Biodiversity AUSTRALIA

SUSTAINABLE PARTNERSHIPS
DEDICATED TO ACHIEVING
ECOLOGICAL AND ECONOMICAL BALANCE

LEADING THE WAY
IN ENVIRONMENTAL
MANAGEMENT

ECOLOGICAL ASSESSMENT FOR SUBDIVISION MODIFICATION

RTS SUPER C/- PDA PLANNING

September 2020

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1. Background Information

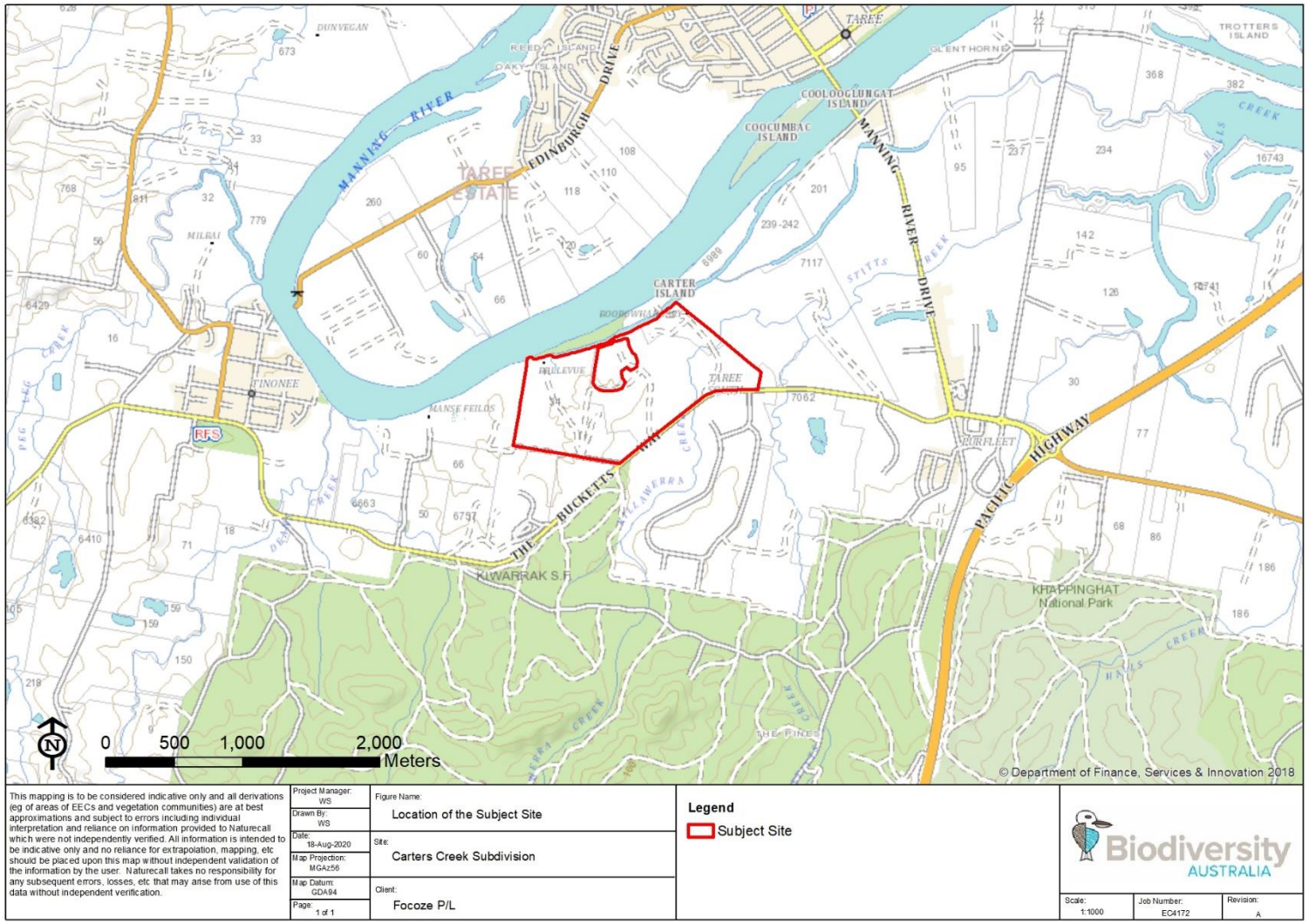
The subject land comprises Lot 53 & 54 DP 836998 and Lot 156 DP 753202 on The Bucketts Way, Tinonee (Figure 1). The land comprises a mixture of open forest, scattered trees and exotic pasture grassland.

Lewis Ecological and Orogen Environmental have undertaken flora and fauna surveys and ecological assessments over the site in 2001 and 2007 (Orogen 2007). These studies detected a number of threatened species on the site including the Koala, Brush-tailed Phascogale, Eastern Osprey and Pale Yellow Doubletail.

The subdivision was approved under the major projects pathway in 2009. A subdivision modification application is now being prepared. The modification includes several changes to the approved subdivision layout including changes to the Lot and road layout and reduced exclusion area for the Endangered Ecological Community recorded on site.

An ecological assessment is required to accompany the modification and assess any new species listed since the original approval or any changes in the site conditions. The modification needs to be assessed under Division 4, Part 7 of the Biodiversity Conservation Act. This report assesses the modification under the eight biodiversity values listed under Clause 30(2)(c) of the *Biodiversity Conservation (savings and transitional) Regulation 2017* to demonstrate if the modification will increase the impact on biodiversity values, and whether it will require preparation of a Biodiversity Development Assessment Report (BDAR).

Figure 1: Location of the subject site



2. Previous Ecological Assessment Summary

As part of a major project assessment, Orogen carried out a comprehensive flora and fauna survey and ecological assessment over the site in 2006 (Orogen 2007). This included general flora surveys, targeted surveys for threatened flora and fauna trapping surveys. A summary of the methods and results is provided in the following sections.

2.1 Survey Methods

Flora surveys consisted of the following methods:

- Aerial photograph interpretation (API).
- Random meander transects.
- Targeted searches for threatened flora.
- Vegetation mapping.

Fauna surveys were carried out in September 2006. The following table provides a summary of the field survey methods.

Table 1: Orogen 2006 fauna survey methods

Survey Method	Timing	Survey Effort
Elliot Traps-Terrestrial	19-23 Sep, 2006	400 trap nights - Elliot A
Elliot Traps-Terrestrial	19-23 Sep, 2006	160 trap nights - Elliot B
Elliot Traps-Arboreal	19-23 Sep, 2006	160 trap nights - Elliot B
Hair Traps - Terrestrial	20-28 Sep, 2006	320 small + 320 large hair trap nights
Hair Traps - Arboreal	20-28 Sep, 2006	320 Large hair trap nights
Cage Trap- Herbivorous (apple)	19-23 Sep, 2006	48 cage trap nights
Cage Trap - Predator/Feral (chicken)	19-23 Sep, 2006	48 cage trap nights
Call Playback	20-21 Sep, 2006	Two non-consecutive nights, two personnel
Spotlighting	20-21 Sep, 2006 (8hrs)	Two non-consecutive nights, two personnel
Anabat	2006 (date unknown)	
Harp Traps	20-23 Sep, 2006	6 harp trap nights (2 nets x 3 nights)
Radio Tracking	Oct-06	Tracking of 2 x Squirrel Gliders
Koala Spot Assessment Technique (KSAT)	19-21 April 2004 & 2-3 June 2004	87 SAT's or 1968 trees searched for Koala scats

2.2 Survey Results

2.2.1 Flora

The vegetation surveys in 2006 did not detect any threatened flora species that were listed at the time. An additional targeted survey in spring 2008 did however detect the threatened terrestrial orchid *Diuris flavescens* (Pale Yellow Doubletail). A significant population was recorded in the western portion of the site. The subdivision layout was changed to avoid removal of any orchids and allow for buffers.

The field surveys also record the Scrub Turpentine (*Rhodamnia rubescens*), which was listed as *Critically Endangered* under the BC Act in 2018. This species was recorded on the edge of the dry rainforest community and is not within the approved or modified development footprint.

Vegetation surveys recorded four vegetation communities across the site. These comprised the following:

1. Spotted Gum/Grey Ironbark/Small-fruited Grey Gum/White Mahogany Dry Sclerophyll Open Forest.
2. Grey Ironbark/Small-fruited Grey Gum Wet Sclerophyll Forest with Rainforest understorey.
3. Shatterwood/Red Kamala Closed Forest (Dry Rainforest).
4. Pasture Grassland (+/- Forest Red Gum Woodland/Open Woodland).

