with *Brachychiton rupestris* on sedimentary rocks
12.9-10.17	*Eucalyptus acmenoides*, *E. major*, *E. siderophloia* +/- *Corymbia citriodora subsp. variegata* woodland on sedimentary rocks
12.9-10.19	*Eucalyptus fibrosa subsp. fibrosa* woodland on sedimentary rocks

None of the RE's listed in **Table 4** are confirmed or potential representations of a TEC. However, RE12.3.16 is associated with RE12.3.1[2] where its presence is potentially associated with the occurrence of Lowland Rainforest of Subtropical Australia (LRSA) TEC. The LRSA TEC has been ground-truthed during field surveys, and is presented in **Plan 2**. The area where this TEC was observed has been subject to extensive rehabilitation works where species consistent with the LRSA TEC have been incorporated in revegetation works.

Historical aerial imagery indicates that the property has remained as intact vegetation, where evidence of past internal logging has occurred and internal access tracks have been created (refer **Plan 1** for historical aerial imagery). Review of the imagery shows land surrounding the site has been disturbed for agricultural practices and residential development as part of the wider Springfield City area. Although the property has been maintained as intact vegetation, connectivity opportunities have been significantly reduced due to ongoing

[2] Queensland Government 2018, *Regional ecosystem details for 12.3.1*, The State of Queensland 1995-2019, accessed 22/03/2019.

development across the local area. High density development exists adjacent to the site properties and a number of highly frequented roads and Centenary Highway are situated proximal to the site.

3.3. MNES of particular interest

Subsequent to the above desktop results, the field survey assessments sought to identify habitat opportunities, observe species presence and activity, and target searches for evidence of usage by MNES flora and fauna species. This was aided by the preliminary assessment of the likelihood of occurrence for each MNES, with species identified as *may*, *likely* or *known* to occur becoming the focus of the field survey effort. At this point, many species were also considered *unlikely* to occur on-site due to the lack of suitable habitat inferred as present on-site during desktop analysis. However, the presence or absence of a species was not confirmed until after the field surveys ascertained site habitat particulars.

Hence, the MNES targeted during field surveys as a result of the likelihood of occurrence table or previous site recordings are listed in **Table 5**.

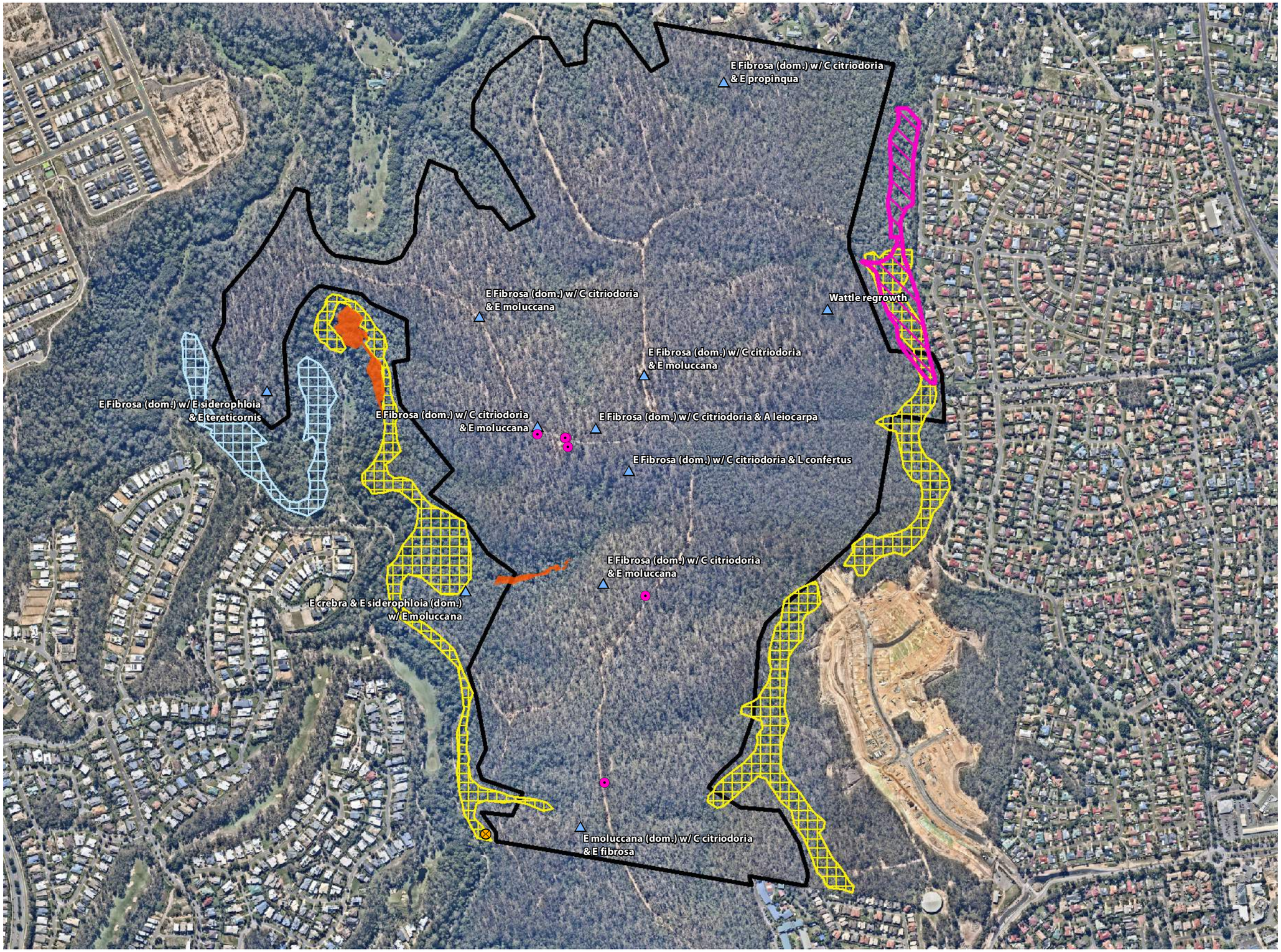
Table 5: MNES targeted based on desktop results

Scientific name	Common name	Likelihood of occurrence (on-site)
Flora		
Macadamia integrifolia	Macadamia Nut	May
Plectranthus habrophyllus	-	Likely
Streblus pendulinus	Siah's Backbone	Unlikely
Fauna		
Anthochaera phrygia	Regent Honeyeater	May
Lathamus discolor	Swift Parrot	May
Mixophyes fleayi	Fleay's Frog	Unlikely
Phascolarctos cinereus	Koala	Likely
Pteropus poliocephalus	Grey-headed Flying-fox	May
*Rhipidura rufifrons**	Rufous Fantail	Known
*Merops ornatus**	Rainbow Bee-eater	May
Listed Threatened Ecological Communities		
Lowland Rainforest of Subtropical Australia – Critically Endangered (community may occur within the area)		Likely

*Listed under EPBC Act as Migratory or Marine.

Results of targeted surveys are discussed in **Section 4** and **Section 5**.

2. Ground-truthed Vegetation Communities



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Layer Sources
Qld State Cadastre and Mapping layers © State of Queensland (Department of Natural Resources and Mines) 2019. Updated data available at http://qldspatial.information.qld.gov.au/catalogue//
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Legend

- Referral site
- Qld DCDB

Field survey comfirmed

- Endangered RE 12.3.3
- Ground-truthed RE 12.3.16 (LRSA TEC Indicator)
- Vegetation canopy
- Marsdenia coronata location
- Plectranthus habrophyllus location
- Lantana dom. waterway
- Camphor laurel/Chinese elm dom.

Issue	Date	Description	Drawn	Checked
A	22/10/2019	Preliminary	TC	HS

0 40 80 160 240 320 m

Transverse Mercator | GDA 1994 | Zone 56 | 1:8,500 @ A3

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Cherish Enterprises Pty Ltd

Mur Boulevard, Springfield

ADDRESS/RPD: Mur Boulevard, Springfield *22/10/2019* *9612 E 02 Vegetation Communities A*

4. Ecological survey results and discussion

One Senior Ecologist and one Ecologist from SHG assessed the project area throughout the survey period. The surveys were completed across 9 days from 11 to 15, March 2019 inclusive, and 7, 15 and 16 August, and 17 September, 2019. The surveys consisted of day and night surveys, where the identification of fauna and flora and their presence on-site were focused upon.

During the surveys, the entire site was traversed multiple times to identify and record all vegetation communities and species. Particular attention was paid to threatened flora and habitat for threatened fauna species that were listed as possibly occurring on or within the vicinity of the site area, and specific micro-assemblages which may support these threatened species (listed in **Table 5**).

The weather conditions during the field survey assessment are summarised in **Table 6**. As shown in **Table 7**, some rainfall occurred prior to the completion of frog surveys, however, the amount of rainfall received is not considered to be optimal in accordance with the EPBC Act's *Survey guidelines for Australia's threatened frogs* for attaining an accurate understanding of acid frog populations. Hence, opportunistic surveys were completed on-site where possible within identified potential habitat.

Table 6: Summary of field survey weather conditions

	11/03/19	12/03/19	13/03/19	14/03/19	15/03/19	07/08/19	15/08/19	16/08/19	17/09/19
Min. temp	20.7°C	20.5°C	18.1°C	22.0°C	18°C	6.8	2.9	5.7	9.7
Max. temp	37.9°C	40.9°C	36.4°C	31.9°C	34.6°C	23.1	24.3	26.0	30.9
Rainfall	0 mm	0.2 mm	0 mm	0 mm	-	0 mm	0.6 mm	0 mm	0 mm

*Source Bureau of Meteorology (BoM) 2019 – Station 140009 Greenbank (Defence).

Table 7: Daily rainfall data recorded at Station 140009 (Greenbank [Defence], BoM 2019)

Date	Daily rainfall (mm)	Acid frog survey conducted
01/03/19	1.6	-
02/03/19	5.6	-
03/03/19	2.8	-
04/03/19	0.2	-
05/03/19	0	-

Date	Daily rainfall (mm)	Acid frog survey conducted
06/03/19	0	-
07/03/19	0	-
08/03/19	8.8	-
09/03/19	0.2	-
10/03/19	0	-
11/03/19	0	Yes
12/03/19	0.2	Yes
13/03/19	0	Yes
14/03/19	0	Yes
15/03/19	-	Yes

4.1. General observations

The following observations have been made based on detailed field surveys.

- The site is surrounded by a highly modified environment, consisting of an education facility to the east, residential development, a golf course, and patches of intact vegetation. Areas of the site have been exposed to weed invasion and evidence of historical logging was observed across the entire site. Drainage lines are mapped within the proposed action area and were not observed to retain pooled water during field survey. Woogaroo Creek lies adjacent to the north-western boundary and Opossum Creek is situated adjacent to the western and south-western boundary. An unnamed waterway is situated adjacent to the eastern boundary in a north-south direction traversing a small section of the subject area. The creeks were observed to contain some pooled water, where Woogaroo and Opossum Creeks were considered to contain some potential frog habitat values. Rocky habitat was recorded in association with the drainage lines on-site and western ridgelines, providing potential habitat for reptiles and small mammals. Internal access tracks exist across the site and heavy rainfall events have resulted in erosion and scouring.
- Over 150 ha of the site is mapped Category B (remnant) vegetation and approximately 3.5 ha is Category X (non-remnant) vegetation. There is a lack of significantly sized trees across the site due to past land uses resulting in modification of natural vegetation features. Dominant canopy species across the site included *Eucalyptus crebra* (Narrow-leaved Ironbark), *Eucalyptus moluccana* (Gum-topped Box) and *Corymbia citriodora* (Spotted Gum). Other species included *Eucalyptus propinqua* (Grey Gum), *Lophostemon confertus* (Brush Box), *Cinnamomum camphora* (Camphor Laurel), *Acacia disparrima* (Hickory Wattle) and *Eucalyptus fibrosa* (Broad-leaved Red Ironbark). *Lantana camara* (Lantana) was present in varying densities in association with the drainage lines across the site and within the creeks located off-site. Vegetation within the shrub layer was largely absent from the site, where it was mostly restricted to gullies and to isolated patches across the site.

- The topography of the site ranges from 30 m above sea level (ASL) around the boundary of the site to 90 m in the central-southern extent of the site.
- Overall, the majority of the project area was found to comprise intact vegetation, although the shrub and ground layers were largely absent. Revegetation efforts was evident in the riparian zone of Opossum Creek, adjacent to the western proposed action boundary.

4.2. Flora survey results

The following section outlines flora observations made based on detailed field surveys.

The EPBC Act PMR (refer **Section 3.1**) identified four TECs considered to have potential to occur on-site. These are described as 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, and White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland.

Endangered RE12.3.16 is mapped in the central-western extent of the site and to the west of the proposed action boundary. This RE contains species reflective of the LRSA TEC and these species were observed within the proposed action bounds (refer **Photo set 1**). Revegetation works are evident in the Endangered RE12.3.16 to the west of the site associated with past rehabilitation efforts (further discussed in **Section 6**). Both LRSA TEC locations were ground-truthed during ecological survey to have slight discrepancies compared to mapped boundary extents (refer **Plan 2**). The rehabilitated TEC located to the west of the site was situated proximal to a waterway, and was bordered by mature *Cinnamomum camphora* (Camphor Laurel) specimens, potentially restricting the area of the TEC. The LRSA TEC located on-site is situated within the lowest section of a gully line.

The EPBC Act PMR listed 14 threatened native flora species considered to have potential to occur on-site or within a 5 km radius of a central point within the site (refer **Section 3.1** for search coordinates). Two of these flora species were observed and recorded during the field surveys, *Plectranthus habrophyllus* (Plectranthus) (refer **Photo set 2**) and *Macadamia integrifolia* (Macadamia Nut) (refer **Photo 3**). Plectranthus specimens were not observed within the proposed action area, being situated off-site adjacent to the south-western corner. Three small patches were observed in this location measuring approximately 1 m^2. A perimeter was walked around each patch and the location is shown in **Plan 2**. One individual Macadamia Nut specimen was recorded outside of the proposed action area within the ground-truthed rehabilitated LRSA TEC (refer **Plan 2**). It is unclear whether the Macadamia Nut specimen has been planted as part of the rehabilitation efforts, or if it is naturally occurring. Despite search efforts, no additional Macadamia Nut specimens were identified on or adjacent to the site. No threatened flora species listed under the EPBC Act were identified within the proposed action.


Photo set 1: **Species consistent with LRSA TEC on-site.**

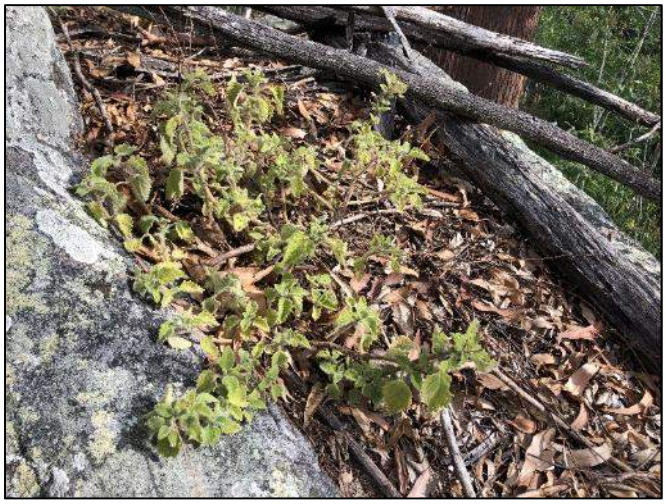



Photo set 2: ***Plectranthus habrophyllus*** **specimens observed off-site, adjacent to the south-western boundary.**

Photo 3: ***Macadamia integrifolia*** **(Macadamia Nut) observed adjacent to western site boundary.**

Regional ecosystem mapping shows the site is mapped mostly as Category B (remnant) composite RE12.9-10.2/12.9-10.7/12.9-10.19 (60/20/15). Small portions of Least Concern RE12.9-10.17, and Endangered RE12.3.16, RE12.9-10.15 and composite RE12.3.7/12.3.3 (80/20) exists extending across part of the northern, eastern and western site boundaries. Vegetation on-site was mostly reflective of this mapping, where Endangered RE12.3.16 (regional ecosystem reflective of LRSA TEC) was ground-truthed to have some discrepancies with the mapped extents. The dominant vegetation communities observed on-site largely consisted of eucalypt and corymbia species (refer **Photo set 4**).

Native vegetation on-site included, *Eucalyptus fibrosa* (Broad-leaved Ironbark), *Eucalyptus crebra* (Narrow-leaved Ironbark), *Eucalyptus siderophloia* (Northern Grey Ironbark), *Corymbia citriodora* (Spotted Gum), *Eucalyptus propinqua* (Grey Gum), *Eucalyptus tereticornis* (Forest Red Gum) and *Eucalyptus moluccana* (Box-topped Gum). Although the sub-canopy and shrub layer across the site was largely lacking, where present, species composition included *Lophostemon confertus* (Swamp Box), *Acacia leiocalyx* (Early Flowering Wattle), *Alphitonia excelsa* (Soap Tree) and *Acacia fimbriata* (Fringing Wattle).

Across the site, the presence of significant sized trees (*i.e.*, greater than 400 mm DBH) was lacking, a potential consequence of historical logging and site modification. A total of 119 flora species were recorded on-site, consisting of 94 native species and 25 introduced species (refer **Table 8** and **Table 9**, respectively).

Eight waterway assessments including photo sets were completed across the site (refer **Plan 3**). Vegetation within and proximal to the mapped water features within the western extent of the site, typically included *Mallotus phillipensis* (Red Kamala) and *Lomandra hystrix* (Green Mat Rush), where *Celtis sinensis* (Chinese Elm) and *Cinnamomum camphora* (Camphor Laurel) were commonly observed along the banks. Varying intensities of Lantana infestation were observed proximal to the centreline of water features, with higher densities occurring on the lower banks adjacent to rehabilitated areas. Other species included *Lomandra multiflora* (Mat Rush), *Phyllanthus microcladus* (Small-leaved Phyllanthus) and *Adiantum hispidulum* (Rough Maiden Hair Fern). Water features along the western boundary contained woody debris although there was a lack of pooled water. Water features mapped along the eastern extent of the site were observed to be dry and highly eroded – anticipated to be a result of high-flow periods. Woogaroo and Opossum Creeks situated outside of the proposed action were observed to have water pooling and aquatic fauna habitat features (*e.g.* submerged woody debris, overhanging and submerged vegetation, undercut banks).

Photo set 4: Vegetation and topography characteristic of a large portion of the subject site.

4.2.1 Endangered RE12.3.7/12.3.3 Polygon (Eastern Property Boundary)

A composite RE community containing 80% Of Concern RE12.3.7 and 20% Endangered RE12.3.3 is mapped proximal to the north-eastern property boundary of Lot 999 on SP292760. This RE community is associated with a mapped waterway which flows north towards Woogaroo Creek.

The Endangered RE community forms a boundary to another composite RE community mapped as containing 65% Least Concern RE12.9-10.2, 20% Of Concern RE12.9-10.7 and 15% Least Concern RE12.9-10.19. Due to the slope and topography within the area assessed, the land zone changes were relatively distinct, with confirmation also through species diversity. Alluvium is defined as sediment mass deposited from channelled stream flow or over-bank stream flow[3]. It is these characteristics that have contributed to the refined mapping within this portion of the site and accurately delineate between the elements that form the Endangered RE as well as those characteristics which form the adjacent Of Concern communities on land zone 9-10.

The following elements were recorded on site:

- The mapped waterway containing the mapped Endangered RE contains a canopy dominated by *Eucalyptus tereticornis* (Forest Red Gum) and *Angophora floribunda* (Rough-barked Apple) with the flow path containing scattered patches of *Casuarina cunninghamiana* (River She Oak), *Lophostemon suaveolens* (Swamp Box) and *Melaleuca quinquenervia* (Broad-leaved Paperbark) (refer **Photo set 5** and **Photo 6**). These elements are confined to the main waterway further east adjacent to the property boundary.
- Other species recorded within the canopy of the Endangered RE include *Eucalyptus moluccana* (Gum Topped Box), *Celtis sinensis* (Chinese Elm) and *Cinnamomum camphora* (Camphor Laurel).
- The western portion of the mapped polygon does not contain elements of the Endangered RE and is dominated by *Eucalyptus siderophloia* (Grey Ironbark) (refer **Photo set 7**). Although characteristics including deposited material were identified along the actual flow path, the adjacent embankments form part of the adjacent land zone 9-10 and include flora species representing the Of Concern RE12.9-10.7. Very few canopy species were located within the area containing elements of land zone 3 within the western portion of the current mapped polygon.
- The proposed changes to the boundary of the Endangered RE are a result of the dominance of *Eucalyptus tereticornis* (Forest Red Gum) located on land zone 3, and are presented in **Plan 2**.

4.2.2 Endangered Polygons along Western Property Boundary.

These polygons are associated with both land zone 3 and land zone 9-10. All Endangered RE communities, including RE12.9-10.15, RE12.9-10.16 and RE12.3.3, were identified along or adjacent to the property boundary. The edge of each Endangered RE polygons has been located with GPS and ground-truthed (refer **Plan 2**).

Field survey identified the edge of the southernmost portion of the polygon is significantly larger than what is mapped within the current RE mapping and continues north along Opossum Creek (refer **Plan 2**). This area

[3] Speight, J.G. and Isbell, R.F. 2009, "Substrate", in *Australian soil and land survey field handbook (3rd edn)*, CSIRO Publishing, Melbourne.

is located mostly outside of the proposed action. The species which represent this Endangered RE are largely representative within the sub-canopy layer with an overstory dominated by *Eucalyptus siderophloia* (Grey Ironbark) (refer **Photo set 8**).

Endangered RE12.3.16 is recognised as being a regional ecosystem containing flora species reflective of the LRSA TEC. During field survey, the presence of this RE on-site was confirmed traversing the central-western boundary. The ground-truthed extent of RE12.3.16 shows the RE is narrow and restricted largely to the gully line (refer **Plan 2**). Current mapping indicates flora species consistent with this RE continue along Opossum Creek in a northward direction, however, this was ground-truthed to have some discrepancies. Two discontinued patches of vegetation reflective of RE12.3.16 were defined during field survey, where one was recorded entirely off-site to the west of the site (refer **Plan 2**).

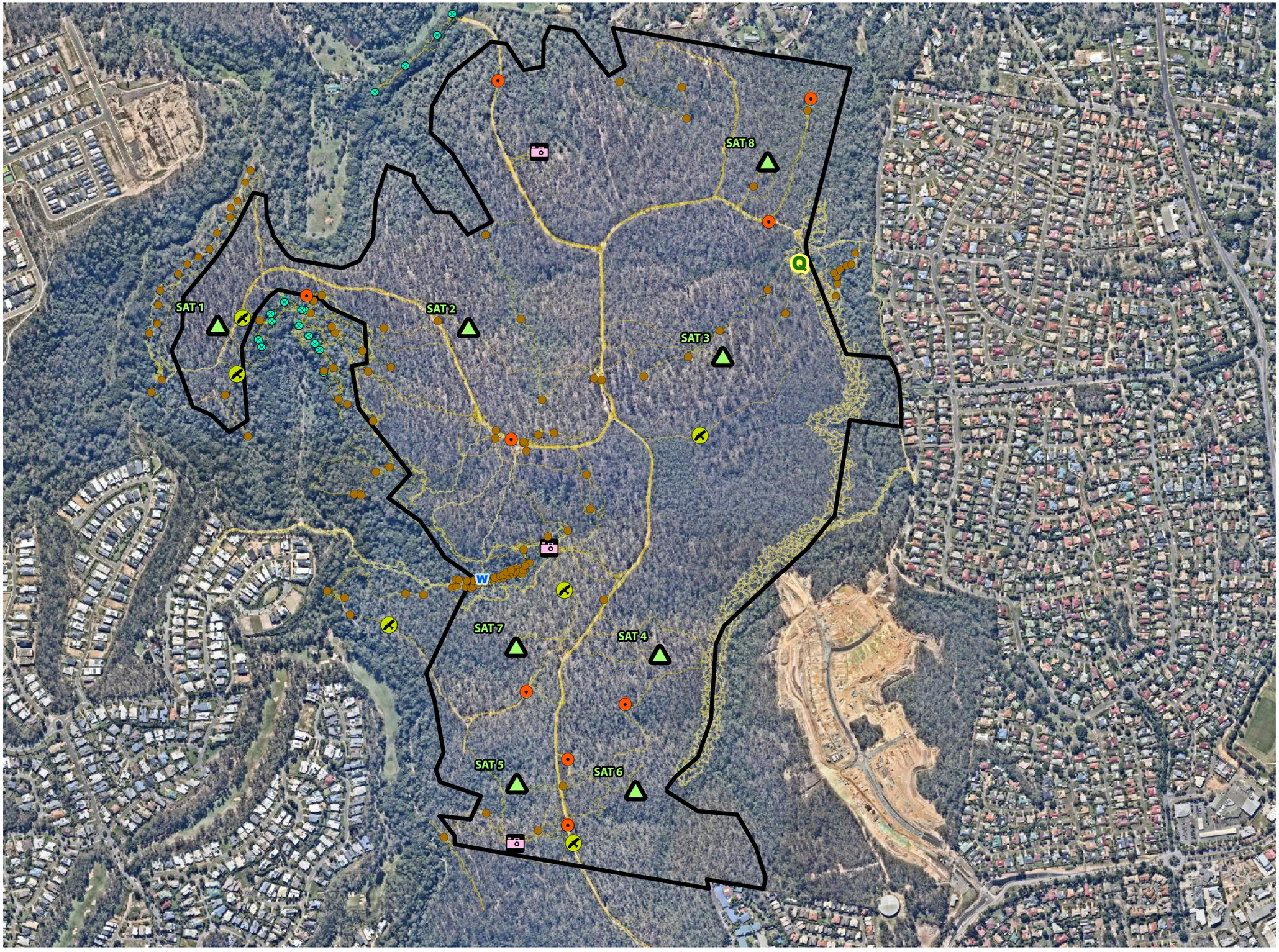
Photo set 5: **Vegetation associated with the mapped watercourse.**

Photo 6: **Vegetation characteristics within Endangered regional ecosystem polygon.**

Photo set 7: **Vegetation dominated by *Eucalyptus siderophloia* (Grey Ironbark) currently within the mapped Endangered regional ecosystem.**

Photo set 8: **Species characteristic of Endangered RE communities within the western site extent.**

3. Field Survey Effort



NOTES
This plan was prepared as a desktop assessment tool.
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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) 2019. Updated data available at http://qldspatial.information.qld.gov.au/catalogue//
Aerial Imagery © Nearmap, 2019

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Legend

- Referral site
- Qld DCDB

Field survey locations

- Bird survey
- Frog survey
- Mircobat survey
- Motion sensor camera
- SAT
- Vegetation quaternary assessment
- Waterway assessment
- General obsersvation record
- Tracklog

Issue	Date	Description	Drawn	Checked
A	22/10/2019	Preliminary	TC	HS

0 50 100 200 300 m

Transverse Mercator | GDA 1994 | Zone 56 | 1:8,500 @ A3

saunders havill group

Cherish Enterprises Pty Ltd

Mur Boulevard, Springfield

ADDRESS/RPD: Mur Boulevard, Springfield *22/10/2019* *9612 E 03 Field Survey Effort A*

4.2.3 Threatened flora

For the purposes of this assessment, a significant flora species has been defined as a species that is:

- scheduled as 'critically endangered', 'endangered', 'vulnerable' or conservation dependent under the EPBC Act.

