Preliminary Documentation Report (Part B)

The Trails Residential Development, Redland Bay, Queensland 4165 (EPBC 2021/9047)

Prepared for SRCP (Shoreline) Pty Ltd
Our Reference: 10725 E
10 December 2025

Saunders Havill

PATHWAYS TO SUCCESS

EPBC Act referral

Australian Government
Department of Agriculture, Water and the Environment

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Title of proposal	2021/9047 - The Trails Residential Development

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

The Trails is located at Lot 12 on SP268704 and adjoining road, Serpentine Creek Road, Redland Bay, Queensland 4165 ('the site'). The proposed action, known as The Trails, is for the development of 24.27 hectares (ha) of rural land for urban purposes including residential development and open space. The site currently adjoins rural properties to the east and south, Bayview Conservation Area to the west and north. The site is access via an easement from 275 Serpentine Creek Road, Redland Bay.

The referral area includes Lot 12 on SP268704 covering approximately 22.25 ha and the balance of the site is made up by the adjoining roads to the north and west accounting for 2.02 ha. The proposed action will comprise of 22.41 ha for residential purposes including an internal road network and supporting infrastructure. A future open space corridor will run east to west through the centre of the site covering approximately 1.86 ha. The proposed action site details are provided in Attachment 1 (The Trails Proposed Action -Plans) and illustrates these components.

The following activities will take place on-site as part of the proposed action:
- Pre-clearance fauna surveys and clearing of vegetation only under the supervision of fauna spotter catchers that holds a permit issued by the Queensland Government Department of Environment and Science;
- Bulk earthworks to achieve the required grades across the site (conducted in a cautious/sensitive manner at all times on account of the adjacent Bayview Conservation Area, e.g., minimising stockpiles, locating stockpiles as far east as practicable);
- Installation of utility services and laying base and bitumen for roads/access;
- Creation of lots and open space as per the development plan (refer Attachment 1 The Trails Proposed Action - Plans);
- Landscape works including the installation of playgrounds and the rehabilitation of open space areas to remove weeds and enhance habitat/ecological values (the existing agricultural use has greatly diminished these values); and
- Construction of buildings/dwellings.

These activities represent typical urban development.

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 Trails is located on Lot 12 on SP268704 covering approximately 22.25 ha and the adjoining road to the north and west accounting for 2.02 ha. The site is located in the southern part of the Redland City local government area and is accessed via an easement from 275 Serpentine Creek Road, Redland Bay. The site is predominately scattered trees amongst grassed paddock and used for grazing. The property to the south was historically utilised for rural/agricultural pursuits and recently (August 2020) urban development under the Shoreline urban village (EPBC 2016/7776) commenced. Beenleigh Redland Bay Road and Serpentine Creek Road provide the major access thoroughfares between the site and established residential areas at Redland Bay and Logan. The site is characterised by a central drainage line that directs on-site overland flow east towards the adjoining rural properties, eventually discharging into Moreton Bay.

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

The disturbance footprint is comprised of the following (refer to Attachment 1-The Trails Proposed Action Plans):
Residential Precinct - 22.41 hectares
Open Space (Corridor) - 1.86 hectares
Total - 24.27 hectares

There is no avoidance footprint. The entirety of the proposed action area (or work area) is comprised of the disturbance footprint (24.27 ha).

Rehabilitation works (approved by Council) will be undertaken within the corridor to support fauna movement opportunities and post-development hydrological regimes.

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1.7 Proposed action location

Other - Lot 12 on SP268704 and adjoining road to the north and west.

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

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

☑ Yes ☐ No

1.10.1.0 Council contact officer details

1.10.1.1 Name of relevant council contact officer	City Planning & Assessment
1.10.1.2 E-mail	rcc@redland.qld.gov.au
1.10.1.3 Telephone Number	0738298999

1.11 Provide an estimated start and estimated end date for the proposed action

Start Date	01/07/2024
End Date	01/07/2030

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

A Material Change of Use (MCU) and Reconfiguration of a Lot (ROL) development permits will be sought from Redland City Council. The proposal, as shown in Attachment 1 (The Trails Proposed Action - Plans), will be assessed against the Redland Planning Scheme in accordance with the Planning Act 2016 (Qld).

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

During the public consultation period for the State Government's Shaping Queensland - South East Queensland Regional Plan 2017, submissions were received regarding land adjacent to the then urban footprint at Southern Redland Bay. In considering submissions, the State recognised that this area represented a logical extension to the urban footprint, and included areas of suitable land, and would benefit from existing and planning infrastructure committed to support the Southern Redland Bay area. The State government's regional plan took effect from August 2017 with the amendments to the urban footprint. A review of the current South East Queensland Regional Plan 2017; ShapingSEQ, confirms the site is located within the urban footprint. As discussed, this regional plan underwent a thorough consultation process with submissions being accepted up to March 2017.

Additionally, the Redland Planning Scheme underwent a similar consultation processes in accordance with the Planning Act 2016 (Qld). The planning process for the proposed action will include the necessary development applications (MCU, ROL and Operational Works (OPW)) to Redland City Council. These documents will be made accessible to the public through Redland City Council PD Online (http://pdonline.redland.qld.gov.au/pages/xc.track/searchapplication.aspx).

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 project is not subject to an environmental impact assessment; however, an ecological assessment was completed as part of this referral, which considered Commonwealth, State and Local legislation requirements.

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

1.16.1 Identify the nature/scope and location of the related action (Including under the relevant legislation)

The approved Shoreline urban village (EPBC 2016/7776) is a related project that abuts the site to the south (refer Attachment 1 The Trails Proposed Action - Plans for location).

EPBC 2016/7776 is a residential development that entails approximately 3,800 homes, shops, restaurants and a 2.2 km people's foreshore park to be built on approximately 279.5 hectares, the majority of which was cleared for farming in the 1930s. The related nature of these projects is detailed further in Attachment 2 The Trails Proposed Action - Ecological Assessment, Section 1.2, pp. 1, as the character limit of this section has been reached.

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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

Wetland

Moreton Bay Ramsar Wetland

Impact

The Protected Matters Report identified the proposed action is within 5km of the Moreton Bay Ramsar Wetlands.

There are no potential direct impacts expected as the referral area is located approximately 1 km west of the Moreton Bay Ramsar Wetlands. Several land parcels and Serpentine Creek Road (a major road) separate the referral area and Ramsar Wetlands. The referral area is at the top of the localised catchment, with run-off travelling east towards the bay. There are nil tidal areas on-site, nor are there marine plants.

Potential water quality impacts to Moreton Bay as a result of the proposed action, relate to the loads of pollutants delivered from the site during construction and operation. The development is intended to adopt the best practice design measures such as sediment basins, vegetated swales, bioretention basins and wetlands to ensure surface water quality objectives in accordance with State standards.

Implementation of mitigation measures (i.e. stormwater quality controls) are forecast to deliver an improvement in water quality leaving the site, and these are a standard design measure of urban development. The approved water quality management plan for EPBC 2016/7776 notes that the conversion of land use from agriculture/grazing to urban with stormwater management on adjacent land will see a reduction in sediment and nutrient loads being exported off-site (refer Public Document, pp. 13 - https://communities.lendlease.com/queensland/shoreline/-/media/communities/au/shoreline/documents/sustainability/8868-e-1-shoreline-redlands-wqmp-a.pdf?la=en&hash=E0C815E72106C036B3F461E967456F274EF817E7). Therefore, the proposed action is considered unlikely to have a significant impact on Moreton Bay Ramsar Wetlands.

Refer to Attachment 2 The Trails Proposed Action - Ecological Assessment, Section 6.1.1, pp. 63 for the significant impact assessment. This has not been included within the online referral form due to the character limit restrictions.

2.3.2 Do you consider this impact to be significant?

☐ 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

White-throated Needletail (Hirundapus caudacutus)

Impact

The Protected Matters Report identified this species as a potential occurrence within 5km of the site. Although field surveys failed to detect this species, potential habitat is present on-site. The referral area is dominated by non-remnant vegetation as a

result of historical and current land uses. As such, the site is not considered to provide suitable roosting habitat for this species which prefer to roost in forests and woodlands among dense foliage or in hollows. However, the site may provide potential foraging habitat for this aerial species, flying between clearings and above woodland for their food sources. Potential impacts may therefore result in the removal of potential foraging habitat for this species. Given the availability of habitat within the region and lack of sightings and limited publicly available records, it is considered unlikely that the proposed action will directly or indirectly impact this species.

Refer to Attachment 2 The Trails Proposed Action - Ecological Assessment, Section 6.2.1, pp. 65 for the significant impact assessment. This has not been included within the online referral form due to the character limit restrictions.

Species or threatened ecological community

Koala (Phascolarctos cinereus)

Impact

The Protected Matters Report identified this species as a potential occurrence within 5km of the site. Based on the absence of records for the species on-site, no evidence of activity and relatively limited habitat, the species is considered unlikely to utilise the site frequently. It is noted that no Koalas were recorded as part of field surveys for the related action, Shoreline urban village (EPBC 2016/7776). It is also noted that the Koala was not a controlling provision for the Shoreline urban village action.

Using the Koala Habitat Assessment Tool, the referral area scored a 6/10, indicating the site is considered critical habitat for the survival of this species based on this assessment tool. However, the portions of the site mapped as Grassed Paddock with Scattered Eucalypts, Corymbias and Melaleuca are not considered habitat critical to the survival of this species (refer Attachment 2 The Trails Proposed Action - Ecological Assessment, Plan 2, pp. 34). This score is the opinion of SHG, and may be different to that of the assessor. The proposed disturbance (24.27 ha) would have a low risk of having a significant impact on the Koala. Additionally, the proposed action will create an open space corridor across the central portion of the site, providing connectivity between the adjoining lots to the east and Bayview Conservation Area to the west.

Although the clearing may result in the removal of some koala food trees, historical disturbance and surrounding environment have reduced the koala habitat value of the assessment area. The removal of vegetation located within the referral area is not considered to have a significant residual impact on koala habitat, either through a reduction of extent or increased fragmentation. This assessment is further supported by the lack of evidence of the koala within the site and limited recent koala sightings within the locality.

Refer to Attachment 2 The Trails Proposed Action - Ecological Assessment, Section 6.2.2, pp. 76, for the significant impact assessment. This has not been included within the online referral form due to the character limit restrictions.

Species or threatened ecological community

Grey-headed Flying-fox (Pteropus poliocephalus)

Impact

The Protected Matters Report identified this species as a potential occurrence within 5km of the site. The species is highly adaptive with its diverse native diet, which it can be supplemented with introduced species. It is known to forage within a variety of habitat areas as each resource does not produce food throughout the entire year. Opportunistic and targeted surveys did not locate roosting sites in the referral area or within adjoining properties. No Grey-headed Flying-fox individuals were recorded during field surveys and limited record occur within proximity to the site. Additionally, no active roosts with this species occur within 10 km of the site (refer Attachment 2 The Trails Proposed Action - Ecological Assessment, Plan 5).

Due to the limited availability of suitable foraging habitat on-site, particularly in context to surrounding bushland to the west, the species is considered highly unlikely to utilise the site. Furthermore, no evidence of Grey-headed Flying-fox was recorded as part of field surveys for the Shoreline urban village (EPBC 2016/7776). It is noted that the Department considers foraging habitat for the Grey-headed Flying-fox is analogous with habitat for the koala and that is why it the species was targeted as part of this assessment. The site does not provide or hold habitat characteristics which would make its occurrence, event as a transient visitor, likely. Given no roosting sites are located on-site or in proximity, it is highly unlikely that the action will involve impacts on the Grey-headed Flying-fox according to the EPBC Act Significant Impact Guidelines 1.1.

Refer to Attachment 2 The Trails Proposed Action - Ecological Assessment, Section 6.2.3, pp. 81, for the significant impact assessment. This has not been included within the online referral form due to the character limit restrictions.

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Species or threatened ecological community

White-throated Needletail (Hirundapus caudacutus)

Impact

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Refer to Attachment 2 The Trails Proposed Action - Ecological Assessment, Section 6.2.3, pp. 81, for the significant impact assessment. This has not been included within the online referral form due to the character limit restrictions.

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

Migratory species

Migratory Shorebird Species
Bar-tailed Godwit (Limosa lapponica baueri) - Vulnerable / Migratory
Numenius madagascariensis (Eastern Curlew) - Critically Endangered / Migratory
Numenius phaeopus (Whimbrel) - Migratory
Tringa nebularia (Common Greenshank) - Migratory

Impact

The Protected Matters Report identified these species as potential occurrences within 5km of the site. The results of BAAM surveys (2016) concluded that migratory shorebirds foraged across all areas of mudflats from the bayside of the mangroves to the waterline edge adjacent to the Shoreline urban village action (EPBC 2016/7776) (refer Attachment 2 - The Trails Proposed Action- Ecological Assessment, Figure 15, pp. 86), however no migratory shorebirds use habitats along this area of Moreton Bay for roosting. This was also supported by no recorded roosting sites in the area, with the closest roosting area recorded as Port Halloran, approximately 9 km north of the area. Contemporary surveys by SHG confirmed that the referral area does not support roosting habitat.

Foraging habitat for migratory birds is separated from the site by approximately 1,080 m (refer Attachment 2 The Trails Proposed Action- Ecological Assessment, Plan 6, pp. 87). The BAAM report states that mangroves (down to a width as low as 10m) can a form an effective barrier to noise, light and visual disturbances associated with development. Further, the report states that due to the muddy substrate associated with foraging habitat human, boat and dog disturbances are considered unlikely to occur. As these migratory shorebird species are considered a contextual occurrence based on proximity to feeding habitat, all species have been assessed as a group using the Significant Impact Guidelines Listed Migratory Species criteria. Based on the field findings, lack of on-site records and existing disturbance on and adjacent the site the proposed action is considered unlikely to have significant residual impacts on the listed migratory species.

Refer to Attachment 2 The Trail Proposed Action - Ecological Assessment, Section 6.3, pp. 84, for significant impact assessment. This has not been included within the online referral form due to the character limit restrictions.

2.5.2 Do you consider this impact to be significant?

☐ 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

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

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

Overall, the site flora values were assessed as highly disturbed and predominantly cleared of canopy vegetation, with limited patches of vegetation comprising mature or regrowth vegetation. The site is predominately scattered trees amongst grassed paddock and is used for grazing.

The site contains approximately 2 hectares of mapped remnant vegetation under the Queensland Vegetation Management Act 1999 (VMA), within the roads along the northern and western referral area boundary. Vegetation within the road is comprised of endangered composite regional ecosystem (RE) described as RE12.11.27/12.11.23/12.11.26 (40/40/20). The remainder of the site (approximately 22.27 ha) is mapped non-remnant vegetation under the VMA, evident of historical broadscale clearing and regularly maintained paddock.

Grassed Paddock and Scattered Trees
This vegetation community dominates the site, covering approximately 19.7 ha, as a result of historical broad-scale clearing maintained through cattle grazing. Canopy species include Eucalyptus racemosa (Scribbly Gum), Eucalyptus planchoniana (Needlebark Stringybark), Corymbia trachyphloia (Brown Bloodwood) and Melaleuca quinquenervia (Broad-leaved Paperbark). The understorey and shrub layers were assessed as absent. Ground cover is dominated by both native and introduced pastoral grass species including Heteropogon contortus (Black Spear Grass), Imperata cylindrica (Blady Grass), Themeda triandra (Kangaroo Grass), Cynondon dactylon (Green Couch), Chloris gayana (Rhodes Grass), Megathyrsus maximus (Guinea Grass) Paspalum notatum (Bahia Grass) and Themeda quadrivalvis (Grader Grass). Of note within this community, one (1) large Eucalyptus racemosa (Scribbly Gum) within the central portion of the site contained a raptor nest.

Northern Patch of Regrowth Vegetation
This patch of vegetation was approximately 1.95 ha in size and located within the north-eastern corner of the site. The vegetation is considered largely representative of RE12.11.26 (an Of Concern regional ecosystem), as the canopy is dominated by Eucalyptus planchoniana, with Corymbia trachyphloia dispersed throughout. The majority of these were recorded with a DBH of between 100mm and 300mm, representative of regrowth vegetation. The understorey and shrub layers are largely absent, maintained through grazing. The ground layer, similarly to the majority of the site, was dominated by native and introduces pastoral grass species listed previously.

Central Patch of Regrowth Vegetation
The canopy of this vegetation covers the smallest portion of the site, covering 0.65 ha, and was located along the drainage line and adjacent the constructed dam. The canopy was dominated by Melaleuca quinquenervia (Broad-leaved Paperbark). The understorey and shrub layers were assessed as largely absent. The species observed in the construction of the dam include Persicaria decipiens (Slender Knotweed), Ludwigia peploides (Water Primrose), Nymphaea caerulea (Blue Water Lily), Cyperus polystachyos (Bunchy Sedge) and Juncus usitatus (Common Rush). Damp areas along the drainage line also contained patches of Eleocharis equisetina (Spike Rush), Fimbristylis ferruginea (A Fringe Rush), Fimbristylis nutans (Fringe Rush) and Fimbristylis velata (A Fringe Rush). Other ground covers include both native and introduced pastoral grass species listed previously.

Road Vegetation (Remnant Vegetation)
This vegetation is located along the northern and western boundaries, covering approximately 2 ha. The existing road adjacent is mapped as containing remnant Endangered vegetation. The largest of the two remnant polygons is mapped along the western part of the referral area and is mapped as containing composite regional ecosystem described as RE12.11.27 /12.11.23/12.11.26 (40/40/20). The remnant vegetation associated with this road extends north and west into the as Bayview Conservation Area. Maintenance along the lot boundary within the road for access and bushfire mitigation is undertaken with both vegetation clearing and mulching occurring approximately ten (10) metres from the lot boundary. The dominant species noted in the road area was Allocasuarina littoralis (Black She Oak) with scattered Eucalyptus racemosa (Scribbly Gum) observed along the western and northern boundary and Eucalyptus planchoniana (Needlebark Stringybark) more so towards the north-eastern property boundary. These species are largely representative of the mapped remnant communities including Of Concern RE12.11.26 towards the north east corner and Endangered RE12.11.27 dominating the western boundary area. Other canopy species noted were Corymbia intermedia (Pink Bloodwood) and Corymbia trachyphloia (Brown Bloodwood). The shrub layer is largely absent due to the thick leaf litter associated with the Allocasuarina littoralis (Black She Oak) species with the shrub layer sparse.

Refer Attachment 2 Section 4.3.3.

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

The site ranges from 20-30m above sea level (ASL), with two high points, one within the north and another in the south, forming a gully through the centre of the site. This gully directs overland flows in an easterly direction towards the adjoining rural properties and eventually into Moreton Bay. This area has been mapped as a waterway under the VMA and 'low' risk waterway for waterway barrier works (WWBW) under the Fisheries Act 1994 (Qld).

Tthe waterway exhibits characteristics of an overland flow path. Vegetation is dominated by native and introduced pastoral grasses and a defined channel or banks are absent, hence it is also described as a drainage line.

A small dam exists within the centre of the site created by building a mound either side of the drainage line. Species observed were due to the construction of the dam and include Persicaria decipiens (Slender Knotweed), Ludwigia peploides (Water Primrose), Nymphaea caerulea (Blue Water Lily), Cyperus polystachyos (Bunchy Sedge) and Juncus usitatus (Common Rush). The dam is surrounded by regrowth native vegetation (predominantly Melaleuca quinquenervia) and was more typical of a flow path dominated by both native and introduced pastoral grasses maintained through cattle grazing. Damp areas along flow path also contained patches of Eleocharis equisetina (Spike Rush), Fimbristylis ferruginea (A Fringe Rush), Fimbristylis nutans (Fringe Rush) and Fimbristylis velata (A Fringe Rush). Vegetation typical of RE 12.3.6 dominated by Melaleuca quinquenervia (Broad-leaved Paperbark) was present along the drainage line, however no defined channel bank was present. This waterway continues off-site from the eastern site boundary and into adjoining properties.

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

A review of the Supporting Vegetation Management Map (published by the Queensland Government Department of Resources) indicates that the site is comprised of two land zones:

Land zone 3: recent Quaternary alluvial systems
Recent Quaternary alluvial systems, including closed depressions, paleo-estuarine deposits currently under freshwater influence, inland lakes and associated wave built lunettes. Excludes colluvial deposits such as talus slopes and pediments. Includes a diverse range of soils, predominantly Vertosols and Sodosols; also with Dermosols, Kurosols, Chromosols, Kandosols, Tenosols, Rudosols and Hydrosols; and Organosols in high rainfall areas.

Land Zone 11: hills and lowlands on metamorphic rocks
Metamorphosed rocks, forming ranges, hills and lowlands. Primarily lower Permian and older sedimentary formations which are generally moderately to strongly deformed. Includes low- to high-grade and contact metamorphics such as phyllites, slates, gneisses of indeterminate origin and serpentinite, and interbedded volcanics. Soils are mainly shallow, gravelly Rudosols and Tenosols, with Sodosols and Chromosols on lower slopes and gently undulating areas. Soils are typically of low to moderate fertility.

Land zone 11 dominates the site while land zone 3 is largely restricted to the gully within the central portion of the site.

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

No outstanding natural features are present on the site. The site adjoins the Bayview Conservation Area to the west.

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

The site contains approximately 2 hectares of mapped remnant vegetation under the VMA, over two polygons, within the roads along the northern and western site boundaries. The largest of the two remnant polygons is mapped along the western part of the referral area and is mapped as containing composite regional ecosystem described as RE12.11.27/12.11.23/12. 11.26 (40/40/20). The remnant vegetation associated with this road and extending north and west of the site is known as Bayview Conservation Area. Maintenance along the lot boundary within the road for access and bushfire mitigation purposes is undertaken with both vegetation clearing and mulching occurring approximately ten (10) metres from the lot boundary. The remainder of the site (approximately 22.27 ha) is mapped non-remnant vegetation under the VMA, evident of historical broadscale clearing and regularly maintained paddock.

Although mapped as non-remnant vegetation under the VMA, two patches of native vegetation regrowth were identified within the site, one within the north and the other within the centre of the site. These are described separately below.

Northern Patch of Regrowth Vegetation
This patch of vegetation was approximately 1.95 ha in size and located within the north-eastern corner of the site. The vegetation is considered largely representative of RE12.11.26 (an Of Concern regional ecosystem), as the canopy is dominated by Eucalyptus planchoniana, with Corymbia trachyphloia dispersed throughout. The majority of these were recorded with a DBH of between 100mm and 300mm, representative of regrowth vegetation. The understorey and shrub layers are largely absent, maintained through grazing. The ground layer, similarly to the majority of the site, was dominated by native and introduces pastoral grass species listed previously.

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

Central Patch of Regrowth Vegetation

The canopy of this vegetation covers the smallest portion of the site, covering 0.65 ha, and was located along the drainage line and adjacent the constructed dam. The canopy was dominated by Melaleuca quinquenervia (Broad-leaved Paperbark). The understorey and shrub layers were assessed as largely absent. The species observed in the construction of the dam include Persicaria decipiens (Slender Knotweed), Ludwigia peploides (Water Primrose), Nymphaea caerulea (Blue Water Lily), Cyperus polystachyos (Bunchy Sedge) and Juncus usitatus (Common Rush). Damp areas along the drainage line also contained patches of Eleocharis equisetina (Spike Rush), Fimbristylis ferruginea (A Fringe Rush), Fimbristylis nutans (Fringe Rush) and Fimbristylis velata (A Fringe Rush). Other ground covers include both native and introduced pastoral grass species listed previously.

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

The site ranges from 20-30m above sea level (ASL), with two high points, one within the north and another in the south, forming a gully through the centre of the site.

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

The site was found to be highly disturbed and is predominately cleared of canopy vegetation, with the exception of the remnant vegetation within the existing road along the northern and western boundaries and two patches of native vegetation regrowth within the north-eastern and central portions of the site, and scattered trees across the property. The majority of the site reflects regularly maintained paddock.

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

No Commonwealth Heritage Places are located on or adjacent to the referral area.

3.9 Describe any Indigenous heritage values relevant to the project area

No Indigenous heritage values are located on or adjacent to the referral area.

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

Lot 12 on SP268704: freehold
Road: no tenure

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

The land is a rural property which is currently used for grazing, and the existing road is a public area.

The proposal is for the development of the land for urban purposes, including residential and open space.

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

Avoidance

The site is mapped predominantly Category X (non-remnant) vegetation and therefore considered to contain relatively limited MNES habitat values in comparison with other properties within the region that have not been used for agricultural pursuits. As the site was subject to significant historical disturbance, the land was selected for the proposed action to avoid and minimise potential impacts to MNES.

Although the road is mapped as Category B (remnant) vegetation, this area has also experienced a high degree of disturbance for access maintenance and bushfire mitigation, resulting in a cleared area approximately 10 metres from the lot boundary.

Additionally, the layout and design of the urban development proposed within the site further avoids and minimises impacts through the strategic location of a future open space corridor aligned east-west through the site. This corridor retains the drainage line and Melaleuca quinquenervia regrowth within the central portion of the site (subject to detailed design at the operational works stage), and will deliver a natural connection between the Bayview Conservation Area and neighbouring properties to the west.

Rehabilitation and restoration of this corridor is expected to lead to overall enhanced riparian vegetation and waterway function compared to the current composition. The reinstatement of riparian vegetation will reference Least Concern RE12.3.6 Melaleuca quinquenervia open forest which is mapped on the VMA pre-clear mapping as naturally occurring along the gully lines and alluvial plains in this region.

Refer to Attachment 2 Section 5.2.

Vegetation and Fauna Management Plans

A Vegetation Management Plan (VMP) will be completed for the referral area as part of a future operational works application to Redland City Council. The purpose of the VMP is to manage the vegetation removal process and protection of fauna species within the clearing area. A Fauna Management Plan (FMP) includes potential impacts of the construction phase covering the loss of vegetated areas, isolated trees and likely barriers and impediments to local dispersal.

Fauna Spotter Catcher

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

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

Rehabilitation Plan

A Rehabilitation Plan for the open space corridor centrally located within the site will be prepared to enhance the riparian vegetation, waterway function and provide safe fauna movement opportunities. The types of restoration proposed includes assisted natural regeneration for the existing Melaleuca quinquenervia regrowth area. The methodology for the site works, weed treatment techniques as well as planting methodology and proposed species to be planted will be detailed in the rehabilitation plan submitted to Redland City Council as part of seeking operational works approvals.

Refer to Attachment 2 Section 5.4.

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 proposal intends to adopt a number of specialised management plans to ensure indirect impacts associated with the

development (e.g. run-off, light, noise etc.) will not impact the habitat or lifecycle of native species. This includes alignment with the EPBC Act approved Eastern Curlew Impact Management Plan and Water Quality Management Plan (WQMP) under EPBC 2016/776, and implementation of site specific VMP, FMP, Rehabilitation Plan and Construction Environmental Management Plan.

The project will align with the approved WQMP (under Shoreline urban village EPBC 2016/7776) including designed mitigation and management measures, monitoring parameters and trigger thresholds. With adoption of these measures, any changes to the water quality of the Ramsar Wetlands (including changes to salinity, pollutants, and nutrients) will be minor and temporary, at most. Further, initial investigations indicate that due to the change in land use from rural to urban and with the adoption of best practice water quality objectives and erosion and sediment control measures identified in State and National guidelines, there will be a reduction in nutrient loads (i.e. nitrogen, phosphorus and TSS).

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

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

Overall, the EPBC Significant Impact Assessments (refer Attachment 2 Section 6) concludes that The Trails proposed action involving development for residential and open space uses on land that is predominately cleared and currently used for grazing and roads will not have a significant residual impact on MNES. Ecological values associated with the site are predominantly associated with the remnant vegetation along the northern and western boundaries adjoining the Bayview Conservation Area, and two patches of native vegetation regrowth within the northern and central portions of the site.

Further, no MNES listed threatened flora species or fauna species were recorded by field surveys nor were any threatened species considered likely to utilise the site due to significant historical disturbances which have modified the natural ecological values.

The following provides a summary of key MNES findings:
- The site is located over 1 km west of the Moreton Bay (Ramsar) wetlands.
- No TECs were recorded on-site.
- No listed threatened flora species were recorded on-site.
- No listed threatened fauna species were recorded on-site.
- Phascolarctos cinereus (Koala) and Pteropus poliocephalus (Grey-headed Flying-fox) were the only listed threatened species considered as having the potential to occur on or within close proximity to the site.

Spot Assessment Technique (SAT) surveys for the Koala undertaken across the site did not record signs (scats) of habitat usage.

Vegetation within the north and west road and central portion of the site dominated by Melaleuca quinquenervia identified as containing suitable foraging trees for Grey-headed Flying-fox.

No records for either species have been made or within close proximity to the site.

- No migratory species were recorded on-site.

The layout and design of the urban development avoids and minimises impacts through the strategic location of a future open space corridor aligned east-west through the site. This corridor retains the drainage line and Melaleuca quinquenervia regrowth within the central portion of the site (subject to detailed design at the operational works stage), and will deliver a natural connection between the Bayview Conservation Area and neighbouring properties to the west.

The proposal intends to adopt a number of specialised management plans to ensure indirect impacts associated with the development (e.g. run-off, light, noise etc.) will not impact the habitat or lifecycle of native species. This includes alignment with the EPBC Act approved Eastern Curlew Impact Management Plan and WQMP under EPBC 2016/776, and implementation of site specific VMP, FMP, Rehabilitation Plan and Construction Environmental Management Plan.

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

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

Lendlease has an excellent record of environmental management and sustainability at State, national and international levels. It has worked closely with community as well as local and state authorities to ensure site responsive outcomes. Examples of this include returned effluent treatment and reuse systems, seed collection and propagation programmes, undertaking HIA Green Smart programmes across a number of projects, waterway and corridor management plans ensuring no impact into downstream wetlands and builder's water recycling programmes. Additional to this, Lendlease undertakes community education and interaction programmes across all of its communities in creating a high level of social capital. At the Lendlease Bingara Gorge project (EPBC 2014/7400), the proponent being Lendlease Communities (Wilton) Pty Ltd (a subsidiary of Lendlease Corporation Limited) notified the Department of two potential non-compliances. One led to warning and the second has not yet been closed out.

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

Lendlease is not involved in any proceedings under a Commonwealth, State or Territory law for the protection of the environment of the conservation and sustainable use of natural resource.

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

Lendlease's vision to create the best places is underpinned by its commitment to sustainability as a core operating principle. Lendlease aspires to be a sustainable organisation which goes beyond minimising harm to the natural environment. To achieve this aspiration, they will not only employ strategies to prevent pollution but also explore every opportunity to leave a positive environmental impact.

Lendlease have an integrated Environment, Health & Safety (EHS) management system called Orbit, which is supported by the Lendlease Global Minimum Requirements. Together, these set out the process of how we will set objectives relating to environmental management and provide the minimum standards of management. Lendlease commit to complying with legislation, regulation, codes of practice, industry standards, contractual relationships and other requirements that we subscribe to. We will monitor, measure and report our performance in accordance with our EHS framework and ISO14001requirements. To exhibit leadership, we will continually improve our environmental performance through the ongoing review and setting of objectives within our EHS framework.

We will also seek out opportunities to partner and engage with leading organisations, industry associations and our supply chain to drive better environmental outcomes for a sustainable future.

In support of this Environment Policy we will:
•Reduce our contribution to climate change and build resilience into the places we create and in the communities where we have a presence;
•Seek to prevent and minimise pollution associated with any of our operations
•Protect biodiversity and ecosystems through the ongoing assessment and management of our activities;
• Value water as a natural resource and conserve its use;
•Recognise resource scarcity through responsible procurement, use and management of materials; and
•Advocate and pursue a holistic approach to the design, delivery and operation of high performance green buildings, infrastructure and sustainable precincts that exceeds best practice through innovation.

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

2020/8863 Bayhill Estate residential development, Redland Bay, Qld
2020/8849 Southern Redland Bay Wastewater Treatment Plant, Qld
2019/8587 Mt Gilead Stage 2 Residential Development, NSW

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

2019/8552 Chapman Street Residential Development, NSW
2019/8436 Subdivision of Lot 12 on SP243847 Elliot Springs Estate, Townsville, Qld
2018/8359 Pine Valley Residential Development, Morayfield, Qld
2017/7875 Woogaroo Heights master planned residential development, Springfield, Qld
2016/7849 Adelaide Festival Plaza Precinct Upgrade, SA
2016/7830 Residential development, Lot 61 off Appin Road, Mt Gilead, NSW
2015/7599 Mt Gilead residential development, NSW
2015/7561 Alkimos city centre and central development, WA
2015/7534 Construction of a western access road, Julago, Qld
2014/7400 Bingara Gorge staged residential development, NSW
2013/7057 Spring Mountain mixed use master planned community development, Springfield, Qld
2013/6828 Woodlands Residential development (Villages 4 and 6, Waterford, Qld
2013/6818 Fernbrooke Ridge residential estate development - Balance Land, Redbank Plains, Qld
2013/6791 Yarrabilba residential development and associated infrastructure. Qld
2011/5902 Residential development Lot 1004 Alkimos WA
2011/5826 Gawler East Residential Development Project, SA
2010/5381 Calderwood Urban Development, NSW
2007/3574 Development and Construction of Rocky Springs Masterplanned Community, Qld
2005/1936 Upgrade of Taylors Road West, Vic
2005/1935 Caroline Springs Residential Development (middle sector), Vic
2004/1925 Subdivision of Precincts 3 and 12, St Patricks Estate, NSW
2004/1921 Caroline Springs residential development (northern sector), Vic
2004/1907 Development of Stage 7 of the North Shore Coastal Village, Qld
2001/520 North Lakes Development, Qld

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

Section 7

Information sources

Reference source

BAAM (2014) Shoreline Ecological Assessment – Redland Bay, prepared for Fox and Bell, by BAAM Ecological Consultants, dated 2014.

BAAM (2016) Shoreline Ecological Assessment – Redland Bay, prepared for Shoreline Redlands, by BAAM Ecological Consultants, dated 2016.

BAAM (2017) Response to EPBC Request for preliminary documentation (EPBC 2016/7776), prepared for Shoreline Redlands by BAAM Ecological Consultants, dated 20 Jun 2017.

BAAM (2017) Eastern Curlew Impact Management Plan, prepared for Shoreline Redlands, by BAAM Ecological Consultants, dated 28 Jan 2020.

Biolink. (2019). Redlands Coast Koala Population and Habitat Assessment.

Reliability

Reports and studies developed to inform compliance with Commonwealth, Queensland and local government approval processes. These studies have been undertaken by professional consultants who are qualified ecologists with practical experience in surveying and monitoring the local environment. Methods followed during field surveys were in accordance with relevant guidelines published by State and Commonwealth departments. References that have been cited in preparation of this referral and supporting documentation (include databases and documents) have been produced and maintained by State and Commonwealth departments, and as such are considered highly reliable.

Uncertainties

The field surveys are based on conditions encountered and information reviewed at the date of preparation of the report. The opinions, conclusions and any recommendations in the field survey reports are based on information obtained from specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points. Investigations undertaken in respect of these reports are constrained by the site conditions, such as access restrictions and vegetation. Thus, not all relevant site features and conditions may have been identified. Site conditions may change after the date of preparation of these reports.

Reference source

Desktop analysis also included review of existing reporting, supporting approvals for the surrounding area, including:

Dr Romane Cristescu, K. H.-C. (2018). Redland Coast Koala Population Assessment Project. University of the Sunshine Coast, Detection Dogs for Conservation.

Hosking, D. C. (2018). Priority areas in the Redlands for Koala Conservation: Building a Model of Spatial Prioritisation using Zonation. University of Queensland.

DS Dique, J. T. (2004). Determining the distribution and abundance of a regional Koala population in south-east Queensland for conservation management. Wildlife Research 31: 109-117.

DS Dique, J. T. (2003). Dispersal patterns in a regional Koala population in south east Queensland. Wildlife Research 30: 281-290.

Reliability

Reports and studies developed to inform compliance with Commonwealth, Queensland and local government approval processes. These studies have been undertaken by professional consultants who are qualified ecologists with practical experience in surveying and monitoring the local environment. Methods followed during field surveys were in accordance with relevant guidelines published by State and Commonwealth departments. References that have been cited in preparation of this referral and supporting documentation (include databases and documents) have been produced and maintained by State and Commonwealth departments, and as such are considered highly reliable.

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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 Agriculture, Water and the Environment. (2020). Phascolarctos cinereus - Koala SPRAT Profile. Retrieved from Species Profile and Threats Database: http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl

Department of Agriculture, Water and the Environment. (2020). Pteropus poliocephalus - Grey-headed Flying-fox SPRAT Profile. Retrieved from Species Profile and Threats Database: http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=186

Department of Agriculture, Water and the Environment. (2020). Hirundapus caudacutus - White-throated Needletail SPRAT Profile. Retrieved from Species Profile and Threats Database: https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=682

Department of Agriculture, Water and the Environment. (2020). Numenius phaeopus — Whimbrel SPRAT Profile. Retrieved from Species Profile and Threats Database:
http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=849

Reliability

Government database based on peer reviewed research.

Uncertainties

Nil.

Reference source

Department of Agriculture, Water and the Environment. (2020). Numenius madagascariensis — Eastern Curlew, Far Eastern Curlew SPRAT Profile. Retrieved from Species Profile and Threats Database: https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=847

Department of Agriculture, Water and the Environment. (2020). Limosa lapponica — Bar-tailed Godwit SPRAT Profile. Retrieved from Species Profile and Threats Database: http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=844

Department of Agriculture, Water and the Environment. (2020). Tringa nebularia — Common Greenshank, Greenshank SPRAT Profile. Retrieved from Species Profile and Threats Database: http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=832

Reliability

Government database based on peer reviewed research.

Uncertainties

Nil.

Reference source

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

Department of the Environment. (2013). Significant Impact Guidelines 1.1 - Matters of National Environmental Significance. Canberra: Commonwealth of Australia.

Reliability

Sources are Federal legislation and guidelines for MNES which are required to be used for EPBC Act assessments.

Uncertainties

Nil.

Reference source

DesignFlow. (2019). Water Quality Management Plan, prepared by for Shoreline Redlands, by DesignFlow, dated December 2019.

Reliability

Reports and studies developed to inform compliance with Commonwealth, Queensland and local government approval processes. These studies have been undertaken by professional consultants who are qualified ecologists with practical experience in surveying and monitoring the local environment. Methods followed during field surveys were in accordance with relevant guidelines published by State and Commonwealth departments. References that have been cited in preparation of

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this referral and supporting documentation (include databases and documents) have been produced and maintained by State and Commonwealth departments, and as such are considered highly reliable.

Uncertainties

The field surveys are based on conditions encountered and information reviewed at the date of preparation of the report. The opinions, conclusions and any recommendations in the field survey reports are based on information obtained from specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points. Investigations undertaken in respect of these reports are constrained by the site conditions, such as access restrictions and vegetation. Thus, not all relevant site features and conditions may have been identified. Site conditions may change after the date of preparation of these reports.