All of these communities were found to be in a modified state as a result of previous disturbances including clearing, logging, grazing and fire.

Of these communities, the dry rainforest community is likely to qualify as a Lowland Rainforest Endangered Ecological Community under both state and federal legislation.

Community number 2 qualified as the EEC *Subtropical Coastal Floodplain Forest* where it occurred on a floodplain.

2.2.2 Fauna

A total of 115 fauna species were recorded across the site, which mainly comprised bird species. Eleven of these species recorded are listed as threatened species under the NSW *Biodiversity Conservation Act*. These comprise:

- Brush-tailed Phascogale;
- Koala;
- Squirrel Glider;
- Grey-headed Flying Fox;
- Large Bent-wing Bat;
- Eastern Freetail Bat;
- Eastern Osprey;
- Red-backed Button Quail;
- Powerful Owl;
- Varied Sittella (listed as threatened since surveys); and
- Glossy Black Cockatoo.

2.3 Impact Assessment Results

The ecological assessment included a Seven Part Test of Significance to assess the impact of the development on recorded and potentially occurring threatened species and ecological communities. The Seven Part Test concluded that the development would be unlikely to result in a significant impact,

and a Species Impact Statement was not required. This conclusion was based on successful implementation of the recommendations provided.

Assessment of Matters of National Environmental Significance (MNES) determined that the development would be unlikely to result in a significant impact on federally listed threatened species.

2.4 Key Recommendations

The ecological assessment included a number of recommendations to avoid and minimise adverse impacts on threatened species and ecological communities. These include the following:

- Vegetation retention – Retain bushland areas within environmental zones.
- Subdivision design – Minimise clearing, position large Lots in the most sensitive areas of the site, minimise roads in fauna movement corridors, designation of fauna corridors, designation of revegetation and open space areas.
- Habitat enhancement, restoration and management – revegetation program to regenerate cleared areas that do not fall within Lots, planting of Koala food trees, weed management, placement of felled trees and logs for enhanced habitat structure, erection of Osprey nesting platform.
- Community awareness and participation – An environmental awareness and education program was recommended to be developed and establishment of a Koala Management Committee.
- Pre-clearing surveys – Pre-clearing surveys within clearing areas, supervision of vegetation clearing by an ecologist.

The consent for the subdivision stated that the following plans must be prepared:

- Tree and Vegetation Removal Plan.
- Habitat and Vegetation Management Plan:
  - Threatened Species Management Plan.
  - Vegetation Rehabilitation Plan.
  - Orchid Management Plan.

3. Updated Survey and Assessment Methods

Part of the ecological study to assess the modification involved an updated database search, literature review and one-day site inspection. The purpose of the site inspection was to note any changes on vegetation and habitats since the 2006 surveys, record the current site condition, confirm that no threatened plants are present in the proposed clearing/thinning areas and determine the current level of Koala activity. The methods undertaken are provided in the following sections.

3.1 Desktop Study and Literature Review

A desktop study was carried out prior to the field survey to gather relevant information and data. The following databases and Geographic Information System (GIS) layers were searched/obtained:

- Department of Environment and Energy Protected Matters Search Tool (DAWE 2020a).
- Office of Environment and Heritage NSW BioNet/Atlas of Wildlife (OEH 2020a).
- Office of Environment and Heritage Threatened Biodiversity Data Collection (OEH 2020b).
- Coastal Quaternary Geology – North Coast of NSW digital data layer (Troedson & Hashimoto 2008).
- NSW Government - Biodiversity Values Map and Threshold Tool and digital data layer (DPIE 2020).

The following literature was also reviewed:

- Flora and Fauna Assessment for Rural Residential Subdivision – Lots 53 & 54 DP 836998 and Lot 156 753202. The Bucketts Way, Tinonee (Orogen 2007).

3.2 Flora Survey

3.2.1 Threatened Flora Species

Searches for threatened flora were carried out on the subject site on the 6th August 2020. The searches were conducted in the identified clearing/thinning locations in the modified subdivision plan. The location of searches is shown in Figure 2.

Threatened plant searches for locally and regionally recorded threatened species consisted of undertaking random meanders throughout the site and parallel field traverses as per the NSW Guide to Surveying Threatened Plants (OEH 2016).

A total of four dedicated transects were conducted within the site. These traverses focused on the clearing/thinning footprints within the subject site.

Opportunistic searches for threatened flora species were also undertaken during other activities.

3.3 Fauna Survey

3.3.1 Diurnal Bird Survey

This involved passive surveys (e.g. listening for bird calls) and active observation/binocular searches while walking around the entire development site; and opportunistically during other activities. A total of two-person hours was spent on bird surveys.

3.3.2 Koala Spot Assessment Technique (SAT) surveys

One dedicated Koala survey using the Spot Assessment Technique (SAT) was conducted within the subject site to confirm current levels of Koala activity. The location is shown in Figure 2.

The SAT survey consisted of identifying a centre tree which is known to be frequented by the Koala, known to contain faecal pellets of the Koala or is likely to be considered as a potentially important tree for the Koala. In the event that a tree of this criteria was not located, a centre tree was randomly selected in an area of habitat most likely to support this species.

Once a centre tree was selected, active searches for Koala scats were undertaken under this tree and under the 29 of the nearest trees. Searches involved checking the ground and leaf litter within a one-metre radius of each tree, for a period of two minutes per tree or until a scat was found. This technique is recognised as a very efficient method of detecting Koala presence, and in some instances, is a method used to identify areas of major Koala activity/significance e.g. Core Koala Habitat (Phillips and Callahan 1995; Jurskis and Potter 1997).

Figure 2: Location of field surveys

4. Database Search and Site Survey Results

4.1 Locally Recorded Threatened Species

The following table lists the threatened flora and fauna species identified in database and literature searches of the locality.

Table 2: Locally recorded threatened species

Common Name	Scientific Name	BC Act	EPBC Act	Source
Flora				
Trailing Woodruff	*Asperula asthenes*	V	V	OEH Bionet
White-flowered Wax Plant	*Cynanchum elegans*	E	E	OEH Bionet
Pale Yellow Doubletail	*Diuris flavescens*	E	CE	OEH Bionet
Slaty Red Gum	*Eucalyptus glaucina*	V	V	OEH Bionet
Craven Grey Box	*Eucalyptus largeana*	E	E	OEH Bionet
Narrow-leaved Red Gum (Endangered population)	*Eucalyptus seeana*	E	-	OEH Bionet
-	*Maundia triglochinoides*	V	-	OEH Bionet
-	*Pterostylis chaetophora*	V	-	OEH Bionet
Scrub Turpentine	*Rhodamnia rubescens*	E	-	OEH Bionet
Native Guava	*Rhodomyrtus psidioides*	E	-	OEH Bionet
Manning Yellow Solanum	*Solanum sulphureum*	E	E	OEH Bionet
Aves				
Australasian Bittern	*Botaurus poiciloptilus*	E	E	OEH Bionet
Barking Owl	*Ninox connivens*	V	-	OEH Bionet
Bush Stone-curlew	*Burhinus grallarius*	E	-	OEH Bionet
Black Necked Stork	*Ephippiorhynchus asiaticus*	E	-	OEH Bionet
Comb-crested Jacana	*Irediparra gallinacea*	V	-	OEH Bionet
Eastern Osprey	*Pandion cristatus*	V	M	OEH Bionet Orogen 2007
Glossy Black Cockatoo	*Calyptorhynchus lathami*	V	E	OEH Bionet Orogen 2007
Little Eagle	*Hieraaetus morphnoides*	V	-	OEH Bionet
Little Lorikeet	*Glossopsitta pusilla*	V	-	OEH Bionet
Magpie Goose	*Anseranas semipalmata*	V	-	OEH Bionet
Masked Owl	*Tyto novaehollandiae*	V	-	OEH Bionet
Powerful Owl	*Ninox strenua*	V	-	OEH Bionet Orogen 2007
Red-backed Button-quail	*Turnix maculosus*	V	-	OEH Bionet Orogen 2007
Sooty Owl	*Tyto tenebricosa*	V	-	OEH Bionet
Speckled Warbler	*Chthonicola sagittata*	V	-	OEH Bionet
Spotted Harrier	*Circus assimilis*	V	-	OEH Bionet