Potential habitat for MNES species *Plectranthus habrophyllus* (Plectranthus) and *Macadamia integrifolia* (Macadamia Nut) was observed on-site. *Plectranthus habrophyllus* specimens have previously been recorded to the south of the proposed action area, and was again observed at this location in three individual patches during this field survey effort. No specimens were observed within the proposed action area during field survey effort (refer **Section 10** for details, and **Plan 2** for location). One isolated Macadamia Nut specimen was observed within the ground-truthed LRSA TEC to the west of the proposed action (**Plan 2**). Due to the isolated state of the Macadamia Nut specimen, location being outside the subject site, and extensive field surveys failing to record additional Macadamia Nut specimens across the proposed action area, it is considered unlikely that the specimen or species will be impacted by the proposed action.

It should be noted that extensive surveys were undertaken to identify any *Streblus pendulinus* (Siah's Backbone) specimens within or proximal to the proposed action impact area. However, no individuals were recorded during detailed field survey. Due to the lack of confirmed sightings within the local area, and the recorded natural distribution being restricted to Norfolk Island (Department of the Environment 2019), it is considered highly unlikely the species would occur within the proposed action area, nor would the species' population be impacted as a result of the action.

No additional MNES flora were encountered on-site during field survey. A list of native flora is provided in **Table 8**, and weed / introduced flora species are presented in **Table 9**.

Table 8: Native flora species list

Scientific name	Common name	EPBC Act status
Acacia concurrens	Black Wattle	
Acacia disparrima	Hickory Wattle	
Acacia fimbriata	Fringed Wattle	
Acacia leiocalyx	Early-flowering Black Wattle	
Acacia maidenii	Maiden's Wattle	
Acacia podalyriifolia	Silver Wattle	
Adiantum hispidulum	Rough Maidenhair Fern	
Alchornea ilicifolia	Native Holly	
Allocasuarina littoralis	Black Sheoak	
Alphitonia excelsa	Red Ash	
Alyxia ruscifolia	Chain Fruit	

Scientific name	Common name	EPBC Act status
Angophora leiocarpa	Smooth-barked Apple	
Aphananthe philippinensis	Rough-leaved Elm	
Araucaria cunninghamii	Hoop Pine	
Brachychiton acerifolis	Illawarra Flame Tree	
Brachychiton discolor	Lace Bark Tree	
Breynia oblongifolia	Coffee Bush	
Callitris glaucophylla	White Cypress-pine	
Casuarina cunninghamiana	River Sheoak	
Cayratia cleatidea	Slender Grape	
Clematicissus opaca	Forest Grape	
Cordyline rubra	Cordyline	
Corymbia citriodora	Spotted Gum	
Corymbia intermedia	Pink Bloodwood	
Corymbia tessellaris	Moreton Bay Ash	
Cupaniopsis anarcoides	Tuckeroo	
Cyanthilium cinereum	Vernonia	
Cymbopogon refractus	Barbwire Grass	
Desmodium rhytidophyllum	Hairy Trefoil	
Dianella caerulea	Blueberry Lilly	
Drypetes deplanchei	Yellow Tulip	
Entolasia stricta	Wiry Panic	
Erythrina vespertilio	Bat Wing Coral Tree	
Eucalyptus acmenoides	White Mahogany	
Eucalyptus carnea	Broad-leaved White Mahogany	
Eucalyptus cloeziana	Gympie Messmate	
Eucalyptus crebra	Narrow-leaved Ironbark	
Eucalyptus fibrosa	Red Ironbark	
Eucalyptus grandis	Flooded Gum	
Eucalyptus microcorys	Tallowwood	
Eucalyptus moluccana	Gum-topped Box	
Eucalyptus propinqua	Grey Gum	

Scientific name	Common name	EPBC Act status
Eucalyptus saligna	Sydney Blue Gum	
Eucalyptus seeana	Narrow-leaved Red Gum	
Eucalyptus siderophloia	Northern Grey Ironbark	
Eucalyptus tereticornis	Forest Red Gum	
Eustrephus latifolius	Wombat Berry	
Ficus fraseri	Sandpaper Fig	
Ficus obliqua	Small-leaved Fig	
Flindersia australis	Crows Ash	
Gahnia aspera	Rough Saw-sedge	
Geitonoplesium cymosum	Scrambling Lilly	
Glochidion ferdinandi	Cheese Tree	
Goodenia rotundifolia	Star Goodenia	
Grevillea robusta	Silky Oak	
Heteropogon contortus	Black Speargrass	
Imperata cylindrica	Blady Grass	
Jagera pseudorhus	Foam Bark	
Juncus usitatus	Common Rush	
Lomandra hystrix	Green Mat-rush	
Lomandra longifolia	Mat Rush	
Lomandra multiflora	Many-headed Mat Rush	
Lophostemon confertus	Brush Box	
Lophostemon suaveolens	Swamp Box	
Lygodium microphyllum	Climbing Maidenhairs Fern	
Macadamia integrifolia	Macadamia Nut	Endangered
Maclura cochinchinesis	Cockspur Thorn	
Mallotus mollissinus	Soft kamala	
Mallotus phillipensis	Red Kamala	
Marsdenia coronata	Slender Milkvine	
Melaleuca irbyana	Swamp Tea-tree	
Melaleuca saligna	White Bottlebrush	
Melia azederach	White Cedar	

Scientific name	Common name	EPBC Act status
Melichrus procumbens	Jam Tarts	
Ottochloa gracillima	Graceful Grass	
Oxalis corniculata	Creeping Woodsorrel	
Panicum effusum	Hairy Panic	
Parsonsia straminea	Monkey Rope Vine	
Pellaea nana	Sickle Fern	
Petalostigma pubescens	Quinine Bush	
Phyllanthus microcladus	Small-leaved Phyllanthus	
Plectranthus habrophyllus	Plectranthus	Endangered
Podocarpus elatus	Brown Pine	
Pomax umbellata	Pomax	
Pultenaea villosa	Hairy Pea Bush	
Sarcopetalum harveyanum	Pearl Vine	
Smilax australis	Barbwire Vine	
Syzygium leuhmannii	Small-leafed Lilly Pily	
Themeda triandra	Kangaroo Grass	
Toona ciliata	Red Cedar	
Trema tomentosa	Poison Peach	
Waterhousia floribunda	Weeping Lilly Pily	
Xanthorrhoea latifolia	Grass Tree	

Table 9: Weed and introduced flora species list

Scientific name	Common name	Plants listed as "Restricted" under the *Biosecurity Act 2014*
Ageratum houstonianum	Blue Billygoat Weed	
Albizia lebbeck	Indian siris	
Asparagus aethiopicus	Asparagus Fern	Category 3
Asparagus africanus	Climbing Asparagus Fern	Category 3
Bidens pilosa	Cobblers Peg	
Celtis sinensis	Chinese Elm	Category 3
Chloris virgata	Rhodes Grass	

Scientific name	Common name	Plants listed as "Restricted" under the *Biosecurity Act 2014*
Cinnamomum camphora	Camphor Laurel	Category 3
Cyperus polystachyos	Bunchy Sedge	
Ipomoea indica	Mile-A-Minute	
Lantana camara	Lantana	Category 3
Lantana monteviredensis	Creeping Lantana	Category 3
Macroptilium atropurpureum	Siratro	
Megathyrsus maximus	Guinea Grass	
Ochna serrulata	Ochna	
Optunia tomentosa	Velvet Prickly Pear	Category 3
Passiflora edulis	Edible Passionfruit	
Passiflora suberosa	Corky Passionflower	
Passiflora subpeltata	White Passion Flower	
Pteridium esculentum	Bracken Fern	
Schinus terebinthifolius	Broad Leaved Pepper	Category 3
Solanum mauritianum	Wild Tobacco	
Solanum nigrum	Blackberry Nightshade	
Solanum seaforthianum	Brazilian Nightshade	
Solanum torvum	Devils Fig	
Urochloa decumbens	Signal Grass	

4.3. Fauna observations

Fauna assessments were completed in accordance with the methodologies detailed in **Section 2.2** and survey locations are shown in **Plan 3**. Species-specific surveys were targeted largely at locations where potentially suitable habitat for fauna of interest was present. During these surveys, searches were undertaken to describe on-site habitat features (*e.g.*, habitat trees, fallen logs, termite mounds, roosting signs, etc.), and additional signs of fauna activity (*e.g.*, scats, tracks, scratch marks on trees, nests, etc.) were recorded (refer **Photo set 9**). Consideration of target species was influenced by previous ecological surveys on-site, the suitability and significance of the habitat on-site, and recent recorded sightings of the species in the context of the local area and the broader region (as discussed in **Section 3.3**).

The following subsections include a description of the significant fauna species targeted, their likelihood of occurrence and any confirmed records during the survey period. A list of all fauna species recorded during the survey period, and field methodology associated with identification of the species, is presented in **Table 10**.

Methodology employed during fauna surveys follows the *Terrestrial Vertebrate Fauna Survey Guidelines for Queensland* (Eyre *et al.* 2018), and significant fauna sightings are presented in **Plan 4**. The likelihood of occurrence assessment, directing species-specific surveys, is presented in **Section 5**.

Two invasive fauna species were recorded during site field surveys; *Vulpes vulpes* (Red Fox) and *Rhinella marina* (Cane Toad). The Red Fox was observed opportunistically during vegetation surveys proximal to the waterway mapped in the western extent of the site (refer **Plan 4**). Specific-searches were undertaken surrounding rocky outcrops, however, no fox den was located.

As outlined in **Table 5**, six MNES fauna were identified as *may* or *likely* to occur within the proposed action area. Two of these MNES fauna were observed during field survey, being *Pteropus poliocephalus* (Grey-headed Flying-fox) and *Rhipidura rufifrons* (Rufous Fantail). The Grey-headed Flying-fox (GHFF) was observed as fly-over species only, where no individuals were observed directly utilising the potential foraging habitat recognised in the impact area (refer **Section 8** for detailed assessment). Rufous Fantail specimens were observed on multiple occasions across the proposed action area (refer **Section 11** for detailed assessment). *Phascolarctos cinereus* (Koala) are known to occur within the wider local area. However, despite species-specific searches being undertaken during field survey effort, only indirect evidence of Koala was observed in the form of scats, where no physical observations were recorded (refer **Section 7** for detailed assessment against the referral guidelines).

Photo set 9: Rocky terrain and burrow within termite nest providing potential fauna habitat.

Table 10: Fauna species observed on-site

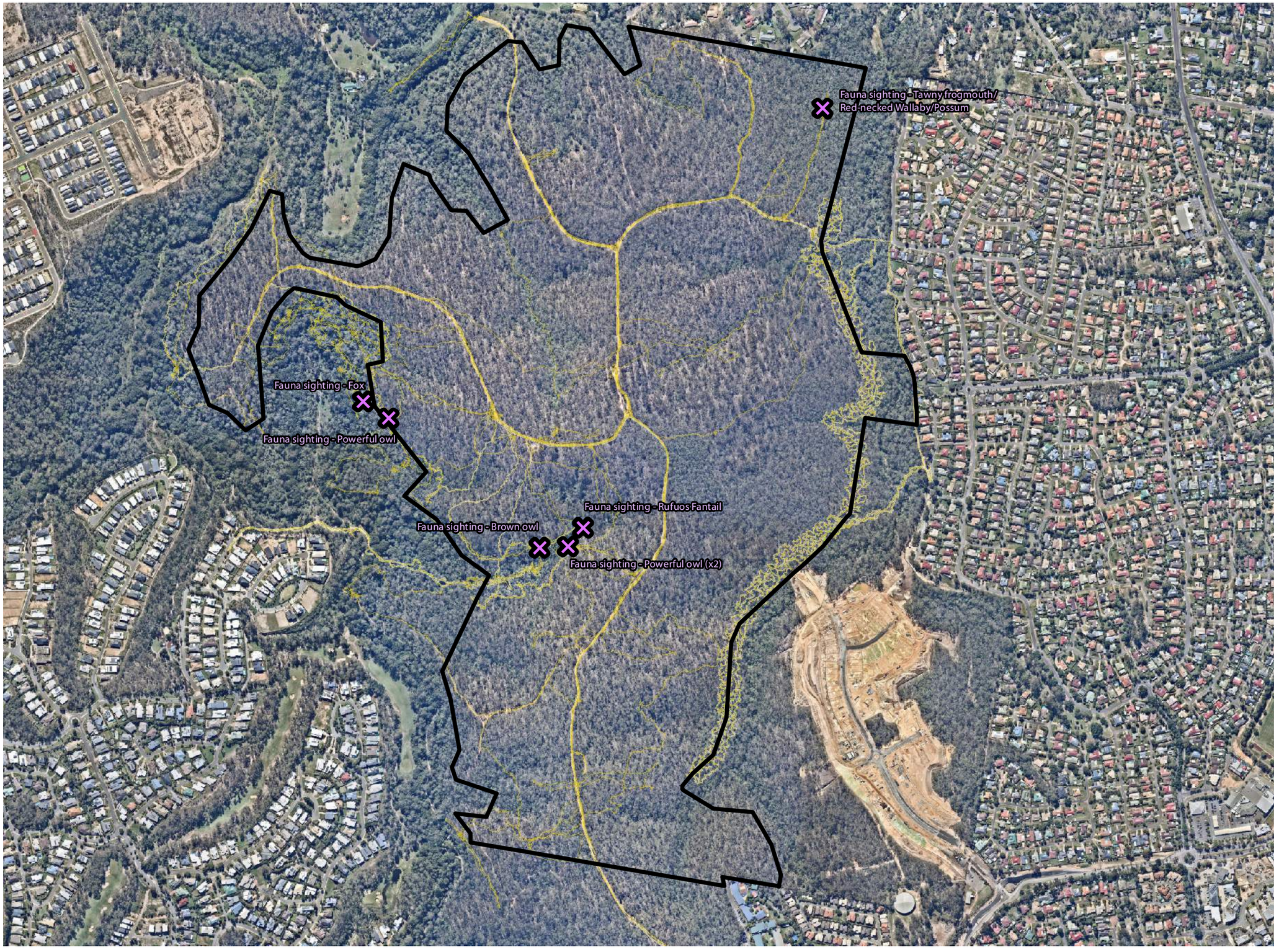
Scientific name	Common name	Survey technique	EPBC Act status
Birds			
Acanthiza pusilla	Brown Thornbill	BS	
Alisterus scapularis	Australian King Parrot	BS	
Caligavis chrysops	Yellow-faced Honeyeater	BS	

Scientific name	Common name	Survey technique	EPBC Act status
Climacteris picumnus	Brown Treecreeper	BS	
Coracina novaehollandiae	Black-faced Cuckoo-shrike	BS / O	
Corvus orru	Torresian Crow	BS / O	
Cracticus nigrogularis	Pied Butcherbird	BS / O	
Cracticus tibicen	Australian Magpie	BS / O	
Cracticus torquatus	Grey Butcherbird	BS / O	
Dacelo novaeguineae	Laughing Kookaburra	BS / O	
Dicrurus bracteatus	Spangled Drongo	BS / O	
Grallina cyanoleuca	Magpie-lark	BS / O	
Hirundo neoxena	Welcome Swallow	BS / O	
Manorina melanocephala	Noisy Minor	BS / O	
Ninox strenua	Powerful Owl	DAS	
Ninox novaeseelandiae	Southern Boobook Owl	S	
Phaps chalcoptera	Common Bronzewing	BS / O	
Philemon corniculatus	Noisy Friarbird	BS	
Podargus srigoides	Tawny Frogmouth	S	
Psophodes olivaceus	Eastern Whipbird	BS	
Rhipidura rufifrons	Rufous Fantail	BS	Migratory & Marine
Sericornis frontalis	White Browed Scrub Wren	BS	
Todiramhus macleayii	Forest Kingfisher	BS	
Trichoglossus haematodus	Rainbow Lorikeet	BS	
Turnix varius	Painted Button Quail	BS	
Vanellus miles	Masked Lapwing	BS / O	
Reptiles			
Chlamydosaurus kingii	Australian Frilled Lizard	O	
Intellagama lesueurii	Australian Water Dragon	O	
Lampropholis guichenoti	Common Garden Skink	O / DAS	
Varanus sp.	Monitor Lizard	O / STOT	
Amphibians			
Rhinella marina	Cane Toad	O / S	Invasive
Mammals			

Scientific name	Common name	Survey technique	EPBC Act status
Pteropus poliocephalus	Grey-headed Flying-fox (Fly-over only)	S	Vulnerable
Trichosurus vulpecula	Common Brushtail Possum	STOT / S	
Vulpes vulpes	Red Fox	O	Invasive
Mormopterus norfolkensis	East-coast Free-tailed Bat	UBCS	
Chalinolobus gouldii	Gould's Wattled Bat	UBCS	
Miniopteris australis	Little Bent-wing Bat	UBCS	

Note: BS – Bird survey; DAS – Diurnal active searches; O – Observational survey; STOT – Scats, tracks and other traces; S – Spotlighting; UBCS – Ultrasonic bat call survey.

4. Fauna Survey Results



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) 2019. Updated data available at http://qldspatial.information.qld.gov.au/catalogue//
Aerial Imagery © Nearmap, 2019

Legend

- Referral site
- Qld DCDB
- Tracklog
- Fauna sighting location

Issue	Date	Description	Drawn	Checked
A	22/10/2019	Preliminary	TC	HS

0 40 80 160 240 320 m

Transverse Mercator | GDA 1994 | Zone 56 | 1:8,500 @ A3

saunders havill group

Cherish Enterprises Pty Ltd

Mur Boulevard, Springfield

ADDRESS/RPD: Mur Boulevard, Springfield *22/10/2019* *9612 E 04 Fauna Survey Results A*

4.3.1 Amphibians

The PMST's PMR identified one EPBC Act listed frog species with the potential to occur on or proximal to the proposed action boundary; *Mixophyes fleayi* (Fleay's Frog) (refer **Section 5**). Fleay's Frog is listed as Endangered under the EPBC Act and was assessed as *unlikely* to occur on-site. This was generally due to the lack of semi-permanent to permanent water pooling on-site. Generally, the species has been observed to exist in areas where riparian vegetation is modified and Lantana or similar weed species exist within the ground layer. Woogaroo and Opossum Creeks adjacent to the western bounds were observed to hold more suitable habitat. Targeted field surveys, including nocturnal voice playback and call recording, diurnal searches and opportunistic searches, occurred along Woogaroo and Opossum Creeks over the survey event (refer **Plan 4** and **Photo set 10**).

No threatened frog species listed under the EPBC Act were identified during the targeted field surveys. The field survey did not identify any amphibians on-site, with the exception of *Rhinella marina* (Cane Toad) (refer **Table 10**). The Cane Toad is an invasive species and was identified across the site during observational searches and spotlighting (refer **Photo set 10**). The lack of amphibians identified on-site may be attributable to the dry period during the survey, where insignificant amounts of rainfall were received (refer **Table 7**).

The *Survey guidelines for Australia's threatened frogs* outlines optimal survey conditions to maximise the likelihood of detecting Fleay's Frog within a specific area. The guideline specifies surveys should be undertaken in the following conditions and/or time of year:

- calling period between September and March; and
- optimal weather conditions, specifically not during heavy rainfall or streamflow and when substrate and leaf litter are wet.

The surveys undertaken on-site were undertaken during the preferred month/season, however, due to the lack of heavy rainfall prior to survey, the surveys were not considered to be undertaken during optimal survey conditions overall. Hence, an accurate understanding of amphibian presence/absence within the waterways surrounding the site, specifically for Fleay's Frog, cannot be definitively attained from this survey event.

Photo set 10: Riparian vegetation adjacent to the referral area (left); *Rhinella marina* (Cane Toad) observed on-site (right).

4.3.2 Birds

Twenty-six (26) EPBC Act listed bird species, two migratory marine bird species and six migratory terrestrial species were identified as having the potential to occur on or proximal to the proposed action in the PMR (refer **Appendix A**). *Anthochaera phrygia* (Regent Honeyeater), *Lathamus discolor* (Swift Parrot), and *Merops ornatus* (Rainbow Bee-eater) were assessed as *may* occur on-site, while *Rhipidura rufifrons* (Rufous Fantail) was assessed as *known* to occur on-site (refer **Section 5** for likelihood of occurrence assessment).

Targeted field surveys including bird surveys, spotlighting, active diurnal searches and opportunistic searches were completed over the survey effort (**Plan 3**). One threatened bird species listed under the EPBC Act was identified during the targeted field surveys, being Rufous Fantail which is listed under the EPBC Act as a migratory (Bonn Convention) and marine species (refer **Section 11** for further assessment).

The field surveys identified 26 bird species during field survey (refer **Table 10**). The number of bird species recorded was characteristic of a site containing relatively intact, although disturbed, bushland and ephemeral water features. A number of bird species were observed within areas proximal to Woogaroo and Opossum Creeks, allowing easy access to water sources off-site. Species included *Rhipidura rufifrons* (Rufous Fantail), *Podargus strigoides* (Tawny Frogmouth) and *Ninox strenua* (Powerful Owl) (refer **Photo set 11**).

Photo set 11: Tawny Frogmouth and Powerful Owl observed within the referral area.

4.3.3 Reptiles

Nine EPBC Act listed reptiles were identified as potentially occurring on or proximal to site in the PMST's PMR (refer **Appendix A**). Given the proximity of the site to the Brisbane River (approximately 3.8 km to the north), six species of turtle are listed as potentially occurring within a 5 km radius of the site. However, following likelihood of occurrence assessment, the site is not considered to hold suitable habitat for marine species such as turtles, therefore all turtles are considered *unlikely* to occur within the proposed action area. The remaining three reptile species (Collared Delma, Dunmall's Snake and Three-toed Snake-tooth Skink) are also considered *unlikely* to occur due to the lack of suitable habitat and soil composition identified within site bounds (refer **Table 13**).

Importantly, no threatened reptile species listed under the EPBC Act were identified during the targeted field surveys.

The field surveys identified four reptile species not listed as threatened under the EPBC Act (refer **Table 10**). The most commonly recorded species included the *Intellagama leseuerii* (Australian Water Dragon) and *Lampropholis guichenoti* (Common Garden Skink). Both the *Varanus sp.* (Monitor Lizard) and *Chlamydosaurus kingie* (Australian Frilled Lizard) were observed once during the survey period and were climbing trees. The Australian Frilled Lizard observed was a juvenile (refer **Photo set 12**).

Photo set 12: Juvenile Australian Frilled Lizard observed on-site.

4.3.4 Arboreal and terrestrial mammals

Six arboreal and terrestrial mammals listed under the EPBC Act were identified as potentially occurring on or proximal to the site by the PMST PMR (refer **Appendix A**). Targeted field surveys within and adjacent to the referral area included spotlighting, diurnal active searches, and assessment of Koala habitat (including SAT surveys) (refer to **Section 2.2** for methodologies utilised).