Reference source

V J Nelder, B. A. (2019). Methodology for survey mapping of regional ecosystems and vegetation communities in Queensland. Brisbane: Queensland Herbarium, Department of Environment and Science.

Reliability

Methodology developed to inform for the Queensland Government. It is a recommended methodology by DES and is widely used by environmental professionals.

Uncertainties

Nil.

Reference source

South East Queensland Regional Plan 2017 (ShapingSEQ), prepared by Department of Infrastructure, Local Government and Planning (DILGP)

Queensland Government (2021), Supporting Vegetation Management Map, prepared by the Department of Resources (DOR), Qld.

Reliability

Government documents published by the Queensland Government Department of Infrastructure, Local Government and Planning (DILGP) and Department of Resources (DOR), therefore it is a trusted document.

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

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 an organisation or business?

☑ Yes ☐ No

Organisation

Organisation name (as registered for ABN/ACN)	LENDLEASE COMMUNITIES (SHORELINE) PTY LIMITED
Business name	
ABN	14623367377
ACN	
Business address	Level 14, Tower Three, International Towers Sydney, Exchange Place, 300 Barangaroo Avenue,, Barangaroo, 2000, NSW, Australia
Postal address	
Main Phone number	0292366111
Fax	
Primary email address	joel.salmon@lendlease.com
Secondary email address	

9.1.2 I qualify for exemption from fees under Regulation 5.23(1)(ii) of the EPBC Regulations 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 Regulation 5.21A of the EPBC Regulations

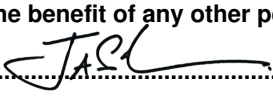
☐ Yes ☑ No

9.1.3 Contact (for an organisation - the contact details of the person authorised to sign on behalf of the organisation)

First name	Joel
Last name	Salmon
Job title	Senior Development Manager
Phone	(07) 3027 3000
Mobile	
Fax	
Email	joel.salmon@lendlease.com
Primary address	GPO Box 2777, Brisbane, 4001, QLD, Australia
Address	

Declaration: Person proposing the action (To be signed by the person at 9.1.3)

I, Joel Salmon **, 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:  **Date:** 5 October 2021

I, _____, the person proposing the action, consent to the designation of _____ as the proponent for the purposes of the action described in this EPBC Act Referral.

Signature:.....Date: .....

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 an organisation or business?

☑ Yes ☐ No

Organisation

Organisation name (as registered for ABN/ACN)	LENDLEASE COMMUNITIES (SHORELINE) PTY LIMITED
Business name	
ABN	14623367377
ACN	
Business address	Level 14, Tower Three, International Towers Sydney, Exchange Place, 300 Barangaroo Avenue,, Barangaroo, 2000, NSW, Australia
Postal address	
Main Phone number	0292366111
Fax	
Primary email address	joel.salmon@lendlease.com
Secondary email address	

9.2.2 Contact (for an organisation - the contact details of the person authorised to sign on behalf of the organisation)

First name	Joel
Last name	Salmon
Job title	Senior Development Manager
Phone	(07) 3027 3000
Mobile	
Fax	
Email	joel.salmon@lendlease.com
Primary address	GPO Box 2777, Brisbane, 4001, QLD, Australia
Address	

Declaration: Proposed Designated Proponent

I, Joel Salmon **,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: ..... **Date:** 5 October 2021

Australian Government
Department of Agriculture, Water and the Environment

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 an organisation or a business?

☑ Yes ☐ No

Organisation

Organisation name (as registered for ABN/ACN)	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	0732519455
Fax	
Primary email address	jordanbachmann@saundershavill.com
Secondary email address	

9.3.2 Contact (for an organisation - the contact details of the person authorised to sign on behalf of the organisation)

First name	Jordan
Last name	Bachmann
Job title	Senior Environmental Planner
Phone	0732519451
Mobile	
Fax	
Email	jordanbachmann@saundershavill.com
Primary address	9 Thompson St, Bowen Hills, 4006, QLD, Australia
Address	

Declaration: Referring party (person preparing the information)

I, Jordan Bachmann **, 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:** 05/10/2021

Australian Government
Department of Agriculture, Water and the Environment

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 The Trails Proposed Action - Plans.pdf
localgov_approval_consent	Attachment 2 The Trails Proposed Action - Ecological Assessment.pdf

Appendix B

Coordinates

Area 1
-27.651437513487,153.29415109757
-27.65198002,153.297660828
-27.652011392635,153.29786115154
-27.652195744,153.29782398
-27.652195699901,153.29782369937
-27.654160511861,153.29743223212
-27.655740161861,153.29711749713
-27.657828275862,153.29670145013
-27.657284569117,153.29320347144
-27.657285959,153.293203197
-27.65725350224,153.29300038029
-27.651437513487,153.29415109757

Attachment 1 – Plans

1. The Trails Proposed Action

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.

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Legend

- Qld DCDB
- Proposed Action
- Impact Area

Issue	Date	Description	Drawn	Checked
A	7/09/2021	Preliminary	LS	LT

0 50 100 m

Transverse Mercator | GDA 1994 | Zone 56 | 1:7,500 @ A3

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Redland Bay, Queensland 4165

Address / RPD: Lot 12 on SP268704 and road reserve

7/09/2021 | 10725 E 01 Proposed Action A

2. The Trails Development Plan (Indicative)

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.

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Legend

- Qld DCDB
- Proposed Action
- Future open space corridor
- Residential Development
- Road

Issue	Date	Description	Drawn	Checked
A	10/09/2021	Preliminary	LS	LT

0 50 100 m

Transverse Mercator | GDA 1994 | Zone 56 | 1:7,500 @ A3

saunders havill group

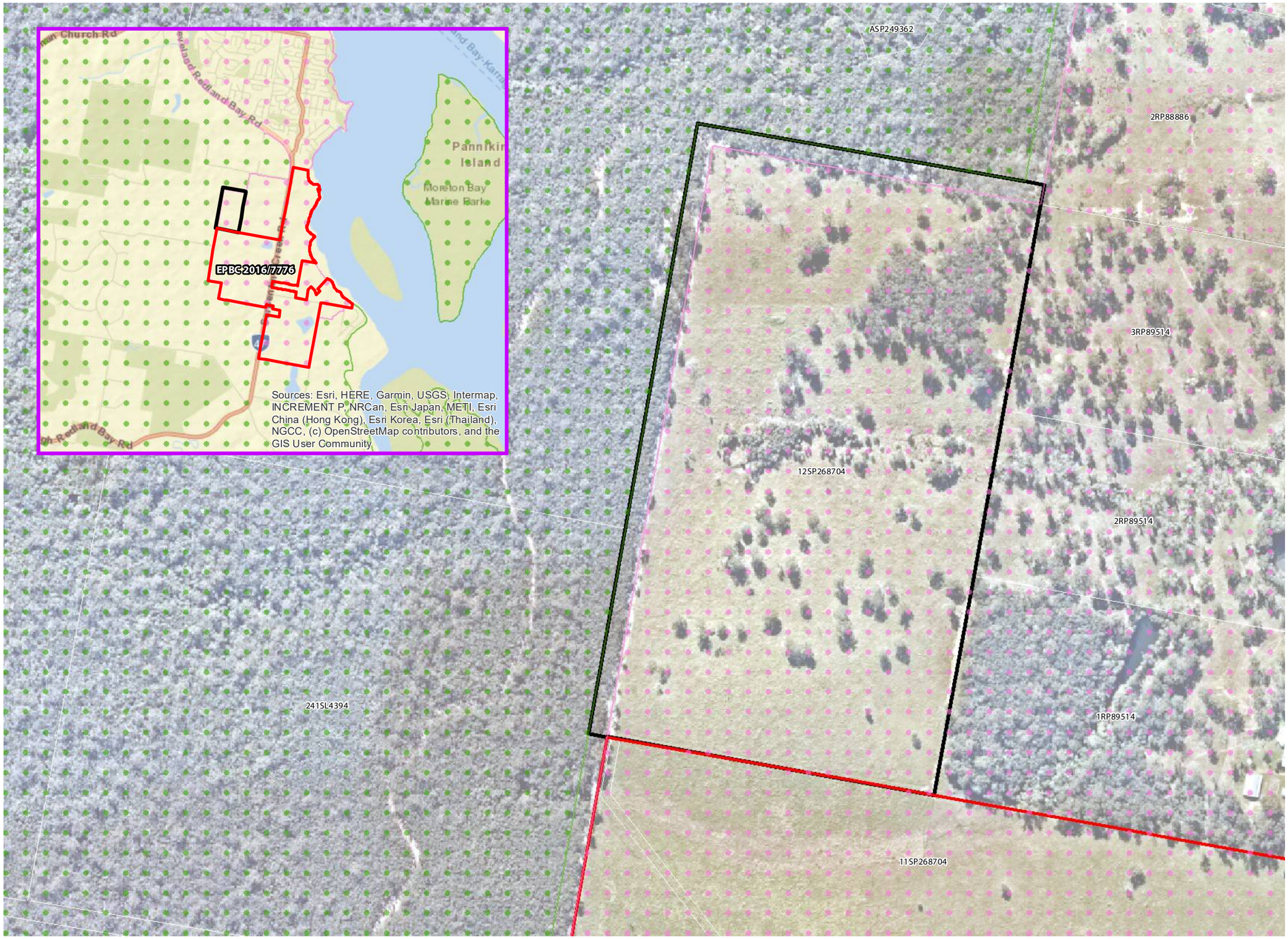
lendlease

Redland Bay, Queensland 4165

Address / RPD: Lot 12 on SP268704 and road reserve

10/09/2021 | 10725 E 02 Development Plan A

3. Related Project EPBC 2016/7776



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.

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Legend

- Qld DCDB
- Proposed Action
- EPBC 2016/7776
  Referral Date: 12/09/2016
  Approved Date: 26/04/2018

South East Queensland Regional Plan 2005-2026

Regional Land Use Categories

- Regional Landscape and Rural Production Area
- Urban Footprint

Issue	Date	Description	Drawn	Checked
A	10/09/2021	Preliminary	LS	LT

0 50 100 m

Transverse Mercator | GDA 1994 | Zone 56 | 1:4,000 @ A3

Address / RPD: Lot 12 on SP268704 and road reserve

10/09/2021 | 10725 E 03 Related Projects A

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Redland Bay, Queensland 4165

Attachment 2 – MNES Ecological Technical Report

MNES Ecological Technical Assessment

The Trails EPBC Act Referral
Serpentine Creek Road, Redland Bay

Prepared for Lendlease Communities (Shoreline) Pty Ltd
10 September 2021

Job 10725 E

saunders havill group

Document Control

Document: 10725 E MNES Ecological Technical Assessment, The Trails EPBC Act Referral, Serpentine Creek Road Redland Bay, prepared by Saunders Havill Group for Lendlease Communities (Shoreline) Pty Ltd, dated 10 September 2021.

Document Issue

Issue	Date	Prepared By	Checked By
Issue A	10.09.2021	LT	JB

Prepared by

ABN 24 144 972 949
www.saundershavill.com

Table of Contents

Figures

Tables

1. Introduction

Saunders Havill Group (SHG) was engaged by Lendlease Communities (Shoreline) Pty Ltd ('the proponent') to carry out an ecological technical assessment to support a referral for The Trails ('the proposed action') under the Commonwealth Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The purpose of this report is to identify potential Matters of National Environmental Significance (MNES), specifically listed threatened species, that may be impacted by the proposed urban development. The proposed action site is located at Serpentine Creek Road, Redland Bay, Queensland, described as Lot 12 on SP268704 and the adjacent road to the north and west ('the site'). Refer to Figure 1 for the site context and Figure 2 for the site aerial.

1.1. The Proposed Action

The proposed action is for the development of the land for urban purposes, including residential and open space, hereafter referred to as 'The Trails'. Refer to Figure 3 for proposed development footprint.

1.2. Key site details

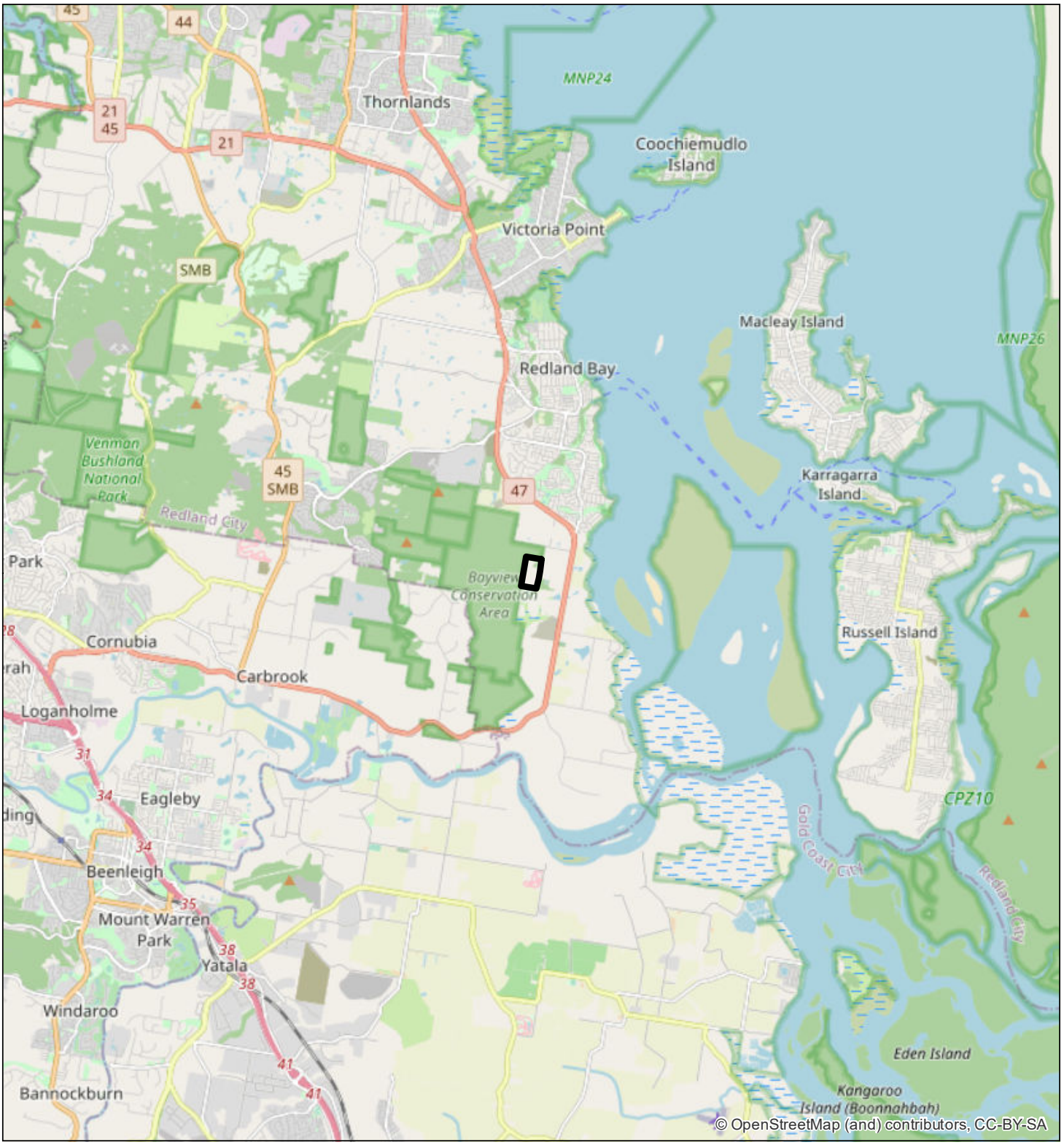
The site is predominately scattered trees amongst grassed paddock and used for grazing. The site adjoins the Bayview Conservation Area to the west and is currently surrounded by rural land uses to the south and east. The property to the south was utilised for rural/agricultural pursuits and recently (August 2020) urban development under the Shoreline urban village (EPBC 2016/7776) commenced. The site is accessed via an easement from 275 Serpentine Creek Road, Redland Bay.

The proposed action is related to EPBC 2016/7776 as it shares a parcel boundary and the current proponent of both is Lendlease Communities (Shoreline) Pty Ltd. However, the original proponent of EPBC 2016/7776 was another party, and that action was referred for assessment on 12 September 2016, and then approved on 26 April 2018. This approval was transferred to Lendlease Communities (Shoreline) Pty Ltd on 16 August 2018. The referral and approval of EPBC 2016/7776 significantly precedes Lendlease Communities (Shoreline) Pty Ltd's involvement with this proposed action (i.e. The Trails), and therefore the approved action is considered related to the proposed action.

The site is located within Redland City Council (RCC) Local Government Area and is subject to the provisions of the Redlands Planning Scheme (v6.2). Under the Redland Planning Scheme (v6.2) the site is zoned Rural.

Table 1: Property Summary

Address	Serpentine Creek Road, Redland Bay, Queensland
RPD	Lot 12 on SP268704 and road
Lot Area	22.25 ha (sourced from Qld SmartMap)
Road Area	2.02 ha
Proposed Action Area	24.27 ha
LGA	Redland City Council
Planning Scheme / Local Plan	Redland Planning Scheme v6.2
Proposed Land Use	Residential and open space (drainage corridor)



Legend

Proposed Action

Figure 1

Site Context

File ref. 10725 E Figure 1 Site Context A
Date 7/09/2021
Project Serpentine Creek Road, Redland Bay

0 1 2 4 km

Scale (A4): 1:125,000 [GDA 1994 MGA Z56]

N

Layer Source: © State of Queensland 2021

Legend

Proposed Action

Qld DCDB

Figure 2

Site Aerial

File ref. 10725 E Figure 2 Site Aerial A
Date *10/09/2021*
Project *Serpentine Creek Road, Redland Bay*

0 25 50 100 150 *m*

N

Scale (A4): 1:4,000 [GDA 1994 MGA Z56]

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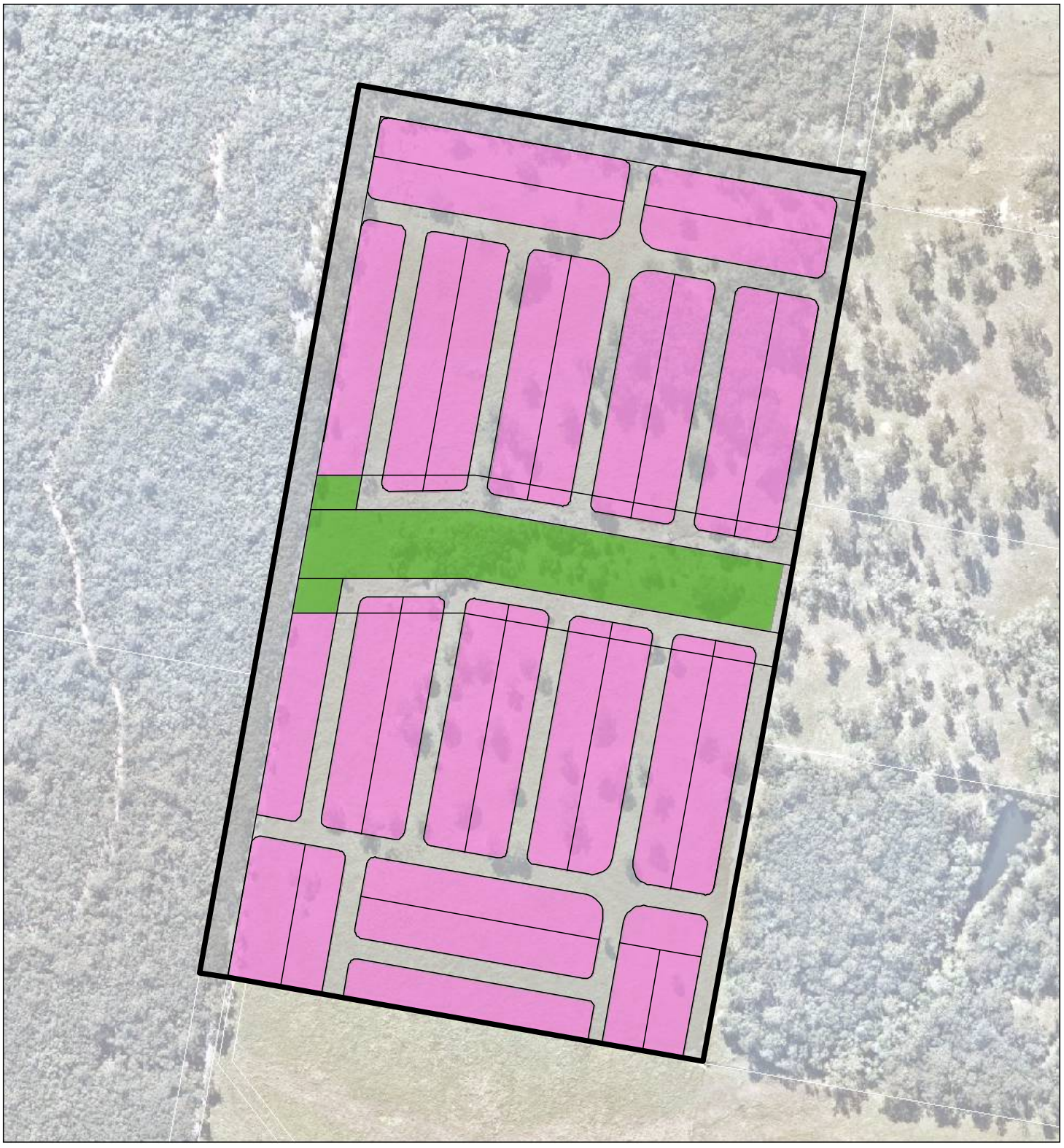
Layer Source: © State of Queensland 2021,Nearmap 2021



Legend

- Proposed Action
- Qld DCDB
- Future open space corridor
- Residential Development
- Road
- Development Layout

Figure 3

Development Plan (Indicative)

File ref. 10725 E Figure 3 Dev Plan A
Date *10/09/2021*
Project *Serpentine Creek Road, Redland Bay*

0 25 50 100 150 *m*

N

Scale (A4): 1:4,000 [GDA 1994 MGA Z56]

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Layer Source: © State of Queensland 2021,Nearmap 2021

2. Ecological Assessment Methodology and Process

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

1. Desktop analysis
2. Legislation and policy review
3. Field surveys and results
4. Impact assessment
5. MNES significant impact assessments and
6. Conclusions and recommendations.

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

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 including the following:

- Commonwealth Matters of National Environmental Significance (MNES) protected under *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) on and around the site using the Protected Matters Search Tool (PMR);
- *Nature Conservation Act 1992* (NCA) listed threatened species on and around the site using the Wildlife Online Database;
- Public environmental databases including Atlas of Living Australia;
- State Government environmental overlay mapping and databases including:
    - Regulated vegetation maps under the *Vegetation Management Act 1999* (VMA)
    - Flora survey trigger areas under the NCA
    - Fish habitat under the *Fisheries Act 1994*
    - Watercourses under the *Water Act 2000*
    - Weeds under the *Biosecurity Act 2014*
    - Matters of State Environmental Significance (MSES) under the *Environmental Offsets Regulation 2014*
    - Koala habitat under the superseded planning framework (State) and *Planning Regulation 2017*.
- RCC Planning Scheme Documents and Maps, and
- Review of existing reporting supporting approvals for the surrounding area, including:
    - BAAM (2014) Shoreline Ecological Assessment – Redland Bay, prepared for Fox and Bell, by BAAM Ecological Consultants, dated 2014.
    - BAAM (2016) Shoreline Ecological Assessment – Redland Bay, prepared for Shoreline Redlands, by BAAM Ecological Consultants, dated 2016.
    - BAAM (2017) Response to EPBC Request for preliminary documentation (EPBC 2016/7776), prepared for Shoreline Redlands by BAAM Ecological Consultants, dated 20 Jun 2017.

- BAAM (2017) Eastern Curlew Impact Management Plan, prepared for Shoreline Redlands, by BAAM Ecological Consultants, dated 28 Jan 2020. (Note, this document is an approved management plan under EPBC 2016/7776).
- DesignFlow (2019) Water Quality Management Plan, prepared by for Shoreline Redlands, by DesignFlow, dated December 2019. (Note, this document is an approved management plan under EPBC 2016/7776).

A review of aerial photography history was undertaken to assist with the broad delineation of vegetation communities and to determine historical patterns to local vegetation communities.

2.2. Field survey methodology

Ecological field surveys were conducted across the referral area utilising the following methods in order to describe the site ecological values.

Table 2: Survey Summary

Date	Survey Method	Surveyor(s) & Qualifications
14 February 2020	Observational survey, active and targeted searches, SAT	**Megan McKinney** Principal Ecologist Bachelor of Science (Threatened Species Ecology) Bachelor of Science (Zoology) (Animal Physiology)
6 – 11 May 2020	Standardised fauna assessment	**David Havill** Senior Ecologist Bachelor of Applied Science (Natural Systems and Wildlife Management) Diploma of Arboriculture
6 May 2020	Spotlight meander	
9 May 2020	Songmeter survey	**Hannah Silcox** Environmental Scientist Bachelor of Environmental Management (Natural Systems and Wildlife)
10 May 2020	Spotlight meander	**Amy Westman** Ecologist Bachelor of Science (Zoology)
10 May 2020	Anabat Swift	**Liam Brzezinski** Ecologist Bachelor of Environmental Management (Natural Systems and Wildlife)
13 May 2020	Observational survey	Anabat Analysis / Microbat call identification undertaken by Balance! Environmental.

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

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

The observational survey included identification of ecological features and values such as broad vegetation communities, fauna habitats and ecological corridors. Identification and description of the fauna habitats present within the area included any habitat trees. Specific attention was paid to threatened flora and fauna species. For the purposes of this report, a significant flora and fauna species has been defined as a species that is listed as Critically Endangered, Endangered, Vulnerable or Conservation Dependent under the EPBC Act.

2.2.2 Ground-truthing of vegetation communities

Vegetation was ground-truthed and assessed against current VMA Regional Ecosystem mapping and pre-clear mapping. A comprehensive flora survey was undertaken using a methodology consistent with the established formats used by the Queensland Herbarium Nelder et al. 2020[1] and Hnatiuk et al. 2009[2]. Survey methodology comprised of an initial visual audit, followed by quantitative assessment of vegetation associations and communities.

The initial visual audit consisted of a random meander over the site to ground-truth desktop investigations and identify the location and extent of any vegetation associations and communities. Qualitative assessments were undertaken by collecting data associated with structural formations (i.e. growths form, stratum intervals, crown cover and height) and floristic associations (i.e. species diversity) for each broad vegetation type.

2.2.3 Waterway Assessment

Preliminary waterway surveys were completed during fauna surveys. Detailed waterways assessments were completed alongside vegetation surveys and flora identification. The following information was collected:

- general description;
- channel shape and modifications;
- in-stream habitat;
- vegetation quality and cover (embankments, channel and overall corridor);
- bed, bank and bar conditions (erosion, scouring, sediment); and
- weed cover.

2.2.4 Diurnal active and targeted searches

An active targeted searches were conducted during daylight hours. These assessments involved thorough searching within potential microhabitat such as under tree bark, within loose leaf litter, under rocks and fallen timber, within

[1] Neldner, V.J., Wilson, B.A., Dillewaard, H.A., Ryan, T.S., Butler, D.W., McDonald, W.J.F, Addicott, E.P. and Appelman, C.N. (2020) Methodology for survey and mapping of regional ecosystems and vegetation communities in Queensland. Version 5.1. Updated March 2020. Queensland Herbarium, Queensland Department of Environment and Science, Brisbane.

[2] Hnatiuk, R.J., Thackway, R. and Walker, J. 2009, 'Vegetation', in National Committee on Soil and Terrain, Australian Soil and Land Survey Field Handbook, 3rd edition, CSIRO publishing, Melbourne, pp. 73–127.

partially decomposed tree stags and in tree foliage. Prior to conducting spotlight surveys, significant hollows and notable features were noted and these directed spotlight meanders. The active search was conducted on 14 February 2020 by a single ecologist for 30 minutes. All species encountered were recorded.

2.2.5 Nocturnal Searches, spotlighting and roost searches

This non-intrusive 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).

Spotlight searches were conducted over the course of two nights (6 and 10 May 2020) from 1730hrs 2100hrs by two ecologists. High-powered spotlights (Fenix HP25R Rechargeable LED Headlamp – 1000 lumens) were used to detect cryptic and nocturnal fauna. Site access via foot was preferred (vehicle access was difficult/problematic). Mapped waterway areas and large habitat trees were specifically targeted during the surveys.

2.2.6 Standardised fauna assessment

The Terrestrial Vertebrate Fauna Survey Guidelines for Queensland[3] (2018), outlines recommendations for standardised survey techniques and establishes the minimum standards for adequately assessing habitat for fauna species. The initial site visit provided preliminary information for ecologists to construct a plan for fauna assessment. A fauna survey site was undertaken between 6 and 11 May 2020, employing standardised fauna survey site methodology in addition to several specialised survey techniques targeting specific fauna taxa and species. The following sections detail the fauna assessment methodology employed within the site.

One full fauna survey site was installed in accordance with **Figure 4** within non-remnant vegetation. The fauna site remained active for a minimum of four nights (approximately 96 hours). During this time, ecologists monitored and reset all traps each morning between 0630hrs and 0900hrs and again between 1530hrs and 1715hrs. All fauna was identified and released *in situ* as quickly as possible. Pitfall buckets and funnel traps remained open at all times whereas Elliott traps were closed from 0900hrs to 1530hrs to avoid heat stress and injury to fauna.

2.2.7 Motion detection camera

Two (2) motion detection camera traps were installed across the referral area in locations targeted at threatened species and cryptic fauna. Due to time limitations on-site, cameras were installed for the duration of 5 nights from 6 to 11 May 2020. Camera traps were baited with a trap containing peanut butter and oat mixture with cameras fixed to a tree approximately 70cm from the ground and 100-150cm in front of the bait station. Camera images were downloaded and analysed with all species identified subsequently added to the site fauna list.

2.2.8 Koala Habitat and SAT Surveys

Koala Habitat and Spot Assessment Technique (SAT) surveys were undertaken on-site in accordance with the methodology developed by the Australian Koala Foundation (as per Phillips & Callaghan 2011[4]) and specified in the

[3] 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.

[4] Phillips, S & Callaghan, J. 2011. The Spot Assessment Technique: a tool for determining localised levels of habitat use by Koalas Phascolarctos cinereus. Australian Koala Foundation, Australia.

EPBC Act Referral Guidelines for the Vulnerable Koala. The 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 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 one metre radius of the trunk. After approximately two-person minutes of searching for scats, the base of the trunk is observed for scratches and the crown for Koala (refer Phillips & Callaghan 2011). One (1) SAT survey was undertaken within the referral area on 14 February 2020.

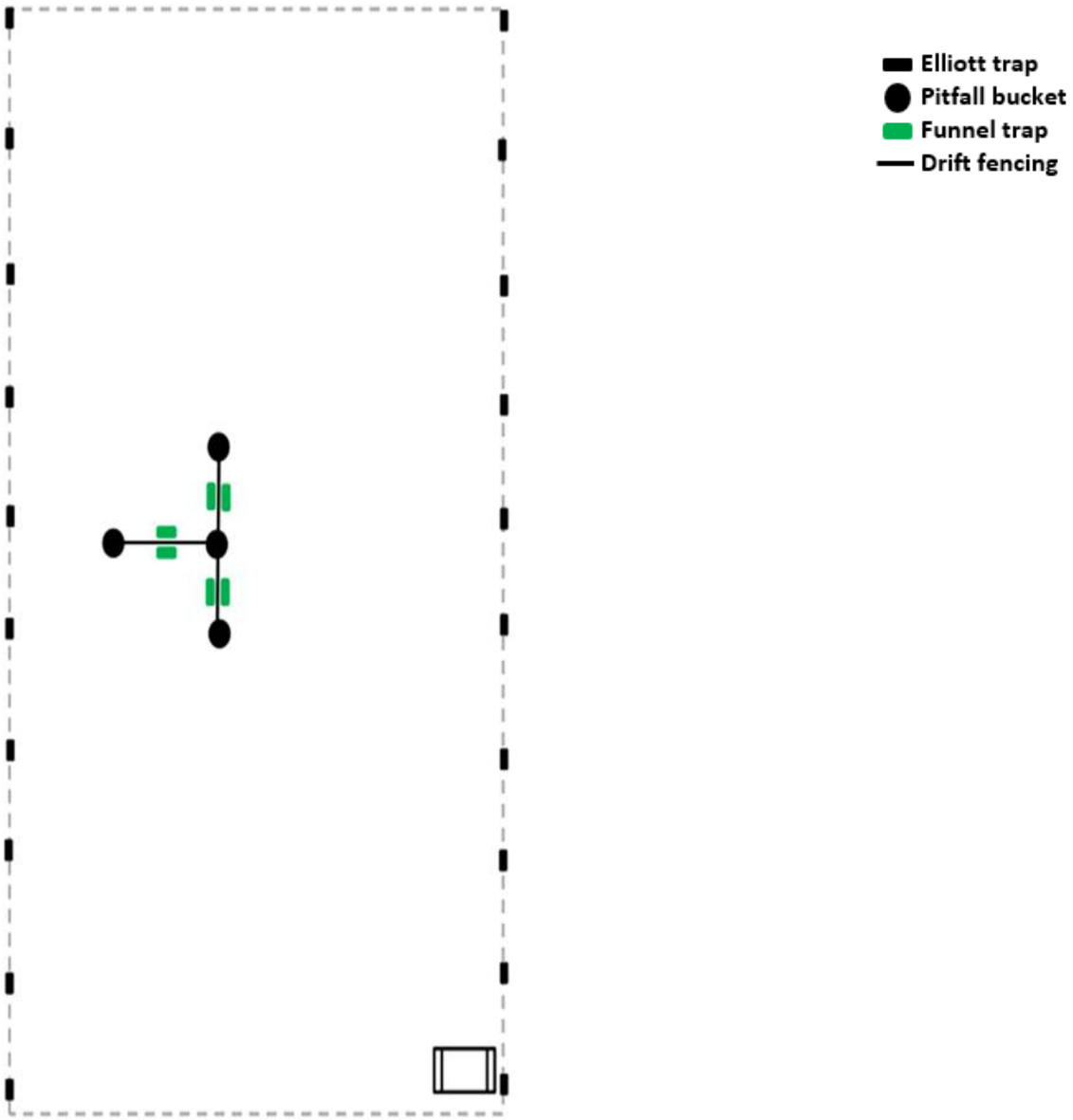


Figure 4: Standardised fauna survey site (adapted from Terrestrial Vertebrate Fauna Survey Guidelines for Queensland version 3.0 (DES 2018)).

2.2.9 Anabat

A bat echolocator device (Anabat Swift) was installed at one (1) location across the site for a single night on 10 May 2020. The Anabat machine was active from 1630hrs to 0730hrs. Locations within proximity to water are optimal, as microbats come in regularly to drink from water sources. Isolated water sources are the most likely to capture maximum bat calls due to the concentration of bats likely to utilise these.

2.2.10 Songmeter Survey

A songmeter (Wildlife Acoustics SM4+ machine) was installed at one (1) location across the site for a single night on 9 May 2020. A songmeter records frog and bird calls at specific times, based on set programming. Due to slightly cooler days and nights, the songmeter was set to record late afternoon through to late morning (1600hrs to 0800hrs) allowing for potential frog calls during warmer parts of the day when calls are possible. The songmeter was not used between 0800hrs and 1600hrs as ecologists were frequenting all waterholes during these hours. This enabled post-survey analysis of calls providing additional data to determine whether any threatened frog species are present and calling on-site. Supplementary spotlight and active searches, specifically targeting threatened frog species', *Crinia tinnula* and *Adelotus brevis* complemented the songmeter survey.

2.3. Likelihood of Occurrence

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

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

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

Table 3: Likelihood of occurrence assessment criteria

Likelihood of occurrence	Assessment criteria
Low	No previous records of the species within the locality and one or more of the following criteria is met: • Not previously recorded on the referral area and surrounds and the referral area is beyond the current known geographic range; • Dependant on specific habitat types or resources that are not present on the referral area; or • Considered extinct in the wild.
Moderate	Species previously recorded within the locality and one or more of the following criteria is met: • Previously recorded in proximity to the referral area (i.e. vagrant individuals); or • Potential habitat typologies or resources are present on the referral area.
High	Species previously recorded within the locality and one or more of the following criteria is met: • Previously recorded on the referral area; • Dependant on habitats or habitat resources that are available on the referral area; or

Likelihood of occurrence	Assessment criteria
	• Suitable habitats are available on the referral area that are capable of supporting a resident population or individuals of the species.
Known	Flora species or ecological community positively identified during field surveys within the referral area. Fauna species positively recorded during field surveys within the referral area or adjacent habitats.

2.4. Significant Impact Risk Assessment

A risk assessment of potential impacts was completed resulting in a summary of potential and residual risk. Best practice assessment and practices will be employed to minimise the impacts associated with both construction and operation of the project using the Matters of National Environmental Significance: Significant Impact Guidelines 1.1 *Environment Protection and Biodiversity Act 1999*, Commonwealth of Australia, 2013 (EPBC SI Guidelines).

Table 4: Risk Assessment Matrix

	Consequence				
	Minor	**Moderate**	**High**	**Major**	**Critical**
Highly Likely	Medium	High	High	Severe	Severe
Likely	Low	Medium	High	High	Severe
Possible	Low	Medium	Medium	High	Severe
Unlikely	Low	Low	Medium	High	High
Rare	Low	Low	Low	Medium	High

*As defined under *AS/NZS ISO 31000:2009 Risk management – Principles and guidelines* (Standards Australia 2009).

Highly likely	Is expected to occur in most circumstances
Likely	Will probably occur during the life of the project
Possible	Might occur during the life of the project
Unlikely	Could occur but considered unlikely or doubtful
Rare	May occur in exceptional circumstances
Minor	Minor incident of environmental damage that can be reversed
Moderate	Isolated but substantial instances of environmental damage that could be reversed with intensive efforts
High	Substantial instances of environmental damage that could be reversed with intensive efforts
Major	Major loss of environmental amenity and real danger of continuing
Critical	Severe widespread loss of environmental amenity and irrecoverable environmental damage

2.5. Study Limitations

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

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

Fauna surveys utilised a combination of passive and active methods for detection, including call recognition, spotlighting, visual identification, motion detection cameras, trapping active searches and inferential evidence of habitat usage (e.g. scratches, scats, burrows, active nests etc).

3. Legislation, Policy and Planning Instruments

3.1. *Environment Protection and Biodiversity Conservation Act 1999*

The EPBC Act objectives are to protect and manage matters of national environmental significance (MNES) which include nationally and internationally important flora, fauna, ecological communities and heritage places. A search using the Commonwealth's Protected Matters Report (PMR) was obtained to initially ascertain which MNES may be temporarily or permanently located within a 5 km radius from the central point of the site. Table 5 lists a summary of these results relevant to the site. The complete results of this search are included in Appendix A.