Common Name	Scientific Name	BC Act	EPBC Act	Source
Square-tailed Kite	*Lophoictinia isura*	V	-	OEH Bionet
Swift Parrot	*Lathamus discolor*	E	E	OEH Bionet
Varied Sittella	*Daphoenositta chrysoptera*	V	-	OEH Bionet Orogen 2007
White-bellied Sea Eagle	*Haliaeetus leucogaster*	V	M	OEH Bionet
White-throated Needletail	*Hirundapus caudacutus*	-	V	OEH Bionet
Wompoo Fruit-Dove	*Ptilinopus magnificus*	V	-	OEH Bionet
Mammalia				
Brush-tailed Phascogale	*Phascogale tapoatafa*	V	-	OEH Bionet Orogen 2007
Common Planigale	*Planigale maculata*	V	-	OEH Bionet
Eastern Bent-wing Bat	*Miniopterus schreibersii oceanensis*	V	-	OEH Bionet
Eastern Free-tail Bat	*Mormopterus norfolkensis*	V	-	OEH Bionet Orogen 2007
Grey-headed Flying-fox	*Pteropus poliocephalus*	V	V	OEH Bionet Orogen 2007
Koala	*Phascolarctos cinereus*	V	V	OEH Bionet Orogen 2007
Little Bent-wing Bat	*Miniopterus australis*	V	-	OEH Bionet
Long-nosed Potoroo	*Potorous tridactylus*	V	V	OEH Bionet
New Holland Mouse	*Pseudomys novaehollandiae*	-	V	OEH Bionet
Southern Myotis	*Myotis macropus*	V	-	OEH Bionet
Spotted-Tailed Quoll	*Dasyurus maculatus*	V	E	OEH Bionet
Squirrel Glider	*Petaurus norfolcensis*	V	-	OEH Bionet Orogen 2007
Yellow-bellied Glider	*Petaurus australis*	V	-	OEH Bionet
Key: Endangered (E), Vulnerable (V), Migratory (M).				

4.2 Matters of National Environmental Significance

The results of the MNES search are provided in the table below. The search was undertaken using a ten-kilometre search radius from the subject site. See Appendix 1 for the full report.

Table 3: PMST database results

Category	Result	Description
World Heritage Properties	None	-
National Heritage Places	None	-
Wetlands of International Importance	None	-
Great Barrier Reef Marine Park	None	-
Commonwealth Marine Area	None	-
Listed Threatened Ecological Communities	3	Three listed threatened ecological communities are listed as likely to occur within the locality.

Category	Result	Description
Listed Threatened Species	61	Species or species habitat is known/likely/may occur within the locality. Three federally listed species have been recorded on site – the Koala, Grey-headed Flying Fox and Pale Yellow Doubletail.
Listed Migratory Species	43	Migratory wetland, terrestrial and marine species or species habitat is known/likely/may occur within the locality.
Other matters protected by the EPBC Act		
Commonwealth Land	5	Refer to the full report in Appendix 1 for details
Commonwealth Heritage Places	None	-
Listed Marine Species	48	Species or species habitat is known/likely/may occur within the locality.
Whales and other Cetaceans	1	Species or species habitat is known/likely/may occur within the locality.
Critical Habitats	None	-
Commonwealth Reserves - Terrestrial	None	-
Commonwealth Reserves - Marine	None	-

4.3 New Threatened Species Listings

The following species recorded within ten kilometres of the site have been listed as threatened species since the 2007 assessment:

Flora:

- Scrub Turpentine (recorded during previous surveys); and
- Native Guava.

Fauna:

- Koala - EPBC Act listing (recorded during previous surveys);
- Varied Sittella (recorded during previous surveys);
- Little Lorikeet;
- White-throated Needletail; and
- White-bellied Sea Eagle (recorded during previous surveys).

4.4 Field survey results

4.4.1 Threatened Flora Searches

The threatened flora transects did not detect any threatened flora species. The timing of the surveys was suitable to detect most of the recorded/potentially occurring species aside from the Pale Yellow Doubletail. This species is unlikely have changed its distribution since the 2007 surveys. It is however recommended that an updated targeted survey is undertaken at the appropriate timing to confirm if there are any new colonies on the site.

4.4.2 Vegetation Condition

The vegetation communities on site do not appear to have significantly changed since the previous surveys in 2007. The dry sclerophyll forest communities are still regularly slashed and exist in a modified state with limited understorey and shrub layer development (Photos 1-2). Slashing has also continued over the open/cleared areas on the site which has prevented any additional regeneration. There appears to be some additional regeneration along the creek line in the east of the site.

Evidence of the recent bushfire was noted; however, it appears that it was largely a low intensity fire and no tree mortality was noted. Vegetation in the west of the site (Photo 3) showed greater impacts from the recent bushfire. There is good regeneration of native species in the ground layer, and this is likely to be a result of the fires, followed by good rains. Satellite imagery shown in Figures 3-4 demonstrate the difference in vegetation condition since the bushfire occurred.

Photo 1: Vegetation in the central portion of the site

Photo 2: Vegetation in the northeast of the site

Photo 3: Bushfire impacted vegetation in the northwest of the site

Figure 3: Imagery of the site after a bushfire in November 2019

Figure 4: Imagery of the site in April 2020

4.4.3 Opportunistic Fauna Surveys

Opportunistic fauna surveys detected a range of bird species on the site. A total of 20 bird species were recorded, all of which have been recorded on site during previous surveys. Two mammal species (Koala and Red-necked Wallaby) and one amphibian (Common Eastern Froglet) were recorded.

Koala scats were opportunistically recorded at several locations on the site. Scats were recorded under numerous trees in the central portion of the site and were also recorded in the east of the site. Many of the scats were fresh and less than one month old.

4.4.4 Koala SAT Surveys

The Koala SAT survey recorded Koala scats under four trees, giving an activity level of 13.3%. This falls within the low activity as defied in the Orogen (2007) report. This result is similar to results in 2007 for this part of the site which recorded low to moderate activity levels. These results indicate that the habitat is still important to the local Koala population and would continue to form an area of Core Koala Habitat. Measures should be taken to retain preferred food trees where possible and implement all recommendations from the consent and previous report which relate to Koalas.

5. Assessment of Approved and Modified Subdivision

5.1 Approved Subdivision

The subdivision was assessed through the major project part 3A pathway. It was granted consent by the Minister for Planning in April 2009. The following section provides details of the approved subdivision design and layout, to allow an accurate comparison with the proposed modified subdivision.

The approved subdivision consists of 123 Lots which comprise rural residential Lots and large forested Lots containing environmental protection areas (Figure 5). The residential Lots largely occur in existing cleared areas in the east and west of the site, which has minimised the amount of vegetation that requires removal. Asset Protection Zones (APZs) are required to be established where Lots adjoin bushland areas which would require vegetation thinning in some areas. Lots in the west of the site have also been modified to allow protection of the Pale Yellow Doubletail population.

Vegetation removal associated with the approved subdivision is limited to small patches of complete vegetation removal for development envelopes and roads; and thinning over larger areas to allow for APZs. Most vegetation removal would occur in the central portion of the site, for Lots 309-311 and Lots 323-326. Figure 6 shows the extent of clearing and thinning required for the approved subdivision.

The subdivision allows for retention of most of the site vegetation, including the dry rainforest and *Subtropical Coastal Floodplain Forest* EEC. The contiguous stands of dry sclerophyll forest would be retained with only minimal clearing/thinning around the disturbed edges.