The site contains Koala food and shelter trees where some modification of vegetation composition was observed within the ground layer. Eight SAT surveys were undertaken across the site (refer **Plan 4**), where the majority of surveys resulted in low Koala usage scores when utilising the East Coast (med-high) benchmarks[1]. One SAT survey produced a high usage score under the East Coast (med-high) benchmarks. A summary of the SAT surveys are presented in **Table 11** and raw data is located in **Appendix C**. An assessment of potential impacts of the proposed action to the Koala is provided in **Section 7**.

Table 11: Summary of SAT survey results

SAT Survey #	Number of trees with scats	Percentage	Koala usage East Coast (med - high)
1	11	36.67 %	High
2	3	10.00 %	Low
3	2	6.67 %	Low
4	2	6.67 %	Low
5	5	16.67 %	Low
6	3	10.00 %	Low
7	2	6.67 %	Low
8	3	10.00 %	Low

The remaining arboreal and terrestrial mammals are considered *unlikely* to occur on-site due to available habitat being unsuitable, and lack of known records within the surrounding area. This was applicable to Northern Quoll, Spot-tailed Quoll, Greater Glider, Brush-tailed Rock-wallaby and Long-nosed Potoroo (refer **Section 5** for likelihood of occurrence assessment).

No threatened arboreal or terrestrial mammals listed under the EPBC Act were identified on-site during the targeted field surveys, where only indirect evidence of Koala in the form of scats was identified.

The most common arboreal or terrestrial mammal recorded was *Trichosurus vulpecula* (Common Brushtail Possum), which was observed during spotlighting surveys. One invasive mammal was observed, *Vulpes vulpes* (Red Fox), proximal to the waterway situated within the western extent of the site during vegetation surveys (refer **Plan 4**).

4.3.5 Flying mammals

Two flying mammal species listed under the EPBC Act were identified in the desktop assessment (refer **Appendix A**). These species were Grey-headed Flying-fox (*Pteropus poliocephalus*) and Large-eared Pied Bat (*Chalinolobus dwyeri*). The GHFF was assessed as *may* occur on-site, while the Large-eared Pied Bat was *unlikely*.

No threatened flying mammal species listed under the EPBC Act were identified utilising the site during the targeted field surveys. However, the GHFF was observed as a fly-over species during field survey. It is likely that the GHFF observed as fly-over originates from the flying-fox roost known to contain GHFF to the north-east of the site, named Camira, Barbara Street.

The field surveys identified three microbat species, none of which are listed as threatened under the EPBC Act (refer to **Table 10** and **Appendix D**). These were all identified through call playback methods at various locations across the site (refer **Plan 3**). Scattered hollow-bearing trees across the site, although limited, may have influenced the presence of the microbats through the provision of suitable roosting habitat and vegetation increasing foraging resources.

4.3.6 Aquatic fauna

One fish species listed under the EPBC Act was identified in the desktop assessment; *Epinephelus daemelii* (Black Rockcod) (refer **Appendix A**). This species was assessed as being *unlikely* to occur on-site. No threatened fish species listed under the EPBC Act were identified during the targeted field surveys. The overall lack of pooled water within the proposed action boundary means a lack of habitat exists on-site.

5. MNES assessment

A tabulated assessment of the potential for the nine types of MNES to occur on-site or be impacted by the action is provided in **Table 12**. This assessment is based on the desktop and field survey results and makes the distinction between MNES that have either nil or a very low potential to be impacted by the project and those that have some potential and need to be investigated further.

In summary, the MNES assessment identified:

- World heritage properties, National heritage places, Wetlands of international importance, Commonwealth marine areas and the Great Barrier Reef Marine Park have little to zero potential to be impacted by the action generally due to the physical distance between the project and these MNES;
- the project does not constitute a nuclear action or involve a water resource in relation to coal seam gas and large coal mining development, and therefore these are not grounds to refer the project for assessment under the EPBC Act; and
- nationally threatened species and ecological communities, and migratory species have some potential to be impacted by the project.

A likelihood of occurrence assessment for each MNES listed in the PMR that has a potential to occur on-site has been completed (refer **Table 13**). The results of targeted MNES field surveys (as per **Section 3.3**) are provided as part of the analysis.

The nationally threatened species and ecological communities identified as may and likely to occur on-site and hence, with the potential to be impacted by development are assessed further with reference to the relevant significant impact criteria in **Sections 6** to **Section 11** of this report.

Table 12: Potential to impact on MNES

MNES	Description	Relevance to Site	Assessment
World Heritage Properties	A 'declared World Heritage property' is an area that has been included in the World Heritage list or declared by the minister to be a World Heritage property. World Heritage properties are places with natural or cultural heritage values which are recognised to have outstanding universal value.	The closest World Heritage Site is Gondwana Rainforests of Australia which is approximately 56 km south-west of the site.	There is no potential for the project to impact on a World Heritage Property. **Further assessment is not required.**
National Heritage Places	The National Heritage List contains places or groups of places with outstanding heritage value to Australia – whether natural, Indigenous or historic or a combination of these.	The closest National Heritage Place is Gondwana Rainforests of Australia which is approximately 56 km south-west of the site.	There is no potential for the project to impact on a National Heritage Place. **Further assessment is not required.**
Wetlands of international importance (Ramsar)	A 'declared Ramsar wetland' is an area that has been designated under Article 2 of the Ramsar Convention or declared by the minister to be a declared Ramsar wetland under section 16 of the EPBC Act.	Moreton Bay is approximately 40 km east of the site. No works will be carried out within the wetland itself.	There is no potential for the project to impact on a Ramsar Wetland. **Further assessment is not required.**
Nationally threatened species and ecological communities	An action will require approval if the action has, will have, or is likely to have a significant impact on a species listed in any of the following categories: ▪ extinct in the wild ▪ critically endangered ▪ endangered, or ▪ vulnerable.	The PMR identified 61 listed threatened species and 4 TECs with the potential to occur in the project area or within 5 km of the project.	There is potential for this action to impact on nationally threatened species and ecological communities. **Further assessment against the significant impact criteria is required for this MNES (refer Sections 6 to Section 10). All other nationally threatened species and ecological communities not assessed within this report were considered and concluded as**

MNES	Description	Relevance to Site	Assessment
	An action will also require approval if the action has, will have, or is likely to have a significant impact on an ecological community listed in any of the following categories: ▪ critically endangered, or ▪ endangered.		**unlikely to undergo a significant impact as a result of the proposed action (refer Table 13).**
Migratory species	An action will require approval if the action has, will have, or is likely to have a significant impact on a listed migratory species.	The PMR identified 35 listed migratory species with the potential to occur in the project area or within 5 km of the project.	There is potential for this action to impact on migratory species. **Further assessment against the significant impact criteria is required (refer Section 11).**
Commonwealth marine areas	Marine protected areas are marine areas which are recognised to have high conservation value. Actions in or near marine protected areas, or other areas with high conservation value, have a greater likelihood of significant impacts on the Commonwealth marine environment.	The action is not being undertaken in or adjacent to a Commonwealth marine area. The project is located more than 37 km east from the nearest Commonwealth marine area.	It is considered unlikely for the project to impact on Commonwealth Marine Areas. **Further assessment is not required.**
The Great Barrier Reef Marine Park	The Great Barrier Reef Marine Park is established under the *Great Barrier Reef Marine Park Act 1975*. The GBRMP is an area recognised to have high conservation value and an action will require approval if it is likely to impact the environment.	The GBRMP is more than 340 km north of the site.	There is no potential for the project to impact on the GBRMP. **Further assessment is not required.**
Nuclear actions	A nuclear action (including uranium mining) will require approval if it has, will have, or is likely to have a significant impact on the environment.	The project does not comprise a nuclear action.	**This MNES does not apply.**
A water resource, in relation to coal seam gas	Under the EPBC Act, an action which involves a CSG development or a large coal mining	The project does not comprise a CSG development or large coal mine.	**This MNES does not apply.**

MNES	Description	Relevance to Site	Assessment
development and large coal mining development	development requires approval from the Australian Government if the action has, will have, or is likely to have a significant impact on a water resource.		

Table 13: Likelihood of occurrence assessment for nationally threatened species and ecological communities

Listed TECs

Name	Status	Type of presence	Description of the community/preferred habitat	Analysis	Likelihood of occurrence (on-site)
Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland ecological community	Endangered	This TEC is listed as a community that may occur within the area.	In Queensland, this ecological community coincides with two RE communities including Of Concern RE12.1.1 (*Casuarina glauca* +/- mangroves woodland) as well as areas where the canopy is dominated by Casuarina glauca within RE12.3.20 (*Melaleuca quinquenervia*, *Casuarina glauca* +/- *Eucalyptus tereticornis*, *Eucalyptus siderophloia* open forest on low coastal alluvial plains).	No species representing these characteristics or vegetation communities were observed within the assessment area. The majority of RE communities on-site are associated with land zone 9-10, which is not suitable to this TEC. The remaining area is classified as land zone 3, however, vegetation communities do not reflect the regional ecosystems that comprise this TEC.	Unlikely
Lowland rainforest of Subtropical Australia	Critically Endangered	This TEC is listed as a community that may occur within the area.	Typically, there is a relatively low abundance of species from the genera Eucalyptus, Melaleuca and Casuarina. Buttresses are common as is an abundance and diversity of vines. This community is usually associated with REs 12.3.1 (more recently mapped as 12.3.16), 12.5.13, 12.8.3, 12.8.4, 12.8.13, 12.11.1, 12.11.10, 12.12.1, and 12.12.16.	Species representing this TEC were observed in association of Endangered RE12.3.16 ground-truthed to be in two location proximal and/or within the proposed action area. One patch was located adjacent to the western bounds of the subject site during field survey, where a second patch was	Known

				observed to traverse the central-western bounds of the proposed action area. The LRSA TEC off-site was observed to have undergone rehabilitation efforts to rehabilitate the TEC flora values. The LRSA TEC on-site was not observed to be rehabilitated, and was restricted to within a narrow gully line. The two LRSA TEC's were abutted by Endangered RE12.9-10.15, which is not a regional ecosystem considered to consist of flora species reflective of the LRSA TEC. No other areas were identified as containing flora species reflective of the LRSA TEC on or proximal to the proposed action.	
Poplar Box Grassy Woodland on Alluvial Plains	Endangered	This TEC is listed as a community that may occur within the area.	In Queensland, this TEC occurs in the Brigalow Belt bioregion extending into the South Eastern Queensland bioregion. Vegetation components vary from a grassy woodland to grassy open woodland structure but may occasionally exhibit an open forest structure with an overstorey dominated by Eucalyptus populnea (Poplar Box) and an understorey predominantly composed of perennial forbs and C4 grasses. This community can consist of RE11.3.2, RE11.3.17, RE11.4.7, RE11.4.12 and RE12.3.10.	No species representing these characteristics or vegetation communities were observed within the assessment area. The majority of RE communities on-site are associated with land zone 9-10, which is not suitable to this TEC. The remaining area is classified as land zone 3, however, vegetation communities do not reflect the regional ecosystems that comprise this TEC.	Unlikely
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and	Critically Endangered	This TEC is listed as a community that is likely to occur within the area.	This threatened community is characterised by a species-rich understorey of native tussock grasses, herbs and scattered shrubs and the dominance of White Box, Yellow Box, or Blakely's Red gum trees. This community is usually associated with Regional	No species representing these characteristics or vegetation communities were observed within the assessment area. All RE communities on-site are associated with	Unlikely

Derived Native Grassland	Ecosystem 11.8.2a, 11.8.8, 11.9.9a (superseded), 13.3.1, 13.11.8, 13.12.8 and 13.12.9. It can also be a small component of Regional Ecosystem 11.3.23, 12.8.16, 13.3.4, 13.11.3 and 13.11.4.	land zone 9-10, which is not suitable to this TEC.

Listed threatened species

Scientific name	Common name	Status	EPBC code	Description of preferred habitat	Analysis	Likelihood of occurrence (on-site)
Birds						
Anthochaera phrygia	Regent Honeyeater	Critically Endangered	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, river valleys and foothills. These woodlands have a significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. They are a generalist forager, mainly feeding on nectar from a wide range of eucalypts and mistletoes.	The site contains regrowth vegetation communities dominated by Eucalypt and Corymbia species. More recently there have been confirmed sightings within the Springfield local area. Detailed bird surveys were undertaken across the proposed action area and proximal to surrounding waterways during dawn and dusk periods. No evidence of the Regent Honeyeater was found during field survey effort (undertaken in March, August and September, 2019). Although no physical observations were made, this species has the potential to utilise the proposed action area.	May
Botaurus poiciloptilus	Australasian Bittern	Endangered	1001	The Australasian Bittern occurs in terrestrial wetlands and, rarely, estuarine habitats, mainly in the temperate southeast and southwest. It favours	No suitable habitat was observed on-site.	Unlikely

Scientific name	Common name	Status	EPBC code	Description of preferred habitat	Analysis	Likelihood of occurrence (on-site)
				wetlands with tall dense vegetation, where it forages in still, shallow water up to 0.3 m 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	Critically Endangered	856	The Curlew Sandpiper occurs in littoral and estuarine habitats, and is mainly found in intertidal mudflats of sheltered coasts. It sometimes occurs in non-tidal swamps, lakes and lagoons on the coast and inland. It roosts on shingle, shells or sand beaches; spits or islets on the coast or in wetlands.	No suitable habitat was observed on-site.	Unlikely
Cyclopsitta diophthalma coxeni	Coxen's Fig-Parrot	Endangered	59714	The Coxen's Fig-Parrot occurs in rainforest habitats including subtropical rainforest, dry rainforest, littoral and developing littoral rainforest, and vine forest. In the past, it has been most abundant in lowland subtropical rainforest. Populations are now concentrated into fragmented remnants of dry rainforest and cool subtropical rainforest. Favouring	No suitable habitat was observed on-site.	Unlikely

Scientific name	Common name	Status	EPBC code	Description of preferred habitat	Analysis	Likelihood of occurrence (on-site)
				alluvial areas that support figs and other trees with fleshy fruits.		
Dasyornis brachypterus	Eastern Bristlebird	Endangered	533	The Eastern Bristlebird inhabits low dense vegetation in a broad range of habitat types including sedge land, heathland, swampland, shrub land, 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.	Although some areas within the subject site were identified with ground and understorey vegetation, the density was not suitable for the Eastern Bristlebird. Hence, no suitable habitat was observed on-site. Further, this species exists within a restricted area and the site does not exist within this. As there is a lack of records within the local area, it is unlikely that this species will occur on-site.	Unlikely
Diomedea antipodensis	Antipodean Albatross	Vulnerable	64458	The Antipodean Albatross is a migratory bird and is marine, pelagic and aerial. It rarely enters the belt of icebergs region of Antarctica, but in late summer, it may approach the edge of pack-ice. It sleeps and rests on ocean waters when not breeding. They nest in open patchy vegetation, such as among tussock grassland or shrubs on ridges, slopes and plateaus. On Antipodes Island, they nest in relatively uniform densities, but avoid areas of tall vegetation on steep coastal slopes, or amongst the tall ferns on poorly drained parts of the peaks near the island's centre.	No suitable habitat observed on-site.	Unlikely
Diomedea antipodensis gibsoni	Gibson's Albatross	Vulnerable	82270	Gibson's Albatross is a migratory bird and is marine, pelagic and aerial. In the Antarctic, it occurs in open water, and rarely enters the belt of icebergs region.	No suitable habitat observed on-site.	Unlikely

Scientific name	Common name	Status	EPBC code	Description of preferred habitat	Analysis	Likelihood of occurrence (on-site)
				In late summer, it may approach the edge of the pack-ice. It flies within 15 m of the sea surface, using the updraft from wave fronts for lift. It circles over breeding islands to heights of at least 1500 m. On breeding islands, the Gibson's Albatross nests on coastal or inland ridges, slopes, plateaux and plains, often on marshy ground. Nests of the Gibson's Albatross are sited on moss terraces, in dense tussocks, and often in loose aggregations on the west (windward) side of islands. It prefers open or patchy vegetation (tussocks, ferns or shrubs), and it requires nesting areas that are near exposed ridges or hillocks so that it can take off.		
Diomedea exulans	Wandering Albatross	Vulnerable	89223	The Wandering Albatross is marine, pelagic and aerial. It occurs where water surface temperatures range from -2° to 24°C. In the Antarctic, the Wandering Albatross occurs in open water, rarely entering the belt of icebergs. In late summer, it may approach the edge of the pack-ice. In the Antarctic, it concentrates near submarine plateaux, banks and ridges. In the Australasian region, it occurs inshore, offshore and in pelagic waters. It flies within 15 m of the sea surface, using the updraft from wave fronts for lift. It circles over breeding islands to heights of at least 1500 m. On breeding islands, the Wandering Albatross nests on coastal or inland ridges, slopes, plateaux and plains, often on marshy ground. Nests of the Wandering Albatross are sited on moss	No suitable habitat observed on-site.	Unlikely

Scientific name	Common name	Status	EPBC code	Description of preferred habitat	Analysis	Likelihood of occurrence (on-site)
				terraces, in dense tussocks, and often in loose aggregations on the west (windward) side of islands. It prefers open or patchy vegetation (tussocks, ferns or shrubs), and it requires nesting areas that are near exposed ridges or hillocks so that it can take off.		
Erythrotriorchis radiatus	Red Goshawk	Vulnerable	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. Habitat has to be open enough for fast attack and manoeuvring in flight, but provide cover for ambushing of prey.	The site contains habitat potentially suitable to the species, however, due to a lack of relatively recent records within the local area, it is unlikely that this species will occur.	Unlikely
Geophaps scripta scripta	Squatter Pigeon (southern)	Vulnerable	64440	This species inhabits open grasslands and woodlands typically with a native understorey although may occur in artificial pasture.	The site lacks open grasslands and woodlands with a consistent native understorey, hence, no suitable habitat was observed on-site.	Unlikely
Grantiella picta	Painted Honeyeater	Vulnerable	470	The Painted Honeyeater is found in dry open forests and woodlands, and is strongly associated with mistletoe. It may also be found along rivers, on plains with scattered trees and on farmland with remnant vegetation. It has been seen in urban parks and gardens where large eucalypts are available. Painted Honeyeaters are specialist foragers, foraging at the flowers of the parasitic mistletoes that grow in trees.	No suitable habitat was observed on-site.	Unlikely

Scientific name	Common name	Status	EPBC code	Description of preferred habitat	Analysis	Likelihood of occurrence (on-site)
Hirundapus caudacutus	White-throated Needletail	Migratory	682	The White-throated needletail is almost exclusively aerial. This species has been recorded roosting in trees in forests and woodlands, both among dense foliage in the canopy or in hollows. The species breeds in wooded lowlands and sparsely vegetated hills, as well as mountains covered with coniferous forests.	No suitable habitat was observed on-site.	Unlikely
Lathamus discolor	Swift Parrot	Critically Endangered	744	Swift Parrots breed 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. While the species is very uncommon in south-east Queensland, its occurrence cannot be completely discounted. There are suitable winter flowing species present on the site which may attract birds during flowing (e.g. E. tereticornis).	The site contains potentially suitable foraging habitat to this species. More recently there have been confirmed sightings within the Springfield local area. Detailed bird surveys were undertaken across the proposed action area and proximal to surrounding waterways during dawn and dusk periods. No evidence of the Swift Parrot was found during field survey effort, where the species typically migrates to the mainland between February and March. Field survey effort was undertaken in March, August and September, 2019. Although no physical observations were made, this species has the potential to utilise the proposed action area.	May
Macronectes giganteus	Southern Giant-petrel	Endangered	1060	The Southern Giant-Petrel is marine bird that occurs in Antarctic to subtropical waters. In summer, it	No suitable habitat was observed on-site.	Unlikely

Scientific name	Common name	Status	EPBC code	Description of preferred habitat	Analysis	Likelihood of occurrence (on-site)
				mainly occurs over Antarctic waters, and it is widespread south as far as the pack-ice and onto the Antarctic continent.		
Macronectes halli	Northern Giant Petrel	Vulnerable	1061	The Northern Giant-Petrel is marine and oceanic. It mainly occurs in sub-Antarctic waters, but regularly occurs in Antarctic waters of the southwestern Indian Ocean, the Drake Passage and west of the Antarctic Peninsula. The range of the Northern Giant-Petrel extends into subtropical waters mainly between winter and spring. It frequents both oceanic and inshore waters near breeding islands and in the non-breeding range.	No suitable habitat was observed on-site.	Unlikely
Numenius madagascariensis	Eastern Curlew	Critically Endangered	847	The Eastern Curlew occupies in coastal lakes, inlets, bays and estuarine habitats, and sometimes intertidal mudflats and saltmarshes of sheltered coasts. This specie roosts on sandy spits and islets, especially on dry beach sand near the high-water mark, and among coastal vegetation.	No suitable habitat was observed on-site.	Unlikely
Pachyptila turtur subantarctica	Fairy Prion (southern)	Vulnerable	64445	The fairy prion (southern) breeds on Macquarie Island and a number of other subantarctic islands outside of Australia. There are 80 to 250 breeding pairs in Australia and a global population of 80,000. In Australia, breeding is recorded on two rock stacks off Macquarie Island and on the nearby Bishop and Clerk Island. The population may have been larger prior to the arrival of black rats on Macquarie Island. The subspecies digs burrows among rocks or low	No suitable habitat was observed on-site.	Unlikely

Scientific name	Common name	Status	EPBC code	Description of preferred habitat	Analysis	Likelihood of occurrence (on-site)
				vegetation in which to nest. Burrows may be dug below mat forming herbs. Feeds by plucking food from the ocean surface. Some individuals may migrate towards New Zealand and southern Australia in winter.		
Poephila cincta cincta	Southern Black-throated Finch	Endangered	64447	The Black-throated Finch occurs mainly in grassy, open woodlands and forests, typically dominated by *Eucalyptus*, *Corymbia* and *Melaleuca*, and occasionally in tussock grasslands or other habitats (i.e. freshwater wetlands), often along or near watercourses, or in the vicinity of water. Almost all recent records of the finch from south of the tropics have been in riparian habitat.	Elements of potential habitat were observed on-site. However, due to the lack of records within the site and surrounding area, it is highly unlikely that the Black-throated Finch would occur on-site.	Unlikely
Rostratula australis	Australian Painted Snipe	Endangered	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 habitat was observed on-site.	Unlikely
Sternula nereis nereis	Australian Fairy Tern	Vulnerable	82950	The Fairy Tern (Australian) nests on sheltered sandy beaches, spits and banks above the high tide line and below vegetation. The subspecies has been found in embayments of a variety of habitats including offshore, estuarine or lacustrine (lake) islands, wetlands and mainland coastline.	No suitable habitat was observed on-site.	Unlikely

Scientific name	Common name	Status	EPBC code	Description of preferred habitat	Analysis	Likelihood of occurrence (on-site)
Thalassarche cauta cauta	Shy Albatross	Vulnerable	82345	Breeding occurs on nests located on rock islands that are a mound of soil, grass and roots. Largely limited to the coast line.	No suitable habitat was observed on-site.	Unlikely
Thalassarche cauta steadi	White-capped Albatross	Vulnerable	82344	The White-capped Albatross is a marine species and occurs in subantarctic and subtropical waters. It reaches tropical areas associated with the cool Humboldt Current off South America. It is unknown what sea-surface temperatures this subspecies prefers; however, in the southern Indian Ocean it has been observed in waters of 6.4–13.5 °C. The White-capped Albatross has been noted in shelf-waters around breeding islands and over adjacent rises. During the non-breeding season, birds have been observed over continental shelves around continents. The species occurs both inshore and offshore and enters harbours and bays. The species is scarce in pelagic waters. Birds gather to scavenge at commercial fishing grounds.	No suitable habitat was observed on-site.	Unlikely
Thalassarche eremita	Chatham Albatross	Endangered	64457	The Chatham Albatross is a marine species. It occurs in subantarctic and subtropical waters reaching the tropics in the cool Humboldt Current off South America. It has been noted in shelf-waters around breeding islands, over continental shelves during the non-breeding season, and occurs inshore and offshore. It enters harbours and bays and is scarce in pelagic waters. The Chatham Albatross preference for sea-surface temperatures is poorly known. In	No suitable habitat was observed on-site.	Unlikely

Scientific name	Common name	Status	EPBC code	Description of preferred habitat	Analysis	Likelihood of occurrence (on-site)
				Chilean waters it has been observed over waters of 11.5 to 15°C. The species nests on level or gently sloping ledges, summits, slopes and caves of rocky islets and stacks. It is usually in broken terrain with little soil and vegetation.		
Thalassarche impavida	Campbell Albatross	Vulnerable	64459	The Campbell Albatross is a marine sea bird inhabiting sub-Antarctic and subtropical waters from pelagic to shelf-break water habitats.	No suitable habitat was observed on-site.	Unlikely
Thalassarche melanophris	Black-browed Albatross	Vulnerable	66472	The Black-browed Albatross is a marine species that inhabits Antarctic, subantarctic and temperate waters and occasionally enters the tropics. It can tolerate a broad range of sea-surface temperatures from 0–24° C or probably more based on occasional records from the tropics. It forages around the breaks of continental and island shelves and across nearby underwater banks, but also frequents other marine habitats, such as oceanic waters and the iceberg belt at the limit of the Antarctic pack ice. In the non-breeding season it follows cold water currents north to the continental shelves of Australia, South America and Africa where it can occur in coastal and inshore waters and sometimes enter fjords and channels.	No suitable habitat was observed on-site.	Unlikely
Thalassarche salvini	Salvin's Albatross	Vulnerable	64463	Salvin's Albatross is a marine species occurring in subantarctic and subtropical waters, reaching the tropics in the cool Humboldt Current, off South America. The sea-surface temperature preferences of	No suitable habitat was observed on-site.	Unlikely