Table 5: EPBC Act PMR Summary

Threatened Ecological Communities		
1. Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland – Endangered (community may occur within area) 2. Lowland Rainforest of Subtropical Australia – Critically Endangered (community may occur within area) 3. White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland – Critically Endangered (community may occur within area)		
Threatened Species		
Scientific Name	**Common Name**	**Status**
Birds		
Anthochaera phrygia	Regent Honeyeater	Critically Endangered
Botaurus poiciloptilus	Australasian Bittern	Endangered
Calidris canutus	Red Knot, Knot	Endangered
Calidris ferruginea	Curlew Sandpiper	Critically Endangered
Calidris tenuirostris	Great Knot	Critically Endangered
Charadrius mongolus	Lesser Sand Plover, Mongolian Plover	Endangered
Dasyornis brachypterus	Eastern Bristlebird	Endangered
Diomedea antipodensis	Antipodean Albatross	Vulnerable
Diomedea antipodensis gibsoni	Gibson's Albatross	Vulnerable
Diomedea exulans	Wandering Albatross	Vulnerable
Erythrotriorchis radiatus	Red Goshawk	Vulnerable
Falco hypoleucos	Grey Falcon	Vulnerable
Fregetta grallaria grallaria	White-bellied Storm-Petrel (Tasman Sea),	Vulnerable
Geophaps scripta scripta	Squatter Pigeon (southern)	Vulnerable
Grantiella picta	Painted Honeyeater	Vulnerable

Threatened Species		
Scientific Name	**Common Name**	**Status**
Hirundapus caudacutus	White-throated Needletail	Vulnerable
Lathamus discolour	Swift Parrot	Critically Endangered
Limosa lapponica baueri	Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit	Vulnerable
Macronectes giganteus	Southern Giant-Petrel, Southern Giant Petrel	Endangered
Macronectes halli	Northern Giant Petrel	Vulnerable
Numenius madagascariensis	Eastern Curlew	Critically Endangered
Pachyptila turtur subantarctica	Fairy Prion (southern)	Vulnerable
Pterodroma neglecta neglecta	Kermadec Petrel (western)	Vulnerable
Rostratula australis	Australian Painted Snipe	Endangered
Sternula nereis nereis	Australian Fairy Tern	Vulnerable
Thalassarche cauta	Shy Albatross	Vulnerable
Thalassarche eremita	Chatham Albatross	Endangered
Thalassarche impavida	Campbell Albatross, Campbell Black-browed Albatross	Vulnerable
Thalassarche melanophris	Black-browed Albatross	Vulnerable
Thalassarche salvini	Salvin's Albatross	Vulnerable
Thalassarche steadi	White-capped Albatross	Vulnerable
Thinornis cucullatus cucullatus	Eastern Hooded Plover	Vulnerable
Turnix melanogaster	Black-breasted Button-quail	Vulnerable
Fish		
Epinephelus daemelii	Black Rockcod, Black Cod, Saddled Rockcod	Vulnerable
Hippocampus whitei	White's Seahorse	Endangered
Maccullochella mariensis	Mary River Cod	Endangered
Frogs		
Mixophyes fleayi	Fleay's Frog	Endangered
Insects		
Argynnis hyperbius inconstans	Australian Fitiillary	Critically Endangered
Mammals		
Balaenoptera musculus	Blue Whale	Endangered
Cahlinolobus dwyeri	Large-eared Pied Bat	Vulnerable
Dasyurus maculatus maculatus	Spot-tailed Quoll	Endangered
Eubalaena australis	Southern Right Whale	Endangered

Threatened Species		
Scientific Name	**Common Name**	**Status**
Megaptera novaeangliae	Humpback Whale	Vulnerable
Petauroides Volans	Greater Glider	Vulnerable
Phascolarctos cinereus	Koala	Vulnerable
Potorous tridactylus tridactylus	Long-nosed Potoroo	Vulnerable
Pseudomys novaehollandiae	New Holland Mouse, Pookila	Vulnerable
Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable
Xeromys myoides	Water Mouse, False Water Rat, Yirrkoo	Vulnerable
Plants		
Acronychia littoralis	Scented Acronychia	Endangered
Arthraxon hispidus	Hairy-joint Grass	Vulnerable
Baloghia marmorata	Marbled Balogia, Jointed Baloghia	Vulnerable
Corchorus cunninghamii	Native Jute	Endangered
Cryptocarya foetida	Stinking Cryptocarya, Stinking Laurel	Vulnerable
Cryptostylis hunteriana	Leafless Tongue-orchid	Vulnerable
Cryptostylis shirleyana	Wedge-leaf Tuckeroo	Vulnerable
Endiandra floydii	Floyd's Walnut	Endangered
Gossia gonoclada	Angle-stemmed Myrtle	Endangered
Macadamia integrifolia	Macadamia Nut, Queensland Nut Tree, Smoothshelled Macadamia, Bush Nut, Nut Oak	Vulnerable
Macadamia tetraphylla	Macadamia, Rough-leaved Queensland Nut	Vulnerable
Persicaria elatior	Knotweed, Tall Knotweed	Vulnerable
Phaius australis	Lesser Swamp-orchid	Endangered
Rhodamnia rubescens	Scrub Turpentine	Critically Endangered
Rhodomyrtus psidioides	Native Guava	Critically Endangered
Samadera bidwillii	Quassia	Vulnerable
Thesium austral	Austral Toadflax	Vulnerable
Reptiles		
Caretta caretta	Loggerhead Turtle	Endangered
Chelonia mydas	Green Turtle	Vulnerable
Coeranoscincus reticulatus	Three-toed Snake-tooth Skink	Vulnerable
Delma torquata	Adorned Delma	Vulnerable
Dermochelys coriacea	Leatherback Turtle, Leathery Turtle, Luth	Endangered
Eretmochelys imbricata	Hawksbill Turtle	Vulnerable

Threatened Species		
Scientific Name	**Common Name**	**Status**
Lepidochelys olivacea	Olive Ridley Turtle, Pacific Ridley Turtle	Endangered
Natator depressus	Flatback Turtle	Vulnerable
Sharks		
Carcharias taurus (east coast population)	Grey Nurse Shark (east coast population)	Critically Endangered
Carcharodon carcharias	White Shark, Great White Shark	Vulnerable
Pristis zijsron	Green Sawfish, Dindagubba, Narrowsnout Sawfish	Vulnerable
Rhincodon typus	Whale Shark	Vulnerable

A likelihood of occurrence assessment was undertaken to inform targeted field surveys. The results of site-based assessments were then combined with the likelihood assessment to include a risk analysis. The combined likelihood and risk assessment from PMR identified matters is included in Appendix B.

It is noted that the adjacent project *Shoreline urban village* (EPBC 2016/7776) was a controlled action and approved with the following controlling provisions:

- Wetlands of International Importance – Moreton Bay (Ramsar)
- Listed Threatened Species and Communities – Eastern Curlew
- Listed Migratory Species – Eastern Curlew

The PMR matters (Listed Threatened Species and Communities and Listed Migratory Species) were targeted as part of the survey effort.

3.2. Nature Conservation Act 1992

The NCA classifies and protects significant areas (Protected Areas) and protects threatened plant and animal species. The *Nature Conservation (Animals) Regulation 2020* and *Nature Conservation (Plants) Regulation 2020* lists plant and animal species presumed extinct, critically endangered, endangered, vulnerable, near threatened, special least concern, least concern, international or prohibited. The schedules of these regulations were considered in this report using a Wildlife Online Database Search with a 5 km radius from the site. Threatened species with the potential to occur around the referral area are listed in Table 6. Refer to Appendix C for full search results.

Table 6: NCA Wildlife Online Database Search Results

Scientific Name	Common Name	Status
Amphibians		
Adelotus brevis	Tusked Frog	Vulnerable
Crinia tinnula	Wallum Froglet	Vulnerable
Birds		
Hirundapus caudacutus	White-throated Needletail	Vulnerable
Botaurus poiciloptilus	Australian Bitten	Endangered

Scientific Name	Common Name	Status
Calyptorhynchus lathami lathami	Glossy Black-cockatoo (eastern)	Vulnerable
Rostratula australis	Australian Painted Snipe	Endangered
Calidris ferruginea	Curlew Sandpiper	Endangered
Limosa lapponica baueri	Western Alaskan Bar-tailed Godwit	Vulnerable
Numenius madagascariensis	Eastern Curlew	Endangered
Mammals		
Phascolarctos cinereus	Koala	Vulnerable

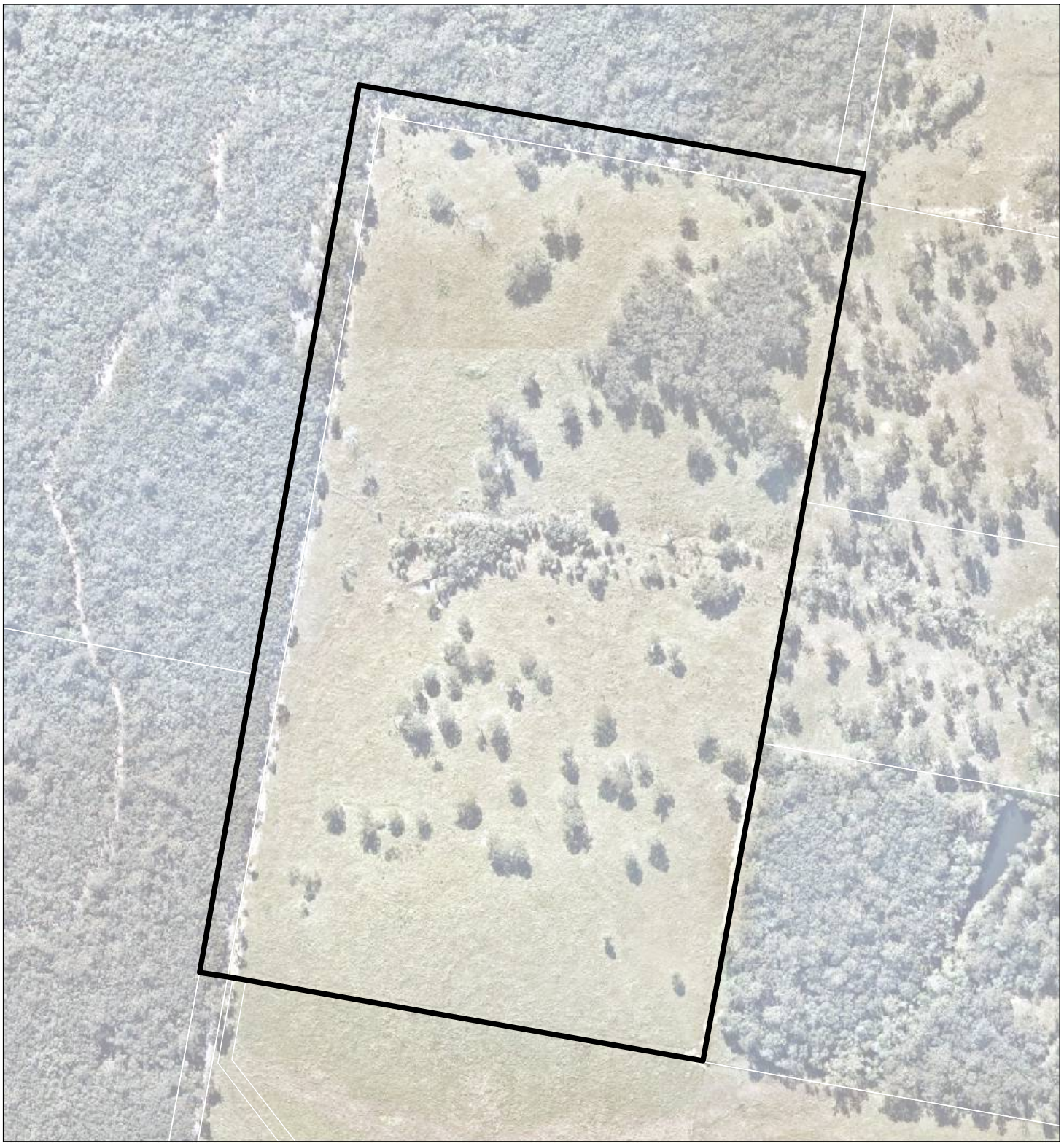
Under the NCA, any future development must consider impacts to listed fauna species.

The protected plants regulatory framework established approval triggers and processes for clearing protected plants based on historical locations of flora. A protected plant is defined as all extinct, critically endangered, endangered, vulnerable and/or near threatened (i.e. threatened) plant species listed by name in Schedules 1-5 of the *Nature Conservation (Plants) Regulation 2020* and least concern wildlife, not listed by name yet identified as a plant indigenous to Australia. Under the NCA, a protected plant that is *in the wild* must not be 'taken', which includes being cleared, unless taking is under:

- A conservation plan applicable to the plant;
- A license, permit or other authority under a regulation; or
- An exemption under a regulation.

A search of the Protected Plants Flora Survey Trigger Map identified that the site is not located within a High Risk Area for Protected Plants (refer Figure 5). Therefore, the historical absence of threatened flora protected under the NCA on the referral area, combined with the historical grazing land use, indicated a low likelihood of threatened flora occurring *in the wild*.

The *Nature Conservation (Koala) Conservation Plan 2017* stipulates controls for clearing koala habitat trees in South East Queensland and requires clearing works to be undertaken by a registered fauna spotter catcher with permits from the DES. All future clearing work will be undertaken in accordance with the *Nature Conservation (Koala) Conservation Plan 2017* controls.



Legend

- Proposed Action
- Qld DCDB
- High risk area - flora survey trigger (None on site)

Figure 5

NCA - Protected Plants
Flora Survey Trigger

File ref. 10725 E Figure 4 NCA A
Date *1/09/2021*
Project *Serpentine Creek Road, Redland Bay*

0 25 50 100 150 *m*

Scale (A4): 1:4,000 [GDA 1994 MGA Z56]

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3.3. Vegetation Management Act 1999

Regulated Vegetation Management Mapping under the VMA shows vegetation categories used to control clearing at the State level of regulation. Mapped Category X areas are non-remnant and not regulated under the VMA, and those shown as Category A, B, C or R are subject to clearing requirements. The latter vegetation categories can only be cleared in accordance with an exemption, self-assessable vegetation clearing code, area management plan or development approval. A Supporting Map defining Regional Ecosystems, wetlands, watercourses and essential habitat, is provided with the Regulated Vegetation Management Map. State approval for clearing regulated vegetation is required under the *Planning Act 2016* unless the work meets the definition of exempt clearing work or accepted development requirements.

A property search of the Regulated Vegetation Management Map identifies the site is predominately mapped as Category X (non-remnant vegetation) with Category B vegetation extending over the road along the northern and western parts of the referral area (refer Figure 6). The Supporting Vegetation Management Map (SVMM) shows this Category B vegetation is described as Endangered RE12.11.27/12.11.23/12.11.26 (40/40/20) (refer Figure 7). This vegetation is also associated with essential habitat for *Crinia tinnula* (Wallum Froglet) and *Phascolarctos cinereus* (Koala). A drainage feature associated with regulated vegetation is also mapped over the central portion of the site.

It is noted that the site has been subject to a 'lock it in' Property Map of Assessable Vegetation (PMAV) (2010/003488) whereby the land owner agreed with the administering authority (of the VMA) that the non-remnant vegetation on-site was accurate.

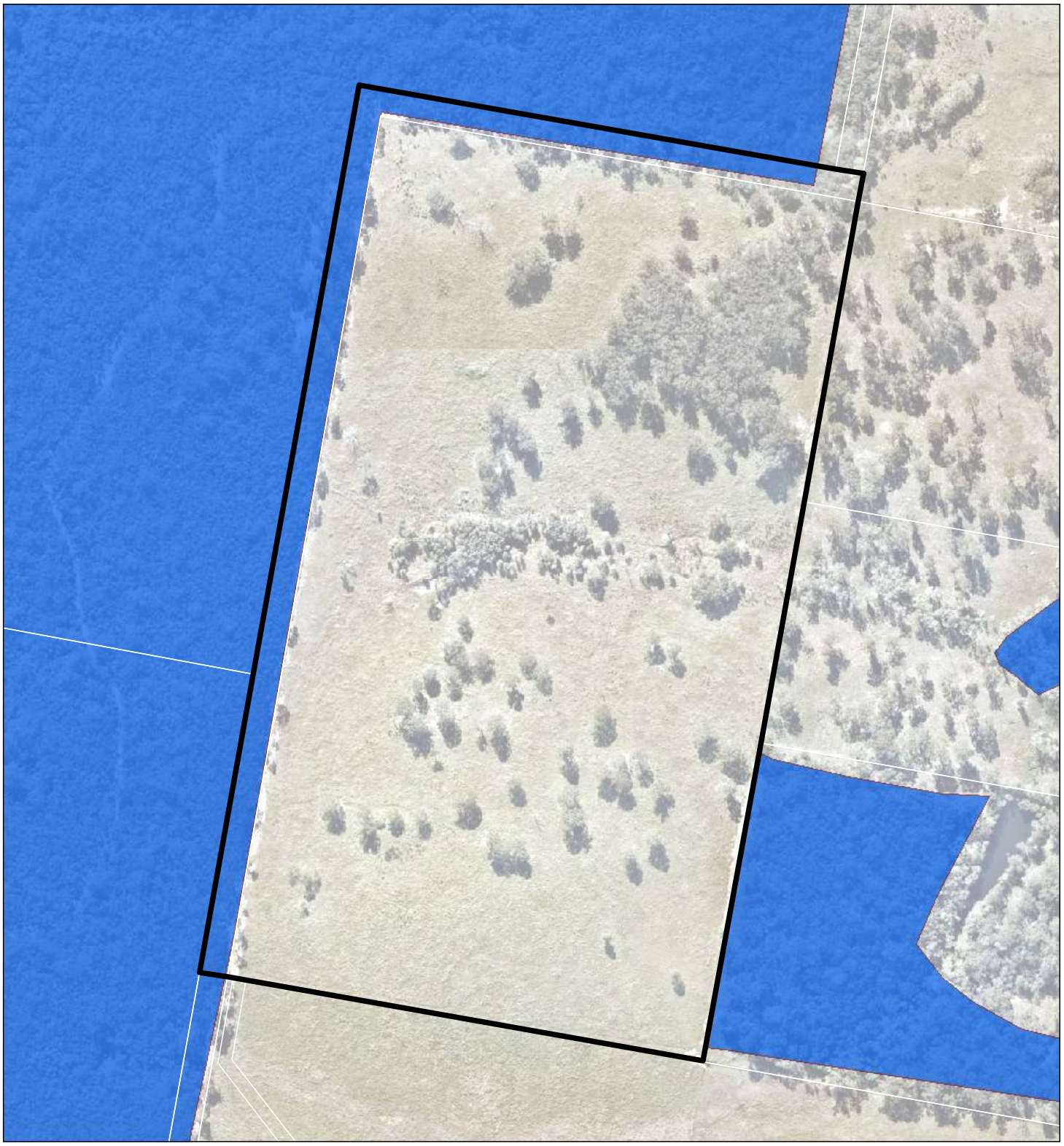
3.4. *Biosecurity Act 2014*

The *Biosecurity Act 2014* commenced on 1 July 2016 and establishes a framework to regulate and control invasive plants and animals. Under the Act, land owners are responsible for taking all reasonable and practicable steps to minimise the risks associated with invasive plants and animals under their control. This responsibility is known as the general biosecurity obligation (GBO).

The *Biosecurity Act 2014* categorises restricted matter (restricted plants and animals) into the following:

- Category 1: must be reported to an inspector within 24-hours (includes Red Imported Fire Ants, amongst others).
- Category 2: must be reported within 24-hours to Biosecurity Queensland on 13 25 23.
- Category 3: must not be distributed either by sale or gift, or released into the environment.
- Category 4: must not be moved.
- Category 5: must not be kept.
- Category 6: must not be fed (animals).
- Category 7: must be euthanised (animals).

Restricted matters detected on-site area are discussed in Section 4.3.5



Legend

- Proposed Action
- Qld DCDB

Regulated Vegetation

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

Figure 6

Regulated Vegetation Management Map

File ref. 10725 E Figure 5 RVMM A
Date *1/09/2021*
Project *Serpentine Creek Road, Redland Bay*

0 25 50 100 150 *m*

Scale (A4): 1:4,000 [GDA 1994 MGA Z56]

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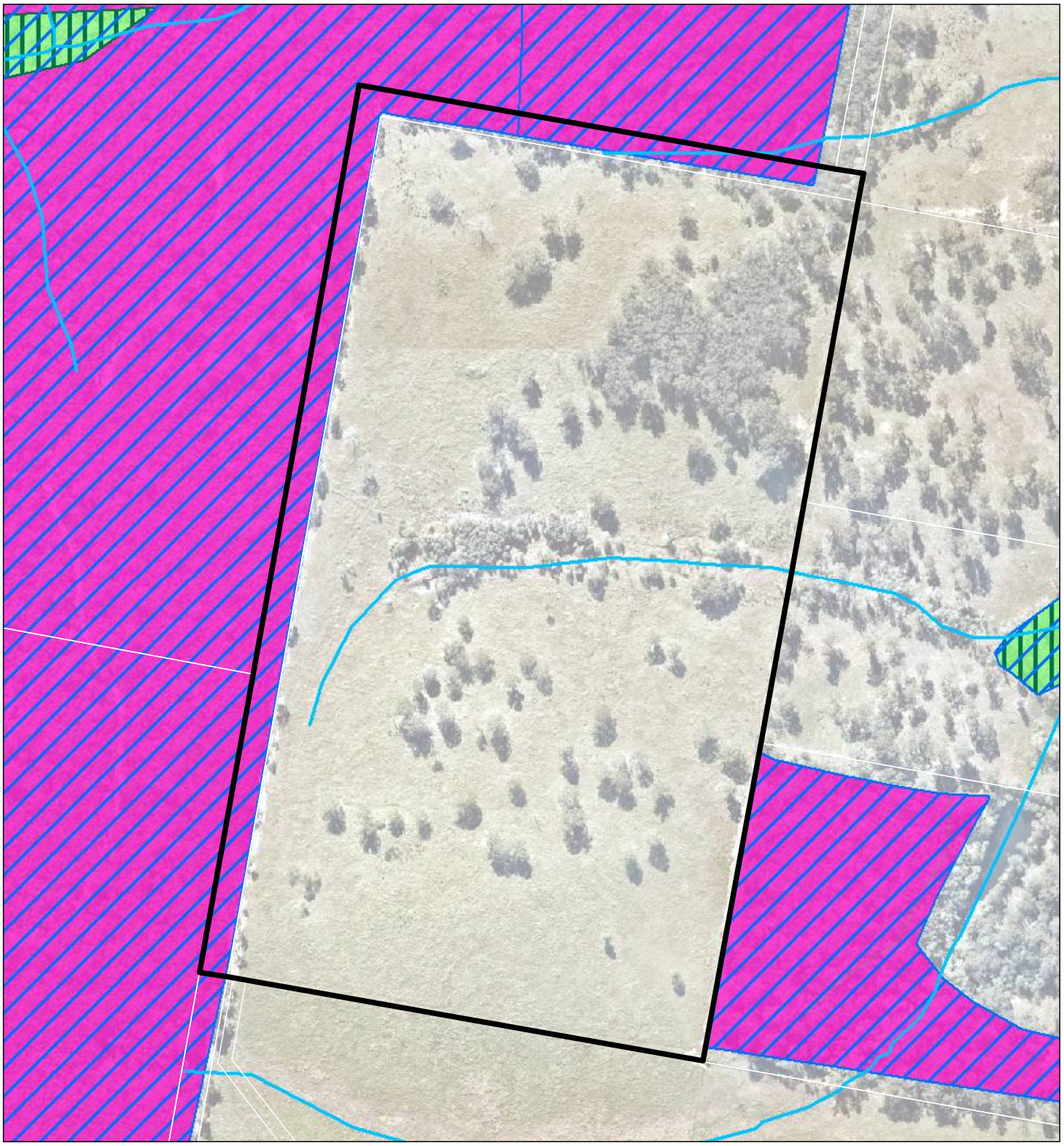

Legend

- Proposed Action
- Qld DCDB
- VM Essential Habitat
- VM Wetland

Regional Ecosystems mapping

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

Figure 7

Regulated Vegetation Supporting Map

File ref. 10725 E Figure 6 RVSM A
Date *1/09/2021*
Project *Serpentine Creek Road, Redland Bay*

0 25 50 100 150 *m*

Scale (A4): 1:4,000 [GDA 1994 MGA Z56]

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3.5. *Fisheries Act 1994*

The *Fisheries Act 1994* regulates the use, conservation and improvement of Queensland's fisheries resources and fish habitats. The legislation manages the impact from coastal development on marine fish habitat, including protected marine plants, and declared fish habitat areas. Development proposals that modify, or have a temporary or permanent loss of fish habitat are assessed by the Department of Agriculture and Fisheries (DAF).

Two (2) low risk (green) fisheries mapped waterways for waterway barrier works (WWBW) traverse the site, one bisects the northern boundary and the other traverses the central portion of the site (refer Figure 8). While this mapping appears to be incorrect (refer to Section 4.3.6), this mapping alone is a State referral trigger. Should any earthworks be undertaken within the mapped waterways that do not meet Accepted Development Requirements, a response to State Code 18: Waterway Barrier Works may be required.

3.6. *Water Act 2000*

The *Water Act 2000* provides a framework for sustainable management of Queensland's water resources and quarry material. Under the *Water Act 2000*, a riverine protection permit is required to be obtained if works within a defined watercourse result in filling or excavation unless these works meet an exemption.

A review of Queensland Globe indicates that the central waterway on-site is a confirmed drainage feature under the Act. The northern waterway is unmapped, however based on the attributes it is likely a drainage feature. Earthworks in the referral area will not trigger assessment under the *Water Act 2000*.

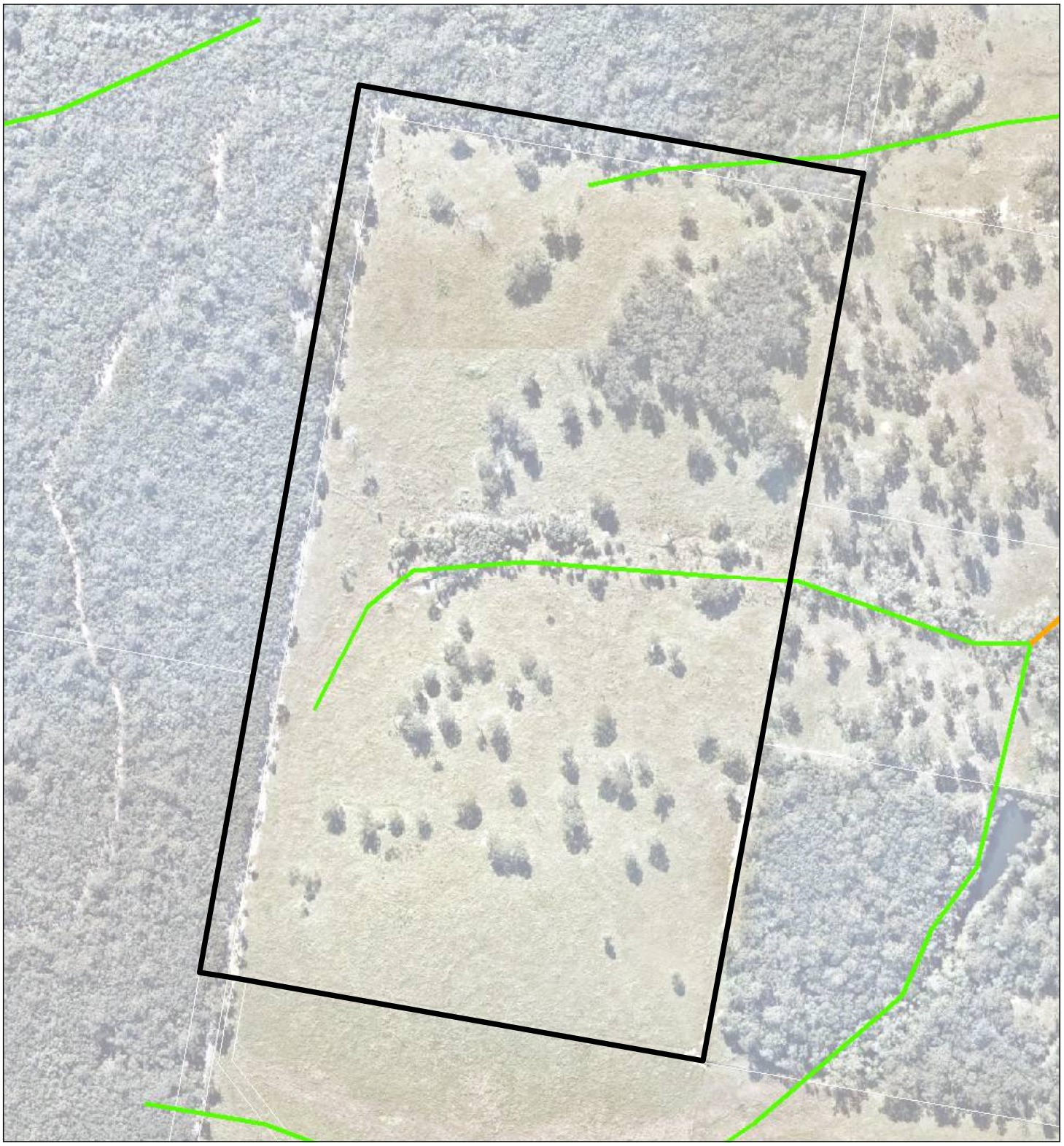
3.7. Coastal Development

Development activities may have significant impacts on the processes and ecological values of coastal areas including beaches, dunes and foreshores. Regulating development in these areas helps to protect and conserve environmental, social and economic values of coastal resources and enhance the resilience of coastal communities and hazards. Development is regulated under the State's *Coastal Protection and Management Act 1995* in conjunction with the *Planning Act 2016*.

Assessable coastal development includes:

1. Operation work, that is
    - Tidal works, or
    - Listed activities completely or partially within a costal management district
2. Material change of use in a costal management district
3. Reconfiguring a lot in a coastal management

Whilst the referral area is in the broadly defined Coastal Zone, it is not in a coastal management district or tidal area, nor will earthworks be considered tidal works. Therefore, special development controls and management practices will not apply to future development (refer to Figure 10).



Legend

Proposed Action

Qld DCDB

Waterways

Risk of Impact

1 - Low

2 - Moderate

Figure 8

Fisheries - Waterways for Waterway Barrier Works

File ref. 10725 E Figure 7 Fisheries A
Date *2/09/2021*
Project *Serpentine Creek Road, Redland Bay*

0 25 50 100 150 *m*

N

Scale (A4): 1:4,000 [GDA 1994 MGA Z56]

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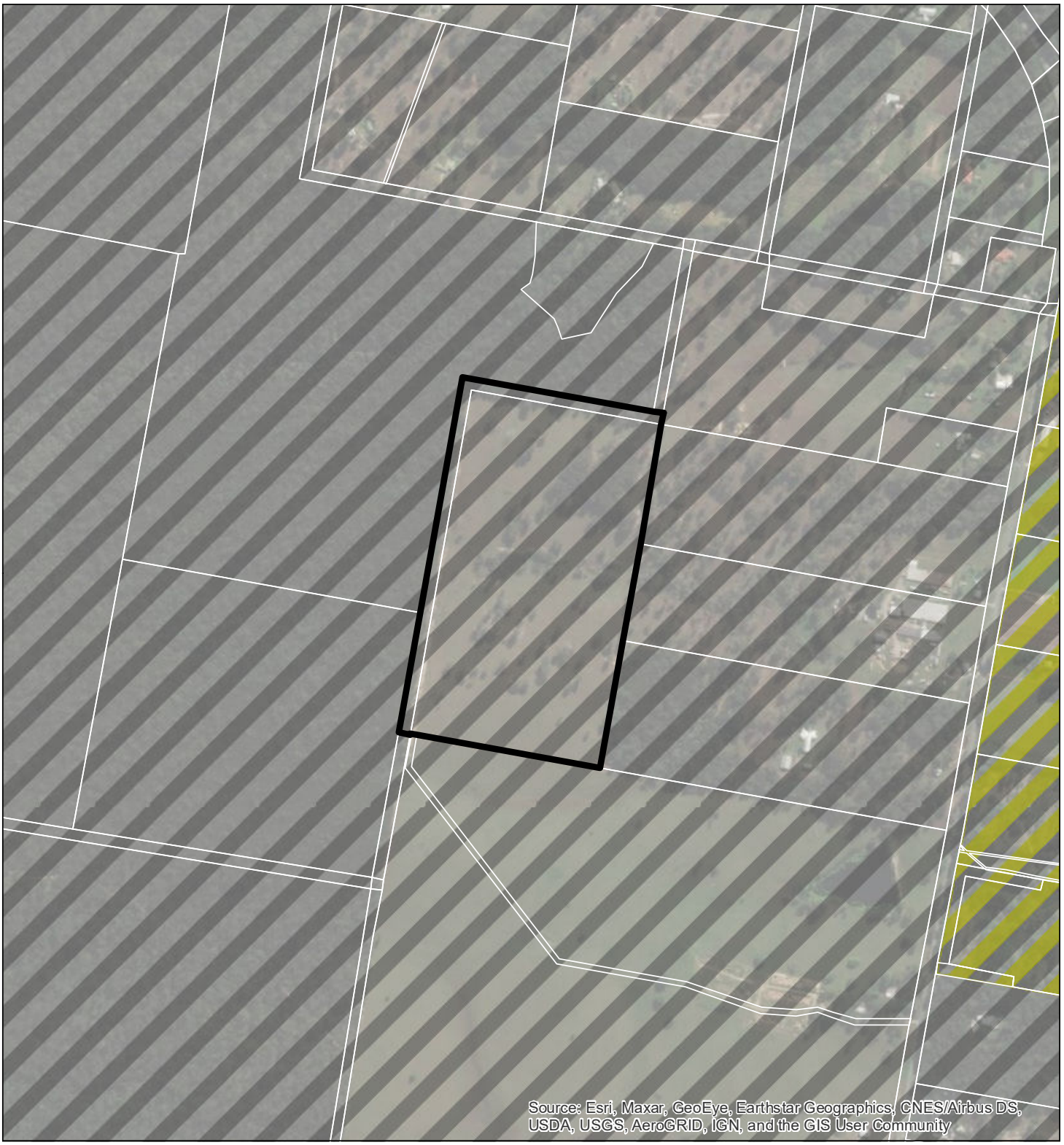


Legend

- Proposed Actionv
- Qld DCDB
- QLD Coastal Management District (Not on site)
- QLD coastal zone

Figure 9

SARA Coastal Protection

File ref. 10725 E Figure 8 SARA Coastal A
Date *8/09/2021*
Project *Serpentine Creek Road, Redland Bay*

0 25 50 100 150 *m*

N

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

Layer Sources © State of Queensland 2021, Nearmap 2021

3.8. Koala Habitat

South East Queensland koala habitat protection mechanisms are incorporated into the *Planning Regulation 2017* (PR) and State Development Assessment Provisions (SDAP). The SDAP details specific assessment benchmarks where development is proposed within mapped Koala Habitat Area (KHA) and/or Koala Priority Areas (KPAs). It regulates the clearing of mapped Koala habitat through stipulating how it must be cleared (e.g. staging, presence of a Koala spotter, etc.) when a development approval is sought for a material change of use, operational work, or reconfiguring a lot to create an additional lot. The PR outlines prohibited and assessable development in a Koala priority area and Koala habitat area.

The site is mapped within a KPA and contains KHA (core and locally refined, refer Figure 10).

3.9. State Planning Policy

The State Planning Policy (SPP) provides interim development assessment requirements which ensures that state interests are considered by local government when assessing development applications where the local government planning scheme does not yet integrate the State interests as stipulated in the SPP. Matters of State Environment Significance (MSES) are defined under the *Environmental Offset Act 2014* and the protection of these values balanced with all facets of development are detailed in the SPP. The site, predominantly the road, is mapped as containing Biodiversity MSES for (refer Figure 11):

- Regulated Vegetation – Category B
- Regulated Vegetation – Essential Habitat
- Wildlife Habitat

MSES mapping was required to be incorporated into the Redlands City Plan, however a superseded planning scheme application will need to consider MSES in addition to the superseded planning scheme overlays.

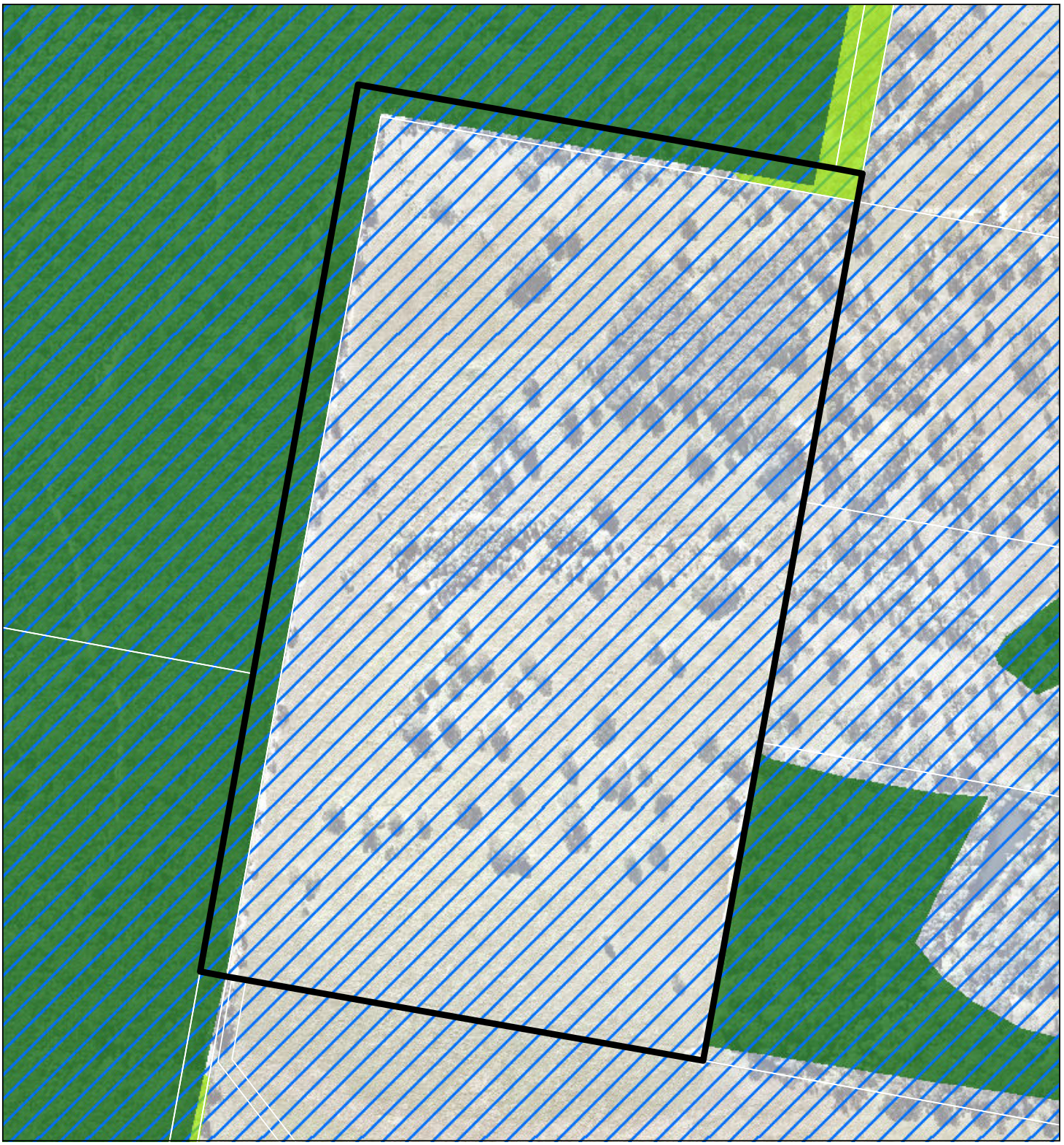
3.10. Town Planning Instruments

The site is located within the jurisdiction of RCC and new development is subject to the provisions of the Redlands Planning Scheme (v6.2).