Figure 5: Approved subdivision layout plan

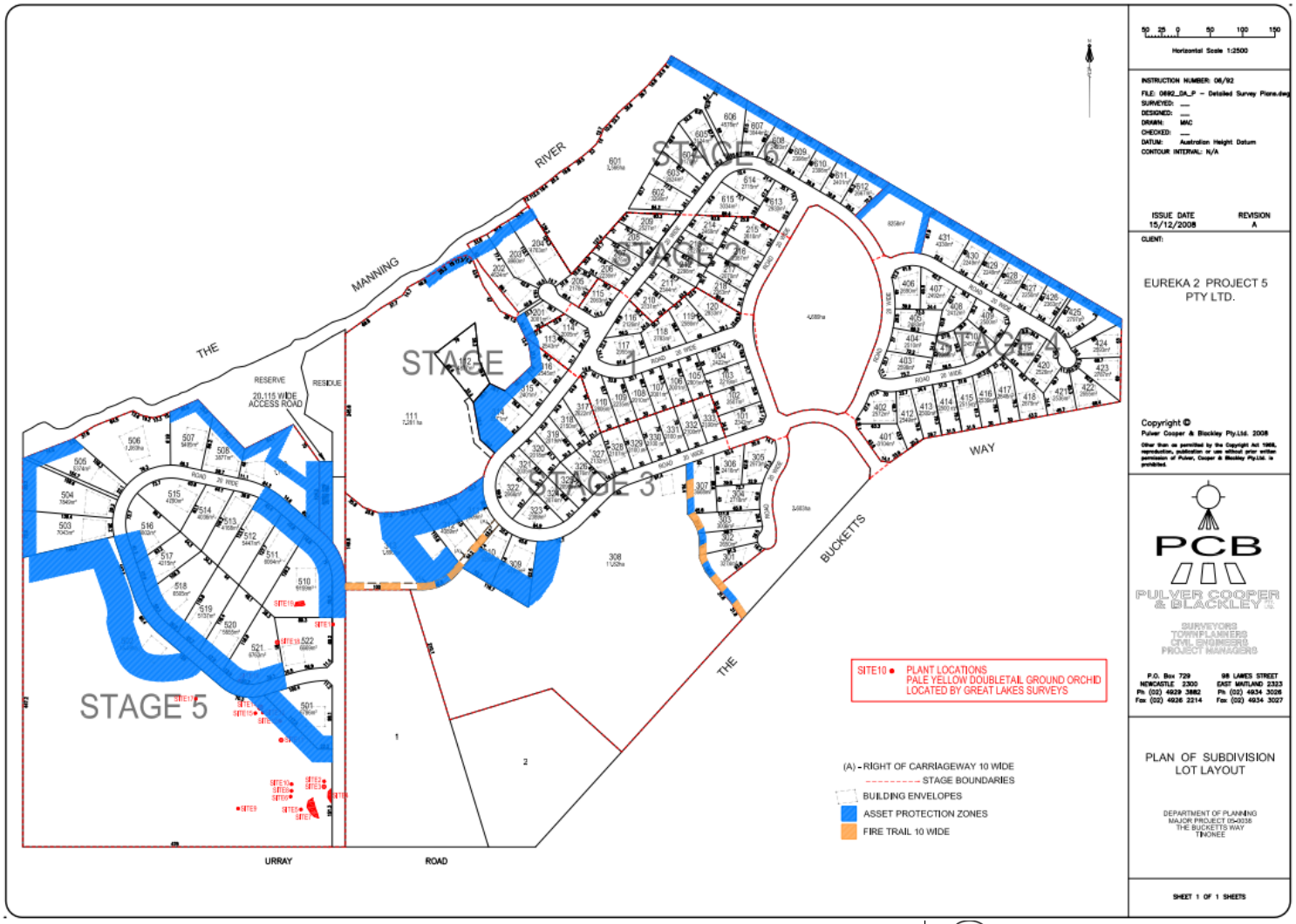
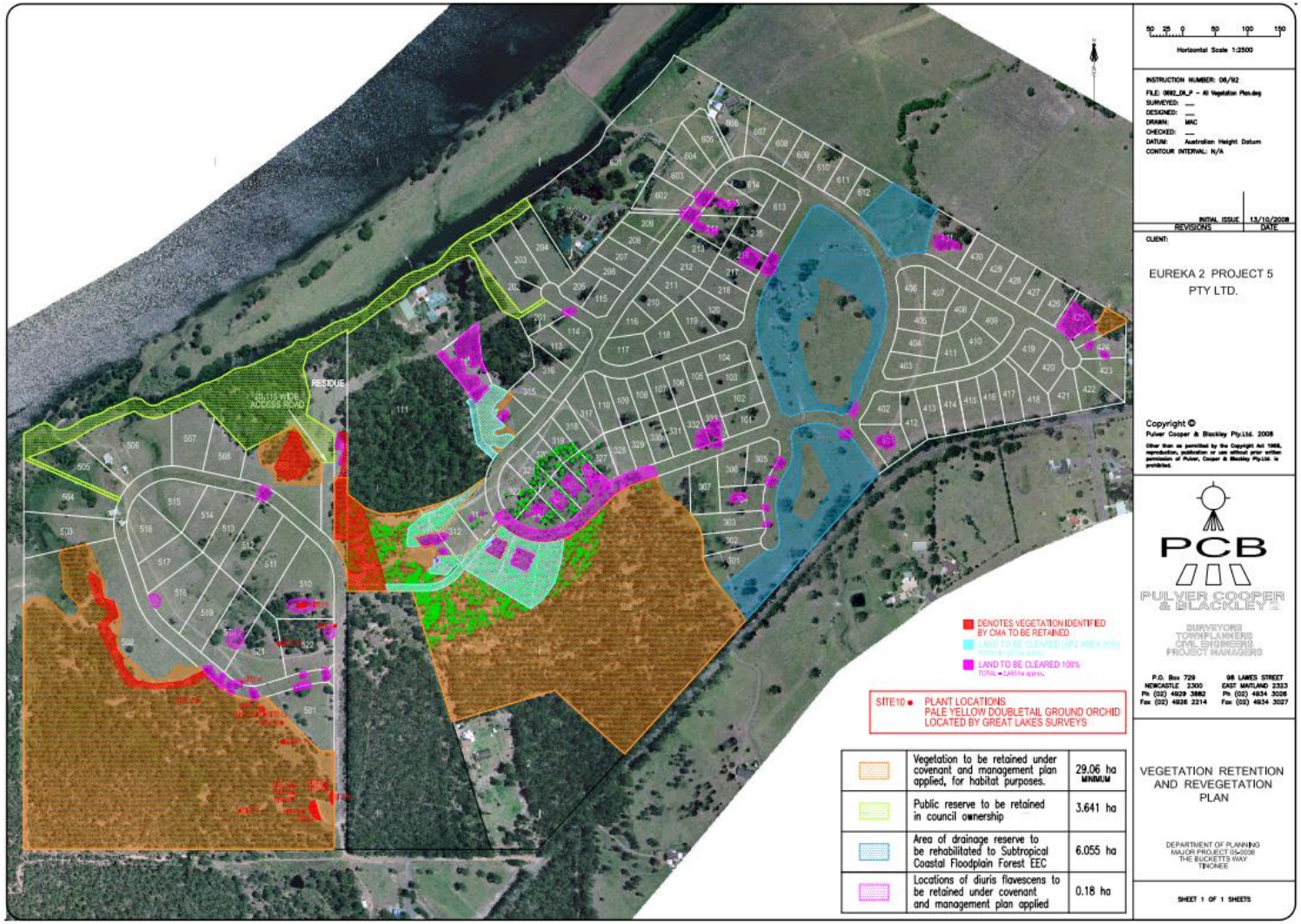


Figure 6: Approved subdivision vegetation removal plan



5.2 Modified Subdivision

The approved subdivision is proposed to be modified for a number of reasons. These include creating larger Lot sizes in line with market demands, changes in road location and Lot layout to allow for improved traffic flow and shorter roads, dedication of reserves to Council and changes to river front access. The extent of the drainage reserve and EEC rehabilitation area has also been revised based on geotechnical studies which determined the extent of the alluvial floodplain formation was less than previously determined using mapping available at the time. The overall layout plan and vegetation removal/retention plan are shown in Figures 7-8.

An overlay analysis of the approved and modified plan was undertaken in ArcGIS to accurately determine the changes in vegetation removal between the two plans. The amount of vegetation removal and thinning in the modified plan is similar to the approved plan as shown in Table 4 below. The new plan requires much less 100% clearing, however more thinning to 85% cover is required for building envelopes and Asset Protection Zones.

Although the new plan requires more thinning, this is preferable to 100% clearing as it allows retention of key habitat features such as known Koala food trees and hollow-bearing trees.