Scientific name	Common name	Status	EPBC code	Description of preferred habitat	Analysis	Likelihood of occurrence (on-site)
				Salvin's Albatross are poorly known. In the southern Indian Ocean the species has been observed over waters of 6.4–13.5 °C. Birds have been noted in shelf-waters around breeding islands and over adjacent rises. During the non-breeding season, the species occurs over continental shelves around continents. It occurs both inshore and offshore.		
Turnix melanogaster	Black-breasted Button-quail	Vulnerable	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.	Dense shrub layer and leaf litter was absent from the majority of the site, and was largely restricted to the gully lines when present. The site is not considered to provide suitable habitat for this species to occur, and evidence of the species was not recorded on-site.	Unlikely
Fish						
Epinephelus daemelii	Black Rockcod	Vulnerable	68449	Found in warm temperate to temperate waters of south-eastern Australia, from southern Queensland to Mallacoota, Victoria (rarely further westwards), Tasman Sea islands and seamounts – Norfolk Island, Elizabeth and Middleton Reefs, Lord Howe Island, to New Zealand – the Kermadec Islands, the North Island and the Poor Knights Islands. Depth range 1-50 m. Inhabits caves, gutters and crevices usually to depths of 50 m, although individuals have been collected from below 100 m. Juveniles are found inshore, often in coastal rockpools and estuaries.	No suitable habitat was observed on-site.	Unlikely

Scientific name	Common name	Status	EPBC code	Description of preferred habitat	Analysis	Likelihood of occurrence (on-site)
Maccullochella peelii	Murray Cod	Vulnerable	66633	The Murray Cod utilises a diverse range of habitats from clear rocky streams, such as those found in the upper western slopes of NSW (including the ACT), to slow-flowing, turbid lowland rivers and billabongs. Murray Cod are frequently found in the main channels of rivers and larger tributaries. The species is, therefore, considered a main-channel specialist. Murray Cod tend to occur in floodplain channels and anabranches when they are inundated, but the species' use of these floodplain habitats appears limited. Juveniles less than one year old have been found in main river channels where it appears they settle at a late larval (newly born) stage.	No suitable habitat was observed on-site.	Unlikely
Frogs						
Mixophyes fleayi	Fleay's Frog	Endangered	25960	Fleay's Frog is associated with montane rainforest and open forest communities adjoining rainforest. The species occurs along stream habitats from first to third order streams (i.e. small streams close to their origin through to permanent streams with grades of 1 in 50) and is not found in ponds or ephemeral pools. Adults may be found in leaf litter and along watercourses in rainforest and adjoining wet sclerophyll forests. At some locations where the species has been recorded, riparian vegetation has been disturbed and replaced by weeds, however this is considered marginal habitat. Tadpoles do occur with several species of native fish, however no	Potential habitat occurs adjacent to the site in association with Woogaroo and Opossum Creeks situated to the west of the proposed action. Occurrence within water features on-site is largely restricted due to the lack of pooled water and suitable habitat. Woogaroo and Opossum Creeks were observed to hold pooled water with a significant amount of dry areas (characteristic of ephemeral reaches). Macrophytes and overhanging vegetation was observed along Woogaroo and Opossum Creeks	Unlikely

Scientific name	Common name	Status	EPBC code	Description of preferred habitat	Analysis	Likelihood of occurrence (on-site)
				introduced fish species have been observed in sympatry with this species. In Queensland, important habitat has been defined as: 'permanent and semi-permanent freshwater streams, between 100-1000 m in altitude, in rainforest and other forest communities of the McPherson, Main and Conondale Ranges, Mt Tamborine, and the Mistake and Bunya Mountains'.	banks of the pooled water edges, prompting specific surveys to be undertaken. No individuals were recorded during field survey. Note, surveys were not undertaken during optimal periods, and hence should be undertaken in accordance with the *Survey guidelines for Australian threatened frogs* (*i.e.*, following high rainfall events). However, no individuals nor potential habitat was observed on-site, and therefore the proposed action is not anticipated to impact this species.	
Insects						
Argynnis hyperbius inconstans	Australian Fritillary	Critically Endangered	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* (bladey grass). This habitat is called Melaleuca wetlands, although the larval food plant does not occur in all sub-types of this plant community. It is also sometimes found in disturbed areas (e.g. the drainage ditches of sugarcane farms) or in	No suitable habitat was observed on-site.	Unlikely

Scientific name	Common name	Status	EPBC code	Description of preferred habitat	Analysis	Likelihood of occurrence (on-site)
				association with water course plant communities when its food plant *Viola betonicifolia* is present.		
Phyllodes imperialis smithersi	Pink Underwing Moth	Endangered	86084	The Pink Underwing Moth is found below the altitude of 600 m in undisturbed, subtropical rainforest on rich volcanic soils and fertile alluvium. It occurs in association with the vine *Carronia multisepalea*, a collapsed shrub that provides the food and habitat the moth requires in order to breed. Where *C. multisepalea* attains an upright form, the association with the moth does not occur.	No suitable habitat was observed on-site. Further, the local area lacks recent sightings of the species.	Unlikely
Mammals						
Chalinolobus dwyeri	Large-eared Pied Bat	Vulnerable	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 habitat on-site nor confirmed local records of this uncommon species.	Unlikely
Dasyurus hallucatus	Northern Quoll	Endangered	331	The Northern Quoll occupies a diversity of habitats across its range which includes rocky areas, eucalypt forest and woodlands, rainforests, sandy lowlands and beaches, shrubland, grasslands and desert. Northern Quoll habitat generally encompasses some form of rocky area for denning purposes with surrounding vegetated habitats used for foraging and dispersal. Rocky habitats are usually of high relief, often rugged and dissected but can also include tor fields or caves in low lying areas such as	Although the site contains aspects of potentially suitable habitat on-site, the species lacks confirmed sightings within the local area. It is unlikely that this species would utilise the site.	Unlikely

Scientific name	Common name	Status	EPBC code	Description of preferred habitat	Analysis	Likelihood of occurrence (on-site)
				in Western Australia. 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. Northern Quolls sometimes occur around human dwellings and campgrounds. Northern Quolls appear to be most abundant in habitats within 150 km of the coast.		
Dasyurus maculatus maculatus	Spot-tailed Quoll	Endangered	75184	The Spot-tailed Quoll has a preference for 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.	Although the site contains aspects of potentially suitable habitat on-site, the species lacks confirmed sightings within the local area. It is unlikely that this species would utilise the site. Further, no evidence of this species was observed on-site.	Unlikely
Petauroides volans	Greater Glider	Vulnerable	254	The Greater Glider prefers tall eucalypt forests and woodlands. It is found in highest abundance typically in taller, montane, moist eucalypt forests, with relatively old trees and abundant hollows.	No recent sightings of this species have been recorded within the local area, further, no suitable habitat was observed on-site due to the lack of hollows present.	Unlikely
Petrogale penicillata	Brush-tailed Rock-wallaby	Vulnerable	225	Rocky outcrops appear crucial to current habitat selection by rock-wallabies, however, vegetation structure and composition is also considered to be	No confirmed local records of this uncommon species. This species is restricted to the Great Dividing Range,	Unlikely

Scientific name	Common name	Status	EPBC code	Description of preferred habitat	Analysis	Likelihood of occurrence (on-site)
				an important factor. In many parts of their range, including at the Warrumbungles, rock-wallabies are closely associated with dense arboreal cover, especially fig trees. The vegetation on and below the cliff appear to be important to this species as a source of food and shelter and in some cases may provide some protection from predation. A range of vegetation types are associated with Brush-tailed Rock-wallaby habitat, including dense rainforest, wet sclerophyll forest, vine thicket, dry sclerophyll forest, and open forest.	however, species population is considered to be declining and vulnerable. The site lacks suitable habitat requirements and therefore it is considered unlikely the species would utilise the site.	
Phascolarctos cinereus	Koala	Vulnerable	85104	They are found in a range of habitats, from coastal islands and tall eucalypt forests to low woodlands inland. The species is known from the surrounding area and evidence has been recorded on-site.	Extensive searches of this species, including SAT surveys and scat meanders were completed. During on-ground field survey, only indirect evidence in the form of scats was observed. Land surrounding the site is highly disturbed due to extensive development, leaving the site relatively isolated from potential suitable habitat within the wider landscape – where Koalas are known to disperse from 3.5 km up to 10 km[4]. Due to the situation of the site within the Springfield suburb, planned developments proximal to the site will lead to further isolation. More	Likely

[4] Rhodes, J. R., Beyer, H. L., Preece, H.J. and McAlpine, C.A. (2015) South East Queensland Koala Population Modelling Study. UniQuest, Brisbane, Australia.

Scientific name	Common name	Status	EPBC code	Description of preferred habitat	Analysis	Likelihood of occurrence (on-site)
					suitable habitat exists to the south and east of the site within the Flinders Karawatha Corridor. It is inferred that the site does not have the capacity to maintain significant koala populations.	
Potorous tridactylus tridactylus	Long-nosed Potoroo	Vulnerable	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, fern or heath, or of low shrub of tea-trees or melaleucas. A sandy loam soil is also a common feature.	No suitable habitat was observed on-site due to the lack of dense understorey across the majority of the site, with the exception of within the gully lines.	Unlikely
Pteropus poliocephalus	Grey-headed Flying-Fox	Vulnerable	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 feed son commercial fruit crops. The primary food source is blossom from Eucalyptus and related genera.	No camps were observed throughout the site, however, potential foraging habitat exists on-site. A flying fox camp containing GHFF and considered to not be of national significance exists approximately 1.5 km north of the site. GHFF specimens were observed as fly-over, however, was not observed to be directly utilising the site throughout the assessment period. There is potential that the species would utilise the site for foraging purposes.	May
Plants						
Bosistoa transversa	Three-leaved Bosistoa	Vulnerable	16091	The Three-leaved Bosistoa is conserved within Mt Warning National Park, Numbinbah Nature Reserve,	No suitable habitat was observed on-site.	Unlikely

Scientific name	Common name	Status	EPBC code	Description of preferred habitat	Analysis	Likelihood of occurrence (on-site)
				Limpinwood Nature Reserve and Whian 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 300 meters in altitude. It is commonly associated with Argyrodendron trifoliolatum, Syzygium hodgkinsoniae, Endiandra pubens, Dendrocnide photinophylla, Acmena ingens, Diploglottis australis and Diospyros mabacea.		
Corchorus cunninghamii	Native Jute	Endangered	14659	The Native Jute occurs in the ecotone of wet sclerophyll forest and dry to dry-subtropical rainforest (e.g. araucarian microphyll vine forest), and in Hoop Pine (*Araucaria cunninghamii*) plantations. It often occurs on hill crests, exposed slopes, ridges or upper slopes of hilly terrain on south or south-east aspect. It also occurs on sheltered slopes, gullies and on lower slopes, depending on the topographic position of the sclerophyll-rainforest margin. Sites are at low to mid elevation (150-450 m above sea level). Soils are generally shallow, stony, well drained and derived from metasediments or dark brown or chocolate soils of basaltic origin.	Limited suitable habitat was observed on-site, however, there is a lack of confirmed records of the uncommon species within the local area. Hence it is unlikely that the specimen is present on-site.	Unlikely
Cupaniopsis shirleyana	Wedge-leaf Tuckeroo	Vulnerable	3205	The Wedge-leaf Tuckeroo occurs in a variety of dry rainforest vegetation types, including vine thicket communities on hillsides, stream beds and along	The site was observed to lack suitable habitat for this species. Further, no local	Unlikely

Scientific name	Common name	Status	EPBC code	Description of preferred habitat	Analysis	Likelihood of occurrence (on-site)
				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.	sightings have been recorded of this species.	
Cupaniopsis tomentella	Boonah Tuckeroo	Vulnerable	3322	Boonah Tuckeroo is known only from an area between Boonah and Ipswich in south-eastern Queensland. It grows in vine thickets predominantly on fertile clay soils.	The site is located outside of the distribution range for this species, being isolated to Boonah to the south-west of the site. Further, no TECs associated with the occurrence of this species was observe on or proximal to the proposed action bounds.	Unlikely
Cycas ophiolitica	-	Endangered	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 with *Corymbia intermedia, Eucalyptus drepanophylla* and *E. tereticornis*.	No confirmed local records of this species, which is endemic to Queensland, occurring between Marlborough and Rockhampton.	Unlikely
Dichanthium setosum	Bluegrass	Vulnerable	14159	Dichanthium setosum is associated with heavy basaltic black soils and stony red-brown hard-setting loam with clay subsoil and is found in moderately	No suitable habitat was observed on-site. Further, none of the six EPBC listed TECs where the species is known to	Unlikely

Scientific name	Common name	Status	EPBC code	Description of preferred habitat	Analysis	Likelihood of occurrence (on-site)
				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. The distribution of this species overlaps with six (6) EPBC listed TECs.	occur in association with were observed on or surrounding the site during field survey.	
Macadamia integrifolia	Macadamia Nut	Vulnerable	7326	The Macadamia Nut grows in remnant rainforest. It prefers to grow in mild frost-free areas with reasonably high rainfall. Vegetation communities range from notophyll mixed forest, extremely tall closed forest, simple notophyll mixed very tall closed forest to simple microphyll-notophyll mixed mid-high closed forest with Araucaria and Argyrodendron emergents.	Suitable habitat was observed in association with the rehabilitated LRSA TEC located off-site to the west and on-site within the central-western extent. Particular attention was made to identify whether this species was present. One individual specimen was located and recorded within the LRSA TEC situated off-site. No specimens were observed on-site.	May
Macadamia tetraphylla	Rough-shelled Bush Nut	Vulnerable	6581	Rough-shelled Bush Nut is a rare species that generally occurs in subtropical rainforest and complex notophyll vineforest, at the margins of these forests and in mixed sclerophyll forest. It occurs in restricted habitat, growing on moderate to steep hillslopes on alluvial soils at well-drained sites. The species grows at altitudes from 10 to 460 m asl.	Suitable habitat was observed in association with the rehabilitated LRSA TEC located off-site to the west and on-site within the central-western extent. Particular attention was made to identify whether this species was present. Due to the lack of local recordings and no sightings made of the specimen on-site, it is highly unlikely that this species is present within or proximal to the subject site.	Unlikely

Scientific name	Common name	Status	EPBC code	Description of preferred habitat	Analysis	Likelihood of occurrence (on-site)
Notelaea ipsviciensis	Cooneana Olive	Critically Endangered	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 adjacent to subdivided, modified and developed land.	This species is known from three closely clustered sub-populations in the Ipswich area (Dinmore) of southern Queensland. These locations are more than 7 km from the project. It is unlikely that the species would occur on-site due to its rarity and the isolated circumstances of current populations.	Unlikely
Notelaea lloydii	Lloyd's Olive	Vulnerable	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.	No local species records have been recorded within 7 km of the project, nor were any recorded during field survey.	Unlikely
Phaius australis	Lesser Swamp-orchid	Endangered	5872	The Lesser Swamp-orchid is commonly associated with coastal wet heath/sedge land wetlands, swampy grassland or swampy forest and often where Broad-leaved Paperbark or Swamp Mahogany are found. Typically, the Lesser Swamp-orchid is restricted to the swamp-forest margins, where it occurs in swamp sclerophyll forest (Broad-leaved Paperbark/Swamp Mahogany/Swamp Box (Lophostemon suaveolens), swampy rainforest (often with sclerophyll emergent), or fringing open forest. It is often associated with rainforest elements such as Bangalow Palm (Archontophoenix cunninghamiana) or Cabbage Tree Palm (Livistona australis).	No suitable habitat was observed on-site.	Unlikely

Scientific name	Common name	Status	EPBC code	Description of preferred habitat	Analysis	Likelihood of occurrence (on-site)
Plectranthus habrophyllus	-	Endangered	64589	Restricted to south east Queensland, near Ipswich and near Ormeau, south of Beenleigh. Plants have been recorded growing on chert or sandstone outcrops, in open woodlands often in shaded situations near vine forest.	Suitable habitat was identified on-site. Species-specific surveys failed to identify the species within the proposed action bounds. The species was however recorded off-site to the south-west. The species has been recorded flowering in February, August and December by the Queensland Herbarium. The site was traversed in March, August and September, 2019. Historical and recent records of the species proximal to the project area exist. Despite thorough searches being undertaken, the species was not identified on-site.	Likely
Samadera bidwillii	Quassia	Vulnerable	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.	Potential habitat was observed on-site, however, no confirmed sightings of the uncommon species have been recorded within the local area, and no specimens were observed during field survey.	Unlikely
Streblus pendulinus	Siah's Backbone	Endangered	21618	Siah's Backbone is a Norfolk Island endemic and consists of a population of 187 mature individuals. On Norfolk Island, the species is recorded within: Norfolk Island National Park (167 mature individuals in 2003); Mission Road rainforest remnants; near	Potential habitat was observed within the rehabilitated area situated adjacent to the site boundary in the west, associated with the LRSA TEC. Specific searches were undertaken to identify	Unlikely

Scientific name	Common name	Status	EPBC code	Description of preferred habitat	Analysis	Likelihood of occurrence (on-site)
				Steels Point; Ball Bay Reserve and; Cascade Reserve. On Norfolk Island, the species is found in a variety of forest types, though it is rare.	the presence of this species, prompted by previous studies identifying the species on-site. The locations where the species has previously been recorded, along with identified suitable habitat area, were visited during detailed field survey. However, no individual specimens were identified within the proposed action area, nor proximal to site despite survey effort. Due to its unknown and rare occurrence outside of Norfolk Island, it is highly unlikely the species is present on-site.	
Thesium australe	Austral Toadflax	Vulnerable	15202	Austral toadflax is semi-parasitic on roots of a range of grass species, most notably, *Themeda triandra* (Kangaroo Grass). Previously recorded within open woodland with *Eucalyptus tereticornis* (Forest Red Gum) and *Eucalyptus tindaliae* (Tindale's Stringybark).	The site provides potentially suitable habitat, however, no confirmed sightings of the uncommon species have been recorded within the local area, nor was this species identified during field survey effort.	Unlikely
Reptiles						
Caretta caretta	Loggerhead Turtle	Endangered	1763	Loggerhead turtles have a worldwide tropical and subtropical distribution. In Australia, they occur in coral reefs, bays and estuaries in tropical and warm temperate waters off the coast of Queensland, Northern Territory, Western Australia and New South Wales.	No suitable habitat observed on-site.	Unlikely

Scientific name	Common name	Status	EPBC code	Description of preferred habitat	Analysis	Likelihood of occurrence (on-site)
Chelonia mydas	Green Turtle	Vulnerable	1765	Green Turtles spend their first five to ten years drifting on ocean currents. During this pelagic (ocean-going) phase, they are often found in association with driftlines and rafts of Sargassum (a floating marine plant that is also carried by currents). Once Green Turtles reach 30 to 40 cm curved carapace length, they settle in shallow benthic foraging habitats such as tropical tidal and sub-tidal coral and rocky reef habitat or inshore seagrass beds. The shallow foraging habitat of adults contains seagrass beds or algae mats on which Green Turtles mainly feed.	No suitable habitat observed on-site.	Unlikely
Delma torquata	Adorned Delma	Vulnerable	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.	Although potential habitat occurs in small areas of the proposed action, no confirmed local records of this species exist and no evidence of the species was observed during field survey.	Unlikely
Dermochelys coriacea	Leatherback Turtle	Endangered	1768	The Leatherback Turtles is a highly pelagic species, venturing close to shore mainly during the nesting season. Houghton and colleagues (2008) tracked deep (300–1250 m) and protracted dives (> 1 hour) by Leatherback Turtles in the North Atlantic. It is known from waters all around Australia and can be found foraging year round in Australian waters over Australian continental shelf waters. There are three former nesting sites in Queensland: Wreck Rock beach, Moore Park Beach, and Mon Repos beach.	No suitable habitat observed on-site.	Unlikely

Scientific name	Common name	Status	EPBC code	Description of preferred habitat	Analysis	Likelihood of occurrence (on-site)
Eretmochelys imbricata	Hawksbill Turtle	Vulnerable	1766	Hawksbill Turtles spend their first five to ten years drifting on ocean currents. During this pelagic (ocean-going) phase, they are often found in association with rafts of *Sargassum* (a floating marine plant that is also carried by currents). Once Hawksbill Turtles reach 30 to 40 cm curved carapace length, they settle and forage in tropical tidal and sub-tidal coral and rocky reef habitat. They primarily feed on sponges and algae. They have also been found, though less frequently, within seagrass habitats of coastal waters, as well as the deeper habitats of trawl fisheries.	No suitable habitat observed on-site.	Unlikely
Furina dunmalli	Dunmall's Snake	Vulnerable	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	No confirmed local records of this species.	Unlikely

Scientific name	Common name	Status	EPBC code	Description of preferred habitat	Analysis	Likelihood of occurrence (on-site)
				between Inglewood and Texas, Rosedale, Yeppoon and Lake Broadwater Conservation Park.		
Lepidochelys olivacea	Olive Ridley Turtle	Endangered	1767	Female Olive Ridley Turtles lay clutches of eggs on sandy beaches, hatchlings disperse into offshore currents and have a pelagic phase of unknown length. Small juveniles through to adults reside in coastal zones along the northern coast of Australia and historical bycatch data indicates that large immature and adult-sized Olive Ridleys are present all year round over soft bottomed habits of northern Australian continental shelf waters.	No suitable habitat observed on-site.	Unlikely
Natator depressus	Flatback Turtle	Vulnerable	59257	Adults inhabit soft bottom habitat over the continental shelf of northern Australia, extending into Papua New Guinea and Irian Jaya although the extent of their range is not fully known. Capture locations from trawlers indicate that Flatback Turtles feed in turbid, shallow inshore waters north of latitude 25° S in depths from less than 10 m to depths of over 40 m. Nesting habitat includes sandy beaches in the tropics and subtropics with sand temperatures between 25 °C and 33 °C at nest depth.	No suitable habitat observed on-site.	Unlikely
Saiphos reticulatus	Three-toed Snake-tooth Skink	Vulnerable	88328	The Three-toed Snake-tooth Skink has been found in loose, well mulched friable soil, in and under rotting logs, in forest litter, under fallen hoop pine bark and under decomposing cane mulch. In Queensland, the Three-toed Snake-tooth Skink has been recorded in rainforest, closed forest, wet sclerophyll forest, tall	No suitable habitat was observed on-site. No confirmed local observations of this species.	Unlikely

Scientific name	Common name	Status	EPBC code	Description of preferred habitat	Analysis	Likelihood of occurrence (on-site)
				open Blackbutt (Eucalyptus pilularis) forest, tall layered open eucalypt forest and closed Brush Box (Lophostemon confertus) forest.		

6. Assessment against the significant impact guidelines for Lowland Rainforest of Subtropical Australia

The *Lowland Rainforest of Subtropical Australia* TEC is listed as critically endangered under the EPBC Act. Therefore, any assessed impact of a proposed action on-site would trigger the proponent to make a further subsequent decision regarding whether or not to refer the action.

As detailed in **Section 4.2**, the LRSA TEC was ground-truthed within the central-western extent of the site and outside of the western bounds where rehabilitation efforts have occurred (refer **Plan 2**). Species identified within the LRSA TEC's were reflective of Endangered RE12.3.16 – see **Section 4.2.2** for flora species and LRSA characteristics observed within the proposed action area. The LRSA TEC situated outside of the site bounds is not proposed to be impacted as a result of the proposed action, hence, the LRSA TEC ground-truthed within the central-western site bounds will be assessed throughout the following section only.

The plan of development should be reviewed in conjunction with the significant impact guideline. 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. **reduce the extent of an ecological community**

   Assessment: The LRSA TEC was ground-truthed within the central-western extent of the proposed action area. The TEC was observed to be restricted to the gully line and extending off-site toward Opossum Creek in an east-west direction. Endangered RE12.9-10.15 vegetation abuts the northern edge of the LRSA TEC (Endangered RE12.3.16). The proposed action will avoid clearing vegetation within the Endangered RE's and retain these areas as bushland vegetation. In addition, surrounding vegetation will be retained to ensure a buffer is applied to the Endangered vegetation on-site. Hence, the area of the LRSA TEC will not be reduced in extent, and will be enhanced and rehabilitated (e.g. weed removal) as a result of development.

2. **fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines**

   Assessment: The LRSA TEC on-site will be retained in its entirety as a result of the proposed action. The total extent of the TEC within the proposed action boundary is narrow and small in area due to being restricted to the gully line. Further, surrounding vegetation communities have been observed to dominate the areas immediately outside of the gully area. The proposed action will not result in the clearing of the TEC, although bushland habitat surrounding this vegetation community will largely be removed as a result of this action. Fragmentation of the LRSA TEC is not proposed as a result of this action, nor will this action result in the isolation of any sections of the currently intact LRSA TEC. Construction works including

roads and transmission lines will be avoided within this area to ensure the LRSA TEC is retained *in situ*.