3.10.1 Redland Planning Scheme

Under the Redland Planning Scheme (RPS) (v6.2) the site is zoned Rural and mapped with the following ecologically relevant overlays:

- Environmental Significance Overlay – Matters of Local Environmental Significance (MLES) and Matters of State Environmental Significance (MSES) (refer Figure 12).
- Waterways and Waterbodies – as containing natural drainage lines and Moreton Bay Foreshore Buffer (refer Figure 13).
- Koala Habitat – as containing regrowth and urban non-koala habitat (refer Figure 14).



Legend

- Proposed Action
- Qld DCDB

Koala Habitat Areas

- Core Remnant Koala Habitat Areas
- Locally Refined Koala Habitat Areas
- Koala Priority Areas

Figure 10

Koala Priority Areas and Koala Habitat Areas

File ref. 10725 E Figure 10 Koala 2019 A
Date *7/09/2021*
Project *Serpentine Creek Road, Redland Bay*

0 25 50 100 150 *m*

Scale (A4): 1:4,000 [GDA 1994 MGA Z56]

N

Legend

- Proposed Action
- Qld DCDB
- MSES Wildlife habitat (endangered or vulnerable)
- MSES Wildlife habitat (special least concern animal)
- MSES Wildlife habitat (SEQ koala habitat - core)
- MSES Wildlife habitat (SEQ koala habitat - locally refined)
- MSES Regulated vegetation (intersecting a watercourse)
- MSES Regulated vegetation (essential habitat)
- MSES High ecological significance wetlands
- MSES Regulated vegetation (category B)
- MSES Regulated vegetation (wetland)

Figure 11

Matters of State Environmental Significance

File ref. 10725 E Figure 11 MSES A
Date 7/09/2021
Project Serpentine Creek Road, Redland Bay

0 25 50 100 150 *m*

Scale (A4): 1:4,000 [GDA 1994 MGA Z56]

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Legend

- Proposed Action
- Qld DCDB
- MLES
- MSES

Figure 12

Redland City Council
Environmental Significance

File ref. 10725 E Figure 12 RCC Environmental Sig
Date *7/09/2021*
Project *Serpentine Creek Road, Redland Bay*

0 25 50 100 150 *m*

N

Scale (A4): 1:4,000 [GDA 1994 MGA Z56]

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Legend

- Proposed Action
- Qld DCDB
- Waterway corridors and wetlands

Figure 11

Redland City Council
Waterway Corridors and Wetlands

File ref. 10725 E Figure 13 RCC Waterway Wetlands B
Date *7/09/2021*
Project *Serpentine Creek Road, Redland Bay*

0 25 50 100 150 *m*

N

Scale (A4): 1:4,000 [GDA 1994 MGA Z56]

Legend

- Proposed Action
- Qld DCDB

RCC Koala Habitat

- RE Remnant Koala Habitat
- RE Regrowth Koala Habitat
- Urban Koala Habitat Trees
- Urban Non Koala Habitat

Figure 14

Redland City Council
Koala Habitats

File ref. 10725 E Figure 14 RCC Koala Habitat A
Date *7/09/2021*
Project *Serpentine Creek Road, Redland Bay*

0 25 50 100 150 *m*

Scale (A4): 1:4,000 [GDA 1994 MGA Z56]

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4. Ecological Survey Results

The referral area was subject to extensive on ground surveys by SHG to identify existing ecological values at the site. The following sections present results from all flora and fauna surveys conducted at the site with a focus on the presence or absence of *Matters of National Environmental Significance* (MNES) and assessment of the potential for the proposed action to impact on these matters.

Ecologists from SHG assessed the site on 14 February, 6 to 11 and 13 of May 2020. Weather conditions were recorded and detailed in Table 7.

Table 7: Survey Weather Conditions

Date	Weather Conditions	High (°C)	Low(°C)	Rain (mm)
14 February 2020	Sunny with intermittent showers	25	16	59
6 May 2020	Fine, cloudy	25	14	0.2
7 May 2020	Fine, cloudy	25	14	0.8
8 May 2020	Fine and Sunny	26	14	0.2
9 May 2020	Fine and Sunny	27	14	0
10 May 2020	Fine and Sunny	26	16	0
11 May 2020	Fine and Sunny	24	13	0
13 May 2020	Fine and Sunny	25	14	0

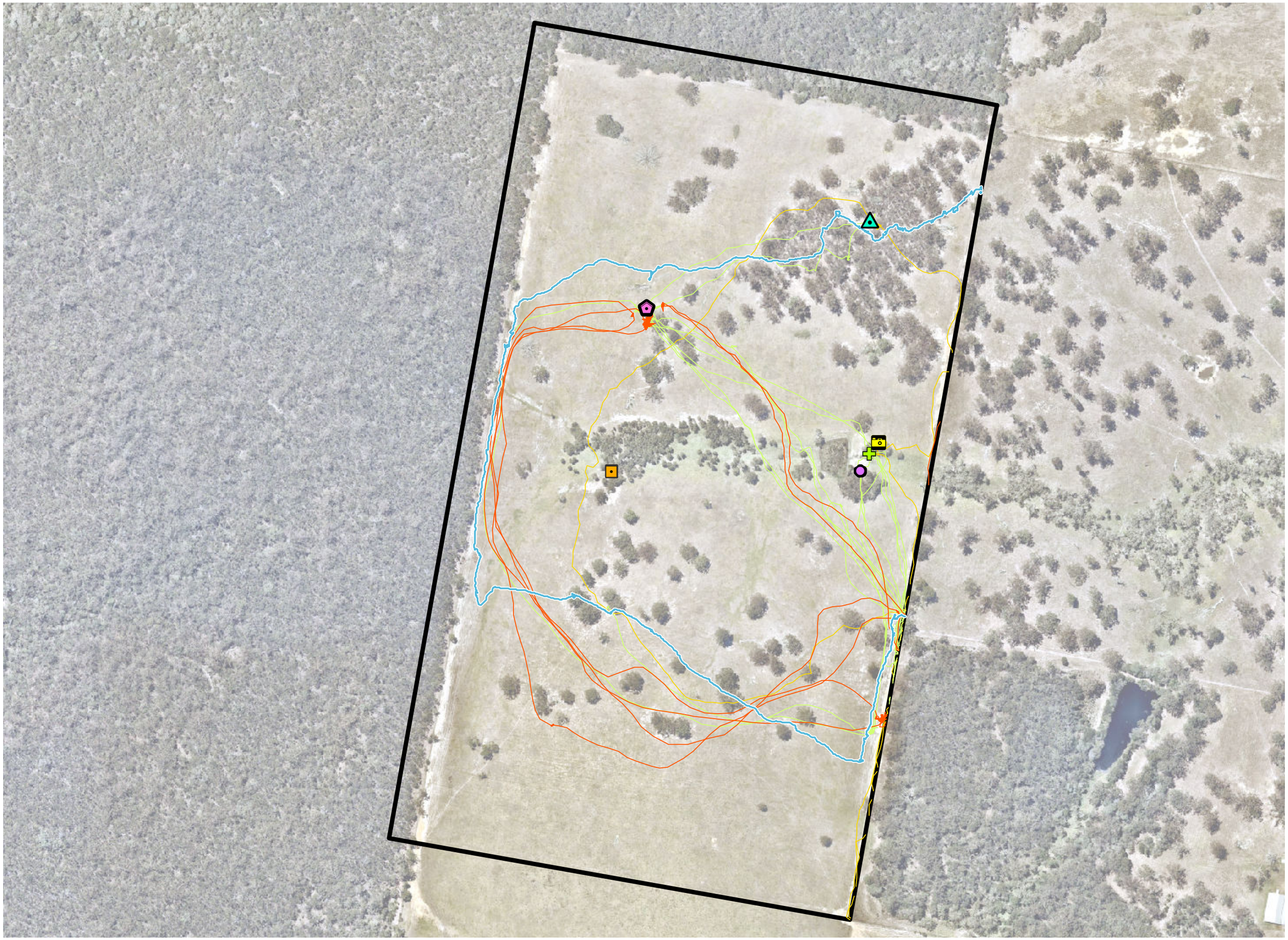
The site was walked to ensure all vegetation communities and species were recorded. Particular attention was paid to any threatened flora and habitat for any threatened fauna species that were listed as possibly occurring on or within the vicinity of the application area by the PMR (refer Table 2 and Appendix A) and specific micro assemblage which may support these threatened species.

The likelihood of occurrence assessment (refer Appendix B) identified the following matters as having potential to occur on or around the site, and thus were targeted by the survey effort:

- Threatened Ecological Communities
    - *Coastal Swamp Oak (*Casuarina glauca*) forest of New South Wales and south east Queensland ecological community*
- Threatened Species
    - Koala
    - Grey-headed Flying-fox
- Migratory Species
    - Shorebirds

Primary focus was placed on *Phascolarctos cinereus* (Koala) as this species is known to occur in the region. *Pteropus poliocephalus* (Grey-headed Flying-fox) specific surveys were also conducted as it is understood that the DAWE view habitat for both the Koala and Grey-headed Flying-fox as analogous.

1. Survey Effort



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

Legend

- Qld DCDB
- Proposed Action
- Anabat
- Camera
- Songmeter
- Fauna Site
- Active Site Search
- SAT Location
- Spotlighting
- GPS Track Log 2020.02.14
- GPS Track Log 2020.05.13
- GPS Track Log 2020.05.05-11

Issue	Date	Description	Drawn	Checked
A	7/09/2021	Preliminary	LS	LT

0 50 100 m

Transverse Mercator | GDA 1994 | Zone 56 | 1:3,000 @ A3

Address / RPD: Lot 12 on SP268704 and road reserve

7/09/2021 | 10725 E 01 Survey Effort A

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Redland Bay, Queensland 4165

Observational surveys for shorebirds were also undertaken as reporting by BAAM (2014, 2017, 2018, refer Section 2.1) identified low-tide mudflats along Moreton Bay, approximately 1 km east of the site, provide suitable foraging habitat for a number of listed threatened and migratory bird species.

The entire survey methodology is detailed in Section 2 of this report, and field survey effort is shown in Plan 1.

4.1. Key MNES Findings

No MNES listed threatened flora species or fauna species were recorded by field surveys nor were any threatened species considered likely to utilise the site due to significant historical disturbances which have modified the natural ecological values.

The following provides a summary of key MNES findings:

- The site is located over 1 km west of the Moreton Bay (Ramsar) wetlands.
- No TECs were recorded on-site.
- No listed threatened flora species were recorded on-site.
- No listed threatened fauna species were recorded on-site.
- *Phascolarctos cinereus* (Koala) and *Pteropus poliocephalus* (Grey-headed Flying-fox) were the only listed threatened species considered as having the potential to occur on or within close proximity to the site.
    - Spot Assessment Technique (SAT) surveys for the Koala undertaken across the site did not record signs (scats) of habitat usage (discussed further in Section 4.5.1).
    - Vegetation within the north and west road and central portion of the site dominated by *Melaleuca quinquenervia* identified as containing suitable foraging trees for Grey-headed Flying-fox.
    - No records for either species have been made or within close proximity to the site.
- No migratory species were recorded on-site.

4.2. General Site Observation

The following observations were made based on desktop and detailed field assessments:

- Contextually, the site is located within the southern extent of the Redland Bay locality. The site, and surrounding properties, were subject to broad-scale clearing historically for agricultural land uses.
- The site covers approximately 24.27 ha, is rectangular in shape and is accessed via an easement (for access) from Serpentine Creek Road to the east
- The site is characterised by a central gully, that divides the site. The gully forms the main catchment for the site which continues into the neighbouring properties to the east and eventually discharges into Moreton Bay. Topography across the site ranges from 20-30m ASL.
- The land is currently used for grazing.
- The majority of the referral area is described as highly disturbed, regularly maintained paddock and cleared of canopy vegetation. Some vegetation patches and the northern and western edges comprise mature and regrowth vegetation, however these values were sub-dominant on-site.

The results of flora and fauna survey are described in the sections below. Key ecological features and values are shown on the field survey results plan (refer Plan 2).

2. Field 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

Legend

- Qld DCDB
- Proposed Action (24.27 ha)

Vegetation Communities

- Grassed paddock with scattered eucalypts +/- Corymbia and Melaleuca (19.64 ha)
- *Native Eucalyptus planchoniana* dominated regrowth +/- *Corymbia trachyphloia* (0.65 ha)
- *Melaleuca quinquenervia* regrowth (2.03 ha)
- Mixed Eucalypt and corymbia remnant vegetation within road reserve (1.95 ha)
- Raptor Nest
- SAT Results (nil)

Issue	Date	Description	Drawn	Checked
A	7/09/2021	Preliminary	LS	LT

0 50 100 m

Transverse Mercator | GDA 1994 | Zone 56 | 1:3,500 @ A3

saunders havill group

lendlease

Redland Bay, Queensland 4165

Address / RPD: Lot 12 on SP268704 and road reserve

7/09/2021 | 10725 E 02 Survey Results A

4.3. Flora Survey Results

4.3.1 Threatened and Protected Flora

- The PMR listed three (3) Threatened Ecological Communities (TECs) as likely to occur within 5 km of the site (refer Section 3.1, Table 5 and Appendix A). No TECs were recorded on or immediately adjacent to the referral area.
    - The Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland ecological community occurs in coastal catchments, mostly at elevations of less than 20m above sea level that are typically found within 30 km of the coast, however, distance can vary by catchment. The canopy layer is dominated by *Casuarina glauca* (Swamp Oak) and in Queensland is represented by Regional Ecosystem (RE) 12.1.1 or 12.3.20. Neither *Casuarina glauca* (Swamp Oak) nor RE12.1.1 or 12.3.20 were identified on-site, and therefore the TEC is not present.
    - The Lowland Rainforest of Subtropical Australia has typically 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 RE 12.3.1, 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, none of which were recorded on or adjacent to the referral area. Therefore, the TEC is not present.
    - The Subtropical and Temperate Coastal Saltmarsh TEC consists mainly of salt-tolerant vegetation (halophytes) including grasses, herbs, sedges, rushes and shrubs. Succulent herbs, shrubs and grasses generally dominate and vegetation is generally of less than 0.5m in height. Only one regional ecosystem community including RE12.1.2 equates to the coastal saltmarsh ecological community. Key species include *Sporobolus virginicus* (Salt Couch), *Sarcocornia quinqueflora* (Samphire), *Juncus kraussii* (Rush), *Samolus repens* (Creeping Brookweed), *Suaeda australis* (Seabite), *Tecticornia pergranulata* (Blackseed Samphire), *Triglochin stricta* (Three-ribbed Arrowgrass), *Gahnia filum* (Clumped Sedge). Neither RE12.1.2 or the listed key species were identified on-site, and therefore the TEC is not present.
- The PMR identified seventeen (17) threatened native flora species as possibly occurring within 5 km of the referral area. None of these species were recorded on or adjacent to the referral area.
- A search of the NCA Wildlife Online database did not identify any threatened flora species as possibly occurring within the area.
- The site contains approximately 2 ha of mapped remnant vegetation mapped under the VMA, described as Endangered RE12.11.27/12.11.23/12.11.26 (40/40/20) along the northern and western boundary. The remaining 22.3ha is mapped as non-remnant, evident of historical broad-scale clearing.

The following sections provide a vegetation description of each of the main site features.

4.3.2 Constructed dam and waterway/drainage line

The central waterway that bisects the property exhibits characteristics of an overland flow path. Vegetation is dominated by native and introduced pastoral grasses and a defined channel or banks are absent, hence it is also described as a drainage line.

A small dam exists within the centre of the site created by building a mound either side of the waterway (refer to Photo Plate 1). Species observed were due to the construction of the dam and include *Persicaria decipiens* (Slender Knotweed), *Ludwigia peploides* (Water Primrose), *Nymphaea caerulea* (Blue Water Lily), *Cyperus polystachyos* (Bunchy Sedge) and *Juncus usitatus* (Common Rush). The dam is surrounded by regrowth native vegetation (predominantly *Melaleuca quinquenervia*) and was more typical of a flow path dominated by both native and introduced pastoral

grasses maintained through cattle grazing. Damp areas along flow path also contained patches of *Eleocharis equisetina* (Spike Rush), *Fimbristylis ferruginea* (A Fringe Rush), *Fimbristylis nutans* (Fringe Rush) and *Fimbristylis velata* (A Fringe Rush). Vegetation typical of RE 12.3.6 dominated by *Melaleuca quinquenervia* (Broad-leaved Paperbark) was present along the drainage line, however no defined channel bank was present. This waterway continues off-site from the eastern site boundary and into adjoining properties.

Photo Plate 1: Constructed dam within the central portion of the site.

Photo Plate 2: Waterway traversing the central portion of the site.

4.3.3 Vegetation Description

Grassed Paddock with Scattered Eucalypts, Corymbias and Melaleucas

This vegetation community dominates the site, covering approximately 19.7 ha, as a result of historical broad-scale clearing maintained through cattle grazing. This area is mapped within Category X (non-remnant) vegetation under the VMA.

Canopy species include *Eucalyptus racemosa* (Scribbly Gum), *Eucalyptus planchoniana* (Needlebark Stringybark), *Corymbia trachyphloia* (Brown Bloodwood) and *Melaleuca quinquenervia* (Broad-leaved Paperbark). The understorey and shrub layers were assessed as absent. Ground cover is dominated by both native and introduced pastoral grass species including *Heteropogon contortus* (Black Spear Grass), *Imperata cylindrica* (Blady Grass), *Themeda triandra* (Kangaroo Grass), *Cynondon dactylon* (Green Couch), *Chloris gayana* (Rhodes Grass), *Megathyrsus maximus* (Guinea Grass) Paspalum notatum (Bahia Grass) and *Themeda quadrivalvis* (Grader Grass).

Of note within this community, one (1) large *Eucalyptus racemosa* (Scribbly Gum) within the central portion of the site contained a raptor nest.

Photo Plate 3: Grassed Paddock with Scattered Eucalypts, Corymbias and Melaleuca

Northern *Eucalyptus planchoniana* ± *Corymbia trachyphloia* regrowth

This patch of vegetation was approximately 1.95 ha in size and located within the north-eastern corner of the site. This area is mapped within Category X (non-remnant) vegetation under the VMA.

The vegetation is considered largely representative of RE12.11.26 (an Of Concern regional ecosystem), as the canopy is dominated by *Eucalyptus planchoniana*, with *Corymbia trachyphloia* dispersed throughout. The majority of these were recorded with a DBH of between 100mm and 300mm, representative of regrowth vegetation. The understorey and shrub layers are largely absent, maintained through grazing. The ground layer, similarly to the majority of the site, was dominated by native and introduces pastoral grass species listed previously.

Photo Plate 4: Northern *Eucalyptus planchoniana* ± *Corymbia trachyphloia* regrowth

Central *Melaleuca quinquenervia* regrowth

This vegetation community covers the smallest portion of the site, covering 0.65 ha, and was located along the drainage line and adjacent the constructed dam. This area is mapped within Category X (non-remnant) vegetation under the VMA.

The canopy was dominated by *Melaleuca quinquenervia* (Broad-leaved Paperbark). The understorey and shrub layers were assessed as largely absent. As discussed within Section 4.3.2, species observed in the constructed dam include *Persicaria decipiens* (Slender Knotweed), *Ludwigia peploides* (Water Primrose), *Nymphaea caerulea* (Blue Water Lily), *Cyperus polystachyos* (Bunchy Sedge) and *Juncus usitatus* (Common Rush). Damp areas along the drainage line also contained patches of *Eleocharis equisetina* (Spike Rush), Fimbristylis *ferruginea* (A Fringe Rush), *Fimbristylis nutans* (Fringe Rush) and *Fimbristylis velata* (A Fringe Rush). Other ground covers include both native and introduced pastoral grass species listed previously.

Photo Plate 5: Central *Melaleuca quinquenervia* regrowth

***Allocasuarina littoralis* dominated remnant vegetation ± *Eucalyptus racemosa* and *Eucalyptus planchoniana* within Road**

This community was present along the northern and western referral area boundaries, covering approximately 2 ha and is mapped as predominantly Category B (remnant) vegetation under the VMA.

The existing road adjacent is mapped as containing remnant Endangered vegetation. The largest of the two remnant polygons is mapped along the western part of the referral area and is mapped as containing composite regional ecosystem described as RE12.11.27/12.11.23/12.11.26 (40/40/20).

The remnant vegetation associated with this road and extending north and west of the site is known as Bayview Conservation Area. Maintenance along the lot boundary within the road for fire breaks and management purposes is undertaken with both vegetation clearing and mulching occurring approximately ten (10) metres from the lot boundary.

The dominant species noted in the road area was *Allocasuarina littoralis* (Black She Oak) with scattered *Eucalyptus racemosa* (Scribbly Gum) observed along the western and northern boundary and *Eucalyptus planchoniana* (Needlebark Stringybark) more so towards the north-eastern property boundary. These species are largely representative of the mapped remnant communities including Of Concern RE12.11.26 towards the north east corner and Endangered RE12.11.27 dominating the western boundary area. Other canopy species noted were *Corymbia intermedia* (Pink Bloodwood) and *Corymbia trachyphloia* (Brown Bloodwood). The sub-canopy layer within both remnant polygons is very dense most likely due to a lack of fire regimes with a large amount of woody debris noted both standing and within the ground layer.

The shrub layer is largely absent due to the thick leaf litter associated with the *Allocasuarina littoralis* (Black She Oak) species with the shrub layer sparse. Very few weed or introduced species were observed within the vegetated area however some ground layer weed species along the edges of the maintenance track were observed

Photo Plate 6: *Allocasuarina littoralis* dominated remnant vegetation ± *Eucalyptus racemosa* and *Eucalyptus planchoniana* within Road

4.3.4 Native Flora

A total of forty-one (41) flora species were identified across the referral area, of which twenty (20) are native flora species and twenty-one (21) are introduced or weed species (refer Table 8 and Table 9, respectively).

As discussed in Section 4.3.1, no threatened flora species were recorded nor are they considered likely to occur. Native flora is consistent with mapped remnant and pre-clear vegetation communities.

Table 8: Native Flora Species List

Scientific Name	Common Name
Acacia disparimma	Hickory Wattle
Acacia leiocalyx	Early-flowering Black Wattle
Allocasuarina littoralis	Black Sheoak
Corymbia intermedia	Pink Bloodwood
Corymbia trachyphloia	Brown Bloodwood
Cynodon dactylon	Couch
Eleocharis equisetina	Spike Rush
Eucalyptus planchoniana	Needlebark Stringybark
Eucalyptus racemosa	Scribbly Gum
Eucalyptus tereticornis	Forest Red Gum
Fimbristylis ferruginea	A Fringe Rush
Fimbristylis nutans	Fringe Rush
Fimbristylis velata	A Fringe Rush
Heteropogon contortus	Black Spear Grass
Imperata cylindrica	Blady Grass
Juncus usitatus	Common Rush
Lomandra longifolia	Matrush
Melaleuca viminalis	Weeping Bottlebrush
Phragmites australis	Common Reed
Themeda triandra	Kangaroo Grass

4.3.5 Introduced Species

The following observations result from the field survey:

- Of the forty-one (41) flora species recorded across the site, twenty-one (21) are considered introduced flora species to the area (refer Table 9.
- Three (3) of these species are listed as restricted matters under the *Biosecurity Act 2014*. Under the Act, restricted matters are to be managed at the Local Government level through a biosecurity plan that covers invasive plants and animals in its area.

Table 9: Introduced Species List

Scientific Name	Common Name	Restricted under Biosecurity Act 2014 (Category)
Ageratum houstonianum	Blue Billygoat Weed	
Asclepias curassavica	Red Headed Cotton Bush	
Asparagus aethiopicus	Asparagus Fern	Category 3
Baccharis halimifolia	Groundsel Bush	Category 3
Bidens pillosa	Cobblers Peg	
Chloris gayana	Rhodes Grass	
Cyperus polystachyos	Bunchy Sedge	
Cynodon dactylon	Couch	
Gomphocarpus physocarpus	Balloon Cotton Bush	
Lantana camara	Lantana	Category 3
Ludwidgia peploides	Water Primrose	
Megathyrsus maximus	Guinea Grass	
Paspalum notatum	Bahia Grass	
Passiflora suberosa	Corky Passionflower	
Persicaria decipiens	Slender Knotweed	
Phytolacca octandra	Inkweed	
Salvinia molesta	Salvinia	
Setaria sp.	Setaria Grass	
Solanum mauritianum	Wild Tobacco	
Sorghum halepense	Johnson Grass	
Themeda quadrivalvis	Grader Grass	
Verbena bonariensis	Purple Topped Verbena	

4.4. Fauna Results

4.4.1 Summary

The following observations have been made based on field survey:

- The PMR identified sixty (60) listed threatened fauna species as potentially occurring within 5 km of the site. These included thirty-four (34) birds, three (3) fish, one (1) frog, one (1) insect, eleven (11) mammals, eight (8) reptiles and four (4) sharks.

A likelihood of occurrence analyses ruled out the majority of these species as potentially occurring due to an absence of specific habitat features (e.g. wetlands, rocky outcrops and rainforest and swamp environments) (refer Appendix C).

Only two (2) threatened fauna species were identified as having the potential to occur on-site: *Phascolarctos cinereus* (Koala) and *Pteropus poliocephalus* (Grey-headed Flying-fox).

- Despite targeted searches, no EPBC Act listed fauna species were recorded on-site.

Migratory shorebirds were identified as potentially occurring on or around the site.

- Eastern curlew and other EPBC Act listed migratory shorebirds were recorded in proximity to the site at Moreton Bay. Foraging habitat for this species however is located on average 1 km east of the site.

MNES results are discussed further in Section 4.5.

- A search of the Wildlife Online database identified ten (10) threatened fauna species as possibly occurring within 5 km of the site. These included nine (7) birds, two (2) frogs and one (1) mammal.
    - Again, despite targeted searches, no evidence of threatened species was recorded on-site.
- Under the VMA, essential habitat for the Koala and Wallum Froglet is mapped within the site, due to the mapped supporting regional ecosystems. As remnant vegetation is only present on the northern and western boundaries of the site (refer Section 4.3), the large majority of the site is not considered essential habitat.
    - The site is dominated by Category X (non-remnant) vegetation, largely maintained through cattle grazing.
    - Mapped Category B (remnant) vegetation is located within the road along the northern and western site boundaries. The edges that abut the road tenure boundary were maintained for access and bushfire management, resulting in a cleared area approximately 10 metres from the lot boundary.
    - The constructed dam within the centre of the site is artificial and contains both native and introduced wetland species.
    - The mapped waterway through the centre portion of the site does not exhibit characteristics of a watercourse (i.e. defined channel/fish habitat) and is typical of an overland flow path.
    - Preferred Koala habitat is considered restricted to the area west of the site within the Bayview Conservation Area. However, scattered *Eucalyptus tereticornis* (Forest Red Gum) were located within the site and may provide refuge habitat.
- The freehold area was subject to broad-scale clearing in support of historical agricultural pursuits. The site itself is predominately devoid of canopy vegetation with the exception of two (2) patches of regrowth vegetation within the north-eastern and central portions of the site. As such, limited habitat values occur within the property.
- Areas of highest ecological and habitat value are associated with:
    - The regrowth patches within the north-eastern and central portions of the site which provides refuge and connectivity amongst a largely cleared property and surrounding landscape.
    - The damp areas of the central drainage line and constructed dam provide limited habitat for wetland dependent species.
    - Vegetation located within the road which abuts the Bayview Conservation Area and contains several hollow-bearing trees.

- *Eucalyptus racemosa* (Scribbly Gum) within the central portion of the property contains a raptor nest. This nest was not observed to be in use during the survey period.

- Sixty-five (65) fauna species were recorded within the site or as fly over species (refer Table 10). This included including six (6) amphibians, forty-two (42) birds, thirteen (13) mammals and three (3) reptiles. All species recorded and highly mobile and common to the local area. The following threats and disturbances were also noted:
  - Cattle were observed grazing within the site and adjoining properties.
  - Domestic dogs were observed on adjoining properties limiting the likelihood of other mammals occurring on-site.
  - Cane toads were prevalent during the standardised fauna assessment.
  - Several trees were heavily marked with scratches, some of which were likely to be caused by ascending lace monitors (*Varanus varius*). The presence of Lace Monitors can also limit use of site by native mammals.

Table 10: Recorded Fauna Species List

Species	Common name	Survey Method
Amphibians		
Limnodynastes peroni	spotted marsh frog	*Songmeter*
Limnodynastes terraeginae	Scarlet-sided pobblebonk	*Spotlight*
Litoria nasuta	Striped rocket frog	*SFA*
Pseudophryne raveni	copper-backed toadlet	*Son meter*
Rhinella marina	Sane toad	*SFA*
Uperoleia fusca	Dusky toadlet	*Songmeter*
Birds		
Acanthiza pusilla	Brown Thornbill	*SFA*
Anas superciliosa	Pacific Black Duck	*Observation*
Aquila audax	Wedge-tailed Eagle	*SFA*
Ardea intermedia	Intermediate egret	*Observation*
Artamus leucorynchus	White-breasted Woodswallow	*SFA, Observation*
Bubulcus ibis	Cattle egret	*SFA*
Cacatua galerita	Sulphur-crested cockatoo	*Spotlight, Observation*
Cacatua sanguinea	Little corella	*SFA*
Cacomantis flabelliformis	Fan-tailed cuckoo	*SFA*
Centropus phasianinus	Pheasant Coucal	*Observation*
Chrysococcyx basalis	Horsfields bronze cuckoo	*Observation*
Colluricincla harmonica	Grey shrike-thrush	*SFA, Camera*

Species	Common name	Survey Method
Columba livia	Rock dove	*SFA*
Coracina novaehollandiae	Black-faced cuckoo shrike	*SFA*
Coracina tenuirostris	Cicadabird	*SFA*
Cracticus nigrogularis	Pied butcherbird	*SFA, Spotlight*
Cracticus tibicen	Australian magpie	*Observation*
Cracticus torquatus	Grey butcherbird	*SFA*
Dacelo novaeguineae	Laughing kookaburra	*Spotlight*
Dicaeum hirundinaceum	Mistletoe Bird	*Observation*
Entomyzon cyanotis	Blue-faced honeyeater	*SFA, Observation*
Etrochelidon nigricans	Tree martin	*Observation*
Gerygone olivacea	White-throated gerygone	*SFA, Observation*
Hirundo neoxena	Welcome swallow	*SFA*
Lalage leucomela	Varied triller	*SFA, Observation*
Lichmera indistincta	brown honeyeater	*Observation*
Manorina melanocephala	Noisy miner	*SFA, Observation*
Meliphaga lewinii	Lewins honeyeater	*Observation*
Merops ornatus	Rainbow bee-eater	*Observation*
Microeca fascinans	Jacky winter	*Observation*
Nymphicus hollandicus	Cockatiel	*Observation*
Ocyphaps lophotes	Crested pigeon	*Observation*
Pachycephala rufiventris	Rufous whistler	*SFA, Observation*
Pardalotus striatus	Striated pardalote	*SFA, Observation*
Parvipsitta pusilla	Little lorikeet	*SFA*
Platycercus adscitus	Pale-headed rosella	*SFA, Observation*
Podargus strigoides	Tawny frogmouth	*Spotlight*
Rhipidura albiscapa	Grey fantail	*SFA*
Rhipidura leucophrys	Willie wagtail	*SFA*
Threskiornis moluccus	Australian white ibis	*Observation*
Trichoglossus chlorolepidotus	scaly-breasted lorikeet	*Observation*
Trichoglossuss moluccanus	rainbow lorikeet	*Observation*
Vanellus miles	masked lapwing	*Observation*

Species	Common name	Survey Method
Mammals		
Austronomus australis	White-striped Free-tailed Bat	*Songmeter*
Bos taurus	Domestic Cattle	*SFA*
Chalinolobus gouldii	Gould's Wattled Bat	*Songmeter*
Chalinolobus nigrogriseus	Hoary Wattled Bat	*Songmeter*
Macropus rufogriseus	Red-necked wallaby	*SFA*
Macropus rufogriseus	Red-necked wallaby	*Spotlight*
Miniopterus australis	Little Bent-wing Bat	*Songmeter*
Oryctolagus cuniculus	Rabbit	*SFA*
Ozimops ridei	Ride's Free-tailed Bat	*Songmeter*
Petaurus breviceps	Sugar glider	*Spotlight*
Pteropus alecto	Black flying fox	*Spotlight*
Pteropus sp.	*Pteropus* sp.	*SFA*
Trichosurus vulpecula	Brushtail possum	*Spotlight*
Reptiles		
Cryptiblepharus pulchra	Wall Skink	Active
Intellagama lesueurii	Eastern Water Dragon	Spotlight
Varanus varius	Lace Monitor	Active

SFA – Standardised Fauna Assessment

Photo Plate 7: Raptor nest identified within *Eucalyptus racemosa* within central portion of the site.

4.4.2 Active and Target Search

One (1) active search was undertaken within the site on 14 February 2020 at 1000hrs for 30 minutes. Details of the search are provided within Table 11.

Table 11: Active Search Details

Date	**14/02/2020**
Location	Regrowth woodland in north-east of Lot 12 SP68704
Habitat	*Eucalyptus planchoniana* regrowth, no sub canopy, minimal native understorey present
Microhabitat searched	Under litter, within fallen timber, under bark
Timing	1000
Species detected	Lace monitor (*Varanus varius*), wall skink (*Cryptoblepharus pulchra*)

Active Search Location Photo

4.4.3 Spotlight Searches

Two spotlight meanders were conducted on 6 May 2020 and the 10 May 2020 from 1730hrs to 2030hrs. Table 12 and Table 13 show the species recoded during nocturnal spotlight searches.

Table 12: Fauna species detected during nocturnal search on 6 May 2020

Species	Common name
Amphibians	
Limnodynastes terraeginae	Scarlet-sided pobblebonk
Rhinella marina	Cane toad
Birds	
Cacatua galerita	Sulphur-crested cockatoo
Cracticus nigrogularis	Pied butcherbird
Dacelo novaeguineae	Laughing kookaburra
Mammals	
Macropus rufogriseus	Red-necked wallaby
Petaurus breviceps	Sugar glider
Pteropus alecto	Black flying fox
Trichosurus vulpecula	Brushtail possum
Reptiles	
Intellagama lesueurii	Eastern water dragon

Table 13: Fauna species detected during nocturnal search on 11 May 2020

Species	Common name
Amphibians	
Limnodynastes terraeginae	Scarlet-sided pobblebonk
Rhinella marina	Cane toad
Birds	
Cacatua galerita	Sulphur-crested cockatoo
Cracticus nigrogularis	Pied butcherbird
Dacelo novaeguineae	Laughing kookaburra
Podargus strigoides	Tawny frogmouth
Mammals	
Macropus rufogriseus	Red-necked wallaby
Pteropus alecto	Black flying fox
Trichosurus vulpecula	Brushtail possum
Reptiles	

Species	Common name
Intellagama lesueurii	Eastern water dragon

4.4.4 Standardised Fauna Assessment

Fauna site one was installed in the morning on 6 May in the western part of Lot 12 SP268704 within non-remnant vegetation. This site remained open from 6 May to 11 May 2020.

The site was open grass with minimal large trees retained (refer Photo Plate 8). At the northern end of the site was a large felled tree which provided potential microhabitat and shelter for small terrestrial wildlife. The site sloped downhill to the south and approximately 100 metres beyond the extent of the fauna site lay the central drainage line which runs east-west on neighbouring land through to Serpentine Creek Road. Within the drainage line were regrowth *Melaleuca quinquenervia*. On-site, the drainage line appeared mostly dry towards the upper (western) extent, leading to an open semi-permanent water feature containing rushes and sedges.

Cane toads (*Rhinella marina*) were numerous as was the striped rocket frog (*Litoria nasuta*). Cattle egrets (*Bubulcus ibis*), which are listed as Migratory under the EPBC Act, were present on-site. No additional significant fauna species were detected definitively although flying foxes were heard on-site, affording the potential for grey-headed flying fox (*Pteropus poliocephalus*) to have been present. A fauna list for the site is presented below in Table 14.

Table 14: Fauna detected within Standardised Fauna Assessment

Species	Common name
Amphibians	
Litoria nasuta	Striped rocket frog
Rhinella marina	Cane toad
Birds	
Acanthiza pusilla	Brown thornbill
Aquila audax	Wedge-tailed eagle
Artamus leucorynchus	White-breasted woodswallow
Bubulcus ibis	Cattle egret
Cacatua sanguinea	Little corella
Cacomantis flabelliformis	Fan-tailed cuckoo
Colluricincla harmonica	Grey shrike-thrush
Columba livia	Rock dove
Coracina novaehollandiae	Black-faced cuckoo shrike
Coracina tenuirostris	Cicadabird
Cracticus nigrogularis	Pied butcherbird
Cracticus torquatus	Grey butcherbird

Species	Common name
Entomyzon cyanotis	Blue-faced honeyeater
Gerygone olivacea	White-throated gerygone
Hirundo neoxena	Welcome swallow
Lalage leucomela	Varied triller
Manorina melanocephala	Noisy miner
Pachycephala rufiventris	Rufous whistler
Pardalotus striatus	Striated pardalote
Parvipsitta pusilla	Little lorikeet
Platycercus adscitus	Pale-headed rosella
Rhipidura albiscapa	Grey fantail
Rhipidura leucophrys	Willie wagtail
Mammals	
Bos taurus	Domestic cattle
Macropus rufogriseus	Red-necked wallaby
Oryctolagus cuniculus	Rabbit
Pteropus sp.	*Pteropus* sp.

Photo Plate 8: Standardised Fauna Assessment Site

4.4.5 Motion Detection Camera

The camera was installed adjacent to the constructed dam within the central portion of the site. The vegetation was open non-remnant with limited *Melaleuca quinquenervia* lining the waterbody. The results are provided in Table 15.

Table 15: Fauna detected at camera site during May survey period

Date	Species	Common name
9/05/2020	*Rhinella marina*	Cane toad
10/05/2020	*Colluricincla harmonica*	Grey shrike thrush

Photo Plate 9: Motion detection camera and bait station set up.