Table 4: Differences in vegetation removal/retention

Attribute	Approved Subdivision	Modified Subdivision
Number of Lots	123	115
Vegetation clearing (100%)	2.46 ha	0.8 ha
Vegetation thinning (85%)	-	3 ha
Vegetation thinning (30%)	1.9 ha	1.2 ha
Vegetation retention	29.06 ha	25.34 ha

Figure 7: Modified subdivision plan

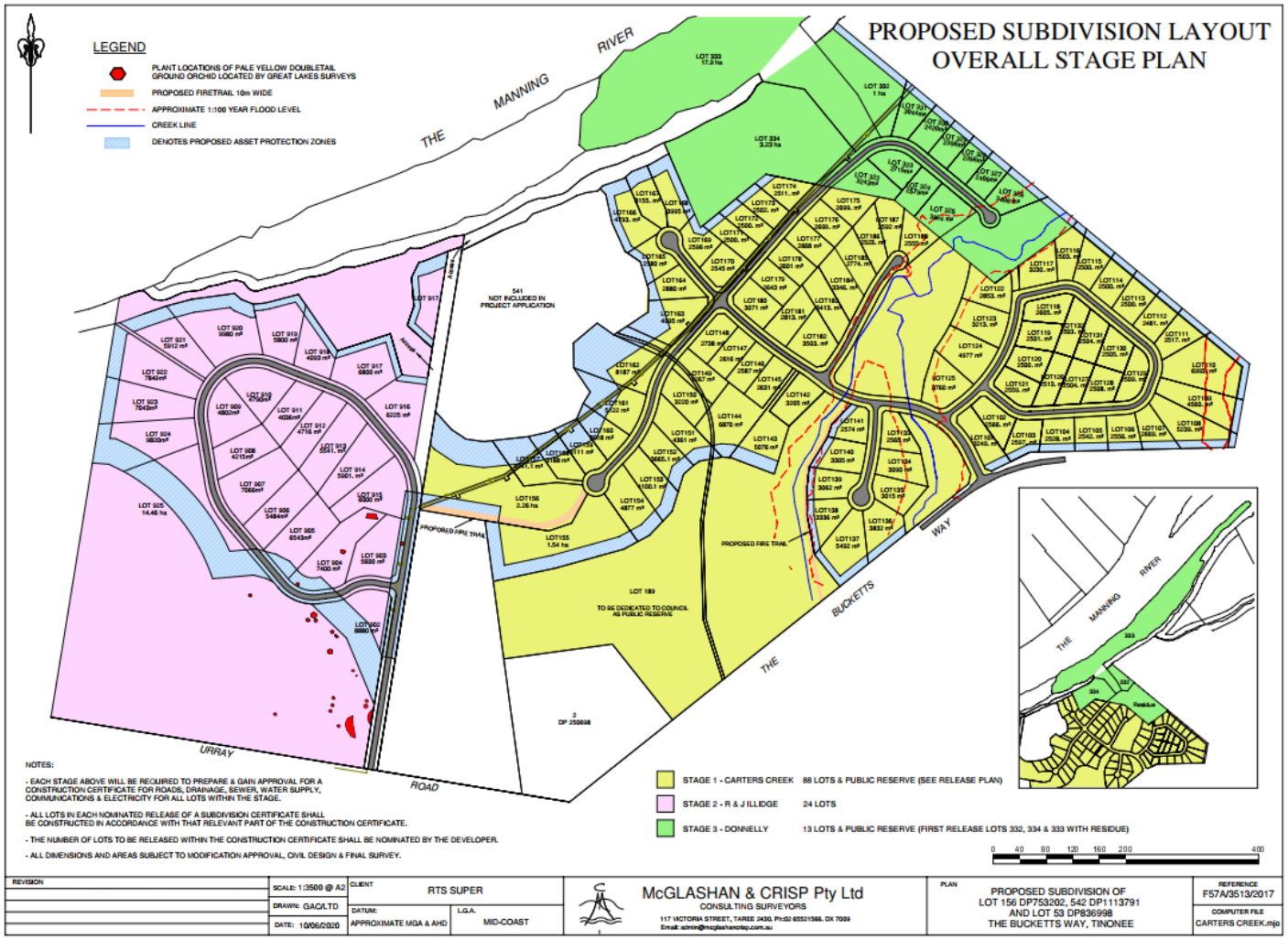
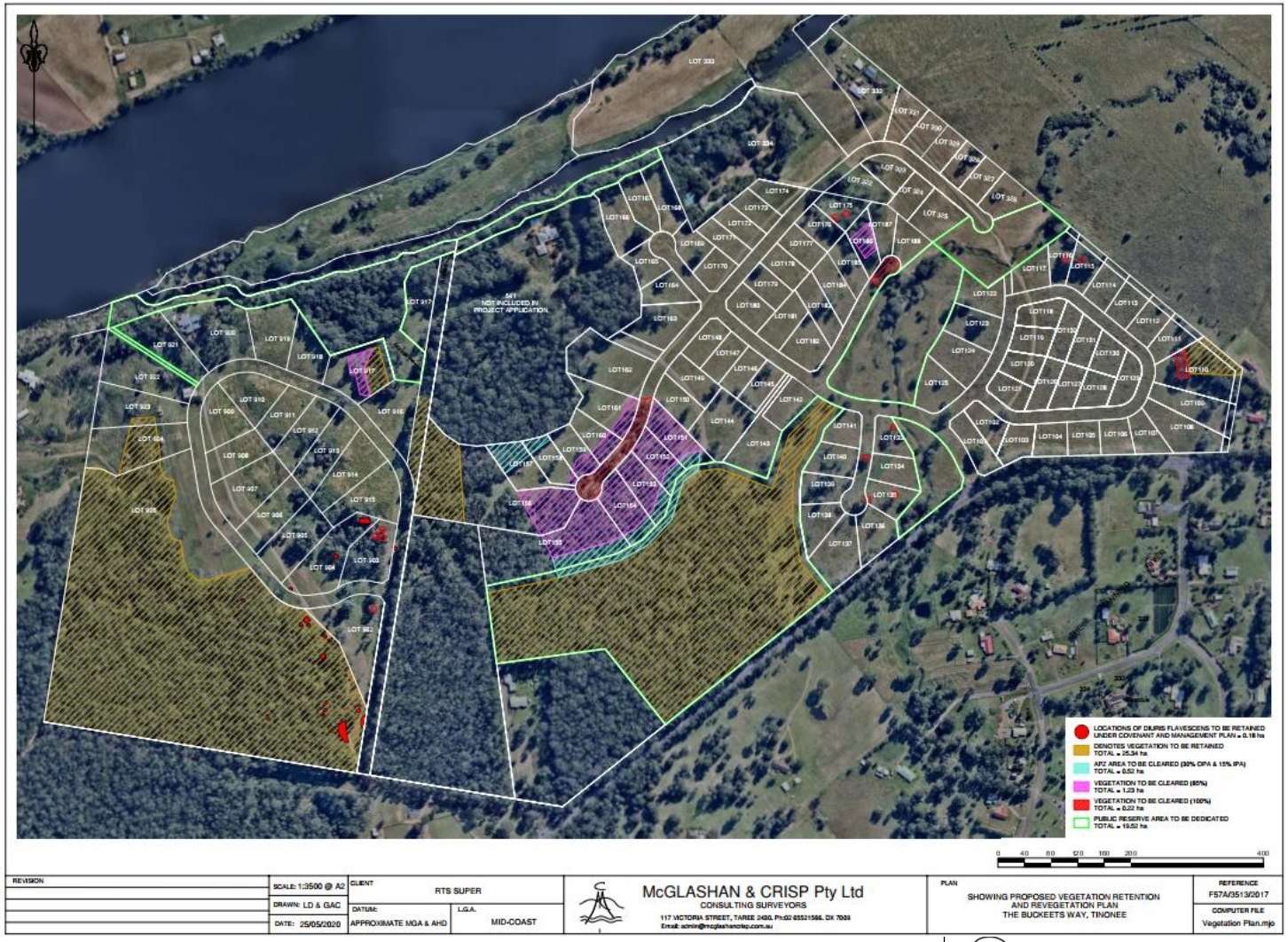


Figure 8: Vegetation removal/retention plan



5.3 Impact of the Modified Subdivision

The impact of the modified subdivision on threatened species and ecological communities is likely to be less than the approved subdivision. This is due to the lower intensity of the development (less human presence and associated anthropogenic impacts) and the flexibility in retaining habitat features in the thinning areas versus complete removal with the approved subdivision. The updated road design which features more cul-de-sacs is also likely to reduce driver speeds which will see a lower risk of road strike for the Koala and other fauna species.

The changes to the public reserve layout in the south of the site also allows for a dedicated corridor between the main patch of forest and the floodplain EEC area to the west which will be rehabilitated. This, in turn improves the east-west connectivity through the entire development site. In the approved subdivision layout, the EEC reserve area is directed towards the Bucketts Way along the southern boundary. This would direct fauna towards this busy road and result in an increased road strike hazard, especially once this area regenerates.

A discussion of impacts relating to threatened species is provided in the following section.