3. **adversely affect habitat critical to the survival of an ecological community**

   Assessment: The ground-truthed LRSA TEC was observed to be restricted to the gully line within the central-western extent of the proposed action. On-ground field survey identified that the *in situ* vegetation characteristics existed across a smaller area than that currently mapped. Endangered RE12.9-10.15 abuts the northern boundary of the LRSA TEC mapped as RE12.3.16. Both regional ecosystems will be retained as a result of the proposed action, where a buffer of additional vegetated bushland (consisting Of Concern composite regional ecosystem attributes) will be maintained to ensure potential impacts on the proposed action are minimised and mitigated. The buffer area will ensure the existing vegetation characteristics and value will be protected and reduce potential edge effects and the potential for development impacts resultant of the action. Therefore, due to the retention of the Endangered RE12.3.16 and RE12.9-10.15, and surrounding composite Of Concern regional ecosystem values, it is unlikely that the proposed action will adversely affect habitat critical to the survival of the LRSA TEC.

4. **modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns**

   Assessment: During field survey, the LRSA TEC was ground-truthed to be restricted to a gully line within the central-western extent of the proposed action area. The LRSA TEC extends in an east-west direction and connects to Endangered RE12.9-10.15 where it follows Opossum Creek to the north. The proposed action will retain the LRSA TEC as a result of development, where additional vegetation situated within the composite Of Concern regional ecosystem in the western portion of the subject area will be retained as a buffer to development works. The proposed action is not anticipated to modify or destroy abiotic factors as best of practice mechanisms and standards will be implemented during works associated with the proposed action. Further, monitoring of water runoff and soil stability will occur to ensure no significant changes occur. In addition, as the proposed action will retain a large amount of bushland to the west of the LRSA TEC as a buffer to development, it is unlikely that resultant alterations to ecosystem processes and functionality will occur. Existing contours within the LRSA TEC and within a buffer area will remain, minimising the potential for modification of current ecosystem functionality. Hence, the proposed action is unlikely to modify or destroy abiotic factors essential to the LRSA TEC.

5. **cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting**

   Assessment: The LRSA TEC was ground-truthed during field survey effort and was observed to be restricted within a gully line traversing the central-western portion of the proposed action area. Due to the location of the indicator regional ecosystem, Endangered RE12.3.16, the

proposed action will not directly impact (*i.e.*, vegetation clearing, earthworks) the existing ecological characteristics associated with the LRSA TEC. The retention of a vegetated buffer surrounding the LRSA TEC (consisting of Endangered RE12.9-10.15 and composite Of Concern regional ecosystems) is anticipated to reduce the potential for species loss or decline within and bounding the LRSA TEC. The buffer area between the LRSA TEC and proposed development will ensure existing vegetation values are retained *in situ* and hence protect the biodiverse environment associated with and allowing the continuation of this TEC. As the proposed action will not result in clearing of the LRSA TEC nor of vegetation within the immediate surrounds, it is not anticipated that the proposed action will result in substantial changes to species composition nor result in a reduction of species diversity or presence.

6. cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:

- **assisting invasive species, that are harmful to the listed ecological community, to become established, or**

Assessment: Predation by the European Red Fox, biological effects (toxic ingestion) caused by the Cane Toad, and the invasion of escaped garden plants are included within the key threatening processes that are considered relevant to the LRSA TEC (Department of Sustainability, Environment, Water, Population and Communities, 2011). Field survey recorded Red Fox, Cane Toad and Ochna (*Ochna serrulata*) specimens within the proposed action boundary, indicating the LRSA TEC on-site is already exposed to harm from invasive species. Ochna is included within the most damaging weed species that are known to infest this TEC, and should be managed to prevent impacts to the integrity of the LRSA TEC. As a result of the proposed action, pest management mechanisms will be implemented to reduce existing threats. Further, the proposed action is not anticipated to result in an increase of invasive species within the LRSA TEC due to the current existence of invasive species and subsequent rehabilitation efforts.

- **causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community, or**

Assessment: Works associated with the proposed action are not anticipated to result in regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the TEC. Best of practice mechanisms and standards will be implemented during works associated with the proposed action to ensure no runoff within the potential to inhibit or kill the growth of species in the TEC occur. Further, the retention of a vegetated buffer area will enhance water filtration processes and support ecosystem health and functionality.

7. interfere with the recovery of an ecological community.

Assessment: The LRSA TEC was ground-truthed to be largely restricted to a gully line situated within the central-western extent of the site. As a result of the proposed action, the regional ecosystem associated with the TEC, Endangered RE12.3.16, is proposed to be retained with

an additional vegetation buffer consisting of composite Of Concern vegetation characteristics. As the LRSA TEC is proposed to be retained *in situ* with the inclusion of a buffer to the proposed impact area, the proposed action is not anticipated to interfere with the recovery of the LRSA TEC.

7. Assessment against referral guidelines for the Koala

Commonwealth approval is required for an action that has, will have, or is likely to have a significant impact on a species listed in any of the following categories:

- extinct in the wild;
- critically endangered;
- endangered; or
- vulnerable.

An action will also require approval if the proposed action has, will have, or is likely to have a significant impact on an ecological community listed in any of the following categories:

- critically endangered; or
- endangered.

To determine whether the proposed action will have an impact on the Koala, the Koala Guidelines (**Figure 3**) have been responded to in the following sections of this report.

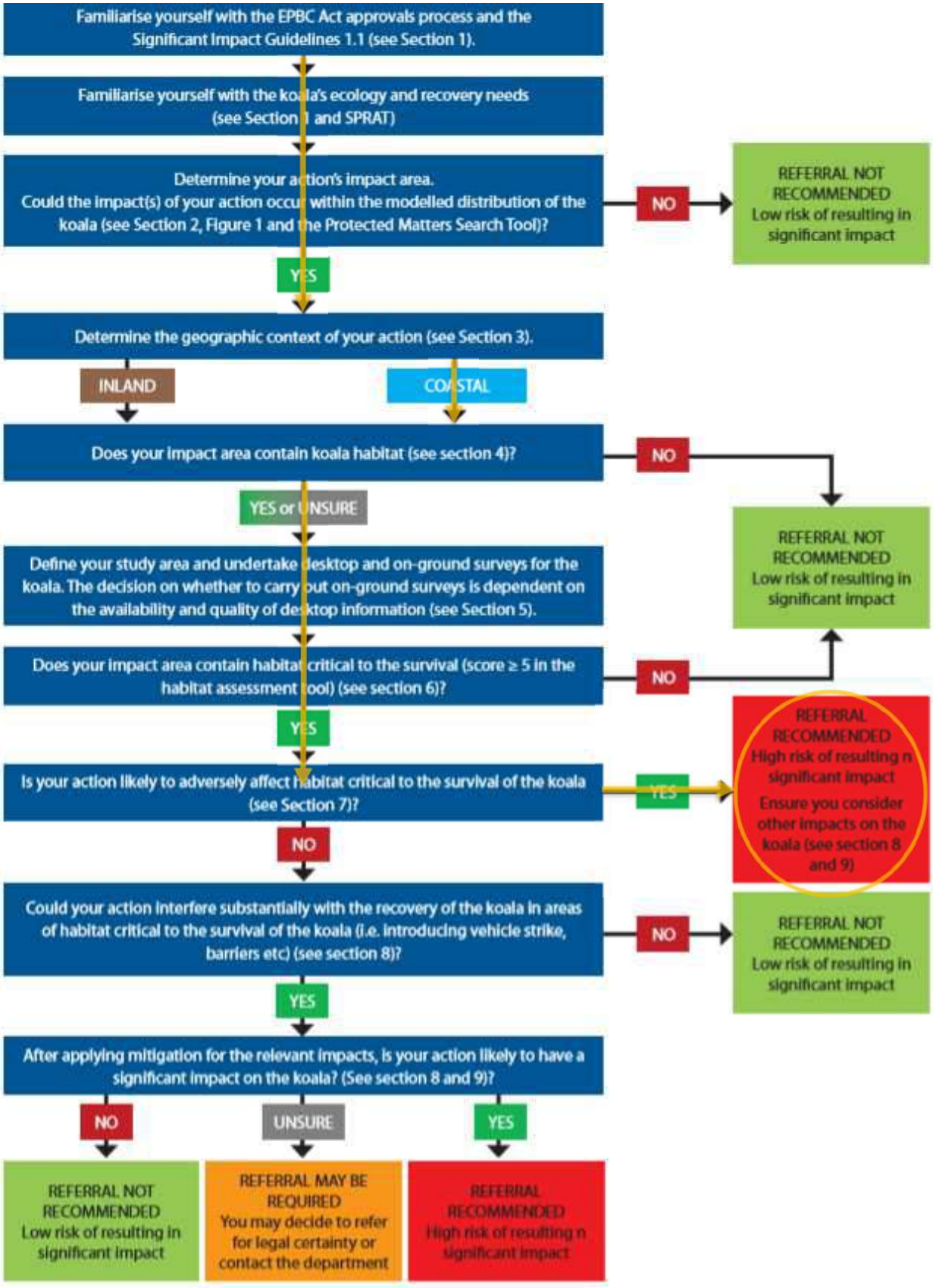
7.1. Stage 1 – Modelled distribution and geographical context

The Modelled Distribution of the Koala contained within the Guidelines encompasses most areas of Queensland, New South Wales and the Australian Capital Territory. A search of the EPBC Act PMST within a 5 km buffer lists the Koala as a species or species habitat known to occur within the area (**Appendix A**). As per the Guidelines, the location of the proposed action is therefore considered to fall within the modelled distribution of the Koala. Koala sightings have been recorded within 2 km of the proposed action in the last 5 years according to publicly available data (via BioMaps, ALA and AFK databases). No Koala sightings have been recorded in the proposed action boundary within the last 10 years according to these databases.

The Guidelines separate the geographical context into two zones, inland and coastal, based on the 800 mm per annum rainfall isohyet. The proposed action is located within the "coastal" area as per the Department's distribution map. Therefore, the coastal habitat attributes contained in the Guidelines are relevant when using the Habitat Assessment Tool later down the flow chart.

The proposed action is located within the coastal context of the modelled distribution area, Koalas have been recorded within a 2 km radius and Koala scats were found within the proposed action bounds. Therefore, further consideration under the assessment guidelines is justified.

Figure 3: Summary of the EPBC Act referral guidelines for the Koala



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

The 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 is contained within Section 6 of the 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 critical habitat for the Koala under the Koala Guideline. **Table 14** provides an assessment against the five primary Koala habitat attributes for the referral area.

The assessment is based on field surveys carried out by SHG during field survey effort detailed in **Section 4**. Survey methodology utilised and field survey results relevant to the referral area are outlined in **Sections 2.2.7** and **4**.

Table 14: Koala habitat assessment

Attribute	Score	Comment
Koala occurrence	**2**	<u>Desktop</u> The PMR using a 5 km radius identified the Koala as having the potential to occur on-site. The Wildlife Online extract identified 175 records of Koala, while a search of the ALA database indicates 30 records for the species within a 5 km radius of the site. <u>On-ground</u> Surveys conducted by SHG (March, August and September 2019) resulted in indirect evidence of Koala in the form of scats which were located under a number of trees across the site. A total of 8 SAT surveys were completed across the proposed action area. Notably, no physical observations of Koala were made during field survey. Data collected during the 8 SAT surveys was assessed and showed low Koala usage across the site, in accordance with the East coast (med-high) benchmark[1]. Hence, it is inferred that Koala usage of potential habitat within the proposed action area is low. **There is evidence that one or more Koalas may have utilised the site within the last 2 years. This attribute has been given a score of 2.**

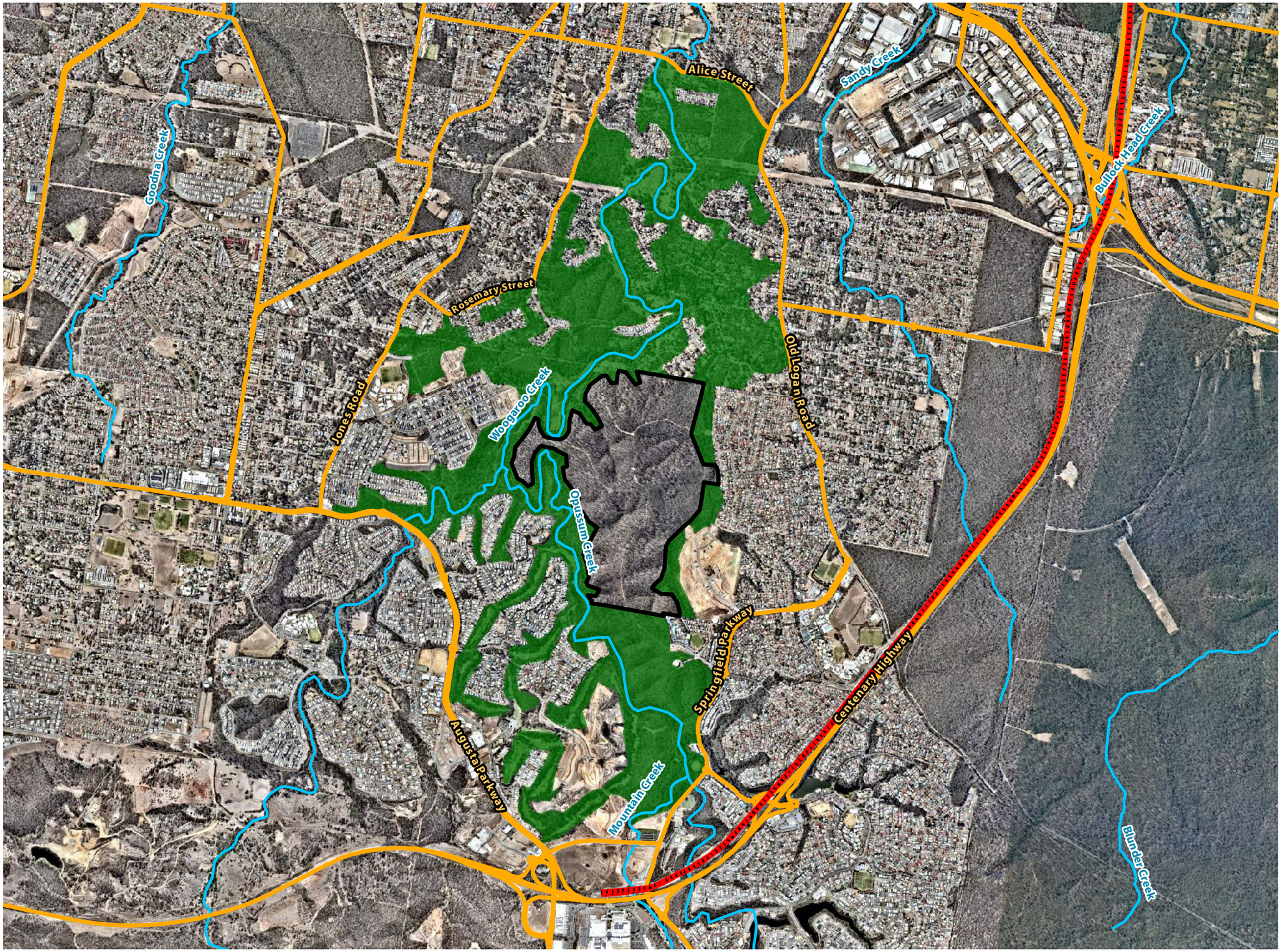
Attribute	Score	Comment
Vegetation composition	**2**	<u>Desktop</u> Regional ecosystem mapping published by the Queensland Government identifies the proposed action area as containing mostly remnant (Category B) Endangered and composite Of Concern regional ecosystems, and non-remnant (Category X) vegetation. Remnant vegetation communities mapped on-site include a number of eucalypt and Corymbia species which are known Koala food trees. <u>On-ground</u> The site contains a mix of recognised Koala trees in varying densities and maturity. This includes *Eucalyptus tereticornis* (Forest Red Gum), *Eucalyptus fibrosa* (Broad-leaved Ironbark), *Eucalyptus crebra* (Narrow-leaved Ironbark), *Eucalyptus siderophloia* (Northern Grey Ironbark), *Corymbia citriodora* (Spotted Gum), *Eucalyptus propinqua* (Grey Gum) and *Eucalyptus moluccana* (Gum-topped Box). **The site contains a 'woodland' or 'open forest' with two or more known Koala food tree species, the vegetation composition attribute is given a score of 2.**
Habitat connectivity	**2**	The proposed action is surrounded by highly modified lands where intact bushland has been considerably degraded and fragmented as a result of urbanisation. This has resulted in the modification of existing vegetation values in the immediate area due to encroaching development. Connectivity potential exists in association with Woogaroo and Opossum Creeks adjacent to the western bounds of the site, and the unnamed waterway adjacent to the eastern boundary of the site. The waterways extend into the landscape and were observed to contain retained vegetation in the riparian zone potentially suitable to Koala dispersal requirements. This vegetation is largely retained as narrow lineal strips and is exposed to considerable edge effects from surrounding urban development, including noise and light pollution, and weed invasion (refer **Plan 5**). Two larger intact patches of vegetation exist to the east and south of the site, south of the Centenary Highway. This vegetation consists of known Koala habitat food trees, however, safe pathway to facilitate Koala movement is effectively limited by high density residential development, the Centenary Highway, Springfield Rail Line, a number of high trafficked roadways and planned clearing associated with future residential development. Koala dispersal capacity into these areas from site is hence somewhat limited. Importantly, the existence of the anthropogenic barriers surrounding the site may pose significant threats to Koala injury due to increased vehicle strike and the presence of domestic dogs. In addition, Ipswich City Council (ICC) website states that more than 6,500 ha of eucalypt and other native forest have been purchased for the purpose of conservation. The intention of these conservation efforts is to provide a safe haven for Koalas and other species across the landscape, distanced from the urban environment and associated threats. A number of privately and publicly owned protected areas exist within the Ipswich area, however, the project area is not identified to be suitable for conservation efforts in this regard.

Attribute	Score	Comment
		The Flinders Karawatha Corridor is situated to the south of the site and constitutes a large area of vegetation deemed significant to biodiversity and fauna movement across the landscape. The corridor provides enhanced opportunities for Koala movement within an intact environment where anthropogenic barriers are absent. It is anticipated that the protection of this area is more suitable and safe for unimpeded Koala movement and existence. Conversely, relatively intact vegetation considered suitable to facilitate Koala movement within the immediate landscape exists from the site (refer **Plan 5**). Although a large amount of this vegetation abuts highly modified areas, particularly high density residential uses, it is still anticipated to provide suitable habitat to Koalas dispersing throughout the landscape. Koala utilising this vegetation are considered to be transient species due to the lack of substantial intact patches of vegetation. Due to the dominance of lineal strips of bushland being retained proximal to the site, it is considered that significant edge effects impact this vegetation and expose any existing Koala to threats including vehicle strike, deterrence by humans, dog attack and stress related to disorientation. Due to the size of the site and waterways branching away from site which contain retained vegetation suitable to the Koala, the site is considered to be a part of a contiguous landscape of less than 500 ha but more than 300 ha. **Connectivity of the site to suitable habitat values is relatively limited due to historical and ongoing disturbances, specifically urban development. However, due to the retention of mostly lineal bushland strips and intact vegetation on-site, the site is considered to be part of a contiguous landscape more than 500 ha. For this reason, the site has been designated with a habitat connectivity score of 2.**
Key existing threats	**1**	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 AKF Koala map, ALA Koala data and recent wildlife organisational publications shows that one Koala death has occurred proximal to the site, being on Augusta Pkwy. The death was recorded on 9 January 2010 according to the AFK Koala map, and was situated approximately 1.5 km south-west of the subject site. Further, two Koalas have been observed to be sick/injured to the north of the site, recorded in October 2016 and January 2019. 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 immediately surrounding the site will result in increased traffic flows and loss of suitable habitat.

Attribute	Score	Comment
		<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, ICC'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. Due to the highly urbanised surrounding area, it is considered that the presence of dogs in residential backyards is increased, enhancing the potential for domestic dog access. Further, members of the public were observed utilising the site during field survey to walk their dogs both on- and off-leash. Fauna protection fencing around the site is not present, allowing easy accessibility by dogs. In addition to the risk of dog attack, the EPBC-listed invasive species, Red Fox (*Vulpes vulpes*) was sighted on-site during field survey effort and a potential den site was recorded (refer **Plan 4**). The impact of foxes on Koala mortality rates is more recently being considered as an active threat to Koalas as opportunistic attacks are likely to occur when prey species abundance is lowered (Commonwealth of Australia, 2011; Department of Environment & Climate Change NSW, 2008). Due to habitat fragmentation and removal, Koalas are forced to move across the ground for longer periods of time. As a fox was observed utilising the site, it is confirmed that there is an additional active threat to the Koala on-site. **As there is evidence of threats from vehicle strikes and dog attacks within the area, along with the presence of the EPBC-listed invasive species, Red Fox, the key existing threats attribute has been given a score of 1.**
Recovery value	**0**	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 maintain corridors and connective habitat that allows movement of Koalas between large areas of habitat. The site area is situated within high density urban development where it is relatively isolated from surrounding suitable habitat in its existing state. As development progresses within the local area, further fragmentation will occur resulting in fewer fauna movement opportunities. The surrounding locality is earmarked for development to cater for future population growth within SEQ, and hence continued modification and isolation of vegetation is anticipated to occur. Although there are patches of vegetation of varying quality proximal to the project, approved development will impact this vegetation either directly or indirectly (e.g., edge effects). This will also result in additional barriers including roads and

Attribute	Score	Comment
		incompatible urban landscapes. The movement of fauna to and from the site will become dangerous and likely lead to increased Koala mortality. The subject site has been modified previously due to logging and some internal clearing to facilitate access tracks and maintain the property. Vegetation on-site is generally intact, and contains known Koala food trees. However, due to urban development encroaching the boundary of the site, it is not considered that the site will be important in the recovery of the Koala. This is because the site is relatively isolated from surrounding habitat, and hence is not considered viable to support a population of Koala. The site is therefore not considered to be connected to areas of Koala habitat as anthropogenic barriers in the form of roads and urbanisation limit dispersal capacity. The local Koala population is not considered genetically distinct from other Koala populations in SEQ. While the health of the local Koalas is unknown, diseases such as Chlamydia and Koala Retrovirus are extremely prevalent amongst SEQ Koalas. Environmental corridors are generally considered to provide the most effective habitat value and connectivity when edge effects are minimised. Strategic planning of the Flinders Karawatha Corridor ensures environmental values and the provision of opportunities for fauna dispersal are maintained across the landscape. As such, within the broader landscape, the subject site is not considered to provide Koala habitat critical to the longevity of the population. Potential dispersal to surrounding bushland habitat is extremely limited, as discussed. Potential recovery and persistence is highly restricted due to past disturbances on-site (evidenced by Lantana infestations within the drainage lines and along tracks), extensive urban development and internal track clearing. Further, residential development has been approved within the surrounding area and will increase the isolated state of the site from suitable habitat. In summary, the recovery value of the referral area is compromised by its urban footprint designation, the existing and future planned urban development within the local area, current isolated state and existing disturbances from historical land use practices. **The 'recovery value' attribute has been given a score of 0.**
Total	**7**	**As the habitat score is more than 5, the site is considered to provide critical habitat for the Koala.**

5. Habitat Connectivity



NOTES
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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
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Aerial Imagery © Nearmap, 2019

Legend

- Referral site
- Qld DCDB
- Waterway
- Arterial/major roads
- Springfield rail line
- Habitat connectivity (>500 ha)

Issue	Date	Description	Drawn	Checked
A	22/10/2019	Preliminary	TC	HS

0 200 400 600 m

Transverse Mercator | GDA 1994 | Zone 56 | 1:30,000 @ A3

saunders havill group

Cherish Enterprises Pty Ltd

Mur Boulevard, Springfield

ADDRESS/RPD: Mur Boulevard, Springfield *22/10/2019* *9612 E 05 Connectivity Assessment A*

7.3. Stage 3 – Adverse Effects on Critical Habitats

7.3.1 Is the action likely to adversely affect Koala habitat?

As woodland areas on the site of the proposed action achieve critical status (a score ≥ 5), the next stage of assessment—assessing whether the proposed 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 Koala Guidelines with a flowchart provided to help proponents make an assessment on whether the proposed action should be referred. Assessment of the proposed action at Mur Boulevard against the flowchart is described below.