4.4.6 SAT Survey

One (1) SAT survey was conducted during the survey period in February 2020. No koala scats were detected during the SAT survey or active searches (refer to Table 16). Several trees were heavily marked with scratches, some of which were likely to be caused by ascending Lace Monitors (*Varanus varius*) (refer to Photo Plate 10).

Table 16: SAT survey results

Tree No.	Species	Common Name	DBH	Scat presence
1	*Eucalyptus planchoniana*	Needlebark Stringybark	280	N
2	*Eucalyptus planchoniana*	Needlebark Stringybark	270	N
3	*Eucalyptus planchoniana*	Needlebark Stringybark	160	N
4	*Eucalyptus planchoniana*	Needlebark Stringybark	140	N
5	*Eucalyptus planchoniana*	Needlebark Stringybark	100	N
6	*Eucalyptus planchoniana*	Needlebark Stringybark	330	N
7	*Eucalyptus planchoniana*	Needlebark Stringybark	220	N
8	*Eucalyptus planchoniana*	Needlebark Stringybark	160	N
9	*Eucalyptus planchoniana*	Needlebark Stringybark	200	N

Tree No.	Species	Common Name	DBH	Scat presence
10	*Eucalyptus planchoniana*	Needlebark Stringybark	130	N
11	*Eucalyptus planchoniana*	Needlebark Stringybark	150	N
12	*Eucalyptus planchoniana*	Needlebark Stringybark	200	N
13	*Corymbia trachyphloia*	Brown Bloodwood	100	N
14	*Corymbia trachyphloia*	Brown Bloodwood	100	N
15	*Eucalyptus planchoniana*	Needlebark Stringybark	110	N
16	*Corymbia trachyphloia*	Brown Bloodwood	140	N
17	*Eucalyptus planchoniana*	Needlebark Stringybark	180	N
18	*Eucalyptus planchoniana*	Needlebark Stringybark	150	N
19	*Corymbia trachyphloia*	Brown Bloodwood	210	N
20	*Corymbia trachyphloia*	Brown Bloodwood	130	N
21	*Corymbia trachyphloia*	Brown Bloodwood	180	N
22	*Eucalyptus planchoniana*	Needlebark Stringybark	120	N
23	*Eucalyptus planchoniana*	Needlebark Stringybark	160	N
24	*Eucalyptus planchoniana*	Needlebark Stringybark	140	N
25	*Eucalyptus planchoniana*	Needlebark Stringybark	150	N
26	*Eucalyptus planchoniana*	Needlebark Stringybark	220	N
27	*Eucalyptus planchoniana*	Needlebark Stringybark	110	N
28	*Eucalyptus planchoniana*	Needlebark Stringybark	140	N
29	*Eucalyptus planchoniana*	Needlebark Stringybark	160	N
30	*Eucalyptus planchoniana*	Needlebark Stringybark	180	N

Photo Plate 10: Scratches on significant trees throughout the non-remnant vegetation on-site

4.4.7 Anabat Survey

An Anabat machine (Anabat Swift model) was installed on 10 May 2020 at the edge of the constructed dam centrally located on-site. Anabat machines record microbat high-frequency calls, storing them for analysis by an expert post-survey. The Anabat machine was active from 1630hrs to 0730hrs. Species detected at the Anabat site are provided in Table 17.

Table 17: Anabat Survey Results for 10 May 2020

Species	Common Name	Calls Detected
Austronomus australis	White-striped Free-tailed Bat	14
Chalinolobus gouldii	Gould's Wattled Bat	1
Chalinolobus nigrogriseus	Hoary Wattled Bat	9
Miniopterus australis	Little Bent-wing Bat	6
Ozimops ridei	Ride's Free-tailed Bat	6

Photo Plate 11: Anabat positioning proximal to constructed dam within central portion of the site.

4.4.8 Songmeter Survey

The songmeter was installed on 9 May 2020 at the edge of the constructed dam centrally located in the site. The site consisted of scattered *Melaleuca quinquenervia* and *Acacia disparrima* within non-remnant vegetation. Rushes, sedges and grasses were present within the waterbody and provided potential habitat for frog species.

Table 18: Songmeter results for 9 May 2020

Species	Common name
Limnodynastes peroni	Spotted marsh frog
Pseudophryne raveni	Copper-backed toadlet

Species	Common name
Uperoleia fusca	Dusky toadlet

Photo Plate 12: Songmeter positioning proximal to constructed dam within the central portion of the site.

4.5. Threatened Fauna Species

A number of threatened fauna species were identified as having the potential to occur within the area surrounding the site under the EPBC Act and NCA (refer Table 5 and Table 6). Likelihood of Occurrence analyses were undertaken to assess site characteristics for suitable habitat for listed threatened species (refer Appendix B). The likelihood of occurrence assessment determined three (3) threatened fauna species protected under the EPBC Act have a moderate or higher potential to occur within the site (refer Table 19). Additionally, migratory shorebird species are considered to be a contextual occurrence despite preferred habitat being absent from the site.

Table 19: Summary of likelihood of occurrences (≥ moderate)

Species	Common Name	EPBC Status	Analysis	Desktop Search	Field Survey
Birds					
Hirundapus caudacutus	White-throated Needletail	V	Recorded within 5 km of the referral area. The site has potential to support	Moderate	Moderate

Species	Common Name	EPBC Status	Analysis	Desktop Search	Field Survey
			the species. Field surveys did not detect this species.		
Mammals					
Phascolarctos cinereus	Koala	V	Koala habitat is mapped in association with the remnant vegetation within the road. WildNet confirms the species has been recorded within 5 km of the referral area. Extensive field surveys targeting koalas were conducted, and no direct or indirect evidence was observed.	High	Moderate
Pteropus poliocephalus	Grey-headed Flying-fox	V	Suitable foraging vegetation occurs on-site, particularly within the small area of category B (remnant) vegetation within the road and central patch of regrowth vegetation dominated by *Melaleuca quinquenervia* (Broad-leaved Paperbark). This species was not detected during surveys.	Moderate	Moderate
Migratory Species					
Shorebird Species	-	Migratory		Contextual Occurrence	

No fauna species listed as threated under the EPBC Act or NCA were observed on-site, nor considered likely to occur. Due to historical broad-scale clearing across the majority of the referral area, the site is highly disturbed, predominately cleared for grazing and rural land use, and contains relatively low fauna habitat values. Furthermore, the site does not contain significant features (e.g. rock outcrops, wetlands, rainforest etc.) that provide specific habitat requirements for the majority of listed species.

Hirundapus caudacutus (White Throated Needletail), *Phascolarctos cinereus* (Koala) and *Pteropus poliocephalus* (Grey-headed Flying-fox) are the only threatened species considered to have potential to occur based on desktop assessment of vegetation characteristics and known occurrence in the broader area. These species and other threatened species with similar ecology were targeted as part of this survey effort.

Additionally, it is noted that suitable habitat for migratory shorebirds exists approximately 1 km to the east within the Moreton Bay foreshore and were also targeted during the survey period.

5. Impact Assessment

5.1. Proposed Action

The proposed action is for the development of land for urban purposes, including residential and open space (refer Figure 3). The proposed development will necessitate the disturbance of approximately 22.41 ha of the 24.27 ha for new road and allotments, predominantly amongst non-remnant vegetation. The balance of the site, approximately 1.86 ha, will be rehabilitated as an open space corridor with habitat elements (refer Figure 3).

The proposed open space corridor is strategically located through the central portion of the site aligning to the mapped waterway and *Melaleuca quinquenervia* regrowth. The corridor will provide connectivity between the Bayview Conservation Area and neighbouring properties to the east.

Table 20: Proposed Action Summary

Item	Area
Referral area:	**24.27 ha**
New road and allotments	22.41 ha
Rehabilitated open space corridor	1.86 ha

5.2. Avoidance and Minimisation

The site is mapped predominantly Category X (non-remnant) vegetation and therefore considered to contain relatively limited MNES habitat values in comparison with other properties within the region that have not been used for agricultural pursuits. As the site was subject to significant historical disturbance, the land was selected for the proposed action to avoid and minimise potential impacts to MNES.

Although the road is mapped as Category B (remnant) vegetation, this area has also experienced a high degree of disturbance for access maintenance and bushfire mitigation, resulting in a cleared area approximately 10 metres from the lot boundary.

Additionally, the layout and design of the urban development proposed within the site further avoids and minimises impacts through the strategic location of a future open space corridor aligned east-west through the site. This corridor retains the mapped waterway and *Melaleuca quinquenervia* regrowth within the central portion of the site, and will deliver a natural connection between the Bayview Conservation Area and neighbouring properties to the west.

Rehabilitation and restoration of this corridor is expected to lead to overall enhanced riparian vegetation and waterway function compared to the current composition. The reinstatement of riparian vegetation will reference Least Concern RE12.3.6 *Melaleuca quinquenervia* open forest which is mapped on the VMA pre-clear mapping as naturally occurring along the gully lines and alluvial plains in this region.

5.3. Potential Impacts

A list of key potential ecological impacts during varying phases of the proposed development is presented within Table 21 and discussed in detail within the following sub-sections.

Table 21: Summary of Potential Impacts

Construction Phase	Operation Phase (ongoing disturbance)
- Vegetation Clearing - Habitat loss - Changes in hydrology and water quality - Weeds - Vehicle movements - Earthworks - Light emissions during construction - Noise and vibration - Waste disposal - Hazardous and dangerous goods - Increased human presence	- Weed incursion - Vehicle strike - Noise and light pollution - Increased human presence

5.3.1 Vegetation Clearing

The project is predicted to directly disturb the entire 24.27 ha site for the proposed urban development comprising of residential dwellings, open space and supporting infrastructure. Approximately 1.89 ha of this total will be rehabilitated as open space in a linear corridor to deliver connectivity between the Bayview Conservation Estate and adjoining properties to the east of the site.

5.3.2 Habitat Loss

The proposed action is predicted to potentially impact habitats which are highly degraded in association with non-remnant vegetation, which provides relatively limited habitat values for MNES.

Significant Impact Assessments for the MNES identified as having a moderate and higher likelihood of occurrence are provided in Section 6.

5.3.3 Changes to hydrology and water quality

Earthworks and increased hardstand surfaces can change hydrological regimes and water quality entering a receiving environment. The site is located upstream of the Moreton Bay Ramsar Wetlands site and run-off or pollutants from the site are discharged via the on-site drainage corridor which continues into adjoining properties to the east. Changes to the hydrological regime including the volume, timing, duration and frequency of ground and surface water flows to the Ramsar Wetlands may significantly impact this MNES. Additionally, changes in water quality such

as levels of salinity, pollutants, nutrients and water temperature may adversely impact fauna and fish species dependent upon the Ramsar Wetlands.

5.3.4 Weeds

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

5.3.5 Vehicle Movement

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

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

Indirect impacts include:

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

With implementation of standard mitigation measures, the project is likely to result in a temporary and minor impact to ecological values due to vehicular movements.

5.3.6 Earthworks

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

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

Excessive deposition of dust on leaves of plants can suppress the growth and photosynthesis, resulting in reduced habitat quality for fauna. High levels of airborne dust can irritate the respiratory systems of fauna and potentially result in ingestion of dust-coated seeds and other foods. Excessive deposition of dust on open water bodies may also degrade water quality and overall habitat quality for fauna. With implementation of standard mitigation measures, the project is likely to result in a temporary and minor impact to ecological values due to the generation of dust.

5.3.7 Light Emissions During Construction

Artificial light can affect both nocturnal and diurnal animals by disrupting behavioural patterns, with quality of light (e.g. wavelength, colour), intensity and duration potentially evoking different faunal responses. Impacts from

increased light levels include disorientation from, or attraction toward, artificial sources of light; mortality from collisions with structures; and effects on light-sensitive cycles of species (e.g. breeding and migration for fauna and flowering in plants). An artificial increase in lighting can also affect abundance of predators.

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

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

5.3.8 Noise and Vibration

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

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

5.3.9 Waste Disposal

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

5.3.10 Hazardous and Dangerous Goods

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

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

5.3.11 Increased Human Presence

Increased human activity during construction has the potential to disturb fauna within adjacent habitat areas. Resulting impacts to fauna include heightened vigilance and predator avoidance, which can disrupt foraging and roosting efficiency or deter wildlife from using particular areas. Impacts essentially represent a reduction in core

habitat due to edge effects. The project is likely to result in a temporary and minor impact to ecological values due to increased human presence on-site during the construction period.

5.4. Mitigation Measures

5.4.1 Vegetation and Fauna Management Plans

A Vegetation Management Plan (VMP) will be completed for the referral area as part of a future operational works application to Redland City Council. The purpose of the VMP is to manage the vegetation removal process and protection of fauna species within the clearing area. The VMP covers the clearing of all vegetation listed in this report and include details on:

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

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

The FMP should link closely with the VMP and include details on:

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

5.4.2 Fauna Spotter Catcher

A registered and suitability qualified fauna spotter catcher/ecologist will be employed for the construction phase of the Project to implement a protocol of best management practises as required under State legislation. Significant habitat features, should any be identified on-site, will be flagged prior to clearing events and these areas supervised

by an appropriately experienced ecologist. Identified within the clearing supervision protocol should be flagging of hollow bearing trees followed by the removal of vegetation surrounding them. After 24 to 72 hours, these trees should then be removed. Trees must be directionally felled into open or already cleared areas.

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

5.4.3 Rehabilitation Plan

A Rehabilitation Plan for the open space corridor centrally located within the site will be prepared to enhance the riparian vegetation, waterway function and provide safe fauna movement opportunities. The types of restoration proposed include assisted natural regeneration for the existing *Melaleuca quinquenervia* regrowth area and reconstruction of the cleared paddock area. The methodology for the site works, weed treatment techniques as well as planting methodology and proposed species to be planted will be detailed in the rehabilitation plan submitted to Redland City Council as part of seeking operational works approvals.

6. Significant Impact Assessments

6.1. Wetlands Of International Importance

The Moreton Bay Ramsar Wetlands are situated off-site and to the east of the referral area. Several land parcels and Serpentine Creek Road (a major road) separate the referral area and Ramsar Wetlands. The referral area is at the top of the localised catchment, with run-off travelling east towards the bay. There are nil tidal areas on-site, nor are there marine plants (these are prevalent along the tidal and intertidal areas).

Potential water quality impacts to Moreton Bay as a result of the proposed action, relate to the loads of pollutants delivered from the site during construction and operation. The development is intended to adopt the best practice design measures such as sediment basins, vegetated swales, bioretention basins and wetlands to ensure surface water quality objectives in accordance with State standards. Further, MUSIC modelling by DesignFlow (2017) for the entirety of the Shoreline urban village (EPBC 2016/7776) identified that post development whereby the use will shift from rural to urban use with stormwater management, surface water quality will see a reduction in sediment and nutrient loads exported to Moreton Bay. This will be supported by:

- A significant reduction in agriculture and grazing land use (high polluting)
- Expansion of open space areas (creation of restored waterways and natural areas)
- The adoption of stormwater quality treatment systems to treat runoff from all new urban development areas, which are required under the State Planning Policy.

6.1.1 Assessment against significant impact criteria

An action is likely to have a significant impact on the ecological character of a declared Ramsar wetland if there is a real chance or possibility that it will impact any of the following:

1. **Areas of the wetland being destroyed or substantially modified**

The wetland is located approximately 1 km east of the referral area, and therefore it warrants consideration and assessment. There will be no direct impacts from the proposed action to Moreton Bay Ramsar Wetlands or marine plant communities. The project will not necessitate the removal of off-site marine plants.

It is anticipated that the change from existing rural land use (e.g. removal of sediment laden dams, horses, dogs, foxes etc.) will result in a net ecological benefit for downstream Moreton Bay values as a result of reduced nutrient laden run-off into Moreton Bay.

2. **A substantial or measurable change in the hydrological regime of the wetland, for example, a substantial change in the volume, timing, duration and frequency of ground and surface water flows to and within the wetland.**

The action will have no direct impact on the Ramsar Wetlands.

There will be an increase in non-permeable surfaces on the referral area, and therefore a greater volume of stormwater run-off to downstream catchments. However, this proposed action represents a small area (24.27 ha) compared the approved Shoreline urban village EPBC 2016/7776 (approximately 279.5 ha) which was deemed by the Department

as not having a significant impact on Moreton Bay Ramsar Wetlands with the implementation of mitigation and management measures identified in the EPBC Act approved Water Quality Management Plan (WQMP). The WQMP adopts best practice water quality objectives and erosion and sediment control measures identified in State and National guidelines.

The project intends to adopt the WQMP including designed mitigation and management measures, monitoring parameters and trigger thresholds. The minor increase in the volume of run-off is highly unlikely to result in a substantial or measurable change to the hydrological regime (volume, timing, duration and frequency) of the Moreton Bay Ramsar Wetlands. Trigger thresholds, monitoring controls, contingency measures and corrective actions adopted in the approved WQMP are considered to appropriately minimise, manage and mitigate any unforeseen events, while adaptive management, reporting and independent auditing required under the WQMP will ensure controls relative to protection of Moreton Bay, are always in place.

3. **The habitat or lifecycle of native species, including invertebrate fauna and fish species, dependant upon the wetland being seriously affected**

The proposed action will have no direct impact on the Ramsar Wetlands or marine plants.

The proposal intends to adopt a number of specialised management plans to ensure indirect impacts associated with the development (e.g. run-off, light, noise etc.) will not impact the habitat or lifecycle of native species. This includes alignment with the EPBC Act approved Eastern Curlew Impact Management Plan and WQMP under EPBC 2016/776, and implementation of site specific VMP, FMP, Rehabilitation Plan and Construction Environmental Management Plan. It is noted that the substantially larger Shoreline urban village EPBC 2016/7776 (approximately 279.5 ha compared to the 24.27 ha proposed action) was not considered to have a significant impact to native species associated with Moreton Bay, following the adoption of the same management plans, principles and procedures. Further, adaptive management, reporting and independent auditing required under the approved WQMP will ensure controls relative to protecting known values of Moreton Bay, which contribute to habitat and lifecycle of threatened and native species, are always in place.

4. **A substantial and measurable change in the water quality of the wetland – for example, a substantial change in the level of salinity, pollutants, or nutrients in the wetland, or water temperature which may adversely impact on biology, ecological integrity, social amenity or human health.**

The proposed action will have no direct impact on the Ramsar Wetlands.

The project will align with the approved WQMP (under Shoreline urban village EPBC 2016/7776) including designed mitigation and management measures, monitoring parameters and trigger thresholds. With adoption of these measures, any changes to the water quality of the wetland (including changes to salinity, pollutants, and nutrients) will be minor and temporary, at most. Further, initial investigations indicate that due to the change in land use from rural to urban and with the adoption of best practice water quality objectives and erosion and sediment control measures identified in State and National guidelines, there will be a reduction in nutrient loads (i.e. nitrogen, phosphorus and TSS).

Further, adaptive management, reporting and independent auditing required under the WQMP will ensure controls relative to protection of Moreton Bay are always in place.

5. **An invasive species that is harmful to the ecological character of the wetland being established (or an existing invasive species being spread) in the wetland.**

No marine invasive species are predicted to colonise the area as a result of the proposed action. Increased urban density near wetland areas may lead to an increase in weed cover in mangrove and saltmarshes, however the wetland is approximately 1 km east of the referral area and therefore any invasive species impacts attributable to this project are very unlikely.

Summary
Due to the proximity of the Moreton Bay Ramsar Wetlands to the referral area (approximately 1 km), this significant impact assessment was considered warranted. Implementation of mitigation measures (i.e. stormwater quality controls) as part of the project are forecast to deliver an improvement in water quality leaving the site. Therefore, the proposed action is considered unlikely to have a significant impact on Moreton Bay Ramsar Wetlands.

6.2. Nationally Threatened Species and Ecological Communities

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 potential occurrences identified in Table 19, the findings from the desktop assessments and field surveys have been assessed against the *Significant Impact Guidelines 1.1 – Matters of National Environmental Significance*. The assessments are provided against each matter separately within the following sub-sections.

6.2.1 White-throated Needletail

A review of the Wildnet Database indicates that this species was historically recorded within 5 km of the referral area. Although field surveys failed to detect this species, potential habitat is present on-site.

This species is predominantly aerial and occurs over most types of habitat. The species is recorded often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy,

but they are less commonly recorded flying above woodland (Higgins 1999[5]). When flying above farmland, they are more often recorded above partly cleared pasture, plantations or remnant vegetation at the edge of paddocks (Emison & Porter 1978[6]; Friend 1982[7]; Tarburton 1993[8]).

The species has been recorded roosting in trees in forests and woodlands, both among dense foliage in the canopy or in hollows (Corben et al. 1982[9]; Day 1993[10]; Quested 1982[11]; Tarburton 1993) and may take refuge during extreme conditions.

Significant Impact Assessment

The following significant impact assessment utilised the data gathered through desktop assessments and field surveys against the *Significant Impact Guidelines 1.1 – Matters of National Environmental Significance*.

Table 22: Significant Impact Assessment – White-throated Needletail

Significant Impact Criteria (White-throated Needletail)	**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 referral area is dominated by non-remnant vegetation as a result of historical and current land uses. As such, the site is not considered to provide suitable roosting habitat for this species which prefer to roost in forests and woodlands among dense foliage or in hollows. However, the site may provide potential foraging habitat for this aerial species, flying between clearings and above woodland for their food sources. A review of the Wildnet Online database identified that this species was recorded within 5 km of the referral area previously. Extensive field surveys failed to detect this species either on or adjacent to the site or as a flyover. Reviewing the above, it is considered unlikely that this species inhabits the site and it is considered unlikely that the proposed action will decrease the size of an important population.	**A significant impact is not likely**
2. Reduce the area of occupancy of an important population.	An important population is not considered present on the assessment area for the following reasons: • the species does not breed in Australia; • the site does not provide suitable roosting habitat; • limited species records within proximity to the site; and	**A significant impact is not likely**

[5] Higgins, P.J. (ed.) (1999). Handbook of Australian, New Zealand and Antarctic Birds. Volume Four - Parrots to Dollarbird. Melbourne: Oxford University Press.

[6] Emison, W.B. & J.W. Porter (1978). Summer surveys of birds in the Mt Cobberas - Snowy River area of Victoria, Australia. Emu. 78:126-136.

[7] Friend, G.R. (1982). Bird populations in exotic pine plantations and indigenous eucalypt forests in Gippsland, Victoria. Emu. 82:80-91.

[8] Tarburton, M.K. (1993). Radiotracking a White-throated Needletail to roost. Emu. 93:121--124.

[9] Corben, C., G. Roberts & A. Smyth (1982). Roosting of a White-throated Needletail. Sunbird. 12:47-48.

[10] Day, N. (1993). Tree perching and presumed roosting of White-throated Needletails Hirundapus caudacutus. Australian Bird Watcher. 15:43-44.

[11] Quested, T. (1982). Spine-tailed Swift landing in tree. Australian Birds. 16:64.

Significant Impact Criteria (White-throated Needletail)	Description	Impact
	• this species was not identified during extensive field surveys; Areas observed to be of most ecological value within the assessment area for this species were the woodland/forest edges of the adjacent Bayview Conservation Area and cleared areas of the site, specifically for foraging. Limited roosting habitat is available within the site as a result of historical broad-scale clearing. Preferred roosting habitat is present in the adjoining Bayview Conservation Area. Reviewing the above, an important population is not considered to inhabit the site and it is therefore considered unlikely that the proposed action will reduce the area of occupancy of an important population.	
3. Fragment an existing important population into two or more populations.	As discussed in the responses to items 1 and 2 above, the site is not considered to support an important population. Extensive field surveys failed to detect this species on or adjacent to the site or as a flyover. This species is also considered to be highly mobile and not impeded by physical barriers. Therefore, the proposed action is not anticipated to result in fragmenting an existing important population into two or more populations.	**A significant impact is not likely**
4. Adversely affect habitat critical to the survival of a species.	While the site may provide potential foraging habitat as a result of the cleared areas and woodland/forest edges, the site is not considered to provide critical habitat for this species. This species prefers roosting in dense foliage and hollows, neither of which are abundant within the site. Preferred habitat for this species is considered available within the adjacent Bayview Conservation Area. The site is not considered to provide critical habitat for this species and the loss will not adversely affect the survival of the species.	**A significant impact is not likely**
5. Disrupt the breeding cycle of an important population.	This species does not breed in Australia and the site does not support 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.	As discussed within Item 4 above, the site may provide potential foraging habitat for this species, however, roosting habitat is considered absent. Suitable foraging and roosting habitat is considered abundant within the region. The proposed action is not considered to decrease the availability or quality of habitat to the extent that the species is likely to decline.	**A significant impact is not likely**
7. Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.	The site is not considered critical habitat for this species. Due to the historical broad-scale clearing and ongoing cattle grazing invasive flora species are common within the non-remnant vegetation. Weeds and invasive species within the remnant vegetation along the northern and western site boundaries are very low due to the lack of disturbance. The proposed action will increase the number of domestic animals (cats and dogs) within the locality, however this threat is already considered present.	**A significant impact is not likely**

Significant Impact Criteria (White-throated Needletail)	Description	Impact
8. Introduce disease that may cause the species to decline.	The site is not considered critical habitat for this species nor support an important population. The proposed action is considered unlikely to introduce a disease that may cause the species to decline.	**A significant impact is not likely**
9. Interfere substantially with the recovery of the species.	Threats leading to the decline of this species are predominantly associated with the species breeding grounds outside of Australia. The site is not considered to critical habitat for the survival of this species nor support an important population. Therefore the proposed action is considered unlikely to interfere substantially with the recover of this species.	**No significant impact likely**

Reviewing the completed investigations against the significant impact guidelines, the proposed action is considered unlikely to have a significant impact on the White-throated Needletail. This assessment is based on consideration of desktop assessments, extensive field survey findings, existing site characteristics and habitat availability within the wider region. 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.

6.2.2 Koala

In accordance with the *EPBC Act Referral Guidelines for the Vulnerable Koala*, the Spot Assessment Technique (SAT) was applied in to search the site for the potential presence of the Koala (refer Section 2.2.8 for method). The Australian Koala Foundation koala activity level classification table (above) (following Philips and Callaghan 2011) provides an estimate of koala utilisation based on defined Activity Categories. The East Coast (med-high) Activity Category is appropriate for the site. No evidence, direct or indirect, of this species was observed on-site and therefore usage for the site is considered Low.

Additionally, opportunistic searches for Koalas were also undertaken as part of the field survey effort. No Koalas were observed on-site. While no records of this species occur within the site, this species has been identified within adjoining properties. No physical barriers are present between these properties to prevent fauna movement.

Based on the absence of records for the species on-site, no evidence of activity and relatively limited habitat, the species is considered unlikely to utilise the site frequently. It is noted that no Koalas were recorded as part of field surveys for the related action, Shoreline urban village (EPBC 2016/7776). It is also noted that the Koala was not a controlling provision for the Shoreline urban village action.

To determine whether the proposed action will have an impact on the koala, the Koala Referral Guidelines have been responded to in the following sections of this report.

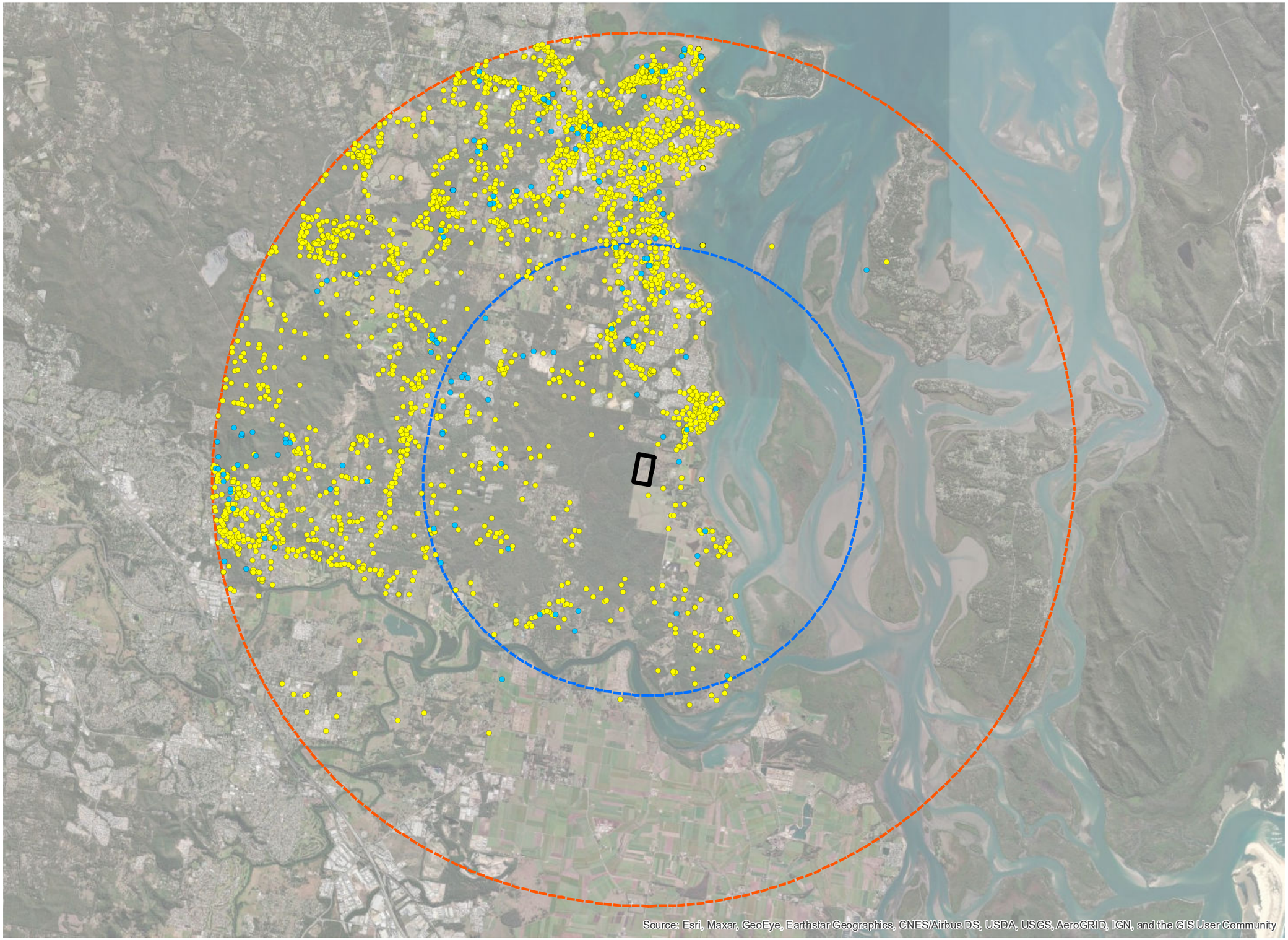
<u>Modelled Distribution and Geographical Context</u>

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 PMR 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 assessment area is therefore considered to fall within the modelled distribution of the Koala. Koala sightings have been recorded within 2 km of the referral area in the last ten years according to publicly available data (via Wildnet and ALA databases).

The Guidelines separate the geographical context into two zones, inland and coastal, based on the 800 mm per annum rainfall threshold. The referral area is 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 Koala Habitat Assessment Tool (KHAT) to determine if the site provide critical habitat for the survival of this species.

The referral area is located within the coastal context of the modelled distribution area, Koalas have been recorded within the wider area according to public databases, and therefore further consideration under the assessment guidelines is justified.

3. Koala Sightings



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

Legend

- Proposed Action
- Site 10km Buffer
- Site 5km Buffer
- Koala Records (ALA, 2021) - 157
- Koala Records (WildNet, 2021) - 3224

Issue	Date	Description	Drawn	Checked
A	7/09/2021	Preliminary	LS	LT

0 1 2 3 Kilometers

Transverse Mercator | GDA 1994 | Zone 56 | 1:90,000 @ A3

saunders havill group

lendlease

Redland Bay, Queensland 4165

Address / RPD: Lot 12 on SP268704 and road reserve

7/09/2021 | 10725 E 03 Koala Sightings A

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 comprised give a total out of 10. Impact areas that score **5 or more** are considered to contain critical habitat for the koala. Table 23 provides an assessment against the five primary koala habitat attributes for the assessment area.

The assessment is based on field surveys carried out by the Saunders Havill Group during 2020 and relevant database and mapping searches. The survey methods are outlined in Section 2.2.8, and results of the field survey of the assessment area are outlined in Section 4.4.6.

Table 23: Koala Habitat Assessment Tool

Attribute	Score	Comment
Koala occurrence	**+1**	Although field surveys failed to detect this species through direct observation or indirectly through SAT surveys, a search of the Wildnet database identified records of the koala within 2 km of the site (refer to Plan 3). The closest and most recent sighting of this species available via Biomaps was located approximately 1.9 km from the site boundary and four years ago (in 2017). However, this species was identified within the broader locality during surveys for the Shoreline urban village referral (EPBC 2016/7776) and ongoing survey works throughout the area by SHG between 2019-2021 **There is evidence that one or more Koalas within 2 km of the site within the last 2 years. This attribute has been given a score of 1.**
Vegetation composition	**+2**	Biolink Ecological Consultants[12] (2019) identified the preferred koala food tree species for Redland Local Government Area as the following: • *Eucalyptus robusta* (Swamp Mahogany) • *Eucalyptus resinifera* (Red Mahogany) • *Eucalyptus tereticornis* (Forest Red Gum) • *Eucalyptus microcorys* (Tallowwood) • *Eucalyptus moluccana* (Grey Box), and • *Eucalyptus propinqua* and/or *Eucalyptus major* (grey gums) including affiliated species such as *Eucalyptus biturbinata* and/or *Eucalyptus longirostrata*.

[12] Biolink Ecological Consultants. 2019. Redlands Coast Koala Population and Habitat Assessment. Brisbane.

Attribute	Score	Comment
		The referral area is mapped largely as non-remnant vegetation. As such, the vegetation within the site provides limited koala food tree species. One (1) preferred koala food tree species, *Eucalyptus tereticornis* (Forest Red Gum), was identified during field surveys scattered, although very sparsely, throughout the non-remnant portion of site. The northern and western site boundaries are mapped as remnant vegetation and provide more suitable habitat for this species. Another koala food tree species, not listed above, was identified as a sub-dominant canopy species, *Corymbia intermedia* (Pink Bloodwood). **Two or more koala food trees were identified within the canopy of the woodland areas, resulting in an attribute score of 2 for the woodlands.**
Habitat connectivity	**+2**	The site adjoins the Bayview Conservation Area and Carbrook Wetlands which combined provide over 1000 ha of connected habitat (refer to **Plan 4**). **The site is part of a contiguous landscape greater than 500 ha. Therefore, this attribute for the assessment area has been given a score of 2.**
Key existing threats	**0**	Three (3) key existing threats pose a risk to survival of local koala populations: Vehicle Strike, Dog Attack and Disease. According to the Queensland Department of Environment and Science, vehicles collide with more than 340 Koalas each year in South East Queensland. Approximately 100 koalas are hospitalised each year in South East Queensland due to dog attack. However, 75% of all koalas attacked will die[13]. Dog ownership in residential areas in Redland City Council allows for each household to maintain a maximum of two dogs at any one time. A third dog may be considered, however, a permit will be required. During field surveys, the adjoining properties to the east were observed to keep domestic dogs. Given the surrounding road network and urban development the risk of koala mortalities from vehicle strikes and dog attacks are significant. However, it is unlikely that the development will significantly increase the vehicle strike risk considering the limited species records and lack of suitable habitat within the assessment area, size of the development and sensitive design inclusions. It is highly unlikely that the proposed development will significantly increase the numbers of domestic dogs within the locality. As demonstrated by the Queensland Koala Hospital records, disease among the South East Queensland koala population is widespread. Chlamydia is a common bacterial infection in koalas which causes symptoms such as cystitis, conjunctivitis leading to blindness, respiratory infections, reduced fertility rates and if left untreated can lead to death. Unfortunately, most wild koala populations are infected, and it inhibits conservation activities. Of the fifty-six (56) closest Koala records to the site, 30 were recorded as sick (conjunctivitis, cystitis, wasted), 10 were struck by vehicles and 3 were attacked by dogs. **There is evidence of frequent koala mortality within 5 km of the study area. Thus, this attribute has been scored 0.**

[13] Department of Environment and Science, 2020, accessed: https://environment.des.qld.gov.au/wildlife/animals/living-with/koalas/threats#toc-0

Attribute	Score	Comment
Recovery value	**+1**	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. One of these attributes is considered relevant to the site, that being connectivity to a large connected area of koala habitat. The historical disturbances, limited species records, lack of suitable koala food trees and physical barriers separating the assessment area and suitable habitat suggest the assessment area is unlikely to be important for achieving interim recovery objectives. **The recovery value of the assessment area has been scored a 1.**
Total	**6**	**The site is considered critical habitat for the survival of this species based on this assessment tool.**

Adverse Effects on Critical Habitats

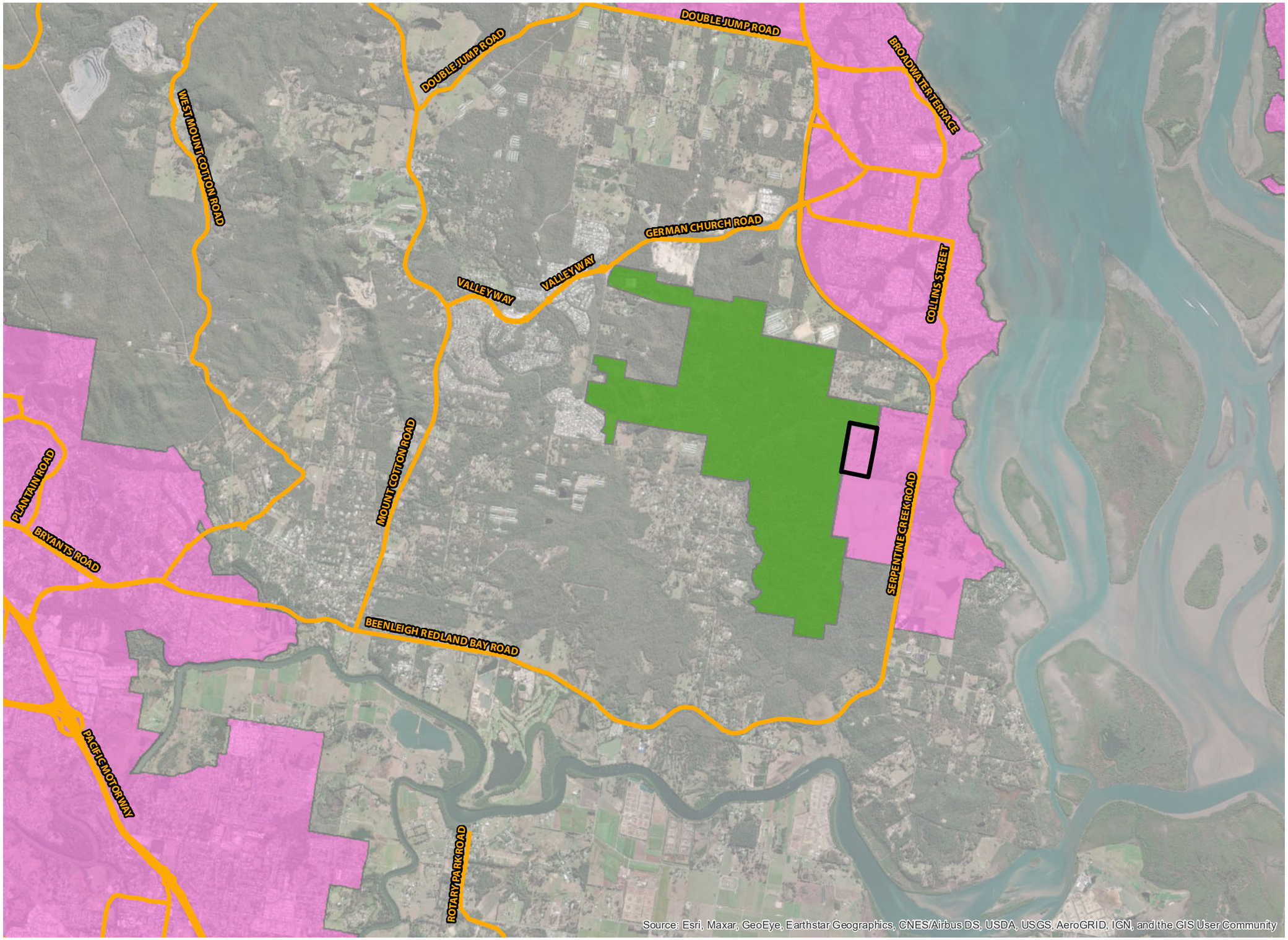
Vegetated areas within the site are considered to achieve critical status (a KHAT score ≥ 5). However, SHG does not consider the portions of the site mapped as Grassed Paddock with Scattered Eucalypts, Corymbias and Melaleuca (refer Plan 2), as critical habitat. This score is the opinion of SHG, and may be different to that of the assessor.