5.3.1 Impact on New Threatened Species Listed

The literature review and database search has found that there are three previously recorded species that are now listed as threatened species. The Koala has now also ben listed as *Vulnerable* under the EPBC Act. A further three locally recorded species are likely to be potential occurrences based on presence of suitable habitat and local records.

Of these species listed since the 2007 assessment, the Koala, Scrub Turpentine, Varied Sittella and White-belled Sea Eagle were recorded on site during previous surveys. The Scrub Turpentine was recorded on the edges of the dry rainforest community in the north of the site. This area will not be impacted by the approved or modified subdivision, and no Scrub Turpentine were recorded in the clearing/thinning footprint during the updated threatened flora searches.

The Native Guava could potentially occur on the site; however, it was not recorded during previous surveys nor was it identified within the footprint during the updated threatened flora searches. Therefore, it is unlikely that the development would directly impact this species.

Aside from the Koala, all of the new fauna species listings comprise birds, and the Varied Sittella and White-bellied Sea Eagle have been previously recorded on the site. There is no foraging habitat fir the White-bellied Sea Eagle on the site, and no nest sites have been recorded. The modified subdivision is therefore likely to have little consequence on this species. The Varied Sittella could potentially be impacted, however given the large extent of suitable habitat that will be retained on the site, it is likely to be able to successfully forage and breed in the residual habitat post development. The Little Lorikeet and White-throated Needletail are unlikely to be adversely affected given the minor extent of potential habitat that will be removed and that many of the potential breeding hollows for the Little Lorikeet are likely to be retained in the APZ and thinning zones.

An assessment of Significance would readily determine that the modified subdivision would be unlikely to result in a significant impact on these species. A Koala referral assessment under the Koala Referral Guidelines (Department of the Environment 2014) is provided in the following section.

5.3.2 Impact on Koala Population

The updated survey determined that Koalas are still actively using the site habitat despite the recent drought and bushfires. Koala activity was recorded in the central and eastern portion of the site in areas that are proposed to be cleared and thinned.

The subdivision modification will result in a similar impact on vegetation, however there will be less area to be completely cleared, and more areas will be subject to thinning to 85% cover and 30% cover. This is likely to benefit the Koala population as it will allow more preferred Koala food trees to be retained. The change to the road and public reserve layout are also likely to result in less risk of road strike and better connectivity through the site.

5.3.3 Koala Referral Assessment

The habitat on site has been assessed using the Koala habitat assessment tool from the EPBC Act Referral Guidelines (Department of the Environment 2014). To qualify as critical habitat, it must score five or more. This is shown in the following table:

Table 5: Koala habitat assessment

Attribute	Score	Reason	
Koala Occurrence	2	Desktop	A number of records occur within 2 km of the site on Bionet Atlas.
		On-ground	Koalas recorded on site during this and previous surveys
Vegetation structure and composition	2	Desktop	N/A
		On-ground	The site contains open forest with several recognised Koala food trees.
Habitat connectivity	2	Site is part a contiguous landscape which is >500 ha.	
Key existing threats	1	Desktop	OEH Bionet contains records of Koala road kill in the locality
		On-ground	Domestic dogs and roads in surrounding rural-residential areas would be a likely threat to local Koalas.
Recovery value	1	It is uncertain if the habitat to be removed is important for achieving the interim recovery objectives for the Koala. The following are factors contributing to this: • Very minor extent of foraging resources in the development footprint in the context of the large areas of habitat in surrounding areas. • Presence of Core Koala Habitat. • Connectivity through the study area will remain so local movements unlikely to be impacted by tree removal. • There is a risk of car strike and dog attack in the study area.	
Total	8	Site qualifies as critical habitat.	

As per the Koala habitat assessment tool, the site qualifies as critical habitat. An assessment has been undertaken to determine if the proposal will adversely affect this habitat and/or interfere substantially with the recovery of the Koala and require referral to the Minister.

The following table derived from the Koala Referral Guidelines (Department of the Environment 2014) assesses whether the proposal is likely to adversely affect habitat critical to the survival of the Koala.

Table 6: Critical habitat assessment

Attribute	Response	Reason
Does impact area contain habitat critical to the survival of the Koala?	Yes	Site scores eight as per the Koala habitat assessment tool, qualifying it as critical habitat.
Do the areas proposed to be cleared contain known Koala food trees?	Yes	Habitat to be removed contains preferred food trees.
Are you proposing to clear ≤2 ha of habitat containing known Koala food trees in an area with a habitat score of ≤5?	No	Proposal will require clearing and thinning of approximately 5 ha of habitat in an area with a habitat score of eight.
Are you proposing to clear ≥20 ha of habitat containing known koala food trees in an area with a habitat score of ≥8?	No	Proposal will require clearing and thinning of approximately 5 ha of habitat in an area with a habitat score of eight.
Outcome	Impact uncertain, further assessment required.	

5.3.4 Assessment of Significance Criteria

The MNES, Significant Impact Guidelines 1.1 (Department of the Environment 2013) define an action is as likely to have a significant impact on a vulnerable species, if it will:

- lead to a long-term decrease in the size of an important population of a species;
- reduce the area of occupancy of an important population;
- fragment an existing important population into two or more population;
- adversely affect habitat critical to the survival of a species;
- disrupt the breeding cycle of an important population;
- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;
- result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat;
- introduce disease that may cause the species to decline; or
- interfere substantially with the recovery of the species.

An *important population* is defined under the MNES Significant Impact Guidelines 1.1 (Department of the Environment 2013) as one that is necessary for a species' long-term survival and recovery. This includes such populations as:

- key populations either for breeding or dispersal;
- populations that are necessary for maintaining genetic diversity; and or
- populations that are near the limit of the species range.

According to the MNES, Significant Impact Guidelines 1.1 (Department of the Environment 2013), *critical habitat* refers to areas critical to the survival of a species or ecological community and may include areas that are necessary for/to:

- activities such as foraging, breeding, roosting or dispersal;

- succession;
- maintain genetic diversity and long-term evolutionary development; or
- reintroduction of populations or recovery of the species/community.

The following sections address the significant impact criteria listed above.

5.3.4.1 Assessment of Significance: Koala

Koala (*Phascolarctos cinereus*)

EPBC Act Status: Vulnerable

Distribution

The listed species range for the Koala is from north-eastern Queensland to the Victorian border, however as a result of translocations, a number of populations can be found outside of this range (DAWE 2020b). In NSW, the distribution of the Koala extends as far west as the Darling River Plains, Cobar Peneplain and Murray-Darling Depression bioregions (DAWE 2020b).

Koala distribution is highly dependent on altitude (<800 metres above sea level), temperature and in some instances, leaf moisture (DAWE 2020b).

The Threatened Species Scientific Committee estimated that the Koala population between 1990 and 2010 in NSW declined at a rate of 33%, with numbers falling from 31,400 to 21,000. These numbers predicted to be much fewer currently (DAWE 2020b).

Threats

The key existing threats to the Koala are ongoing habitat loss and fragmentation, vehicle strike and predation by the domestic/feral dog. The Australian Government also recognises the significant threat of extreme environmental conditions (i.e. extreme heat, drought, fire) and disease (in particular Chlamydia infections and Koala Retrovirus) to the Koala (DAWE 2020b).

Survey Results

The Koala was detected within the subject site during the 2007 surveys, and also recently as part of this updated assessment. The site contains areas of Core Koala Habitat as evidenced by Koala sightings and medium to high activity levels.

Important Population Assessment

The local Koala population may represent an important population of this species due to its role in maintaining local genetic diversity and breeding/dispersal. The subject site does not fall in the limit of this species' range.