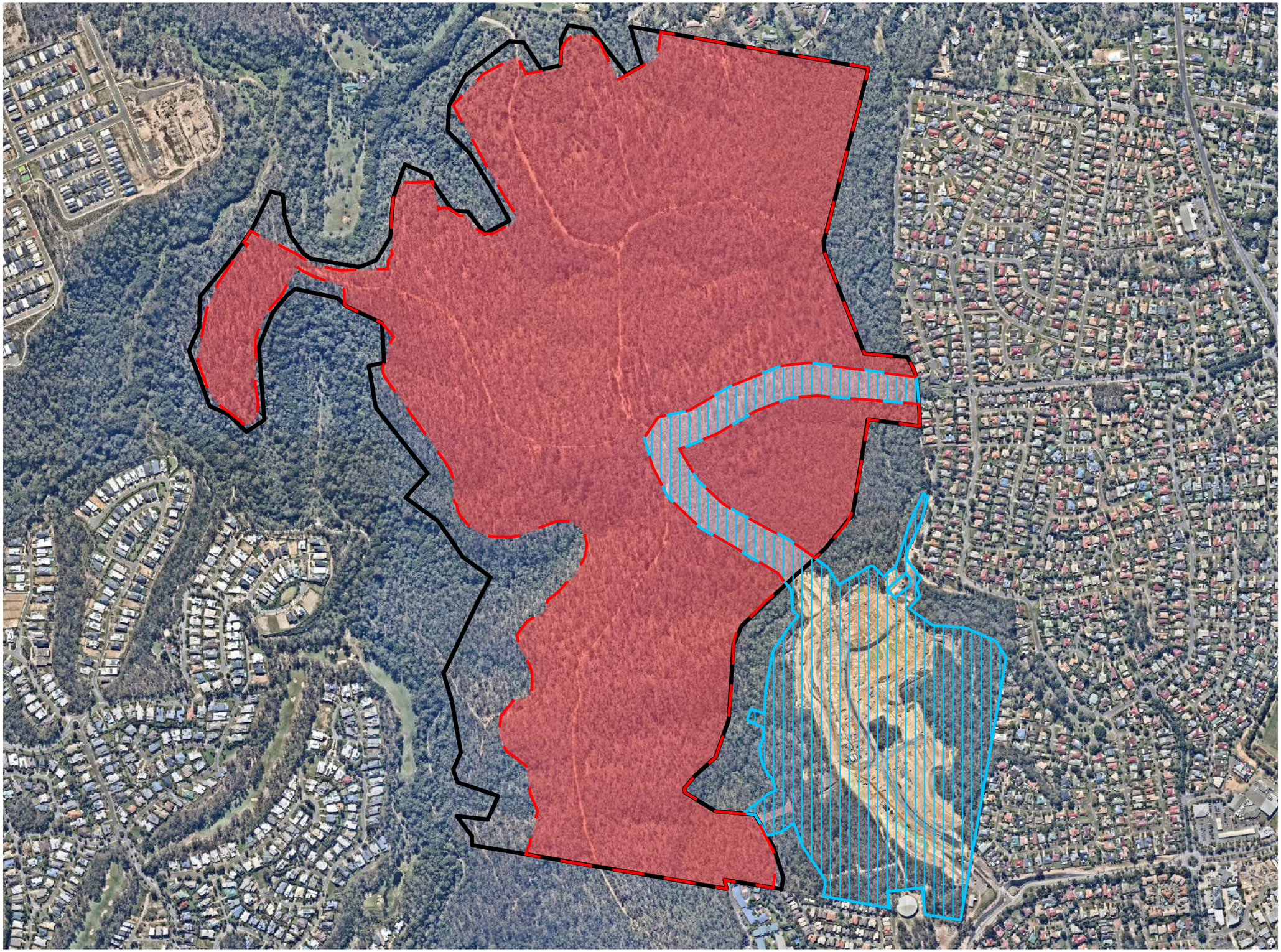
- **Does your impact area contain habitat critical to the survival of the koala (habitat score ≥ 5)?** – Yes, the woodland areas on the property were given a habitat score of 7, which is considered critical habitat under the Guidelines.
- **Do the area(s) proposed to be cleared contain known koala food trees?** – Yes, the on-ground assessment found Koala food trees in woodland areas within the referral area.
- **Are you proposing to clear ≤ 2 ha of habitat containing known koala food trees in an area with a habitat score of 5?** – An area of more than 2 ha is proposed to be cleared (refer **Figure 2**), where the referral area has a habitat score of 7.
- **Are you proposing to clear ≥ 20 ha of habitat containing known koala food trees in an area with a habitat score of ≥ 8?** – The proposed action will result in the direct impact (clearing) of approximately 136 ha of native vegetation that is habitat for the Koala, and an indirect impact of an additional 26 ha of native vegetation, where the referral area has a habitat score of 7 (refer to **Plan 6**).

Reviewing the site of the proposed action against the characteristics outlined in the flowchart indicates the proposed action displays the following characteristics that reduce adverse effects:

- The retention of native vegetation including Endangered regional ecosystems will occur mostly within the western extent providing a buffer of vegetation between the proposed action and ecologically valuable areas. The retention of this vegetation is mostly associated with Woogaroo and Opossum Creeks (both creeks are situated adjacent to the western boundary of the site) facilitating continued connectivity opportunity across the landscape.
- Evidence of Koala activity was observed within the referral area in the form of scats, where no physical observations were recorded. The retention of vegetation associated with the waterways to the west will ensure continued habitat opportunity for any transient Koala specimens.
- Clearing will not exacerbate fragmentation as development works are proposed to be situated within areas already showing signs of disturbance (*i.e.*, established access tracks and selective clearing). Development design ensures isolation of habitat does not occur, and facilitates continued fauna movement corridors across the area.

The direct impact (clearing) and functional loss of approximately 136 ha of woodland containing Koala food trees in an area with a critical habitat score of 7 will reduce the amount of potential habitat for the Koala in the region.

6. Critical Habitat Analysis



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Legend

- Referral site
- EPBC 2014/7306

Critical habitat impact analysis

- Referral site critical habitat impact area - 136 ha
- Referral site critical habitat impact area approved under EPBC 2014/7306 - 8 ha

Issue	Date	Description	Drawn	Checked
A	22/10/2019	Preliminary	TC	HS

0 40 80 160 240 320 m

Transverse Mercator | GDA 1994 | Zone 56 | 1:8,500 @ A3

saunders havill group

Cherish Enterprises Pty Ltd

Mur Boulevard, Springfield

ADDRESS/RPD: Mur Boulevard, Springfield *22/10/2019* *9612 E 06 CH Assessment A*

7.3.2 Could the action interfere with the recovery of the Koala?

For further clarity, the next step is to ascertain whether or not the proposed 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 Guidelines to help proponents make an assessment on whether residual impacts are likely to be significant and therefore require referral.

Possible impacts listed in the 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, are discussed in **Table 15**. The mitigation strategy addresses potential impacts of clearing associated with the proposed action, and the management of existing threats within the landscape.

Table 15: Residual impact assessment

Dog attack
The proposed action is unlikely to significantly increase the incidence of dog attack. High density residential properties within the surrounding landscape are likely to mean that dogs are present in the area. Domestic dogs were observed on-site where members of the public were walking their dogs throughout the area. This provides direct evidence that dogs are present within the landscape and are kept within residential yards proximal to the proposed action. The presence of the dogs may account for the low level of Koala evidence and inferred low Koala usage within and proximal to the proposed action bounds, where the existence of dogs surrounding the site may deter Koala occurrence. Current and future development is anticipated to result in an increased number of dogs within the area. **No residual impacts are identified.**
Vehicle strike
It is likely that vehicle activity in the area will increase as a result of development on the site of the proposed action. Given the subject site is already surrounded by highly frequented roads (e.g. Centenary Highway and Augusta Parkway) and the extensive network of roads within surrounding residential estates, interaction between vehicles and Koalas is considered unlikely to increase significantly as a result of the proposal. Road design, signage, and the imposition of a low vehicle speed will help mitigate any potential risks to Koalas. Further, fauna protection fencing will increase Koala protection and work to deter fauna from accessing roads. **No residual impacts are identified.**
Disease and pathogens
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 referral area (evidenced by sick Koala sightings found during desktop searches to the east). The proposed action is unlikely to cause pressure on the local Koala population to the point where these diseases manifest and the proposed action is extremely unlikely to introduce or spread disease or pathogens into significant Koala habitat areas.

No residual impacts are identified.

Barriers to dispersal

While the development will remove areas of Koala food trees, it is arguable that this will result in significant negative impacts to dispersal given the disturbed state of vegetation on-site, existing barriers to Koala movement (*i.e.*, roads, residential estates, ongoing clearing) and further the lack of Koala sightings recorded on-site (indicating low usage). The connectivity opportunities surrounding the site are largely limited to vegetated lineal strips of known Koala food trees, often associated with waterways. The retention of vegetation along the western extent of the proposed action bounds is anticipated to provide similar ongoing fauna movement opportunities as those recognised within the surrounding landscape. Further, the proposed action does not result in the introduction of a land use currently not present within the landscape. Therefore, through the retention of vegetation adjacent to Woogaroo and Opossum Creeks as a result of the proposed action, the addition of barriers not conducive to Koala dispersal within the centre of the proposed action is not anticipated to prevent Koala dispersal, where Koala area present, throughout the landscape. The retained vegetation associated with the creeks is anticipated to facilitate continued Koala movement with the capacity to support Koala presence reflective of a low usage site.

No residual impacts are identified.

Hydrological change

The increase in hardstand areas across the proposed action area has the potential to affect 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. As no development will be occurring within any waterways mapped under the *Fisheries Act 1994* nor the *Water Act 2000* proximal to the proposed action, any impacts are likely to be restricted to overland flow, which will be appropriately managed and mitigated in accordance with State and Local Governmental requirements. As such, development is unlikely to result in hydrological changes that will further degrade the proposed action area.

No residual impacts are identified.

Field and desktop assessments against the Koala Guidelines were utilised for the following Significant Impact Assessment (**Table 16**) based on the SIG 1.1.

Table 16: Significant Impact Assessment – 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 project area is not considered to support an important population of Koala and the project is unlikely to lead to a long-term decrease in the size of any local Koala populations. Following review of a number of online databases and extensive field survey effort,	**A significant impact is not likely**

Significant impact criteria	Description	Impact
	results indicate an important population of the Koala does not exist on or within the surrounding area of the proposed action. Any Koalas utilising the site are unlikely to be necessary for maintaining genetic diversity given dispersal barriers that have been constructed (major roads, highways and urbanisation), are under construction (urban development) and are proposed (urban development) that inhibit gene flow amongst Koalas in the region. It is anticipated that any Koala individuals utilising the site are likely to be transient only, due to evidence of low usage on-site in the form of scats only and lack of physical Koala sightings on and surrounding the proposed action. Further, given the limited number of recently recorded direct sightings of the Koala within and surrounding the project area, the project area is not considered to accommodate an important population.	
2. Reduce the area of occupancy of an important population.	The project area is not anticipated to reduce the area of occupancy for an important population of Koalas due to the lack of evidence of Koala on-site. Evidence of Koala in the form of scats was observed during field survey, and was inferred to be low usage using the East Coast (med-high) benchmark[1]. Recorded sightings via a number of databases have not recorded Koala utilising the site within the last 10 years (*i.e.* ALA and BioMaps). Further, observations within the surrounding area are extremely limited. The lack of recorded sightings is attributable to the extensive urban development footprint within the surrounding area where existing habitat is mostly restricted to lineal vegetation strips and fragmented from surrounding intact bushland limited habitat connectivity opportunity exists due to highly frequented roads. The referral area is not considered to support an important population, and therefore the proposed action is not anticipated to reduce the area of occupancy of an important population.	**A significant impact is not likely**
3. Fragment an existing important population into two or more populations.	The project area is not anticipated to fragment an existing important population into two or more populations due to the site not supporting an important population. The project area was not observed to support an important population, where only evidence of low usage in the form of scats was observed during field survey. Past extensive clearing and urban development has resulted in a large percentage of the surrounding environment to be unsuitable for Koala presence. Continued residential development to facilitate population growth is planned to occur within the wider landscape, where a number of urban developments have been approved and further construction works are occurring within the surrounding area (*i.e.*, EPBC 2014/7306 adjoining the south-eastern site bounds). Further, the proposed development design seeks to avoid fragmenting smaller patches of vegetation from larger, intact vegetation. The retention of vegetation along the western extent	**A significant impact is not likely**

Significant impact criteria	Description	Impact
	abutting Woogaroo and Opossum Creeks is considered to provide continued habitat connectivity opportunity across the landscape for any transient individuals present. Consequently, the project is unlikely to fragment a population into two or more populations due to existing and future unsuitable land uses.	
4. Adversely affect habitat critical to the survival of a species.	The site of the proposed action has been historically disturbed as a result of selective clearing and recreational activities. However, critical Koala habitat is located across the site. The proposed action will result in the clearing and functional loss of approximately 136 ha of critical Koala habitat (refer **Plan 6**). As a consequence, the proposed action is likely to adversely affect habitat critical to the survival of the species.	**Likely to have a significant impact**
5. Disrupt the breeding cycle of an important population.	The site does not contain an important population of Koalas as defined under the Guidelines. Koalas were not recorded breeding on-site, and also do not require specific breeding sites. No physical observations of Koala were recorded during field survey, where only indirect evidence in the form of scats were observed. Further, little evidence of Koala has been recorded within the surrounding area within the last 10 years. This is attributable to extensive clearing and ongoing urbanisation within the Springfield locality. Therefore, the proposed development is not anticipated to disrupt the breeding cycle of Koalas, particularly those associated with an important population.	**A significant impact is not likely**
6. Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	Vegetation within the proposed action area is considered to be largely disturbed due to selective clearing and ongoing recreational activities. The removal of vegetation within the proposed action area is not considered to have a significant impact on the availability of habitat throughout the broader landscape, given that remnant vegetation and vegetation considered to be of highest ecological value is proposed to be retained. The development design is not anticipated to isolate habitat, and will ensure continued connectivity through the retention of vegetation associated with surrounding waterways (e.g. Woogaroo and Opossum Creeks). Further, due to the lack of recorded sightings of the Koala on and proximal to the referral area, and field survey only recording indirect evidence of Koala in the form of scats, a high rate of site utilisation is considered unlikely. As such, the proposal is not considered likely to lead to species decline.	**A significant impact is not likely**

Significant impact criteria	Description	Impact
7. Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.	The project area is disturbed from previous fire regimes, routine impacts to vegetation for internal access tracks, some past logging activities and extensive development surrounding the site. Infestations of *Lantana camara* (Lantana) exist within the drainage lines and are scattered in somewhat isolated patches, along with other invasive species, throughout the remaining extent of the project area. Current and past development works surrounding the site have resulted in increased edge effects including weed invasion, domestic animal presence and increased traffic and noise pollution. Notably, invasive species including the Red Fox was observed utilising the site during field survey. Further, the lack of Koala sightings within the proposed action area and surrounding landscape indicate an important population does not reside within the subject area. Therefore, the proposed development is unlikely to result in the introduction of invasive species that are harmful to vulnerable species due to pre-existing invasive weeds and invasive fauna.	**A significant impact is not likely**
8. Introduce disease that may cause the species to decline.	Most of South East Queensland's Koala populations are recorded as having a high prevalence of Chlamydia infection and Koala Retrovirus (KoRV). Sick and dead by disease Koalas have been recorded within the local area. As such, the proposed action is considered unlikely to cause pressure on the local Koala population to the point where these diseases manifest further. In addition, the site of the proposed action is highly fragmented and is extremely unlikely to introduce or spread disease or pathogens into Koala habitat areas.	**A significant impact is not likely**
9. Interfere substantially with the recovery of the species.	Assessment has concluded that the proposed action is unlikely to interfere substantially with the recovery of Koala (refer to **Table 14** and **Table 15**), primarily due to the fragmented and highly modified state of the vegetation within the proposed action area as a result of urban development, roads and cleared areas, and overall lack of suitable intact habitat within the surrounding area. Further, the existence of intact habitat to the south of the Centenary Highway is considered to provide safe and accessible habitat features to the Koala.	**A significant impact is not likely**

7.4. Stage 4 – Likelihood of Significant Impact

Saunders Havill Group carried out an assessment of clearing within the referral area at the Mur Boulevard against the EPBC Act Referral Guidelines for the Vulnerable Koala and SIG 1.1. Our assessment followed the process identified in Figure 1 of the Koala Guidelines and criteria listed in SIG 1.1. The assessments were based on relevant database searches and field surveys carried out in March, August and September 2019.

The assessment resulted in the following outcomes:

- The proposed action is located within the coastal context of the modelled Koala distribution area.
- Habitat at the site of the proposed action was assessed using criteria outlined in the Koala Guidelines and was found to have a score of 7/10. This score is considered by the Koala Guidelines to be critical habitat for the Koala. An important Koala population was not identified to exist within the proposed action area following analysis of the field and desktop assessment findings. *In situ* habitat has been modified as a result of historic and ongoing disturbances (e.g. selective clearing, recreational activities), and has connectivity opportunity to habitat proximal to the site through lineal strips of vegetation mostly associated with waterways. Existing threats in the proposed action area and within the wider locality exist, including the presence of dogs, foxes and vehicle strike.
- For clarity, the potential for development was further assessed to identify the likelihood that it will impact on Koala habitat and whether it will interfere with the recovery of the Koala, including against the SIG 1.1. The proposed action will consist of the direct impact to approximately 136 ha of critical habitat to the Koala (score of 7), however, the proposed action is not considered to interfere with the recovery of the Koala. This view is largely due to the location of the proposed action being relatively isolated from surrounding suitable large patches of intact habitat due to the existing highly modified environment. Rapid and ongoing urbanisation, and the existence of barriers such as Centenary Highway and the Springfield Rail Line and cleared areas further reduces dispersal capacity throughout the surrounding landscape. Further, due to the lack of contemporary Koala recordings within the local area, any Koala utilising the site are considered to most likely be transient and not part of a significant population within the proposed action.

Through the assessment of the proposed action against the EPBC Act *Significant Impact Guidelines 1.1* and against the *Referral guidelines for the vulnerable Koala*, the proposed action is considered to have a significant impact on 136 ha of habitat critical for the survival of the Koala.

The Koala Habitat Assessment Tool, provided in the EPBC Act *Referral guidelines for the vulnerable Koala*, attributed a score of 7/10 to the habitat situated within the referral area. As the score is greater than 5/10, the site is considered to provide critical habitat for the Koala. As such, the clearing and functional loss of 136 ha of critical Koala habitat is considered to have a significant impact on the Koala.

This opinion is based on existing experience in preparing EPBC Act referrals, consideration of field findings and analysis of habitat connectivity. It is noted that only through formal referral to the Department can an official position on a proposed action's status under the EPBC Act be determined.

8. Assessment against referral guidelines for the Grey-headed Flying-fox

Though once abundant between Rockhampton, Queensland and Mallacoota, Victoria, the range of Grey-headed Flying-fox has contracted considerably[5]. The GHFF is no longer present in the Rockhampton and Hervey Bay areas and have declined in numbers around Brisbane[6].

The GHFF is heavily dependent on the availability of foraging resources and roost sites. As canopy feeding frugivores and nectivores, GHFFs frequent fruiting and flowering trees in rainforests, open eucalypt forests, woodlands, *Melaleuca sp.* swamps and Banksia woodlands[6]. 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.

The maximum nightly foraging distance of GHFF is estimated at 50 kilometres, while most animals forage within a 15 km radius of daytime roost sites[5].

Data derived from the Department's national Flying-fox monitoring program indicates there is one GHFF camp of national importance within 15 km of the referral area, being Mount Ommaney – Westlake Drive (400). Six GHFF camps of other importance and identified as containing GHFF's within the last 2 years were identified as being within a 15 km radius of the referral area; Bundamba, Paice St (574), Camira, Barbara Street (140), Ellen Grove, Waterford Rd (337), Parkinson, Avondale Crescent (419), Ipswich Nature Centre, Queens Park, Goleby Ave (595) and Yamanto (479).

The GHFF was observed as a transient fly-over species during the targeted field surveys on-site. Based on a review of the site's proximity to known camps, GHFF observed flying-over the site are most likely from the Camira, Barbara Street flying-fox camp, not recognised to be of national importance. The flying-fox camp is located approximately 1.5 km north-east of the site. While suitable foraging vegetation occurs on-site due to the remnant status and dominance of Eucalypt species, the species was not seen utilising this vegetation. It is considered that the native vegetation on-site would provide suitable foraging habitat for the GHFF, should it choose to utilise the site during flowering periods.

The *Referral guideline for management actions in grey-headed and spectacled flying-fox camps* states that the guideline does not apply to the following:

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5 Tidemann, C.R., 1998, *Grey-headed Flying-fox, Pteropus poliocephalus, Temminck, 1824*, In: Strahan, R., ed. The Mammals of Australia. Frenchs Forest: New Holland Publishers Pty Ltd.

6 Duncan, A., G.B. Baker & N. Montgomery, 1999, *The Action Plan for Australian Bats*, Canberra: Environment Australia.

- Actions in the vicinity of camps, such as development actions, firework displays or concerts, which may indirectly affect camps of EPBC Act-listed flying-fox species.
- 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 guideline .

The plan of development should be reviewed in conjunction with the significant impact guideline. An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:

8. Lead to a long-term decrease in the size of an important population of a species

Assessment: During field survey efforts, the species was not observed to be directly utilising the proposed action area, where it was observed only as a fly-over species. Potential foraging habitat exists across the area of the proposed action. As a result of the proposed action, the retention of foraging habitat along the western boundary, also associated with Woogaroo and Opossum Creeks, will occur. The removal of potential foraging habitat within the proposed action bounds is not anticipated to lead to a long-term decrease in the size of an important population due to the availability of potentially suitable foraging habitat within 15 km of the flying-fox camps. Larger patches of intact vegetation exist to the south of Centenary Highway, approximately 3 km to the east, and to the north of Brisbane River. Each of these are expected to provide higher quality foraging habitat suitable to GHFF. Further, it is considered unlikely that the GHFF roost of national importance (located in Mount Ommaney – Westlake Drive (400)) would rely on vegetation within the proposed action for foraging purposes considering the vast availability of intact foraging habitat to the north. Vegetation to be retained within the proposed action bounds is considered sufficient to continue the provision of stepping stone habitat suitable to GHFF foraging purposes. The retention of this vegetation is anticipate to facilitate continued movement across the wider landscape area by the GHFF. Hence, vegetation to be removed across the proposed action is expected to result in negligible impacts, if any, on the GHFF population in the wider locality. All GHFF camps within 15 km of the referral area are expected to be unaffected by the proposed action.

9. Reduce the area of occupancy of an important population

Assessment: During field survey efforts, the species was not observed to be directly utilising the proposed action area, where GHFF was observed only as a fly-over species. The proposed development is not anticipated to result in a reduction in area of occupancy at any of the flying-fox camps containing GHFF within the identified 15 km radius. The area of occupancy will not be reduced at the nationally important GHFF camp at Mount Ommaney – Westlake Drive (400) to the north. The retention of remnant vegetation along the western boundary, adjoining Woogaroo and Opossum Creeks, is anticipated to provide continued movement opportunities and potentially suitable foraging habitat throughout the wider landscape.

10. Fragment an existing important population into two or more populations

Assessment: During field survey efforts, the species was not observed to be directly utilising the proposed action area, where GHFF was observed only as a fly-over species. Hence, no important populations or flying-fox camps containing GHFF specimens was observed within nor proximal to the proposed action bounds. The proposed action will not occur where a GHFF camp is located, and the retention of remnant vegetation within the western extent of the site will occur as part of the development. Further, development design ensures isolation of smaller habitat patches does not occur. Therefore, fragmentation of the existing population is not considered likely.

11. Adversely affect habitat critical to the survival of a species

Assessment: During field survey efforts, the species was not observed utilising the proposed action area, however, was observed as a fly-over species. Vegetation across the site is considered to be foraging habitat for the species. The proposed action will result in the removal of approximately 136 ha of GHFF foraging habitat, and consequently, the proposed action is likely to adversely impact habitat critical to the survival of the species.

12. Disrupt the breeding cycle of an important population

Assessment: During field survey efforts, the species was not observed to be directly utilising the proposed action area, where GHFF was observed only as a fly-over species. The retention of the remnant vegetation along the western extents of the referral area, in association with Woogaroo and Opossum Creeks, will occur as a result of the proposed action. This will allow the site of the proposed action to continue in the provision of foraging habitat to the GHFF. Further, no important population was recorded utilising the proposed action area during field survey effort, and the development will not occur within or proximal to a flying fox camp. Hence, the proposed action is not anticipated to disrupt the breeding cycle of an important population of GHFF.

13. Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline

Assessment: During field survey efforts, the species was not observed to be directly utilising the proposed action area, where GHFF was observed only as a fly-over species. The proposed action will involve clearing potential foraging habitat mostly within the central portion of the site, where the retention of remnant vegetation situated along the western bounds, mostly associated with Woogaroo and Opossum Creeks, will occur. Further, due to the lack of observed usage of the proposed action area by the GHFF, but presence of GHFF camps within a 15 km radius, the potential habitat within the subject site is not considered to be of high value to GHFF populations within the wider locality. In addition, the retention of selected remnant vegetation will ensure continued potential foraging habitat exists within the area if GHFF specimens choose to utilise it as stepping stone habitat. The presence of intact vegetation to the north of Brisbane River and to the south and east of the Centenary Highway will continue and not be reduced as a result of this proposed action. Therefore, a decline in the species attributable to the proposed action is considered very unlikely.

14. Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat

Assessment: Rehabilitation works are proposed within the retained remnant vegetation communities, particularly within gully lines where invasive species were observed to be dominant, to improve existing potential foraging habitat (e.g., weed removal, pest management and managed public access). The *in situ* potential foraging habitat within the proposed action area has remained in the landscape alongside large-scale development and residential uses over many decades and the ecological surveys did not identify the presence of invasive species (as recognised by the Department of Environment and Science[7]) that currently cause harm to the GHFF foraging habitat. Based on these measures, the proposed action is considered unlikely to result in invasive species causing harm to the existing foraging habitat.