It is noted that the Department believes that although cleared areas may not provide key foraging or shelter habitat for the koala, these areas may be traversed by koalas moving between adjacent areas of habitat and koala habitat trees scattered throughout these areas may provide potential feed and shelter. As such, the Department may consider the entire site as critical habitat for this species.

Nevertheless, if the score derived from the KHAT (i.e. 6) is applied over the entire site, deeming it critical habitat, the proposed disturbance (24.27 ha) would have a low risk of having a significant impact on the Koala. Additionally, the proposed action will create an open space corridor across the central portion of the site, providing connectivity between the adjoining lots to the east and Bayview Conservation Area to the west.

Although the clearing may result in the removal of some koala food trees, historical disturbance and surrounding environment have reduced the koala habitat value of the assessment area. The removal of vegetation located within the development footprint is not considered to have a significant residual impact on koala habitat, either through a reduction of extent or increased fragmentation. This assessment is further supported by the lack of evidence of the koala within the site and limited recent koala sightings within the locality.

4. Connecitivty Assessment



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

Legend

- Proposed Action
- Bayview Conservation Area (>500ha)
- Shaping SEQ Regional Plan 2017 - Urban Footprint
- Major Roads

Issue	Date	Description	Drawn	Checked
A	7/09/2021	Preliminary	LS	LT

0 0.5 1 1.5 Kilometers

Transverse Mercator | GDA 1994 | Zone 56 | 1:50,000 @ A3

saunders havill group

lendlease

Redland Bay, Queensland 4165

Address / RPD: Lot 12 on SP268704 and road reserve

7/09/2021 | 10725 E 04 Connectivity A

Could the action interfere with the recovery of the koala?

For further clarity, the next step is to ascertain whether 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 24. The mitigation strategy addresses potential impacts of clearing the assessment area, and the management of existing threats within the landscape.

Table 24: Residual impact assessment

Dog attack
The proposed action in this location is unlikely to significantly increase the incidence of dog attack. Properties to the north and east are known to house domestic dogs at present. The proposed action has been designed to reduce impacts to MNES including the rehabilitation of the future corridor for connectivity and fauna movement opportunities to reduce wildlife from traversing residences and reduce potential dog/koala interactions. The risk of dog attack in the area is expected to remain relatively the same, as the proposed development does not significantly increase the presence of dogs within the local area. **No residual impacts are identified.**
Vehicle strike
The creation of a relatively small internal road network with low speed limits (approximately 40-50km/hr) servicing the proposed development is not anticipated to significantly increase the potential for vehicle strike. The proposed road network is typical of the urban residential use. The majority of koala/vehicle strike records within proximity to the site are located along Serpentine Creek Road. The potential for vehicle strike along Serpentine Creek Road is expected to reduce as visibility at night increases through lighting and the speed along Serpentine Creek Road is lowered from 80km/hr. Resultantly, interactions between vehicles and koalas within the locality is considered unlikely to increase significantly. Road design, speed limits and signage will mitigate potential risks to Koalas within the referral area. **No residual impacts are identified.**
Disease and pathogens
As discussed, the majority of the koala hospital records within proximity to the site record sick koalas, showing visible signs of diseased including conjunctivitis, cystitis and wasted. The symptoms of these diseases are often observed within koala

populations undergoing environmental stresses, such as overcrowding and poor nutrition. The proposed action is unlikely to create a scenario whereby these diseases manifest or spread into significant koala habitat areas.

No residual impacts are identified.

Barriers to dispersal

While the proposed action will remove some koala food trees, it is unlikely that this will result in significant negative impacts to dispersal given the historical disturbances, modified vegetation within the assessment area and existing barriers to safe koala movement across the locality. A corridor located within the centre of the site will be rehabilitated to mitigate impacts to connectivity and fauna movement.

No residual impacts are identified.

Hydrological change

Earthworks required to modify the land and the increase in hardstand areas across the assessment area have the potential to affect hydrology. Management plans approved by Redland City Council will be implemented during operational works that will address the requirements of State and Local government guidelines and ensure that impacts are minimised. The existing on-site overland flow path will be rehabilitated within the future open space corridor. No development will be proposed within a defined waterway under the *Water Act 2000*. Therefore, 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 permanent hydrological changes that will further degrade the referral area or directly impact areas of Koala habitat.

No residual impacts are identified.

Significant Impact Assessment

Field and desktop assessments against the koala Guidelines were utilised for the following Significant Impact Assessment (refer Table 25) based on the *Significant Impact Guidelines 1.1 – Matters of National Environmental Significance*.

Table 25: Significant Impact Assessment - Koala

Significant Impact Criteria (Koala)	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 referral area is dominated by non-remnant vegetation as a result of historical land uses. The development footprint has been largely restricted to the existing disturbed areas, avoiding significant vegetation and potential habitat. Remnant vegetation along within the development footprint was assessed during field survey effort as containing limited Koala food trees consisting of only two (2) species (*i.e.*, *E. tereticornis* and *C. intermedia*), which were separate and scattered throughout mapped non-remnant and remnant vegetation.	**A significant impact is not likely**

Significant Impact Criteria (Koala)	Description	Impact
	Following an assessment of available database records, such as Biomaps, AKF and ALA, it is acknowledged that Koalas have been recorded in the surrounding locality, although there are limited recent records (i.e. last 5 years). More recent assessments within the locality (EPBC 2016/7776) recorded this species within proximity to the site. The site is not capable of supporting a koala population and no evidence of this species was identified on-site. Therefore, it is considered unlikely that: (1) there is a koala population on-site and (2) that it would constitute an important population. It is anticipated that Koala populations within the wider area may traverse the site for temporary purposes. Suitable habitat exists to the west and north of the site within the adjoining Bayview Conservation Area. This vegetation would be the closest suitable habitat to the assessment area. It is possible to assume that individuals may disperse from this land occasionally. The vegetated areas within the site scored a 6/10 against the KHAT, indicating that the site provides habitat critical to the survival of this species. The removal of this vegetation and some Koala food trees is considered unlikely to impact the wider Koala population. The future corridor running east to west through the site will be rehabilitated and provide safe fauna movement opportunities. Overall, it is considered unlikely that a koala population is supported solely within the assessment area, and hence the proposed development is not expected to decrease the size of an important population.	
2. Reduce the area of occupancy of an important population.	An important population is not considered present on the assessment area for the following reasons: • Historical and current disturbances (agricultural); • The site cannot support a population of koalas; and • No species evidence recorded on-site. Areas observed to be of most ecological value within the site were identified to be consistent with the vegetation within the road and along the drainage line. The future corridor within the site will be rehabilitated facilitating continued connectivity throughout the locality. No evidence (direct or indirect) of koala was observed on-site during field surveys. Due to the size of the site and current levels of disturbance, it is unlikely that an important population of koala utilises the site or adjoining rural properties. As such, the proposal is not considered to reduce the area of occupancy of an important population.	**A significant impact is not likely**

Significant Impact Criteria (Koala)	Description	Impact
3. Fragment an existing important population into two or more populations.	As discussed in the responses to point 1 and point 2 above, evidence of this species was no recorded on-site, as such the site is not considered to support an important population. Koala occurrence on publicly available databases lack recent records of koala proximal to the site. However, recent surveys for other projects (EPBC 2016/7776) recorded this species in proximity to the site. It is not anticipated that an important population of Koala exists on-site, nor utilises the site regularly. It is acknowledged that the site adjoins the Bayview Conservation Area and provides dispersal opportunities. However, existing threats such as Serpentine Creek Road and surrounding urban development limit connectivity to the north, east and south. The rehabilitation of the future open space corridor will provide ongoing connectivity between the east and west. Therefore, due to the lack of on-site evidence and rehabilitation of the future corridor supporting the continuation of movement opportunities, the proposed action is not anticipated to result in fragmenting an existing important population into two or more populations.	**A significant impact is not likely**
4. Adversely affect habitat critical to the survival of a species.	While the proposed action results in the removal of few scattered food trees, the entire site was subject to historic and current disturbances. The site is predominantly mapped as non-remnant vegetation, with only part of the road mapped as remnant vegetation. Even though this area is mapped as remnant vegetation a 10 m wide clearance is provided from the lot boundary into the road for bushfire and maintenance/access requirements. The remaining vegetation within the road and patches of regrowth vegetation within site provide potential refuge habitat for the koala. It is not considered that vegetation on-site is of unique or special value when compared to the surrounding local area. Further, the amount being removed is not considered to adversely affect the local extent of habitat critical to the survival of koala. In addition, rehabilitation of the future open space corridor is proposed as part of the action to maintain connectivity and provide refuge opportunities, if necessary. This site has been selected through regional and local planning investigations for urban development largely due to the historic and existing on-site and surrounding disturbances which reduces the overall environmental value and therefore importance of this site when considering the interim recovery objectives for the koala. It is considered that the extent of potential habitat loss will not adversely affect the survival of the species.	**A significant impact is not likely**

Significant Impact Criteria (Koala)	Description	Impact
5. Disrupt the breeding cycle of an important population.	Surveys of the assessment area did not identify any koalas or evidence of koalas on-site. This, in addition to the few contemporary koala records in proximity (as identified on publicly available databases), indicates the impact area may provide dispersal opportunities or refuge to transient individuals only and is unlikely to constitute a breeding or important population. It is considered unlikely that the breeding cycle of an important population will be disrupted by the proposed action.	**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.	Koalas were not identified (directly or indirectly) on-site during field surveys. As a population was not observed, nor any evidence of one was observed on-site, it is unlikely a permanent and / or important koala population utilise the referral area. The project is predicted to directly disturb the entire 24.27 ha site for the proposed urban development comprising of residential dwellings, open space and supporting infrastructure. Approximately 1.89 ha of this total will be rehabilitated as open space in a linear corridor to deliver connectivity between the Bayview Conservation Estate and adjoining properties to the east of the site. Remnant vegetation within the road and regrowth vegetation within the site is considered to provide koala habitat. Reviewing the above, the removal of this vegetation is considered unlikely to significantly reduce availability or quality of habitat to the extent that the species is likely to decline.	**A significant impact is not likely**
7. Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.	Likely due to the historic and current use of the site and adjoining properties, feral fauna and flora species was confirmed. Although not considered an invasive species, domestic dogs have the potential to attack wildlife and are a major threat to koala survival. Domestic dogs were confirmed within several properties adjoining the site, potentially impacting koala presence. It is highly unlikely that the proposed development will significantly increase the numbers of domestic dogs within the locality. The invasive plant, *Lantana camara*, which is a known barrier to koala dispersal, is present in varying intensities within adjoining properties. Protocols will be implemented to ensure spread of this invasive plant does not occur. Additionally, rehabilitation works within the future open space corridor will maintain movement opportunities for koalas between east and west. As such, it is unlikely that the proposal will increase the prevalence of this or additional invasive species already present in the area.	**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). Deceased koalas (albeit by unknown causes) have been recorded within the local area. As such, the proposed action is considered unlikely to cause additional pressure on the local koala population to the point where these diseases manifest further.	**A significant impact is not likely**

Significant Impact Criteria (Koala)	Description	Impact
9. Interfere substantially with the recovery of the species.	A review of the interim recovery objectives for the koala indicates that the proposed action is unlikely to interfere substantially with the recovery of koala, primarily due to the presence of existing threats and the intended land use of the site and adjoining properties. The site and adjoining properties have been subject to historic and ongoing disturbances for agriculture, commercial and residential uses resulting in a landscape predominantly lacking koala habitat values. As such, the proposed action is not anticipated to substantially interfere with the recovery of the koala.	**No significant impact likely**

Reviewing the assessment against the significant impact guidelines, the proposed action is considered unlikely to have a significant residual impact on the Koala. This opinion is based on existing experience in preparing EPBC Act referrals, consideration of field findings, level of existing disturbance on-site and in properties surrounding the site, presence of suitable habitat on-site and connectivity to suitable koala habitat. 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.

6.2.3 Grey-headed Flying-fox

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

The species is highly adaptive with its diverse native diet, which it can be supplemented with introduced species. It is known to forage within a variety of habitat areas as each resource does not produce food throughout the entire year. Opportunistic and targeted surveys did not locate roosting sites in the referral area or within adjoining properties. No Grey-headed Flying-fox individuals were recorded during field surveys and limited record occur within proximity to the site. Additionally, no active roosts with this species occur within 10 km of the site (refer Plan 5).

Due to the limited availability of suitable foraging habitat on-site, particularly in context to surrounding bushland to the west, the species is considered highly unlikely to utilise the site. Furthermore, no evidence of Grey-headed Flying-fox was recorded as part of field surveys for the Shoreline urban village (EPBC 2016/7776).

It is noted that the Department considers foraging habitat for the Grey-headed Flying-fox is analogous with habitat for the koala and that is why it the species was targeted as part of this assessment. The site does not provide or hold habitat characteristics which would make its occurrence, event as a transient visitor, likely.

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

To determine whether the proposed action is likely to have a significant impact on the Grey-headed Flying-fox, an assessment against the *EPBC Significant Impact Guidelines 1.1* is provided in Table 26.

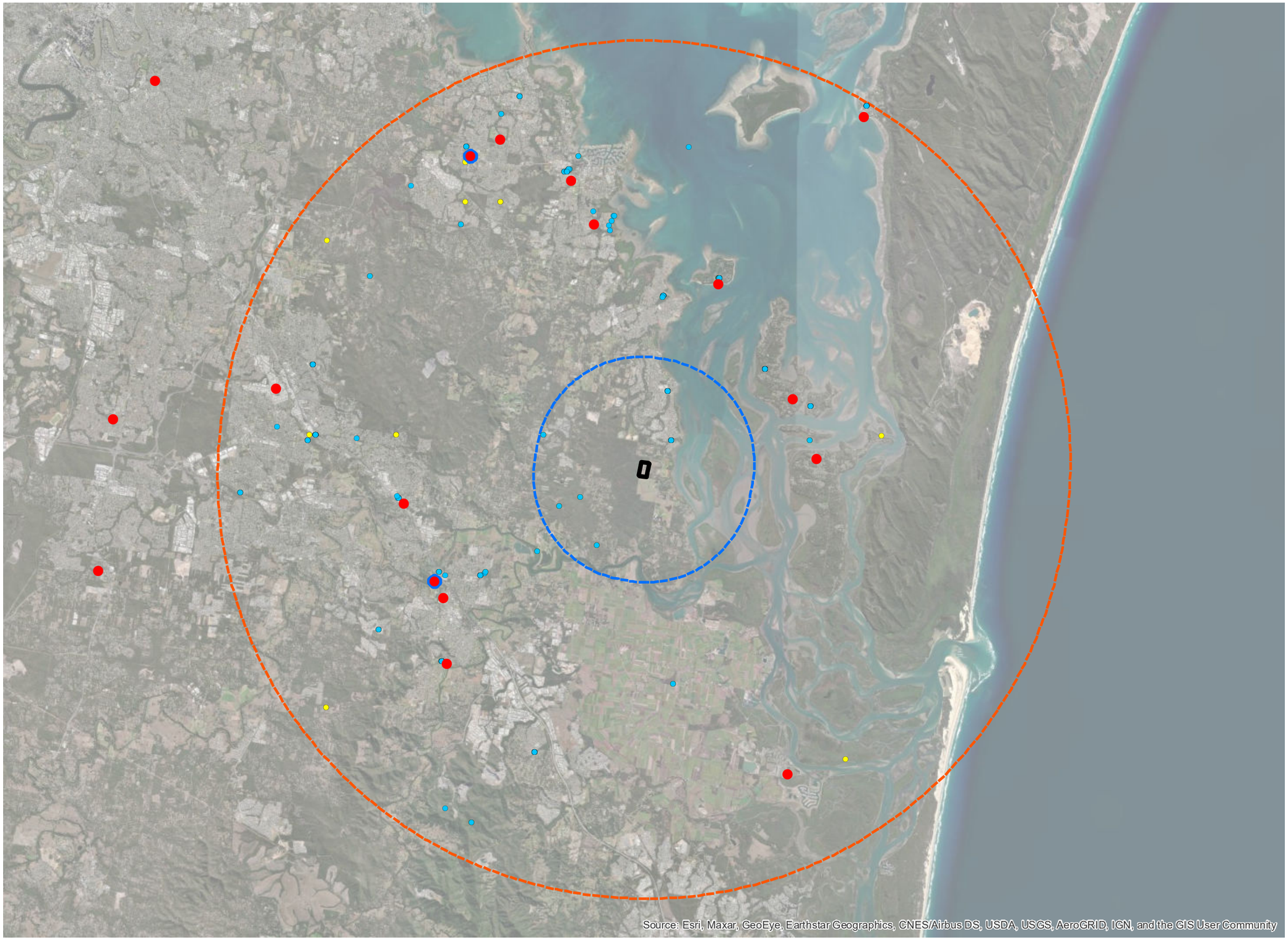
Table 26: Significant Impact Assessment – Grey-headed Flying-fox

Significant Impact Criteria	Description	Impact
An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:		
1. Lead to a long term decrease in the size of an important population of a species.	This species was not observed utilising the site nor observed as a fly over species. No suitable roosting sites occur on or adjacent to the site. A Flying-fox camp containing the GHFF has previously been observed in Loganholme, approximately 12 km to the south-west, last surveyed in February 2020. SEQ has a permanent and abundant population of GHFF and available habitat is spread throughout the region given the high prevalence of *Eucalypts*. While regrowth vegetation patches on-site are considered potential foraging habitat for the species, due to the limited amount and fragmentation, proximity to development and absence of evidence of the species utilising the site even as a transient visitor, the site is not considered to support an important population of the species and the proposed action is unlikely to lead to a long term decrease in the size of any local GHFF populations.	**No significant impact**
2. Reduce the area of occupancy of an important population.	This species was not observed utilising the site nor observed as a fly over species. No suitable roosting sites occur on or adjacent to the site. The proposed action will not reduce the area of occupancy of an important population of GHFF as no part of the action will occur within an area known to be occupied by the species.	**No significant impact**
3. Fragment an existing important population into two or more populations.	The SPRAT species profile outlines that while there are spatially structured colonies of GHFF, there are no separate or distinct populations due to the constant genetic exchange and movement between camps throughout the species' geographic range. In addition, given the high mobility of the species, and comparatively, the small scale of the site in relation to this mobile behaviour, the proposed action is unlikely to fragment a population into two or more populations. Of note, the species was not observed utilising the site nor observed as a fly over species.	**No significant impact**
4. Adversely affect habitat critical to the survival of a species.	An individual of the *Pteropus* was observed on-site. Regrowth vegetation patches within the site are considered to provide limited foraging habitat for the species. The proposal will result in the removal of approximately 4.6 ha of potential GHFF foraging habitat (based on canopy cover estimate). The regrowth *Melaleuca quinquenervia* (~0.65 ha) will be rehabilitated within the future open space corridor subject to detailed design of the earthworks footprint. Due to the lack of sightings and habitat, the proposed action is not considered to adversely affect habitat critical to GHFF.	**No significant impact**

Significant Impact Criteria	Description	Impact
5. Disrupt the breeding cycle of an important population.	Field surveys did not identify any evidence, including roosts/camps, of this species on-site or within adjoining properties. As such, breeding is unlikely to occur on-site. As no roosting camps were observed on or near the site, the proposed action is unlikely to disrupt the breeding cycle of an important population.	**No significant impact**
6. Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	While suitable foraging habitat is located across the site, the removal of these vegetation is unlikely to have a significant impact on the availability of habitat in the landscape, given the vast quantity and availability of foraging habitat in the surrounding area (i.e. Bayview Conservation Area).	**No significant impact**
7. Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.	The proposed action is unlikely to result in the introduction of invasive species. Protocols will be implemented throughout the construction phase of the action to limit the establishment or spread of existing invasive species. Further, a rehabilitation plan is to be prepared for the future open space corridor further reducing the risk of invasive species on-site.	**No significant impact**
8. Introduce disease that may cause the species to decline.	The project is unlikely to introduce disease into the area.	**No significant impact**
9. Interfere substantially with the recovery of the species	Recovery of the species has specifically targeted the broad-scale culling of the species. In addition, conservation efforts have led to the protection of known roosting sites and important habitat. The site has not been identified as an important habitat or roost site and the action is unlikely to interfere with the recovery of the species.	**No significant impact**

Reviewing the assessment above, the proposed action is considered unlikely to have a significant impact on the Grey-headed Flying-fox. This opinion is based on existing experience in preparing EPBC Act referrals, consideration of field findings, lack of species records, level of existing disturbance on-site and in properties surrounding the site and presence of suitable habitat on-site. 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.

5. Grey-headed Flying-fox Sightings and Roosts



Notes:
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Layer Sources

Legend

- Proposed Action
- Site 20km Buffer
- Site 5km Buffer
- Grey-headed Flying-fox Records (ALA, 2021) - 239
- Grey-headed Flying-fox Records (WildNet, 2021) - 236
- Grey-headed Flying-fox Roost Active in Recent Surveys
- Grey-headed Flying-fox Roost Active in Recent Surveys with a Population level of 3 or Higher

Issue	Date	Description	Drawn	Checked
A	7/09/2021	Preliminary	LS	LT

0 2 4 6 Kilometers

Transverse Mercator | GDA 1994 | Zone 56 | 1:180,000 @ A3

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lendlease

Redland Bay, Queensland 4165

Address / RPD: Lot 12 on SP268704 and road reserve

7/09/2021 | 10725 E 05 GHFF Sightings and Roosts A

6.3. Migratory Species

6.3.1 Migratory Shorebirds

The site is considered to provide limited habitat for migratory shorebirds as a result of the historical broad-scale clearing and maintenance through cattle grazing. However, four (4) migratory shorebird species were recorded proximal the site during previous field surveys (BAAM, 2016) for the Shoreline urban village (EPBC 2016/7776):

Table 27: Migratory shorebird likelihood of occurrence

Species	Common Name	EPBC Status	Likelihood of Occurrence
Limosa lapponica baueri	Bar-tailed Godwit	V	Contextual Occurrence
Numenius madagascariensis	Eastern Curlew	CE	
Numenius phaeops	Whimbrel	Migratory	
Tringa nebularia	Common Greenshank	Migratory	

The results of BAAM's surveys (2016) concluded that migratory shorebirds foraged across all areas of mudflats from the bayside of the mangroves to the waterline edge adjacent to the Shoreline urban village action (EPBC 2016/7776) (refer Figure 15), however no migratory shorebirds use habitats along this area of Moreton Bay for roosting. This was also supported by no recorded roosting sites in the area, with the closest roosting area recorded as Port Halloran, approximately 9 km north of the area. Contemporary surveys by SHG confirmed that the referral area does not support roosting habitat.

Foraging habitat for migratory birds is separated from the site by approximately 1,080 m (refer Plan 6). The BAAM report states that mangroves (down to a width as low as 10m) can a form an effective barrier to noise, light and visual disturbances associated with development. Further, the report states that due to the muddy substrate associated with foraging habitat human, boat and dog disturbances are considered unlikely to occur.

As these migratory shorebird species are considered a contextual occurrence based on proximity to feeding habitat, all species have been assessed as a group using the Significant Impact Guidelines Listed Migratory Species criteria.

To determine whether the proposed action is likely to have a significant impact on the migratory shorebird species, an assessment against the *EPBC Significant Impact Guidelines 1.1* is provided in Table 28.

Table 28: Migratory Shorebird Impact Assessment

Significant Impact Criteria (Migratory Shorebirds)	Description	Impact
An action is likely to have a significant impact on a migratory species 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	An area of 'important habitat' for a migratory species is: a. habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species, and/or	**No significant impact**

Significant Impact Criteria (Migratory Shorebirds)	Description	Impact
hydrological cycles), destroy or isolate an area of important habitat for a migratory species	b. habitat that is of critical importance to the species at particular life-cycle stages, and/or c. habitat utilised by a migratory species which is at the limit of the species range, and/or d. habitat within an area where the species is decline. The listed migratory species were not observed during field surveys and the site is not considered to provide suitable roosting or foraging habitat for any of the listed shorebird species. Plan 6 demonstrates that the referral area is located approximately 1 km west of potential foraging habitat for migratory shorebird species at Moreton Bay. As such, the site is not considered to support an ecologically significant proportion of the population of a species and does not provide critical habitat at any life-cycle stages. Reviewing the above, the proposed action is not considered to substantially modify, destroy or isolate an area of important habitat for a migratory species.	
2. Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species, or	The proposed action is unlikely to result in the introduction of invasive species. Protocols will be implemented throughout the construction phase of the action to limit the establishment or spread of existing invasive species. Further, a rehabilitation plan is to be prepared for the future open space corridor further reducing the risk of invasive species on-site.	**No significant impact**
3. Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.	These species were no observed during field surveys and the site is not considered to provide suitable roosting or foraging habitat for any of the listed shorebird species. Although, a raptor nest was located on-site, however throughout the surveying period and other ad hoc inspections (during 2019-2021), the nest has not been occupied by any species. Additionally, a review of the relevant SPRAT profiles reveals that these species do not breed in Australia. The site is not considered to support an ecologically significant proportion of the population of a species and does not provide critical habitat at any life-cycle stages. Therefore, the proposed action is considered unlikely to disrupt the lifecycle of an ecologically significant proportion of the population of a migratory species.	**No significant impact**

Reviewing the assessment above, the proposed action is considered unlikely to have a significant impact on migratory shorebird species. This opinion is based on existing experience in preparing EPBC Act referrals, consideration of field findings, lack of species records, level of existing disturbance on-site and properties surrounding the site and presence of suitable habitat on-site. 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.

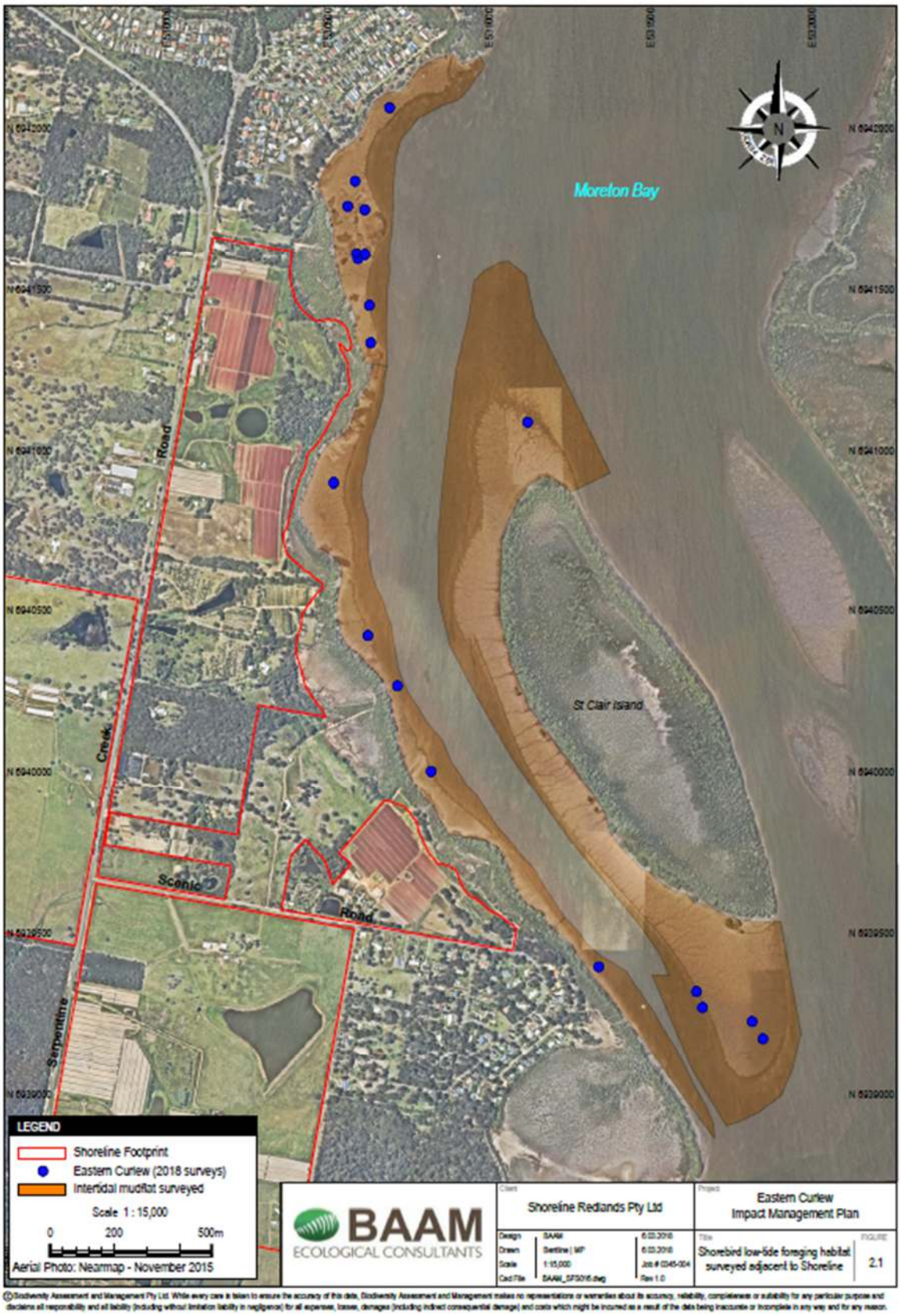
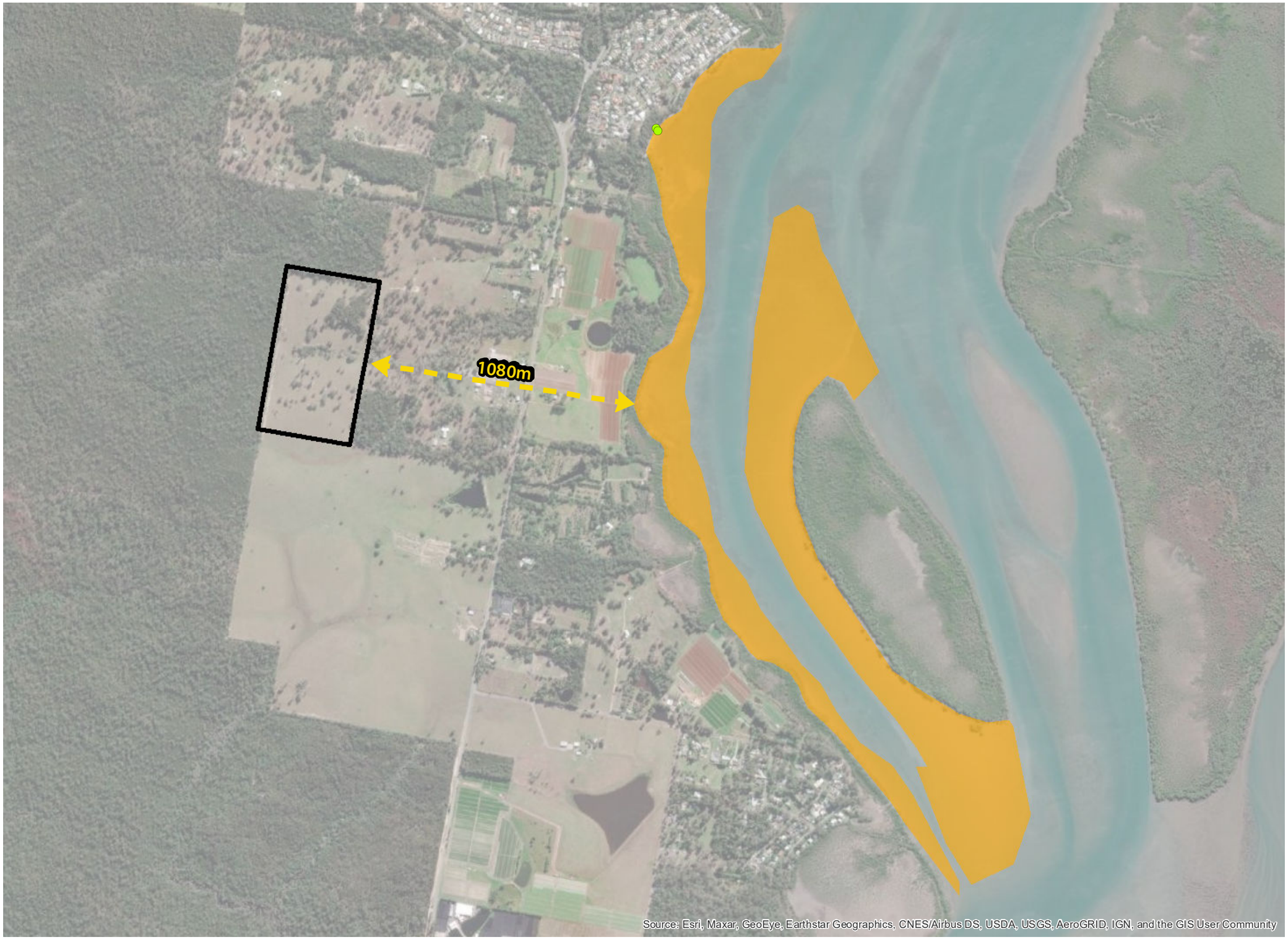


Figure 15: Extract: Figure 2.1 Shorebird foraging density habitat surveyed adjacent to Shoreline, extracted from the Eastern Curlew Impact Management Plan (BAAM 2020))

6. Separation from Migratory Shorebird Species Habitat



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Layer Sources

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

Legend

- Proposed Action
- Intertidal Mudflat
- Eastern Curlew Sightings (ALA, 2021)

Issue	Date	Description	Drawn	Checked
A	7/09/2021	Preliminary	LS	LT

0 100 200 300 400 500 Meters

Transverse Mercator | GDA 1994 | Zone 56 | 1:15,000 @ A3

Address / RPD: Lot 12 on SP268704 and road reserve

7/09/2021 | 10725 E 06 Separation from Migratory shorebirds A

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lendlease

Redland Bay, Queensland 4165

7. Conclusions

This MNES Ecological Technical Assessment was prepared by Saunders Havill Group on behalf of Lendlease Communities (Shoreline) Pty Ltd to inform a referral under the EPBC Act. The purpose of this report is to identify potential MNES, specifically listed threatened species that may be impacted by the proposed urban development known as The Trails ('the action') located at Serpentine Creek Road, Redland Bay, Queensland.

The following conclusions are made based on the completed ecological assessment:

- Contextually, the referral area is located within the southern extent of Redland Bay and adjoins the Bayview Conservation Area.
- Moreton Bay Ramsar Wetlands, is located approximately 1 km to the east.
- The referral area, and surrounded properties, were subject to broad-scale clearing historically for pastoral land uses.
- Overall, the site was found to be highly disturbed and is predominately cleared of canopy vegetation, with the exception of a small patches of regrowth vegetation and disturbed remnant vegetation within the adjacent road. The majority of the site reflects regularly maintained paddock and is currently used for grazing.
- A search using the PMR for MNES under the EPBC Act, identified the potential for three (3) TECs, seventeen (17) threatened flora species and sixty (60) threatened fauna species as having the potential to occur on-site.
    - No EPBC Act listed TECs nor threatened species were on-site.
    - No listed fauna species were recorded on-site despite targeted searching using opportunistic observations, active searches, spotlighting, songmeter, anabat and SAT surveys.
        - The white-throated needletail was considered a potential occurrence given the proximity of previous records and availability of foraging habitat on-site (i.e. mix of woodland and cleared areas and vegetation edges). The site is considered unlikely to provide roosting habitat for this species and therefore the proposal is considered unlikely to have a significant impact on this species.
        - Of the listed fauna species, *Phascolarctos cinereus* (koala) is known to occur in the broader Redland Bay area and has been recorded during other surveys for projects within adjoining properties (refer Shoreline urban village EPBC 2016/7776). However, no evidence of this species (direct or indirect) was recorded during field surveys. It is noted that habitat for this species is considered limited to the road and regrowth patches, accounting for approximately 4.6 ha of the site. The site is considered low quality habitat. The balance of the site is unsuitable for the species and reflects maintained paddocks with scattered native trees. As such, the species is considered unlikely to utilise the site, for any reason other than dispersal and movement within the wider region.
        - It is acknowledged that the Department considers potential Koala habitat is analogous with foraging habitat for *Pteropus poliocephalus* (Grey-headed Flying-fox). However, given significant disturbance of the site, no recent records for the species within the area and only a small 4.6 ha of potential foraging habitat on-site, the species is considered highly unlikely to utilise the site. Higher quality habitat is available within the wider region. Further, it is understood that the future open space corridor will be rehabilitated with riparian

vegetation reflective of the species composition of Least Concern RE12.3.6 *Melaleuca quinquenervia* open forest which is mapped on the VMA pre-clear mapping as naturally occurring along the gully lines and alluvial plains in this region. This RE provides suitable habitat for the koala and as such, rehabilitation and revegetation of the drainage line corridor with RE12.3.6 consistent species is considered to provide improved habitat values and connectivity on-site into the future.