Significant Impact Criteria

Table 7: Significant impact assessment - Koala

Significant Impact Criteria	Details
a) Lead to a long-term decrease in the size of an important population of a species	The habitat within the subject site provides a significant extent of foraging resources for the local population along with secondary functions such as refuge and connectivity. This habitat is largely centred on the stands of bushland on site. The subdivision will require removal of some Koala habitat, however this comprise habitat on the edges of the large bushland areas and scattered patches of vegetation. The main area of habitat removal is in the central portion of the site. Overall, approximately 0.8 ha of habitat will require complete removal, with a further 4.2 ha to be thinned for new Lots and Asset Protection Zones. The overall result is a minor reduction of the site's foraging resources. There will be over 25 ha of retained habitat within the site which will continue to provide foraging and breeding habitat for the local Koala population. The proposal has aimed to reduce the loss of Koala food trees by situating most of the new Lots in existing cleared areas and recommendations to retain KFTs in the thinning areas. Habitat connectivity for Koalas has also been considered in the development design and Koala corridors will be established through the site. While the removal of Koala habitat is a negative impact, given that the majority of Koala food trees and habitat on the site will remain post development, and potential new threats can be managed through a raft of specific mitigation measures, the proposal is considered unlikely to lead to a direct reduction in the size of the important population in the long term.
b) Reduce the area of occupancy of an important population	The proposal will remove approximately 0.8 ha of Koala habitat, with thinning occurring across 4.2 ha. In the context of the large areas of habitat that will be retained on site, and the habitats that occur in adjoining and nearby lands, the removal of this habitat in the development footprint is unlikely to reduce in the area of occupancy for the local population. Significant areas of currently degraded habitat on site will also be revegetated which will help offset the loss of habitat.
c) Fragment an existing important population into two or more populations	The Koala is relatively mobile though is highly susceptible to threats such as dog attack and vehicle strike. Koala movement across the proposed development area will remain, as will existing linkages to adjacent habitat. Given these factors, there is no potential for fragmentation or isolation of an important population.
d) Adversely affect habitat critical to the survival of a species	As demonstrated previously, the site qualifies as critical habitat for the Koala. To determine if the proposal is likely to adversely affect this habitat (and thus require a referral) the proposed development has been assessed against the following factors (DoE 2014): • *The score calculated for the impact area*: The site scored eight out of a possible ten. This is due to the presence of the Koala on site, the presence of preferred Koala food trees on site and the sites connectivity to larger areas of habitat nearby. • *Amount of Koala habitat being cleared*: The proposal will remove approximately 0.8 ha of habitat, with thinning occurring over 4.2 ha. The best potential habitat on the site will be retained in the bushland areas which will be dedicated to Council as a reserve. Koala food trees can be selectively retained in the thinning areas which will allow these areas to continue to provide foraging resources. • *Method of clearing*: The thinning/APZ zones can be selectively cleared to retain Koala food trees. KFTs should be marked and surveyed on a plan to facilitate maximum retention. It is recommended that an ecologist conducts pre-clearing surveys for Koalas prior to vegetation removal and remains on site during clearing to ensure Koalas do not enter the clearing area. • *The density or abundance of Koalas*: There is a high number of Koala records in the locality. Within the site, several Koalas were observed in the 2007 surveys and SAT surveys found many areas with moderate to high activity levels. This indicates there is a resident population on the site and surrounding areas which may comprise 3-4 Koalas. • *Level of fragmentation caused by the clearing*: The clearing and thinning areas are located on the edges of the large forest stands as well as isolated trees and small patches of vegetation. This will lead to a minor increase in fragmentation, however no contiguous stands of habitat or movement corridors will be fragmented by the subdivision. The development layout has allowed for continued connectivity through the site for Koalas and other fauna. Given the above, the proposal is not considered to significantly affect habitat critical to the survival of the Koala.

Significant Impact Criteria	Details
e) Disrupt the breeding cycle of an important population	The development will reduce the extent of available habitat within the Koalas home range, but the majority of Koala food trees and Core Koala Habitat will remain on the development site. Post development, the remaining habitat on the site and adjoining would be expected to be sufficient to maintain viability of the population.
f) Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The extent of vegetation/habitat loss associated with the modified subdivision is not expected to affect a population of the Koala to the point it could cause a decline. Large areas of high quality habitat will remain on site which will continue to support the population and maintain viability.
g) Result in invasive species, that are harmful (by competition, modification of habitat, or predation) to a Vulnerable species, becoming established in the Vulnerable species' habitat	No new species that affects the Koala is likely to be introduced as a direct result of the proposal. Dogs would already be present on the site, and while the development may lead to an increase in dogs, this is not a new threat and the consent includes measures to keep dogs away from areas of Core Koala habitat on the site.
h) Introduce a disease that may cause a species to decline	No disease that poses a potential risk to this species is likely to be introduced to the site.
i) Interferes substantially with the recovery of the species	The proposal will result in the removal of a relatively small area of foraging habitat for the Koala that is not significant enough to interfere with its recovery.
Resulting Impact	**Significant impact unlikely - referral not recommended.**

6. Additional Recommendations

All recommendations provided in the Orogen 2007 ecological assessment and the subdivision consent are still considered appropriate. Three additional recommendations are provided.

6.1 Koala Food Tree and Hollow-bearing Tree Mark-up and Survey

The clearing/thinning footprint of the modified subdivision should be pegged on site by a surveyor. It is recommended that an ecologist carries out a tree marking survey within the footprint to identify all preferred Koala food trees and hollow-bearing trees. These should then be surveyed by a registered surveyor and shown on the development plan. This will allow for these features to be retained where possible in the thinning and APZ areas.

6.2 Tree Retention in APZ

Vegetation removal for the APZ/thinning zones is to selectively retain the following trees in this order:

- Hollow-bearing Trees.
- Tallowwood, Forest Red Gum and Grey Gum (preferred Koala food trees).
- Bloodwoods (sap tree for Squirrel Glider).

Non-Koala/habitat trees and undergrowth should be removed first to achieve canopy separation in the APZ. Trees with branches that connect with other tree canopies may also be pruned, reducing the need to remove the entire tree to achieve canopy separation.

6.3 Updated Orchid Survey

An updated survey for the Pale Yellow Doubletail is recommended to be undertaken in September 2020 to confirm its current distribution and if any new colonies have established. The reference population should first be checked to confirm the timing of the local flowering event.

7. Conclusion

This report has assessed the proposed subdivision modification application for Caters Creek Estate on the Bucketts Way, Tinonee. The subdivision was approved in 2009, however a modification is now being lodged which contains a number of changes in the layout.

Analysis of the approved subdivision and the modification has determined that the modified layout is likely to have less impacts on biodiversity. It will allow for enhanced fauna connectivity across the site, less risk of fauna road strike and a greater number of habitat features can be retained in the area now subject to vegetation thinning rather than complete removal under the approved plan. The modified plan now has fewer Lots on the site which will reduce the level of potential anthropogenic impacts to some degree.

An updated site survey did not record any threatened plants in the proposed clearing/thinning areas. Searches for Koala scats and an SAT survey found that the site is still being actively used by Koalas and would comprise Core Koala Habitat.

There have been several new relevant threatened species listings since the 2007 ecological assessment. Assessment of these species determined that the subdivision would be unlikely to result in any significant adverse impacts given the minor level of vegetation removal required in the context of the retained vegetation on site which will form part of a reserve dedicated to Council.

Three additional recommendations have been provided which will assist in the retention of Koala food trees and hollow bearing trees and provide an update on the status and distribution of the Pale Yellow Doubletail population known to occur on the site.

8. References

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A-1 Protected Matters Search Tool Results