15. Introduce disease that may cause the species to decline, or

Assessment: It is not anticipated that the proposed action will introduce a disease that may cause the species to decline. The nearest GHFF containing flying fox camp is located approximately 1.5 km to the north-east of the site and is currently situated within a highly disturbed mosaic of land use types, including residential development, high impact industrial uses, cleared areas and retained vegetation. The proposed action will not alter the existing mosaic of land use types in the region and is not a land use known to be associated with the introduction of disease and cause a subsequent species decline.

16. Interfere substantially with the recovery of the species.

Assessment: The proposed action is not anticipated to interfere with the recovery of the species due to the lack of evidence showing existing usage of the site and the proposed retention of potentially suitable foraging habitat within the western extent of the subject area. GHFF camp populations fluctuate due to the natural dispersal range of the species and ability to identify suitable habitat in alternative locations. As the proposed action includes the retention of potential foraging habitat within the western extent of the subject area, and other vegetation rehabilitation efforts, it is not anticipated that the species recovery will be interfered with nor result in decline as a result of the proposed action.

[7] Department of Environment and Science (2017), *Grey-headed flying-fox*, Queensland Government.

9. Macadamia Nut (*Macadamia integrifolia*)

Macadamia integrifolia (Macadamia Nut) is listed as Vulnerable under the EPBC Act. The Macadamia Nut occurs as a scattered rare to occasional tree, and populations sizes are difficult to estimate (Barry & Thomas 1994). Populations in the Queensland Regional Forest Agreement (RFA) region (area of 10 000 km^2) are estimated at 2500 mature individuals in 20 populations. These populations were formerly declining but are now considered stable (Queensland CRA/RFA Steering Committee 1997). The Macadamia Nut occurs from Mt Bauple, near Gympie, to Currumbin Valley in the Gold Coast hinterland, south-east Queensland.

Macadamia Nut grows in remnant rainforest, preferring partially open areas such as rainforest edges. However, this habitat is not continuously fit for the species. Vegetation communities in which the Macadamia Nut is found range from complex notophyll mixed forest, extremely tall closed forest, simple notophyll mixed very tall closed forest to simple microphyll-notophyll mixed mid-high closed forest with *Araucaria* and *Argyrodendron* emergent. Potentially suitable habitat was observed in association with the LRSA TEC's identified on and to the west of the proposed action area.

One individual specimen was observed off-site, located within the rehabilitated area of the LRSA TEC to the west of the site (refer **Plan 2**). The Macadamia Nut was observed to be isolated, and despite detailed search efforts, no additional specimens were recorded. Potential habitat was not identified across the majority of the site, where existing remnant vegetation was largely not suitable for the existence of Macadamia Nut species. The LRSA TEC's were traversed extensively to ensure any existing Macadamia Nut specimens were identified.

Due to the highly isolated state of the Macadamia Nut and situation outside of the proposed action bounds, it is not anticipated that a significant impact on the species will result from the proposed action.

10. Plectranthus (*Plectranthus habrophyllus*)

Plectranthus habrophyllus (Plectranthus) is listed as Endangered under the EPBC Act. *P. habrophyllus* is restricted to south east Queensland, near Ipswich and near Ormeau, south of Beenleigh (Queensland Herbarium 2008); has a distributional range of approximately 40 km (Queensland Herbarium undated) and is known from only six locations in south-east Queensland (Queensland Herbarium 2008). Plants have been recorded growing on chert or sandstone outcrops, in open woodlands often in shaded situations near vine forest (Forster 1994). Plectranthus flowers in February, August and December.

No preferred survey guidelines under the EPBC Act exist, however, field surveys were targeted within areas identified to contain suitable habitat to the species. A likelihood of occurrence assessment was completed to ascertain the potential for Plectranthus to occur on-site (refer **Table 13**), where the analyses highlighted the species is likely to occur.

During detailed field survey, *Plectranthus habrophyllus* was not observed within the proposed action bounds. Instead, the species was observed off-site, adjacent to the south-western corner of the proposed action boundary (refer **Section 4.2**). Three separate patches of Plectranthus were present on a rocky escarpment along Opossum Creek, where surrounding vegetation was characterised by *Eucalyptus microcorys* (Tallowwood), *Corymbia citriodora* (Spotted Gum), *Eucalyptus crebra* (Narrow-leaved Ironbark) and *Lophostemon confertus* (Brush Box). The shrub layer was dominated by *Acacia fimbriata* (Fringed Wattle), *Melia azedarach* (White Cedar), *Alphitonia excelsa* (Soap tree) and *Lantana camara* (Lantana).

Due to the location of the species being outside of the proposed action boundary, it is not anticipated that a significant impact to *Plectranthus habrophyllus* will occur as a result of this action.

11. Migratory / marine species

A likelihood of occurrence assessment was carried out for all migratory/marine species identified in the EPBC Acts PMR based on suitable habitat mapped as potentially occurring on or proximal to the site (refer **Table 17**).

One migratory species was observed during the field survey effort; *Rhipidura rufifrons* (Rufous Fantail). The Rainbow Bee-eater (*Merops ornatus*), listed as marine, was analysed in the likelihood of occurrence table as *may* occur on-site, however, was not observed during field survey. The remaining species identified in the PMR were assessed as being unlikely to occur on or proximal to the site. Hence, the potential for the proposed action to impact upon Rufous Fantail population is assessed within the following subsections.

11.1. *Rhipidura rufifrons* (Rufous Fantail)

Rhipidura rufifrons (Rufous Fantail) is listed as marine and migratory species under the EPBC Act. It is known to occur in coastal and near coastal districts of northern and eastern Australia. There is no evidence for historical changes in the distribution of the Rufous Fantail in Australia, although populations around South East Queensland (Nanango) are said to have declined since the 1940s.

In east and south-east Australia, the Rufous Fantail mainly inhabits wet sclerophyll forests, often in gullies dominated by Eucalypts including Tallowwood (*Eucalyptus microcorys*), Mountain Grey Gum (*E. cypellocarpa*), Narrow-leaved Peppermint (*E. radiata*), Mountain Ash (*E. regnans*), Alpine Ash (*E. delegatensis*), Blackbutt (*E. pilularis*) or Red Mahogany (*E. resinifera*). They are typically observed where a dense shrubby understorey often with ferns exists. The species occasionally occurs in secondary regrowth, following a disturbance event in forests or rainforest. Also recorded in drier sclerophyll forests and woodlands, including Spotted Gum (*Eucalyptus maculata*), Yellow Box (*E. melliodora*), ironbarks or stringybarks, often with a shrubby or heath understorey.

Movement patterns of the Rufous Fantail are not fully understood. Some populations of the Rufous Fantail in east Australia are migratory. The main threats to Rufous Fantail populations includes fragmentation and loss of core moist forest breeding habitat through land clearing and urbanisation. However, populations of Rufous Fantail appear to be relatively adapted to changing environments and disturbances.

Suitable habitat was observed on-site in the form of ironbarks and a number of Eucalypt species. A number of sightings recorded during the field survey revealed that Rufous Fantail are present on-site. The species was observed on multiple occasions within riparian vegetation along a creek line. The vegetation included *Lophostemon confertus* (Brush Box), *Alyxia ruscifolia* (Chain Fruit), a low-level infestation of *Lantana camara* (Lantana) and *Pellaea nana* (Sickle Fern). This is considered to be suitable foraging and/or breeding habitat for Rufous Fantail as the species mainly inhabits wet sclerophyll forests, often in gullies dominated by Eucalypt species. In addition, some species listed as potentially occurring on-site are considered to be almost exclusively aerial (*i.e.*, Fork-tailed Swift), and suitable habitat was not identified within the site (refer **Table 17**).

Table 17: MNES migratory terrestrial species likelihood of occurrence assessment

Listed migratory species

Scientific name	Common name	Status	EPBC code	Description of species	Analyses	Likelihood of occurrence
Marine Birds						
Merops ornatus	Rainbow Bee-eater	Marine	670	The Rainbow Bee-eater is distributed across much of mainland Australia, and occurs on several near-shore islands. It is not found in Tasmania, and is thinly distributed in the most arid regions of central and Western Australia	Potential habitat was observed on-site, and due to the large distribution, it is possible for the species to occur on-site.	May
Migratory Marine Birds						
Apus pacificus	Fork-tailed Swift	Migratory	678	The Fork-tailed Swift is almost exclusively aerial, flying from less than 1 m to at least 300 m above ground and probably much higher. In Australia, they mostly occur over inland plains but sometimes above foothills or in coastal areas. The Fork-tailed Swift is a non-breeding visitor to all states and territories of Australia.	No suitable habitat was observed on-site.	Unlikely
Ardenna grisea	Sooty Shearwater	Migratory	82651	In Australia, the Sooty Shearwater breeds on islands off New South Wales (NSW) and Tasmania. The species occurs off the coast of south-east Queensland in small numbers and is a moderately common migrant and visitor to Victoria and South Australia. In Australian waters, the Sooty Shearwater has been recorded in areas with sea surface-temperatures of 8.7-22.0° C.	No suitable habitat was observed on-site.	Unlikely
Migratory Marine Species						
Manta alfredi	Reef Manta Ray	Migratory	84994	Known on Australian waters from about Perth, Western Australia, around the tropical north to the Solitary Islands, New South Wales; also Cocos (Keeling) Islands and Christmas Island in the eastern	No suitable habitat observed on-site.	Unlikely

Scientific name	Common name	Status	EPBC code	Description of species	Analyses	Likelihood of occurrence
				Indian Ocean. Elsewhere the species is circumglobal in tropical waters. Often seen inshore around coral and rocky reefs in tropical and subtropical waters. manta rays also occur around offshore reefs and seamounts.		
Manta birostris	Giant Manta Ray	Migratory	84995	The Manta Ray lives in tropical, marine waters worldwide, but is also found occasionally in temperate seas. In Australia it is recorded from south-western Western Australia, around the tropical north of the country and south to the southern coast of New South Wales.	No suitable habitat observed on-site.	Unlikely
Orcaella heinsohni	Australian Snubfin Dolphin	Migratory	81322	Stranding and museum specimen records indicate that Australian Snubfin Dolphins occur only in waters off the northern half of Australia, from approximately Broome (17° 57´ S) on the west coast to the Brisbane River (27° 32´ S) on the east coast. Aerial and boat-based surveys indicate that Australian Snubfin Dolphins occur mostly in protected shallow waters close to the coast, and close to river and creek mouths.	No suitable habitat observed on-site.	Unlikely
Migratory Terrestrial Species						
Cuculus optatus	Oriental Cuckoo	Migratory	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.	Due to the disturbed nature of the site and its surrounds, it is highly unlikely this migratory species would utilise the site.	Unlikely
Monarcha melanopsis	Black-faced Monarch	Migratory	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	No suitable habitat was observed on-site.	Unlikely

Scientific name	Common name	Status	EPBC code	Description of species	Analyses	Likelihood of occurrence
				temperate rainforest, dry (monsoon) rainforest and occasionally cool temperate rainforest.		
Monarcha trivirgatus	Spectacled Monarch	Migratory	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 was observed on-site.	Unlikely
Motacilla flava	Yellow Wagtail	Migratory	644	This insectivorous bird inhabits mostly well-watered open grasslands and the fringes of wetlands Roosts in mangroves and other dense vegetation. Listed as an extremely uncommon migrant to Australia under the draft referral guideline for 14 birds listed as a migratory species under the EPBC Act.	No suitable habitat was observed on-site.	Unlikely
Myiagra cyanoleuca	Satin Flycatcher	Migratory	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 was observed on-site.	Unlikely
Rhipidura rufifrons	Rufous Fantail	Migratory	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.	Suitable habitat is present across the site, where a number of Eucalypt species exist across the site. In addition, potentially suitable habitat exists in association with the riparian corridors of Woogaroo and Opossum Creeks. Sighting of the species occurred during field survey.	Known

Scientific name	Common name	Status	EPBC code	Description of species	Analyses	Likelihood of occurrence
Migratory Wetlands Species						
Actitis hypoleucos	Common Sandpiper	Migratory	59309	The species utilises a wide range of coastal wetlands and some inland wetlands, with varying levels of salinity, and is mostly found around muddy margins or rocky shores and rarely on mudflats. The Common Sandpiper has been recorded in estuaries and deltas of streams, as well as on banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and claypans, and occasionally piers and jetties. The muddy margins utilised by the species are often narrow, and may be steep. The species is often associated with mangroves, and sometimes found in areas of mud littered with rocks or snags.	No suitable habitat was observed on-site.	Unlikely
Calidris acuminata	Sharp-tailed Sandpiper	Migratory	874	In Australasia, the Sharp-tailed Sandpiper prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline saltlakes inland.	No suitable habitat was observed on-site.	Unlikely
Calidris melanotos	Pectoral Sandpiper	Migratory	858	In Australasia, 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. The species is usually found in coastal or near coastal habitat but occasionally found further inland.	No suitable habitat was observed on-site.	Unlikely
Gallinago hardwickii	Latham's Snipe	Migratory	863	In Australia, Latham's Snipe occurs in permanent and ephemeral wetlands up to 2000 m above sea-level. They usually inhabit open,	No suitable habitat was observed on-site.	Unlikely

Scientific name	Common name	Status	EPBC code	Description of species	Analyses	Likelihood of occurrence
				freshwater wetlands with low, dense vegetation (e.g. swamps, flooded grasslands or heathlands, around bogs and other water bodies). However, they can also occur in habitats with saline or brackish water, in modified or artificial habitats, and in habitats located close to humans or human activity.		
Pandion haliaetus	Osprey	Migratory	952	It inhabits the areas around shallow waters, being sufficiently tolerant of human settlement to persist in suburban and sometimes urban environments. Birds usually build large nests high in exposed trees.	No suitable habitat was observed on-site.	Unlikely
Tringa nebularia	Common Green	Migratory	832	The Common Greenshank is found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. It occurs in sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass. Habitats include embayments, harbours, river estuaries, deltas and lagoons and are recorded less often in round tidal pools, rock-flats and rock platforms. The species uses both permanent and ephemeral terrestrial wetlands, including swamps, lakes, dams, rivers, creeks, billabongs, waterholes and inundated floodplains, claypans and saltflats. It will also use artificial wetlands, including sewage farms and saltworks dams, inundated rice crops and bores. The edges of the wetlands used are generally of mud or clay, occasionally of sand, and may be bare or with emergent or fringing vegetation, including short sedges and saltmarsh, mangroves, thickets of rushes, and dead or live trees.	No suitable habitat was observed on-site.	Unlikely

11.1.1 Assessment of Rufous Fantail against significant impact criteria

An action is likely to have a significant impact on a migratory species, specifically Rufous Fantail, if there is a real chance or possibility that it will:

1. **Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species**

   Assessment: Important habitat for migratory species is defined as habitat used occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species, and/or habitat that is of critical importance as a particular life stage, and/or habitat utilised by a migratory species which is at the limit of the species range, and/or habitat within an area where the species is declining. Rufous Fantail specimens were observed during detailed field survey to be utilising the proposed action area.

   The *Draft referral guideline for 14 birds listed as migratory species under the EPBC Act* outlines the significant impact thresholds relevant to Rufous Fantail. The Guideline identifies the upper thresholds for areas of i
   mportant habitat to Rufous Fantail which are likely to result in significant impacts to the species population if substantially lost or modified. Thresholds for the proportion of Rufous Fantail population likely to result in significant impacts if affected is also detailed. An action likely to exceed the lower threshold (0.1%) where 750 ha of habitat is proposed to be impacted should be investigated further – however, the proposed action will result in the removal of approximately 136 ha of potential habitat. Further, the number of Rufous Fantail identified on-site do not meet the lower limit threshold stated within the guideline (344 individuals).

   In addition, the habitat within the proposed action was not observed to support a significant population of Rufous Fantail, and is considered to be utilised for migratory purposes only. Rufous Fantail often utilise dry eucalypt forests and woodlands as passage habitat, which is present on-site. However, additional habitat in association with riparian areas including wet eucalypt forest and rainforest (LRSA TEC) is observed on and proximal to the site, and will be retained as a result of the proposed action. Suitable remnant habitat will also be conserved within the western extent of the action boundary. Further, it is noted that the retained lineal strips of riparian vegetation associated with creek lines within the wider landscape will continue to provide suitable habitat for Rufous Fantail, and connectivity will continue across the local area. Due to the surrounding availability of potentially suitable habitat and the proposed retention of habitat on and adjacent to the site, the proposed action is unlikely to result in significant impacts to Rufous Fantail through modification of the site.

2. **Result in an invasive species that is harmful to migratory species becoming established in an area of important habitat for the migratory species**

Assessment: The proposed action is not likely to result in the introduction of additional invasive species harmful to Rufous Fantail. Invasive species to Rufous Fantail have been identified as Black Rat (*Rattus rattus*) and invasive vines of riparian habitat (e.g. Rubber Vine (*Cryptostegia grandiflora*)). These species were not observed on-site during field survey, and are not anticipated to be introduced as a result of the proposed action. The site is currently exposed to threats including domestic animals, edge effects (weed invasion, weather impacts), and human impacts (noise and light pollution, litter, habitat modification). However, it is unlikely that the proposed action will increase the presence of invasive species that is harmful to Rufous Fantail. Additional measures to ensure invasive species are not introduced onto site as a result of the proposed action will be implemented. Under Queensland law, invasive species are required to be managed on any site in accordance with the relevant legislation and guidelines.

3. Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species

Assessment: The site is not considered to support an ecologically significant portion of Rufous Fantail. This is because the site is considered to contribute to passage habitat, and not have the capacity to support an important population due to the lack of moist, dense habitats (*i.e.*, mangroves). Therefore the proposed action is not anticipated to disrupt the lifecycle of Rufous Fantail population

12. Conclusion

Overall, this report concludes that a proposed action involving mixed-use urban development and the retention of selected ecological values has a low potential to cause a significant residual impact on the following MNES as defined under significant impact guidelines: Macadamia Nut (*Macadamia integrifolia*), *Plectranthus habrophyllus* (Plectranthus), Rufous Fantail (*Rhipidura rufifrons*) and the Lowland Rainforest of Subtropical Australia. However, the proposed action is likely to have a significant impact on critical Koala (*Phascolarctos cinereus*) habitat and Grey-headed Flying-fox (*Pteropus poliocephalus*) foraging habitat. As such, the proposed action is recommended to be referred for an EPBC Act 'controlled action' assessment.

It is noted that the content of this report represents opinions based on contemporary experience in EPBC Act referrals, consideration of the desktop and field findings and the existing condition of the proposed action area. It is also noted that only through formal referral can an official position on the action status under the EPBC Act be determined. This advice has been prepared at the request of, and based on the briefing from, Cherish Enterprises Pty Ltd. If the proposed action or brief is considered likely to change from that provided then we strongly recommend further advice in relation to the EPBC Act is obtained.

13. Appendices

Appendix A

Environment Protection and Biodiversity Conservation Act 1999

Protected Matters Report

Appendix B

Nature Conservation Act 1992

Wildlife Online Extract

Appendix C

SAT survey results

Appendix D

Microbat recordings – March 2019

Appendix A

Environment Protection and Biodiversity Conservation Act 1999

Protected Matters Report

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.

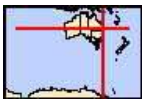
Report created: 23/09/19 10:22:59

Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements

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:	4
Listed Threatened Species:	61
Listed Migratory Species:	36

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:	1
Listed Marine Species:	41
Whales and Other Cetaceans:	1
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:	1
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar) [Resource Information]

Name	Proximity
Moreton bay	20 - 30km 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
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to 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
Cyclopsitta diophthalma_coxeni Coxen's Fig-Parrot [59714]	Endangered	Species or species habitat may occur within area
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat likely to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Species or species habitat may occur within area
Diomedea antipodensis_gibsoni Gibson's Albatross [82270]	Vulnerable	Species or species habitat may occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species

Name	Status	Type of Presence
		habitat known 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
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat likely to occur within area
Rostratula australis Australian Painted-snipe, Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta cauta Shy Albatross, Tasmanian Shy Albatross [82345]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta steadi White-capped Albatross [82344]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Species or species habitat may occur within area
Turnix melanogaster Black-breasted Button-quail [923]	Vulnerable	Species or species habitat likely to occur within area
Fish		
Epinephelus daemelii Black Rockcod, Black Cod, Saddled Rockcod	Vulnerable	Species or species

Name	Status	Type of Presence
[68449]		habitat may occur within area
Frogs		
Mixophyes fleayi		
Fleay's Frog [25960]	Endangered	Species or species habitat may occur within area
Insects		
Argynnis hyperbius inconstans		
Australian Fritillary [88056]	Critically Endangered	Species or species habitat may occur within area
Phyllodes imperialis smithersi		
Pink Underwing Moth [86084]	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 known to occur within area
Petauroides volans		
Greater Glider [254]	Vulnerable	Species or species habitat known 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	Roosting known to occur within area
Plants		
Bosistoa transversa		
Three-leaved Bosistoa, Yellow Satinheart [16091]	Vulnerable	Species or species habitat likely to occur within area
Corchorus cunninghamii		
Native Jute [14659]	Endangered	Species or species habitat may 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 habitat likely to occur within area
Dichanthium setosum		
bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Macadamia integrifolia Macadamia Nut, Queensland Nut Tree, Smooth-shelled Macadamia, Bush Nut, Nut Oak [7326]	Vulnerable	Species or species habitat likely to occur within area
Macadamia tetraphylla Rough-shelled Bush Nut, Macadamia Nut, Rough-shelled Macadamia, Rough-leaved Queensland Nut [6581]	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
Phaius australis Lesser Swamp-orchid [5872]	Endangered	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		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Delma torquata Adorned Delma, Collared Delma [1656]	Vulnerable	Species or species habitat likely to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Furina dunmalli Dunmall's Snake [59254]	Vulnerable	Species or species habitat may occur within area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
Saiphos reticulatus Three-toed Snake-tooth Skink [88328]	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

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardenna grisea Sooty Shearwater [82651]		Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Species or species habitat may occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Tasmanian Shy Albatross [89224]	Vulnerable*	Species or species habitat may occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Species or species habitat likely to occur within area
Migratory Marine Species		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Species or species habitat known to occur within area
Manta alfredi Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta		Species or species habitat may occur within

Name	Threatened	Type of Presence
Ray [84994]		area
Manta birostris Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area
Orcaella heinsohni Australian Snubfin Dolphin [81322]		Species or species habitat known 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 known to 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
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 known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known 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 known to 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 likely to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species

Name	Threatened	Type of Presence
		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 - GREENBANK TRAINING AREA

Commonwealth Heritage Places [Resource Information]

Name	State	Status
Natural		
Greenbank Military Training Area (part)	QLD	Listed place

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 known to 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]		Breeding known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known 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 known to occur within area

Name	Threatened	Type of Presence
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Species or species habitat may occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat may occur within area
Diomedea gibsoni Gibson's Albatross [64466]	Vulnerable*	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
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may 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 known to 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 likely to occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat likely to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area
Puffinus griseus Sooty Shearwater [1024]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
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 likely to occur within area
Thalassarche cauta Tasmanian Shy Albatross [89224]	Vulnerable*	Species or species habitat may occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat known to occur within area

Whales and other Cetaceans		[Resource Information]
Name	Status	Type of Presence
Mammals		
Orcaella brevirostris Irrawaddy Dolphin [45]		Species or species habitat known 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
Feral deer Feral deer species in Australia [85733]		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
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

Nationally Important Wetlands [Resource Information]

Name	State
Greenbank Army Training Area C	QLD

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

-27.6449 152.9039

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

Nature Conservation Act 1992

Wildlife Online Extract

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: -27.6417
Longitude: 152.9312
Distance: 5
Email: hannahsilcox@saundershavill.com
Date submitted: Friday 20 Sep 2019 15:18:19
Date extracted: Friday 20 Sep 2019 15:20:11

The number of records retrieved = 8

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Limnodynastidae	*Adelotus brevis*	tusked frog		V		3
animals	birds	Apodidae	*Hirundapus caudacutus*	white-throated needletail		V	V	2
animals	birds	Cacatuidae	*Calyptorhynchus lathami lathami*	glossy black-cockatoo (eastern)		V		2
animals	birds	Strigidae	*Ninox strenua*	powerful owl		V		1
animals	mammals	Phascolarctidae	*Phascolarctos cinereus*	koala		V	V	177
plants	land plants	Apocynaceae	*Marsdenia coronata*	slender milkvine		V		2/2
plants	land plants	Lamiaceae	*Plectranthus habrophyllus*			E	E	6/6
plants	land plants	Myrtaceae	*Melaleuca irbyana*			E		1/1