- No migratory birds were recorded on, or adjoining, the site nor as fly overs.
  - BAAM, who undertook broader shorebirds surveys along the coastline, recorded four (4) migratory shorebird species during surveys for Shoreline master plan (EPBC2016/7776);
    - *Limosa lapponica baueri* (Bar-tailed Godwit),
    - *Numenius madagascariensis* (Eastern Curlew),
    - *Numenius phaeopus* (Whimbrel), and
    - *Tringa nebularia* (Common Greenshank).
  - The listed migratory shorebird species do not breed in Australia.
  - BAAM (2016) concluded that migratory shorebirds foraged across all areas of mudflats from the bayside of the mangroves to the waterline edge adjacent to Shoreline. Foraging habitat for migratory birds is separated from the site by approximately 1,080 m. As such, the proposed action is considered unlikely to significantly impact migratory species.

- A Wildlife Online search for threatened species under the NCA identified the potential for ten (10) threatened fauna species and no threatened flora species, to occur.
  - Under the VMA, essential habitat is also mapped for *Crinia tinnula* (Wallum Froglet) and *Phascolarctos cinereus* (Koala). Although, the constructed on-site dam provides habitat some wetland dependant species, this is not considered suitable habitat for Wallum Froglet. Only the vegetation areas of the site, approximately 4.6 ha, is considered suitable refuge habitat for the koala.
- The referral area contains approximately 2 ha of mapped remnant vegetation mapped under the *Vegetation Management Act 1999* (VMA), described as Endangered RE12.11.27/12.11.23/12.11.26 (40/40/20) along the northern and western boundary. The remainder is mapped as non-remnant, evident of historical broad-scale clearing.
- The project area contains a diverse array of flora species typically found within a pastoral landscape. A total of forty-one 41) flora species were recorded within the application area. Of these species twenty (20) were native and twenty-one (21) were introduced or planted species typical of rural residential land uses. Three (3) species are listed as restricted plants under the *Biosecurity Act 2014* and will require specific levels of management.
- Fauna recorded across the site included common mammals, small reptiles and avifauna, which are likely to utilise the application area as part of a much broader home range. These species are considered common to the area and are typically encountered throughout urban areas within the Redland Bay area.
- Horses, domestic dogs and evidence of foxes were recorded on and adjacent to the site which pose significant threat to arboreal fauna, including Koalas.
- The site's ability to support listed threatened fauna species, which are generally highly sensitive, specialised and require particular habitat features, is highly unlikely for the majority of the listed EPBC Act or NCA protected species.

- The assessment of the sites habitat values resulted in the vast majority of these listed species as having no suitable habitat on-site as they are generally associated with less disturbed environments, topography the contains greater areas of rocky outcrops suitable for dens or vegetation communities dominated by rainforest species.

Overall, the site is considered to be disturbed as a result of historical clearing and land uses. No significant biodiversity values were recorded on or adjacent to the project area. Ecological values associated with the site are considered to be limited to the drainage line across the centre of the site. It is understood that this area will be located within the future open space corridor which will be rehabilitated with riparian vegetation reflective of the species composition of Least Concern RE12.3.6 *Melaleuca quinquenervia* open forest. This regional ecosystem is mapped on the VMA pre-clear mapping as naturally occurring along the gully lines and alluvial plains in this region and provides suitable habitat for the Koala and as such, rehabilitation and revegetation of the future open space corridor will maintain hydrological regimes and fauna movement.

No significant residual impacts on MNES are anticipated to occur as a result of the development. The configuration of the urban development will support fauna movement along the open space corridor connecting to off-site habitat and other open space corridors to the east. Only via referral to DAWE and assessment under the EPBC Act can a new (proposed) action be decided as Not a Controlled Action or Controlled Action. The proponent seeks this confirmation, however the Shoreline urban village referral decision (related action EPBC 2016/7776) and the results detailed in this MNES Ecological Technical Assessment support a Not a Controlled Action referral decision for The Trails proposed action.

8. Appendices

Appendix A

EPBC Act Protected Matters Report

Appendix B

Likelihood of Occurrence Assessment

Appendix C

Wildlife Online Database Search Results

Appendix A

EPBC Act Protected Matters Report

EPBC Act Protected Matters Report

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

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

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

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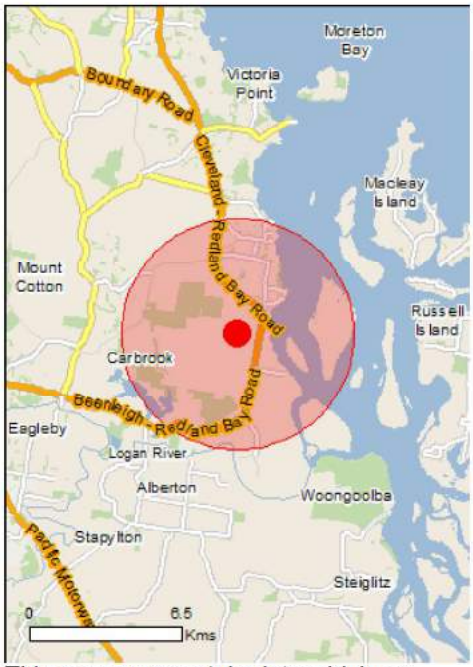

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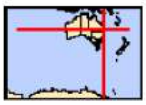

Summary

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:	3
Listed Threatened Species:	77
Listed Migratory Species:	77

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:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	109
Whales and Other Cetaceans:	13
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:	3
Regional Forest Agreements:	None
Invasive Species:	34
Nationally Important Wetlands:	2
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar) [Resource Information]

Name	Proximity
Moreton bay	Within Ramsar site

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 likely to occur within area
Lowland Rainforest of Subtropical Australia	Critically Endangered	Community may occur within area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known 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

Name	Status	Type of Presence
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
Fregetta grallaria grallaria White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat may occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known 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 known to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat likely to occur within area
Pterodroma neglecta neglecta Kermadec Petrel (western) [64450]	Vulnerable	Foraging, feeding or related behaviour may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	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

Name	Status	Type of Presence
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	Foraging, feeding or related behaviour likely to occur within area
Thinornis cucullatus cucullatus Eastern Hooded Plover, Eastern Hooded Plover [90381]	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 [68449]	Vulnerable	Species or species habitat may occur within area
Hippocampus whitei White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]	Endangered	Species or species habitat likely to occur within area
Maccullochella mariensis Mary River Cod [83806]	Endangered	Translocated population known to 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
Mammals		
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat may occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat known 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

Name	Status	Type of Presence
Potorous tridactylus tridactylus Long-nosed Potoroo (SE Mainland) [66645]	Vulnerable	Species or species habitat may occur within area
Pseudomys novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
Xeromys myoides Water Mouse, False Water Rat, Yirrkoo [66]	Vulnerable	Species or species habitat likely to occur within area
Plants		
Acronychia littoralis Scented Acronychia [8582]	Endangered	Species or species habitat may occur within area
Arthraxon hispidus Hairy-joint Grass [9338]	Vulnerable	Species or species habitat likely to occur within area
Baloghia marmorata Marbled Balogia, Jointed Baloghia [8463]	Vulnerable	Species or species habitat may occur within area
Corchorus cunninghamii Native Jute [14659]	Endangered	Species or species habitat likely to occur within area
Cryptocarya foetida Stinking Cryptocarya, Stinking Laurel [11976]	Vulnerable	Species or species habitat may occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat may occur within area
Cupaniopsis shirleyana Wedge-leaf Tuckeroo [3205]	Vulnerable	Species or species habitat may occur within area
Endiandra floydii Floyd's Walnut [52955]	Endangered	Species or species habitat likely to occur within area
Gossia gonoclada Angle-stemmed Myrtle [78866]	Endangered	Species or species habitat likely to occur within area
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
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat may occur within area
Phaius australis Lesser Swamp-orchid [5872]	Endangered	Species or species habitat likely to occur within area
Rhodamnia rubescens Scrub Turpentine, Brown Malletwood [15763]	Critically Endangered	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Rhodomyrtus psidioides Native Guava [19162]	Critically 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 may occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Coeranoscincus reticulatus Three-toed Snake-tooth Skink [59628]	Vulnerable	Species or species habitat likely to occur within area
Delma torquata Adorned Delma, Collared Delma [1656]	Vulnerable	Species or species habitat may 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	Foraging, feeding or related behaviour known to occur within area
Sharks		
Carcharias taurus (east coast population) Grey Nurse Shark (east coast population) [68751]	Critically Endangered	Species or species habitat likely to occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Pristis zijsron Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Breeding may occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

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

Name	Threatened	Type of Presence
Migratory Marine Birds		
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur

Name	Threatened	Type of Presence within area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Foraging, feeding or related behaviour likely to occur within area
Ardenna grisea Sooty Shearwater [82651]		Species or species habitat may occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat known to 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
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		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
Sternula albifrons Little Tern [82849]		Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	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	Foraging, feeding or related behaviour likely to occur within area
Migratory Marine Species		
Balaena glacialis australis Southern Right Whale [75529]	Endangered*	Species or species habitat likely to occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within

Name	Threatened	Type of Presence
		area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Carcharhinus longimanus Oceanic Whitetip Shark [84108]		Species or species habitat may occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Dugong dugon Dugong [28]		Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		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
Manta alfredi Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		Species or species habitat may occur within 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
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Orcaella heinsohni Australian Snubfin Dolphin [81322]		Species or species habitat likely to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Pristis zijsron Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Breeding may occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Sousa chinensis Indo-Pacific Humpback Dolphin [50]		Breeding known to occur

Name	Threatened	Type of Presence within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		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
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
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
Arenaria interpres Ruddy Turnstone [872]		Roosting known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Roosting known to occur within area
Calidris alba Sanderling [875]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat likely to occur within area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Roosting known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area
Limicola falcinellus Broad-billed Sandpiper [842]		Roosting known to occur within area
Limnodromus semipalmatus Asian Dowitcher [843]		Species or species habitat may occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Roosting known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting known to occur within area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Philomachus pugnax Ruff (Reeve) [850]		Roosting known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]		Roosting known to occur within area
Tringa brevipes Grey-tailed Tattler [851]		Roosting known to occur within area
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area
Tringa incana Wandering Tattler [831]		Roosting known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area
Xenus cinereus Terek Sandpiper [59300]		Roosting known to occur within area

Other Matters Protected by the EPBC Act

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
Anous stolidus Common Noddy [825]		Species or species habitat likely 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 ibis Cattle Egret [59542]		Species or species habitat may occur within area
Arenaria interpres Ruddy Turnstone [872]		Roosting known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Roosting known to occur within area
Calidris alba Sanderling [875]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat likely to occur within area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Charadrius ruficapillus Red-capped Plover [881]		Roosting known to occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Roosting known to occur

Name	Threatened	Type of Presence
		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
Diomedea gibsoni Gibson's Albatross [64466]	Vulnerable*	Species or species habitat may occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Heteroscelus brevipes Grey-tailed Tattler [59311]		Roosting known to occur within area
Heteroscelus incanus Wandering Tattler [59547]		Roosting known to occur within area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Roosting 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
Limicola falcinellus Broad-billed Sandpiper [842]		Roosting known to occur within area
Limnodromus semipalmatus Asian Dowitcher [843]		Species or species habitat may occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Roosting known 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

Name	Threatened	Type of Presence
		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
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 known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting known to occur within area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat likely to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Philomachus pugnax Ruff (Reeve) [850]		Roosting known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]		Roosting known to occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Foraging, feeding or related behaviour likely to occur within area
Puffinus griseus Sooty Shearwater [1024]		Species or species habitat may occur within area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Roosting known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat known to occur within area
Sterna albifrons Little Tern [813]		Species or species habitat may occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Species or species habitat may occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Species or species habitat may occur within

Name	Threatened	Type of Presence
		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	Foraging, feeding or related behaviour likely to occur within area
Thinornis rubricollis rubricollis Hooded Plover (eastern) [66726]	Vulnerable*	Species or species habitat may occur within area
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area
Xenus cinereus Terek Sandpiper [59300]		Roosting known to occur within area
Fish		
Acentronura tentaculata Shortpouch Pygmy Pipehorse [66187]		Species or species habitat may occur within area
Campichthys tryoni Tryon's Pipefish [66193]		Species or species habitat may occur within area
Corythoichthys amplexus Fijian Banded Pipefish, Brown-banded Pipefish [66199]		Species or species habitat may occur within area
Corythoichthys ocellatus Orange-spotted Pipefish, Ocellated Pipefish [66203]		Species or species habitat may occur within area
Festucalex cinctus Girdled Pipefish [66214]		Species or species habitat may occur within area
Filicampus tigris Tiger Pipefish [66217]		Species or species habitat may occur within area
Halicampus grayi Mud Pipefish, Gray's Pipefish [66221]		Species or species habitat may occur within area
Hippichthys cyanospilos Blue-speckled Pipefish, Blue-spotted Pipefish [66228]		Species or species habitat may occur within area
Hippichthys heptagonus Madura Pipefish, Reticulated Freshwater Pipefish [66229]		Species or species habitat may occur within area
Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species

Name	Threatened	Type of Presence
		habitat may occur within area
Hippocampus kelloggi Kellogg's Seahorse, Great Seahorse [66723]		Species or species habitat may occur within area
Hippocampus kuda Spotted Seahorse, Yellow Seahorse [66237]		Species or species habitat may occur within area
Hippocampus planifrons Flat-face Seahorse [66238]		Species or species habitat may occur within area
Hippocampus trimaculatus Three-spot Seahorse, Low-crowned Seahorse, Flat-faced Seahorse [66720]		Species or species habitat may occur within area
Hippocampus whitei White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]	Endangered	Species or species habitat likely to occur within area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Micrognathus andersonii Anderson's Pipefish, Shortnose Pipefish [66253]		Species or species habitat may occur within area
Micrognathus brevirostris thorntail Pipefish, Thorn-tailed Pipefish [66254]		Species or species habitat may occur within area
Microphis manadensis Manado Pipefish, Manado River Pipefish [66258]		Species or species habitat may occur within area
Solegnathus dunckeri Duncker's Pipehorse [66271]		Species or species habitat may occur within area
Solegnathus hardwickii Pallid Pipehorse, Hardwick's Pipehorse [66272]		Species or species habitat may occur within area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area
Solenostomus cyanopterus Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area
Solenostomus paradoxus Ornate Ghostpipefish, Harlequin Ghost Pipefish, Ornate Ghost Pipefish [66184]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area
Trachyrhamphus bicoarctatus Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within

Name	Threatened	Type of Presence
		area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Mammals		
Dugong dugon Dugong [28]		Species or species habitat known to occur within area
Reptiles		
Aipysurus laevis Olive Seasnake [1120]		Species or species habitat may occur within area
Astrotia stokesii Stokes' Seasnake [1122]		Species or species habitat may occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour 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
Hydrophis elegans Elegant Seasnake [1104]		Species or species habitat may occur within area
Laticauda laticaudata a sea krait [1093]		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	Foraging, feeding or related behaviour known to occur within area
Pelamis platurus Yellow-bellied Seasnake [1091]		Species or species habitat may occur within area

Whales and other Cetaceans		[Resource Information]
Name	Status	Type of Presence
Mammals		
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species

Name	Status	Type of Presence
		habitat may occur within area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Species or species habitat known to occur within area
Orcaella brevirostris Irrawaddy Dolphin [45]		Species or species habitat likely to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Sousa chinensis Indo-Pacific Humpback Dolphin [50]		Breeding known to occur within area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Bayview	QLD
Carbrook Wetlands 1	QLD
Carbrook Wetlands 2	QLD

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

Name	Status	Type of Presence
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 within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur

Name	Status	Type of Presence within area
Plants		
Alternanthera philoxeroides Alligator Weed [11620]		Species or species habitat likely to occur within area
Asparagus aethiopicus Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425]		Species or species habitat likely to occur within area
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
Chrysanthemoides monilifera subsp. rotundata Bitou Bush [16332]		Species or species habitat likely to occur within area
Cryptostegia grandiflora Rubber Vine, Rubbervine, India Rubber Vine, India Rubbervine, Palay Rubbervine, Purple Allamanda [18913]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Hymenachne amplexicaulis Hymenachne, Olive Hymenachne, Water Stargrass, West Indian Grass, West Indian Marsh Grass [31754]		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
Parthenium hysterophorus Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed [19566]		Species or species 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
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 likely to occur within area

Nationally Important Wetlands	[Resource Information]
Name	State
Carbrook Wetlands Aggregation	QLD
Moreton Bay	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

-27.6545 153.29554

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.

Department of Agriculture Water and the Environment
GPO Box 858
Canberra City ACT 2601 Australia
+61 2 6274 1111

Appendix B

Likelihood of Occurrence Assessment

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

Matters of National Environmental Significance						
Name	**Status**	**Type of presence**	**Description of the community/preferred habitat**	**Likelihood of Occurrence Analysis**	**Desktop Likelihood of occurrence (on-site)**	**Field Survey Confirmed Likelihood of occurrence (on-site)**
Wetlands of International Importance (Ramsar)						
Moreton Bay		Within RAMSAR Site	Within RAMSAR Site.	There will be no measurable affect to Moreton Bay.	Unlikely	**Unlikely**
Threatened Ecological Communities						
Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland ecological community	E	Community likely to occur within area	In Queensland, this ecological community coincides with two regional ecosystem communities including Of Concern RE12.1.1 (*Casuarina glauca* +/- mangroves woodland) as well as areas where the canopy is dominated by *Casuarina glauca* within 12.3.20 (*Melaleuca quinquenervia, Casuarina glauca +/- Eucalyptus tereticornis, Eucalyptus siderophloia* open forest on low coastal alluvial plains).	Desktop analysis and field surveys confirmed that regional ecosystem 12.1.1 and 12.3.20 do not occur on-site.	Unlikely	Unlikely
Lowland rainforest of subtropical Australia	CE	Community may occur within area	This TEC occurs mainly on basalt and alluvial soils and is characteristic of a low abundance of *Eucalyptus, Melaleuca* and *Casuarina* species. Specimens with buttress roots and a diversity of vines are common throughout this TEC. This 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.	Desktop analysis and field surveys confirmed that regional ecosystem 12.3.1, 12.5.13, 12.8.3, 12.8.4, 12.8.13, 12.11.1, 12.11.10, 12.12.1, and 12.12.1 do not occur on-site.	Unlikely	Unlikely

Subtropical and Temperate Coastal Saltmarsh	V	Community likely to occur within area	The Coastal Saltmarsh community is described as containing mainly salt-tolerant vegetation including grasses, herbs, sedges, rushes and shrubs. Succulent herbs, shrubs and grasses tend to dominate vegetation is generally of less than 0.5m in height. This ecological community is associated with Queensland regional ecosystems 12.1.2.	Desktop analysis and field surveys confirmed that regional ecosystem 12.1.2, or any salt-tolerant flora species, were not present on-site.	Unlikely	Unlikely

Scientific name	**Common name**	**Listing Status***		**EPBC code**	**Habitat and Distribution**	**Microhabitat keywords**	**Likelihood of Occurrence Analysis**	**Desktop Likelihood of occurrence (on-site)**	**Field Survey Confirmed Likelihood of occurrence (on-site)**
		EPBC Act	**NC Act**						
Birds									
Anthochaera phrygia	Regent Honeyeater	CE	E	82338	Regent Honeyeaters mostly occur in dry Box-Ironbark Eucalypt woodland and dry sclerophyll forest associations in areas of low to moderate relief, wherein they prefer moister, more fertile sites. These areas are generally associated with creek flats and river valleys and foothills. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes. They are a generalist forager, which mainly feed on nectar from a wide range of eucalypts and mistletoes.	*Corymbia citriodora* forest	The site is mapped as containing some Eucalypt species including *Eucalyptus siderophloia* (Grey Ironbark). Field surveys conducted over two consecutive years within May – August, did not detect any evidence of the species onsite. Federal survey guidelines of conducting targeted surveys over a minimum of 5 survey periods (days) and 20 person hours was achieved. However, given the lack of sightings in the area and limited suitable habitat, the species is considered unlikely to utilise the site.	Low	Unlikely
Botaurus poiciloptilus	Australasian Bittern	E	-	1001	The Australasian Bittern occurs in terrestrial wetlands and, rarely, estuarine habitats, mainly in the temperate south-east and south-west. It favours wetlands with tall dense vegetation, where it forages in still, shallow water up to 0.3 m deep, often at the edges of pools or	Wetlands, permanent water, freshwater dam	This site does contain mapped terrestrial wetlands, but the vegetation is highly modified. Limited, if any suitable habitat for breeding and nest construction (presence of suitable reed beds) occurs onsite. Where marginal	Moderate	Low

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Microhabitat keywords	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act						
					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.		habitat occurs onsite, these areas lie within the retained habitat corridor. WildNet confirms the species has been recorded within 5km of the subject site.		
Calidris canutus	Red Knot	E	E	855	In Australasia the Red Knot mainly inhabit intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours; sometimes on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms or coral reefs. They are occasionally seen on terrestrial saline wetlands near the coast, such as lakes, lagoons, pools and pans, and recorded on sewage ponds and salt works, but rarely	Intertidal mudflats	WildNet confirms the species has been recorded within 5km of the subject site. No suitable foraging or breeding habitat occurs on-site.	Low	Unlikely

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Microhabitat keywords	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act						
					use freshwater swamps. They rarely use inland lakes or swamps. The Red Knot usually forage in soft substrate near the edge of water on intertidal mudflats or sandflats exposed by low tide.				
Calidris ferruginea	Curlew Sandpiper	CE	E	856	Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters. In Queensland, scattered records occur in the Gulf of Carpentaria, with widespread records along the coast south of Cairns.		Suitable habitat is located on-site with some wetlands present. Where potentially suitable habitat occurs onsite, these areas lie within the retained habitat corridor and will be enhanced and restored as part of the site rehabilitation plan. WildNet confirms the species has been recorded within 5km of the subject site. Despite this, extensive field surveys were completed, and no individuals were detected. The species is considered to have a low potential to occur onsite.	Moderate	Low

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Microhabitat keywords	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act						
Calidris tenuirostris	Great Knot	CE	E	862	In Australasia, this species typically prefers sheltered coastal habitats, with large intertidal mudflats or sandflats. This includes inlets, bays, harbours, estuaries and lagoons. They are occasionally found on exposed reefs or rock platforms, shorelines with mangrove vegetation, ponds in saltworks, at swamps near the coast, salt lakes and non-tidal lagoons. The Great Knot rarely occurs on inland lakes and swamps		WildNet confirms the species has been recorded within 5km of the subject site. However, very limited, if any suitable foraging habitat is located on-site.	Low	Low
Charadrius mongolus	Lesser Sand Plover	E	E	879	The Lesser Sand Plover is found on sand and mudflats. This species feeds on small molluscs, worms and crustaceans.		No suitable foraging or breeding habitat occurs on-site.	Unlikely	Unlikely
Diomedea antipodensis	Antipodean Albatross	V	-	64458	The Antipodean Albatross 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. The Antipodean Albatross nests in open patchy vegetation, such as among tussock grassland or shrubs on ridges, slopes and plateaus.		No suitable habitat was observed throughout the assessment area.	Unlikely	Unlikely

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Microhabitat keywords	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act						
Diomedea antipodensis gibsoni	Gibson's Albatross	V	V	82270	Gibson's Albatross is marine, pelagic and aerial. In the Antarctic, it occurs in open water, and rarely enters the belt of icebergs region. In late summer, it may approach the edge of the pack-ice. Gibson's Albatross 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.		No suitable habitat was observed throughout the assessment area.	Unlikely	Unlikely
Diomedea exulans	Wandering Albatross	V	V	89223	Wandering albatross are found right across the Southern Ocean, including Antarctic, subantarctic and subtropical waters. Wandering albatross breed on subantarctic and Antarctic islands between 46° and 56°S such as Iles		No suitable habitat was observed throughout the assessment area.	Unlikely	Unlikely

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Microhabitat keywords	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act						
					Kerguelen, South Georgia and Macquarie Island. Young birds will remain at sea for five to ten years before returning to their natal island to breed.				
Erythrotriorchis radiatus	Red Goshawk	V	V	942	A wide ranging and highly mobile species generally observed over eucalypt habitats. This species prefers forest and woodland with a mosaic of vegetation types, large prey populations (birds) and permanent water. The vegetation types include eucalypt woodland, open forest, tall open forest, gallery rainforest, swamp sclerophyll forest and rainforest margins. Habitat has to be open enough for fast attack and manoeuvring in flight but provide cover for ambushing of prey.		This site does not contain the mosaic of vegetation types that this species favours. There is no evidence of permanent residence, and due to the scarcity of this species and lack of local records, its occurrence is highly unlikely.	Unlikely	Unlikely
Falco hypoleucos	Grey Falcon	V	V	929	The Grey Falcon is usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. Also occurs near wetlands where surface water attracts prey. Preys primarily on birds, especially parrots and pigeons, using high-speed chases and stoops; reptiles and		Limited suitable habitat is located on-site due to the highly modified environment of the site. Few suitable unused nests (raptor or corvid) exist onsite and were all inactive during field surveys in 2020 and 2021.	Low	Unlikely

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Microhabitat keywords	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act						
					mammals are also taken. Like other falcons it utilises old nests of other birds of prey and ravens, usually high in a living eucalypt near water or a watercourse; peak laying season is in late winter and early spring; two or three eggs are laid. The nests chosen are usually in the tallest trees along watercourses, particularly River Red Gum (*Eucalyptus camaldulensis*) and Coolibah (*E. coolabah*).		The species is considered unlikely to inhabit or utilise the site.		
Fregetta grallaria grallaria	White-bellied Storm-Petrel	V	-	64438	The White-bellied Storm-Petrel occurs across sub-tropical and tropical waters in the Tasman Sea, Coral Sea and, possibly, the central Pacific Ocean. In the non-breeding season, it reaches and forages over near-shore waters along the continental shelf of mainland Australia. It breeds, in Australian territory, on offshore islets and rocks in the Lord Howe Island group. It nests in crevices between large volcanic rocks, and in burrows excavated in banks.	continental shelf; volcanic rocks; banks	No suitable habitat occurs on-site.	Unlikely	Unlikely
Geophaps scripta scripta	Squatter Pigeon (southern)	V	V	64440	This species inhabits open grasslands and woodlands typically with a native		This site contains limited suitable habitat, as the majority of the site exists as modified grazing land with	Unlikely	Unlikely

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Microhabitat keywords	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act						
					understorey although may occur in artificial pasture.		a limited native understorey. In other parts of the species' range, they are readily observed within grazed paddocks, whereas during extensive surveys, no individuals were detected. In addition, the species is very rarely observed in southern Queensland, and thus this species is not expected to occur onsite.		
Grantiella picta	Painted Honeyeater	V	V	470	The species inhabits mistletoes in eucalypt forests/woodlands, riparian woodlands of black box and river red gum, box-ironbark-yellow gum woodlands, acacia-dominated woodlands, paperbarks, casuarinas, callitris, and trees on farmland or gardens. The species prefers woodlands which contain a higher number of mature trees, as these host more mistletoes. It is more common in wider blocks of remnant woodland than in narrower strips.		Some preferred foraging species are located on-site, however the site is highly modified and limited mature trees exist.	Low	Unlikely
Hirundapus caudacutus	White-throated Needletail	V	V	682	Although they occur over most types of habitats, they are probably recorded most often above wooded areas, including open forest and rainforest, and may also fly		WildNet confirms the species has been recorded within 5km of the subject site.	Moderate	Moderate

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Microhabitat keywords	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act						
					between trees or in clearings, below the canopy, but they are less commonly recorded flying above woodland. They also commonly occur over heathland, but less often over treeless areas, such as grassland or swamps.		The site has potential to support the species, however, extensive field surveys were completed, and the species was not detected.		
Lathamus discolor	Swift Parrot	CE	E	744	The Swift Parrot breeds in Tasmania during spring to early summer. During autumn and winter the species migrates to the mainland where it follows a nomadic existence linked to the availability and timing of flowering of trees in various locations.		With Eucalypts present on-site and the Swift Parrots nomadic lifestyle, the species has potential to occur on-site. The federal survey guidelines survey effort guide for the species was achieved during field assessment. More than 32 person hours of bird surveys were completed over eight days across the site, with many more hours completed recording species incidentally encountered across the site. Given the lack of observations during targeted surveys in 2020 and 2021 as well as throughout the local area, the species is not considered	Low	Unlikely

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Microhabitat keywords	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act						
							likely to utilise the site for foraging or roosting purposes.		
Limosa lapponica baueri	Bar-tailed Godwit	V	V	86380	The Bar-tailed Godwit is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It is found often around beds of seagrass and, sometimes, in nearby saltmarsh.		WildNet confirms the species has been recorded within 5km of the subject site. However, no suitable habitat was observed throughout the assessment area.	Low	Unlikely
Macronectes giganteus	Southern Giant Petrel	E	E	1060	The Southern Giant-petrels range widely throughout the southern oceans. In summer they occur predominantly below 60° S in sub-Antarctic to Antarctic waters.		No suitable foraging or breeding habitat occurs on-site.	Unlikely	Unlikely
Macronectes halli	Northern Giant Petrel	V	V	1061	The Northern Giant-Petrel is marine and oceanic. It mainly occurs in sub-Antarctic waters, but regularly occurs in Antarctic waters of the south-western 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 foraging or breeding habitat occurs on-site.	Unlikely	Unlikely

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Microhabitat keywords	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act						
Numenius madagascariensis	Eastern Curlew	CE	E	847	The Eastern Curlew is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass. Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. The birds are often recorded among saltmarsh and on mudflats fringed by mangroves, and sometimes use the mangroves. The birds are also found in saltworks and sewage farms.		WildNet confirms the species has been recorded within 5km of the subject site. However, no suitable habitat was observed throughout the assessment area.	Low	Unlikely
Pachyptila turtur subantarctica	Fairy Prion	V		64445	This marine species apparently occurs mainly offshore but may move inshore during stormy weather. The Fairy Prion (southern) breeds on Macquarie Island and a number of other subantarctic islands outside of Australia. Digs burrows among rocks or low vegetation in which to nest. Burrows may be dug below mat forming herbs.	low vegetation; offshore	No suitable foraging or breeding habitat occurs on-site. This species is also known to occur almost exclusively offshore.	Unlikely	Unlikely
Pterodroma neglecta neglecta	Kermadec Petrel (western)	V	-	64450	The Kermadec Petrel (western) is a pelagic seabird that occurs in tropical, subtropical and temperate waters of the Pacific Ocean.	tussocks; steep cliffs; high altitude	No suitable foraging or breeding habitat occurs on-site.	Unlikely	Unlikely

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Microhabitat keywords	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act						
					It has been recorded in waters of 15–25 °C in the subtropics and in colder waters in temperate regions, with one bird sighted in the northern Pacific Ocean in waters of about 6 °C. It breeds on islands, atolls and islets in the southern Pacific Ocean. Breeding habitat in Australia includes: Balls Pyramid, a tall rock stack where it occurs above an altitude of 400 metres, and nests on sheltered tussock ledges on steep cliff faces, and may be seen flying at high altitudes around the cliffs; and on Phillip Island, where pairs nest beneath Olive (Olea europaea) shrubs in elevated regions around the centre of the island. It formerly nested on almost inaccessible ledges at Mount Gower and Mount Lidgbird on Lord Howe Island and, although this breeding colony is now extinct, it is thought that some birds continue to fly about the cliffs of Mount Gower.				
Rostratula australis	Australian Painted-snipe	E	V	77037	The Australian Painted Snipe is usually found in shallow inland wetlands, either freshwater or brackish, that are either permanently or temporarily filled. The		WildNet confirms the species has been recorded within 5km of the subject site.	Moderate	Low

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Microhabitat keywords	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act						
					species has a scattered distribution throughout many parts of Australia, with a single record from Tasmania.		Wetlands do occur on-site, however, extensive field surveys were completed, and no individuals were observed. In addition, few records of the species exist in proximity to the site, with the closest being approximately 7km south-west of the site.		
Sternula nereis nereis	Australian Fairy Tern	V	-	82950	The Australian Fairy Tern nests on sheltered, sandy beaches spits and banks above the high tide level but below vegetation. The Australian Fairy Tern has been recorded in embayments of a variety of habitats including offshore, estuarine or lacustrine islands, wetlands and mainland coastlines. They are known to roost on beaches overnight.		No suitable foraging or breeding habitat occurs on-site.	Unlikely	Unlikely
Thalassarche cauta	Shy Albatross	E	V	82345	The Shy Albatross is the only albatross to breed in Australian waters and breed only within the Australasian region. Wanders from subtropical to sub-Antarctic oceans, often visiting shallower waters on the shelf and around waters. Comes close inshore, entering bays and harbours extending		No suitable foraging or breeding habitat occurs on-site.	Unlikely	Unlikely

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					offshore beyond the shelf edge; is scarce further out over pelagic depths.				
Thalassarche eremita	Chatham Albatross	E	-	64457	Breeding for the Chatham Albatross is restricted Pyramid Rock, Chatham Islands, off the coast of New Zealand. This is a marine species with principle foraging range for this species is in coastal waters off eastern and southern New Zealand and Tasmania.		No suitable foraging or breeding habitat occurs on-site.	Unlikely	Unlikely
Thalassarche impavida	Campbell Albatross	V	-	64459	The Campbell Albatross is a non-breeding visitor to Australian waters. Non-breeding birds are most commonly seen foraging over the oceanic continental slopes off Tasmania, Victoria and New South Wales. This species is a marine sea bird inhabiting sub-Antarctic and subtropical waters from pelagic to shelf-break water habitats. The Campbell Albatross breed on Campbell Island. They make their nests on tussock-covered ledges and terraces of cliffs, slopes and hills, overlooking the sea or valleys, and on the summits of rocky islets.		No suitable foraging or breeding habitat occurs on-site.	Unlikely	Unlikely
Thalassarche melanophris	Black-browed Albatross	V	-	66472	This species uses wide range of marine habitats from inshore shallows, bays and channels to the edge of the continental		No suitable foraging or breeding habitat occurs on-site.	Unlikely	Unlikely

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					shelf and beyond to pelagic ocean environs.				
Thalassarche salvini	Salvin's Albatross	V	-	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. 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 and enters harbours and bays. Salvin's Albatross nests on level or gently sloping ledges, summits, slopes and caves of rocky islets and stacks, usually in broken terrain with little soil and vegetation.		No suitable foraging or breeding habitat occurs on-site.	Unlikely	Unlikely
Thinornis cucullatus cucullatus	Hooded Plover (eastern)	V	-	90381	The hooded plover (eastern) inhabits ocean beaches, particularly wide beaches backed by dunes with large amounts of seaweed, creek mouths and inlet entrances. It may also occur on near-coastal saline and freshwater lakes and lagoons, tidal bays and estuaries, on rock platforms, or on rocky or sandy reefs close	dunes; beach	No suitable foraging or breeding habitat occurs on-site.	Unlikely	Unlikely

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					to shore. Breeds on or near beaches, with nests located on flat beaches above the high tide mark, on stony terraces adjacent to beaches, or on the sides of sparsely vegetated dunes.				
Turnix melanogaster	Black-breasted Button Quail	V	V	923	Typical habitat occurs in dry rainforest and vegetation immediately adjacent to rainforest. However, the species has also been recorded in a variety of low coastal heathlands around Fraser Island and nearby mainland. Deep leaf litter in which the species can forage appears to be particularly favoured.		The site does not contain dry rainforest or vegetation immediately adjacent to rainforest, and no heathlands are present. Deep leaf litter is also absent over the majority of the site. Field survey did not detect any evidence of the species and it is considered unlikely that this species would occur onsite.	Low	Unlikely
Fish									
Epinephelus daemelii	Black Rockcod	V	-	68449	Found on coastal reefs, estuaries and deep offshore. It is rarely seen due to its secretive nature usually found hiding in caves and under ledges.		No suitable habitat to support this species occurs on-site.	Unlikely	Unlikely
Hippocampus whitei	White's Seahorse, Crowned Seahorse, Sydney	E		66240	White's Seahorse can be found in coastal embayment and estuaries from Hervey Bay, Queensland to Sussex Inlet, New South Wales. Habitats that are considered important to this species includes natural		No suitable habitat occurs on-site.	Unlikely	Unlikely

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	Seahorse				sponge gardens, seagrass meadows and soft corals. It is also known to occur in artificial habitat include protective swimming net enclosures and jetty pylons.				
Maccullochella mariensis	Mary River Cod	E		83806	Mary River Cod are found in in Mary River system, with some specimens translocated, their preferred habitat includes deep, shaded, slow flowing pools with plenty of snags and log-piles.		No suitable habitat occurs on-site.	Unlikely	Unlikely
Frogs									
Mixophyes fleayi	Fleay's Frog	E	E	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.		The creek habitat on site is not montane rainforest and does not contain attributes to support the species breeding and life-history requirements. Thus the likelihood of this species occurring is low.	Low	Unlikely
Insects									
Argynnis hyperbius inconstans	Australian Fritillary	CE	E	88056	Most specimens have been collected from river estuaries or swampy coastal areas at or near sea level. The Australian fritillary butterfly is restricted to open, swampy, coastal areas where the larval food plant,		The site is located close to the coast and some species within the Viola plant family were located in small numbers on-site. Despite this, minimal native groundcovers exist	Low	Unlikely

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					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.		in light of the current and recent grazing regime onsite. However, a senior flora ecologist conducted targeted assessment to determine whether the larval food plant species, *Viola betonicifolia*, was present. The preferred larval food was not detected on-site. It is considered that due to the lack of critical food supply for the larval stage of the species, it is unlikely the Australian Fritillary exists onsite.		
Mammals									
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	183	The Large-eared Pied Bat roosts on sandstone cliffs and fertile woodland valley habitat within close proximity of each other. However, in South East Queensland habitat includes rainforest and moist eucalypt forest habitats at high elevations.		No suitable high elevation habitat to support this species occurs on-site.	Unlikely	Unlikely
Dasyurus maculatus maculatus	Spot-tailed Quoll	E	V	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		No suitable denning habitat to support this species occurs on-site, or in the nearby vicinity. Considering this lack of critical	Unlikely	Unlikely

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					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.		habitat, in conjunction with historical records, the closest being over 17km south-west, the species is considered unlikely to utilise the site.		
Petauroides volans *(Petauroides armillatus – NC (Animals) Regulation)*	Greater Glider	V	V	254	The Greater Glider is an arboreal nocturnal marsupial that is mostly restricted to eucalypt forests and woodlands, although it occurs in highest abundance within continuous tall, moist eucalypt forests with abundant (large) hollow-bearing trees for shelter and a variety of eucalypt species for feeding across seasons. Diet consists of eucalypt leaves, and occasionally flowers. Small home ranges and low dispersibility make this species sensitive to clearing and fragmentation, with low persistence in small forest fragments.		The impact site consists predominantly of non-remnant vegetation with remnant and regrowth specimens and woodland patches interspersed throughout. A lack of recent records of the species in conjunction with disjunct nature of suitable remnant vegetation specifically within the site, suggests the species is unlikely to utilise the site. The existence of extensive remnant vegetation within the conservation area to the west, presents a more favourable and likely locations for habitation of this species.	Low	Low