Australian Government
Department of the Environment and Energy

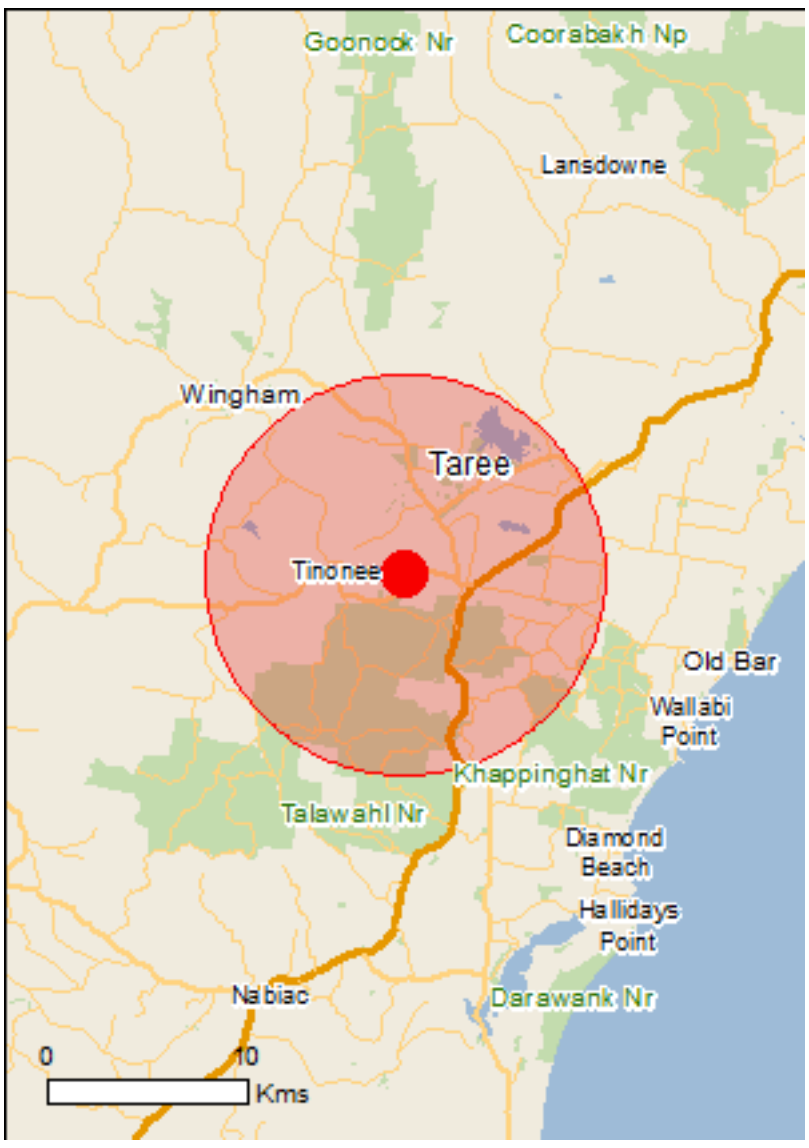
EPBC Act Protected Matters Report

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

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

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

Report created: 19/08/20 12:47:21



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

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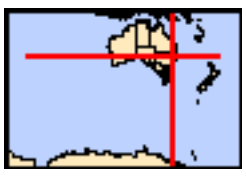

Summary

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:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	61
Listed Migratory Species:	43

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:	5
Commonwealth Heritage Places:	None
Listed Marine Species:	48
Whales and Other Cetaceans:	1
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

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

State and Territory Reserves:	6
Regional Forest Agreements:	1
Invasive Species:	39
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

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 likely to 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	Foraging, feeding or related behaviour likely 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
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Species or species habitat likely to occur within area
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Species or species habitat likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat likely to occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat likely to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	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
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 likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat likely to occur

Name	Status	Type of Presence within area
Thinornis cucullatus cucullatus Hooded Plover (eastern), Eastern Hooded Plover [90381]	Vulnerable	Species or species habitat may occur within area
Fish		
Epinephelus daemelii Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat likely to occur within area
Frogs		
Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat known to occur within area
Mixophyes balbus Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat likely to occur within area
Mixophyes iteratus Giant Barred Frog, Southern Barred Frog [1944]	Endangered	Species or species habitat may occur within area
Mammals		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat known to occur within area
Petrogale penicillata Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat likely to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Potorous tridactylus tridactylus Long-nosed Potoroo (SE Mainland) [66645]	Vulnerable	Species or species habitat known to occur within area
Pseudomys novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat known to occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
Plants		
Arthraxon hispidus Hairy-joint Grass [9338]	Vulnerable	Species or species habitat likely to occur within area
Asperula asthenes Trailing Woodruff [14004]	Vulnerable	Species or species habitat known to occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat may occur within area
Cynanchum elegans White-flowered Wax Plant [12533]	Endangered	Species or species habitat known to occur within area

Name	Status	Type of Presence
Diuris flavescens Pale Yellow Doubletail, Wingham Doubletail [55075]	Critically Endangered	Species or species habitat known to occur within area
Eucalyptus glaucina Slaty Red Gum [5670]	Vulnerable	Species or species habitat known to occur within area
Eucalyptus largeana Craven Grey Box [18581]	Endangered	Species or species habitat may occur within area
Euphrasia arguta [4325]	Critically Endangered	Species or species habitat may occur within area
Macadamia integrifolia Macadamia Nut, Queensland Nut Tree, Smooth-shelled Macadamia, Bush Nut, Nut Oak [7326]	Vulnerable	Species or species habitat may occur within area
Melaleuca biconvexa Biconvex Paperbark [5583]	Vulnerable	Species or species habitat may occur within area
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat likely to occur within area
Phaius australis Lesser Swamp-orchid [5872]	Endangered	Species or species habitat may occur within area
Solanum sulphureum [87381]	Endangered	Species or species habitat known to occur within area
Syzygium paniculatum Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub Cherry, Creek Lilly Pilly, Brush Cherry [20307]	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	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	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

Name	Threatened	Type of Presence within area
[Apus pacificus](#) Fork-tailed Swift [678]		Species or species habitat likely to occur within area
[Ardenna grisea](#) Sooty Shearwater [82651]		Species or species habitat likely to occur within area
[Calonectris leucomelas](#) Streaked Shearwater [1077]		Species or species habitat may occur within area
[Diomedea antipodensis](#) Antipodean Albatross [64458]	Vulnerable	Species or species habitat likely to occur within area
[Diomedea epomophora](#) Southern Royal Albatross [89221]	Vulnerable	Species or species habitat likely to occur within area
[Diomedea exulans](#) Wandering Albatross [89223]	Vulnerable	Species or species habitat likely to occur within area
[Diomedea sanfordi](#) Northern Royal Albatross [64456]	Endangered	Species or species habitat likely to 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
[Thalassarche bulleri](#) Buller's Albatross, Pacific Albatross [64460]	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
[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 likely to occur within area
[Thalassarche steadi](#) White-capped Albatross [64462]	Vulnerable	Species or species habitat likely to occur within area

Name	Threatened	Type of Presence
Migratory Marine Species		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat may 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
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat may occur within area
Sousa chinensis Indo-Pacific Humpback Dolphin [50]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat 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
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species

Name	Threatened	Type of Presence
		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
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
[Pandion haliaetus](#) Osprey [952]		Breeding known to occur within area
[Tringa nebularia](#) Common Greenshank, Greenshank [832]		Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

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

Name
Commonwealth Land - Australian Postal Corporation
Commonwealth Land - Australian Telecommunications Commission
Commonwealth Land - Commonwealth Trading Bank of Australia & Harold W J Cowa
Commonwealth Land - Defence Housing Authority
Defence - TAREE GRES DEPOT ; MACQUARIE DEPOT-41 RNSWR-TAREE

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
[Apus pacificus](#) Fork-tailed Swift [678]		Species or species habitat likely to occur within area
[Ardea alba](#) Great Egret, White Egret [59541]		Species or species habitat known to occur within area
[Ardea ibis](#) Cattle Egret [59542]		Species or species habitat may occur within area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
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
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Species or species habitat likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Species or species habitat likely to occur within area
Diomedea gibsoni Gibson's Albatross [64466]	Vulnerable*	Species or species habitat likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat likely to 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 may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
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
Pachyptila turtur Fairy Prion [1066]		Species or species habitat likely to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Puffinus griseus Sooty Shearwater [1024]		Species or species habitat likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	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
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 likely to occur within area
Thalassarche sp. nov. Pacific Albatross [66511]	Vulnerable*	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat likely to occur within area
Thinornis rubricollis rubricollis Hooded Plover (eastern) [66726]	Vulnerable*	Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species

Name	Threatened	Type of Presence
		habitat may occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Species or species habitat known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Species or species habitat known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Species or species habitat may occur within area

Whales and other Cetaceans		[Resource Information]
Name	Status	Type of Presence
Mammals		
Sousa chinensis Indo-Pacific Humpback Dolphin [50]		Species or species habitat likely to occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Coocumbac Island	NSW
Forestry Management Areas in Taree (FMZ2)	NSW
Khappinghat	NSW
Khappinghat	NSW
Talawahl	NSW
Talawahl	NSW

Regional Forest Agreements	[Resource Information]

Note that all areas with completed RFAs have been included.

Name	State
North East NSW RFA	New South Wales

Invasive Species	[Resource Information]

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

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species

Name	Status	Type of Presence
		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
Turdus merula Common Blackbird, Eurasian Blackbird [596]		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
Equus caballus Horse [5]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		

Name	Status	Type of Presence
Alternanthera philoxeroides Alligator Weed [11620]		Species or species habitat likely to occur within area
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		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
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Asparagus plumosus Climbing Asparagus-fern [48993]		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 likely to occur within area
Chrysanthemoides monilifera subsp. rotundata Bitou Bush [16332]		Species or species habitat likely to occur within area
Dolichandra unguis-cati Cat's Claw Vine, Yellow Trumpet Vine, Cat's Claw Creeper, Funnel Creeper [85119]		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
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding Pine [20780]		Species or species habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		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

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

-31.93839 152.44375

Acknowledgements

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

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

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

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

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