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

SAT survey results

SAT Survey 1

Number of trees	Botanical name	Common name	DBH	Scat present (Y / N)
1	*Eucalyptus fibrosa*	Broad-leaved Ironbark	450	Y
2	*Eucalyptus fibrosa*	Broad-leaved Ironbark	300	N
3	*Eucalyptus siderophloia*	Northern Grey Ironbark	350	N
4	*Eucalyptus fibrosa*	Broad-leaved Ironbark	380	N
5	*Eucalyptus fibrosa*	Broad-leaved Ironbark	130	Y
6	*Eucalyptus fibrosa*	Broad-leaved Ironbark	400	N
7	*Eucalyptus fibrosa*	Broad-leaved Ironbark	210	N
8	*Eucalyptus fibrosa*	Broad-leaved Ironbark	800	Y
9	*Eucalyptus fibrosa*	Broad-leaved Ironbark	150	N
10	*Eucalyptus fibrosa*	Broad-leaved Ironbark	350	Y
11	*Eucalyptus fibrosa*	Broad-leaved Ironbark	300	N
12	*Eucalyptus fibrosa*	Broad-leaved Ironbark	100	N
13	*Eucalyptus fibrosa*	Broad-leaved Ironbark	200	N
14	*Eucalyptus siderophloia*	Northern Grey Ironbark	100	Y
15	*Eucalyptus fibrosa*	Broad-leaved Ironbark	230	N
16	*Eucalyptus fibrosa*	Broad-leaved Ironbark	280	N
17	*Eucalyptus fibrosa*	Broad-leaved Ironbark	200	N
18	*Eucalyptus fibrosa*	Broad-leaved Ironbark	230	Y
19	*Eucalyptus fibrosa*	Broad-leaved Ironbark	160	N
20	*Eucalyptus fibrosa*	Broad-leaved Ironbark	180	N
21	*Eucalyptus fibrosa*	Broad-leaved Ironbark	240	Y
22	*Eucalyptus siderophloia*	Northern Grey Ironbark	550	N
23	*Eucalyptus fibrosa*	Broad-leaved Ironbark	420	N
24	*Eucalyptus fibrosa*	Broad-leaved Ironbark	180	Y
25	*Eucalyptus fibrosa*	Broad-leaved Ironbark	200	N
26	*Eucalyptus fibrosa*	Broad-leaved Ironbark	150	Y
27	*Eucalyptus fibrosa*	Broad-leaved Ironbark	250	Y
28	*Eucalyptus fibrosa*	Broad-leaved Ironbark	250	N
29	*Eucalyptus fibrosa*	Broad-leaved Ironbark	210	Y
30	*Eucalyptus fibrosa*	Broad-leaved Ironbark	250	N
	Total scat			**11**
	Total percentage			**36.67 %**

SAT Survey 2

Number of trees	Botanical name	Common name	DBH	Scat present (Y / N)
1	*Corymbia citriodora*	Spotted Gum	150	N
2	*Eucalyptus fibrosa*	Broad-leaved Ironbark	230	N
3	*Eucalyptus moluccana*	Gum-topped Box	180	N
4	*Eucalyptus fibrosa*	Broad-leaved Ironbark	150	N
5	*Eucalyptus fibrosa*	Broad-leaved Ironbark	120	N
6	*Eucalyptus fibrosa*	Broad-leaved Ironbark	130	N
7	*Eucalyptus fibrosa*	Broad-leaved Ironbark	180	N
8	*Eucalyptus fibrosa*	Broad-leaved Ironbark	280	N
9	*Eucalyptus fibrosa*	Broad-leaved Ironbark	400	N
10	*Eucalyptus fibrosa*	Broad-leaved Ironbark	130	N
11	*Eucalyptus moluccana*	Gum-topped Box	120	N
12	*Eucalyptus fibrosa*	Broad-leaved Ironbark	420	N
13	*Eucalyptus fibrosa*	Broad-leaved Ironbark	390	N
14	*Eucalyptus moluccana*	Gum-topped Box	150	N
15	*Eucalyptus fibrosa*	Broad-leaved Ironbark	500	N
16	*Eucalyptus fibrosa*	Broad-leaved Ironbark	130	N
17	*Eucalyptus moluccana*	Gum-topped Box	180	N
18	*Eucalyptus moluccana*	Gum-topped Box	230	N
19	*Eucalyptus fibrosa*	Broad-leaved Ironbark	110	N
20	*Eucalyptus fibrosa*	Broad-leaved Ironbark	110	Y
21	*Eucalyptus moluccana*	Gum-topped Box	230	N
22	*Eucalyptus fibrosa*	Broad-leaved Ironbark	500	N
23	*Corymbia citriodora*	Spotted Gum	100	Y
24	*Eucalyptus fibrosa*	Broad-leaved Ironbark	100	N
25	*Eucalyptus fibrosa*	Broad-leaved Ironbark	200	N
26	*Eucalyptus fibrosa*	Broad-leaved Ironbark	270	N
27	*Eucalyptus fibrosa*	Broad-leaved Ironbark	170	Y
28	*Eucalyptus fibrosa*	Broad-leaved Ironbark	250	N
29	*Eucalyptus fibrosa*	Broad-leaved Ironbark	150	N
30	*Eucalyptus fibrosa*	Broad-leaved Ironbark	130	N
		Total scat		**3**
		Total percentage		**10.00 %**

SAT Survey 3

Number of trees	Botanical name	Common name	DBH	Scat present (Y / N)
1	*Eucalyptus fibrosa*	Broad-leaved Ironbark	140	N
2	*Eucalyptus fibrosa*	Broad-leaved Ironbark	370	N
3	*Eucalyptus fibrosa*	Broad-leaved Ironbark	470	N
4	*Eucalyptus fibrosa*	Broad-leaved Ironbark	260	N
5	*Eucalyptus fibrosa*	Broad-leaved Ironbark	200	N
6	*Eucalyptus fibrosa*	Broad-leaved Ironbark	240	N
7	*Eucalyptus fibrosa*	Broad-leaved Ironbark	160	N
8	*Eucalyptus fibrosa*	Broad-leaved Ironbark	100	N
9	*Eucalyptus fibrosa*	Broad-leaved Ironbark	410	N
10	*Eucalyptus fibrosa*	Broad-leaved Ironbark	150	N
11	*Eucalyptus crebra*	Narrow-leaved Ironbark	260	N
12	*Eucalyptus fibrosa*	Broad-leaved Ironbark	240	N
13	*Eucalyptus moluccana*	Gum-topped Box	130	N
14	*Eucalyptus moluccana*	Gum-topped Box	100	N
15	*Eucalyptus fibrosa*	Broad-leaved Ironbark	360	N
16	*Eucalyptus fibrosa*	Broad-leaved Ironbark	380	N
17	*Eucalyptus moluccana*	Gum-topped Box	110	N
18	*Eucalyptus fibrosa*	Broad-leaved Ironbark	330	N
19	*Corymbia citriodora*	Spotted Gum	130	N
20	*Corymbia citriodora*	Spotted Gum	110	N
21	*Eucalyptus fibrosa*	Broad-leaved Ironbark	170	N
22	*Eucalyptus fibrosa*	Broad-leaved Ironbark	180	N
23	*Eucalyptus fibrosa*	Broad-leaved Ironbark	300	N
24	*Eucalyptus fibrosa*	Broad-leaved Ironbark	140	N
25	*Corymbia citriodora*	Spotted Gum	100	N
26	*Eucalyptus fibrosa*	Broad-leaved Ironbark	100	N
27	*Eucalyptus fibrosa*	Broad-leaved Ironbark	400	N
28	*Eucalyptus fibrosa*	Broad-leaved Ironbark	110	N
29	*Eucalyptus fibrosa*	Broad-leaved Ironbark	300	Y
30	*Eucalyptus moluccana*	Gum-topped Box	200	Y
		Total scat		**2**
		Total percentage		**6.67 %**

SAT Survey 4

Number of trees	Botanical name	Common name	DBH	Scat present (Y / N)
1	*Eucalyptus moluccana*	Gum-topped Box	380	Y
2	*Eucalyptus moluccana*	Gum-topped Box	150	N
3	*Eucalyptus moluccana*	Gum-topped Box	160	N
4	*Eucalyptus fibrosa*	Broad-leaved Ironbark	400	N
5	*Corymbia citriodora*	Spotted Gum	110	N
6	*Eucalyptus moluccana*	Gum-topped Box	110	N
7	*Corymbia citriodora*	Spotted Gum	120	N
8	*Eucalyptus fibrosa*	Broad-leaved Ironbark	130	N
9	*Eucalyptus fibrosa*	Broad-leaved Ironbark	150	N
10	*Eucalyptus moluccana*	Gum-topped Box	180	N
11	*Eucalyptus moluccana*	Gum-topped Box	100	N
12	*Eucalyptus fibrosa*	Broad-leaved Ironbark	450	Y
13	*Eucalyptus moluccana*	Gum-topped Box	230	N
14	*Eucalyptus fibrosa*	Broad-leaved Ironbark	510	N
15	*Eucalyptus moluccana*	Gum-topped Box	200	N
16	*Corymbia citriodora*	Spotted Gum	130	N
17	*Eucalyptus moluccana*	Gum-topped Box	230	N
18	*Eucalyptus moluccana*	Gum-topped Box	210	N
19	*Eucalyptus moluccana*	Gum-topped Box	170	N
20	*Corymbia citriodora*	Spotted Gum	170	N
21	*Eucalyptus moluccana*	Gum-topped Box	350	N
22	*Eucalyptus moluccana*	Gum-topped Box	130	N
23	*Eucalyptus moluccana*	Gum-topped Box	390	N
24	*Eucalyptus moluccana*	Gum-topped Box	100	N
25	*Eucalyptus moluccana*	Gum-topped Box	120	N
26	*Corymbia citriodora*	Spotted Gum	100	N
27	*Corymbia citriodora*	Spotted Gum	150	N
28	*Eucalyptus fibrosa*	Broad-leaved Ironbark	280	N
29	*Eucalyptus moluccana*	Gum-topped Box	300	N
30	*Eucalyptus moluccana*	Gum-topped Box	280	N
	Total scat			**2**
	Total percentage			**6.67 %**

SAT Survey 5

Number of trees	Botanical name	Common name	DBH	Scat present (Y / N)
1	*Eucalyptus moluccana*	Gum-topped Box	260	N
2	*Eucalyptus moluccana*	Gum-topped Box	250	N
3	*Eucalyptus moluccana*	Gum-topped Box	270	N
4	*Eucalyptus siderophloia*	Northern Grey Ironbark	150	N
5	*Corymbia citriodora*	Spotted Gum	120	N
6	*Corymbia intermedia*	Pink Bloodwood	180	N
7	*Corymbia citriodora*	Spotted Gum	110	N
8	*Eucalyptus moluccana*	Gum-topped Box	190	N
9	*Eucalyptus siderophloia*	Northern Grey Ironbark	210	N
10	*Eucalyptus siderophloia*	Northern Grey Ironbark	250	Y
11	*Angophora leiocarpa*	Smooth-barked Apple	310	Y
12	*Corymbia citriodora*	Spotted Gum	100	N
13	*Corymbia intermedia*	Pink Bloodwood	150	N
14	*Corymbia citriodora*	Spotted Gum	140	Y
15	*Eucalyptus siderophloia*	Northern Grey Ironbark	350	N
16	*Corymbia citriodora*	Spotted Gum	280	Y
17	*Corymbia citriodora*	Spotted Gum	200	N
18	*Eucalyptus siderophloia*	Northern Grey Ironbark	310	N
19	*Eucalyptus siderophloia*	Northern Grey Ironbark	420	Y
20	*Eucalyptus siderophloia*	Northern Grey Ironbark	250	N
21	*Corymbia citriodora*	Spotted Gum	150	N
22	*Corymbia citriodora*	Spotted Gum	110	N
23	*Corymbia citriodora*	Spotted Gum	150	N
24	*Eucalyptus moluccana*	Gum-topped Box	300	N
25	*Corymbia citriodora*	Spotted Gum	140	N
26	*Eucalyptus moluccana*	Gum-topped Box	210	N
27	*Corymbia intermedia*	Pink Bloodwood	130	N
28	*Corymbia citriodora*	Spotted Gum	210	N
29	*Corymbia citriodora*	Spotted Gum	310	N
30	*Corymbia intermedia*	Pink Bloodwood	100	N
	Total scat			**5**
	Total percentage			**16.67 %**

SAT Survey 6

Number of trees	Botanical name	Common name	DBH	Scat present (Y / N)
1	*Eucalyptus fibrosa*	Broad-leaved Ironbark	220	Y
2	*Eucalyptus siderophloia*	Northern Grey Ironbark	250	N
3	*Eucalyptus fibrosa*	Broad-leaved Ironbark	170	Y
4	*Corymbia citriodora*	Spotted Gum	190	N
5	*Corymbia citriodora*	Spotted Gum	100	N
6	*Eucalyptus fibrosa*	Broad-leaved Ironbark	120	N
7	*Corymbia citriodora*	Spotted Gum	110	N
8	*Eucalyptus moluccana*	Gum-topped Box	190	N
9	*Eucalyptus siderophloia*	Northern Grey Ironbark	200	N
10	*Corymbia citriodora*	Spotted Gum	200	N
11	*Eucalyptus moluccana*	Gum-topped Box	190	N
12	*Eucalyptus moluccana*	Gum-topped Box	180	N
13	*Eucalyptus siderophloia*	Northern Grey Ironbark	100	N
14	*Eucalyptus moluccana*	Gum-topped Box	110	N
15	*Corymbia citriodora*	Spotted Gum	110	N
16	*Eucalyptus siderophloia*	Northern Grey Ironbark	260	N
17	*Eucalyptus siderophloia*	Northern Grey Ironbark	250	N
18	*Eucalyptus siderophloia*	Northern Grey Ironbark	270	Y
19	*Corymbia citriodora*	Spotted Gum	250	N
20	*Eucalyptus siderophloia*	Northern Grey Ironbark	120	N
21	*Eucalyptus siderophloia*	Northern Grey Ironbark	380	N
22	*Corymbia citriodora*	Spotted Gum	200	N
23	*Corymbia citriodora*	Spotted Gum	100	N
24	*Eucalyptus siderophloia*	Northern Grey Ironbark	100	N
25	*Eucalyptus moluccana*	Gum-topped Box	200	N
26	*Eucalyptus moluccana*	Gum-topped Box	120	N
27	*Eucalyptus moluccana*	Gum-topped Box	110	N
28	*Corymbia citriodora*	Spotted Gum	120	N
29	*Eucalyptus moluccana*	Gum-topped Box	110	N
30	*Eucalyptus siderophloia*	Northern Grey Ironbark	100	N
		Total scat		**3**
		Total percentage		**10.00 %**

SAT Survey 7

Number of trees	Botanical name	Common name	DBH	Scat present (Y / N)
1	*Eucalyptus moluccana*	Gum-topped Box	160	N
2	*Eucalyptus moluccana*	Gum-topped Box	200	N
3	*Eucalyptus moluccana*	Gum-topped Box	200	N
4	*Eucalyptus moluccana*	Gum-topped Box	210	N
5	*Eucalyptus fibrosa*	Broad-leaved Ironbark	110	N
6	*Eucalyptus moluccana*	Gum-topped Box	200	N
7	*Eucalyptus moluccana*	Gum-topped Box	140	N
8	*Eucalyptus fibrosa*	Broad-leaved Ironbark	120	N
9	*Eucalyptus moluccana*	Gum-topped Box	130	N
10	*Eucalyptus fibrosa*	Broad-leaved Ironbark	120	N
11	*Eucalyptus fibrosa*	Broad-leaved Ironbark	280	N
12	*Eucalyptus moluccana*	Gum-topped Box	130	N
13	*Eucalyptus moluccana*	Gum-topped Box	130	N
14	*Eucalyptus moluccana*	Gum-topped Box	380	N
15	*Eucalyptus moluccana*	Gum-topped Box	100	N
16	*Eucalyptus fibrosa*	Broad-leaved Ironbark	200	N
17	*Eucalyptus moluccana*	Gum-topped Box	250	N
18	*Eucalyptus moluccana*	Gum-topped Box	120	N
19	*Eucalyptus moluccana*	Gum-topped Box	250	N
20	*Eucalyptus fibrosa*	Broad-leaved Ironbark	170	N
21	*Eucalyptus fibrosa*	Broad-leaved Ironbark	180	N
22	*Eucalyptus fibrosa*	Broad-leaved Ironbark	100	Y
23	*Eucalyptus fibrosa*	Broad-leaved Ironbark	200	N
24	*Eucalyptus moluccana*	Gum-topped Box	100	N
25	*Eucalyptus fibrosa*	Broad-leaved Ironbark	210	N
26	*Eucalyptus moluccana*	Gum-topped Box	180	N
27	*Eucalyptus moluccana*	Gum-topped Box	300	Y
28	*Eucalyptus moluccana*	Gum-topped Box	280	N
29	*Eucalyptus moluccana*	Gum-topped Box	250	N
30	*Eucalyptus fibrosa*	Broad-leaved Ironbark	120	N
		Total scat		**2**
		Total percentage		**6.67 %**

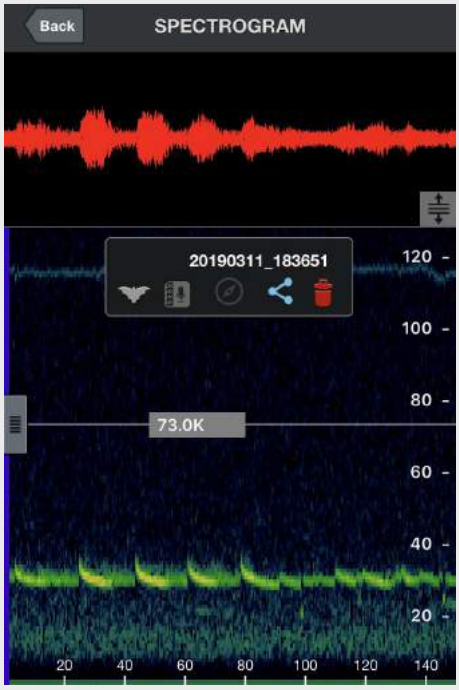
SAT Survey 8

Number of trees	Botanical name	Common name	DBH	Scat present (Y / N)
1	*Eucalyptus siderophloia*	Northern Grey Ironbark	200	N
2	*Corymbia intermedia*	Pink Bloodwood	100	N
3	*Eucalyptus siderophloia*	Northern Grey Ironbark	220	Y
4	*Eucalyptus propinqua*	Grey Gum	210	N
5	*Eucalyptus propinqua*	Grey Gum	200	N
6	*Eucalyptus propinqua*	Grey Gum	100	N
7	*Eucalyptus propinqua*	Grey Gum	170	N
8	*Eucalyptus propinqua*	Grey Gum	170	N
9	*Eucalyptus propinqua*	Grey Gum	250	Y
10	*Eucalyptus tereticornis*	Forest Red Gum	100	N
11	*Eucalyptus tereticornis*	Forest Red Gum	180	N
12	*Eucalyptus tereticornis*	Forest Red Gum	160	N
13	*Corymbia intermedia*	Pink Bloodwood	150	N
14	*Corymbia intermedia*	Pink Bloodwood	190	N
15	*Eucalyptus propinqua*	Grey Gum	130	N
16	*Eucalyptus siderophloia*	Northern Grey Ironbark	220	N
17	*Eucalyptus seeana*	Narrow-leaved Red Gum	310	Y
18	*Corymbia intermedia*	Pink Bloodwood	100	N
19	*Corymbia intermedia*	Pink Bloodwood	100	N
20	*Eucalyptus siderophloia*	Northern Grey Ironbark	310	N
21	*Eucalyptus propinqua*	Grey Gum	150	N
22	*Corymbia intermedia*	Pink Bloodwood	120	N
23	*Eucalyptus seeana*	Narrow-leaved Red Gum	160	N
24	*Eucalyptus seeana*	Narrow-leaved Red Gum	450	N
25	*Eucalyptus propinqua*	Grey Gum	150	N
26	*Eucalyptus seeana*	Narrow-leaved Red Gum	180	N
27	*Eucalyptus siderophloia*	Northern Grey Ironbark	290	N
28	*Corymbia intermedia*	Pink Bloodwood	230	N
29	*Corymbia intermedia*	Pink Bloodwood	170	N
30	*Corymbia intermedia*	Pink Bloodwood	180	N
	Total scat			**3**
	Total percentage			**10.00 %**

Appendix D

Microbat recordings – March 2019

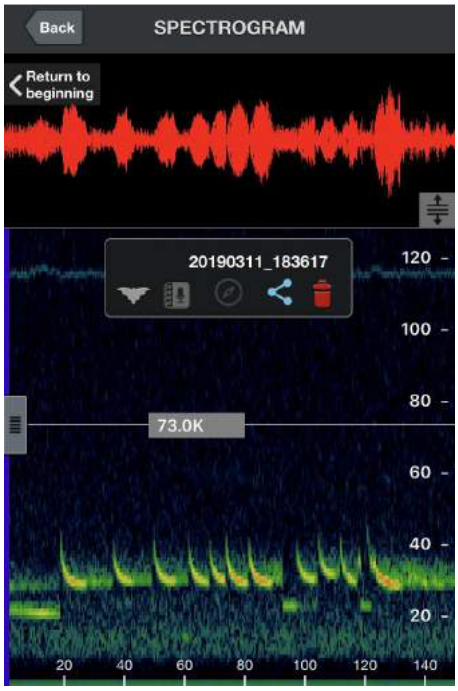
Ultrasonic bat call detector results

Species identification	Raw data recording snip
Mormopterus norfolkensis (East-coast Free-tailed Bat)	

As described by Pennay *et al* (2004)[8], this species is identified through the following characteristics:

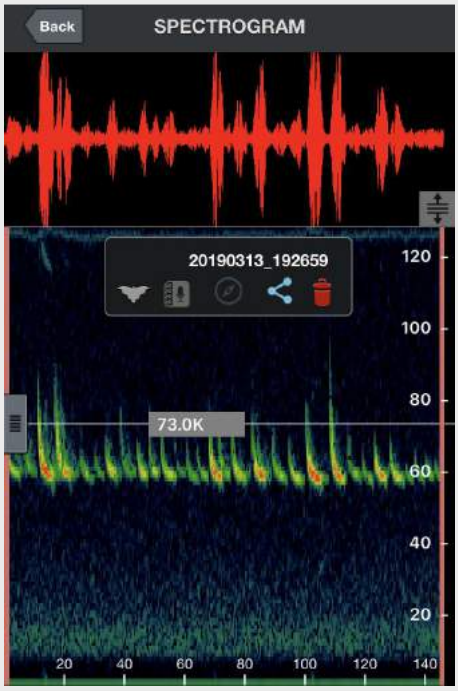
> *Characteristic frequency 31 to 35 kHz (n = 5). May be flat, but sometimes with short initial and down-sweeping tail. Pulses alternate by about 2 kHz in frequency when in search phase, however may call for several pulses without alternating.*

[8] Pennay, M., Law, B. & Reinhold, L. 2004, *Bat calls of New South Wales: Region based guide to the echolocation calls of Microchiropteran bats,* NSW Department of Environment and Conservation, Hurstville.

Species identification	Raw data recording snip
Chalinolobus gouldii (Gould's Wattled Bat)	

As described by Pennay *et al* (2004)[4], this species is identified through the following characteristics:

> *Characteristic frequency between 25 and 34 kHz (n = 122). Usually curved, with a down-sweeping tail or no tail. Consecutive pulses alternate in frequency and sometimes shape when in "typical" search phase. The upper pulses may be shorter in duration with a maximum frequency that is often equal or lower than the lower pulses. Never exhibits harmonics. The upper pulses may drop out when "cruising" in open spaces leaving only the lower pulses. Usually reverts to alternating pulses if long enough sequence is recorded. In forest the calls are steep and alternating. Good quality calls should not be confused with any other species.*
>
> *In regions west of the Great Dividing Range the call may be confused with Mormopterus species 4 (large penis) and Scotorepens balstoni. Can be differentiated from Mormopterus species 4 (large penis) by curved call, lack of harmonics and alternation if long enough sequence is recorded. Can be differentiated from Scotorepens balstoni, when calling at higher than 30 kHz by the presence of alternation.*
>
> *Data indicates that this species does not noticeably vary its call throughout NSW.*

Species identification	Raw data recording snip
Miniopterus australis (Little Bent-wing Bat)	

As described by Pennay *et al* (2004)[4], this species is identified through the following characteristics:

> *Characteristic frequency 54.5 to 64.5 kHz (n = 53). Curved, usually with down-sweeping tail. Has a higher characteristic frequency than any other species with curved pulses.*
>
> *Overlaps in frequency with Vespadelus pumilus at 57 to 58 kHz, but most good calls can be distinguished by the presence of a down-sweeping tail.*
>
> *This species is known to exhibit some variation in call characteristics over its range, calling at lower frequencies (56 to 56.5 kHz) in north Queensland (Reinhold et al. 2001). Data from New South Wales occupies a wide range in characteristic frequencies (10 kHz), which may suggest some local variation.*

ENVIRONMENTAL POLICY

INTRODUCTION

Cherish Enterprises is committed to ensuring that all activities resulting from its business and operations are carried out in a manner that protects the health and wellbeing of all employees, contractors and the general public. We are committed to reducing the environmental impact of our businesses while maintaining a high-quality services to our customers. We will adopt practices that provide for sustainable development and innovation in our projects.

OBJECTIVES

- Ensure compliance with all relevant legislative and regulations requirements.
- Conduct regular environmental audits to monitor progress and ensure legal compliance.
- Implement corrective action in a timely manner.
- Wherever possible, provision of good practices that have minimal adverse environmental impact on our developments.
- Ensure the safe and appropriate disposal of all excess materials generated to minimise any environmental impact.
- Communicate proactively, promptly and transparently with all stakeholders, the community and government on environmental issues.
- Ensure all incidents are reported and investigated to prevent recurrence.
- All employees are responsible to ensure compliance with this policy and should take reasonable precautions and use all due care and diligence to prevent non-compliance.

Samuel Lin
Managing Director

1 October 2019

Attachment 3 – Cherish Enterprises Environmental Policy