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Phascolarctos cinereus	Koala	V	V	85104	The Koala is found in a range of habitats, from coastal islands and tall eucalypt forests to low woodlands inland.		Mapped Koala habitat is mapped on-site and WildNet confirms the species has been recorded within 5km of the subject site. However, extensive field surveys targeting koalas were conducted, and no direct or indirect evidence was observed.	High	Moderate
Potorous tridactylus tridactylus	Long-nosed Potoroo	V	V	66645	The Long-nosed Potoroo inhabits coastal heaths and dry and wet sclerophyll forests. Dense understorey with occasional open areas is an essential part of habitat, and may consist of grass-trees, sedges, ferns or heath, or of low shrub of tea-trees or melaleucas. A sandy loam soil is also a common feature.		No suitable habitat is located on-site.	Unlikely	Unlikely
Pseudomys novaehollandiae	New Holland Mouse	V	V	96	Across the species' range the New Holland Mouse is known to inhabit open heathlands, open woodlands with a heathland understorey and vegetated sand dunes. The New Holland Mouse is a social animal, living predominantly in burrows shared with other individuals. The home range of the New Holland Mouse		Limited suitable habitat is located on-site The species has not been recorded within 5km of the subject site, nor was any evidence of the species detected during site assessment and systematic fauna surveys.	Unlikely	Unlikely

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					ranges from 0.44 ha to 1.4 ha. The species peaks in abundance during early to mid stages of vegetation succession typically induced by fire.				
Pteropus poliocephalus	Grey-headed Flying-fox	V	-	186	Species generally roosts in camps in trees adjacent to larger permanent watercourse. The Grey-headed flying fox requires foraging resources and roosting sites. It is a canopy-feeding frugivore and nectarivore, which utilises vegetation communities including rainforests, open forests, closed and open woodlands, Melaleuca swamps and Banksia woodlands. It also feeds on commercial fruit crops. The primary food source is blossom from Eucalyptus and related genera.		While suitable foraging vegetation occurs on-site, particularly within the small area of category B (remnant) vegetation which is dominated by *Melaleuca quinquenervia* (Broad-leaved Paperbark), the species was not detected during surveys. However, an unconfirmed species of flying was audibly detected during nocturnal surveys.	Moderate	Moderate
Xeromys myoides	Water Mouse	V	V	66	The Water mouse requires mangroves and the associated saltmarsh, sedgelands, clay pans, heathlands and freshwater wetlands. The species requires suitable nesting habitat to be in proximity to foraging habitat, which is typically in mangrove ecosystems within the intertidal zone. Essential habitat for this species is		Very limited marginal habitat is located on-site. However, this area is highly modified and utilised for cattle grazing. The site also lacks attributes required to support a population or individuals of this species, being ready access to prey items within the intertidal zone. No	Low	Unlikely

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					generally recorded within land zone 1 and land zone 2.		evidence of the species was detected during field and habitat surveys. The species has not been recorded within 5km of the subject site.		
Plants									
Acronychia littoralis	Scented Acronychia	E	E	8582	Scented Acronychia occurs in coastal areas (<2 km from the sea) in sub-littoral rainforest, usually in transitional zones between littoral rainforest and swamp sclerophyll forest, littoral and coastal cypress pine communities or on the margin of littoral forest and cleared land. Common associated tree species include Brush Box (*Lophostemon confertus*), Coast Banksia (*Banksia integrifolia*), Coast Cypress Pine (*Callitris columellaris*), Hoop Pine (*Araucaria cunninghamii*), Pink Bloodwood (*Eucalyptus intermedia*) and Broad-leaved Paperbark (*Melaleuca quinquenervia*). Scented Acronychia grows only on Quaternary geology, marine-aeolian sands on outer barrier Holocene	rainforest; quaternary; marine-aeolian sands; fringe habitat	No suitable habitat to support this species occurs on-site.	Low	Unlikely

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					dunes, inner barrier Pleistocene sands, alluvial benches of re-worked sand and alluvium close to river estuaries or low coastal hills mantled with wind-blown sand.				
Arthraxon hispidus	Hairy-joint Grass	V	V	9338	Hairy-joint grass is found in or on the edges of rainforest and in wet eucalypt forest, often near creeks or swamps, as well as woodland.	rainforest; swamp	No suitable habitat to support this species occurs on-site.	Unlikely	Unlikely
Baloghia marmorata	Marbled Balogia, Jointed Baloghia	V	V	8463	Marbled Balogia is restricted to sub-tropical rainforest at low altitude on basaltic soils with a high rainfall.		No suitable habitat occurs on-site.	Unlikely	Unlikely
Corchorus cunninghamii	Native Jute	E	E	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. It also occurs on sheltered slopes, gullies and on lower slopes, depending on the topographic position of the sclerophyll-rainforest margin.		No suitable habitat occurs on-site.	Unlikely	Unlikely

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Cryptocarya foetida	Stinking Cryptocarya	V	V	11976	The Stinking Cryptocarya is restricted to coastal sands, or if not, then close to the coast, occurring in littoral rainforest on old sand dunes and subtropical rainforests over slate and occasionally on basalt to an altitude of 150 m.		No suitable habitat to support this species occurs on-site.	Low	Unlikely
Cryptostylis hunteriana	Leafless Tongue-orchid	V	-	19533	Leafless tongue-orchid habitats include wet heath, sedgeland, grasstree plains and in woodland with scribbly gum, silvertop ash, red bloodwood and black she-oak.		Potential habitat occur on-site with some indicative species present. However, the ground layer is highly modified from cattle grazing and no individuals were detected during site surveys.	Low	Unlikely
Cupaniopsis shirleyana	Wedge-leaf Tuckeroo	V	V	3205	The Wedge-leaf Tuckeroo occurs in a variety of dry rainforest vegetation types, including vine thicket communities on hillsides, stream beds and along riverbanks at altitudes up to 550 m above sea level. This species is also likely to occur on the margins of native vegetation in scrubby urbanised areas. Predominately found on dark brown sandy loams and sandy clay loams (pH 5-7.5) and rocky scree slopes. Generally, these soils have formed from volcanic parent materials (mainly granites		No suitable habitat is located on-site.	Unlikely	Unlikely

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					and granodiorites, basalt and andesitic flows, and pyroclastics).				
Endiandra floydii	Floyd's Walnut	E	E	52955	Warm temperate, subtropical rainforest or wet sclerophyll forest with Brush Box overstorey, and in Camphor Laurel forest. The species can occur in disturbed and regrowth sites. The species generally prefers sheltered locations however it has been recorded on ridgelines, slopes, gullies and creek flats.	sheltered; creeks; forest; disturbance	This site lacks favoured habitat for the species. No records of the species within 5 km of the site under WildNet records.	Unlikely	Unlikely
Gossia gonoclada	Angle-stemmed Myrtle	E	E	78866	*Gossia gonoclada* is recorded growing along watercourses. The species prefers to grow is lowland remnant riparian rainforest and notophyll vine forest in subtropical South-east Queensland. Some have been recorded in the ecotone areas between vine forest and rainforest vegetation and that of Eucalypts.		The riparian vegetation located on-site is highly modified from grazing activities. The species has not been recorded within 5km of the subject site.	Low	Unlikely
Macadamia integrifolia	Macadamia Bush	V	V	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-		No suitable habitat to support this species occurs on-site.	Unlikely	Unlikely

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					notophyll mixed mid-high closed forest with Araucaria and Argyrodendron emergents.				
Macadamia tetraphylla	Rough-shelled Bush Nut	V	V	6581	This species generally occurs in subtropical rainforest and complex notophyll vineforest, at the margins of the forests and mixed sclerophyll forest. It occurs in restricted habitat, growing on moderate to steep hillslopes on alluvial soils at well drained sites.		No suitable habitat to support this species occurs on-site.	Unlikely	Unlikely
Persicaria elatior	Knotweed, Tall Knotweed	V	V	5831	Knotweed commonly grows in damp places including coastal areas with swampy areas, along watercourses, streams and lakes, swamp forests as well as disturbed areas. Associated species include *Melaleuca linearifolia, M. quinquenervia, Lophostemon suaveolens, Casuarina glauca, Corymbia maculate, Pseudognaphalium luteoalbum* and *Polygonum hydropiper.* Knotweed has been recorded at 7 sites in Queensland including - Cornubia wetland, 2008		WildNet confirms no specimens have been recorded within 5km of the subject site and no specimens were detected during site surveys. Limited habitat and associated species occur within the site.	Unlikely	Unlikely

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					- "end of Dulwich Street" Loganholme, 2006 - North Stradbroke Island, 1938, 2006 - South Stradbroke Island, 1997 - Ekibin Creek, 1916 - Eagle Farm, 1888				
Phaius australis	Lesser Swamp-orchid	E	-	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*).		Broad-leaved paperbark habitat occurs on-site, however, this species has not been recorded within 5km of the subject site. in addition, field surveys failed to identify any individual specimens on-site.	Low	Unlikely
Rhodamnia rubescens	Scrub Turpentine	CE	CE	15763	Known to occur from coastal districts of NSW north from Batemans Bay to		No suitable habitat is located on-site.	Unlikely	Unlikely

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					Bundaberg in Queensland. The distribution occasionally extends inland onto the escarpment up to 600 m ASL in areas with rainfall of 1000-1600 mm. Commonly occurs in all rain forest subforms except cool temperate rainforest. Species occupies a range of volcanically derived and sedimentary soils and is a common pioneer species in Eucalypt forests. Often found in wet sclerophyll associations in rainforest transition zones and Creekside riparian associations. Flowers from late winter through spring, with a peak in October and fruits appear in December in the Sydney region. Habitat is likely to include subtropical rainforests, northern warm temperate rainforests, littoral rainforest, for example.				
Rhodomyrtus psidioides	Native Guava	CE	CE	19162	Known to occur from coastal districts of NSW north from Gosford to Maryborough in Queensland. Occurrence records are typically restricted to coastal and sub-coastal areas of low elevation however the species does occur up to c. 120 km inland in the Hunter and Clarence River		No suitable habitat is located on-site.	Unlikely	Unlikely

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					catchments and along the Border Ranges. The species flowers in late spring to early summer, producing fruits in summer. Habitat is likely to include subtropical rainforests, warm temperate rainforests, littoral rainforest, and wet sclerophyll forests.				
Samadera bidwillii	Quassia	V	V	29708	Quassia commonly occurs in lowland rainforest or on rainforest margins, but it can also be found in other forest types, such as open forest and woodland. Quassia is commonly found in areas adjacent to both temporary and permanent watercourses in locations up to 510 m altitude. The species occurs on lithosols, skeletal soils, loam soils, sands, silts and sands with clay subsoils.		This species favours lowland rainforest or rainforest margins which are absent from the site, and no local records exist, and thus Quassia is unlikely to be present on site.	Low	Unlikely
Thesium australe	Austral Toadflax	V	V		Austral Toadflax is semi-parasitic on the roots of a range of grass species, notably *Themeda triandra* (Kangaroo Grass). It occurs in shrubland, grassland or woodland, often on damp sites.		Both suitable habitat and the host species, *Themeda triandra* occur on-site. However, WildNet records demonstrate the species has not been observed within 5km of the	Low	Low

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							subject site, indicating that the species is unlikely to be present.		
Reptiles									
Coeranoscincus reticulatus	Three-toed Snake-tooth Skink	V	-	59628	Three-toed Snake-tooth Skins have been found in loose, well mulched, friable soils, in and under rotting logs, in forest litter, under fallen hoop pine bark and under decomposing cane mulch. Projected foliage cover was estimated at 70-80% at two research sites. In Queensland, the species has been recorded in rainforest, closed forest, wet sclerophyll forest, tall open *Eucalyptus pilularis* forest, tall, layered open eucalypt forest and closed *Lophostemon confertus* forests. It has also been recorded in areas of extensive regrowth in heavily logged areas.		No suitable habitat occurs on-site.	Unlikely	Unlikely
Delma torquata	Collared Delma	V	V	1656	In general, the species occurs on rocky hillsides on basalt and lateritic soils supporting open eucalypt and Acacia woodland with a sparse understorey of shrubs and tussocks or semi-evergreen vine thicket.		No suitable habitat was observed throughout the assessment area, with no rocky slopes or microhabitat present on site.	Unlikely	Unlikely

**Status abbreviations are as follows: CE = Critically Endangered, E = Endangered, V = Vulnerable, NT = Near Threatened, C = Least Concern, SL = Special Least Concern, - = Not Listed.*

***Whales, Sharks and sea turtles were removed from this list due to lack of suitable marine habitat.**

Listed migratory species (not listed above)

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Migratory marine birds							
Anous stolidus	Common Noddy	825	During the breeding season, the Common Noddy usually occurs on or near islands, on rocky islets and stacks with precipitous cliffs, or on shoals or cays of coral or sand. During the non-breeding period, the species occurs in groups throughout the pelagic zone (open ocean).		No suitable habitat to support this species occurs on-site.	Unlikely	Unlikely
Apus pacificus	Fork-tailed Swift	678	This species is almost exclusively aerial and mostly occur over inland plains but sometimes above foothills or in coastal areas.		The site is considered a coastal area, however, WildNet confirms the species has not been recorded within 5km of the subject site, nor was it observed during extensive field assessment.	Low	Unlikely
Ardenna carneipes	Flesh-footed Shearwater	82404	Pairs breed on islands in burrows on sloping ground in coastal forest, scrubland, shrubland or grassland. The Flesh-footed Shearwater does not occur in any of the threatened ecological communities listed under the EPBC Act		No suitable habitat exists on site. No records of the species exist within 5 km of the site under Atlas of Living Australia.	Unlikely	Unlikely
Ardenna grisea	Sooty Shearwater	82651	The Sooty Shearwater forages in pelagic (open ocean) sub-tropical, sub-Antarctic and Antarctic waters. Birds nest in burrows or rock crevices on coastal slopes, ridges and cliff tops, in herbfields, tussock grassland or forest. Areas with waterlogged		No suitable habitat exists on site. No records of the species within 5 km of the site under Atlas of Living Australia	Unlikely	Unlikely

Scientific name	Common name	EPBC code	Habitat and Distribution	Microhabitat keywords	Likelihood of Occurrence Analysis	Desktop Likelihood of Occurrence (on-site)	Field Survey Confirmed Likelihood of Occurrence (on-site)
			or shallow soils and/or dense vegetation are avoided.				
Calonectris leucomelas	Streaked Shearwater	1077	Streaked shearwaters breed on islands off the southern Russian Far East, and Japan, east China, Korea and Taiwan. In the non-breeding season they migrate to waters off New Guinea and northern Australia and the South China Sea.		No suitable habitat to support this species occurs on-site.	Unlikely	Unlikely
Fregata ariel	Lesser Frigatebird	1012	The Lesser Frigatebird breeds on small, remote tropical and sub-tropical islands, in mangroves or bushes, and even on bare ground.		No suitable habitat to support this species occurs on-site.	Unlikely	Unlikely
Fregata minor	Greater Frigatebird	1013	The Greater Frigatebird breeds on small, remote tropical and sub-tropical islands, in mangroves or bushes and occasionally on bare ground.		No suitable habitat to support this species occurs on-site.	Unlikely	Unlikely
Sternula albifrons	Little Tern	82849	Little terns inhabit sheltered coastal environments, including lagoons, estuaries, river mouths, deltas, lakes, bays, harbours and inlets. Especially those with exposed sandbanks or sand spits as well as exposed open beaches.		WildNet confirms the species has been recorded with 5km of the subject site. However, no suitable habitat is located on-site.	Low	Low
Migratory terrestrial species							
Cuculus optatus	Oriental Cuckoo	86651	Non-breeding habitat only: monsoonal rainforest, vine thickets, wet sclerophyll forest or open Casuarina, Acacia or Eucalyptus woodlands. Frequently at edges or ecotones between habitat types		Limited marginal habitat to support this species occurs on-site as the site is highly modified. No individuals were detected during site assessments and field surveys.	Low	Low

Scientific name	**Common name**	**EPBC code**	**Habitat and Distribution**	**Microhabitat keywords**	**Likelihood of Occurrence Analysis**	**Desktop Likelihood of Occurrence (on-site)**	**Field Survey Confirmed Likelihood of Occurrence (on-site)**
Monarcha melanopsis	Black-faced Monarch	609	The Black-faced Monarch mainly occurs in rainforest ecosystems, including semi-deciduous vine thickets, complex notophyll vine forests, tropical (mesophyll) rainforest, subtropical (notophyll) rainforest, mesophyll (broadleaf) thicket/shrubland, warm temperate rainforest, dry (monsoon) rainforest and occasionally cool temperate rainforest.		WildNet confirms the species has been recorded within 5km of the subject site. However, no suitable habitat occurs on-site.	Low	Low
Monarcha trivirgatus	Spectacled Monarch	610	The Spectacled Monarchs natural habitats are subtropical or tropical moist lowland forests, subtropical or tropical mangrove forests, and subtropical or tropical moist montane forests. Its preference is for thick understorey areas.		No suitable habitat to support this species occurs on-site.	Unlikely	Unlikely
Motacilla flava	Yellow Wagtail	644	This species occupies a range of damp or wet habitats with low vegetation, from damp meadows, marshes, waterside pastures, sewage farms and bogs to damp steppe and grassy tundra.		No suitable habitat to support this species occurs on-site.	Unlikely	Unlikely
Myiagra cyanoleuca	Satin Flycatcher	612	Satin Flycatchers inhabit heavily vegetated gullies in eucalypt dominated forests and taller woodlands, and on migration occur in coastal forests, woodlands, mangroves and drier woodlands and open forests.		No suitable habitat to support this species occurs on-site.	Unlikely	Unlikely
Rhipidura rufifrons	Rufous Fantail	592	The Rufous fantail mainly inhabits wet sclerophyll forests, often in gullies dominated by Eucalypts such as *Eucalyptus microcorys*, *Eucalyptus pilularis*,		WildNet confirms the species has been recorded within 5km of the subject site.	Unlikely	Unlikely

Scientific name	**Common name**	**EPBC code**	**Habitat and Distribution**	**Microhabitat keywords**	**Likelihood of Occurrence Analysis**	**Desktop Likelihood of Occurrence (on-site)**	**Field Survey Confirmed Likelihood of Occurrence (on-site)**
			Eucalyptus resiniferia and a number of other Eucalyptus species.		However, no suitable wet sclerophyll forests are located on-site.		
Migratory wetland species							
Actitis hypoleucos	Common Sandpiper	59309	The Common Sandpiper utilises a wide range of coastal wetlands and some inland wetlands, including estuaries and deltas of streams, banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and clay pans, and occasionally piers and jetties. They are mostly found in shallow water, around muddy margins or rocky shores and sometimes in muddy areas littered with rocks or snags. The species commonly utilises mangroves for foraging and roosting but is rarely seen on mudflats. The species is a non-breeding visitor to Australia, typically present in this region during the summer months.		Very limited marginal habitat occurs on-site. However, WildNet contains no record of the species within 5km of the subject site. Extensive field surveys also failed to detect the species.	Low	Low
Arenaria interpres	Ruddy Turnstone	872	In Australasia, the Ruddy Turnstone is mainly found on coastal regions with exposed rock coast lines or coral reefs. It also lives near platforms and shelves, often with shallow tidal pools and rocky, shingle or gravel beaches. The species is a non-breeding visitor to Australia, typically present in this region during the summer months.		No suitable foraging habitat occurs on-site.	Unlikely	Unlikely

Scientific name	Common name	EPBC code	Habitat and Distribution	Microhabitat keywords	Likelihood of Occurrence Analysis	Desktop Likelihood of Occurrence (on-site)	Field Survey Confirmed Likelihood of Occurrence (on-site)
Calidris acuminata	Sharp-tailed Sandpiper	874	In Australia, the Sharp-tailed Sandpiper prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh, and beach cast algae / seaweed or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline salt lakes inland. They also occur in salt works and sewage farms. They use flooded paddocks, sedgelands and other ephemeral wetlands, but leave when they dry. They use intertidal mudflats in sheltered bays, inlets, estuaries or seashores, and also swamps and creeks lined with mangroves. The species is a non-breeding visitor to Australia, typically present in this region during the summer months.		WildNet confirms the species has been recorded within 5km of the subject site. Limited suitable habitat occurs on-site, due to the lack of emergent and fringing vegetation within the wetlands onsite. In addition,, extensive field surveys failed to identify the species, indicating it is unlikely to occur onsite.	Moderate	Low
Calidris alba	Sanderling		In Australia, the species is almost always found on the coast, mostly on open sandy beaches exposed to open sea-swell, and also on exposed sandbars and spits, and shingle banks, where they forage in the wave-wash zone and amongst rotting seaweed. Sanderlings also occur on beaches that may contain wave-washed rocky outcrops. The species is a non-breeding visitor to Australia, typically present in this region during the summer months.		No suitable foraging habitat occurs on-site.	Unlikely	Unlikely

Scientific name	**Common name**	**EPBC code**	**Habitat and Distribution**	**Microhabitat keywords**	**Likelihood of Occurrence Analysis**	**Desktop Likelihood of Occurrence (on-site)**	**Field Survey Confirmed Likelihood of Occurrence (on-site)**
Calidris melanotos	Pectoral Sandpiper	858	The Pectoral Sandpiper prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. Occasionally found further inland. The species is a non-breeding visitor to Australia, typically present in this region during the summer months.		Limited marginal foraging or habitat occurs on-site, specifically due to the lack of vegetation fringing the wetlands in light of the site's recent grazing regime. However, WildNet does not record the species within 5km of the subject site and extensive field surveys failed to identify the species.	Low	Low
Calidris ruficollis	Red-necked Stint	860	The Red-necked Stint is found in small to large flocks on sand and mudflats around fresh through to saline waterways in coastal and inland areas. This species is commonly found in the tidal mudflats and coastal wetlands of Moreton Bay. The species is a non-breeding visitor to Australia, typically present in this region during the summer months.		No suitable foraging habitat occurs on-site.	Unlikely	Unlikely
Charadrius bicinctus	Double-banded Plover	895	The Double-banded Plover is found on littoral, estuarine and fresh or saline terrestrial wetlands and also saltmarsh, grasslands and pasture. It occurs on muddy, sandy, shingled or sometimes rocky beaches, bays and inlets, harbours and margins of fresh or saline terrestrial wetlands such as lakes, lagoons and swamps, shallow estuaries and rivers. The species is sometimes associated with coastal lagoons, inland saltlakes and saltworks. This species		Marginal foraging habitat occurs on-site within open, grazed areas. However, the species has not been recorded within 5km of the subject site, nor was it detected during the extensive field surveys occurring during winter months, when it is likely to be present.	Low	Low

Scientific name	Common name	EPBC code	Habitat and Distribution	Microhabitat keywords	Likelihood of Occurrence Analysis	Desktop Likelihood of Occurrence (on-site)	Field Survey Confirmed Likelihood of Occurrence (on-site)
			benefits from grazed lands and regularly occurs within open, grazed pastures during Australian winters. The species breeds only within New Zealand and is a non-breeding migrant to Australia.				
Charadrius veredus	Oriental Plover	882	Immediately after arriving in non-breeding grounds in northern Australia, Oriental Plovers spend a few weeks in coastal habitats such as estuarine mudflats and sandbanks, on sandy or rocky ocean beaches or nearby reefs, or in near-coastal grasslands, before dispersing further inland. Thereafter they usually inhabit flat, open, semi-arid or arid grasslands, where the grass is short and sparse, and interspersed with hard, bare ground, such as claypans, dry paddocks, playing fields, lawns and cattle camps, or open areas that have been recently burnt. At the onset of the Wet Season, some may move into lightly wooded grasslands. The species is a non-breeding visitor to Australia, typically present in this region during the summer months.		No suitable foraging or breeding habitat occurs on-site.	Unlikely	Unlikely
Gallinago hardwickii	Latham's Snipe	863	Latham's Snipe occurs in permanent and ephemeral wetlands. They usually inhabit open, freshwater wetlands with low, dense vegetation. The species is a non-breeding visitor to Australia, typically present in this region during the summer months.		WildNet confirms the species has been recorded within 5km of the subject site. Limited suitable habitat occurs on-site, due to the lack of combination of open wetland with low, dense vegetation fringing the	Low	Low

Scientific name	Common name	EPBC code	Habitat and Distribution	Microhabitat keywords	Likelihood of Occurrence Analysis	Desktop Likelihood of Occurrence (on-site)	Field Survey Confirmed Likelihood of Occurrence (on-site)
					waterbodies onsite. In addition, extensive field surveys failed to identify the species, indicating a lower likelihood of occurrence.		
Gallinago megala	Swinhoe's Snipe	864	The species inhabits dense clumps of grass and rushes round the edges of fresh and brackish wetlands. This includes swamps, billabongs, river pools, small streams and sewage ponds. They are also found in drying claypans and inundated plains pitted with crab holes, grasslands, drier cultivated areas (including crops of rapeseed and wheat) and market gardens. The species is a non-breeding visitor to Australia, typically present in this region during the summer months.		Marginal foraging habitat occurs on-site due to the lack of favoured dense grasses and rushes fringing wetlands on the focal site. WildNet confirms the species has not been recorded within 5km of the subject site and no evidence of the species was detected during site assessments in January 2021.	Low	Low
Gallinago stenura	Pin-tailed Snipe	841	The Pin-tailed Snipe occurs most often in or at the edges of shallow freshwater swamps, ponds and lakes with emergent, sparse to dense cover of grass/sedge or other vegetation. The species is also found in drier, more open wetlands such as claypans; sewage ponds. Not normally in saline or inter-tidal wetlands. The species is a non-breeding visitor to Australia, typically present in this region during the summer months.		Suitable foraging habitat occurs on-site however, sheltering habitat, being fringing vegetation, is predominantly absent or minimal through the onsite wetlands. WildNet confirms the species has not been recorded within 5km of the subject site and no evidence of the species was detected during site surveys.	Low	Low

Scientific name	**Common name**	**EPBC code**	**Habitat and Distribution**	**Microhabitat keywords**	**Likelihood of Occurrence Analysis**	**Desktop Likelihood of Occurrence (on-site)**	**Field Survey Confirmed Likelihood of Occurrence (on-site)**
Limicola falcinellus	Broad-billed Sandpiper	842	The Broad-billed Sandpiper occurs in sheltered parts of the coast, favouring estuarine mudflats but also occasionally occur on saltmarshes, shallow freshwater lagoons, saltworks and sewage farms, and in areas with large soft intertidal mudflats, which may have shell or sandbanks nearby. Occasionally they occur on reefs or rocky platforms. They have also been recorded in creeks, swamps and lakes near the coast, particularly those with bare mudflats or sand exposed by receding water. They often favour mud among, or fringed by, mangroves, particularly on the seaward side and sometimes occur in estuaries edged by saltmarsh. They are rarely recorded inland. The species is a non-breeding visitor to Australia, typically present in this region during the summer months.		Marginal foraging habitat occurs on-site however favoured habitat, being tidal mud and sandflats, is absent from site. WildNet confirms the species has not been recorded within 5km of the subject site and no evidence was detected during on-site surveys.	Low	Low
Limnodromus semipalmatus	Asian Dowitcher	843	The Asian Dowitcher occurs in sheltered coastal Environments, such as embayments, coastal lagoons, estuaries and tidal creeks. They are known to frequent shallow water and exposed mudflats or sandflats. The species is a non-breeding visitor to Australia, typically present in this region during the summer months.		No suitable foraging or breeding habitat occurs on-site.	Unlikely	Unlikely

Scientific name	Common name	EPBC code	Habitat and Distribution	Microhabitat keywords	Likelihood of Occurrence Analysis	Desktop Likelihood of Occurrence (on-site)	Field Survey Confirmed Likelihood of Occurrence (on-site)
Limosa lapponica	Bar-tailed Godwit	844	The Bar-tailed Godwit is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It is found often around beds of seagrass and, sometimes, in nearby saltmarsh. It has been sighted in coastal sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats. The species is a non-breeding visitor to Australia, typically present in this region during the summer months.		No suitable foraging or breeding habitat occurs on-site.	Unlikely	Unlikely
Limosa limosa	Black-tailed Godwit	845	In Australia the Black-tailed Godwit has a primarily coastal habitat environment. The species is commonly found in sheltered bays, estuaries and lagoons with large intertidal mudflats or sandflats, or spits and banks of mud, sand or shell-grit; occasionally recorded on rocky coasts or coral islets. The species is a non-breeding visitor to Australia, typically present in this region during the summer months.		WildNet confirms the species has been recorded within 5km of the subject site. However, no suitable foraging habitat occurs on-site, with the species favouring open mud and sand flats.	Low	Low
Numenius minutus	Little Curlew	848	The Little Curlew is most often found feeding in short, dry grassland and sedgeland, dry floodplains and blacksoil plains, which have scattered, shallow freshwater pools or areas seasonally inundated. Open woodlands with a grassy or burnt understorey,		Marginal foraging habitat occurs on-site within the wetter areas along the waterway. Despite this, no evidence of the species was detected during site assessments in February 2020 and January 2021.	Low	Low

Scientific name	Common name	EPBC code	Habitat and Distribution	Microhabitat keywords	Likelihood of Occurrence Analysis	Desktop Likelihood of Occurrence (on-site)	Field Survey Confirmed Likelihood of Occurrence (on-site)
			dry saltmarshes, coastal swamps, mudflats or sandflats of estuaries or beaches on sheltered coasts, mown lawns and recreational areas are also used. The species congregates around pools, river beds and water-filled tidal channels, and shallow water at edges of billabongs. The species is a non-breeding visitor to Australia, typically present in this region during the summer months.				
Numenius phaeopus	Whimbrel	849	The Whimbrel is often found on the intertidal mudflats of sheltered coasts, in harbours, lagoons, estuaries and river deltas, often those with mangroves, but also open, unvegetated mudflats. It is occasionally found on sandy or rocky beaches, on coral or rocky islets, or on intertidal reefs and platforms. It also used saltflats with saltmarsh, or saline grasslands with standing water. There are a small number of inland records from saline lakes and canegrass swamps. The species is a non-breeding visitor to Australia, typically present in this region during the summer months.		WildNet confirms the species has been recorded within 5 km of the subject site. Favoured habitat is not present on-site. In addition, extensive field surveys failed to detect evidence of the species.	Moderate	Low
Pandion haliaetus	Osprey	952	Eastern Ospreys occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. They are mostly found		WildNet confirms the species has been recorded within 5 km of the subject site.	Moderate	Low

Scientific name	**Common name**	**EPBC code**	**Habitat and Distribution**	**Microhabitat keywords**	**Likelihood of Occurrence Analysis**	**Desktop Likelihood of Occurrence (on-site)**	**Field Survey Confirmed Likelihood of Occurrence (on-site)**
(Pandion cristatus)			in coastal areas but occasionally travel inland along major rivers.		Given the sites close proximity to the coast, there is potential for Ospreys to utilise the site. However, extensive field surveys did not detect any individuals or likely nests.		
Philomachus pugnax	Ruff	850	In Australia the Ruff is found on generally fresh, brackish of saline wetlands with exposed mudflats at the edges. It is found in terrestrial wetlands including lakes, swamps, pools, lagoons, tidal rivers, swampy fields and floodlands. They are occasionally seen on sheltered coasts, in harbours, estuaries, seashores and are known to visit sewage farms and saltworks. They are sometimes found on wetlands surrounded by dense vegetation including grass, sedges, saltmarsh and reeds. The species is a non-breeding visitor to Australia, typically present in this region during the summer months.		Marginal habitat occurs on-site however, the species typically favours wetlands with lowset, dense fringing vegetation, which is limited to wetlands within the retained corridor. However, WildNet confirms the species has not been recorded within 5km of the subject site and no evidence of the species was detected during field surveys..	Low	Low
Pluvialis fulva	Pacific Golden Plover	25545	The Pacific Golden Plover is found on mud and sandflats, coastal marshes, rocky beaches and platforms. This species is known to forage on molluscs, insects, crustaceans and spiders. The species is a non-breeding visitor to Australia, typically present in this region during the summer months.		No suitable foraging or breeding habitat occurs on-site.	Unlikely	Unlikely

Scientific name	Common name	EPBC code	Habitat and Distribution	Microhabitat keywords	Likelihood of Occurrence Analysis	Desktop Likelihood of Occurrence (on-site)	Field Survey Confirmed Likelihood of Occurrence (on-site)
Pluvialis squatarola	Grey Plover	865	In non-breeding grounds in Australia, Grey Plovers occur almost entirely in coastal areas, where they usually inhabit sheltered embayments, estuaries and lagoons with mudflats and sandflats, and occasionally on rocky coasts with wave-cut platforms or reef-flats, or on reefs within muddy lagoons. They also occur around terrestrial wetlands such as near-coastal lakes and swamps, or salt-lakes. The species is also very occasionally recorded further inland, where they occur around wetlands or salt-lakes. The species is a non-breeding visitor to Australia, typically present in this region during the summer months.		WildNet confirms the species has been recorded within 5km of the subject site. The wetlands on-site provide marginal foraging habitat for the species however, favoured habitat is typically sand flats and coastlines with roosting on exposed sandy areas. Extensive field surveys did not record the species and it is considered unlikely it would utilise the site.	Moderate	Unlikely
Tringa brevipes	Grey-tailed Tattler	851	The Grey-tailed Tattler is often found on sheltered coasts with reefs and rock platforms or with intertidal mudflats. It can also be found at intertidal rocky, coral or stony reefs as well as platforms and islets that are exposed at low tide. It has been found around shores of rock, shingle, gravel or shells and also on intertidal mudflats in embayments, estuaries and coastal lagoons, especially fringed with mangroves. The species is a non-breeding visitor to Australia, typically present in this region during the summer months.		WildNet confirms the species has been recorded within 5km of the subject site. However, no suitable habitat occurs on-site.	Low	Low

Scientific name	Common name	EPBC code	Habitat and Distribution	Microhabitat keywords	Likelihood of Occurrence Analysis	Desktop Likelihood of Occurrence (on-site)	Field Survey Confirmed Likelihood of Occurrence (on-site)
Tringa glareola	Wood Sandpiper	829	The Wood Sandpiper uses well-vegetated, shallow, freshwater wetlands, such as swamps, billabongs, lakes, pools and waterholes. They are typically associated with emergent, aquatic plants or grass, and dominated by taller fringing vegetation, such as dense stands of rushes or reeds, shrubs, or dead or live trees, especially Melaleuca and River Red Gums Eucalyptus camaldulensis and often with fallen timber. They also frequent inundated grasslands, short herbage or wooded floodplains, where floodwaters are temporary or receding, and irrigated crops. The species is a non-breeding visitor to Australia, typically present in this region during the summer months.		Marginal foraging habitat occurs on-site but is highly limited by the general lack of fringing vegetation around onsite wetlands which they are typically associated with. WildNet confirms the species has not been recorded within 5km of the subject site.	Low	Low
Tringa incana	Wandering Tattler	831	The Wandering Tattler is generally found on rocky coasts with reefs and platforms, points, spits, piers, offshore islands and shingle beaches or beds. It is occasionally seen on coral reefs or beaches, and tends to avoid mudflats. Foraging habitat is among rocks or shingle, or in shallow pools at edges of reefs or beaches, mainly along the tideline. The species is a non-breeding visitor to Australia, typically present in this region during the summer months.		No suitable foraging habitat occurs on-site.	Unlikely	Unlikely

Scientific name	**Common name**	**EPBC code**	**Habitat and Distribution**	**Microhabitat keywords**	**Likelihood of Occurrence Analysis**	**Desktop Likelihood of Occurrence (on-site)**	**Field Survey Confirmed Likelihood of Occurrence (on-site)**
Tringa nebularia	Common Greenshank	832	The Common Greenshank is found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. The species is known to forage at the edges of wetlands in soft mud or mudflats. The species is a non-breeding visitor to Australia, typically present in this region during the summer months.		Limited suitable foraging habitat occurs on-site within the wetlands proposed for retention and restoration. WildNet confirms the species has been recorded within 5km of the subject site however, extensive field surveys did not detect evidence of the species on-site.	Moderate	Low
Tringa stagnatilis	Marsh Sandpiper	833	The Marsh Sandpiper lives in permanent or ephemeral wetlands of varying salinity, including swamps, lagoons, billabongs, saltpans, saltmarshes, estuaries, pools on inundated floodplains, and intertidal mudflats and also regularly at sewage farms and saltworks. They are recorded less often at reservoirs, waterholes, soaks, bore-drain swamps and flooded inland lakes. The species is a non-breeding visitor to Australia, typically present in this region during the summer months.		Suitable foraging habitat exists on-site however, WildNet confirms the species has not been recorded within 5km of the subject site. In addition, field surveys did not detect evidence of the species.	Low	Low
Xenus cinereus	Terek Sandpiper	59300	The Terek Sandpiper mostly forages in the open, on soft wet intertidal mudflats or in sheltered estuaries, embayments, harbours or lagoons. The species has also been recorded on islets, mudbanks, sandbanks and spits, and near mangroves and occasionally in samphire.		No suitable foraging or breeding habitat occurs on-site.	Unlikely	Unlikely

Scientific name	Common name	EPBC code	Habitat and Distribution	Microhabitat keywords	Likelihood of Occurrence Analysis	Desktop Likelihood of Occurrence (on-site)	Field Survey Confirmed Likelihood of Occurrence (on-site)
			The species is a non-breeding visitor to Australia, typically present in this region during the summer months.				

Appendix C

Wildlife Online Database Search Results

Queensland Government

WildNet species list

Search Criteria: Species List for a Specified Point
Species: All
Type: Native
Queensland status: Rare and threatened species
Records: Confirmed
Date: Since 1980
Latitude: -27.6545
Longitude: 153.2955
Distance: 5
Email: madelinedooley@saundershavill.com
Date submitted: Tuesday 24 Aug 2021 13:08:02
Date extracted: Tuesday 24 Aug 2021 13:10:02

The number of records retrieved = 10

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Limnodynastidae	*Adelotus brevis*	tusked frog		V		1
animals	amphibians	Myobatrachidae	*Crinia tinnula*	wallum froglet		V		1
animals	birds	Apodidae	*Hirundapus caudacutus*	white-throated needletail		V	V	3
animals	birds	Ardeidae	*Botaurus poiciloptilus*	Australasian bittern		E	E	1
animals	birds	Cacatuidae	*Calyptorhynchus lathami lathami*	glossy black-cockatoo (eastern)		V		2
animals	birds	Rostratulidae	*Rostratula australis*	Australian painted snipe		E	E	2
animals	birds	Scolopacidae	*Calidris ferruginea*	curlew sandpiper		CR	CE	1
animals	birds	Scolopacidae	*Limosa lapponica baueri*	Western Alaskan bar-tailed godwit		V	V	4
animals	birds	Scolopacidae	*Numenius madagascariensis*	eastern curlew		E	CE	15
animals	mammals	Phascolarctidae	*Phascolarctos cinereus*	koala		V	V	464

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 (EX), Extinct in the Wild (PE), Critically Endangered (CR), Endangered (E), Vulnerable (V), Near Threatened (NT), Special Least Concern (SL) and Least Concern (C).

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

Records - The first number indicates the total number of records of the taxon (wildlife records and species listings for selected areas).
This number is output as 99999 if it equals or exceeds this value. A second number located after a / indicates the number of specimen records for the taxon.
This number is output as 999 if it equals or exceeds this value.